# TOGETHER IS MORE

Intraprofessional working and learning within the complexity of care for older adults

**Maarten van der Ven**




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# Propositions

1. To improve intraprofessional workplace learning, we should also change the way we work together – this thesis

2. We tend to train residents to become increasingly independent professionals in a healthcare system that increasingly depends on collaboration – this thesis

3. Residents rotating through other medical departments can act as boundary workers, serving as catalysts for intraprofessional learning – this thesis

4. Evaluation that mirrors how learners learn creates opportunities to revisit, deepen, and expand their learning – this thesis

5. Intraprofessional collaboration learning should be an integral part of the (postgraduate) education curriculum – this thesis

6. Resident–supervisor dynamics can hinder intraprofessional collaboration learning during dialogues in the workplace – this thesis

7. Supervisors are key facilitators of intraprofessional learning, yet they are not always prepared to fulfil this role – this thesis

8. A complex web of contextual factors in the clinical workplace complicates how residents collaborate and learn across specialty boundaries – this thesis

9. 'The whole is more than the sum of parts' - Attributed to Aristoteles

10. 'Hips don't lie' – Shakira

# Together is more - intraprofessional working and learning within the complexity of care for older adults

Maarten van der Ven

**Maarten Jacobus Hieronymus Van der Ven**
**Together is more - intraprofessional working and learning within the complexity of care for older adults**
How residents and supervisors can learn intraprofessional collaboration in the workplace

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# Together is more - intraprofessional working and learning within the complexity of care for older adults

How residents and supervisors can learn intraprofessional collaboration in the workplace

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# CHAPTER 1

## General introduction

Population aging leads to a growing number of older adult patients with multimorbidity (1). Providing appropriate care for these patients is challenging, as rapid technological advancements create a multitude of potential diagnostic and therapeutic options for each individual chronic condition a patient has (2-4). Currently, healthcare professionals manage the complex care needs of these multimorbid patients through extensive specialization (5). A result of this specialization, is that patients often simultaneously receive care from multiple healthcare professionals, who each focus on a specific condition (2).

However, when multiple professionals are involved, patients often end up with multiple treatment plans that may lack alignment or contain contradictions (6). Inadequate collaboration among healthcare professionals may contribute to fragmentation of care, which increases the risk of adverse patient outcomes (7). Consequently, these multimorbid patients require coordinated care across healthcare professionals (2, 3). Therefore, effective collaboration between healthcare professionals is essential for delivering effective, efficient, and integrated care (8, 9). As a result, exploring how collaboration across healthcare professionals may facilitate coordinated and integrated care for patients with complex needs has become an important focus of research.

Research on collaboration distinguishes different types of collaboration, amongst which interprofessional and intraprofessional collaboration. These types of collaboration are defined as:

- *Interprofessional collaboration(IPC)* involves healthcare professionals from two or more different professional backgrounds, such as physicians, nurses, and paramedical professionals, working together from one integrated treatment plan (10).

- *Intraprofessional collaboration(IntraPC)* involves healthcare professionals from two or more different specialties within a single profession, such as a geriatrician, a general practitioner and a surgeon, working together from one integrated treatment plan (11). In some studies, the term *interphysician collaboration (IPhC)* is used to refer specifically to IntraPC between physicians from different medical specialties.

Effective IPC and IntraPC do not occur automatically when professionals from different professions and/or specialties work alongside each other (10, 12). It requires shared understanding, communication, mutual respect, and the ability to integrate different professional perspectives (10). these competencies need to be developed and maintained through medical education (13). Consequently, collaboration is not only a matter of healthcare organization but also of learning. Therefore, medical education may require a redesigned to include learning IPC and IntraPC (15).

Over the past years, research on IPC learning has expanded rapidly and undergraduate training has increasingly incorporated interprofessional education and Collaborative Practice (IPECP) as an essential part of medical education (10, 16). In contrast, IntraPC learning remains a comparatively underexplored area (11). Furthermore, important differences between IPC and IntraPC have been identified, such as differences in hierarchical structures and the less clearly defined leadership roles across medical specialties (17). These contextual differences between IPC and IntraPC, indicate that certain components of IPC and IPECP may not evidently be transferable to IntraPC and learning (17).

Residents, who are physician during postgraduate specialty training, are often assumed to develop IntraPC competencies automatically through participating in clinical practice (18). However, as residents progress within postgraduate training, they tend to become more embedded within their specialty-specific silos. As a result, curiosity towards the perspectives of colleagues from other specialties may gradually diminish (19). To this effect, residents in previous studies have mentioned how IntraPC learning requires explicit attention in postgraduate training (11, 20).

Postgraduate training offers valuable opportunities to foster IntraPC learning. Residents participate in clinical practice and encounter interactions with colleagues from other specialties on a daily basis, while simultaneously experiencing the challenges of IntraPC first-hand (20). To guide educators in facilitating IntraPC learning in the workplace, a set of IntraPC competencies and design principles have been developed (21, 22). Design principles are empirically developed, practice- and theory-informed guidelines that may aid educators in the creation of learning activities (22). However, how these IntraPC design principles translate into deliberate learning activities in workplace has yet to be established.

Several theoretical perspectives are relevant to creating IntraPC learning activities, including those on workplace learning, learning during clinical supervision, and learning through boundary crossing. The following sections will elaborate on these theoretical perspectives in more detail.

## Workplace learning

Workplace learning refers to the acquisition of new concepts, knowledge, ideas, or skills through active participation in daily professional practice (23, 24). Workplace learning is a dynamic and social process in which learners interact with other members of the healthcare system (24, 25). Other members of the healthcare system may then provide guidance, support, and opportunities for the co-construction of new knowledge during activities observed in practice (24, 25). This form of learning is widely used in medical education, as the workplace requires learner to integrate knowledge, skills, and professional attitudes.

Situated Learning Theory describes workplace learning as a process occurring through legitimate peripheral participation in the workplace (25). In the Situated Learning Theory, workplace learning is characterized as being 'embedded in everyday activities, context and culture, inherently social, often unintentional rather than deliberate, and progressive in terms of the learner's participation' (25). Because workplace learning is so intertwined with participation in practice, it is strongly shaped by its context (26, 27). Using the lens of situated learning, context can be defined as the varying conditions of an individual and/or situation, including personal, physical, organizational, institutional, economic, social, and cultural aspects (26, 28). Consequently, learning in the workplace always occurs, but *what* and *how* professionals learn is highly dependent on the learning context (26).

Therefore, a context that supports communication and reflection habits can support IntraPC learning, whereas a constraining context may reinforce less effective or even obstructive beliefs and behaviors (29). Furthermore, understanding how the workplace can be intentionally designed to foster IntraPC learning is essential.

## Learning during clinical supervision

Supervisors play a pivotal role in creating a supportive learning environment in the workplace (30).

Interactions between resident and supervisor are a main source of workplace learning in postgraduate training, particularly through clinical supervision (30). During clinical supervision, the supervisor provides effective guidance and feedback on important aspects within clinical practice, such as decision making, patient safety and procedural skills (31). Within clinical supervision, the resident presents the patient's case, including their proposed diagnostic and treatment plans (32). During this interaction, the supervisor monitors the resident's clinical performance and patient safety, and the supervisor assesses the resident's level of competence. Through this process the supervisor identifies areas in the residents performance that require further development (33). From this description follows the dual purpose of clinical supervision, both to check the treatment plan for the patient and to monitor the learning progress of the residents (33). Supervisors are responsible for maintaining a balance between these two objectives (31-33). Achieving this balance can be challenging, as clinical supervision interactions are often brief and the supervisor may be consulted remotely (31-33).

Interactions between residents and supervisors can occur during supervised participation in practice, mutual observation and dialogues (30). Previous studies identified mechanisms to learning during these interactions, including entrustment and support seeking during participation, monitoring and modeling during observation and feedback and meaning making during dialogues (30). In previous research on IntraPC learning, residents indicated they see

an important task for supervisors in addressing IntraPC learning in the workplace (11, 20). Role modeling and workplace dialogues have been identified to hold potential to this learning (11, 18, 20). As such, supervisors play a critical role in either reinforcing siloed, specialty-specific practices or promoting integrated and coordinated collaborative practice (18). How supervisors can enable IntraPC learning during role-modelling or workplace dialogues remains underexplored.

Despite the extensive literature on clinical supervision as a vehicle for workplace learning, little is known about how clinical supervision specifically supports IntraPC learning in complex clinical environments.

## Boundary crossing

Besides daily interactions between residents and supervisors within specialties, residents also interact daily with residents from other medical specialties. Each specialty department can be seen as its own complex system with their own tasks, roles, responsibilities, protocols, cognitive frameworks and workplace culture. Between different specialty systems, boundaries exist. These boundaries are defined as sociocultural differences leading to discontinuity in action and interaction (34).

The theory of Boundary crossing describes how working across the boundaries between these specialty systems, holds great learning potential for IntraPC learning (34). This learning particularly occurs while working with boundary objects, boundary workers and boundary activities (34, 35). Boundary objects are physical artifacts that cross the boundary and have meaning on both sides. Boundary workers are people that work across the boundary, 'building bridges' between the two sides. Boundary activities are activities that transcend boundaries. Making use of existing boundary objects, workers and activities can help in identifying opportunities for IntraPC workplace learning.

During these boundary crossing learning opportunities, the learning mechanisms as presented in table 1 may be triggered.

**Table 1 Learning mechanism triggered by learning through Boundary Crossing**

| Mechanism | Description |
|---|---|
| Identification | learners gain insight into the roles, responsibilities and tasks involved in working on both their own and the other side of the boundary. |
| Coordination | learners gain insight into the communicative connections across the boundary and learn ways to interact across the boundary. |
| Reflection | learners make and take perspectives on the processes of crossing the boundary, to gain a deeper understanding of the interactions taking place on both sides of the boundary. |
| Transformation | learners collectively create new strategies for collaboration across the boundary, leading to a new shared collaborative practice |

## Researching IntraPC

In the care for multimorbid frail older adults, IntraPC is shaped through interactions in a complex environment. This environment is characterized by a multitude of perspectives, competing priorities, complex organizational and team structures and unpredictable patient trajectories. In this setting, IntraPC and learning are not discrete or controllable phenomena, but rather dynamic processes consisting of multiple interactions among stakeholders embedded in everyday clinical work.

To account for this complexity, this thesis adopts a constructivist perspective and focuses on understanding how IntraPC and learning are experienced, enacted, and sustained. Therefore, qualitative, exploratory approaches, conducted in co-construction with professionals from the workplace, provide the methodological foundation of this research. The studies in this thesis aimed to gain in-depth, context-sensitive insights and understanding into the processes through which IntraPC learning may take shape in daily clinical care.

## Research context

The studies in the thesis were conducted within the department of geriatric medicine at the Radboud university medical Center (Radboudumc) in The Netherlands, with a particular focus on postgraduate training within this department. Radboudumc is a large tertiary medical Center in Nijmegen, a medium sized city in the Netherlands. This center provides highly specialized care for a wide range of patients.

Geriatric medicine in the Netherlands is a specialty that provides hospital based care for frail, multimorbid older adults. It is particularly involved in providing integrated care for both physical and mental health problems, using a holistic approach regarding the patient's entirety of care needs. This geriatric medicine department is composed of an inpatient acute care ward,

emergency department consultation, an inpatient liaison team and an outpatient consultation department.

The medical staff of this department consists of nine geriatricians, two internists, two physician assistants and a continuously changing group of residents. These residents are from varying postgraduate training programs, including secondary care training programs such as geriatric medicine and internal medicine, but also primary care programs such as general practice or elderly care. (table 2 medical specialties in the Netherlands)

**Table 2 Medical specialties in the Netherlands**

| | |
|---|---|
| General practitioner (GP) | Doctor 'working in the frontline of a healthcare system, taking the initial steps to provide care for any health problem(s) that patients may have including prevention, diagnosis, cure, care, and palliation. |
| Elderly care physician | Doctor working in long-term care for older adults and chronic patients, mostly in a nursing home. In the Netherlands this is a PC specialty. |
| Geriatric medicine | Doctor working in acute care for older adults in a hospital setting. They work includes outpatient consultation as well as inpatient clinical practice. |
| Primary care (PC-setting) | The PC-setting in the first, community-based medical care. The PC doctors are (amongst others) GPs or elderly care physicians. The gatekeeping role of PC doctors makes them responsible for adequate referral of patients to hospital care. |
| Primary care resident (PC resident) | PC residents include GP residents and elderly care residents. The postgraduate PC training involves a 3-year competency-based program. The PC residents provide patient care in the PC setting (first and third year). During their second year, PC residents undertake other placements, amongst which is a hospital (6-9 months). |
| Medical specialist | Doctor providing specialist medical care. Mostly offered in hospital settings, where both inpatient and outpatient clinics are combined |
| Secondary care residents (SC residents) | Doctor in training to become medical specialist. The postgraduate medical specialist training involves a 4-6-year competency-based program. The medical specialist residents provide patient care in a hospital, or other secondary care setting (SC). |

This context is particularly interesting in regard to intraPC. The complex care needs of the patients frequenting this department, inherently requires collaboration across medical specialties from primary and secondary care settings, offering ample opportunities for IntraPC learning. Moreover, the active participation of professionals from different backgrounds during their postgraduate training in the care for multimorbid older adults offers shared reflection opportunities.

In the Netherlands, the medical education trajectory across undergraduate to continued professional development increasingly incorporates workplace learning (36). The undergraduate

curriculum consists of a bachelor's and a master's degree phase. The bachelor's degree phase is largely composed of classroom-based learning activities, while the master's degree phase places greater emphasis on workplace learning during rotations in diverse clinical setting (36). Postgraduate training is predominantly based on workplace learning (30). Therefore clinical workplaces such as this geriatric medicine department, are largely responsible for the co-creating, executing and evaluating the postgraduate training of its residents.

## AIM OF THIS THESIS

In this thesis, we aim to explore how (supervised) intraprofessional workplace learning opportunities emerge during geriatric medicine rotations, how these opportunities can be enhanced, and how current workplace practices enable or constrain residents' learning. This resulted in the following research questions, methodologies, data collection and analysis:

| Chapter | Research question | Methodology | Data collection and analysis |
|---|---|---|---|
| Chapter 2 | what are the theory-driven, and practice-informed learning activities that can effectively facilitate IntraPC learning between co-located PC and SC residents during hospital rotations, and what specific learning outcomes do these activities yield? | Design based research | Observations, in-depth and focus group interviews<br><br>Template analysis and thematic analysis |
| Chapter 3 | What are longer term effect of IntraPC learning activities on the participating residents' collaborative behavior and clinical practice? | Collective evaluation | 'the Effects Forum'<br><br>Timeline analysis<br>Inductive coding and thematic analysis |
| Chapter 4 | How, and to what extent, do existing Resident-supervisor dialogues provide opportunities for IntraPC learning in the workplace? | Focused ethnography | Observations, in-depth and focus group interviews<br><br>Inductive coding and thematic analysis |
| Chapter 5 | How do interactions between residents and supervisors of different specialties occur in ever changing acute care teams and what contextual factors influence these interactions? | Focused ethnography | Observations, in-depth and focus group interviews<br><br>Inductive coding and thematic analysis |

## OUTLINE OF THIS THESIS

In order to answer our research questions, this thesis presents 4 studies in chapters 2 to 5.

In chapter 2 we illustrate how previously developed IntraPC competencies and design principles can be translated into IntraPC learning activities. Using a design based research approach these IntraPC learning interventions are designed, implemented and evaluated within the complex clinical environment. Through observations, in-depth interviews, and focus group interviews, the evaluation provides insights into implementation processes, underlying learning mechanisms and outcomes. The insight informed the refinement of IntraPC learning activities.

Chapter 3 illustrates the exploration of the effects of IntraPC learning activities on behavior and clinical practice of participating residents. As exploring longer term effects of workplace learning interventions is complex. Therefore, this chapter explored the use of 'the Effects Forum' to explore longer term learning outcomes. The 'Effects Forum' is a collective evaluation method originating from applied social sciences and combines focus group interviewing, with timeline analysis and knowledge co-construction.

Chapter 4 continues exploring how IntraPC may be facilitated in the workplace. Interactions between resident and supervisor are a central part of workplace learning in postgraduate training. Whereas residents see potential for IntraPC learning within resident-supervisor dialogues, supervisors may doubt the necessity of IntraPC learning or may feel unprepared to facilitate IntraPC learning. Through a ethnographic study, we identify IntraPC learning opportunities and explore barriers to IntraPC learning within resident-supervisor dialogues in the workplace.

Chapter 5 focuses on interactions of residents and supervisors working in acute care. Acute care for older adults with complex care needs, are prone to require the perspective of multiple specialty physicians simultaneously. Efficient and effective IntraPC for these patients is essential to prevent adverse outcomes for these patients. However, the acute care context which is characterized by high volumes of patients, who may require urgent care, where residents work in ever changing rapidly deployed teams. Through an ethnographic study, we explore whether interactions across specialties in the acute care reflect IntraPC and how these interactions may promote IntraPC learning.

## RESEARCH TEAM

At the start of this thesis, a conscious effort was made to compose a research team with diverse professional backgrounds, areas of expertise, and perspectives. The research team was able to make optimal use of its diverse perspectives through the use of team reflexivity, enabling a rich and nuanced analysis of the data (37).

I was a resident in geriatric medicine at the start of this thesis, and during the research became a supervisor in the geriatric medicine department where these studies were performed. My first supervisor, a medical doctor with a master's degree in educational sciences specializes in workplace learning and provides her perspective drawing on insights from learning theory. My second supervisor is an educational researcher with a focus on learning across disciplinary boundaries and brought her perspective with a focus on interdisciplinary education, both within and beyond healthcare settings, as well as insights into research methodology. My co-supervisor, a psychologist, had previously written her own doctoral dissertation on IntraPC learning, and contributed particular expertise into the role of power dynamics in IntraPC learning. Finally, a colleague geriatrician, who also works as a clinical supervisor and postgraduate program director, contributed substantially as a co-author to several studies. She drew on her extensive experience in the care of older adult patients, as well as in supervising and mentoring residents during postgraduate training and provided valuable clinical and educational perspectives on the data.

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ARTS

# CHAPTER 2

## ‘The best for both worlds’: optimizing the design of hospital placements for intraprofessional collaboration learning across the primary-secondary care interface

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*Submitted*

**Background**
Physicians need to be prepared on how to provide coordinated and integrated care across the primary care(PC)-secondary care(SC) interface. This requires dedicated learning on intraprofessional collaboration (IntraPC). The co-location of PC and SC residents during hospital rotations has shown great potential for facilitating IntraPC learning. However, current postgraduate programmes lack essential learning activities for IntraPC learning during these hospital rotations. This study aimed to co-create and evaluate learning activities to facilitate IntraPC learning during hospital rotations to improve the collaborative practice across the PC-SC interface.

**Methods**
This study includes phases two and three of a design-based qualitative research project. PC and SC residents and supervisors, together with researchers and educationalists, co-created and evaluated IntraPC workplace learning activities based on design principles. These learning activities were implemented in a geriatric medicine rotation in the Netherlands with co-located PC and SC residents. A total of sixteen residents participated in IntraPC learning activities. Eight one-hour observations, ten in-depth interviews, and two focus group interviews were conducted to evaluate the participants' reception, triggered learning mechanisms and learning outcomes.

**Results**
The learning program Secondary Primary care Intraprofessional Collaboration Education (SPICE), containing two workplace learning activities and four formal learning activities, was created. Participants were enthusiastic about SPICE activities and experienced a safe learning environment. They collaboratively identified three improvements to address limitations to IntraPC learning encountered in SPICE: 1) aligning the activities with scheduled teaching hours to minimize additional workload; 2) shifting the focus from a doctor-centered to a patient-centered perspective; and 3) promoting discussions on IntraPC within the context of supervised workplace learning. Participation in IntraPC learning activities led to enhanced mutual understanding, heightened awareness of key collaboration moments and improved PC-SC alignment.

**Conclusion**
Implementing IntraPC learning activities during co-location of PC and SC residents in hospital rotations is both feasible and effective in fostering dialogue on improving collaboration across the PC-SC interface. These evidence-informed co-created IntraPC learning activities provided the opportunity for PC and SC residents and supervisors to create a new shared collaborative practice that promotes improved collaborative care.

