Auditing integrated stroke care to support quality improvement activities: development of a peer-to-peer audit framework

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Abstract

Purpose – To organize stroke care, multiple stakeholders work closely together in integrated stroke care services (ISCS). However, even a well-developed integrated care program needs a continuous quality improvement (CQI) cycle. The current paper aims to describe the development of a unique peer-to-peer audit framework, the development model for integrated care (DMIC), the Dutch stroke care standard and benchmark indicators for stroke.

Design/methodology/approach – A group of experts was brought together in 2016 to discuss the aims and principles of a national audit framework. The steering group quality assurance (SGQA) consisted of representatives of a diversity of professions in the field of stroke care in the Netherlands, including managers, nurses, medical specialists and paramedics.

Findings – Auditors, coordinators and professionals evaluated the framework, agreed on that the framework was easy to use and valued the interesting and enjoyable audits, the compliments, feedback and fruitful insights. Participants consider that a quality label may help to overcome necessity issues and have health care insurers on board. Finally, a structured improvement plan after the audit is needed.

Originality/value – An audit offers fruitful insights into the functioning of an ISCS and the collaboration therein. Best practices and points of improvement are revealed and can fuel collaboration and the development of partnerships. Innovative cure and care may lead to an increasing area of support among professionals in the ISCS and consequently lead to improved quality of delivered stroke care.

Keywords Audit, Stroke, Quality, Care, Framework

Paper type Research paper

Introduction

Stroke is the second leading cause of morbidity and mortality in the world. Every year, more than five and a half million people die from stroke (Kim *et al.*, 2020). The crude incidence of stroke continues to rise because of an aging Western population and unhealthy lifestyle (GBD, 2018; Gorelick, 2019). Unfortunately, with a "business as usual" approach, the burden of stroke will not decrease in the next decade or beyond (Norrving *et al.*, 2018).

Over the years, the acute treatment of stroke has become more evidence based (Middleton *et al.*, 2011; Wardlaw *et al.*, 2014; Goyal *et al.*, 2016; Langhorne *et al.*, 2020). Also, the prevention

of stroke is gaining effect (Rashid *et al.*, 2003; Collins *et al.*, 2004; Collaborative overview, 1994). The latter includes targeting the major risk factors for stroke and cardiovascular disease, such as elevated systolic blood pressure, high body mass index, high blood lipid levels, diabetes mellitus and renal disease and behavior such as physical inactivity, poor diet and smoking. Moreover, according to the European Stroke Action Plan (ESAP) for the years 2018–2030 seven domains will have be put in place: primary prevention, organization of stroke services, management of acute stroke, secondary prevention, rehabilitation, evaluation of stroke outcome and outcome management and (quality of) life after stroke (Norrving *et al.*, 2018).

To organize stroke care, multiple stakeholders currently work closely together in integrated stroke care services (ISCS) and subsequently incorporate the services from hospitals, rehabilitation facilities, nursing homes and community care. The aim of ISCS is to provide person-centered care in all phases after stroke, with coordination of multi-disciplinary collaboration and using the collective expertise. Following from the 69th World Health Assembly in 2016, "integrated care" is the leading paradigm and should optimally lead to improved patient satisfaction, enhanced quality of life and better patient outcomes. An important policy toward integrated care is striving for quality improvement and safety (Sixty Ninht World Assembly, 2016).

However, the heterogeneous outcomes of integration initiatives for people with chronic diseases, including stroke, indicate that multiple challenges exist regarding the design, implementation and evaluation of such initiatives (Ouwens *et al.*, 2005). In the current patient journey, the stroke care process is experienced to be overly complex, since patients receive care from multiple organizations and multiple professionals in the different phases of disease (pre-stroke, acute phase, rehabilitation phase and chronic phase) (Valentijn *et al.*, 2013; Vat *et al.*, 2016; Zonneveld *et al.*, 2018). A person-centered and integrated care program based on patient-reported stroke outcomes needs a continuing quality improvement cycle to be part of it. This will enable an incremental redesign and implementation of service delivery.

