

Relevant Quality Assurance of Point-of-Care Testing in Emergency Home Health Nursing: An analysis of factors affecting Clinical Practice

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Purpose: The study aims to identify factors affecting clinical practice related to QA for POCT analyses in EHH nursing services. This is to support collaboration between EHH nursing services and BLS's located at hospital-based clinical laboratories, in designing relevant and functional QA programs for POCT performed in the EHH nursing service.

Material and Methods: EHH nursing services from four Danish districts participated in the project. The findings of this project are based on participant observations and interviews. Participant observation among EHH nurses in all four districts served as the foundation for a moderator guide, which was used for two focus group interviews among the nurses. Finally, the findings were refined through an interview formalized with two hospital-based BLS's responsible for POCT QA. All three interviews were transcribed and processed through thematic analysis.

Outcomes/discussion: The EHH nursing services participating in this project all have a collaboration with a hospital-based BLS for their POCT QA. However, they all have experience with QA strategies, which have proven inefficient. The results showed that the following themes influence the EHH nurses' involvement in QA for POCT analyses: Management, Organization of QA, Approach to QA and Skills in QA. All the themes have factors that affect QA for POCT but also affect the EHH nurses' quality of work life and/or professional values.

Conclusion: The findings indicate that an incentive to participate in QA programs for POCT must be established before collaboration between the management of EHH nursing service and the clinical laboratories is plausible. But if a collaboration has been established, key factors for QA-BLS include establishing collaboration with relevant districts management; organizing QA programs with attention to local structures and workflows; and encouraging strong relationships between QA-BLS and the EHH nurses to ensure correct training and follow-up among the EHH nurses.

Abbreviations: EHH = Emergency Home Health, POCT = Point-of-Care Test, QA = Quality Assurance, BLS = Biomedical Laboratory Scientists

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Introduction

Globally, healthcare systems are shifting from a hospital-centered model to a more patient-centered approach, thereby reinforcing the primary healthcare sector to ensure optimal health outcomes and cost-effectiveness.¹ This transformation in the healthcare systems, is driving a significant growth in the use of point-of-care testing (POCT) and enables laboratory testing with rapid results to be performed outside hospital settings and directly at the patient's location.² To ensure that the POCT analysis gives valid results it is important to ensure quality assurance (QA) of both the POCT equipment and the operator. The significance of sufficient QA of POCT analysis have been reported in several studies, including articles from England and Norway.^{3,4}

In Denmark it is a legal requirement for all municipalities, hereby referred to as districts, to have an emergency home health (EHH) nursing service that can perform POCT analysis. This aims to facilitate faster discharges of hospitalized patients and to provide supervision for vulnerable patients to ensure that hospitalization occurs only when clinically warranted. In Denmark it is a requirement to perform QA related to POCT used by the EHH nurses in the districts, but how and to which extent is not specified.⁵ Danish Society for Clinical Biochemistry⁶ (DSKB) along with authority's in many countries here among Belgium and Norway recommend that QA for POCT analysis in the primary sector is performed in collaboration with clinical laboratories.^{4,6} But as of September 2025, it is still less than half of the Danish districts and thereby the EHH nursing services, that have a formalized collaboration with a hospital-based clinical laboratory to ensure the QA for POCT analysis.⁷

The aim of this project is to support interdisciplinary and cross-sector collaboration between EHH nursing services in the districts, which use POCT, and biomedical laboratory scientists (BLS) located at hospital-based clinical laboratories. The project seeks to draw benefit from the knowledge and knowhow of various professions and sectors to develop

High-quality QA programs for POCT analysis that are perceived as relevant by EHH nursing service and thereby enhancing patient safety. To achieve this, the project seeks to identify factors that affect QA for POCT analysis among EHH nurses working out in the districts. Hopefully, this will pave the way for developing QA programs that the district EHH nursing service will fully commit to.

Materials and methods

This study employed a qualitative approach to explore EHH nurses' perspectives on QA for POCT analysis, with particular attention to the factors influencing their participating in QA programs.

The empirical data was gathered primarily from EHH nurses working in four different districts and obtained by participant observation and focus group interviews. To refine these findings, a group interview with two QA-BLS's was also conducted.

Initiating contact

The access to relevant information in the districts has primarily been promoted by our network consisting of; an external lecturer who works as an EHH nurse, and QA-BLS's. Our District 1 committed to participate from day one granting us access to conduct participation observation of work-situations and carry out a focus group interview with the relevant EHH nurses. In the three other districts we were granted access to conduct participation observation, by shadowing their QA-BLS when having QA meetings with the EHH nurses in the district. One of these districts (district 2), also consented to a focus group interview involving the EHH nurses.