## INTRODUCTION

Population aging is leading to a rise in the number of older patients with multimorbidity (1). Their complex and dynamic care needs require an increasing number of physicians to be involved in the care for a single patient(2). These physicians may work either in the primary care (PC) setting, including general practitioners and elderly care physicians, or in the secondary care (SC) setting, including hospital specialists such as geriatricians, internists, cardiologists and surgeons.

Older adult patients frequently undergo hospital admissions and outpatient consultations in both PC and SC settings, resulting in frequent handovers between PC and SC physicians (1, 3). Frequent transitions of complex patient care between PC and SC have been linked to fragmentation of care and a higher likelihood of medical errors and adverse patient outcomes (2, 4, 5). This increased risk in adverse outcomes has been attributed to limited and inadequate communication and collaboration between PC and SC physicians (2, 4, 5). Additionally, each physician tends to work from their own treatment plan, which introduces the risk of unaligned, conflicting advice and treatments (5-7). Therefore, effective collaboration between PC and SC physicians is needed to ensure collaborative care for multimorbid older adults (2, 8). This type of effective, coordinated and integrated collaboration among physicians from different specialties is called Intraprofessional Collaboration (IntraPC) (9).

Learning IntraPC does not occur automatically through participation in clinical practice, but requires dedicated training (10). Accordingly, international postgraduate curricula, have underlined the importance of adding workplace learning activities on collaborating across the PC-SC interface to post-graduate training (11, 12). However, current postgraduate curricula scarcely contain learning activities that facilitate IntraPC learning across the PC-SC interface (9, 10).

For PC residents globally, hospital rotations are a standard part of their postgraduate curricula (13). During these rotations, PC and SC residents work and learn alongside each other in the same ward (10). This co-location offers valuable opportunities for IntraPC learning among PC and SC residents, which currently often remain unexplored (10). Deliberate IntraPC workplace learning activities may guide clinicians during their role as supervisor, in facilitating IntraPC learning between the co-located PC and SC residents (14, 15). To this extend, IntraPC design principles and IntraPC competencies have been formulated to provide theoretical frameworks and learning goals that may aid educators in creating dedicated IntraPC learning activities (14-16). Nevertheless, the translation of these practice- and theory- informed IntraPC design principles and IntraPC competencies into learning activities for co-located PC and SC residents in hospital rotations has not been described, nor what learning outcomes these may yield.

Considering the substantial demands on residents in postgraduate training, it is crucial to design new learning activities in a way that minimizes additional workload, ensures direct applicability to clinical practice and demonstrates tangible improvements to collaborative care across the PC-SC interface (17). Therefore, this study aimed to explore: what are the theory-driven, and practice-informed learning activities that can effectively facilitate IntraPC learning between co-located PC and SC residents during hospital rotations, and what specific learning outcomes do these activities yield?

## METHODS

This study is part of a larger design-based research (DBR) on IntraPC learning for co-located PC and SC residents. DBR is a study design that is characterized by the discovery, design, development and evaluation of activities in a participatory, systematic and iterative way to simultaneously improve both clinical practice and theoretical understanding (18, 19). In DBR, three phases can be distinguished: the preliminary phase, design phase and assessment phase (18).

IntraPC competencies and design principles were formulated in the preliminary phase (phase I) of this DBR and published in previous studies (14, 15). Design principles are empirically developed, practice- and theory-informed guidelines that may aid educators in the creation of learning activities (20). (Box 1) Competency frameworks describe what skills and knowledge a resident should have to be able to participate effectively in clinical practice (21). In the present study, a *design group*, a *research group* and *research participants* collaborated in the DBR design phase (phase II) and assessment phase (phase III) of creating, implementing and evaluating IntraPC learning activities by connecting learning theories, design principles and clinical practice through co-creation with stakeholders (18, 22).

In the design phase(II) of this study, an iterative process among PC and SC residents, supervisors, educationalists and researchers led to the co-creation of a workplace learning programme on IntraPC called 'Secondary Primary care Intraprofessional Collaboration Education: SPICE'. Stakeholders constantly re-evaluated and adjusted learning activities informed by research data. Co-creation is a process where all stakeholders are involved in and responsible for the development of the product (23). Co-creation is a valuable tool that involves both learners and teachers in the design of teaching and learning and contributes to improvement in the quality of education, by addressing perspectives of each type of stakeholder (24). Connecting and sharing experiences by stakeholders in co-creation can foster greater mutual learning, a more positive, inclusive and democratic learning environment, increased internal motivation, and higher quality of the educational design (24).

Subsequently, in the assessment phase (Phase III) of this DBR, the research group evaluated the participants' reception of learning activities and identified learning mechanisms and outcomes. The data collection consisted of a combination of observations, in-depth interviews and focus groups with a constructivist approach (25). The boundary crossing theory was used as a theoretical lens in the data analysis of this study, to gain a deeper understanding of mechanisms and outcomes of IntraPC workplace learning activities (26).(Box 2)

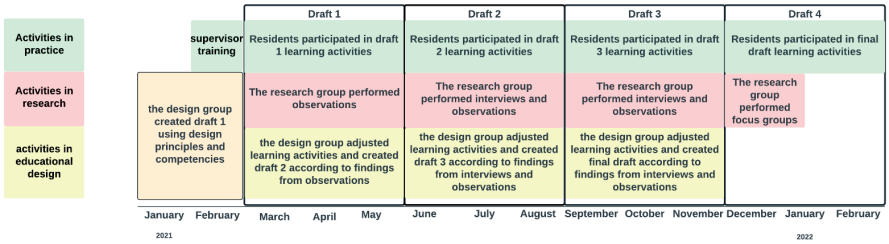



**Figure 1. Depicts the process of how we intertwined the design and assessment phases in the drafts of SPICE by combining clinical practice with educational design and evaluative research.**

**Box 1. the design principles as published by Looman et al for developing IntraPC learning across the PC-SC interface(15)**

**Culture**

1. The patient is the starting-point for working and learning
2. Build relations with intraprofessional (primary–secondary care) colleagues
3. Apply the principle that, in a intraPC partnership, we are all different but operate on a basis of equity

**Connecting contexts**

4. Facilitate learning together by working together
5. Facilitate the acquisition of knowledge of one another's work contexts and activities to promote good collaboration.

**Making the implicit explicit**

6. Collaborate on patients and pay deliberate attention to two-way learning from different perspectives.
7. Purposely discuss intraPC collaboration during daily work activities.
8. Supervisors themselves engage in intraPC as role models.
9. The training team engages explicitly in intraPC with the aim of delivering quality patient care and achieving continuous quality improvement.
10. Bodies responsible for specialty programme goals define intraPC as a competency that *every* doctor should have.
11. Supervisors, teachers and residents work to ensure that every resident knows how to engage in intraPC upon completion of their training.
12. Residents transfer intraPC lessons and apply them in their own work contexts.

**Box 2. Theoretical background on IntraPC learning across the PC-SC interface during co-location of PC and SC residents: the boundary crossing theory (26-28)**

Boundary crossing theory is helpful in understanding IntraPC learning that may occur during PC and SC resident co-locations and can provide insight into how this learning may be improved. This theory describes the learning potential of working across boundaries. In this theory, boundaries are defined as sociocultural differences leading to discontinuity in action and interaction. An example of a boundary with significant learning potential is the PC-SC interface.

Boundary crossing occurs while working with boundary objects, boundary workers and boundary activities.

***Boundary objects*** are physical artifacts that cross the boundary and have meaning on both sides.

***Boundary activities*** are activities that occur around the boundary. In the case of the PC-SC interface,

***Boundary workers*** are people that work across the boundary, 'building bridges' between the two sides.

In the case of the PC-SC interface, boundary objects could be referral or discharge letters, boundary activities are hospital admission or discharge and boundary workers could be PC residents during their SC geriatric medicine rotations.

In boundary crossing, four important learning mechanisms are described:

- In **identification**, learners gain insight into the roles, responsibilities and tasks involved in working on both their own and the other side of the boundary.
- In **coordination**, learners gain insight into the communicative connections across the boundary and learn ways to communicate across the boundary.
- In **reflection**, learners make and take perspectives on the processes of crossing the boundary, to gain a deeper understanding of the interactions taking place on both sides of the boundary.
- In **transformation**, learners collectively create new strategies for collaboration across the boundary, leading to a new shared collaborative practice

## Study setting

This study was conducted at the Department of Geriatric Medicine in an academic medical centre in the Netherlands. This department has an outpatient clinic, an inpatient acute care ward, an inpatient consultation team and an attending geriatrician in the emergency room.

## The design group, the research group and the research participants

The *design group* consisted of PC and SC clinicians, educationalists and two of the researchers; they designed IntraPC learning activities based on competencies and design principles(14). (Box 1)

The *research group* consisted of an SC resident (MV) and an SC supervisor and head education geriatric medicine (DA), a psychologist and head education PC department (NL) and educational researchers (WKS and CF).

The *research participants* were PC and SC residents and supervisors. The PC residents were in training for General Practice and Elderly Care and the SC residents for Geriatrics or Internal

Medicine. (Appendix 2: overview of specialties) These PC and SC residents worked alongside each other in outpatient consultation, on the geriatric medicine liaison team or at the geriatric medicine inpatient ward. Each resident worked on their own patients in one of these clinical placements. All residents working in the geriatric department met during formal learning activities and morning and evening handovers.

Supervisors were geriatricians, general practitioners and elderly care specialists who were working in their own context and contributed to IntraPC learning during workplace learning activities.

Participants for interviews and focus groups were selected through purposive sampling, making sure we interviewed at least one resident and one supervisor of each participating specialty (General Practice, Elderly Care, Geriatrics and Internal Medicine) about their experiences and learning outcomes (29).

### Draft 1 learning activities and curriculum

The first draft of the learning activities consisted of a supervisor training module, four formal learning activities and four workplace learning activities. (see Appendix 1)

Supervisors were trained in February 2021 before the activities for residents started in March 2021. The three formal learning activities were performed successively once every month, guided by a member of the design group acting as a teacher. Residents were encouraged to participate in workplace learning activities on their own account whenever possible during clinical practice. Each draft lasted three months, after which alterations to the draft could then be made in accordance to research data. Ultimately, four drafts were performed. (figure 1)

### Data collection

Data collection transpired between March 2021 and December 2021. Each learning activity was evaluated through observations by two different members of the research group. The observations were conducted by the first author (at the time Geriatric Medicine resident) (MvdV) and a psychologist (NL). By observing interactions between participating residents and the teacher, we gained insight into facilitators and barriers for learning and learning outcomes, such as acquired collaborative skills or improved understanding towards each other. These findings were then explored in depth through interviews, performed by the observing researchers. Interviewing started when the researchers had observed all draft 1 learning activities. (Appendix 3 interview guide)

The researchers conducted the first observation and interview round together; the next observations and interviews were conducted by at least one of the researchers (MvdV/ NL). We did not have an a priori threshold to determine conceptual depth of observations and interviews

as this was determined based on our analysis, in particular when meaning saturation occurred (30). We stopped sampling when the research team concluded that we had reached 'meaning saturation' and conceptual depth to answer the research question (30).

## Data analysis

The observation field notes and in-depth interviews were transcribed and analysed in atlas.ti through a combination of inductive and deductive coding using a template analysis (31). To ensure that the transcripts were reviewed from multiple perspectives, each transcript was analysed by two researchers (MvdV and NL). The researchers analysed the first transcript together. The next transcripts were coded independently. MvdV and NL met weekly to discuss their findings. MvdV and NL identified valuable quotes and discussed these during monthly meetings with the design and research groups. During these meetings, themes in these quotes were identified by members of both the design and the research group. When no further dimensions, nuances or insights were found, the research group concluded meaning saturation was reached and data collection stopped (30).

Data analysis intertwined the design and assessment phases of DBR and occurred in two rounds. In the first round, the design and research groups discussed whether the design principles had been properly incorporated, identified barriers to IntraPC learning in the learning activities and identified potential learning outcomes of SPICE. These discussions provided modifications to the learning activities to optimize learning outcomes.

In the second round, the research group explored learning outcomes of SPICE in greater depth by using the boundary crossing theory as an analytical lens. By using a second round of deductive coding with the learning mechanisms of boundary crossing as code templates, the relation of learning mechanisms and outcomes became apparent (26). (see Box 2 theoretical background)

Valuable codes and quotes from this second analysis were discussed once again in a meeting between the design group and the research group, to assess the potential learning mechanisms they could reflect.

During focus group interviews, participants were then asked to provide their opinion on the adjustments made to learning activities, as well as their view on the themes we identified regarding learning mechanisms and outcomes. Afterwards, their opinions and views were transcribed and analysed using the same process as in the in-depth interviews. The design and research groups then triangulated data from observations, in-depth and focus group interviews, resulting in definitive themes in learning mechanisms and outcomes of SPICE (32).

### Ethical approval

This study was performed in accordance with the Helsinki Declaration, and it was reviewed by the Dutch ethical committee for medical education (ERB NVMO file number 2020.7.3). Written informed consent for participation was obtained before participation. Participants gave consent for publication of their pseudonymized data.

## RESULTS

A total of sixteen residents and sixteen supervisors participated in the SPICE learning activities. We conducted eight one-hour observations of learning activities and ten one-hour in-depth interviews. Six residents and four supervisors who had participated in SPICE were interviewed.

Finally, modifications to the learning activities and to the preliminary findings on learning mechanisms and outcomes were discussed with participants during two focus group interviews, one with residents and one with supervisors. The first focus group included seven residents and the second seven supervisors. (Table 1)

**Table 1 characteristics of SPICE, interviews and focus group participants**

| Number of participants in: | SPICE | In-depth interviews | Focus group |
|---|---|---|---|
| **N** | | | |
| Residents | 16 | 6 | 7 |
| Supervisors | 16 | 4 | 7 |
| **Gender (Male/female)** | | | |
| Residents | 4 / 12 | 2 / 4 | 4 / 3 |
| Supervisors | - | 0 / 5 | 2 / 5 |
| **Specialty** | | | |
| Residents | | | |
| PC | | | |
| General Practice | 6 | 3 | 2 |
| Elderly Care | 4 | | 1 |
| SC | 2 | | 1 |
| Geriatric Medicine | 10 | 3 | 5 |
| Internal Medicine | 8 | 2 | 4 |
| Supervisors | 2 | 1 | 1 |
| • PC | | | |
| General Practice | | | |
| Elderly Care | | | |
| • SC | 6 | 2 | 0 |
| Geriatric Medicine | 2 | 1 | - |
| Internal Medicine | 4 | 1 | - |
| | 10 | 2 | 7 |
| | 9 | 2 | 6 |
| | 1 | 0 | 1 |

## Designing and adjusting learning activities

The co-creation process with PC and SC residents and supervisors yielded six theory-driven, and practice-informed learning activities, including four formal learning activities and two workplace learning activities (table 2) The study included four design cycles each leading to modification of the learning activities. The definitive learning activities, the design principles used in their creation and adjustments that were made through the evaluation process are depicted in table 2.

**Table 2 . Adjusted SPICE learning activities and the design principles included in each learning activity. Adjustments to the programme are shown in Bold *Cursive***

| Learning activities | Goal | Design principles |
|---|---|---|
| **Formal learning activities** | | |
| Kick Off | A meeting was held ***during regular teaching hours*** to introduce SPICE and get to know each other and each other's specialty background. Ice breaking exercises were used to create a safe environment for IntraPC learning, such as:<br>• Two truths one lie about your specialty: residents discussed which of three statements about their specialty was false.<br>• The prejudice game: residents discussed what were common prejudices about their specialty and reflected on the effect of prejudice on IntraPC.<br>• Describing each other's workday: SC residents tried to describe the workday of the PC residents and vice versa.<br>• The imaginary line: residents ranked their specialty according to statements such as 'other physicians are familiar with what my specialty's responsibilities are'.<br>The activity ended with reflection on how the newly acquired knowledge about each specialty could impact IntraPC with this specialty. | 0<br>1<br>2<br>3<br>4 |

| | | |
|---|---|---|
| Rich Pictures | In this session held ***during regular teaching hours,*** residents were asked to prepare a drawing on a topic related to IntraPC between PC and SC. Topics could include:<br>'What is your most/least successful PC/SC collaboration'<br>'What is important for PC/SC IntraPC'<br><br>***Once every three months, this session is dedicated to the topic: 'What is important for a patient regarding PC/SC IntraPC'***<br><br>Each drawing was then discussed during the formal learning activity. If participants could not explain a drawing, they tried to describe the drawing through the following steps:<br>1. What is depicted on the drawing?<br>2. What is the coherence between the elements on the drawing?<br>3. What did the drawer try to tell us through this drawing?<br><br>Then the drawer could clarify his/her drawing. The group discussed how the insights provided by the drawing could be translated to their own collaborative behaviour. | 0<br>1<br>2<br>3<br>11 |

| | | |
|---|---|---|
| Patient Journey | In this meeting held ***during regular teaching hours,*** a PC and an SC resident prepared a presentation about a patient one of them had seen during their recent clinical work. Instead of focusing on the medical context of this patient, they described the journey this patient had made through PC and SC, using questions like:<br>• What moments of collaboration between physicians have occurred?<br>• How did these physicians collaborate, through letters, over the phone etc.?<br>• Was the collaboration sufficient or could it have been improved?<br>• What can be learned about IntraPC from this patient journey?<br><br>The session ended with the residents reflecting on their own collaborative practice and formulating what they aimed to improve in their collaborative behaviour. | 0<br>3<br>4<br>10<br>11 |
| Introduction for supervisors | Firstly, a member of the design group provided an introductory presentation on the different formal and informal SPICE learning activities for PC and SC supervisors. Secondly, the PC and SC supervisors familiarized themselves with the topic of IntraPC between PC and SC through a Rich Pictures session for supervisors only. | 0<br>3<br>7<br>8<br>9 |

| **Informal individual workplace learning activities** | | |
|---|---|---|
| ***SPICE day*** | ***Each Tuesday during the morning handover, residents were encouraged to choose one moment in clinical practice in which they would pay dedicated attention to IntraPC. This could include:***<br>• ***Carrying the referral phone***<br>• ***Discussing IntraPC aspects of referral/discharge letters***<br>• ***Partaking in joint consultation between a PC and an SC resident***<br>• ***Performing outpatient consultation triage.***<br><br>***At the end of the day, residents reflected on these activities with their supervisors. With their new insights, the resident and the supervisor together formulated what they aimed to improve in their collaborative behaviour.*** | 0<br>1<br>3<br>4<br>5<br>6<br>11 |
| Joint consultation in primary care | SC residents visited PC and worked together with PC physicians in their daily practice to get to know the PC context.<br><br>At the end of the day, the SC residents discussed the similarities and differences between their consultation styles with the PC supervisors or residents at the visiting location:<br>• What did they learn from the consultation?<br>• Would the treatment plan made by SC be helpful for PC?<br>• What would have happened if this consultation had occurred in PC?<br><br>The SC residents formulated how they aimed to improve their own consultation with these new insights. | 0<br>3<br>5<br>6<br>11 |

Our evaluation of drafts of the learning activities yielded several limitations to the implementation of the IntraPC learning activities. These included:

1. limited attendance to learning activities

2. a doctor-focused approach to formal learning activities

3. limited attention to IntraPC workplace learning

4. limited involvement of supervisors

Through co-creation with residents and supervisors, activities were adjusted to be more suitable for the postgraduate clinical learning context. Table 3 reflects the limitations to learning in SPICE and what adjustments were made to overcome these limitations.

