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SUPSI

FINAL REPORT – Sub-project 1.1 Work package 1 –

The communication of quality indicators data in residential long-term care:

A rapid review

NATIONAL IMPLEMENTATION PROGRAMME – STRENGTHENING QUALITY OF CARE IN PARTNERSHIP WITH RESIDENTIAL LONG-TERM CARE FACILITIES FOR OLDER PEOPLE

NIP-Q-UPGRADE

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On behalf of the NIP-Q-UPGRADE Consortium

The NIP-Q-UPGRADE supports long-term care facilities in data-driven quality improvement based on the national quality indicators.

National Implementation Programme – Strengthening quality of care in partnership with residential long-term care facilities for older people (NIP-Q-UPGRADE), commissioned by the Federal Quality Commission (FQC) to ARTISET with the industry association CURAVIVA and senesuisse – Laufende Programme und Projekte (admin.ch).

Implemented in collaboration with the Institut für Pflegewissenschaft (INS), Universität Basel, Institut et Haute Ecole de la Santé La Source (LA Source), Lausanne and Scuola universitaria professionale della Svizzera italiana (SUPSI), Manno.

The National Programme is implemented using implementation science approaches. ARTISET and senesuisse have delegated the scientific management of the programme to their collaboration partner, the University of Basel, Institute for Nursing Science (INS). For its part, the INS works collaboratively with the Institut et Haute École de la Santé La Source (La Source), HES-SO University of Applied Sciences Western Switzerland in Lausanne and the Centro Competenze Anziani, Scuola universitaria professionale della Svizzera italiana (SUPSI) to implement the programme nationally and has delegated different sub-aims to the partner institutions. The research institutes' interpretation of the scientifically substantiated results, their conclusions and recommendations to the trustee and to the Federal Quality Commission EQC may differ from the trustee's point of view.

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List of abbreviations

Abbreviation	Explanation of abbreviation
ADL	Activities of Daily Living
BAG	Bundesamt für Gesundheit
CMS	Center for Medicare and Medicaid Services
CPI	Comparative Performance Information
GCNS	Gerontological Clinical Nurse Specialist
HCFA 672	Health Care Financing Administration 672
LTCF	Long Term Care Facility
MDS	Minimum Data Set (the American version of the RAI MDS NH)
NH	Nursing Home
NHC	Nursing Home Compare
NHQI	Nursing Home Quality Initiative
NIP	National Implementation Project
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
QI	Quality Indicator
QIO	Quality Improvement Organization
QM	Quality Measures
RAI MDS	Resident Assessment Instrument Minimum Data Set (the previous version before the current interRAI LTCF)
RCT	Randomized Controlled Trial
STAR	Setting Targets – Achieving Results

Abstract

Project description: This review aims to develop insights and recommendations for the communication of quality indicator results, in a way that facilitates data understanding and strengthens data-driven care quality improvement in long-term care for older people.

Methodological approach: We conducted a rapid review of the literature, based on published guidance from the Cochrane Rapid Reviews Methods Group.

Core results: We retrieved 476 records and included 18 studies.

Features *enhancing stakeholders' understanding* of quality indicator data include:

- user-friendly websites with recent data
- characterising data through simple terms or symbols
- information on residents' satisfaction and facility details
- up-to-date benchmarks, including longitudinal and subnational data

Communication features or strategies *supporting care quality improvement* include:

- workshops and expert assistance on data-driven quality improvement
- threshold comparison and target-setting on quality indicators
- public reporting
- resident-centred quality assessments
- interactive web-based tools enabling users to filter, track and benchmark results
- quality improvement training to all care staff
- partnerships and communities of practice

Based on these findings, we recommend:

1. communicating Swiss quality indicators via a user-friendly, interactive website
2. increasing reporting frequency
3. adopting benchmark data based on expert-set thresholds or high-performer scores
4. testing communication tools and features with stakeholders
5. considering providing free, specialist care quality improvement assistance to facilities

Summary

Mission

This sub-aim of the NIP-Q-UPGRADE program conducts a structured review of the literature on communication channels, methods, and data preparation tools supporting healthcare institutions in understanding and interpreting quality indicator results. This knowledge will participate in supporting improvements in care quality.

Background / context

For quality indicators to effectively work as care quality improvement tools, enabling care actors to target priority areas and translate quality scores into improvement practices, data needs to be understandable and actionable. In this regard, communication strategies play an important role in facilitating general understanding of quality indicators. Yet, as revealed by a preliminary literature search, reported quality measures are not always correctly understood, and may not necessarily lead to improvement initiatives. Against this backdrop, this review seeks to develop insights and recommendations for improving the communication of quality indicator data in Switzerland.

Method

A rapid review of the scientific literature was conducted, following the Cochrane Rapid Reviews Methods Group guidelines.

Results

The review retrieved 476 unique records from three databases, with eighteen studies meeting the inclusion criteria.

Research question 1

How can data presentation or reporting formats or features enhance the understanding of quality indicator data for healthcare professionals and managers in long-term care, policymakers, potential care users, and their relatives?

Key findings on data accessibility and presentation include:

- **Public websites:** ensuring quality indicator data is easily accessible on user-friendly websites.
- **Tailored design:** designing websites and reports tailored to the needs of different audiences, including healthcare professionals, policymakers, and potential care users. Applying older-person-friendly designs and adopting formats accessible to individuals with special needs.
- **Layered information:** presenting information in a layered format, where users can start with summaries and drill down into detailed data as needed.
- **Report cards:** providing easily accessible summary information on facilities, including quality indicator results, to assist potential care users and relatives in making informed decisions when selecting a facility.
- **Information segmentation:** presenting information in short, manageable segments.
- **Referral recommendations:** incorporating care quality information in hospital discharge planners' and doctors' referral recommendations. These professionals assist older adults and their families in choosing long-term care facilities.

The following features relating to the visualisation of quality indicator data were identified:

- **Visual cues:** using word icons, colored dots, or warning triangles to indicate results, as well as overall scores.
- **Descriptive terms:** using simple words to describe results as better, average, or worse, for instance.
- **Data display**: displaying all relevant provider information on one page or in one table, with a limited number of providers per page to facilitate browsing.

Key information for potential long-term care users and their families to select a facility includes:

- **Consumer satisfaction:** data on consumer satisfaction.
- **Facility details:** information on facility location, number of beds, services, management, cost, and financial indicators.
- **Quality ratings:** explanations of quality ratings, their creation, and importance.
- **Supplementary literature:** information on how to select a facility.

Effective benchmark features:

- **Aggregated scores:** national-level benchmarks and graphic displays.
- **Subnational benchmarks:** including, for instance, regional benchmark data.
- **Longitudinal trends:** including past benchmarks to show trends over time.

Research question 2

Which communication features or strategies may support healthcare professionals and managers in long-term care facilities in utilising quality indicators data to foster care quality improvement?