The four districts, that participated in the project, are all connected to the island of Funen, Denmark. The four districts already have existing agreements with a hospital-based clinical laboratory regarding the QA of their POCT equipment and analyses, and they actively engage in these collaborations. However, the structure of the QA programs varies depending on which hospital-based clinical laboratory the district is affiliated with.

Until 2022, the QA programs in the relevant districts followed a uniform structure. Due to insufficient participation in the QA program, however, one hospital-based clinical laboratory decided to revise its procedures. The new approach shifted from conducting QA through the submission of patient samples for control analysis at the hospital-based clinical laboratory to performing QA collaboratively with the QA-BLS responsible for quality in the relevant QA program with the relevant EHH nurses out in the districts.

Ethics

Prior to each observation, verbal consent was obtained among the EHH nurses to allow our presence as observers. No audio or video recordings were made during the observations; instead, field notes were taken continuously. Selected excerpts from these notes are included in project-related publications.

Before conducting the interviews, written informed consent was obtained regarding participation in the interview and the subsequent use of empirical data, including the use of quotations in project-related publications.

All participants were anonymized, and for the same reason, age and years of experience were grouped for the EHH nurses in each district during the focus group interviews.

Participant observation

Participant observation was employed with the aim of gaining insight into the work and everyday practices of EHH nurses, and their approach to QA for POCT analyses. This method was chosen to expand the understanding of the field and to identify important factors that may not be accessible through existing literature. Accordingly, the participant observation was of an exploratory nature.⁸

Field notes were produced either during the observation or as soon as possible after the observation to ensure as accurate and comprehensive notes as possible. It is clearly indicated when an interpretation is made of what occurred by the observer, to distinguish objective observations from subjective interpretations. Since the project focuses on a specific aspect

of EHH nurses' daily work, QA for POCT analyses, focused notes were taken, and other observed aspects were deliberately excluded.⁹

We were granted access to conduct observations on three occasions in district 1, where QA activities are integrated into daily tasks and carried out as time permits. During these visits, we followed the work that was underway at the time. In the other three districts, where QA for POCT was planned with sessions four times annually, observations were performed at these sessions, one session per district. All observations were obtained in the last half of 2023.

Duration, number of nurses observed, and number of observers are listed in table 1.

Table 1. Participant observation: *Districts, duration of observation, number of nurses observed and number of observers.*

Districts	Duration	Number of nurses observed	Observers
District 1	Over the course of three days	2 (one observer at the time)	One observer at a time
District 2	2 hours	3	Both observers present
District 3	2 hours	2	Both observers present
District 4	2 hours	3	Both observers present

Focus group interviews

The participation observation was followed by focus group interviews, as this approach allows for further exploration and elaboration of topics that emerged during the observations and the analysis of the adhering field notes.¹⁰ A semi-structured moderator guide was developed based on the funnel technique and was revised between the interviews to reflect the findings and to adapt to the specific setting of the interviews (Appendix 1).

The number of participants in each interview was determined by the number of EHH

nurses employed in the respective districts, as well as practical considerations related to working hours and available resources. The two focus group interviews were conducted in a room adjacent to the EHH nurses' workplace in the respective districts and the interviews were audio-recorded.¹¹

Most of the participating EHH nurses were also present at the participation observation, meaning they were already familiar with the project and the project managers. When conducting the interviews both project managers were present: one acted as moderator, while the other served as observer and note-taker. Details regarding the participating districts, duration of the interview, number of participants, and the seniority of the EHH nurses are presented in Table 2.

Table 2: Focus group interviews - districts, duration of interview, number of EHH nurses interviewed and years of employment in the role of EHH nurse

District	Duration	Number of nurses interviewed	Years of employment in the role of EHH nurse
District 1	45 min	4 - named nurse 1-4	1 to 20 years
District 2	43 min	3 - named nurse 5-7	1,5 to 15 years

The first focus group interview was conducted in district 1 in December 2023, shortly after the final observation session had concluded. All four EHH nurses employed in the EHH nursing service participated. Three of the four nurses had previously been involved in the project, either through direct observation or informational meetings, while the fourth was newly hired.

The second focus group interview took place in district 2 in March 2024 and included two of the districts' three EHH nurses, as well as one clinical nurse specialist.