In 2006, the Dutch Knowledge Network of Stroke Services (KNCN) was founded to support all stroke services in the Netherlands in their mission to improve the coordination, collaboration and quality of multi-disciplinary integrated stroke care provided within regional stroke networks. With the objective to support CQI, KNCN invites ISCS to perform a regular self-assessment for them to gain insight in their performance and to support comparative learning over time. Therefore, as part of its CQI activities, KNCN worked toward the development of a peer-to-peer audit framework. The current paper describes the development of this unique peer-to-peer audit framework derived from the DMIC (Minkman *et al.*, 2013), the Dutch stroke care standard and benchmark indicators for stroke (https://www.kennisnetwerkcva.nl/kennisbank/quality-standards/).

Development of the peer-to-peer audit framework

The context: Dutch Knowledge Network of Stroke Services (KNCN)
KNCN was founded by members of a few ISCS and a member of the national stroke patient association. They envisioned that sharing knowledge and working together is conditional for CQI of care delivery for persons with stroke. At the start in 2006, 21 ISCS participated in the national network. This number increased to 72 in 2012. After 2014, a decline in participating ISCS took place due to merging of small networks into larger networks. Nowadays, 42 ISCS or integrated stroke care networks are members of KNCN, with about 90% of all Dutch hospitals participating.

The ISCS comprise of different organizations (i.e. hospitals, rehabilitation centers, home care organizations, inter-professional networks, general practitioner practices and

municipalities) and different health care professionals (i.e. neurologists, rehabilitation doctors, elderly care physicians, neurology/rehabilitation/community nurses, neurology/rehabilitation/community paramedics and general practitioners). In general, the organizations and professionals are grouped around one or more hospitals in a region and the integrated care processes are coordinated by ISCS coordinators. Most coordinators are specialized stroke nurses, who are appointed at a regional hospital.

Focus aim and methods of the audit framework

The framework was developed using the steps of the Indicator Development Manual of the Dutch Institute for Health Care Improvement (CBO) (Beersen *et al.*, 2007). This manual is based on the instrument Appraisal of Indicators Through Research and Evaluation (AIRE) (de Koning *et al.*, 2006). Development of the framework occurred via 13 consecutive steps: (1) establishing the overall goal of the indicator development; (2) composing a working group; (3) re-establishing the overall goal in the working group; (4) clearly defining the scope; (5) searching for indicators; (6) listing potential indicators; (7) summarizing potential indicators; (8) elaborating indicators into factsheets; (9) composing a reading guide; (10) review specifications and feasibility assessment; (11) formulate specifications; (12) stakeholder consultations and (13) adapt and finalize indicators.

Steering group quality assurance (SGQA)

Commissioned by KNCN, a group of experts was brought together in 2016 to discuss the aims and principles of a national audit framework (step 2). This SGQA consisted of representatives of a diversity of professions in the field of stroke care in the Netherlands, including managers, nurses, medical specialists and paramedics. From 2016 till 2018, they collectively developed the audit framework.

According to the SGQA, the aim of the framework is to assess the value of "integrated stroke care." The major difference in comparison with existing audits is to no longer focus on the value of separate items of stroke care as provided by separate organizations. Moreover, the audit framework should focus on improving quality of collaboration, education and service delivery to strengthen person-centered, integrated delivery of stroke care. The actual working methods should be compared to national regulations, evidence-based guidelines, norms/indicators and regional protocols. Furthermore, the audit should particularly focus on collaboration between integrated care partners. Finally, the audit should have an emphasis on CQI since true integration does not occur over night (Steps 1, 3 and 4).

Decision building blocks in the SGQA

Concerning the framework, several points of discussion were raised in the SGQA. Most important points concerned criteria, content, auditors, audit and data (Table 1).

First, during a brainstorm session, the SGQA discussed the possible building blocks of the framework, concerning the following elements of the AIRE: (1) purpose and relevance; (2) stakeholders; (3) evidence base and (4) substantiation, wording and utilization. The building blocks should be evidence based and fit with (national) regulations, norms and indicators. Also, it was particularly important to have commitment of key persons. Therefore, the SGQA choose in consensus the content of the DMIC self-evaluation, the Dutch care standard and the benchmark indicators for stroke (https://www.kennisnetwerkcva.nl/kennisbank/quality-standards/). The ISCS are familiar with using these instruments and their applicability has been proven. Moreover, the self-evaluation tool derived from the DMIC (Vat *et al.*, 2016) has already been translated in Dutch and adjusted for stroke by KNCN. Therefore, the building blocks are more easily applicable in daily practice. The building blocks are integrated in the framework (Table 2) (Step 5, 6, 7 and 8).