The literature has pointed towards several communication-related features or strategies that support data-driven quality improvement, including:

- **Workshops:** provide training on general skills in interpreting quality indicators data and using it for data-driven improvement. Include individual expert support for data interpretation and decision-making – supplemented with optional consultation to spark change in clinical practice.
- **Threshold comparison:** comparing results with expert-set thresholds or high-performers scores to highlight areas needing improvement. These may point to clinical problems masked by comparisons with peer averages and shift facilities' focus towards achieving high quality.
- **Public reporting**: may focus stakeholders' attention on achieving good quality outcomes and prompt improvements in key clinical areas. This may, in turn, create incentives for partnership formation and for seeking out novel ways of changing care processes.
- **Report cards:** may enhance some aspects of quality, especially if scores are perceived as valid and expected to impact demand for services.
- **Target setting:** establishing indicator targets, which has led to greater improvements in indicator results, compared to indicators without set targets, in some countries.
- **Detailed data breakdown at unit or service level:** presenting data at unit or service levels (rather than facility level) to highlight detailed trends and guide quality improvement efforts more precisely.
- **Resident-centered assessments:** using comprehensive assessment tools to assess quality from the residents' perspective.

- **Interactive web-based tool**: web-based platforms to track and benchmark quality, with interactive features that enable care providers to identify goals, set and modify targets according to their needs.
- **Partnerships:** collaborations between facilities, auditors, and public health departments.
- **Communities of practice:** sharing successful strategies and tips on implementing change among peers.
- **Quality improvement training:** educating all long-term care staff on quality improvement principles.
- **Support by subnational (e.g., regional) authorities:** providing expert visits, peer-to-peer support, training, materials, and regular meetings on quality improvement.

Conclusion and Recommendations

Effective presentation and reporting formats can significantly enhance the understanding of quality indicator data for diverse audiences. Making data accessible, visually intuitive, and adapted to the needs of different users may promote better understanding and utilisation of this information. This may in turn support healthcare professionals, managers, and policymakers in improving care quality, and potential care users and their relatives in making informed decisions.

Based on the findings of this review, we have formulated five main recommendations, which are adapted to the Swiss context.

1. Firstly, we recommend that quality indicators data be communicated via a visually attractive, accessible and interactive website (which could be outlined in work package 4). This website should present layered information, where users can start with summaries and drill down into detailed data as needed.
2. Secondly, we recommend that the competent federal authority increases the frequency of reporting and provides up-to-date data (i.e. a year old at most).
3. Thirdly, we recommend adopting benchmark data based on expert-set thresholds or high-performers scores, rather than regional or national averages. These may point to clinical problems masked by comparisons with peer averages and shift facilities' focus towards the high quality of their Swiss peers.
4. Fourthly, we recommend testing potential communication tools and features with stakeholders, including residents, relatives, and long-term care staff – through sub-aim 6 of work package 1 for instance.
5. Lastly, we recommend that CURAVIVA and senesuisse examine how to provide free specialist assistance to long-term care facilities, to support them in improving the care quality based on their quality indicators results.

In this review, most of the included studies focus on written, web-based communication tools. NIP-Q-UPGRADE will consider these and other tools that may be used in other countries, for instance – as explored in sub-aim 2 of work package 2. In so doing, the programme will strive to co-create effective communication strategies for quality indicator data – alongside key partners such as long-term care facilities. These efforts will support current and future long-term care users and their relatives in utilising this data to make informed decisions. It will also empower long-term care professionals to practice data-driven care quality improvement.

The strategies and recommendations highlighted in this report have supported quality improvement in long-term care facilities in different countries. Their applicability and impact in the Swiss context will be explored throughout the NIP-Q-UPGRADE and after its completion, in the sustainment phase led by the Federal Quality Commission.

1. Introduction

Since the mid-19th century, the work of pioneer nurses Mary Jane Seacole and Florence Nightingale has placed improving care quality at the heart of the nursing profession (1). Over a century later, in the context of global population ageing, rising healthcare costs, weaknesses in health financing policies, unequal access to care, varying quality of services, and human resources crises, policymakers and academics have paid increasing attention to the quality of healthcare systems, more particularly care quality improvement (2–5). One way to assess quality and foster improvement is to develop and deploy indicators assessing quality of care (2), on which this review focuses.

In long-term care settings, where challenges such as insufficient funding and human resources, increasing demand for services, and lack of quality controls are particularly acute (6,7), efforts to develop quality indicators are well under way. Starting in the US in the mid-1990s (8), quality indicators have been developed and used as a care quality improvement strategy in countries including Australia, New Zealand, Canada, Norway, the UK, Sweden, the Netherlands, Denmark, and Switzerland (9,10).

Care quality indicators can be broadly understood as "standardized, evidence-based measures" of selected aspects of care quality (11). They offer the possibility to identify and monitor areas requiring improvement and care quality issues at facility, regional, national or international level; to compare institutions and regions and track their evolution in quality over time; and to drive evidence-based care improvement (8,12,13). Moreover, communication strategies such as the public reporting of facilities' care quality indicators results have been found to stimulate care providers to invest in quality improvement, as it enables potential care users to compare across facilities and choose best performing ones (14).

For quality indicators to effectively work as care quality improvement tools, enabling care actors to target priority areas and translate quality scores into improvement practices, data needs to be understandable and actionable (15,16). In this regard, communication strategies – at the level of institutional data or of larger regional, national, or international benchmarks – play an important role in facilitating general understanding of quality indicators. These strategies offer possibilities to enhance interpretation of individual quality indicators scores and may lead to improved targeting of data-driven quality actions. Yet, as revealed by a preliminary literature search, reported quality measures are not always correctly understood (17).

Studies have thus explored how to present data in a way that facilitates understanding and interpretation (17–20). Another strand of the literature has examined the links between communication strategies such as public reporting of quality indicators results and quality improvement in long-term care (21–23). However, no review has systematically examined how to communicate quality indicators data to foster correct understanding and care quality improvement in long-term care facilities for older people.

2. Aim

This rapid review aims to generate insights and develop recommendations for the communication of quality indicators data in long-term care for older people, in a way that facilitates data-driven care quality improvement. More specifically, it investigates:

1. which presentation or reporting formats or features support correct understanding of quality indicators data by healthcare professionals and managers of long-term care facilities for older people, policymakers, potential care users, and their relatives (research question 1); and
2. which communication features and strategies may support or encourage healthcare professionals and managers in long-term care facilities for older people in utilising quality indicators data to foster care quality improvement (research question 2).

3. Methods

We conducted a rapid review of the scientific literature, based on published guidance from the Cochrane Rapid Reviews Methods Group (24). In so doing, our aim was to assist policymakers and long-term care actors in improving communication strategies around quality indicators data. The review was conducted between October 2023 and February 2024 and guided by a protocol registered on Zenodo (25).

Eligibility criteria

Types of studies

We included research articles that utilised quantitative, qualitative, or mixed methodologies and reviews (systematic reviews, meta-analyses, and scoping reviews) based on empirical evidence. Studies based on non-empirical evidence, such as opinion papers or theoretical studies, protocols and studies only reported as abstracts were excluded.

Types of study participants

We investigated studies that examined the communication of quality indicator data in terms of target audiences' understanding and use of the data, irrespective of who is communicating the data. For research question 1, we considered the following target audiences of quality indicators data: healthcare professionals and managers working in long-term care facilities for older people, policymakers, potential care users and their relatives. For research question 2, we considered healthcare professionals and managers in long-term care facilities for older people as the main users of data for quality improvement. We included studies that considered residents and relatives' involvement in data-driven decision-making regarding care quality.