To further contextualize and nuance the insights gained from participant observation

and the focus group interviews, a group interview was conducted with two QA-BLS' responsible for overseeing the QA for POCT analysis in the districts of Funen. This interview was carried out in June 2024 and lasted 35 minutes. The interview was conducted online via Microsoft Teams and recorded as video; however, only the audio file was used for subsequent data processing. Both project managers participated - one as moderator and the other as observer and note-taker. The interview guide (Appendix 1) for this session was also semi-structured in design.

Analysis

The analysis of the field notes was conducted using an empirically driven approach, reflecting the exploratory nature of the observational study. The aim was to generate knowledge grounded in the participants' perspectives, actions, and attitudes. Field notes were indexed according to themes relevant to the project and subsequently informed the development of the interview guide used in the following focus group interviews.¹² The three interviews were transcribed in full, utilizing the "Transcribe" function in Microsoft Word as a supportive tool. Interview data were analyzed through an inductive thematic analysis, following the methodology outlined by Braun and Clarke¹³. This process involved coding of interesting features and thematization, and is finalized by interpretation of the data, based on selected quotations, emergent themes, and the interview material as a whole.^{13,14} An inductive approach was chosen to ensure an open and curious engagement with the data, deliberately avoiding the use of theoretical models or prior empirical frameworks. Efforts were made to set aside preunderstandings throughout the analysis.

Outcomes

This section presents findings from both the observational studies and accompanying field notes, as well as the focus group interviews and the group interview. The results are organized into the emergent four main the-

mes: (1) Management, (2) Organization of Quality Assurance, (3) Approach Toward Quality Assurance, and (4) Skills in Quality Assurance. Our findings are substantiated with quotes and field notes, and the emergent subthemes are summarized and collected in table 3, at the end of this section.

Management

As the Danish healthcare system is structured today, districts must pay the hospitals for participation in QA programs under a hospital-based clinical laboratory. Therefore, the management needs incentives that encourage them to commit to QA programs in collaboration with a hospital-based clinical laboratories. This was also highlighted in the interview with the QA-BLS's. They described the challenge of establishing a formalized collaboration around POCT QA activities when participation in the QA program is not mandatory but merely recommended.

"We need someone at a higher level [political] to engage with the districts that aren't participating, rather than it being us, as a QA-BLS from a hospital, trying to get their attention." (QA-BLS 2)

The management's commitment towards QA was found to significantly influence EHH nurses' engagement and motivation in their interactions with the QA-BLS and in their participation in the QA activities. This was evident in the observational studies, where it was observed that a lack of communication from management to the relevant EHH nurses regarding participation in QA activities led to reduced engagement and motivation. Observed not only in performing the QA activities but also in interactions with the QA-BLS, which are seen in the following field notes:

"The newly employed nurse begins by questioning why she is even present, expressing that she has not been adequately informed. The nurses also indicate that they have received no information about what is going to happen or why they are expected to participate in the QA meeting. It is evident that this lack of communication results in low

engagement and a reduced sense of relevance." (Extract from field notes from a QA-meeting with district 3)

During the focus group interviews, participants were asked about the management's involvement in QA activities, and it was evident in both districts that EHH nurses perceive the management commitment to QA important for their QA efforts. Specifically, management is expected to allocate resources to support QA initiatives. One EHH nurse articulated this in the following quote:

"If they want this to have significant value - which they actually do - then they also need to ensure that there are enough time and resources allocated to it [QA]." (Nurse 4, district 1)

The interviews also revealed that the interviewed EHH nurses feel supported by their management in participating in QA activities, as illustrated in the following quote:

"It is also important that management understands the situation - and they have, from day one. And I must say, our manager is highly skilled at communicating with our senior management, clearly articulating what is needed to succeed. From my conversations with her [the manager], I get the impression that she is genuinely receptive." (Nurse 5, district 2)

In one district the EHH nurses themselves attempted to initiate development of the QA program, however, this proved challenging. Political mandates or other explicit demands were perceived as more effective in motivating management to act than the EHH nurses' own initiatives. This is reflected in the fact that other healthcare professionals, in the districts, performing POCT analyses were not subject to QA activities, despite the EHH nurses identifying this as a concern:

"This is exactly what we've been wanting [QA of other healthcare professionals in the districts]. I've seen a need for it for a very long time but haven't really been allowed to pursue it. It's as if the management couldn't see the relevance before, but now I believe they do. It's now clearly stated in the new quality

standard for emergency home health nursing, so we have to act – and move forward.” (Nurse 1, District 1)

Management’s support and commitment towards QA - particularly their prioritization of time and resources - reflect the perceived relevance of these efforts and, consequently, influence EHH nurses’ motivation and engagement in participating in QA activities. Both EHH nurses and QA-BLS’s expressed that it is difficult to motivate management to participate in QA programs unless there is a clear external requirement to do so.