Theme	Points of discussion
Criteria	How and what to measure
	Use of the development model integrated care
	Minimal, desirable and conditional criteria
	Applicability of the framework
	Eligibility for participation
Content	Available tools for the audit
	Regulations in organizations
	National regulations and guidelines
	Evidence-based material
	National norms/indicators
	Agreement and commitment from key persons
Auditors	Manual to fill in framework
	Manual to perform audit
	Profile of the auditor
	Tasks of the auditor
Audit	Which professionals participate in interviews
	Which (type) of organizations involved in audit
	Results on paper or in digital application
Data	Type of data to retrieve
	How to retrieve data
	Regulations according to data sharing
	Ethics and informed consent

Table 1.
Points of discussion in steering group

DMIC self-evaluation tool
According to the DMIC, the progress of an ISCS is represented in four phases as follows: (1) initiative and design phase, (2) experimental and execution phase, (3) expansion and monitoring phase and (4) consolidation and transformation phase (Figure 1). The DMIC comprises 89 unique elements of integrated care, which are grouped into 9 clusters: (1) client-centeredness, (2) delivery system, (3) performance management, (4) quality of care, (5) result-focused learning, (6) inter-professional teamwork, (7) roles and tasks, (8) commitment and (9) transparent entrepreneurship (Minkman *et al.*, 2013; Vat *et al.*, 2016; Buijck and Ribbers, 2018) (Figure 1).

The self-evaluation tool derived from the DMIC has been developed in 2012 for integrated care coordinators. It is a questionnaire with 98 questions to be filled in by the participants of an ISCS (Minkman *et al.*, 2013; Vat *et al.*, 2016). In 2019, KNCN added stroke specific elements, resulting in a total of 110 elements. The self-evaluation tool exists of three parts or objectives as follows: (1) to provide general information concerning the ISCS; (2) to rate the presence of all the elements in the ISCS and indicate which elements have priority for improvement in the next year and (3) to estimate in which phase of development the ISCS is arrived. The outcomes of the self-evaluation tool are to be described in a report. More information about the tool is described elsewhere (Vat *et al.*, 2016).

The self-evaluation tool is used by ISCS to improve the outcomes of care by refining the collaboration between participants. The results should be used to develop an improvement plan. It also offers a way to identify best practices and a fruitful opportunity to disseminate these best practices (Vat *et al.*, 2016). In 2012, 2015 and 2019, all ISCS affiliated to KNCN have been offered to fill in the Dutch self-evaluation. In 2012, 2015 and 2019, respectively 21, 59 and 47 services filled in the self-evaluation. The KNCN supports ISCS to learn from each other by sharing the reports of the self-evaluation. The self-evaluation itself is also part of the audit-procedure and is filled in before the audit takes place. The 110 elements of the self-evaluation were summarized into the 38 elements, which were deemed to be relevant during an audit.

Meets (M)	This norm is agreed and adhered by all partners in the ISCS
Partially Meets (PM)	The partners in the ISCS agreed with the norm, but the norm is not always adhered by all partners in the ISCS
Meets Not (MN)	The norm is not agreed and adhered by all the partners in the ISCS
Not evaluated (NE)	The norm has not been evaluated during the audit