In this review, long-term care facilities are understood as institutions offering health services, supervision, and assistance, amongst other services, to older residents who require residential long-term care. Older people are defined as people aged 60 years and older.

Types of interventions

We included studies that examined the communication of quality indicator data (e.g., data visualisation and presentation tools, communication channels, formats, and strategies) in terms of target audiences' understanding and use of the data for care quality improvement. In this review, communication is understood in broad terms, as the exchange or transmission of quality indicators data.

We focused on quality indicators pertaining to the care of residents. This includes care processes (e.g., medication reviews, advance care planning, use of physical restraints, use of psychotropic medication) and resident outcomes (e.g., incidence of pain, falls, pressure ulcers, malnutrition, quality of life). We did not directly target studies on quality indicators measuring structural or financial aspects of care institutions (e.g., number of beds, staffing, cost per resident).

Types of outcome measures

All outcomes pertaining to the comprehension or use of quality indicator data for care quality improvement reported in the included studies were considered. This included accuracy and ease of data interpretation, errors, preferences, translation of data into action (e.g., priority setting, evidence-based guidelines, internal quality improvement initiatives), and improving trends in indicators data.

Literature search

Based on input from co-authors, an experienced science librarian (BK) and the first author (EP) developed and iteratively tested specific search strategies for Medline (Ovid), Embase, and

APA PsycInfo (see Appendix 1). The search was conducted between the 27th and 30th October 2023. We limited our search to materials published in English since 2000.

Study selection and data extraction

On 30 October 2023, search results were exported to the Rayyan software (Ouzzani et al. 2016). Duplicates were removed. Using predefined inclusion and exclusion criteria (see Appendix 1), two of three reviewers (EP, VDG, NW) independently reviewed the abstract and title of 30% or 141 articles retrieved. All other articles were assessed by one reviewer (EP). Disagreements were solved by consensus. When no consensus could be reached, a third reviewer (NW) resolved disagreements. All full-text reports were reviewed independently by two people (NW, EP). Disagreements were solved by consensus.

A data extraction form was developed by the first author and independently piloted on two studies by two extractors (EP, NW). Next, additional extraction variables were added by both extractors to finalise the tool. Disagreements were discussed to attain similar interpretation of the extraction variables. For the remaining studies, the extraction work was divided between both extractors.

Study synthesis

Evidence was synthesised in tabular form and narratively, as well as in the form of recommendations for the communication of quality indicators data.

4. Results

Identification of relevant studies

As presented in a Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) flow diagram (Appendix 2), a total of 476 unique records were retrieved from three databases, of which 31 were selected for full-text review. Of these, 13 were excluded, mainly as they as they did not consider the outcomes of interest. Eighteen studies were included in the review.

Characteristics of studies and study populations

Of the 18 included studies, 12 originate from the USA, two from Canada, two from the Netherlands, one from France and one covers seven European countries (Austria, England, Finland, Germany, the Netherlands, Catalonia in Spain, and Sweden).

Studies were published between 2001 and 2022.

The quality indicators data sets, when specified, were the Minimum Data Set (MDS USA version) for 11 studies, the Resident Assessment Instrument Minimum Data Set (RAI MDS Canadian version) for 2 studies, Nursing Home Compare (NHC) for 2 studies, the Health Care Financing Administration 672 (HCFA 672) for one study, and national programs for four studies, with some works making use of several data sets.

Participants includes long-term care facilities staff and managers, quality improvement organisations, relatives or volunteers deemed to be representative of a target population (e.g., relatives). When indicated, participants number ranges from five individuals to over 15,000 facilities.

Study designs include 10 descriptive studies (quantitative or mixed methods), three correlational studies, three quasi-experimental studies, one randomised controlled study, and one qualitative study. Out of the 18 total studies, six address research question 1, 11 address research question 2, and one addresses both.

Research question 1: data presentation or reporting formats or features supporting correct understanding of quality indicators data

Features enhancing stakeholders understanding

This report asked which data presentation or reporting formats or features support correct understanding of quality indicators data by healthcare professionals and managers in long-term care facilities for older people, policymakers, potential care users, and their relatives.

As detailed in Appendix 3 (Table S1) and below, we identified features that enhance stakeholders' understanding pertaining to data accessibility and presentation, visualisation, type of information and benchmarks.

a. Key findings on data accessibility and presentation include:

- **Public websites**: quality indicator data reported on public websites (17,18,20,27–29).
- **Tailored design:** websites tailored to consumer needs – e.g. applying design principles that are elderly-friendly and assist consumers with special needs, presenting information in short, manageable segments, according to existing website label criteria (e.g., large fonts, contrasting colours), designed as decision tools rather than databases, and summarising rather than simplifying information, with layered levels of details (27).
- **Report cards:** report cards providing easily accessible summary information on facilities, including quality indicator results, to assist potential care users and relatives in making informed decisions when selecting a facility (27).
- **Referrals**: hospital discharge planners, casemanagers and doctors incorporating care quality information in their referral recommendations – as residents and families may largely rely on recommendations (from professionals and non-professionals) rather than report cards, to obtain information about facilities prior to long-term care admission (30)

b. Features relating to the visualisation of quality indicator data include:

- **Visual cues:** using overall scores, word icons, coloured dots and warning triangles (20)(29).
- **Descriptive terms:** using words to describe results as better, average, or worse for instance (17).
- **Data display**: displaying all relevant provider information on one page or in one table, with a limited number of providers per page to facilitate browsing (20)(17).

c. Key information for potential long-term care users and their families to select a facility includes[1]:

- **Consumer satisfaction:** data on consumer satisfaction, which was deemed the most important by future consumers and representatives (29).
- **Facility details:** descriptive information on facility location, number of beds, services, management, cost, and financial indicators (27).
- **Quality ratings:** structured information on quality ratings (e.g., how they were created, and their importance) – may support consumers understanding (27).
- **Supplementary literature:** information on how to select a facility (27).

[1] It should be noted that the level of understanding is likely to vary from one person to the other; for instance, as shown in one article, relatives' comprehension of quality information is associated with education, income, age and race (Castle 2009).

d. Effective benchmark features:

- **aggregated benchmark (state or national) scores and graphic displays** – yielded the highest relatives' comprehension of quality information scores, although the research did not determine whether state/national benchmark scores are the most useful (28).
- **Subnational benchmarks:** including, for instance, regional benchmark data (30).
- **Longitudinal trends:** including past benchmarks to show trends over time (27).

Features negatively impacting stakeholders understanding

By contrast, features that may negatively impact understanding include:

- **Missing information** – negatively impacts consumers' view of a facility (29).
- **Potentially complex or technical terminology** – should be explained (29).
- **Text accompanying benchmark display** – yielded the lowest comprehension scores among relatives, although the study did not determine what specific areas of the text should be improved (28).
- **Graphic templates, using bar graphs** – led to the highest number of errors (17).
- **Negative direction**, i.e. when lower percentages mean better quality – source of misunderstanding / errors (17).
- **Access barriers**, when a significant effort is required to find facilities' reports cards on a website – limits the usefulness of the public information (Castle and Lowe 2005).