**Table 3. Limitation to IntraPC learning in SPICE, how participant reflected on these limitations and how the limitations were addressed during evaluation of SPICE**

| Observations | Interviews | Design group's modification | Effect of modification |
|---|---|---|---|
| **Draft 1** | | | |
| Limited attendance of residents at SPICE formal learning activities | Although SPICE activities were considered useful, the SPICE activities increased the residents' experienced workload due to extra teaching hours and preparation time.<br><br>Quote:<br>'*On the other hand, I think it's an additional burden, all these things that need to be arranged and done on top of everything else.'* SC resident | SPICE learning activities were aligned with pre-existing scheduled teaching hours. | Improved attendance |

| **Draft 2** | | | |
|---|---|---|---|
| Formal IntraPC learning activities tended to be doctor-centred instead of patient-centred | Supervisors mentioned they noticed a limited focus on the patient's perspective on what is needed for adequate IntraPC across the PC-SC interface.<br><br>Quote:<br>*'We're driven by the medical side of things. We want to do what's best for the patient. And when it's about collaboration, the patient sort of disappears, and it's all about me all of a sudden. But no, it's not about me and the GP. It's about me and the GP doing what's best for this patient.'* - SC supervisor | Once every three months, a Rich Pictures session was dedicated to drawing and discussing the patient's perspective on adequate IntraPC across PC-SC interface. | Residents learned that taking the patient's perspective can be helpful in complex patient cases (e.g., when doctors shifted the burden of taking responsibility for a patient between themselves).<br><br>Quote:<br>*'When your focus is on the patient, what's best for the patient and how we're going to achieve this together, what your possibilities are, then what we can do and how we can do this together.'* - SC resident |

| **Draft 3** | | | |
|---|---|---|---|
| Workplace learning activities were scarcely used. | Discussions on IntraPC during supervision between residents and supervisors or visits to PC facilities occurred only occasionally.<br><br>Residents felt reluctant to discuss IntraPC during supervision and felt it was the supervisors' task to initiate discussion on IntraPC learning.<br><br>Supervisors had their focus on medical knowledge acquisition and felt it was the residents' responsibility to initiate discussions aimed at IntraPC learning.<br><br>Quote:<br>*'I can tell though that when they have a moment in their week that might be a SPICE moment, that they forget to really dedicate it as a SPICE moment. This tells me that, actually, they don't really ask me for feedback.'* - SC supervisor | Workplace learning activities were bundled into 'SPICE Tuesday.' This activity entailed that, each Tuesday during the morning handover, residents were encouraged to choose an IntraPC workplace learning activity to discuss with their supervisors that day or week. | Residents still regarded IntraPC workplace learning as 'too optional', and adherence to IntraPC workplace learning activities remained limited.<br><br>In the focus groups, residents and supervisors did agree that 'SPICE Tuesday' did make them more aware of the mutual responsibility of residents and supervisors to discuss IntraPC during supervision.<br><br>*'As far as I'm concerned, I might proactively ask for supervision when I have meetings with a colleague, a GP or an elderly care specialist.'* - SC resident |

| **Draft 4** | | | |
|---|---|---|---|
| Limited involvement of supervisors in SPICE | Supervisors felt underprepared to facilitate IntraPC learning in WPL and questioned the relevance of IntraPC learning.<br><br>Quote:<br>*'No, but I think that I've always paid a lot of attention to that, so I don't think SPICE will make a big difference…'* - SC supervisor | By clarifying the SPICE Tuesday workplace learning activities and creating a poster for use in the morning handover office, we aimed to create more awareness of opportunities for IntraPC learning in the workplace. | Adherence to IntraPC workplace learning activities remained limited; further studies needed. |

## Reception, learning outcomes and mechanisms

The observations and interviews showed that SPICE learning activities were well received and that residents were excited about IntraPC learning. PC residents indicated they were glad to be able to advocate for their specialty, which contributed to an improved understanding of PC contexts in SC residents. All residents experienced a safe learning environment during SPICE formal learning activities, as SPICE teachers(including PC supervisors and a SC resident and supervisor) were approachable and showed an open attitude towards exploring differences in perspectives between PC and SC. This experienced psychological safety reassured residents to participate freely, even when prejudice and stereotypes were discussed because these were not directed towards specific individuals but rather addressed specialties in general, creating an opportunity to learn from them.

> *'I think simply the safe environment here at the department. I've never felt there was any barrier to saying or mentioning anything, that's it. And, yes, you have made an active contribution to that.'* - PC resident

Data analysis in the assessment phase(III) of this study, provided the following themes in learning outcomes of SPICE and what boundary crossing learning mechanisms (see Box 2) contributed to this outcome:

- Mutual understanding (Identification and Reflection)
- Awareness of key moments in collaboration (Identification and Coordination)
- Improved PC-SC alignment (Reflection and Transformation)

### *Mutual understanding (identification and reflection)*

SPICE learning activities helped residents *identify* differences in PC and SC contexts by sharing patient cases during the formal learning activities as well as by SC residents visiting PC facilities.

The observations and interviews revealed that residents *identified* stereotypical ideas and prejudices about the roles, contexts and responsibilities of their own and the other's specialty. They learned what preconceptions others had about their specialty. During formal learning activities, residents *reflected* on how these beliefs, biases and differences affected their collaborative practices and policymaking and how they could address them.

> *'Yes, it makes you … well, when other people come up with stereotypes about your profession, that you could contradict or confirm them or that you might think oh yes no, you might be right there. Perhaps I should pay more attention to that…'* PC resident

Through SPICE, residents learned to actively try and take the other person's perspective when they were confused about the treatment plan or another specialty physician's referral question. This led to a more profound understanding of possibilities and difficulties in the other person's work context.

> *'We were saying that you don't actually know very well what an elderly care specialist does and what their options are.'* - SC resident

These differences in perspectives were shared in formal learning activities, and this understanding appeared to lead to an improved general collaborative attitude towards each other. We asked supervisors what effect they observed of this improved understanding on the residents' clinical practice. One supervisor felt that the SC residents' overall attitude towards PC physicians in general had significantly improved.

> *'So I do think that, in general, people are less grumpy in their attitude.'* – SC supervisor

### *Awareness of key moments in collaboration (Identification and Coordination)*

As a result of SPICE, residents became more aware of important moments in the collaboration between PC and SC during their daily work and used these moments for IntraPC learning. *(coordination)*

Residents discussed different contact strategies between PC and SC. Their increased awareness resulted in residents *identifying* daily occurrences of IntraPC in clinical practice as 'SPICE moments'. During 'SPICE moments', PC and SC residents discussed IntraPC more frequently

and more explicitly than before, examining how IntraPC could have been improved for a particular patient.

> *'It also made us residents talk about it amongst ourselves. So outside the [SPICE formal learning activities] we often say things like, hey, this is a SPICE moment because it went like this or like that.'* – PC resident

### *Improved PC-SC alignment (Reflection and Transformation)*

The improved mutual understanding and increased awareness of key moments in PC-SC collaboration initiated *reflection* on the residents' current collaborative practice. Residents mentioned that such r*eflection* had made them more aware of the importance of aligning their collaborative behavior to each other. This could include clarity in formulating referral questions in referral letters. They had noticed how referral letters that were unclear or interpreted differently by recipients might lead to unaligned treatment of patients. Residents learned how 'a simple phone call' could help when they were confused about another physician's perspective on a patient or to clarify the colleague's dilemma in a case. By discussing this during SPICE, residents felt encouraged and supported to call a physician of another speciality sooner.

> *'If there's something bothering you or if you're discharging a complicated patient, why don't you just phone up to discuss things, you know, to say "this is what's coming your way, this is what I was running up against, this is what I wasn't sure about". … Just to put things in perspective, and this is so important for follow-up…'* – SC resident

As a result, residents discussed how to *transform* their collaborative practice to be more coordinated and integrated. Several SC residents mentioned they had started to check whether their SC treatment plans and advice helped their referring PC colleague. All PC residents and supervisors indicated that they intended to clarify referral questions in their next referral letters. Residents mentioned that they intended to change their collaboration behaviour once they had either returned to their own specialty or moved on to a next rotation.

> *'Well, I think the main thing is the referral letter, you know, how you draft it and how you prepare it. We've just discussed this at length in the [SPICE formal learning activities] that a clear referral question is really the essence of the referral. This really decides whether, yeah, whether a referral makes sense or not. And that this should be very clearly indicated in your referral letter.'* - PC resident

## DISCUSSION

Residents, supervisors, researchers and educationalists co-created, implemented and evaluated learning activities to facilitate IntraPC learning among co-located PC and SC residents during hospital rotations. The SPICE programme combined formal and informal learning activities and contributed to a safe environment for PC residents to advocate for their specialty and collectively explore opportunities to improve collaborative practice.

To address limitations in IntraPC learning, SPICE formal learning activities were strategically integrated into regular teaching hours to minimize additional workload; formal learning activities actively encouraged residents to take a patient-centred approach over a doctor-centred approach fostering a collaborative mindset; and the importance of IntraPC learning in the workplace was highlighted by dedicating Tuesdays as SPICE days, creating a dedicated space to prioritize and strengthen IntraPC learning during daily activities.

Interviewed supervisors noted that they questioned the necessity of dedicated IntraPC learning activities or that they felt unprepared for facilitating IntraPC workplace learning. Ultimately, residents and supervisors stated that SPICE had led to increased mutual understanding, a greater awareness of pivotal moments in collaboration and a drive to strive for achieving improved PC-SC alignment.

This study demonstrates that the SPICE activities offered a unique opportunity for PC and SC residents and supervisors to engage in shared reflection on how to improve IntraPC across the PC-SC interface. Although hospital rotations are commonly introduced in the PC curriculum to provide PC residents with specialty medical knowledge and insight into the SC context these placements often fall short of their potential to facilitate PC-SC IntraPC learning (10, 33). In practice, pitfalls are that PC residents are submerged in SC and operate as substitute SC residents. This can leave them with limited opportunity to share their PC expertise and limited space to reflect on how their newly acquired insights integrate into their PC practice or collaborative behavior (10, 33, 34). This also inhibits PC and SC residents from learning from each other and effectively learn how to coordinate care and provide integrated care across the PC-SC interface.

Yet, precisely because they have shifted from PC to SC, PC residents act as boundary workers and are well-positioned to enhance intraPC learning during hospital rotations (10, 27). Our findings demonstrate that dedicated IntraPC learning activities such as those in SPICE can initiate reflection and lead to new knowledge and skills for both PC and SC residents and supervisors. By giving PC residents a structured platform to articulate and explore their experiences across settings, intraPC learning at the PC-SC interface can be deepened and mutual understanding

improved. These insights are relevant beyond the specific context of this study as they suggest that professionals who cross boundaries between primary and secondary care, when given a platform to let their perspectives be heard, may act as knowledge brokers and thereby promote collaborative learning in diverse clinical settings.

An essential part of DBR is evaluating how design principles inform educational practice and vice versa (20). The SPICE participants emphasized the importance of creating a safe learning environment where they could advocate for their specialty and openly discuss stereotypes and prejudices, as well as ensuring that learning activities align with existing teaching hours. These findings suggest that design principles two and six - creating psychologically safe learning environments and aligning IntraPC learning activities with activities within the existing curriculum - are particularly important in the implementation of IntraPC learning activities (15). Nonetheless, challenges persist, particularly in relation to the implementation of design principle 6 (learning from daily work) and design principle 7 (enhancing supervisor role modelling) as adherence to SPICE workplace learning activities remained relatively underused. Since workplace learning in postgraduate training typically occurs in interaction between resident and supervisor, further research is needed on supervisors' part and role in IntraPC workplace learning (35).

The supervisors in our study viewed SPICE as resident-centered and at times refrained from engaging in SPICE workplace learning activities. This aligns with earlier research showing that supervisors can be uncertain about the value and necessity of facilitating intraPC learning as well as the best approaches to doing so (10). In contrast, residents have recognized supervisors as essential contributors crucial to intraPC learning (10). Our study adds that prior experience with PC-SC collaboration does not automatically equip supervisors to foster IntraPC learning in the workplace. Targeted formal intraPC activities are a step in the right direction, but additional steps are needed—particularly those that directly involve and support supervisors in their role in IPhC workplace learning.

## Implications

Our data suggest that allowing PC residents to serve as knowledge brokers in formal IntraPC learning activities enhances recognition of IntraPC's significance among both PC and SC residents and supervisors across the PC-SC interface. To achieve integrated, collaborative care for older patients across the PC-SC interface, it is essential that PC and SC educators worldwide work together to design IntraPC learning activities that maximize the value of hospital placements for both PC and SC residents. Co-developing these activities ensures that both perspectives are incorporated, a supportive learning environment is fostered, and the activities align seamlessly with the existing curriculum.

Enhancing IntraPC workplace learning presents challenges, as supervisors may question its necessity or feel unprepared. It is concerning that supervisors felt unprepared to facilitate IntraPC learning, especially since residents often develop collaboration skills by observing and modeling their supervisors' behavior (35). Ensuring effective workplace learning may require more than evidence-based formal learning activities. In particular, it may require a focused approach to supporting and defining the role of supervisors. Future studies should explore how to better equip supervisors for IntraPC learning in complex clinical settings. This may involve active reflection on their collaborative behavior and more explicit discussions with residents, fostering mutual learning through observation, reflection, and role modeling.

**Strengths and limitations**

This study has several strengths. SPICE was developed by a collaboration between both PC and SC professionals, whereas traditionally both settings tend to create their own learning activities. An extensive data set was gathered on PC and SC residents' and supervisors' different perspectives by using multiple methods of qualitative data collection. This resulted in a comprehensive view of the residents' and supervisors' perspectives on the learning activities and enabled triangulation of data to ensure consistency (32).

The design and research groups co-created SPICE with participants to connect theory and practice in the design process. Their diversity in professional backgrounds provided a broad analysis of data and a shared responsibility(5, 36). The design and research groups and the stakeholding participants collaborated in improving and evaluating SPICE. The diverse perspectives in the groups provided creative and context-sensitive solutions for barriers to IntraPC learning in SPICE. This improved reflexivity in the evaluation (36, 37).

Our research design also has some limitations. To explore how participants felt SPICE had influenced their daily practice, we asked residents in interviews what their intended changes in collaborative behaviour would be and we asked supervisors what changes they observed in residents' collaborative behaviour. The current methods did not allow us to observe how these intended changes in collaborative behaviour actually translated into their clinical practice in other specialty contexts, such as when PC residents returned to PC.

Our research setting was limited to a Dutch university medical centre. As context influences possibilities and opportunities for learning, the reception of SPICE in a different setting might result in different outcomes (38). As context is important in workplace learning, other settings may provide other opportunities for IntraPC learning and may result in different outcomes. However, the boundary objects, workers and activities we used in SPICE are common across diverse clinical contexts and the co-creation with both PC and SC physicians has ensured that

both could contribute how to overcome barriers in their settings. This suggests that our findings are likely to be transferable to other settings where PC and SC residents are co-located.

## CONCLUSION

The IntraPC learning activities co-created by residents, supervisors, researchers and educationalists provide valuable opportunities for PC and SC residents to learn from, with and about each other's professions. The learning activities lead to improved mutual understanding, heightened awareness of key collaborative moments and improved PC-SC alignment. PC residents during SC rotations could act as knowledge brokers for IntraPC learning, when given a platform to advocate for PC during dedicated IntraPC learning activities.

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# CHAPTER 3

## ‘A ripple effect of learning’: evaluating intraprofessional workplace learning in postgraduate medical education through collective evaluation

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**Background**

Acquiring competencies in intraprofessional collaboration (IntraPC) across the primary care (PC)–secondary care (SC) interface is essential to prevent adverse outcomes in the increasingly complex care for older adults. The workplace-based learning intervention Secondary Primary care Intraprofessional Collaboration Education (SPICE) was developed to foster IntraPC learning among co-located PC and SC residents during a geriatric rotation in the Netherlands. Understanding how learning through SPICE translates into clinical practice remains challenging and may require innovative evaluation methods. This study explored the longer-term effects of SPICE using a new collective evaluation approach.

**Methods**

We used the Effects Forum, a collective evaluation method originating from applied social sciences that combines timeline analysis, mixed focus groups, and knowledge co-construction. PC and SC residents, supervisors, and patients collaboratively constructed a timeline of IntraPC learning moments during SPICE and the following six months. Participants discussed how and why these moments influenced their collaborative behavior and clinical practice. Data were analyzed using thematic analysis.

**Results**

Seventeen participants took part in two distinct Effects Forums. Residents reported gaining insight into patients' care continuum and developing greater mutual understanding across PC and SC. This facilitated more proactive handovers, which could improve continuity across care settings. Residents also transferred IntraPC learning into new contexts through reflection and dialogue, creating a ripple effect of learning that extending beyond the initial intervention.

**Conclusion**

Workplace-based IntraPC learning can lead to meaningful changes in collaborative behavior and clinical practice. By capturing shared experiences over time, the Effects Forum provided insight into how learning translated into practice and supported ongoing reflection. Collective evaluation offers a valuable approach to understanding the impact of workplace learning interventions in complex healthcare settings, with potential implications for further improving continuity and patient safety through IntraPC learning across the PC-SC interface.

## INTRODUCTION

Multimorbid older adult patients have complex and dynamic care needs that may prompt multiple care transitions between different specialty physicians, including physicians working in primary care (PC) and secondary care (SC) settings (1-3). Inadequate collaboration between PC and SC physicians during these care transitions is associated with fragmentation of care and an increased risk of adverse outcomes (4-7). To prevent adverse outcomes, it is essential to have effective Intraprofessional Collaboration (IntraPC) that entails coordinated and integrated care across medical specialties guided by one integrated treatment plan (8). Therefore, learning adequate IntraPC across the PC-SC interface is essential in the complex care for multimorbid patients (4, 5). Developing IntraPC competencies requires dedicated learning interventions, which current postgraduate training curricula often lack (9). Developing new educational interventions to facilitate IntraPC learning, therefore, is needed (10).

In an effort to develop new IntraPC educational interventions, the innovative workplace-based learning intervention called Secondary-Primary care Intraprofessional Collaboration Education (SPICE) was designed and implemented in the postgraduate curriculum of the geriatric department in a university hospital in the Netherlands. SPICE is a multifaceted workplace-based learning intervention in which co-located residents from PC and SC postgraduate programs doing a geriatric medicine rotation learn from, with and about each other to foster IntraPC learning across the PC-SC interface. SPICE consists of four formal learning activities and two workplace learning activities that provide residents with opportunities for open dialogue on IntraPC across the PC-SC interface (see appendix 1: SPICE program).

Workplace learning in postgraduate medical training can be understood as a form of situated learning, which is characterized by the fact that learning outcomes and mechanisms are shaped by the context in which learning occurs (11, 12). In this setting, knowledge and skills are not acquired in isolation but are embedded within authentic practice, social interactions, and real patient care activities (12, 13). These workplace contexts are characterized by multiple interacting elements that shape clinical decision-making under time pressure, where learning is often implicit and embedded in daily practice (14).

Currently, IntraPC workplace learning in postgraduate training largely occurs through daily interactions between residents from different specialties or between residents and their supervisors (9, 12, 15). Within these interactions—both across specialties and between residents and supervisors—power dynamics play a significant role (16). Hierarchies, professional identities, and underlying assumptions can shape participation, communication, and collaboration, and may at times constrain IntraPC (16). These dynamics are particularly present in interactions across the PC–SC interface (9, 16).

In the design of the SPICE intervention, explicit attention was therefore paid to how contextual and relational factors, including power dynamics, influence both work and learning. SPICE creates a structured space for residents from PC and SC backgrounds to engage in dialogue about real-world collaborative experiences, in which they collectively explore how contextual factors, including power, have shaped their interactions. In doing so, the intervention aims to render these often implicit processes visible and open to reflection.

Because learning in this setting is inherently situated and context-dependent, the evaluation of learning interventions requires an approach that does justice to this complexity. A rich, contextually grounded evaluation makes it possible to capture the interplay between the intervention, the actors involved, and the environment, thereby offering deeper insight into how learning outcomes are constructed. Subsequently, a rigorous evaluation of the effects of IntraPC workplace-based learning interventions on clinical practice is essential, but inherently complex (17). Initial evaluations of SPICE, using in-depth and focus group interviews during and immediately after participation, indicated promising effects in terms of perceived learning and behavioral intentions. How these results translate into effects in clinical practice, however, remains unclear.

Effects on clinical practice may include improved patient outcomes, improved patient and/or caregiver satisfaction or improved collaborative behavior resulting in more coordinated and integrated care (18). Traditional evaluation methods may fall short of exploring the effects of workplace-based learning interventions on clinical practice (17). Quantitative evaluation methods, such as questionnaires or patient-related outcome measures like mortality or hospital readmissions, are subject to a multitude of confounding factors within the complexity of clinical practice (1-3). These confounders may include recall bias, inadequate therapy adherence, informal caregiver burden or interacting comorbidities, which are particularly apparent in the care for patient groups such as multimorbid older adults (1-3). As these confounders may obscure whether observed changes in clinical practice can be attributed to a specific learning intervention, this complicates the use of quantitative methods in understanding the effects of workplace-based learning interventions on clinical practice (1-3).