1   *PATIENT CENTEREDNESS*
1.1   There is a case manager or intermediary available for the patient and their representatives and caregivers
1.2   (Digital) information systems of organizations in the ISCS are used to exchange patient information
1.3   The individual patient receives tailored information and education about diagnose, treatment and consequences thereof. The level of information is adapted to and verified with patient and his/her representatives
1.4   Patients and/or their representatives are actively involved in the deployment and adjustment of their individual care plan, adapted to their extend of self-management or self-efficacy
1.5   Care programs and protocols for specific groups are developed, i.e. aphasia, young stroke, children, cultural diversity and informal caregiver
2   *DELIVERY SYSTEM*
2.1   Agreements concerning care delivery and referral have been made
2.2   Integrated care and/or electronic patient files are available
2 3   Agreements concerning handover of patient information have been made
2.4   Agreements concerning patient flow have been made, i.e. admission, referral, discharge and time-path
2.5   Different expert nurses work in the ISCS: nurse practitioner, case-managers and specialized nurses
3   *PERFORMANCE MANAGEMENT*
3.1   Adequate information concerning the characteristics of patients in the ISCS is available, i.e. numbers, gender, in–outdoor times and age
3.2   Effects of integrated care collaboration is visible in the economic output of the integrated stroke care organizations and is communicated throughout the ISCS, i.e. number of referrals, waiting-lists and consequences
3.3   Successes and results of (innovative) projects are monitored, disseminated, communicated and celebrated
3.4   (Near) mistakes concerning integrated care issues are registered and analyzed in the ISCS: miscommunication, inaccuracies in referral, waiting-lists and errors
4   *QUALITY CARE*
4.1   There is structured guidance about necessity of prevention and possible treatment by means of implementing (the principles of) the patient version of the KNCN care standard
4.2   The ISCS organizes an annual program in favor of European stroke day
4.3   Patients' representatives are involved in improvement projects in the ISCS, i.e. patient-panels, project-groups, meetings and patient association
4.4   There is adequate support for finding a new balance concerning self-efficacy of the patient, i.e. after care, continues attention for fatigue, depression and neuro-psychological/psycho-social issues, adequate support to reduce caregiver strain (i.e. psycho social support, nurse support, community care, practical support, day care and holiday opportunities)
4.5   A specific caregiver in a central role makes a regular inventory of care needs of patients and/or their representatives
4.6   During hospital stay, patients receive daily physical and occupational therapy/training for motor functions and also in the weekend
4.7   Evidence-based guidelines and standards, which are developed in collaboration with the working-field and universities, are used
4.8   In the ISCS, agreements are made about improving results, concerning national norms and indicators, i.e. door to needle time, thrombolysis and intra-arterial treatment

(*continued*)

5	*RESULTS FOCUSSED LEARNING*
5.1	The ISCS is able to show how collaborative knowledge enhances the development of innovations, i.e. innovation team, knowledge brokers, collaborative networks and (inter)national programs
5.2	The ISCS develops courses and programs in a learning environment, i.e. courses, training, exchange of professionals, learning networks and collaboration with universities (of applied sciences)
5.3	The ISCS made agreements about evaluation of reached or not reached integrated care goals, i.e. reports, rewards, quality of care and improvement plans
5.4	Organizations in the ISCS share knowledge concerning: efficient working, maintaining and embedding of integrated care, learning in collaboration and using methods to accelerate
6	*INTERPROFESSIONAL TEAMWORK*
6.1	The ISCS made agreements with ambulance services about transport of suspected stroke patients
6.2	The ISCS made agreements with general practitioners about monitoring cardiovascular risk factors
7	*ROLES AND TASKS*
7.1	Professionals (medics, paramedics, nurses etc.) are informed about each other's competencies and tasks, i.e. education, experience and specialization
7.2	Coordination and consultation between professionals have been established, i.e. multi-disciplinary consultation, structure for (in)formal meetings and deliberation
7.3	Agreements concerning introduction of new organizations in the ISCS have been made
8	*COMMITMENT*
8.1	There is a system of periodical review and evaluation of agreements, approach and results, i.e. integrated care protocol, criteria, goals, vision and mission
8.2	Commitment of leaders in the organizations is acquired and visible, i.e. role, availability, key person and initiatives
8.3	Tasks, responsibilities and authorities of leaders, coordinators and (advisory) boards are well described
8.4	Directors of the ISCS have structural meetings with external parties such as municipality, inspection and care insurers concerning improvements, innovations, performance, quality of care, concerns and results
8.5	Organizations in the ISCS have agreements about releasing of domains, i.e. from one organization to another, diagnostics, e-health, case-management and roles of professionals
9	*TRANSPARENT ENTREPENEURSHIP*
9.1	Organizations in the ISCS made agreements about financial aspects of organizing integrated care
9.2	The ISCS made agreements with care insurers about bundled payments
Benchmark	
10	*INDICATORS*
10.1	The data concerning all (pre-defined) stroke benchmark indicators are collected and recorded
10.2	There is time calculated for registration of integrated care data How much time?
10.3	The ISCS delivers correct and complete data or has is a plan to collect and register the data more adequate
10.4	The results of the stroke benchmark are discussed regularly with the steering committee and professionals

Table 2.