Research question 2: communication features or strategies supporting care quality improvement

In this report, we further asked which communication features or strategies may support healthcare professionals and managers in long-term care facilities for older people in utilising quality indicators data to foster care quality improvement. As presented in Table 1 below and detailed in Appendix 4, the literature has pointed towards several communication-related features or strategies that support data-driven quality improvement.

Table 1: Communication features or strategies supporting care quality improvement

Communication feature or strategy	**Explanation**
Workshop on quality indicators and improvement, feedback reports and consultation with a gerontological clinical nurse specialist to assist with report interpretation and decision-making.	Facilities that sought intensive support from the clinical nurse specialist were able to effect enough change in clinical practice to improve resident outcomes significantly. Outcomes of residents in facilities that used clinical consultation by the nurse specialist demonstrated improving trends in quality indicators measuring falls, behavioural symptoms, activity and pressure ulcers. Simply providing comparative quality indicators feedback was not sufficient to improve resident outcomes (31).
Thresholds as standards of care	Comparisons to expert set thresholds may to point to potential issues masked by comparisons to peer averages. Some facilities may falsely interpret that being average means sufficient quality, if the average practice indicates poor clinical care (31,32).

	By making data about high-performing peers readily accessible, facilities' focus shifts towards high performances. This may improve aggregate results at the national level (33).
Public reporting (US experience)	Public reporting focuses the attention of long-term care stakeholders on achieving good quality outcomes and improving in key clinical areas. It also creates an incentive for partnership formation and motivates facilities to seek out new ways of changing processes of care, such as working closely with doctors (34).
Public reporting (Canadian experience)	Improving trends were observed among publicly reported indicators more often than among indicators that were not publicly reported. The association between data publication and improvement appeared to be stronger for indicators in which no improvement took place prior to publication, and among poor performing facilities (23).
Reporting / report cards	Report cards seem to enhance some aspects of quality but cannot be relied upon as the only policy instrument for quality improvement, as they are not effective across the board (35). They are also more effective in competitive markets (36). Facilities with poor quality scores were more likely to take actions following report cards publication (30).
	Public reporting and report cards' potential to positively affect care quality partly depends on the perceived validity of scores and on expectation that they would affect potential demand for services (30) (38).
Target-setting on quality indicators	When compared to facilities that did not set targets, those that did had significantly greater improvement, regardless of other characteristics. For instance, facilities that set physical restraint targets improved nearly twice as much on the quality measure (33).
Quality indicators at sub-facility level, such as the unit level	In examining only facility-level data, one may miss substantial opportunities for improvement in some units and overlook important improvements occurring on other units, which influence need for improvement (37).
Measurement tool providing a comprehensive resident-centred assessment of quality	It enables management to take a consistent view of diverse institutions and evaluate trends over time, focusing on care quality as perceived by residents (32).
Interactive web-based tool with possibility to track and benchmark quality indicator results (ideally against high performing peers), identify goals and set targets	It was show to speed up quality improvement (33).
Serving as a facilitator in bringing long-term care facilities together to share successful strategies and practical tips on implementing data-informed change	This can be complemented by other strategies such as teaching principles of quality improvement to all long-term care facilities staff; forming partnerships with long-term care facilities stakeholders; and establishing relationship with auditors and/or public health departments (34).

Regional quality improvement assistance	Service providing assistance to facilities regarding public reporting: - exchange of ideas and strategies among providers for improving care processes related to target quality indicators - visits to individual facilities to provide quality improvement assistance - provide materials and educational workshops on clinical domain management and education on quality improvement strategies such as team building, brainstorming, root-cause analysis, rapid-cycle improvement All regional services hold a weekly one-hour meeting to share lessons learned about each stage of implementation

In addition to these features and strategies, one article touched upon the perception of five medical directors relating to quality indicators (39). They highlighted that communication is key to introducing new practices and achieving lasting uptake. They further noted that improved coordination and communication provided useful information to help interpret quantitative results observed: e.g., participants reported that they were able to obtain contextual and patient-specific information that explained why some prescribers had consistently, but justifiably “poor” results on the quantitative indicators.

As detailed below, some strategies had unclear results, in terms of care quality improvement.

- Based on the experience of seven European countries, there is little evidence to show whether public reporting has a significant impact on driving users’ choices of provider. Studies report low awareness of quality indicators among potential end-users and information is not always displayed in a convenient format (e.g., complex numerical scores). The relative youth and the pilot characteristics of some of the schemes covered here could also have contributed to downplay their impact. The establishment of public reporting mechanisms contributed to shaping the discussion on quality measurement in several of the countries surveyed (22)

5. Recommendations

Effective presentation and reporting formats can significantly enhance the understanding of quality indicator data for diverse audiences. Making data accessible, visually intuitive, and adapted to the needs of different users may promote better understanding and utilisation of this information. This may in turn support healthcare professionals, managers, and policymakers in improving care quality, and potential care users and their relatives in making informed decisions.

Based on the findings of this review, we have formulated five main recommendations, which are adapted to the Swiss context and are presented in Table 2 below.

Table 2: Recommendations

	Recommendations	**Rationale**	**Link with NIP-Q-UPGRADE**
1	Firstly, we recommend that quality indicators data be communicated via **a visually attractive, accessible and interactive website** (which could be outlined in the optional work package 4). This website should present *layered information*, where users can start with summaries and drill down into detailed data as needed, with different features and access according to the type of user (e.g. facility quality manager versus a citizen). Regarding data representation, the literature confirms the choice of the Federal Office of Public Health to report at the *cantonal level*, and to report *facility characteristics* alongside quality indicator data.	All public reporting examined in this review is web-based, rather than on paper or PDF format. Simply providing comparative feedback is not enough to improve resident outcomes.	Work package 4 Sub-project 6 of work package 1 Scale-up
2	Secondly, we recommend that the competent federal authority increases the **frequency** of reporting and provides **up-to-date data** (i.e. 6-months old at most)		
3	Thirdly, we recommend adopting benchmark data based on **expert-set thresholds or high-performers scores**, rather than regional or national averages. These may point to clinical problems masked by comparisons with peer averages and shift facilities' focus towards the high quality of their Swiss peers.	By making data about high-performing peer facilities readily accessible, facilities' focus shifts from averages as benchmarks towards aiming for what high-performers have shown to be possible. This also improves aggregate results on national level.	Scale-up