Organization of Quality Assurance

Nationally, there are significant differences in how EHH nursing services are organized within the individual districts, including their geographic location, the POCT equipment used, and whether blood samples are collected capillary or venous. These variations were also observed during fieldwork and were further substantiated in the interviews. The interview with QA-BLS highlighted the importance of designing QA programs that align with the specific structure and organization in each district’s EHH nursing services, ensuring both practical, feasible, and cost-effective QA programs:

“Because it’s a district that is structured quite differently, as it’s not an EHH nursing service but rather 40 nurses providing general care, and covering the EHH nursing function as well. That leads to a completely different structure and setup [regarding the QA activities], which means it becomes a matter of making the best of it.” (QA-BLS 2)

Logistical factors also have an impact on the QA activities for POCT. These include the delivery of samples for QA at the hospitals, the collection of relevant POCT equipment in a district which needs QA checks, and the scheduling and location of QA activities in the districts:

“I must report that I take all the equipment [POCT] from the south of the district to the north, so they are allocated to me (...), which means things are somewhat shut down during

the QA meeting, so it needs to be quick and efficient.” (Nurse 5, District 2)

It was also observed that administrative aspects - particularly those related to IT - can be discouraging for participation in QA activities, if they are perceived as cumbersome and complex. In one of the focus group interviews, the EHH nurses reported that the administrative burden was minimal (the QA-BLS took care of most of the administration), while in the other district they described it as time-consuming and involving multiple IT systems and procedures. This was exemplified by an EHH nurse in the following quote:

“I find that the procedures in the district are cumbersome, and you must navigate through many IT-systems. You [the observers] saw for yourselves how much documentation was required, and on several different platforms [It-systems]. At the hospital, when you perform QA activities, it is accessible and straightforward. That is not the case out here [in the district].” (Nurse 2, District 1)

EHH nurses in the focus group interviews emphasized the importance of ensuring that all healthcare professionals in the districts who perform POCT analyses should be included in QA programs. This is due to the codependence of health care personnel in the districts, as patient care is sometimes initiated by health-care personnel other than the EHH nurses:

“I think this setup [QA program] serves its purpose well. What we’ve been asking for is something [QA activities] for the nursing homes in the district, specifically the equipment for CRP analysis. I feel it’s where our QA program is lacking - as you [Nurse 7] also mentioned.” (Nurse 6, District 2)

In addition to the above-mentioned the data also shows that it is essential for the QA-BLS that QA activities are conducted across all phases of the test process: pre-analytical, analytical, and post-analytical. This is reflected in the following quote:

“For QA activities to become comprehensive it is important to include all three phases: pre-analytical, analytical, and post-analytical phases. We have tried to

examine how we can optimize each of the three phases.” (QA-BLS 1)

Overall, when organizing QA programs, it is important to consider which logistical concerns there might be in the individual district, make sure that the administration and IT-solutions are well-structured and user-friendly. But it is also important to incorporate QA across all phases of the test process and of all relevant staff.

Approach to Quality Assurance

Overall, the observational studies demonstrated that professionalism is a central element in EHH nurses' understanding of what constitutes good patientcare. When EHH nurses perceive QA activities and collaboration with the QA-BLS as relevant, their natural engagement increases, and a clear motivation to participate in QA is observed. The fieldwork showed that participants relate differently to QA activities and to their QA-BLS depending on their perceived relevance of the QA work. These differences are not often verbalized among participants but are evident in non-verbal interactions, including how they engage with each other, how they approach POCT equipment and blood sample collection, and how they interact with the QA-BLS:

“One EHH nurse is highly motivated by the QA training. She expresses that she has not previously received instruction in sample collection, and she has felt the need to rely on self-directed learning. In contrast, the other EHH nurse clearly states that she does not find the training relevant, as she is accustomed to performing the analyses, and she does not feel the need for further instruction. She cannot understand why she should observe the calibration of the POCT equipment. However, during the QA meeting, valuable dialogue between the EHH nurse and the QA-BLS is observed, particularly concerning pre-analytical procedures”. (Extract from field notes from a QA-meeting with district 3)

The above-mentioned is aligned with data from the group interview with the QA-BLS's.