Qualitative methods aimed at exploring the effects of workplace-based interventions on clinical practice are promising, yet they require an approach that adequately accounts for the complexity of the clinical environment. Workplace-based interventions are often multifaceted, making it challenging to capture the full scope effects of the intervention through, for example, individual interviews or observations conducted immediately after formal learning activities. In addition, it can be difficult to identify what informal moments in practice may also have contributed to IntraPC learning. As a result, it may prove difficult to disentangle what components of learning interventions drive meaningful changes in clinical practice (17, 19).

Despite these challenges, evaluating the effects of IntraPC learning interventions such as SPICE remains vital, especially in times of increasing scarcity of personnel and financial resources (20, 21). New learning activities are also often layered onto existing curricula, further expanding their content (22). Consequently, learners in the workplace face rising workload pressures, which have been linked to increased incidence of burnout (22). Careful evaluation of new workplace-based learning interventions, therefore, is essential, not only to ensure their effectiveness and feasibility, but also to prevent them from inadvertently contributing to excessive workload while ensuring they deliver meaningful effects. These considerations highlight the need for innovative evaluation approaches that can capture different perspectives, identify influential components and underlying learning mechanisms and clarify longer-term effects on clinical practice.

As workplace-based learning is inherently a social process amongst stakeholders, an evaluative approach that mirrors this collective and social learning may be promising for exploring effects of workplace-based learning interventions in clinical practice (23, 24). In this study, we explore the longer-term effects of SPICE on residents' collaborative behaviors and clinical practice, six months after completing the program, using a collective evaluation method called 'the Effects Forum'.

**Box 1: Contextual information of the Dutch medical education trajectory, workplace setting and SPICE interventions**

In the Netherlands, medical education consists of undergraduate medical training (bachelor and master level) followed by postgraduate specialty training. While undergraduate training combines formal education with clinical internships, postgraduate training is predominantly workplace-based.

During postgraduate training, physicians in training (residents) participate in clinical rotations within and outside their specialty. Their training is formally overseen by a program director, while their day-to-day clinical work and learning are supervised by different clinical supervisors in the workplace. These supervisors are medical specialists tasked with both overseeing effective task execution and patient safety as well as facilitating workplace learning. Workplace learning is therefore central and characterized by learning through participation in clinical practice. In addition, weekly-scheduled teaching hours provide opportunities for more formal learning activities alongside clinical work.

Within the Dutch healthcare system, PC physicians act as gatekeepers to SC, making collaboration across this interface a routine yet complex aspect of clinical practice. This is particularly relevant in geriatric care, where patients often present with multimorbidity and require coordinated input from multiple specialties.

Against this background, a team of professionals from diverse clinical, educational, and research backgrounds developed the Secondary Primary Care Intraprofessional Collaboration Education (SPICE) program. SPICE is a program integrated into clinical rotations, consisting of a combination of formal IntraPC learning activities and workplace-based learning tasks. The program builds on the co-location of residents from PC and SC training programs and encourages reflective dialogue around real-world PC–SC interactions. Within SPICE activities, a moderator prompts residents to exchange perspectives, reflect on key collaborative moments, and discuss how contextual factors, such as power dynamics and professional assumptions, may influence IntraPC.

## METHODS

To evaluate the longer term effects of SPICE, we used a constructivist approach (25). To appropriately evaluate a complex intervention within a tertiary care context, a methodological approach that acknowledges and accommodates complexity and dynamics is essential. Therefore, we chose 'the Effects Forum', which is a collective evaluation method developed in the applied social sciences field in the Netherlands (26). Collective evaluation is an approach in which a group of stakeholders jointly reflect on an intervention (27, 28). Rather than relying on individual assessments or evaluations, this method uses shared experiences and dialogue. Its aim is to collect multiple perspectives and collaboratively construct meaning regarding the effects of the intervention.

## Effects Forum

The Effects Forum is a group discussion format, in which all stakeholders of the learning intervention are represented. Stakeholders collectively evaluate the effects of an intervention on the personal, interpersonal and system level using a timeline. The Effects Forum uses elements of 1. focus group interviewing, 2. co-construction of knowledge and 3. timeline analysis (26).

1. Focus groups are a method of data collection that gathers opinions, insights and ideas from participants, who can then collaboratively generate deeper insights into their experiences with an intervention (29). By employing a heterogeneous group (in our case comprising PC and SC residents, supervisors and patients), participants can reinforce, contrast or challenge each other's narratives (27). This dynamic fosters a more comprehensive understanding and allows individual findings to be contextualized and transferred to other settings.

2. Co-construction of knowledge is a concept that has been increasingly embraced in qualitative research that aligns well with our constructivist epistemology. It enhances data quality by incorporating multiple perspectives and encouraging examination of the data from various angles (30, 31). This is particularly valuable to equalize voices in order to gain broad insight into issues impacting SPICE outcomes, including potential power dynamics. In the Effects Forum, co-construction is stimulated by including all stakeholders in the same focus group and by appointing one participant per Effects Forum session as the 'effects master'. The effects master is a participant who helps the other participants to become aware of any effects mentioned during the Effects Forum. The effects master is empowered to interrupt the discussion to prompt deeper exploration of any effects mentioned. The effects master writes memos during the Effects Forum to summarize the uncovered effects and stratifies them into categories of personal effects, interpersonal effects or systems effects. Each participant can volunteer for the position of effects master.

3. Timeline analysis serves as a valuable tool as it enables identification and exploration of significant learning moments in the workplace that extend beyond those formally addressed during the intervention (32). By using this approach, it is possible to uncover insightful learning opportunities that might be missed when relying solely on direct questioning about outcomes of formal workplace-based learning activities (32). Moreover, when participants are asked to recall their experiences, they may easily forget important elements, particularly those that occurred further in the past. By collaboratively reconstructing events along a timeline, participants are supported in retrieving memories. This allows for richer data collection and a more comprehensive understanding of the intervention's sustained effects while limiting recall bias.

The process of data generation during the Effects Forum is depicted in Figure 1. In our study, the Effects Forum began with step 1: an introduction to the topic, in which participants could share their initial reactions to IntraPC learning and SPICE. In this introduction, we asked participants to introduce themselves including their professional backgrounds, and to express what they felt was important in IntraPC learning across the PC-SC interface. This was followed by step 2: agreeing who would participate as effects master. In step 3, the timeline was introduced.The learning activities that were part of SPICE had already been placed. Participants were then invited to add moments that influenced their IntraPC learning across the PC-SC interface. Participants were encouraged to add actions and interactions that mattered to them regarding IntraPC learning in the workplace. Subsequently, in step 4, the group collectively prioritized which of these moments were most important to elaborate upon. In step 5, each selected moment was discussed in turn, guided by the following questions:

- What happened during this moment?
- Why was this moment important?
- Did you learn from it? If so, what did you learn?
- Did something change after this moment? If so, what and how is this reflected in your current practice?
- Do other participants recognize this, or have different experiences? If so, what and how?

In this way, all moments were 'unpacked'. Lastly, in step 6 participants were asked to reflect on their key takeaway from SPICE or from the dialogue during the Effects Forum itself.

**Table 1. Overview medical specialties in the Netherlands**

| | |
|---|---|
| General practitioner (GP) | PC doctor 'working in the frontline of a healthcare system', taking the initial steps to provide care for any health problem(s) that patients may have, including prevention, diagnosis, cure, care, and palliation. |
| Elderly care physician | PC doctor working in long-term care for older adults and chronic patients, mostly in a nursing home. In the Netherlands this is a PC specialty. |
| Geriatric medicine | Doctor working in acute care for frail older adults in a hospital setting. They work includes outpatient consultation as well as inpatient clinical practice. In the Netherlands, this is a SC specialty |
| Primary care (PC-setting | The first, community-based medical care. The gatekeeping role of PC doctors makes them responsible for adequate referral of patients to hospital care. |
| Primary care resident (PC resident) | PC residents are in training to become GPs or elderly care physicians. Both PC postgraduate training programs involve a 3-year competency-based program. The PC residents provide patient care in the PC setting during their first and third year. During their second year, PC residents undertake other placements, amongst which is a hospital of 6-9 months. |
| Medical specialist | Doctor providing specialist medical care. Mostly offered in hospital settings, where both inpatient and outpatient clinics are combined. In the Netherlands, geriatricians are medical specialists working in SC. |
| Secondary care residents (SC residents) | Doctor in training to become a medical specialist. The postgraduate medical specialist training involves a 4-6-year competency-based program. The medical specialist residents provide patient care in a hospital, or other secondary care setting (SC). |

## Participants and setting

Given the collective nature of the evaluation, purposive sampling was essential to ensure the inclusion of relevant perspectives. All participants in the evaluation process were regarded as equal contributors, with each having an equal voice in the dialogue. The participants reflected representatives from each stakeholder group. Stakeholders in this learning intervention included residents, supervisors and patients, all of whom were purposefully selected to reflect the diversity of perspectives involved.

The residents were enrolled in PC or SC postgraduate training programs and were doing or had done a rotation in geriatric medicine. These residents were either enrolled in the PC General Practice and Elderly Care programs, or the SC Geriatric or Internal Medicine programs (table 1: medical specialties in the Netherlands). To evaluate the longer-term effects of SPICE for these residents, we invited residents that had finished their SPICE activities at least six months ago. Therefore, we recruited residents that had returned to primary care settings and had moved to another secondary care rotation in another clinical or research department, which provided us with the opportunity to explore how skills acquired in SPICE were transferred to their new placement.

The supervisors were geriatricians that were responsible for overseeing the clinical work of the residents during their geriatric medicine rotation and were responsible for workplace learning during these rotations.

Prior to the Effects Forum, participating residents were asked whether they had encountered a patient during their rotation in geriatric medicine who might be suitable for inclusion. Particularly patients with no or limited cognitive impairment and preferable where IntraPC challenges were a part of the assessment were deemed eligible. So, the patients were older adults that had visited the geriatric medicine department of the university hospital in which SPICE was implemented. These patients had received care from one or more residents present in the Effects Forum while they were participating in SPICE activities during their geriatric medicine rotation in the department.

The study setting was a geriatric medicine department in an academic hospital in the Netherlands. This department includes an out-patient consultation service, an in-patient acute care ward, an attending geriatric resident in the emergency department and a geriatric liaison team for in-patients. Its staff consists of nine geriatricians, two internists and a varying group of residents from different primary and secondary care specialty training programs. For several years now, IntraPC learning has been a topic of research and resident and supervisor training at this department.

## Data generation

We performed two Effects Forums; the first was held in March 2022 and the second in January 2024. The participating residents had enrolled in SPICE the year before taking part in the Effects Forum and had finished at least six months ago. The Effects Forums were held in a hybrid format: participants could participate either live or through video-conference call to facilitate participation for residents that had moved on to PC and SC contexts in different parts of the country and for less mobile patients. The Effects Forums lasted two hours each and were moderated by two researchers: a geriatrician (MV) and a psychologist (NL). The first moderator was the discussion leader, and the second paid attention to participation of the participants in the video conference. A third researcher, an educational researcher (WKS), observed interactions and behavior during the session and supported the effects master in memoing. The interview guide was created using insights from reflective interviewing (33). (see appendix 3: interview guide)

## Data analysis

The data consisted of the effects master memos, the timelines and the audio recordings of the effect forum sessions that were transcribed verbatim. The data were analyzed through thematic analysis in six iterative steps (see below) (34). This process was supported by regular research group meetings to enhance reflexivity (31). These meetings involved collaborative reflection on codes, quotes and preliminary themes across Effects Forums transcripts, timelines and effects master memos. The research group,  could provide their perspectives and theoretical insights in these meetings (22). These insights could then lead to codes being reframed and/or stratified. This analytic process resulted in three overarching themes describing the long-term effects of the SPICE program as perceived and discussed by stakeholders.

*Step 1: Timeline and memo analysis*

The timeline and the effects master's memos were reviewed. Memos were read and re-read and the researchers checked the stratification into personal, interpersonal and system level effects provided by the effects master. The timelines consisted of instances that participants had experienced as moments of IntraPC. We developed code templates based on the learning moments mapped on the timeline, which we could then use for the initial coding of the transcripts.

*Step 2: Within-session analysis*

Verbatim transcripts of the Effects Forums were analyzed combining template analysis and inductive coding using Atlas.ti. Two researchers (MV and WKS) independently conducted template and open coding, meeting regularly to discuss coding decisions, resolve discrepancies and ensure consistency. They used the code templates created from the learning moments on the timeline to identify the selected IntraPC learning moments and the corresponding sections in

the discussions. Through open coding, they then explored learning outcomes, changes in clinical practice and professional behavior in each of the selected learning moments.

*Step 3: Cross-session analysis*
Template codes describing valuable IntraPC learning opportunities from both Effects Forums were compared and synthesized. Similar learning moments were merged and mapped onto one integrated timeline (Figure 2).

*Step 4: Combining IntraPC learning moments templates and open codes*
For each learning moment on the integrated timeline, co-occurring open and template codes and associated quotes were re-read to explore learning outcomes in practice and behavior with each learning moment. This step generated a set of illustrative quotes and code groups linked to each specific learning moment on the integrated timeline.

*Step 5: Overarching comparison across timeline, effects master memos and transcripts*
The resulting code groups and quotes were then combined with the effects master memos to identify overarching preliminary themes that captured the effects observed in clinical practice.

Codes were iteratively grouped into higher-order categories, which were subsequently abstracted into preliminary themes. Throughout this process, the different data types could enrich each other.

*Step 6: Finalize themes*
Finally, the preliminary themes were reviewed across the entire dataset, including other learning moments, in order to verify thematic saturation (35).

**Reflexivity**
From a constructivist perspective, we assume that data are inherently shaped by contextual and relational factors (36). Rather than viewing these context-specific characteristics as sources of bias to be minimized, we aimed to provide a rich and transparent account of how such factors potentially influence both data generation and interpretation.

A key consideration concerns the potential relational dynamics among participating patient and residents, residents and supervisor, the participants and the researchers and the effects master and the researchers:

- Patients were purposively selected from the clinical practice of participating residents, resulting in pre-existing care relationships. While this sampling strategy may have influenced

participants' willingness to express critical perspectives, it enabled patients to provide direct, experience-based feedback on residents' collaborative behavior.

- The role of supervisors in relation to residents may also shape data generation. Supervisors inherently play a role of varying degrees in training of participating residents during the geriatric medicine rotation, which may affect residents' willingness to voice critical reflections. To promote psychological safety, residents were selected who were no longer actively working within the studied department. Additionally, moderators deliberately framed IntraPC in terms of a result of broader contextual dynamics rather than solely an assessment of individual performance.

- The positioning of the research team may also influence data generation and interpretation. Moderator MV held multiple roles as researcher, supervisor and teacher during SPICE formal learning activities. To acknowledge potential dual role tensions, multiple moderators were involved providing the opportunity to interject during the Effects Forums at times where MV's individual perspective might risk taking the upper hand. During data analysis, the research group reflected on how each individual perspective influenced data analysis. Furthermore, moderator NL has specific expertise in observing power dynamics and was attentive to participants' ability to speak freely. Furthermore, particularly in the second Effects Forum, participants were explicitly invited to reflect on unintended or 'negative' outcomes of the SPICE intervention.

- The role of the effects master may also shape the data. As this role was fulfilled by a participant, this dual position may have limited their ability to fully articulate their own perspective. They may also feel a barrier to interrupt the discussion. To support this role, moderator WKS was appointed as a second effects master. During the Effects Forum, the moderators explicitly create space for the effects master to contribute their own perspective or intervene to explore effects in more detail.

Importantly, the research team comprised members with diverse clinical, educational and research backgrounds, enabling a team-based approach to data collection and analysis. This diversity supported ongoing critical reflection on emerging interpretations and facilitated the explicit consideration of different perspectives and assumptions, thereby strengthening the credibility and robustness of the analysis.

## Ethical considerations

This study was performed in accordance with the Helsinki Declaration. Ethical approval for this study has been obtained from the Ethical Review Board of the Netherlands Association for Medical Education (NVMO-ERB) with protocol number 2020.7.3.

Written informed consent for participation was obtained before participation in the Effects Forum. Participants gave consent for publication of their pseudonymized data.

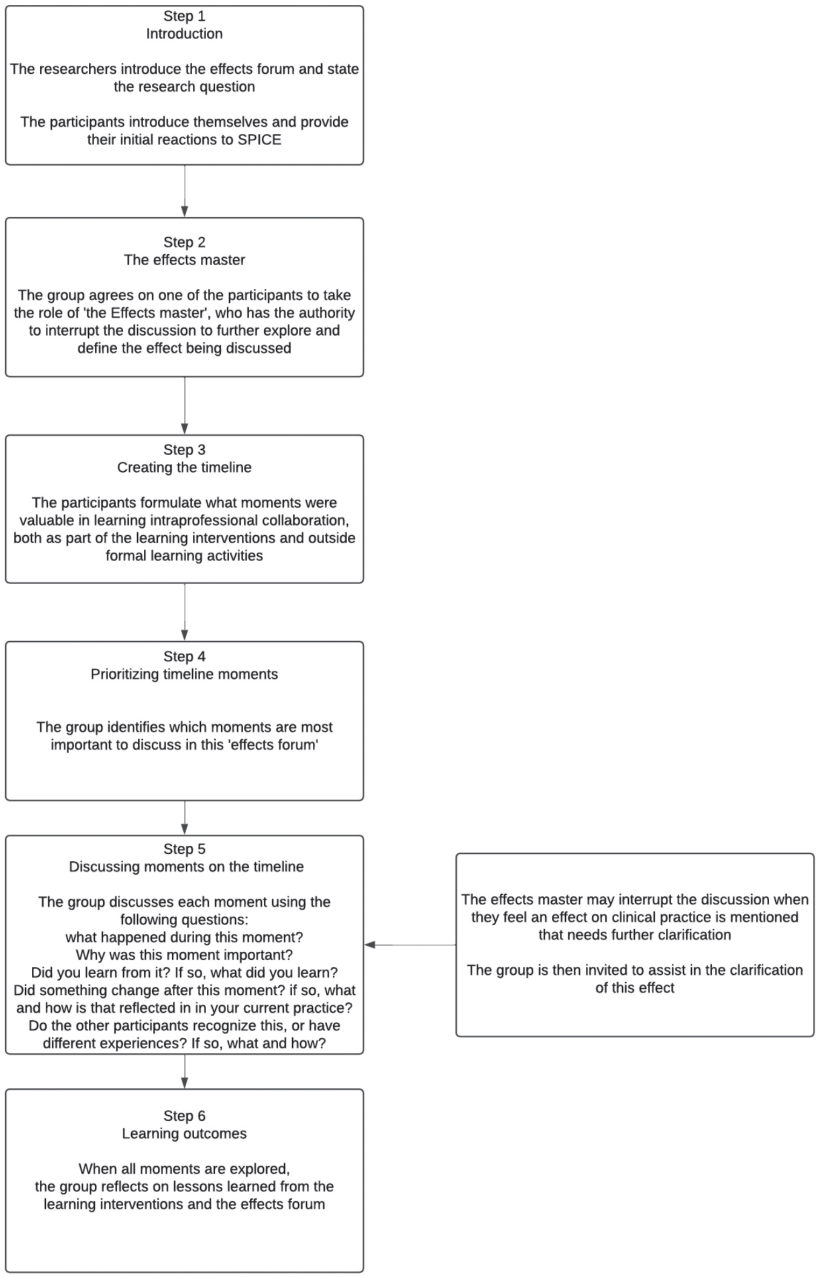



**Figure 1: the data-generation process during the effects forum**

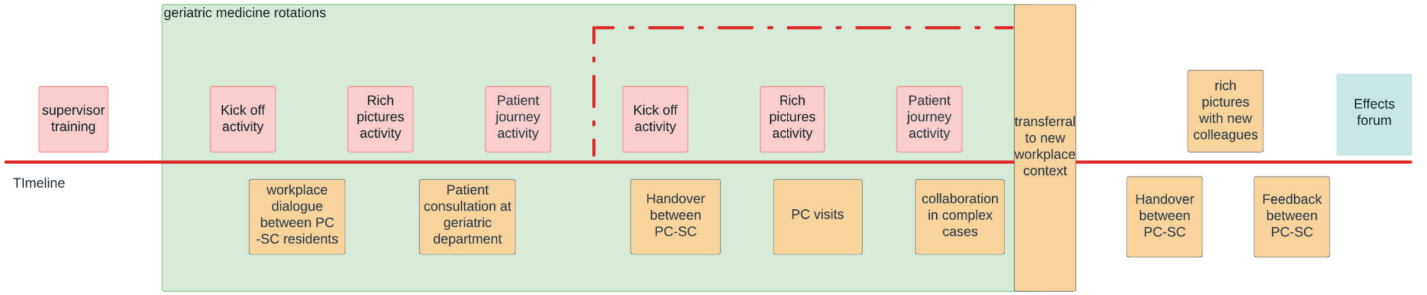



**Figure 2: Timeline with meaningful moments for IntraPC learning**

During the effects forum, participants identified meaningful moments during the last months that had contributed to learning IntraPC. This timeline guided the discussion between participants in the focus groups.