4	Fourthly, we recommend testing potential communication tools (e.g., online reporting system) and features (e.g. data visualisation through specific icons or wordings) around quality indicators with stakeholders, including residents, relatives, and long-term care staff. According to the literature, this is usually **a continuous process of product improvement** as part of a QI programme strategy. First steps are planned during the NP-Q-UPGRADE program.	The literature points towards the importance of testing communication features towards actual or potential care users or other stakeholders. It also indicates several directions regarding communication features and strategies but does not enable us to identify clear and recent best practices applicable to the Swiss context. Moreover, most of the literature dates back from the early 2000s and originated in the U.S. Given rapid technological evolutions, including technological literacy, the possibility for user-friendly interactive websites has changed since these articles were published. As a result, the conclusions reached by included authors may be a little outdated.	Sub-aim 6 of work package 1 Sub-aim 6 of work package 2 Scale-up
5	Lastly, we recommend that CURAVIVA and senesuisse examine how to provide **free specialist assistance to long-term care facilities**, to support them in improving the care quality based on their quality indicators results.	Whilst quality indicator reporting indicates avenues to improve care quality, effective quality improvement usually involves support from individuals or organisations (e.g., through the provision of intensive support or workshops). During NIP-Q-UPGRADE pilots, the academic consortium or implementation provider can play an active role in assistance, training and follow up of participating long-term care facilities. Sustainable scenarios for training, coaching, guidance, and support after NIP-Q-UPGRADE should be anticipated in a timely manner.	Sub-aim 6 of work package 2 Scale-up

In this review, most of the included studies focus on written, web-based communication tools, public reports and benchmarks. However, successful implementation programmes in long-term care and other care settings may deploy **other forms of communication**. These may include peer-to-peer exchange groups, communication groups, sensibilisation campaigns, specialised conferences, and media coverage, for instance. NIP-Q-UPGRADE will consider these and other tools that may be used in other countries, for instance – as explored in sub-aim 2 of work package 2. In sub-projects to come, the programme will thus adopt a broad outlook and considers a wide range of communication forms, beyond public reporting and benchmarking.

In so doing, NIP-Q-UPGRADE will strive to co-create effective communication strategies for quality indicator data – alongside key partners such as long-term care facilities. These efforts will support current and future long-term care users and their relatives in utilising this data to make informed decisions. It will also empower long-term care professionals to practice data-driven care quality improvement.

The strategies and recommendations highlighted in this report have supported quality improvement in long-term care facilities in different countries. Their applicability and impact in the Swiss context will be explored throughout the NIP-Q-UPGRADE and after its completion, in the sustainment phase led by the Federal Quality Commission.

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7. Appendix

Appendix 1: Search Strategy with equations used in different databases

Searches performed on 30th Octobre 2023

Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions 1946 to October 27, 2023
(classic research menu)

1 Quality Indicators, Health Care/ or ("quality indicator*" or "quality measure*" or "performance indicator*" or "comparative performance information" or "quality information" or "performance score" or "outcomes measurement").mp.

2 Communication/ or Data Display/ or (Communication or Display* or Visual* or "format*" or report*).mp.

3 exp Nursing Homes/ or Homes for the Aged/ or Long-Term Care/ or ("long-term care" or (home* adj1 aged) or "nursing home*" or "residential home*" or "residential facilit*" or "nursing facilit*" or "institutional care" or "skilled nursing facilit*" or "care home*" or "residential care" or "residential aged care" or "aged care" or "institutional elderly care").mp.

4 "quality improvement"/ or (comprehension or understanding or interpret* or preference or improve*).mp.

5 1 AND 2 AND 3 AND 4

results: 291

limit 5 to yr="2000 -Current"

Embase (Elsevier 1947 to Current)

1'clinical indicator'/de OR 'quality indicator*':ab,ti OR 'quality measure*':ab,ti OR 'performance indicator*':ab,ti OR 'comparative performance information':ab,ti OR 'quality information':ab,ti OR 'performance score':ab,ti OR 'outcomes measurement':ab,ti

2 'information dissemination'/de OR 'written communication'/de OR 'data visualization'/de OR 'information processing'/de OR 'visual literacy'/de OR communication:ab,ti or display*:ab,ti OR visual*:ab,ti OR 'format*':ab,ti OR report*:ab,ti

3 'long term care'/de OR 'elderly care'/de OR 'geriatric care'/de OR 'home for the aged'/de OR 'nursing home'/de OR 'residential home'/de OR 'residential home'/de OR 'institutional care'/de OR 'residential care'/de OR 'long-term care':ab,ti OR 'nursing home':ab,ti OR 'residential home':ab,ti OR 'residential facilit*':ab,ti OR 'nursing facilit*':ab,ti OR 'institutional care':ab,ti OR 'skilled nursing facilit*':ab,ti OR 'care home*':ab,ti OR 'residential care':ab,ti OR 'residential aged care':ab,ti OR 'aged care':ab,ti OR 'institutional elderly care':ab,ti

4 'total quality management'/de OR comprehension:ab,ti OR understanding:ab,ti OR interpret*:ab,ti OR preference:ab,ti OR improve*:ab,ti

#1 AND #2 AND #3 AND #4 AND [2000-2023]/py

Results: 351

APA PsycInfo 1806 to Octobre Week 3 2023 (Ovid)
(Classic search menu)

1 ("quality indicator*" or "quality measure*" or "performance indicator*" or "comparative performance information" or "quality information" or "performance score" or "outcomes measurement").mp.

2 communication/ or information dissemination/ or visual displays/or graphical displays/ or written communication/ or (Communication or Display* or Visual* or "format*" or report*).mp.

3 (exp nursing homes/ or residential care institutions/ or long term care/ or nursing home residents/ OR elder care/ or ("long-term care" or (home* adj1 aged) or "nursing home*" or "residential home*" or "residential facilit*" or "nursing facilit*" or "institutional care" or "skilled nursing facilit*" or "care home*" or "residential care" or "residential aged care" or "aged care" or "institutional elderly care").mp.)