In the focus group interviews, EHH nurses emphasized the importance of being able to

trust the results from the POCT analysis. In one district the EHH nurses expressed strong confidence in their POCT equipment and results, while the EHH nurses in the other district have adopted a more critical stance due to previous experiences with errors in results from POCT analysis that have had clinical consequences. This is also demonstrated in the following quotes:

“When the QA-BLS comes to the QA-meeting - and she has the correct results from the lab at her hospital - we can observe that they align closely to the results from our POCT equipment. That's why we have this sense of trust [in the POCT equipment] - because that has been our experience every time. It's the reason we have such a strong feeling that our POCT equipment is providing accurate results.” (Nurse 6, District 2)

“I also feel a bit puzzled - if the results don't match what you're seeing, you start to think, hey, maybe there's something wrong with the equipment.” (Nurse 3, District 1)

Among the EHH nurses in the focus group interviews, QA and the work of the QA-BLS are viewed not as a form of control, but as a reassurance for maintaining professional standards. Moreover, QA is seen to enhance patient safety, for example by preventing unnecessary hospital admissions, which is illustrated in the following quotes:

“That's why I make a point of emphasizing that this is an assurance - quality assurance - and not a control. I believe it's something we can all learn from.” (Nurse 1, District 1)

“I think, if I were a patient, I would actually also want someone to come and performed quality assurance and test that it was done correctly.” (Nurse 3, District 1)

Another important factor is the relationship with the QA-BLS, which in both districts plays an important role in the QA process. In one district, contact with the QA-BLS is primarily written, by email, and only initiated when necessary:

“If something is seriously wrong, she [QA-BLS] will contact us directly. Otherwise, we typically check the database four days later,

where the results should be available. It is then our own responsibility to verify that everything is in order.” (Nurse 1, District 1)

In district 1, EHH nurses also noted a significant difference between working with QA in a hospital setting versus out in the district at the EHH nurse service. This can make QA collaboration between hospitals (QA-BLS) and districts more complex. In this district there is a desire for more structured support, such as a consultant or other facilitating solutions. In contrast, EHH nurses in district 2 unanimously agree that having the QA-BLS visiting them in person is beneficial for relationship and collaboration. They also noted that face-to-face contact encouraged more questions and fostered constructive dialogue:

“I find our QA-BLS to be excellent—always approachable and responsive. She is highly competent in her role, and you never feel that any question is too trivial or inappropriate to be asked.” (Nurse 5, District 2)

For the EHH nurses to form a positive approach to QA it is important to make sure that they perceive the QA activities as relevant, and a reassurance for both them and the patients. The EHH nurses should have a clear understanding of the useability of the POCT equipment, but also its pitfalls. These factors can all be facilitated by a good relationship with the QA-BLS, because it opens for constructive dialogue between the EHH nurses and the QA-BLS.

Skills in Quality Assurance

In the focus group interview, EHH nurses emphasized the importance of having QA-BLS responsible for training programs with new colleagues in QA procedures:

“She [QA-BLS] also assists in training of our new colleagues in venipuncture techniques and related procedures. She performs significantly more venipunctures than we do, so it is highly beneficial that the training is conducted by someone with the most extensive

experience. I find that very valuable.” (Nurse 6, District 2)

The EHH nurses understand that QA-BLS’ involvement in QA training for POCT analyses is essential to prevent the spread of improper practices or procedural inaccuracies, which is emphasized in following quote:

“Naturally, we contribute with the knowledge we have. However, it is possible to adopt “poor” practices gradually, and if these are passed on to a new colleague, it may lead to a shift in clinical practice. Therefore, it is preferable that the responsibility for approving and overseeing training lies with the QA-BLS.” (Nurse 5, District 2)

It is evident that EHH nurses rely heavily on knowledge sharing in their daily work, as illustrated by the following quotes:

“... I believe we [nurses in the district] also make extensive use of knowledge sharing.” (Nurse 1, District 1)

“We also have a culture that supports knowledge sharing. I believe this is particularly evident across the entire nursing practice.” (Nurse 4, District 1)

It is therefore expected that EHH nurses will engage in knowledge sharing in relation to QA, and this is also demonstrated in the following quote, where an EHH nurse describes her wants regarding training and follow-up in relation to POCT QA:

“It involves experience, training, and follow-up [...], as minor errors may be repeated if there is no subsequent review or discussion with a colleague.” (Nurse 4, District 1)

Consequently, it is important that the QA-BLS is accessible for consultation to ensure that the QA-BLS is the first choice in training and knowledge sharing to secure proper follow-up and updates regarding QA.