The red line is the timeline, the dotted red line depicts how some geriatric medicine rotations take only three months, so their timeline branches of to a new workplace setting earlier.
The red boxes relate to formal learning activities residents participated in during the geriatric medicine rotation.
Orange boxes relate to moments in clinical practice that resulted in informal learning on IntraPC.
The blue box relates to the research activity described in this paper

## RESULTS

Two Effects Forums were held with a total of 17 participants, including 12 residents, 2 supervisors and 3 patients. The characteristics of the participants in each Effects Forum are depicted in Table 2. In both Effects Forums a resident voluntarily came forward as effects master, a SC resident in the first Effects Forum and a PC resident in the second. The other participants expressed agreement with this allocation of roles.

The moments identified by participants to be unpacked, included the SPICE formal learning activities, dialogues amongst residents during their geriatric medicine rotations, collaboration in complex patient cases, dialogues between PC-SC during clinical practice and interactions with colleagues after transferring to new rotation contexts. We visualized the valuable moments of both Effects Forums in one integrated timeline (Figure 2). Our thematic analysis resulted in the following overarching themes: insight into patients' care continuum, improved mutual understanding and actionable awareness and the ripple effect of IntraPC learning.

**Table 2 Participant characteristics**

| | |
|---|---|
| **N of participants** | 17 |
| Residents | 12 |
| Supervisors | 2 |
| Patients | 3 |
| **Participant age (range)** | |
| Residents | 28 – 42 |
| Supervisors | 35 - 39 |
| Patients | 69 – 74 |
| **Sex** (F/M) | 12/5 |
| **Residents' specialty backgrounds** | |
| Primary care | 7 |
| • General Practice | 3 |
| • Elderly Care | 4 |
| Secondary care | 5 |
| • Geriatric Medicine | 3 |
| • Internal Medicine | 2 |

### Insight into patients' care continuum

In SPICE formal learning activities, residents exchanged perspectives and discussed how clinical practice differed across the PC and SC care contexts, and they could provide feedback on their collaboration, for example, on their handover or referral letters. The residents reported how SPICE activities improved their insight into the care continuum patients may be subjected to in their journey across care settings and how an individual resident's work is only a small part

of that. Patients noted that they often had limited insight into interactions across PC-SC that occurred. They mentioned they were not always aware of the intentions of their referring PC physician that were transferred across the care continuum, which could differ from their own intentions for SC referrals. In addition, patients noted that they often had limited insight into the collaboration between PC and SC, while expressing appreciation for greater involvement in referral.



*'I think it is quite difficult, because you tell your story at the GP, who listens. Then the GP makes a referral, but you are not aware of which information reaches the specialist and you don't know if this information aligns with your perspective on your complaints. The specialist then acts using this information the GP provided. […] I think it's a shame, because you as a patient would want to add your own little note attached to the referral letter.' - patient*

Subsequently, residents and supervisors mentioned they observed a noticeable shift in their perspective towards patient care across the PC-SC interface: while their initial focus had predominantly been doctor-centered and hospital-based, they mentioned to become more open to a patient-centered view within the PC-SC collaboration network.

*… In my first drawing I eventually put the hospital doctor in the middle […] with the patient right next so it's really … actually, I'm really doing just that, aren't I, my patient symbolized the core but the hospital doctor was actually in the middle. Kind of striking, isn't it. […] But when I'm just looking at my way of thinking, I think that this has changed.* - Elderly Care Resident

*What changed, I think, was that I realized much more clearly that, hey, hang on a minute, we're not in the hospital stronghold here but we're moving into … we're operating in a network. I knew that, of course, but I started to pay more attention to it.* - Supervisor

Residents mentioned how insights from SPICE prompted them not only to make more phone calls for explicit handovers across PC-SC, but also to give more feedback to the physician in the other setting.

*Only last week I spoke to a surgeon on the phone. About why they had admitted a patient for analgesia without mentioning the analgesia plan in their [discharge] letter. Yeah, I would have hesitated to do so before SPICE for, well, you don't really want to bother a surgeon. But I felt this mattered so much to the patient that I did make the call and SPICE has really helped me to do so.* - Elderly Care Resident

One of the PC residents mentioned that the insights on IntraPC had made them reflect on the current practices for people in crisis. In their opinion, current interactions between the general practitioner, elderly care specialist and geriatrician for patients in care crisis are often difficult, impacted by competing interests and logistical barriers. They felt current practice for patients in care crisis could benefit from more effective intraprofessional deliberation. SPICE had given her new ideas for discussions among the three involved specialists to enable swift, efficient and limited hospital diagnostic assessment followed by a transition to nursing home care for older adult patients during a care crisis. This idea resonated with the supervisor.

> *I realized it's a pity we don't have a consultation about people in crisis, amongst the three of us. So the Elderly Care specialist on duty, the GP and the geriatrician, initiated by the one, of course, who's having doubts, I suppose. Why don't the three of us meet up briefly to discuss the case? That would be a nice goal for the future. So that was the upshot, that I thought … I'm still … that's still going through my mind. That I'm thinking: why don't we do this in the future.* - Elderly Care Resident

> *Well I'm up against this every week, so I'd love to discuss this with you to come up with a solution. Because I think we can develop a new care model for this within a week.* - Supervisor

One patient added that the Geriatric Medicine resident in charge had contacted other members of his treatment team, after which they noticed the other physicians in their care network approach them differently. In their opinion, their other treating physician now had a more integrated understanding of the interactions of their multiple medical conditions. The patient felt this improved insight into their interacting conditions led to a more patient centred approach in communication and in their treatment. .

> *What I noticed is that the [other physician's] tone had completely changed. Before that, they tended to patronize me, you know: 'pull yourself together and something's always bothering everyone.' After that, though, I was suddenly taken very seriously indeed, I noticed, and I still am.* – Patient

### Improved mutual understanding and actionable awareness

In the Effects Forums, participants discussed how encounters between PC-SC physicians had contributed to their improved understanding of different ways of working. Moments mentioned on the timeline that had prompted IntraPC learning tended to be dialogues with a physician from the other work setting. This included dialogues with fellow residents they encountered in the geriatric ward, encounters with colleagues during daily handovers across the PC-SC interface and (particularly for SC residents) during PC visits as part of SPICE.

*'The conversations you have with each other, that while we all do a rotation at geriatric medicine, while you do shared assignments, but also just, the conversations you have in between, about what is it you [SC resident] do [..]. What is my perspective as elderly care physician but also what is your perspective as internist and how you share these [perspectives]. …This makes it easier to understand what the other wants and how the other thinks'* – resident elderly care



An SC resident visited a PC setting as part of SPICE, where observations of the work of PC residents provided her with insight into the work context of the nursing home.

*Yes, there was a very specific moment [during a PC visit] that was most telling. I was talking to her when we were called about someone who was very short of breath. So the two of us went over there. So she, an Elderly Care specialist in training, she looked at this lady, put a hand on her shoulder and said to the nurse: 'Just give her Lasix 80 mg' and then we left. And I felt an urgent need to sort of take her history, to ask her whether she felt any chest pain, or just to listen [to her lungs] or that sort of thing, so I told her and then she said: 'Oh no, yes, no, she's just a little overwhelmed by it all so I'm just giving her this.' And half an hour later, this lady was sitting in her chair chatting away, everything back to normal. So I … so this was a very concrete moment for me to witness a very different way of working.* – Internal Medicine Resident

During daily interactions between PC and SC, residents explored each other's contexts, values and ways of thinking. The participating residents mentioned that this exploration enhanced their mutual understanding. This improved understanding encouraged them to improve their collaborative behavior and clinical practice. Furthermore, participants stated that they had become more aware of the impact their actions could have on professionals in the other care setting. They mentioned they felt this improved understanding was also reflected in more respect towards each other's profession.

*So really making sure your handover is even better, with medication specified. And making sure your patients and their relatives are informed about the treatment plan you're proposing. We had very concrete discussions with the Elderly Care specialist about advance care plans limiting renewed hospital admissions. He said it happens sometimes that patients or their relatives are not aware of this [decisions made during hospital admission] at all or that it hasn't even been discussed with them, so that they haven't just missed it somehow but that it actually hadn't been discussed at all. If you fail to do so, this really causes a huge problem for the Elderly Care specialist. I'm not saying I've done things in that way before, but it just helps to make you more aware of that sort of thing.* - Internal Medicine Resident

For some residents, this improved understanding prompted them to reflect on their clinical practice and to explore how their actions could be better aligned with physicians in other contexts. We have called this 'actionable awareness': the process by which residents developed a deeper understanding of each other's professional contexts, routines and cognitive frameworks, which in turn prompted them to reflect on how their own actions influenced cross-settings care. Importantly, this reflection also motivated residents to adapt their practices in ways that promoted better integration and coordination across settings.

The PC residents mentioned that this actionable awareness encouraged them to formulate referral questions in a more concise and direct manner. One resident reported that their improved referral question led to more concise responses from SC colleagues. For example, a PC resident referred a patient to neurology for further diagnostics, not because they strongly suspected a brain tumor as the cause of the patient's headaches, but because the patient could not be reassured in primary care. In response, the neurologist provided a more concise answer than the resident had experienced in previous referrals.

> *They tend to deal with my question more specifically. […] I've got an example. […] I had a patient with a headache who thought: 'I've got a brain tumor.' And I was unable to reassure them sufficiently so I referred they, saying: 'Low probability but fail to reassure patient. Is there any likelihood of there being a brain tumor, yes or no. Please present you findings.' And then they [hospital specialist] said very specifically: 'Headache but no brain tumor. Continue treatment plan.' So it's dealt with more specifically whereas normally I might have said: 'Headache analysis please.' And then they would have said: 'Headache no alarming symptoms, watchful waiting.'* - General Practice Resident

SC residents, on the other hand, mentioned to have learned to be more explicit in discussing the expectations that the referring PC physicians and their patients might have of SC assessment and treatment. If the referral question was clearer, they felt their SC diagnostics and treatment plan could be better tailored to the needs of the patient and the referring PC physician.

> *Yes, but I do think it really helps if the other person is also more aware of what they can expect from a colleague in the hospital. Or the other way around, that you learn to ask a colleague specifically: 'But when I'm hearing X, I'm thinking Y, and why do you think this is not the case? Or: So what is really your question?' So when everyone is more SPICE-trained, you learn to question each other in that way.* - Supervisor

### The ripple effect of IntraPC learning

On the timeline, residents added that after they had rotated from their Geriatric Medicine placement to their next specialty placement, which could entail going back to their own

specialty's workplace or to a new out-of-specialty rotation or a research placement, they experienced meaningful IntraPC learning moments in their new context. Residents mentioned that, in the practice of this new placement, they were able to use the reflection and dialogue skills they had acquired in SPICE. Dialogues with colleagues in their new workplace, prompted reflection through comparing and contrasting PC and SC practices

> *'… recognition and similarity, […] a lot more that difference actually. And also alignment. That is the motivation to keep on looking for contact and alignment during [intraprofessional] deliberation.'* – resident internal medicine



Residents mentioned this continued use of reflective dialogue caused them to transfer IntraPC learning from the SPICE activities in the geriatric department to their new workplace. One participant described this as the ripple effect of IntraPC learning.

> *Gotta keep talking about things. When you're in charge of patients at A&E: that's a pretty vulnerable man really. Turns out to be a patient for Internal Medicine, but I could have seen him in Geriatrics during my Geriatrics rotation. In terms of your treatment plan, it might be interesting to compare two cases, you know: two patients arriving at A&E independently, compare and contrast both treatment plans. Not necessarily with one being any better or worse than the other one, but it's kind of interesting to see how different perspectives can be.* - Internal Medicine Resident

One of those meaningful learning moments was when a nursing home resident shared that they had arranged a Rich Pictures session for their new PC colleagues.

> *After I had arrived in my new rotation, I also did a mini SPICE moment for them using a rich picture, so I delivered new knowledge but I also obtained new knowledge. So I explored my SPICE knowledge in greater detail in the care home setting.* - Elderly Care Resident

As lessons learned in SPICE were shared in new work contexts, residents noted how the colleagues in their new workplace became increasingly motivated to engage in more explicit IntraPC across the PC-SC interface, particularly when handovers were positively received by colleagues in the other setting.

> *Yes, I think it's what I just said, that I see it happening in my own work. You see it spreading as a ripple effect, and I'm pleased to hear that [Resident 12] and [Resident 9] are also referring to it, and they may infect their colleagues, so it all becomes more normal. And, as [Resident 12] observed, it also helps because you carry it on to the next one. I also find it easier when I'm talking to a surgeon on the phone: Is it a straightforward answer you want from me? What exactly is*

*your question? And perhaps you're making light of it, you know, trying to find common ground in your collaboration with them. Just take your time in a couple of sentences.* - Supervisor

As the participants noticed their awareness of the importance of handovers between PC and SC had increased, they initiated more frequent and detailed handovers by phone in their new context. While in their opinion, this contributed to improved continuity of care, it also led to an increase in workload. Moreover, when residents transitioned to new clinical environments where SPICE or IntraPC learning was not common practice, their efforts to engage in more comprehensive handovers were sometimes met with confusion or frustration from other physicians, who at times perceived these handovers as unnecessarily time-consuming.

*So sometimes it's discouraging because you know that in other regions you will just have to carry on in the old way, shame, but the [IntraPC] knowledge is lacking there. Oh well, I'm positive about it anyway: it's an opportunity to impart new knowledge, isn't it.* - Geriatric Medicine Resident

*So sometimes you may get a slap in the face from angry colleagues who're thinking: 'What is it you want, for goodness sake?'* - Supervisor

Participants mentioned how they felt the Effects Forums themselves also contributed to IntraPC learning.They were reminded of lessons learned, acquired new insights and could transfer these into their current workplace. The presence and active participation of patients was particularly well received.

*Erm yes, I particularly appreciated the patients being there. I'd already jotted down for myself that it's so important to listen to their request for help and to synch up and to align expectations. It reminded me of this.* - Internal Medicine Resident

*Today I was again made aware how important it is to keep applying the SPICE lessons in day-to-day work.* - Internal Medicine Resident

## DISCUSSION

This study illustrates the exploration of the effects on collaborative behavior and clinical practice of the Secondary-Primary Care Intraprofessional Collaboration Education (SPICE) program. SPICE was designed to foster intraprofessional collaboration (IntraPC) across the primary (PC)-secondary care (SC) interface. By using the Effects Forum, an innovative collective evaluation method, stakeholders created a shared timeline of meaningful IntraPC learning moments and co-constructed effects through dialogue. These moments included the formal SPICE learning

activities. Participants reported that formal SPICE learning activities fostered an awareness of the care continuum and promoted a shift from a doctor-centered to a patient-centered perspective. Participants mentioned how they translated this improved insight into more deliberate handovers. They agreed that these handovers could be used not only to transfer clinical information but also to provide feedback on treatment plans and collaborative practice across care settings. Other valuable IntraPC learning moments were workplace dialogues between PC and SC physicians, both during and beyond SPICE activities. These dialogues were experienced to contribute to a clearer understanding of the capabilities and contexts of colleagues in another care setting and reflected on how their own behaviors influenced work in another care context. Finally, participants mentioned how, after they had transferred to their next rotation, they had experienced new important IntraPC learning moments, which they felt could lead to IntraPC lessons being transferred to their new colleagues and renewed reflection, expanding the ripple effect of IntraPC learning to other settings.

Participants described how they had experienced interactions with professionals from other care settings to provide valuable insights into PC–SC collaboration, which had prompted them to reflect and improve on their collaboration behavior. Through this collective evaluation, the importance of dialogue among stakeholders in both learning at the workplace and during evaluation became evident. During our analysis, we discovered how these findings can be understood through the lens of social constructivist learning theory, which emphasizes that learning is socially situated and co-constructed (37). Within this framework, dialogue is not merely an exchange of information but a process in which participants co-create understanding and develop shared meaning (24). While traditional medical education primarily focuses on biomedical knowledge acquisition (23), the SPICE module intentionally created structured opportunities for dialogue and reflection on collaborative processes across PC and SC. These social engagements in SPICE facilitated the development of reflective and collaborative competencies which are indispensable in today's complex clinical environments, where professionals must learn how to transcend disciplinary boundaries to deliver integrated care (38).

The social constructivist nature of the collective evaluation mirrored the program's social learning mechanisms, aligning the process of evaluation with the principles underpinning learning in SPICE. This evaluative moment, therefore, may be interpreted as an extension of the learning process, effectively reflecting and reinforcing the intended educational outcomes.

It is noteworthy that participants described translating lessons from SPICE into new clinical contexts of subsequent rotations. Previous research on workplace learning has shown that rapid socialization into the local norms of a new rotation may come at the cost of previously learned behaviors (39). Transfer in health professions education requires learners to integrate declarative and procedural knowledge into a coherent mental model, which can be reactivated

in new clinical situations(40). Metacognition appears to play an essential role in creating mental models, enabling learners to interpret the individual demands of the new situation and regulate their thinking and working accordingly (41).

Our findings question the possibility that SPICE may have supported the development of a mental model for IntraPC. A shared mental model is a common representation of tasks, roles and strategies that enable team members to anticipate each other's actions and coordinate effectively (27). Both SPICE and this evaluation emphasized metacognitive processes through collective reflection on IntraPC across the PC-SC interface. Having been provided with different formats for structured collective reflection, participants from PC and SC might have developed a shared mental model of IntraPC during SPICE. Importantly, if this model was indeed co-constructed by stakeholders from PC and SC, it could be used as both a cognitive resource and a shared framework to strengthen coordination and mutual understanding during IntraPC across the PC-SC interface in diverse clinical settings. Shared mental models are known to facilitate coordinated and integrated teamwork in clinical practice and promote the acquisition of IntraPC competencies during workplace learning, and they can be useful, therefore, in diverse clinical settings in subsequent rotations (14, 42). It would be interesting for future research to explore whether SPICE activities indeed contribute to clearly defined mental models of IntraPC.

Subsequently, Participants reported that, upon moving to new rotations, they encountered authentic clinical situations that enabled them to deepen their IntraPC learning. From an interpretive perspective, such experiences may support the ongoing development and refinement of residents' mental models related to IntraPC. Through encountering new situations, residents may test and adapt these understandings, which may contribute to a growing sense of confidence in navigating PC–SC interactions. In turn, participants suggested that this evolving understanding enabled them to apply and share their perspectives with colleagues in new settings, potentially contributing to a broader ripple effect of intraprofessional learning.