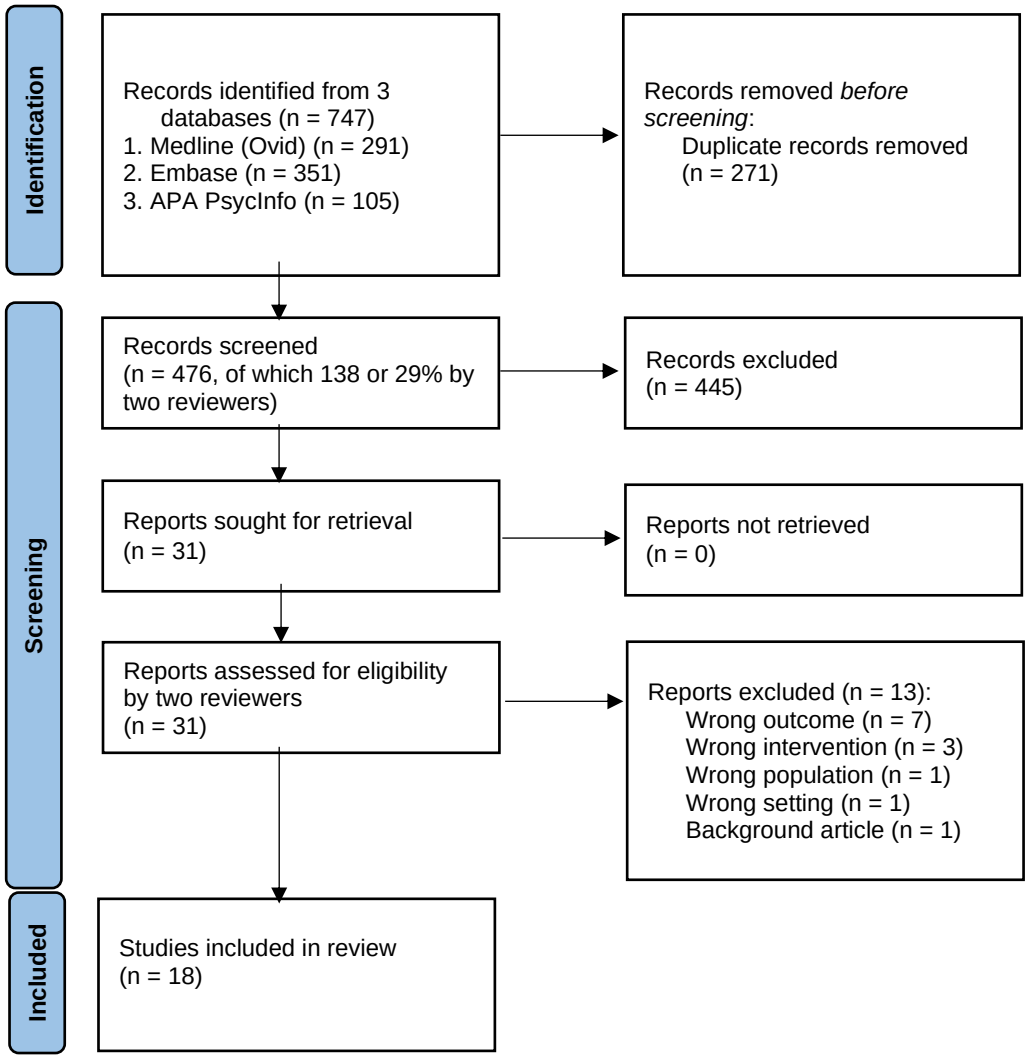
4 comprehension/ or preferences/ or (comprehension or understanding or interpret* or preference or improve*).mp.

5 1 AND 2 AND 3 AND 4
limit 5 to yr="2000 -Current"

Results: 105

Appendix 2: Figure S1

Figure S1: PRISMA flowchart



Appendix 3: Table S1

Table S1: Data presentation or reporting formats or features that may support correct understanding of quality indicators data by healthcare professionals and managers in long-term care facilities for older people, policymakers, potential care users, and their relatives

reference	country of origin (quality indicator data set)	design	study aim	participants	intervention	results
Mattke et al 2003	USA (Minimum Data Set)	D	To design and implement an internet-based performance measurement system to empower consumers and create incentives for quality improvement, and identify a model to approach this technically and politically	NA	Establishing a credible and transparent decision process using a public forum; developing the system based on: (1) review of the literature and existing systems, and discussions with stakeholders; (2) focus on consumer preferences in design; and (3) responsiveness to industry concerns in implementation	Lessons learned in developing a new system based on three key design principles to tailor it to consumer needs: 1) designing a decision tool rather than database 2) summarising rather than simplifying information: layered level of detail, e.g. performance scores presented on a summary page with possibility to drill-down to scores on individual QIs (total of 27 QIs; facilities grouped according to top 20%, bottom 10%, average 70%) 3) accounting for target audience in the creative execution, e.g. elderly friendly design principles, context-sensitive The system was well received by the public and industry, thanks to its collaborative decision process, in which all critical design and execution choices were laid out explicitly and debated with stakeholders in a public forum, and realism and honesty regarding the limitations of the system
Castle and Lowe 2005	USA (Minimum Data Set)	D	To describe which states have produced NH report cards, compare what information they	NA	Statewide public-accountability initiatives operationalized through report cards	High number of state initiatives for consumer public reporting (19 states); Access barriers: NH reports cards not easily accessible on state website; substantial differences in content across states; High variety of

			provide, identify data sources, examine factors previously shown to be associated with their usefulness and illustrate how they could be improved		with provider profiles or consumer reports with quality-of-care information, standardized and released to the public	presentation format and usefulness of the information. Mixed purposes: quality measures to help consumers make data-informed decisions vs. only deficiency citations insufficient to help consumer decisions. Report cards alone do not guarantee the use, nor the improvement of decision-making of potential consumers
Gerteis, Gerteis, Newman and Koepke 2007	USA (Minimum Data Set)	QE	To evaluate alternative formats for consumer reports of NH quality measures for possible use on the Nursing Home Compare website, exploring (1) whether visual cues would help consumers interpret displays of NH measures, (2) whether reporting formats would enhance comprehension, and (3) to what extent consumers' self-reported preferences for one format or another correlated with accurate interpretation.	90 "potential" relatives of residents	Presentation of hypothetical scenario of a NH placement, with participants task to choose a LTCF based templates (in total 7 templates being tested) followed by interview	**Total errors**: "Evaluative Table with Words" elicited the fewest errors. followed by the "Evaluative Tables with Stars" and the "Evaluative Table with 3 Symbols." The two graphic templates elicited the most errors, especially the "Standard Bar Graph." **Interpretive errors**: fewest errors with evaluative templates, followed by numeric and graphic **Sources of errors** include: • Confused by Negative Direction: when lower percentages mean better results • Looked at wrong measure when answering a specific question **Respondent Preferences**: "Evaluative Table with Words", "Numeric Table with Stars" and "Evaluative Table with Stars" **Reported ease of use**: "Evaluative Table with Words" or "Evaluative Table with Stars". Most respondents reported that they preferred to see all information on one page or in one table, for browsing purposes. ➢ Respondents made fewest errors on and preferred templates using words to characterise performance as better, average, or worse, and the most errors when using the graphic templates

Castle 2009	USA (Nursing Home Compare)	D	To examine whether consumers are using Nursing Home Compare and whether they can accurately interpret the quality information given in Nursing Home Compare	4754 family members of residents	Through survey, examine family members' experiences with Nursing Home Compare (NHC) website / report	**Information source:** 18% family members had someone else provide them with NH information from the Internet, 31% used the Internet when choosing a NH and 12% remembered using information from NHC. **Comprehension** was associated with education, income, age, and race**.** The different types of QMs, the displays, explanations of the measures, accompanying text, and benchmark scores in general seemed well understood. Highest comprehension scores were found for the benchmark (state/ national) scores and displays. The lowest comprehension scores were found for the text accompanying the display. **NH choice:** seldom made in a proactive way, often within a few days of hospitalization, representing a considerable challenge for report cards to be easily accessible and understandable. Facility location was extremely important in the decision process.
Van Nie, Hollands, and Hamers 2010	Netherlands (N/A)	QE	To test an internet report card containing information about quality indicators (e.g., pressure ulcers, falls), assessments of consumer satisfaction and of quality of care by the Netherlands Health Care Inspectorate (NHCI)	278 current and future NH consumers and representatives	Participant groups were exposed to sequential cases with an internet report card for an imaginary NH and had to indicate their impression of the NH quality, whether they would choose the NH for themselves/ relatives and were asked to rate the	**Opinions of the card**: all ratings were satisfactory. The information on consumer satisfaction was deemed the most important, followed by the NHCI information. The importance of QI information was rated as relatively low. **Visualization**: The NHCI evaluation of care quality was best visualized by warning triangles. **Assessments of care quality**: participants' quality ratings were most positive if information regarding quality indicators or NHCI evaluation were positive. When only information on consumer satisfaction was present, the