The four main themes identified through the analysis, which are presented in the results section, are further elaborated in the discussion section below.

Table 3. Main themes and subthemes.

Observational Study Themes	Municipality 1 Subthemes	Municipality 2 Subthemes	QA-BLS Subthemes	Main Themes
- Management	- Management support - Commitment towards QA - Relevance/incentive for management	- Management support - Economy	- Management support - Commitment towards QA - Economy - Relevance/incentive for management	Management
- Organization of QA	- IT and administration - Operational Aspects of QA - Comprehensive QA - Including Both Analytical Procedures and Staff Competence	- Comprehensive QA - Including Both Analytical Procedures and Staff Competence	- IT and administration - Logistics of QA - Comprehensive QA - Including Both Analytical Procedures and Staff Competence	Organization of Quality Assurance
- Approach Towards QA	- Confidence in POCT equipment - QA as reassurance (ensuring Patient and Staff Safety) - Collaboration with QA-BLS - Training - Knowledge sharing - Follow up on training	- Confidence in POCT equipment - Collaboration with QA-BLS - Quality Assurance Must Be Contextually Relevant - Training - Knowledge sharing - Utilization of QA-BLS	- QA as reassurance (ensuring Patient and Staff Safety) - Quality Assurance Must Be Contextually Relevant	Approach Towards Quality Assurance Skills in Quality Assurance

Discussion

This section interprets the findings in relation to existing literature and evaluates methodological strengths and limitations of the study. This is followed by a discussion of how the findings - specifically the identified subthemes - can be applied in the development of QA programs in clinical practice, both within the participating districts and potentially at a national and even international level.

Interpretation of Findings

The analysis identified four main themes, which will be discussed separately in the section below.

In the main theme **Management** incentives and financial considerations strongly affect district participation in QA programs. Danish districts operate within fixed service budgets negotiated annually with the government, prioritizing mandatory tasks before optional initiatives.¹⁵ As QA for POCT is not a legal requirement, management commitment becomes critical. Research from Brooks and Anderson¹⁶ emphasizes that management support and

resource allocation enhance nurses' job satisfaction and engagement. Our findings indicate that visible management support and managements prioritization of QA for POCT enhance motivation for QA activities and strengthen collaboration with the QA-BLS. This ultimately contributes to improved quality in EHH nurses' professional practice.¹⁶

In the main theme **Organization of Quality Assurance**, it is important that QA programs are tailored to local structures, logistics, and IT systems. Uniform QA programs are impractical due to organizational diversity across districts. It is essential that QA procedures are perceived as meaningful, as these activities are not immediately aligned with nurses' primary tasks. Studies show that tasks perceived as irrelevant to nurses' primary tasks reduce work satisfaction.¹⁶ Therefore, QA programs should be integrated into the clinical workflows of the individual district. Furthermore, it is important to ensure that QA programs are comprehensive, encompassing all relevant staff and phases (pre-, analytical, and

post-analytical) of the test process. Once nurses recognize the importance of QA for POCT, they tend to engage actively in these efforts. This is also aligned with the nurses' professional values described by Weis & Schank¹⁷, that when the nurses see the relevance in a work task, they commit to it. ¹⁷ The perceived importance of QA for POCT also leads to the understanding that QA must be carried out by all personnel performing POCT analyses, not only by EHH nurses.

Within the main theme *Approach to Quality Assurance*, the relationship with the QA-BLS emerges as a critical factor. This relationship influences EHH nurses' engagement and participation in quality-related work. Brooks and Anderson¹⁶ emphasize that collegial relationships are essential for nurses' engagement and job satisfaction. Consequently, fostering a strong connection with the QA-BLS is vital, as it can positively shape approach toward QA. Nurses are highly aware that QA contributes to both patient and staff safety, and they do not perceive these efforts as a form of control over their professional competence. This perspective aligns with nurses' fundamental ethical value of Responsibility, where conducting QA is essential for ensuring patient safety. ^{17,18} Confidence in the analytical process may lead to unwarranted trust in other steps of the procedure, such as pre-analytical and post-analytical phases. This is an important consideration for the QA-BLS. Kaya and Boz¹⁹ describe how prior experiences influence future behavior. Therefore, integrating patient cases that illustrate potential sources of error in POCT analyses is crucial for enhancing EHH nurses' experiential knowledge and reinforcing their overall commitment to QA.