## Implications

Our findings provide suggestions for educational practice, research and policy. Participants mentioned how the SPICE intervention helped them to make intentions for improved collaborative behavior across the PC-SC interface. Moreover, residents mentioned how they transferred their new insights intonew contexts. The combination of formal activities that provide shared reflective moments and practical, workplace-based learning activities enabled these residents to engage in IntraPC learning in real clinical settings. This indicates the potential value of incorporating dedicated IntraPC workplace-based learning in postgraduate training

This study also explores the educational potential of evaluation research. Prior work has shown that evaluation processes can themselves become meaningful learning interventions. This

potential lies in the generative moments that occur during evaluation (43). Generative moments energize participants and create space for new insights (43). Previous research has indicated that these generative moments often arise during social interactions where the importance of change is explicated and when lessons can be taken to new workplace settings where reflective reinterpretations occur (44, 45). Elements that enable generative moments to occur, appeared to have been presented during SPICE and the subsequent months afterwards. This suggests generative moments may have occurred within the studied timeframe. In this sense, the collective evaluation aligned seamlessly with the social constructivist mechanisms underlying the intervention. Further research could explore whether future postgraduate education initiatives could benefit from incorporating such collective evaluations to strengthen ongoing learning across healthcare settings.



Moreover, this study suggests scientific potential of education evaluation research for exploring the effects of complex workplace-based learning interventions. This method combined multiple perspectives, possibly by enabling the identification of informal learning moments that may have remained hidden in traditional evaluation methods and provided insight into how participants translate learning outcomes into clinical practice. Future research on the effects of workplace-based interventions could benefit, therefore, from employing collective evaluation methods such as the Effects Forum.

### Strengths and limitations

A strength of this study is the fact that the different stakeholders of the IntraPC learning activity were questioned collectively as opposed to individually. The use of a timeline was helpful to limit recall bias as well as to identify both formal and informal meaningful learning moments in daily activities. The collective approach offered participants the opportunity to gain deeper insights into IntraPC and helped bridge the gap between learning and practice by bringing stakeholders together to exchange perspectives.

An important strength of this study is that patients were included in the evaluation process. Residents mentioned that they particularly appreciated their presence, as patients could provide their perspective on whether behavioral changes had led to improved care. The inclusion of patients also provided important additional insights into their perspective on care across the PC–SC interface. Patients highlighted that their expectations of specialist care do not always align with the assumptions of referring primary care physicians, underscoring the importance of explicitly exploring and discussing these expectations, particularly when discrepancies arise. Moreover, patients offered concrete reflections on how residents' collaborative behavior was experienced in practice. For example, they described how specific communication approaches contributed to them feeling more heard and involved in their care. In addition, patients made visible how little insight they typically have into the collaboration between primary and

secondary care providers, and how greater transparency and communication about this process were highly valued. These contributions helped to surface aspects of IntraPC that often remain implicit for healthcare professionals, thereby contributing to co-construction on preferred IntraPC practices from the patient perspective.

During the Effects Forum, it was a difficult but essential taskto ensure that all voices were heard equally and could contribute equally. Patients reported that they found it difficult to follow discussions about SPICE formal learning activities or care structures across the PC-SC interface, mentioning that this difficulty could have hindered their ability to engage with certain technical statements regarding IntraPC across the PC-SC interface made by residents or supervisors. These findings align with previous studies, in which patients have expressed that they often experienced care across PC-SC interface as a 'black box', as something they were unaware of and not involved in, and that its occurrence and its quality were deduced from their appointments and contacts with their doctors and the actions they undertook (46).

A limitation to this study, therefore, may be that patients may not always have been fully able to participate in some discussions. To mitigate this as much as possible, one researcher closely monitored the participants (during the video conference), with particular attention to the patients, and occasionally provided clarification or paraphrasing to support their understanding and engagement. To facilitate patients in voicing their perspective, it could be beneficial in future evaluations to provide patients with more detailed preparation regarding the Effects Forum, PC-SC collaboration and the learning activities, which would allow them to articulate more confidently how the residents' practices affected their care.

Conducting the Effects Forum in a hybrid format may have made it more difficult for some participants to respond.

Another consideration regarding dynamics between participants and researchers, is the dual role of the effects master. In both Effects Forums a resident came forward as the effects master. As a result of the presence of supervisors (including researcher MV), this may have limited their willingness to create memos on unintended or 'negative' outcomes. Second effects master and researcher WKS supported the resident effects master by initiating discussions on potential unintended outcomes, which led to the exploration of learning opportunities with potential 'negative' outcomes.

An important characteristic of this study is that the findings are strongly grounded in the specific context in which the research was conducted. The studied geriatric department is characterized by the provision of care for older patients with multimorbidity, in which close collaboration across the PC–SC interface is essential. Within this setting, attention to IntraPC

has already been well established. This context offers rich opportunities for learning from PC–SC interactions. However, this context is already oriented towards integration and coordination across medical specialties. As a result, it is likely that not only the SPICE intervention, but also the existing workplace culture, contributed to the reported learning experiences. This is also reflected by the presence of daily interactions on our timeline of valuable IntraPC learning moments. Based on the available data, it is not possible to disentangle the influence of the intervention from that of the surrounding context. Furthermore, the study's limited sample size (17 participants) and single-region focus may also restrict transferability. Consequently, the transferability of the findings to other settings is not self-evident. However, the insights generated in this study may serve as sensitizing concepts for future research and practice in different contexts. Nonetheless, the goal of this study was not to facilitate broad generalization but to provide a rich, contextualized understanding of the effects of SPICE, the complexity of evaluating workplace learning interventions and the potential of collective evaluation.



## CONCLUSION

The SPICE program on IntraPC across the PC-SC interface fostered insight into the care continuum, improved mutual understanding with actionable awareness and initiated a ripple effect of IntraPC learning across clinical settings. By way of this collective evaluation, participants revisited and deepened their learning in ways that align with the social and constructivist learning principles embedded in the program itself. This illustrates how collective evaluation can be a meaningful learning experience in its own right. When designing workplace-based learning interventions, incorporating evaluation methods that reflect social interaction as a learning opportunity may be valuable, therefore, not only to demonstrate their effects on clinical practice, but also to deepen and sustain the participants' learning.

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# CHAPTER 4

## An offer you can't refuse: opportunities for intraprofessional collaboration learning in the workplace

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**Introduction**

Intraprofessional collaboration (IntraPC) competencies are invaluable in the care for older adults with complex care needs, but these competencies are not acquired automatically. IntraPC learning requires explicit attention in postgraduate training, where learning usually occurs in the workplace. However, both residents and supervisors struggle with how to incorporate IntraPC learning into daily practice. This study explored how and to what extent current resident-supervisor dialogues (RSDs) provide opportunities for IntraPC learning and explored barriers to IntraPC workplace learning.

**Methods**

In this focused ethnography, we observed RSDs in the geriatric medicine department of a Dutch university medical center, focusing on opportunities for learning about IntraPC in the workplace. After each observation, both the resident and supervisor participated in in-depth interviews to reflect on the observed behavior. Data were then analyzed through inductive coding followed by thematic analysis. Subsequently, themes were discussed during two focus groups to enable collective reflection with research participants.

**Results**

Although ample IntraPC learning opportunities were observed in the current RSDs, they remained underutilized. Participants reported dynamics between residents and supervisors that could obstruct IntraPC learning, including perceived time constraints, feedback misalignment between resident and supervisor, monitoring-focus, and the struggle for entrustment.

**Discussion**

IntraPC learning opportunities in RSDs often remain implicit, even though addressing IntraPC learning does not necessarily require additional supervision time. This implicit learning limits reflection on current collaborative practices. Moreover, dynamics between residents and supervisors may hinder the explicit development of IntraPC competencies. To support improvements in IntraPC learning, supervisors and residents are encouraged to regard IntraPC practices as an important learning topic within RSDs.

## INTRODUCTION

The aging society has growing numbers of older patients with multimorbidity and increasing complex care needs (1). Due to interacting comorbidities, creating personalized treatment plans often requires the perspectives of multiple specialized healthcare professionals (1, 2). A potential risk that arises when multiple healthcare professionals are involved in a single patient's case, is that they all create their own monodisciplinary treatment plan (3). Without collaboration, fragmentation of care and conflicting recommendations between the multiple treatment plans may occur (3). It is therefore important for the various health professionals to learn how to coordinate tasks and align their perspectives to ensure effective collaborative practice (4).



To help ensure future health professionals are prepared to provide effective collaborative practice, medical education research has been aimed at exploring Interprofessional collaboration (IPC) as well as intraprofessional collaboration (IntraPC) (5-7). IPC refers to the process by which healthcare professionals from different professional backgrounds (such as nurses, doctors, and paramedics) collaborate to develop integrated care plans, whereas IntraPC specifically concerns creating an integrated, personalized treatment plan among physicians from different medical specialties (such as surgeons, geriatricians and cardiologists) (8).

While IPC learning has been extensively studied, IntraPC learning remains relatively underexplored (9). Certain themes within IPC learning such as role clarification and clear communication are also relevant to IntraPC learning. However, there are context-specific aspects of collaboration across medical specialties that may prompt different challenges. These challenges include interactional, hierarchical, and professional identity–related dynamics that impact daily interactions among physicians with different specialties (8, 10-12). For example, in interprofessional teams, hierarchical relations are often explicit and tied to professional roles and responsibilities, whereas in intraprofessional teams hierarchy, ownership, responsibility, and task distribution are more implicit and frequently subject to negotiation (8, 10-12). These differences highlight the need to conceptualize and study IntraPC learning as a distinct learning phenomenon with its own challenges and learning requirements.

In current postgraduate training, residents primarily learn IntraPC through implicit socialization processes during everyday clinical work (8, 11). This includes both interactions with physicians from other specialties and resident–supervisor dialogues (RSDs) (8, 11). Through participation in routine practice, residents gradually learn the expectations of different specialties and understand how their own role relates to those of others (13). Research has shown, however, that clinical practice is often characterized by siloed working patterns, and that interactions between physicians from different specialties frequently lack coordination and integration (9).

Relying solely on these implicit learning processes may lead to inconsistent IntraPC learning and perpetuate risks of fragmented care and adverse patient outcomes.

This has led to calls for more explicit attention to IntraPC learning within workplace learning (5, 8). Supervisors play a crucial role in creating a learning environment that facilitates IntraPC workplace learning and resident-supervisor interactions are an important part of workplace learning in postgraduate training (8, 11, 14). The key mechanisms of workplace learning during resident-supervisor interactions are mutual observation of practice (monitoring and modelling), supervised participation in action (entrustment and support seeking) and dialogue during practice (meaning making and feedback), also known as RSDs (see also box 1) (8, 11, 14, 15).

Supervisors and residents rarely observe each other's collaborative practices, limiting opportunities for learning through direct role-modelling (9, 16). That makes other learning opportunities, such as RSDs, even more important to address IntraPC learning in the workplace (11). RSDs are moments in which residents and supervisors discuss patient care, reflect on clinical decisions, and collectively make sense of care trajectories (17). During RSDs, IntraPC learning through shared meaning making may occur as residents may refer to interactions with other specialists, making RSDs a potential site where IntraPC experiences can be surfaced, interpreted, and connected to broader learning goals while remaining embedded in everyday clinical practice (10, 18). It has been argued, that contextual factors such as increasing workload and limited supervision hours form barriers to facilitating IntraPC learning during RSDs or for creating new IntraPC learning opportunities (19). Additionally, previous research into the supervisors' perspective on IntraPC workplace learning has indicated that supervisors may question whether IntraPC learning contributes to improved clinical practice (18). Furthermore, supervisors may feel underprepared to facilitate IntraPC learning (18).

During RSDs, supervisors often struggle to balance interactions focused on overseeing residents' clinical work with those aimed at reflection and learning, particularly those focused on IntraPC learning (18, 20). As a result, it remains unclear how supervisors and residents, despite contextual barriers, can better utilize existing opportunities for IntraPC learning during RSDs. Given the increasing importance of adequate IntraPC competencies, more knowledge is needed of how supervisors can facilitate IntraPC learning during RSDs. To explore how supervisors might support IntraPC learning despite the complexities of the clinical workplace and the barriers it presents, this study aimed to answer the following research question: How, and to what extent, do existing RSDs

provide opportunities for IntraPC learning in the workplace? By exploring current IntraPC learning practices through observations in the workplace we aim to identify how IntraPC workplace learning in RSDs may be improved.

**Box 1. Contexts and mechanisms of supervised workplace learning as described by Wiese et al (14)**

| **Contexts and mechanisms of supervised workplace learning** | |
|---|---|
| **Context: Supervised participation**<br>The degree to which residents participate in practice | |
| Entrustment | The supervisor grants the resident the opportunity to perform clinical tasks autonomously, without direct monitoring |
| Support seeking | The resident seeks the supervisor's input for a clinical task |
| **Context: Mutual observation**<br>Resident and supervisor observe each other's work | |
| Monitoring | The supervisor observes the resident's execution of clinical tasks |
| Modelling | The resident observes the supervisor's execution of a clinical task |
| **Context: Dialogue in practice**<br>Discussion among resident and supervisor outside of direct patient contact | |
| Feedback | A mutual co-construction of resident performance and the means to improve it |
| Meaning making | Shared clinical reasoning through iterative questioning and answering, which aims to stimulate critical thinking and to draw out underlying presumptions |



## METHODS

We performed a focused ethnography study from a constructivist paradigm (21). Focused ethnography-based methods provide a means of collecting data within a well-defined timeline and context by using triangulation of observations, interviews and theory (22). Focused ethnography is an effective method to explore resident-supervisor interactions within a familiar context and limited timeframe (22-24). As focused ethnography requires researchers to be familiar with the context, observations were performed by a medical intern who had done a three month rotation in the studied department prior to data collection. This medical intern was prepared beforehand by senior researchers through trial observations. These senior researchers had different professionals backgrounds, including psychology, educational research and medical specialists, which provided the observer with observational from a broader perspective and increased reflexivity (25).

### Study setting and participants

This study was conducted at the geriatric medicine department at a university medical center in the Netherlands. This geriatric medicine department includes out-patient consultation, an in-patient acute care ward, an attending geriatric resident in the emergency department and a

geriatric liaison team for in-patients. Its staff consists of nine geriatricians, two internists and ten residents from different primary and secondary care specialty training programs. Two of the researchers of this study are a part of the staff and were excluded from participation. For several years, IntraPC learning has been a topic of research and resident and supervisor training at this department.

Participants included residents and supervisors working in the geriatric medicine department. Residents were trainee-physicians partaking in a geriatric medicine rotation. The residents' professional backgrounds including geriatric medicine, internal medicine, general practice and elderly care. Supervisors were geriatricians and internists who oversaw residents' clinical work and were responsible for supporting workplace learning during RSDs. Further details on how the medical education trajectory is structured in the Netherlands, including how postgraduate training is shaped, can be found in box 2.

Participants were recruited for observations and interviews through purposive sampling. All residents and supervisors were asked to participate in the focus group on a voluntary basis. Two weeks prior to the start of the observations, supervisors and residents were informed about this study through a letter from the secretary of the department asking for their written informed consent. Participants were asked for their written informed consent at the beginning of each interview and focus group. Participants could end observations or interviews at any time, without giving any reason. If stated, the data from observations and/or interviews could be removed from the dataset. Data from focus groups could not be removed, as it would not be possible to identify individual findings within the focus group recordings.

We specifically chose to interview residents and supervisors separately to ensure psychological safety of residents both during in-depth and focus group interviews. As the supervisors jointly have a role in the evaluation of the resident, they otherwise might have felt reservations to give their full opinion on the supervisory practices of their supervisors.

**Box 2: The medical education trajectory and the role of postgraduate residency programs**

In the Netherlands, the medical education trajectory consists of an undergraduate training that is composed of a bachelor and a master phase followed by postgraduate specialty training. The undergraduate training consists of a combination of acquiring knowledge on health and disease through formal classroom and internships.

After completing undergraduate training, students can either choose to work to gain experience in clinical practice without entering postgraduate training, or they can apply for a specialty postgraduate training program. This specialty training program is mostly composed of workplace learning, where the students become residents and partake in rotations within their own specialty or in out-of-specialty rotations. The progress of their training is overseen by a program director, but their daily work is overseen by supervisors at the workplace, that can change day to day.

The geriatric medicine postgraduate training program lasts five years and includes rotations in internal medicine, cardiology, hospital-based geriatric medicine (including outpatient, emergency and inpatient care), as well as placements in old age psychiatry and neurology.

In the studied geriatric medicine department, not only geriatric medicine residents are present, but also residents from other training programs completing out-of-specialty rotations, including internal medicine, general practice and elderly care. These programs differ in duration and structure. Internal medicine training lasts six years and includes rotations in multiple specialties such as endocrinology, cardiology, rheumatology and geriatric medicine. General practice and elderly care training both last three years and combine rotations in primary care with placements in hospital settings such as emergency medicine, geriatric medicine and psychiatry. During the geriatric medicine rotations in the studied department, residents are divided over the available clinical settings including inpatient acute care, emergency geriatric medicine, outpatients consultation or the geriatric medicine liaison team.

Residents' daily work is supervised by a clinical supervisor, who is a medical specialist who is responsible for both overseeing their clinical practice and facilitating their workplace learning. Depending on the clinical setting, the supervisor may vary from day to day, ensuring that residents are exposed to different supervisory styles and learning opportunities. This supervision is shaped through various activities, including resident-supervisor dialogues (RSDs), mutual observations, and reflective discussions. As the daily practice often results in a different supervisor every couple of days, a diverse set of supervisors shapes the workplace learning, with the overview of a resident's growth being overseen by the program director.

## Data collection

Data collection transpired between October 2023 and January 2024. We started with observations of RSDs which were recorded in observation field notes. Observations of RSDs were performed in all working areas of this department, being out-patient consultation, liaison consultation and the in-patient geriatric acute care ward. Spradley's nine dimensions of ethnography were used as an observation template (24, 26) (Box 3). The observation field notes reported on descriptions, stories, andexperiences that occurred at times the resident and/or supervisor mentioned a 'third party' specialty physician or a task, role or responsibility of a different specialty physician. Using the nine dimensions of ethnography, contextual factors during these moments were reported in a narrative manner. Interpretations were written in a different color, so it was clear which observations could contain the observer's perspectives or underlying beliefs (24).

In the course of these observations, we identified opportunities for IntraPC learning, which we defined as instances and cues in clinical practice where tasks or activities involving a physician from another specialty were referenced, potentially leading to discussions that could involve IntraPC learning.

Observations were followed by in-depth interviews with the observed residents and the supervisors separately. The interview guide consisted of a basic set of questions to discuss general ideas of the participant on clinical supervision and the observed RSDs. The interview guide was supplemented with specific observations of that participant, to explore whether the participant had experienced IntraPC learning moments and what outcomes these yielded, to explore observer interpretations or to explore underlying motives and beliefs behind observed behavior. As previous work has shown that residents and supervisors may be unable to identify IntraPC learning opportunities, the researchers identified moments with potential for IntraPC learning during observations and discussed these during interviews when participants did not mention any IntraPC learning opportunities (8). This was done to explore additional barriers to IntraPC learning beyond the recognition of everyday IntraPC learning opportunities during the interviews.

To formulate these explorative questions we drew on insights from reflective interviewing, rather than using a strict theoretical framework (27). This entailed focusing on an open and inquiry-based approach, active listening, and reflection on underlying assumptions (27).

The first interviews were performed by two researchers to ensure consistency and to train the medical intern. The interviews started with exploring their experiences of the observed dialogues supplemented with questions to clarify observed behavior. Interviews were then transcribed verbatim.

Observations and interviews continued until the data analysis indicated that data sufficiency and theoretical sufficiency had been reached and no new valuable codes were added to the code book (28). After data analysis of the observations and interviews had been completed, one separate focus group with residents and one separate with supervisors was held. These focus groups were performed by two researchers with different backgrounds (medical intern IW and psychologist NL) to include multiple perspectives during data collection. (Appendix: interview guides)

**Box 3 Nine dimensions of ethnography by Spradley (26)**

| Dimension | Descriptor |
|---|---|
| Space | Physical layout of the place(s) |
| Actor | Range of people involved |
| Activity | A set of related activities that occur |
| Object | The physical things that are present |
| Act | Single actions people undertake |
| Event | Activities that people carry out |
| Time | The sequencing of events that occur |
| Goal | Things that people are trying to accomplish |
| Feeling | Emotions felt and expressed |



## Data analysis

Observation fieldnotes and interview transcripts were analyzed through inductive coding in Atlas.ti.

Two researchers (IW and MV) assessed each field note and transcript individually using open coding. IW and MV met weekly to discuss discrepancies in codes and to create one code book. The code book and relevant quotes were discussed during monthly meeting with the entire research group. During these discussions, the diverse perspectives within the research group were brought into the data analysis, providing for a rigorous analysis and increased reflexivity (25).