The elements were selected and rephrased until consensus was reached in the SGQA. Consensus was reached for all elements after five consultation rounds.

Stroke care standard and benchmark
The stroke care standard consists of norms concerning prevention, individual care plan, treatment/guidance/rehabilitation, re-integration/social participation and secondary prevention/preventing functional decline, which originally are operationalized in 35 items. For the audit framework, the SGQA choose to integrate all items of the care standard into the nine clusters of the DMIC.

The benchmark consists of four norms and they are separately mentioned in the framework: indicators, time for registration, completeness of data and discussion (Table 1).
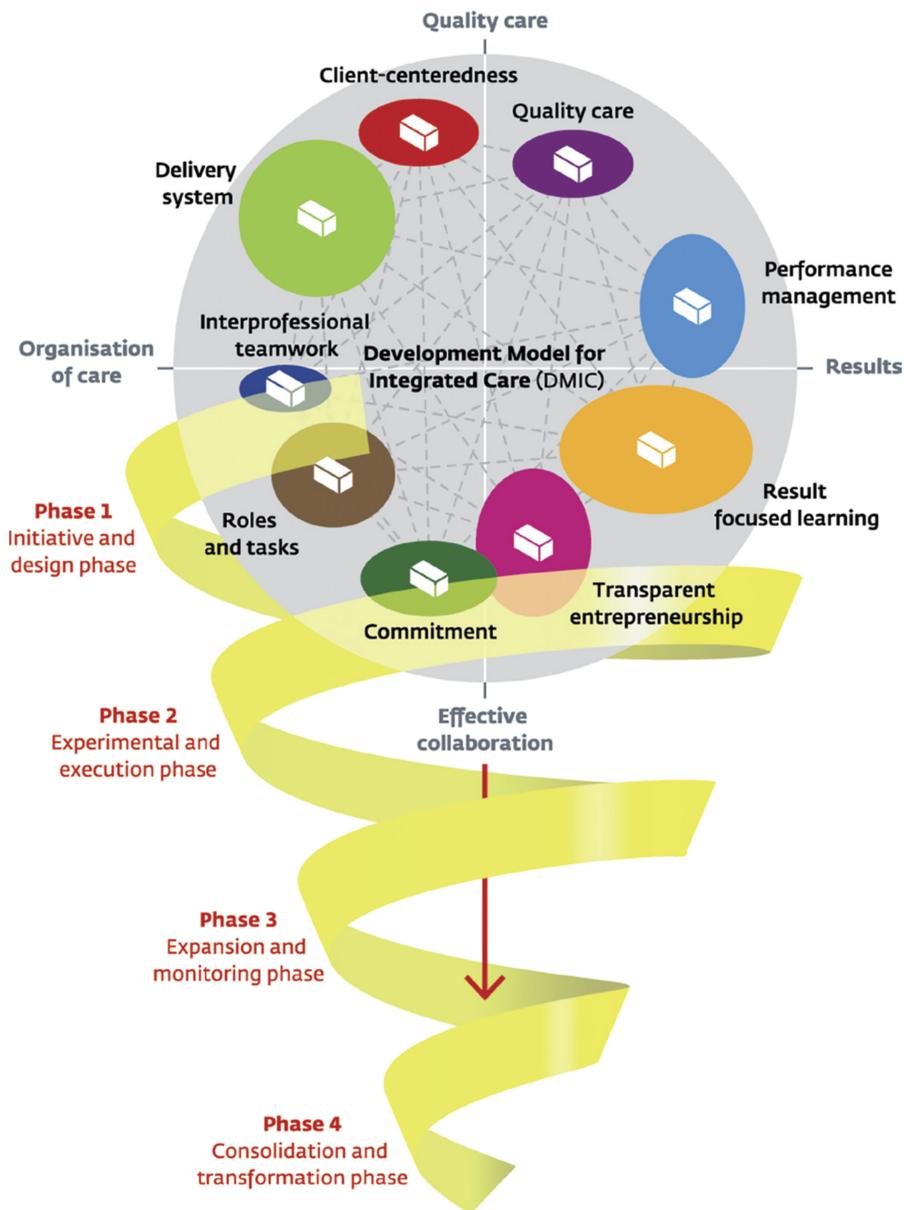
Per norm in the framework a score is awarded by the auditor: meets (M), partially meets (PM), meets not (MN) and not evaluated (NE).