The final main theme, *Skills in Quality Assurance*, addresses how EHH nurses are trained and maintain their skills related to QA for POCT. Findings indicate that professional knowledge-sharing among the nurses are essential to their clinical practice. This is supported by Weis and Schank,¹⁷ who emphasize that such interaction is a key factor in

optimizing nursing and caregiving. Nurses perceive professional follow-up and updates as most effective when conducted in collaboration with relevant specialists. This inter-professional linkage can lead to strong collaboration between QA-BLS and EHH nurses, as well as cross-sectoral cooperation between districts and hospitals. ^{20,21} In daily practice, EHH nurses naturally seek professional knowledge-sharing, consequently, the accessibility of the QA-BLS significantly influences whether EHH nurses consult this expert or rely on discussion among themselves. However, this practice carries the risk of perpetuating inappropriate workflows if the QA-BLS is not perceived as available. This concern was explicitly raised by the EHH nurses during the two focus group interviews.

Discussion of Materials and Methods

This section examines the materials and methods applied in the project and how they may have influenced the results. Contact was established through our existing network within clinical practice, primarily QA-BLS. Consequently, the districts participating in the project were already engaged in some form of POCT QA in collaboration with a hospital-based clinical laboratory. While this facilitated access and ensured a baseline of quality awareness, it may also have introduced a selection bias, limiting perspectives from districts without prior QA experience. Some districts have prior experience with QA programs operating suboptimal. These perspectives emerged in both observational studies and focus group interviews and were further substantiated by interview with QA-BLS. However, because these insights stem from participants already involved in QA programs, there is a risk that factors identified here reflect issues only within EHH nursing services already involved in QA for POCT rather than the full spectrum of challenges faced by districts starting from scratch. Therefore, while we believe the identified factors are broadly relevant for POCT QA in districts, they may not be exhaustive.

The number of EHH nurses participating in each focus group interview ranged from three

to four, which is relatively small for achieving the desired group dynamics.¹⁰ This limited size may have constrained the diversity of viewpoints and reduced opportunities for interactional depth. However, it reflects the actual size of the EHH nursing teams in the district. In one focus group, the clinical nurse specialist also participated, as she collaborates closely with the district EHH nurses. Initially, only EHH nurses from the team were intended to participate, but the inclusion of the clinical EHH nurse specialist provided a more nuanced perspective. While this decision enriched the discussion, it also introduced heterogeneity that could have influenced group dynamics. Data analysis focused primarily on content rather than relational dynamics among participants. Nevertheless, the observer monitored whether any participants dominated the discussion and potentially influenced others. Although some participants spoke more than others, no overt dominance was observed, and the overall atmosphere was perceived as safe and trusting.¹⁰

Discussion of Results Applied in Clinical Practice

Our findings identified factors affecting participation in POCT QA among the EHH nurses. These findings may serve as a foundation for developing tailored QA programs for each district's EHH nursing service. However, the practical implementation of these QA programs may vary significantly across districts with different resource levels and organizational cultures. This variability underscores the need for flexible frameworks rather than rigid programs. The main point is to ensure that EHH nurses perceive these QA programs as relevant and thereby enhancing patient safety.

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The knowledge derived from this study is primarily associated with the EHH nursing service; however, we would argue that its applicability extends to other contexts in which POCT equipment is employed outside of a hospital-based setting, and when used by health-care personnel other than BLS.

Conclusion and Perspectives

The project identified various factors affecting POCT QA in EHH nursing service across four main themes: Management, Organization of Quality Assurance, Approach toward Quality Assurance, and Skills in Quality Assurance. Key insights for QA-BLS include establishing cross-sectional collaboration with relevant districts leaders; organizing quality programs with attention to local structures and workflows; and encouraging strong interprofessional relationships between QA-BLS and the EHH nurses to ensure training and follow-up of skills. It is important to note that these findings do not provide a method for initiating contact between a district and the QA-BLS. Rather, the findings are a tool to support the establishment and maintenance of High-quality QA programs for POCT analysis in the districts and thereby enhancing patient safety.