Once the code book was complete, two researchers performed thematic analysis through analytic memoing to categorize data into preliminary themes (29). The preliminary themes were discussed with the research group, who provided theoretical insight. During the meetings we identified the dynamics between residents and supervisors that impacted IntraPC learning.

To check these preliminary themes with study participants and to gain a deeper understanding of the resident-supervisor dynamics, we performed focus groups to enable collective reflection with residents and supervisors. We conducted one separate focus group with residents and one separate with supervisors to create a safe environment for both to speak freely.

The focus group interviews were transcribed verbatim and analyzed with the same strategy as the observations and interviews. The mechanisms of supervised workplace learning as described by Wiese et al. were used as sensitizing concepts to further understand the refined themes (14). Finally, data from observations, interviews and focus groups were then triangulated into definitive results (28). (Figure 1)

## Ethical approval

Ethical approval was provided by the NVMO Ethical Review Board (NERB dossier number 2023.5.4).

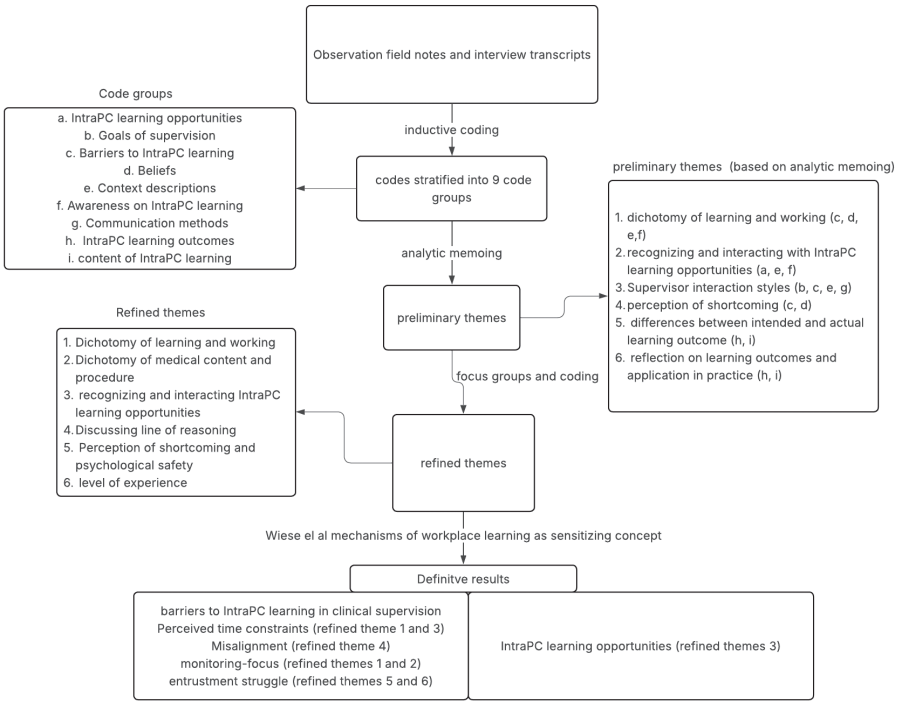



**Figure 1: process of data analysis**

## RESULTS

In total, we performed 43 observations (lasting 6 to 142 minutes per observation) with a total observation time of 22 hours: 20 observations were performed in outpatient consultation, 12 observations in liaison consultation and 11 observations in the inpatient ward. The longest

observations (20A and 20B) were during a shared ward round with both the supervisor and the resident in the inpatient ward.

Purposive sampling resulted in the inclusion of all 9 non-researcher supervisors and 7 residents from different specialty training programs (Table 1). All observed residents and supervisors agreed to participate in interviews, resulting in a total of 19 interviews, including 10 residents and 9 supervisors. Interviews lasted between 17 and 55 minutes. The two separate focus groups consisted of 4 residents and 9 supervisors respectively. Interview and focus group participants' characteristics are presented in Table 1. All supervisors participated in the focus group and 4 residents out of the 10 residents agreed to participate in the focus group. To maximize potential participation for the focus group, a regular teaching hour was used. Evening and night shift scheduling with subsequent resting hours were the most common reasons for residents to refrain from participation.



We observed that many RSDs contained potential IntraPC learning opportunities.

These learning opportunities occurred when residents and supervisors:

***- conveyed a (non-verbal) emotion about an interaction with another physician;***
These emotions varied, including signs of either positive or negative reactions towards the practices of physicians from other specialties. In some instances, these emotional responses seemed to reflect underlying beliefs or perceptions, which could indicate the presence of differing views, prejudice or power dynamics.

***- discussed their specialty's role and responsibilities within the patient's wider care network;***
These discussions included how they regarded their roles, tasks and responsibilities and how others may have different perspectives towards these elements in clinical practice

***- discussed a task for another specialty physician as part of collaborative care.***
These discussions included whether they formulated why the consultation was necessary, what they expected from this specialty physician and what this consultation might mean and how they perceived the consultation's potential contribution to the patient's care.

Despite the presence of learning opportunities, residents and supervisors did not always explicate the IntraPC learning or collaborative practices during these discussions.

During our analysis of potential barriers to IntraPC learning in the RSDs, we identified the following themes: perceived time constraints, feedback misalignment, monitoring-focus and

entrustment struggle. Our findings on learning opportunities and barriers to IntraPC learning in RSDs are presented below and are summarized in Table 2 in Appendix 2.

**Table 1: Interview participants' characteristics**

| | Observations and interviews | Focus groups |
|---|---|---|
| **Residents** | | |
| **Age (range)** | 24 – 35 | 24 – 35 |
| **Sex (F/M)** | 7/0 | 4/0 |
| **Years of experience (range)** | 1 - 5 | 1 – 5 |
| **Specialty (N)** | | |
| Primary care | | |
| General Practice | 2 | 0 |
| Nursing home care | 1 | 1 |
| Secondary care | | |
| Geriatric Medicine | 5 | 2 |
| Internal Medicine | 2 | 1 |
| **Supervisors** | | |
| **Age (range)** | 35 – 67 | 35 – 67 |
| **Sex (F/M)** | 6/3 | 6/3 |
| **Specialty** | | |
| Geriatric Medicine | 7 | 7 |
| Internal Medicine | 2 | 2 |

## Perceived time constraints

As we discussed learning opportunities that had remained unused, two key reactions emerged: either the opportunity was not recognized by the supervisor or the resident, or it was not effectively utilized for learning due to time constraints and competing priorities.

> *"And anything that I'm feeling sort of insecure about or that is about communication, these are often things that can wait."* – Resident focus group

Time constraints were mentioned as the most pressing barrier to reflecting on these learning opportunities. In this geriatric medicine department, the agreed duration of an individual RSD was approximately 30 minutes. However, our observations revealed considerable variation in the duration of RSDs, depending on the clinical context and situational factors.

Longer RSDs were typically observed when particularly complex care needs arose, when multiple interruptions occurred, or when supervisors deliberately created space for the intern's knowledge

acquisition. In contrast, shorter RSDs were often characterized by supervisors appearing rushed, reflecting competing clinical responsibilities.

Despite this variation in duration, comparing RSDs with and without IntraPC learning moments across different work contexts (outpatient consultations, inpatient acute care, and the liaison team) revealed no clear difference in length (Table 3, Appendix 3). This suggests that explicitly addressing IntraPC learning opportunities does not necessarily require additional supervision time.



**Feedback misalignment**

We observed that supervisors provided feedback to residents during RSDs, but the aim of the feedback often remained implicit. In the interviews, we engaged with both supervisors and residents to explore their interpretations of the observed feedback. These interviews contained discrepancies between the supervisors' intentions and the residents' interpretations of the feedback. Whereas the supervisor wanted to address an IntraPC topic, the residents reported entirely different learning outcomes based on the supervisor's feedback than what the supervisor had intended, pertaining to medical knowledge acquisition or doctor-patient communication over IntraPC learning.

An example of misaligning feedback intention and interpretation was when we observed how a supervisor provided the resident with feedback on a referral letter. The quotes below reflect what the supervisor's feedback intention was, as well as what the resident had interpreted as a learning outcome from this feedback.

> *"... and what I felt was important is that I'd heard things behind the scenes that were not mentioned in that letter, which would affect the expectations of the subsequent healthcare professional but which were not officially communicated at all. This bothered me, so I felt it was important that if you're sending a letter, it should contain everything that matters."* – Supervisor on feedback intentions

> *"Patients can read everything these days. So you need to think very carefully about your wording."* – Resident on interpretation of feedback

When reflecting on misalignment in a supervisor's intention and a resident's interpretation during interviews, residents and supervisors mentioned that learning during RSDs is mostly implicit. A supervisor mentioned that it is common for learning outcomes from RSDs to be implicit and that, therefore, RSD learning outcomes rarely lead to adjustments in clinical practice.

*"I don't think the goal of some feedback is always made explicit."* – Resident focus group

*"I do think that these are more or less subconscious lessons that you take away from it as a kind of experience. But I don't think they are very explicit and clear learning points in the sense of: well, now we've learned this or that, or: this needs to be documented, or: we need to adjust our protocol."* – Supervisor interview

When asked why the feedback intention in RSDs often remained implicit, supervisors agreed that being explicit about feedback intention and/or interpretation could hamper psychological safety.

*"This happens occasionally for if I were to keep asking 'so what is it that you've learned' I guess things would soon begin to feel a little unsafe for them."* – Supervisor focus group

**Motoring-focus**

In our observations, residents usually spent the majority of the dialogue presenting their findings and discussing diagnostic or treatment plans, so the supervisors could monitor if these plans were adequate for this patient. Interactions aimed at meaning making, by reflecting on current IntraPC behavior, for example, where less frequent. During interviews, residents and supervisors explained that they felt RSDs were primarily meant for checking their specialty's diagnostic and treatment plans. They felt that learning through reflection and IntraPC learning during RSDs was only a secondary goal.

*"No, it's not a learning opportunity in that case, 'cause the focus is entirely on checking practical items off the list, tick, tick, tick, until we're done fire-fighting, let's move on."* – Resident interview

*" Yes, the main goal is of course that I'm trying to establish what's the matter with the patient or whether the resident's idea about this patient is right. Then we might see if there's any learning point, or I might think well, it 'd be nice to tell them a little more about this and turn it into an educational moment."* – Supervisor interview

In the supervisor focus group, time constraints were mentioned as barriers to facilitating reflection, causing them to prioritize medical technical discussions over facilitating IntraPC learning.

*"All patients must be discussed, briefly, in main points and above all content-related, so it's not necessarily about my own learning process."* – Resident focus group

*"If there's a lot of medical stuff to be discussed or figured out, well, these kinds of in-depth questions or interprofessional learning issues tend to come second, perhaps."* – Supervisor focus group

In the focus group, residents underscored that work processes were prioritized over learning processes as the swift execution of clinical tasks was their primary task. They agreed that the primary tasks of interns are learning, but for residents it is effectively performing all necessary tasks in patient care.

*''I: I also heard you say: "The intern is really here to learn." So why are you [residents] here?*

*R: We are the slaves of the ward. […] Because the work needs to be done."* – Resident focus group



On the other hand, the residents' mindset on prioritizing monitoring over meaning making, did also obstruct learning when a supervisor would initiate meaning making discussions during the RSDs. Residents mentioned that RSDs were meant to seek the supervisors' blessing and check whether they had the ''correct" treatment plan. When residents felt that a medical technical topic had been underdiscussed during the RSD, they could feel uneasy about whether they had created an adequate treatment plan.

*"Because you need to proceed with your patient that day. So you need to perform tasks that require the approval or blessing of the person supervising you."* – Resident focus group

Residents would feel frustrated when a focus on IntraPC learning came too early in the RSD, as they would still be too pre-occupied with the creation of a suitable treatment plan for the patient to partake in reflection.

"*Even a little annoyed perhaps 'cause you're thinking: come on, I'd first like to know what I'm supposed to do with my furosemide please."* – Resident focus group

### Entrustment struggle

During the observed RSDs, differences in a resident's proposed treatment plan and the supervisor's proposed treatment plan elicited nonverbal responses in residents.

When exploring these responses during interviews, we discovered that residents were constantly seeking approval of their capabilities as a physician. This could result in feelings of personal failure when their supervisor had other viewpoints on treatment plans or asked multiple clarifying questions. Residents reported that they felt a sense of unease when supervisors asked

them multiple questions, as this could be interpreted as limited entrustment. RSDs containing multiple questions, therefore, even if these were aimed at meaning making instead of monitoring, could create a tense learning environment and could obstruct IntraPC learning.

> *"And if they do so, and then another question, and then another one, then the conversation tends to lose its flow and turns into a kind of exam. I find such communication uncomfortable because it affects my sense of safety."* – Resident interview

During supervisor interviews, supervisors explained that they were constantly deliberating when to provide entrustment. Entrustment could be provided by refraining from asking monitoring questions on specific entrusted clinical tasks. When no monitoring questions were asked, residents were responsible for the quality of this task. Supervisors repeatedly mentioned that they aimed to adjust their supervision to the residents' level of experience and their entrusted activities and that they would address other learning goals based on previously entrusted professional activities.

> *"Well, what I find particularly important is that you try to match the resident's level. We have quite a range of levels of experience here, of course, and I really make an effort to appraise: who is this person in front of me and what would be a learning opportunity for him or her*." – Supervisor interview

Supervisors struggled to balance entrustment with exploring IntraPC learning opportunities. When supervising less experienced residents with fewer entrusted activities, supervisors focused RSDs on the medical technical aspects of clinical practice, and IntraPC was considered to be less urgent and too complex for these residents. With the more experienced residents, who had more entrusted medical technical skills, supervisors felt that RSDs would provide more time for discussion of metacognitive aspects such as reflection on IntraPC. More experienced residents themselves, however, felt that IntraPC was a basic skill that would not require dedicated attention in RSDs of residents further along in their training, where they felt less of a need to address IntraPC in RSDs.

> "*That, of course, is quite another level of supervision. […] I feel that such collaboration, these more in-depth effectiveness issues, true collaboration, I'll keep that for a slightly later stage*." – Supervisor interview

> *"I think it's part and parcel of this stage of my training that I make and have a plan of my own. And that we should collaborate in this way to deal with something in mutual consultation and a pleasant atmosphere."* – Resident interview

During the focus group, residents reflected on these findings by saying that when they are aware that the supervisors' questioning was aimed at facilitating workplace learning, they would feel more at ease during the RSD. In the supervisors' focus group, some supervisors were surprised by the fact that extensive questioning could impact resident's safety. Other supervisors agreed that the resident's mindset upon entering the dialogue could affect their response: residents with a reflective attitude, might feel safer to learn during RSDs.

> *"This is no surprise to me. I really get it that this would be your interpretation as a resident. What's involved here, I think, is the safety you're offering in your communication with residents. They might feel (as a kind of fixed mindset, you know): 'Oh dear, I've made a mistake and I need to do this differently.' Or: 'I'm allowed to develop and the questions will help me to make progress together.' I hope they feel the latter, but I can readily imagine that supervisors interpret this differently than residents."* – Supervisor focus group



## DISCUSSION

Through this ethnographic study we aimed to explore whether and how existing RSDs provide opportunities for learning about IntraPC and how this learning could be improved during RSDs. Our findings show that daily RSDs in the care of older adults contain IntraPC learning opportunities which remain mostly unused. These opportunities occur when a (non-verbal) emotion about another specialty physician is conveyed, when residents and supervisors discuss their specialty's tasks and roles in a broader patient care network or when a new task is assigned to another specialty. IntraPC learning appeared to be influenced by perceived time constraints, feedback misalignment between supervisor and resident, monitoring-focus and the entrustment struggle.

In the care for older adults with complex care needs, coordinated and integrated care is essential to prevent adverse outcomes (1, 30). Current collaborative practices often lack the coordination and integration these patients' complex care needs demand (9). In a context where coordination and integration across specialties is lacking, IntraPC learning cannot be expected to be learned implicitly. Moreover, by leaving IntraPC learning implicit during workplace learning, residents may inadvertently acquire undesirable habits (such as a silo mentality) or reinforce power dynamics and prejudice (9, 31). This suggests that adjustments are needed within existing RSDs to better support IntraPC learning.

Within these RSDs, we demonstrated how dynamics between resident and supervisor in supervised workplace learning occur and impact IntraPC learning. In this study, we specified *where* IntraPC opportunities arise within everyday RSDs and *why* they remain unused

as a result of these dynamics. Creating treatment plans and acquiring medical knowledge tend to be prioritized during RSDs, resulting in IntraPC learning being systematically deprioritized. Although it is neither feasible nor desirable to make all aspects of practice explicit an individual RSD, current RSDs often treat clinical decision-making ("what to do") and the collaborative processes required to achieve this ("how to do it together") as separate aspects of care. In complex care for frail older adults, however, both aspects are essential for good clinical practice.

Our study shows that hierarchical power dynamics appear to limit the use of opportunities for IntraPC Learning in RSDs. The residents' quotes reveal their hierarchical and evaluative perception of RSDs, suggesting that adjustments to these sessions are unlikely to be initiated by residents themselves. They describe primarily using RSDs to seek validation from supervisors and experiencing their work as service-oriented, referring to themselves as 'slaves to the ward.' These dynamics foster a learning environment where there is no clear or optimal opportunity to report on intraprofessional interactions or to reflect on and learn from these experiences. Supervisors may perceive IntraPC learning as too demanding for less experienced residents, while more experienced residents might consider collaboration as a 'basic skill' which they should not 'bother their boss' with. As a result, residents may avoid raising collaborative challenges for fear of appearing incompetent or vulnerable in evaluative situations with their supervisors. Consequently, residents rarely report on interactions with physicians from other specialties unless overt conflicts arise in clinical practice.

These findings build on previous research, which shows that implicit biases between specialties can influence interactions between residents, and how power dynamics may lead to forms of intraprofessional silencing, whereby the perspectives of certain specialties are lost in communication between residents and supervisors (31, 32). These mechanisms further limit opportunities for supervisors to gain insight into how collaboration between specialties unfolds.

Our findings suggest that supervisors are key to fostering more explicit IntraPC learning. Importantly, supervisors can make a meaningful difference through relatively small adjustments to existing RSDs. Insights from IPC research show that supervisors can prime residents to learn from everyday interactions by encouraging reflection-in-action and by making power dynamics in collaborative encounters explicit (33). What this study adds is the need to extend such attention beyond IPC to IntraPC, as IntraPC involves different hierarchies and power dynamics, which otherwise can easily be overlooked and taken for granted. Supervisors need to recognize IntraPC as an integral component of good clinical practice and to monitor it with the same attentiveness as creating diagnostic and treatment plans.

A first step is for supervisors to inquire more actively into how collaboration across specialties unfolded or will be addressed. Supervisors are often not directly involved in these interactions as

they are often performing other clinical, scientific or educational responsibilities simultaneously, while residents do not spontaneously report on collaborative practice (19). By asking exploratory, process-oriented questions, supervisors can create space for residents to reflect on collaborative practices. This requires supervisors to view care for patients with complex needs as part of a broader care continuum, attending not only to what happens within their own specialty, but also to what precedes and follows that encounter. Actively inviting residents to reflect on these connections encourages them to consider how care across specialties is aligned and coordinated.

Supervisors may initially perceive such adjustments as unnecessary (9, 18). Other remarks include that such adjustments might require large-scale cultural change through extensive training programs, which supervisors oppose due to competing priorities (9, 18). Large-scale cultural adjustments are known to be difficult to implement in complex clinical environments, as clinical activities and learning activities in post-graduate training are already extensive (34, 35). However, our findings suggest that improvements for IntraPC may not require complex large-scale training programs. Precisely because collaboration across specialties is so prevalent in everyday practice, supervisors can stimulate IntraPC learning by modestly broadening their monitoring practices to include not only the diagnostic and treatment plan, but also how collaboration across specialties is or can be organized. This requires supervisors to recognize coordination and integration of care as integral components of good clinical practice and to validate their discussion during RSDs, thereby extending their role beyond evaluating clinical decisions to also guiding residents in the collaborative practice across specialties. In doing so, supervisors can support residents in developing IntraPC competencies which are required for more coordinated and integrated care for older adults with complex care needs.