The audit team
Trained auditors visit the organizations in the ISCS to evaluate the quality of collaboration, education and care provision (Step 10, 11 and 12). Their aim of is to verify the working

methods and stimulate organizations for CQI. The audit may stimulate professionals to improve the delivery of stroke care, under the expectation that audits could consolidate agreements and engagements.

The audit team visits the organizations of the ISCS and communicates with the relevant health care professionals. They process their findings in a report for the ISCS. The audit team consists of a minimum of two auditors who have no (in)direct relationship with the organizations of the auditing ISCS. The audit team has knowledge of stroke, the processes within an organization, integrated care processes and CQI. The audit is structured (framework and program) cyclically (every three years).

The auditor

An auditor describes a clear view of the ISCS on basis of relevant themes (i.e. according to the framework) and uses evidence (i.e. reports, self-evaluation and use of CQI standards) to confirm the findings. An auditor is the expert on behalf of and under auspices of KNCN. The auditor is responsible for performing the audit, giving the feedback to the ISCS and reporting of the audit toward KNCN and the audited ISCS. In the report, an emphasis is made on points of improvement and the identification of best practices. An auditor must perform a minimum of two audits each year. The tasks of the auditor are described in Table 3.

The auditor has, at least, a bachelor's degree and has relevant professional experience in the field of stroke, organization and care processes. The auditor is deployable after taking the course of ISCS auditor in which knowledge is gathered about the audit framework of KNCN. In the course, the auditor is trained among other things in conversation techniques and report writing.

Recruitment and training of auditors

After the job application procedure, ten auditors were selected. They were offered a training to learn: (1) to use the framework; (2) to interview the different health care professionals; (3) to interpret the results of the interviews and (4) to write an audit report (Perspekt, 2021).

Tasks before the audit	Study all relevant information provided by the ISCS
	Prepare for the audit after studying the information
	Make a program to perform the audit
	Communicate adequately with the stroke network coordinator
Tasks during the audit	Explain the aims and execution of the audit to participants of the audit
	Make notes during the audit
	Ask relevant questions during the audit
	Communicate preliminary findings to participants of the audit
Tasks after the audit	Develop the report with the findings of the audit within 20 working days
	Process the feedback of the stroke network in the final report
	Sent the report to KNCN which finalizes it
	Evaluate performance during the audit with co-auditors and ISCS coordinator
Characteristics of the auditor	Integrity
	Discrete and sensitive
	Empathic for feelings and opinions of others
	Ability to be persistent in asking questions
	Thoroughgoing
Skills of the auditor	Social skill full
	Professional critical thinking
	Strong verbal and written communication abilities
	Objective searching for evidence
	Analytical
	Independent working abilities

Table 3.
Tasks, characteristics and skills of the auditor

Furthermore, an important part of the training concerned the communication between the auditors, since each audit-interview needs to be performed by a pair of auditors and the audit team needs to write the concept version of the report directly after the audit. During the training, the auditors discussed how they managed to collect and describe all results into one report. The results not only consist of the findings of the audit but also recommendations how to improve the collaboration in the ISCS. After one year, the auditors were offered a short training to evaluate their performance during the previous audits.

Evaluation using the framework
After the first ten audits, an evaluation took place in the SGQA and the group ISCS coordinators. The main topics of their evaluation were as follows:

(1) The framework was easy to use during the audit. However, a manual with possible answers would be very useful (Steps 9 and 12), because examples (according to the themes in the framework) provided by professionals may be inexhaustive.

(2) The auditors, coordinators and professionals are familiar with using the building blocks (i.e. DMIC self-evaluation, the Dutch care standard and the benchmark indicators for stroke) in the framework, and therefore, the framework was easily applicable during the audit (Step 10, 11 and 12).