					symbols used to present the assessments of care quality (warning triangles, stars or colors).	participants' overall assessment of quality became less positive. Overall scores were higher when all the information was available. Finally, the assessment of care quality and ratings concerned with choosing or recommending a nursing home were clearly associated, although the ratings on choice and recommendation were structurally lower. **Additional information**: participants indicated that they would prefer additional information about relatives' opinions, informal caregivers and volunteers. **Terminology**: a majority thought that terminology used in the report card should be explained. **Extra information:** participants would like to see information about the facilities and location of the NH.
Damman, De Jong, Hibbard, and Timmermans 2016	Netherlands (Dutch consumer Quality Index Long Term Care)	QE	To investigate how different presentation formats influence comprehension and use of comparative performance information (CPI) among consumers from non-vulnerable and vulnerable backgrounds (i.e., with relatively low educational level, health literacy, numeracy and patient activation)	902 people deemed representative of the Dutch population	Respondents saw fictitious but realistic CPI and were provided with two screenshots: one with 20 NH (realistic version) and one with five NH (reduced version). They were asked to imagine having to choose a NH for themselves/their relatives and provided with questions that assessed their comprehension and hypothetical choice.	Displaying an overall performance score and the use of coloured dots and word icons enhanced consumer understanding. Respondents provided with coloured dots most often correctly selected the top three healthcare providers, compared with word icons, star ratings, numbers, and bars (worst) when viewing performance scores of 20 providers. Displaying a reduced number of healthcare providers appeared to support consumers understanding. ➢ The use of overall performance scores, word icons and coloured dots, and a reduced number of providers displayed all enhanced consumer understanding

Mukamel et al 2008	USA (Minimum Data Set)	D	To examine associations between NH quality and publication of the Nursing Home Compare quality report card	701 NH administrators	Comparing quality measures trends pre- and post-publication	Two of five QMs quality measures show improvement following publication: physical restraints (long-term residents) and pain (short-term residents). Pressure ulcers showed a significant deterioration and ADLs and infections showed no significant change. There was significant improvement in the physical restraint QM for facilities taking two or more actions and in the pain QM for all facilities taking actions. The improvement increased as the number of actions increased. The level of deterioration in pressure ulcers was unrelated to the number of actions. Overall, report cards seem to be effective in enhancing some aspects of quality but cannot be relied upon as the only policy instrument for quality improvement

NH: nursing home; CPI: comparative performance information

C: correlational; D: descriptive; QE: quasi-experimental; RCT: randomized controlled trial

Appendix 4: Table S2

Table S2: Communication features or strategies that may support healthcare professionals and managers in long-term care facilities for older people in utilising quality indicators data to foster care quality improvement

reference	country of origin (quality indicator data set)	design	study aim	participants	intervention	results
Rantz et al 2001	USA (Minimum Data Set)	RCT	To determine if providing NH with comparative quality performance information and education about quality improvement would improve clinical practices and subsequently improve resident outcomes, or if a stronger intervention, such as expert clinical consultation with staff, is needed to improve outcomes	staff in 87 NH (e.g. administrator, director of nursing, quality assurance coordinator, staff nurse, nursing assistant)	**Group 1**: workshop on QI and quality improvement and feedback reports **Group 2**: workshop and feedback reports with clinical consultation – phone and/or on-site clinical consultation from a gerontological clinical nurse specialist (GCNS) to assist with report interpretation and decision-making **Group 3**: control	Simply providing comparative performance feedback is not enough to improve resident outcomes. Only NH that sought additional intensive support of the GCNS were able to effect enough change in clinical practice to improve resident outcomes significantly. Outcomes of residents in NH that used clinical GCNS consultation demonstrated trends in improvements in QIs measuring falls, behavioural symptoms, little or no activity, and pressure ulcers (overall and for low-risk residents).
Kissam et al 2003	USA (Minimum Data Set)	D	To review and analyse lessons learned from the six Quality Improvement Organizations (QIOs) that led quality improvement efforts in NH from six pilot states	6 QIOs offering community-based quality improvement assistance programs to NH	QIOs providing assistance to NHs regarding public reporting (1h per week meeting to share lessons learned about each stage of implementation): - exchange of ideas and strategies	Public reporting focuses the attention of all NH industry stakeholders on achieving good quality outcomes/ improve in key clinical areas, creates an incentive for partnership formation, and motivates NH to seek out new ways of changing processes of care. It remains to be seen whether these efforts lead to improved quality of care in NH nationwide. Recommended approaches towards systematic quality improvement in NH, related

					among providers for improving care processes related to the 2 target QIs - visits to individual NHs to provide quality improvement assistance - provide materials and educational workshops on clinical domain management and education on quality improvement strategies such as team building, brainstorming, root-cause analysis, rapid-cycle improvement	to communication: • Form partnerships with NH stakeholders • Establish relationship with State Survey Agency • Teach principles of quality improvement to all NH staff • Serve as a facilitator in bringing NH together to share successful strategies and practical tips on implementing change Recommendations beyond communication: • Promote the use of quality measures in quality improvement • Engage physicians and medical directors in quality improvement • Provide one-on-one assistance to NH • Convert the regulatory compliance culture to a quality improvement culture • Address high rates of staff turnover and position vacancies in nursing homes
Mukamel et al 2008	USA (Minimum Data Set)	D	To examine associations between NH quality and publication of the Nursing Home Compare quality report card	701 NH administrators	Comparing quality measures trends pre- and post-publication	Two of five QMs quality measures show improvement following publication: physical restraints (long-term residents) and pain (short-term residents). Pressure ulcers showed a significant deterioration, and ADLs and infections showed no significant change. There was significant improvement in the physical restraint QM for facilities taking two or more actions and in the pain QM for all facilities taking actions. The improvement increased as the number of actions increased. The level of deterioration in pressure ulcers was unrelated to the number of actions. Overall, report cards seem to be effective in enhancing some aspects of quality but cannot be relied upon as the only policy instrument for quality improvement

Zinn, Weimer, Spector and Mukamel 2010	USA (Nursing Home Compare)	C	To determine what factors were associated with NH investment in quality after publication of the NHC report card	538 NH administrators	NA	The degree to which NH perceive that the report card influences key constituencies (professional referral sources, consumers, state surveyors) is associated with the odds of committing substantial resources to improve report card performance -including hiring new staff, taking other initiatives to hire or retain staff, purchasing new tech/equipment, increase wages. Facilities with lower reported QM scores were three times more likely to make certain investments than high-quality facilities in competitive markets. Perceived QM validity and close monitoring of scores also motivates investment. With respect to actions undertaken, 1/5 nursing homes increased wages in response to publication. Half the administrators perceive that the QMs influence professional referrals, over half believe that the QMs influence consumer choice, and 44% perceive that the QMs influence state survey investigations. Almost half (45%) ranked their operating environment at the highest level of competition, and more than half (51%) had a managed care contract
Grabowski et al 2011	USA (Minimum Data Set and On-Line Survey, Certification, and Reporting System, OSCAR)	C	To evaluate the effects of the Nursing Home Quality Initiative (NHQI), which introduced quality measures to the Centers for Medicare and Medicaid Services' Nursing Home Compare website, on facility performance and consumer demand for services	15'553 NH surveyed per quarter on average; total sample size of 388,813 facility-quarters	Nursing Home Quality Initiative (NHQI)	The introduction of the NHQI was generally unrelated to facility quality and consumer demand. However, NH facing greater competition improved their quality more than facilities in less competitive markets. The lack of competition in many nursing home markets may help to explain why the NHQI report card effort had a minimal effect on nursing home quality. With the introduction of market-based reforms such as report cards, this result suggests policy makers must also consider market structure in efforts to improve nursing home performance