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Appendix 1 - Moderator Guides

Moderator Guide for district 1 - Focus Group Interview

- To begin, I would like to ask each of you to briefly introduce yourselves by stating your name and sharing why you chose to become an EHH nurse within the district.
We will start with a few exercises where you will first reflect on the questions individually and then discuss them in plenary.
- What do you associate with high-quality district EHH nursing service? (Core values for nurses). Please think broadly about your profession, not only in relation to POCT analyses.
- What do you associate with high quality in relation to POCT performed in district EHH nursing service? (You may also include elements that contribute to reducing quality).
- Currently, the QA for POCT analyses performed out in the district EHH nursing service is anchored at a hospital-based clinical laboratory. What are your experiences/opinions regarding this:
 - Advantages/disadvantages.
 - Is there a formal agreement document you actively use, and is the setup clear?
 - Contact QA-BLS (Accessibility and communication channels).
 - Time frame (Is this task a strain on your daily work?).
 - How do you stay updated and maintain competencies related to the QA for POCT?
- Do you find that performing QA according to the QA-BLS or the procedures you follow for POCT in the district EHH nursing service adds value:
 - For the patient.
 - For your professional practice.
 - For interdisciplinary collaboration. (As we understand it, there are also staff in the districts who perform POCT analyses but are not included in the QA-program - is this correct and what are your views on this?)
- How do you perceive the role and significance of your management in relation to the QA for POCT in the district EHH nursing service?
- To what extent do you think management influences the participation in QA for POCT in district EHH nursing service - in general?
- What do you consider to be an ideal setup for QA for POCT performed in district EHH nursing service or which elements should be included in such a setup:
 - Ideal scenario - just think in terms of elements, not a complete package (Feel free to think freely - disregard financial constraints).
 - Importance of management support (Management's stance on QA).
 - Resources for QA.
- Finally, is there anything we haven't covered that you think is relevant to the topic?

Moderator Guide for District 2: Focus Group Interview

- To begin, I would like to ask each of you to briefly introduce yourselves by stating your name and sharing why you chose to become an EHH nurse within the district.
We will start with a few exercises where you will first reflect on the questions individually and then discuss them in plenary.
- What do you associate with high-quality district EHH nursing service? (Core values for nurses). Please think broadly about your profession, not only in relation to POCT analyses.
- What do you associate with high quality in relation to POCT performed in district EHH nursing service? (You may also include elements that contribute to reducing quality).

- Currently, the quality assurance for POCT performed in EHH nursing service is anchored at a hospital-based clinical laboratory. What are your experiences/opinions regarding this:
 - New and old arrangement:
 - Advantages/disadvantages.
 - Is there a formal agreement document you actively use, and is the setup clear?
 - Contact QA-BLS - in relation to both the new and old arrangements.
 - Accessibility and communication channels with the QA-BLS.
 - Time frame (Is this task a strain on your daily work?).
- How do you experience maintaining your competencies in relation to QA for POCT - in relation to both the new and old arrangement?
- Do you find that performing QA for POCT in EHH nursing service adds value:
 - In relation to both the new and old arrangements.
 - For the patient.
 - For your professional practice.
 - For interdisciplinary collaboration. (As we understand it, there are also staff in the districts who perform POCT analyses but are not included in the QA-program - is this correct and what are your views on this?)
- How do you perceive the role and significance of your management in relation to the QA for POCT in the district EHH nursing service?
- To what extent do you think management influences the participation in QA for POCT in district EHH nursing service - in general?
- Or are there other individuals responsible for QA (POCT coordinator/contact person)?
- What do you consider to be an ideal setup for QA for POCT performed in district EHH nursing service, or which elements should be included in such a setup:
 - Ideal scenario - just think in terms of elements, not a complete package (Feel free to think freely - disregard financial constraints).
 - Importance of management support (Management's stance on QA).
 - Resources for QA.
- Finally, is there anything we haven't covered that you think is relevant to the topic?

Moderator Guide for Group Interview

- To begin with, I would like to ask each of you to briefly introduce yourselves by stating your name and job role.
- What do you associate with high quality in relation to POCT performed in district EHH nursing service, based on your job position?
- What do you perceive as facilitating or inhibiting the nurses' participation in QA in district EHH nursing service (i.e., from a nursing perspective):
 - Nurses' perception of relevance regarding QA:
 - What do they consider important?
 - Are there aspects of QA that seem disconnected from nurses' core tasks (i.e., elements that do not fit into their daily practice)?
 - Please address both the old and new arrangements.
 - How significant do you perceive the role of management and financial resources to be in relation to QA for POCT and the district's participation:
 - Management (within your own organization and in the districts).

- Financial resources (within your own organization and in the districts):
 - What do the districts pay for your services?
- If management and financial resources were not a factor - what would you consider to be an ideal setup for QA for POCT performed in district EHH nursing service, or which elements should be included in such a setup?
- Finally, is there anything we haven't covered that you think is relevant to the topic?