(3) Auditors, coordinators and professionals valued the interesting and enjoyable meetings during the audit (Step 12).

(4) Coordinators and professionals valued the compliments and feedback according to points of improvement.

(5) All agreed that independent assessments provide fruitful insights in blind spots in the collaboration in the ISCS.

(6) An audit focused on collaboration is fairly unknown, and it is not yet established in working processes and the necessity is not always clear. A quality label may help to overcome necessity issues and get health care insurers on board.

(7) The ISCS which have been audited developed a more or less structured improvement plan after the audit according to the points of improvement obtained from the audit. The actions in the improvement plan were recorded in the annual plans (Step 13).

Discussion
A unique peer-to-peer audit framework, derived from the DMIC, the Dutch stroke care standard and the benchmark indicators for stroke, was developed on a national level (Minkman *et al.*, 2013; https://www.kennisnetwerkcva.nl/kennisbank/quality-standards/). The audit framework is a unique tool and ISCS should be willing to value their collaboration by an external party. However, the management and decision-making process in an ISCS is a major challenge, with uncertainty about who is accountable for costs and results. Who will stand up in the ISCS to decide for quality improvement and an audit as a shared responsibility? What it makes more difficult is that full insight in the effect and costs of integrated care is lacking (Rocks *et al.*, 2020). The audit gives insight in performance of an ISCS, and if organizations take CQI seriously, an investment is warranted. For this reason, KNCN provides a platform to share knowledge and experiences between ISCS and seeks for possibilities to support the services in their (financial) decision-making processes. For example, by outlining the benefits of activities such as auditing and show which advantages it has.

The collaboration between integrated care partners needs further development for CQI, for example, through exchange of ideas and professionals between organizations. In the review of Juckett *et al.* (2020), the facilitators and barriers of implementing and adopting best practices were uncovered. The most common reported barriers are inconsistent adherence to delivering evidence-based practice (EBP) interventions, complexity of interventions, deemed inapplicable interventions, a lack of staff and EBP experts, increased costs associated with interventions, time constraints, logistical challenges, inadequate equipment, decreased inter-disciplinary communication, inconsistent leadership engagement, lack of knowledge, minor confidence, difficulty forming new habits and not having a favorable view of the intervention. Even when there is strong evidence showing the benefits of an intervention, abovementioned barriers might show up. Therefore, KNCN should invest considerable time in uncovering the facilitators and barriers of implementing new projects in ISCS. Publishing the best practices which are reported during the audit on the website of KNCN might be a first step and enables other ISCS to learn and benefit.

It is important to develop a structured improvement plan since research shows that if an improvement plan does not lead to improved outcomes, it seems that not all the topics of improvement are addressed well (Crowl *et al.*, 2015; Knudsen *et al.*, 2019). Mostly, it can be traced back on a lack of attention regarding to context, structure of the plan, support of staff, external judgment and the response of stakeholders on the external judgment, trust between parties, thorough analysis of the problem and its causes, relation between the analysis and the solutions and actions, prioritizing and phasing of solutions and actions, SMART phrased solutions and actions and how to measure the outcomes. At this moment, a format for an improvement plan is yet not available. The SGQA is planning to design a format for an improvement plan, based on the abovementioned topics and the improvement plans of the audited ISCS with the current and desired situation of collaboration in the ISCS, factors that promote and hinder collaboration, aims of the audit, time-frame, evaluation (schedule, process and results) and quality management with plan-do-check-act cycle.

The strength is that the development of the peer-to-peer audit framework involves professionals with experience in the field of stroke care, integrated care challenges and organization of care. This makes the framework highly applicable in the field of stroke care. Second, by using the DMIC, stroke care standard and stroke benchmark indicators, an evidence-based peer-to-peer audit framework could be developed. Third, the building blocks are familiar to the professionals in the ISCS and, therefore, easily to use during the audit.

An audit offers fruitful insights into the functioning of an ISCS and the collaboration therein. Best practices (i.e. specific care methods, bundled payments projects and education programs) and points of improvement are revealed and can fuel collaboration and the development of partnerships. Innovating cure and care delivery may lead to an increasing area of support among professionals in the ISCS and consequently lead to improved quality of delivered stroke care.

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