Rodrigues, Trigg, Schmidt, and Leichsenring 2014	Seven European countries: Austria, England, Finland, Germany, Netherlands, Spain, Sweden (National programs)	D	To explore experiences with public reporting mechanisms in seven European countries and available information on their impact on quality in long-term care	N/A	Public reporting	Countries surveyed included a variety of public reporting schemes, from pilot programmes to statutory mechanisms. Public reporting mechanisms more often focus on institutional care. Inspections carried out as part of a legal quality assurance framework are the main source of information gathering, supplemented by provider self-assessments in the context of internal quality management and user satisfaction surveys. Information on quality goes beyond structural indicators to also include indicators on quality of life of users. Information is displayed using numerical scores (percentages), but also measures such as ratings and ticks and crosses. Only one country corrects for case-mix. The internet is the preferred medium of displaying information. There is little evidence to show whether public reporting has a significant impact on driving users' choices of provider. Studies report low awareness of quality indicators among potential end users and information is not always displayed in a convenient format (e.g., complex numerical scores). There is scarce evidence of public reporting directly causing improved quality, although the relative youth and the pilot characteristics of some of the schemes covered here could also have contributed to downplay their impact. The establishment of public reporting mechanisms did contribute to shaping the discussion on quality measurement in several of the countries surveyed.
Sanchez et al 2022	France (N/A)	Qual	To describe NH medical directors' perception of the utility of QIs	5 NH medical directors	perception about QI implementation	The main themes to emerge were: (1) communication is key to introducing new practices and achieving lasting uptake; (2) improved coordination and communication provided useful information to help interpret

						quantitative results observed: e.g., participants reported that they were able to obtain contextual and patient-specific information that explained why some prescribers had consistently, but justifiably "poor" performance on the quantitative indicators; (3) negative aspects reported included reluctance to change among prescribers and the tendency to shirk responsibility
Baier, Butterfield, Harris and Gravenstein 2008	USA (Minimum Data Set)	D	To evaluate relative improvement among NH that set targets using the Nursing Home Setting Targets—Achieving Results (STAR) site for 2 quality measures: (1) daily physical restraints; and (2) pressure ulcers in high-risk long-stay residents	7091 volunteer NHs	An interactive Web-based tool that includes the ability to trend and benchmark performance and set targets with monitoring over time, and that includes options to replace averages by performances of high-performing peers	When compared to NH that did not set physical restraint or pressure ulcer targets, NH that set a target had significantly greater relative improvement (those that set physical restraint targets improved nearly twice as much on the quality measure). These trends persisted regardless of NH characteristics (e.g., facility size or membership in a multifacility corporation) or participation in work with their state's Quality Improvement Organization (QIO). During the 1-year observation period, target setting was associated with 2576 fewer residents at risk for pressure ulcers developing a pressure ulcer and 4321 fewer residents being physically restrained. Although the absolute improvement is relatively small—less than 1% for each quality measure—the number of residents affected is substantial.
Poldrugovac et al 2022	Canada (Resident Assessment Instrument-Minimum Data Set, RAI-MDS integrated in national	C	To explore the association of public reporting of performance indicators of long-term care facilities in Canada with performance trends	1087 LTCFs	Public reporting	Improving trends were observed among publicly reported indicators more often than among indicators that were not publicly reported. Our analysis also suggests that the association between publication of data and improvement is stronger among indicators for which there was no improvement prior to publication and among the worst performing facilities.

	platform Continuing Care Reporting System)					
Norton et al 2014	Canada (Resident Assessment Inst- rument Minimum Data Set, RAI MDS)	D	To demonstrate the benefit of defining operational management units in NH and computing quality indicators on these units and on the whole facility; to define rigorous a priori criteria to compare units and facilities and determine whether there is overtime improvement, worsening and status quo in quality performance	30 NHs	Temporal data such as quarterly RAI–MDS indicators are evaluated using statistical process control (SPC) methods.	In 49% of the units studied, unit control chart performance indicated different changes in quality over the reporting period than did the facility chart. These differences lead to quite different quality interventions. We demonstrated the use of statistical process control as a tool for quality improvement in NH and described development of a series of explicit decision rules which can be used by reviewers to classify performance in control charts. ➢ In considering only facility-level data, one may miss substantial opportunities for improvement in some units and overlook important improvements occurring on other units.
Mukamel et al 2007	USA (Minimum Data Set)	D	To examine the initial reaction of NH to publication of CMS report card and evaluate the impact of the report card on quality-improvement actions in response to poor quality measures	724 chief NH administrators	Public Nursing Home Compare report cards introduced in 2002 and published regularly in web-based format, launched with full-page advertisement in all of the major newspapers. Content: general information about the facility, number of deficiency citations and ratio of	**Consultation of QM scores:** A majority of facilities (69%) reported reviewing their quality scores regularly, 82% at least once; 10% stopped after first publication **Actions:** Homes with poor quality scores were more likely to take actions following report cards publication. We found the strongest associations between actions and poor scores when using the 20th percentile. Based on this definition, 77% of facilities had at least 1 of the 10 QMs designated as low quality. **Associated factors**: potential to positively affect NH quality partly depends on perception of validity of scores and expectation that it would affect potential demand for services. **Impact of QM on consumer demand**: content estimated as very low influencer in

					staff hours to resident days.	choice. 74% reports that no one has ever requested QM information versus influencers like distance, location, recommendations health professionals, visit, home amenities, recommendations. **Benchmarks**: 32% chose state average and 28% local competitors. Only 2% choses national average for benchmark. **Advertising***:* 10% of 79% with at least one good score had advertised a high-quality score. **Types of actions**: facilities were more likely to report reorganizing their staff, retraining staff, and changing care protocols than increasing staff. (may need more resource-intensive interventions).
Moxey et al 2002	USA (Minimum Data Set and Health Care Financing Administration 672)	D	To identify domains of quality, select and adapt validated instruments for measurement within each domain, pilot test a data collection process, and develop an operational quality profiling report format for NH	2 LTCFs	Continuous quality improvement process based on a newly developed measurement tool that provides a comprehensive resident-centred assessment of quality (including organizational, clinical, environmental, and social quality domains).	The tool enables management to take a consistent view of diverse institutions, focusing in detail on quality of care as it is perceived by residents, and allows evaluation of trends over time and comparison to external norms.