## Implications

This study's observed IntraPC learning opportunities suggest that IntraPC learning can be meaningfully supported within existing RSDs through small, context-sensitive adjustments rather than through extensive training programs. Supervisors play a key role by modestly broadening their monitoring focus during routine RSDs to include both clinical decision-making and how care is coordinated across medical specialties.

Supervisors can embed brief, process-oriented questions into everyday supervisory conversations, such as: "How shall we align with the care provided by the other specialist?" "What do we need from other specialties, and what do they need from us?" and "How did the collaboration with the other specialty go?" Through these prompts, supervisors can make collaborative processes visible and establish them as legitimate learning objectives. Such prompts signal how care is organised across specialties is as clinically relevant as what decisions are made. By consistently attending to collaborative processes across the care continuum, supervisors can support residents

in developing the competencies needed for coordinated and integrated care, particularly for older adults with complex health needs.

This study also illustrates the value of ethnographic approaches for uncovering how learning opportunities emerge and disappear in real-time clinical interactions. Future research could build on these findings by examining how brief, process-oriented supervisory prompts influence residents' collaborative practices over time and how such practices affect care coordination and patient outcomes. Longitudinal and intervention-based studies may further elucidate whether making IntraPC explicit within supervision contributes to more coordinated and integrated care.

## Strengths and limitations

This study has several strengths. Firstly, we incorporated the perspective of both residents and supervisors on IntraPC workplace learning, whereas previous studies typically focused on only one of these two perspectives. Additionally, by using combined multiple methods of data collection – observations, interviews and focus groups - we could triangulate our findings and report on both observed and reported IntraPC learning behavior. The use of focus groups was a particular strength of this study, as they created an opportunity for collective reflection on the data with both researchers and research participants. This approach together with the discussions with the research team which represented diverse perspectives, contributed to a rigorous and reflexive data analysis.

Our study also had some limitations. The study was conducted within a single center, whereas individual findings may be different in other clinical settings. Most large medical centers, however, share similar complex dynamics. These dynamics may also play a role in the learning of other metacognitive competencies such as interprofessional collaboration or medical ethical aspects of a patient's case. We believe, therefore, that the results are transferable to a variety of other clinical settings.

Furthermore, the study took place within a single department where attention had already been given to IntraPC learning. Yet the findings indicate that even in this setting with a considerable pre-existing focus on IntraPC learning, IntraPC learning potential in RSDs for IntraPC remains under exploited. This underscores the importance of addressing IntraPC learning across diverse clinical settings involved in complex medical care, specifically through targeted adjustments in RSDs, which can facilitate more explicit communication about IntraPC learning.

## CONCLUSION

Resident-supervisor dialogues(RSDs) offer ample opportunities to facilitate learning about intraprofessional collaboration (IntraPC), which when explored, do not necessarily increase the duration of RSDs. Although implicit IntraPC learning does occur, opportunities to reflect on and transform current collaborative practice remain unused. The dynamics between resident and supervisor may obstruct IntraPC learning, including perceived time constraints, feedback misalignment, monitoring-focus and the entrustment struggle. In order to improve IntraPC learning, supervisors and residents need to become aware of how procedural aspects of care are vital to provide good clinical practice and would benefit from small context-sensitive adjustments to clinical supervision to create space for discussion on IntraPC during RSDs.



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# CHAPTER 5

## The impact of context on interphysician collaboration and learning: a focused ethnography around hip fracture patients in the Emergency Department

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**Introduction**

Older patients with complex care needs are increasingly seen in the emergency department (ED), requiring patient-centered care that involves collaboration among multiple specialists. Inadequate interphysician collaboration (IPhC) can increase the risk of adverse outcomes. Although the ED presents opportunities for learning IPhC, it is unknown how this potential could be exploited. This study examines ED interactions between residents and supervisors caring for hip fracture patients to explore influencing contextual factors and how IPhC (learning) can be improved.

**Methods**

Interactions between residents and supervisors from anesthesiology, emergency medicine, geriatric medicine, trauma, and orthopedic surgery concerning eight hip fractures patients were observed. Thirteen residents and twelve supervisors participated in field interviews to discuss observed behavior. Thematic analysis was conducted on observation notes and interviews. Themes were discussed with participants in four focus groups to reflect on interactions and explore opportunities for improving (learning) IPhC.

**Results**

Residents primarily performed their own tasks with remote supervision. Repeated tasks and contradictory treatment plans were common. Five contextual factors influenced IPhC interactions: swarm of unacquainted professionals, bustling ED environment, lack of coordination, silo mentality, and limited, hierarchical feedback culture. Residents viewed their IPhC interactions as sufficient, despite observed contradictions. In focus groups, participants recognized these issues but were unaware of the associated risks.

**Conclusion**

Interactions in acute care lack coordination and integration. The complex acute care context impedes connectivity between specialties and IPhC learning, which may lead to increased risk of adverse outcomes. To improve IPhC and learning, addressing both contextual aspects and improved role modelling and feedback are needed.

## INTRODUCTION

Globally, healthcare systems are being confronted with the challenge of providing care for a growing population of multimorbid, frail older patients (1). Creating personalized treatment plans for older adult patients is often complex due to multiple interacting comorbidities, often requiring the perspectives of multiple specialized physicians at the same time (2).

A potential risk that occurs when multiple physicians are involved in a single patient's case is that the individual physicians create their own monodisciplinary treatment plans. Without interactions between physicians, conflicting recommendations between the multiple treatment plans may occur (6-13). This increases the risk of adverse clinical outcomes, and it decreases patient and staff satisfaction (6-13). It is therefore important for the various physicians to interact in order to align their perspectives to ensure efficient collaborative practice. The all-encompassing process by which a team of physicians with different specialties coordinate and align their tasks to create an integrated treatment objective and plan in accordance with the patient's preferences is known as interphysician collaboration (IPhC) (3). To learn how to provide adequate IPhC, dedicated training is needed during postgraduate training (4). Despite this need, however, current postgraduate residency programs rarely offer explicit IPhC learning (4-6).



During postgraduate training, learning occurs primarily in the clinical workplace (7). Mechanisms important for learning in the workplace include learning through supervised participation in practice, role modeling, and reflection in action (7). Currently, learning of IPhC may only occur implicitly through the discussion of treatment plans during supervisor-resident dialogues (7). However, as demonstrated in previous studies, the workplace offers opportunities for learning IPhC, typically occurring around moments of interaction between residents with varying professional backgrounds (4, 8). In many cases, these opportunities for (collective) reflection on collaborative behavior remain unused (4, 6).

Outcomes in workplace learning are partly related to the context of the learner (9). Therefore, by exploring what context factors may contribute to IPhC and learning thereof, insight may be gained on how IPhC learning may be improved in the clinical workplace. The emergency department (ED) provides a prime example of a setting where effective collaboration is essential (10-12). Previous research on teamwork in acute care settings has indicated that adequate IPhC is crucial to adequate patient assessment, due to continuous changes in team members, who may never interact in a similar case again (12-14). Contextual aspects such as a need for swift decision-making and high patient volumes that are characteristic of the ED environment are known to further hinder IPhC (14, 15).

Patients with hip fractures provide an example that highlights the importance of IPhC in the ED (16-18). Hip fracture patients are predominantly older adults aged 70 and above who present to the ED after a fall. These patients often suffer from extensive multimorbidity and functional decline, with falls frequently triggered by a combination of chronic conditions or acute medical problems such as infections or metabolic disturbances such as electrolyte imbalances (17).

At the ED, a team including emergency physicians, geriatricians, trauma or orthopedic surgeons, and anesthesiologists—assesses the fracture type, the context of the fall, the patient's frailty, and both acute and chronic comorbidities (18). Although surgical intervention is usually indicated to restore mobility, not all patients are suitable candidates for surgery (19). Postoperative complications such as heart failure, sepsis, delirium, and functional decline are common and may outweigh the potential benefits (19). Mortality rates are high in hip fracture patients, as mortality within one year of presenting to the ED with hip fracture is approximately 20% (20).

Given the complex interplay between medical, functional, and ethical considerations, shared decision-making by an interdisciplinary care team is essential (16-18).

It is therefore important for the physicians caring for hip fracture patients to have adequate IPhC skills (18). In academic medical centers and other teaching hospitals, care for patients with hip fractures in the ED is usually provided by an ever changing team comprising residents from the relevant specialties (17, 21).

The majority of research on IPhC learning opportunities and activities has thus far focused on permanent or semi-permanent teams, like those providing care for hospitalized patients (8, 22). Literature on how opportunities for learning IPhC occur within a context of acute care with ever changing teams is limited, as are investigations of how learning opportunities in such contexts may be used for strengthening IPhC learning. Understanding ways of facilitating and improving IPhC and the learning thereof within the setting of complex acute care around hip fracture patients, may also provide insight into how to improve IPhC in general through a better understanding of how contextual aspects affect learning IPhC (23). To this end, the current study is intended to provide insight into IPhC and the learning thereof in acute care by exploring the following questions:

How do interactions between residents and supervisors of different specialties occur in ever changing acute care teams and what contextual factors influence these interactions?

How could IPhC and the learning thereof during interactions in acute care be improved?

## METHODS

We performed a focused ethnographic study on the interactions of residents and supervisors concerning patients with hip fractures in the ED using a constructivist approach (24, 25).

Focused ethnography was the best choice, given our aim of exploring interphysician interactions within a real-life setting and limited time-frame (26). We observed interactions between residents and supervisors in an acute care setting as they provided care to patients with hip fractures in the ED, in order to explore collaborative behavior and opportunities for learning IPhC skills in the workplace in general.

### Study settings and participants

This study was conducted in a large academic hospital in the Netherlands, which is a level one trauma center. The ED has three trauma rooms and nineteen general treatment rooms, handling complex patients referred by general practitioners or arriving via emergency medical services. Patients are assigned to the relevant specialty, with emergency physicians assuming responsibility when the specialty is yet to be determined.



The ED team includes residents and supervisors from various specialties. The residents provide initial patient assessments and consult their supervisors remotely. Residents use a shared physicians' room for administrative tasks and discussions. A clinical care pathway for hip fracture patients outlines the required actions at each stage of treatment, to ensure coordination between specialties involved in their care. Supervisors from the relevant specialties have created this care pathway in 2019, describing the patient journey from presentation in the ED through hospital discharge, clarifying roles and responsibilities of each specialty. All physicians involved in the care are expected to adhere to this care pathway.

The participants in this study included residents and supervisors from the specialties collaborating in the care provided to patients with hip fractures in the ED. These specialties included anesthesiology, trauma surgery, orthopedic surgery, emergency medicine, and geriatric medicine.

### Data collection

We performed observations, field interviews and ended data collection with focus groups in an iterative manner. We observed the journeys of patients with hip fractures in the ED from March to December 2022.

The attending emergency physician was asked to call the researcher once an ambulance was *en route* with a patient aged 70 years or older with a possible hip fracture. Upon the patient's

arrival in the ED, after the patients was declared clinically stable by the Emergency physician, the patient and/or the patient's caregiver (formal or informal) were asked for informed consent for the observation of their journey in the ED. A patient could at all times ask to end the observation.

Each of the physicians involved in a patient's journey were asked for written informed consent upon arriving at the ED. When one physician would not agree with the observation, the data collection would end. The observation ended once the patient left the ED.

Observations were non-participatory, and Spradley's nine dimensions of ethnography were used as a framework (25). To limit any additional burden on study participants during the already delicate evening and nightly hours, we conducted our observations only during office hours.

At the end of each observation, the physicians involved were asked to participate in a brief semi-structured field interview lasting approximately 15 minutes. In the interviews, residents and supervisors were asked about the observed collaboration, based on the interview guide (see the Appendix 1: Interview guides), which was supplemented with questions to clarify specific observed behavior.

After analyzing the observations and interviews, four focus group interviews were held, during which we presented the findings from our observations to the participants (Appendix 1: Interview guides). Participants could share their perspectives on the data and reflect on the preliminary findings. We chose to interview residents and supervisors in separate focus groups, in order to create a safe environment in which residents could comment on the questions without having to pay attention to the responses of their supervisors.

The interview guides for the focus groups were developed based on the key findings from the observations and interviews, and they were intended to explore their perspectives on the IPhC in the hip-fracture care pathway in the ED, as well as their suggestions for improvements (Appendix 1: Interview guides). The first and second focus groups were conducted in December 2022, and the third and fourth were held in March 2023.

## Data analysis

All field interviews and focus groups were recorded and transcribed verbatim. After each observed patient journey, we analyzed the observation field notes and corresponding interviews before continuing with the next observation. This allowed us to adjust our focus if needed and to monitor when new data no longer added insights. The transcripts and observation field notes from the first five observations were analyzed according to inductive coding by two researchers

(MvdV and NE), who read and re-read the data and applied a combination of open and thematic coding (27).

Preliminary versions of the developing code book were discussed with the research team after the field notes from each observation were coded. This process was intended to improve consistency and reflexivity during the data analysis process, as the multiple perspectives of the research group provided a rigorous data analysis (28). This process was repeated until the research team agreed that it contained all relevant codes needed to analyze the entire dataset (Appendix 2: Final code book). Once we noticed during coding that no new themes or relevant new quotes were identified, this was discussed in the research meeting. The research team then collectively regarded the data and concluded that data saturation and had been achieved (29).

Our inductive coding yielded several types of factors that influence IPhC and the learning thereof in this acute care context. For the further analysis of these factors, we defined 'context' as the varying conditions of an individual and/or situation, including personal, physical, organizational, institutional, economic, social, and cultural aspects (9, 30, 31). through this lens, we were provided with a broad perspective on context and generated a profounder understanding of the ED context that influenced interactions between physicians and the learning of IPhC.



The final code book was for two rounds of independent coding of all observations and field interviews by two researchers (MvdV and NE), who met frequently to discuss discrepancies. A preliminary thematic analysis using the definitive code book of the observations and interviews provided input for the interview guide for the focus groups.

The themes from data analysis of observations and field interviews were used as code templates for analyzing the focus groups. Through template analysis, each focus group was coded independently by two researchers (MvdV and SD), who met frequently to discuss discrepancies. The entire research team subsequently identified definitive themes by triangulating the data from observations, field interviews, and focus groups(29).

### Trustworthiness and reflexivity

To ensure the trustworthiness of this qualitative study, we applied Lincoln and Guba's criteria: credibility**,** transferability**,** dependability, and confirmability**.**

Credibility was strengthened through triangulation of data across the three types of data collection and by coding with two independent researchers, through prolonged engagement as observing researcher were familiar with the studied context and through persistent observations as observations only ended when the patient left the emergency department. The interviews

and focus groups provided the opportunity for member checking of observed residents and supervisors as they could reflect on our observed behavior and data analysis.

Transferability was addressed by giving thick description of observed behavior.

Dependability and confirmability were addressed through triangulation and reflexivity of the research group. The research group comprised eight researchers being five clinician-researchers, including both residents and supervisors, two behavioral scientists and two educational researchers. The clinician-researchers, as compared to traditional ethnographic methods, had greater subjective influence on the data. However, as an understanding of residents' and supervisor workflow and context guided their observations, this prior understanding was imperative for the ability to perform a focused ethnography (32).

Through monthly discussions with the entire research group where important observations, quotes and codes were discussed, the educational researchers could provide theoretical insight and broaden our perspectives in data analysis, thereby enhancing reflexivity (28).

Every three months during data collection, an advisory board including a group of medical specialists from each of the participating specialties were invited to provide their interpretations of the preliminary results so a diverse group of specialty physicians could provide input on the data analysis.

### Ethical approval

This study was presented to the METCoost and the CMO Radboudumc for ethical approval, both of which waived approval (Number 2022-13470).

## RESULTS

Interactions between residents and supervisors were observed during eight patient journeys. The observations lasted between two and six hours, for a total observation time of 30.5 hours. In all, 25 interviews were conducted: 13 with residents and 12 with supervisors (time range 5–28 minutes).

The results are presented in three parts. In the first section, participant characteristics and how participants interacted is described. Section two provides the results of the analysis on influencing contextual factors and section 3 is about how participants reflected on the findings and what potential improvements to IPhC and learning thereof are.

Participant characteristics are displayed in Tables 1 and 2.

**Table 1: physicians observed during each patient journey**

| Observation nr | Residents | Supervisors |
|---|---|---|
| 1 | 1 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery<br>1 Radiology | 1 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery |
| 2 | 2 Emergency medicine<br>2 Geriatric medicine<br>1 Surgery<br>1 Anesthesiology | 1 Emergency medicine<br>2 Geriatric medicine<br>1 Surgery |
| 3 | 1 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery | 1 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery |
| 4 | 2 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery<br>2 Orthopedic surgery<br>1 Radiology | 1 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery<br>1 Orthopedic surgery |
| 5 | 2 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery<br>1 Anesthesiology | 2 Emergency medicine<br>2 Geriatric medicine<br>1 Surgery<br>1 Anesthesiology |
| 6 | 1 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery | 1 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery |
| 7 | 1 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery<br>1 Anesthesiology<br>1 facial surgery | 1 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery<br>1 Facial surgery<br>1 Anesthesiology |
| 8 | 1 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery | 1 Emergency medicine<br>1 Geriatric medicine<br>1 Surgery |

**Table 2: Interview and focus group participants**

The specialties of the residents and supervisors interviewed are listed in the first column. The composition of the focus groups is reported in the last column.

| Residents | Interviews | Focus groups |
|---|---|---|
| Age (range in years) | 24 – 35 | 24 – 35 |
| Sex (F/M) | 9/4 | 8 / 3 |
| | | |
| Specialty | | |
| Anesthesiology | 1 | 2 |
| Emergency medicine | 4 | 2 |
| Surgery | 5 | 2 |
| Geriatric medicine | 3 | 2 |
| Orthopedic surgery | 0 | 2 |
| | | |
| **Supervisors** | | |
| Age (range in years) | 32 – 62 | 32 – 62 |
| Sex (F/M) | 4 / 8 | 2 / 7 |
| | | |
| Specialty | | |
| Anesthesiology | 0 | 2 |
| Emergency medicine | 5 | 2 |
| Surgery | 4 | 2 |
| Geriatric medicine | 3 | 2 |
| Orthopedic surgery | 0 | 1 |

## How did physicians interact?

After a patient arrived in the ED, the emergency medicine resident was the first responder. After a hip fracture was diagnosed, the emergency medicine resident discussed the patient with the emergency physician. Next, the emergency medicine resident consulted residents of geriatric medicine and trauma surgery or orthopedic surgery. Other specialty residents were consulted on demand. The 'proximal femur fracture' care pathway instructs these residents to 'collaboratively create a treatment plan for the patient.'

Consulting residents arrived in the ED, taking their own individual versions of the patient's history, performing their own physical examinations, and ordering their own diagnostic tests to answer questions needed for their own treatment plans. The residents performed their assessment asynchronously, sometimes with extended time elapsing between the assessments of the residents of various specialties.

Between bedside assessments, the residents worked in a common shared residents' office, where they performed administrative tasks and made phone calls. On the one hand, with the presence of numerous residents in the office created a loud, busy atmosphere. On the other hand, it appeared to serve as a meeting place, which facilitated spontaneous, coincidental encounters

between residents of different specialties. When residents were aware that they were caring for the same patient, these encounters resulted in the transfer of fragments of information. When a more private space was needed for discussion between physicians (e.g., to discuss a patient with a difficult problem), residents struggled to find an available, quiet location.

Upon completing their tasks, the residents phoned their supervisors to discuss the patients. With the exception of the emergency physician, supervisors were generally not present in the ED. In most cases, they were performing other clinical duties (e.g., outpatient consultation or surgery).

Given that supervisors were usually elsewhere, the residents were responsible for interactions between specialties in the ED. Most interactions between residents consisted of unstructured, coincidental encounters in the ED or multiple short telephone conversations. If one of the residents or supervisors deemed that further discussion between specialties was needed to complete their own treatment plans, a discussion between specialties was arranged, with all residents meeting in the ED.



**How did contextual factors influence interactions?**

We identified multiple contextual factors that can influence IPhC and the learning thereof. We organized these factors into five themes: a swarm of unacquainted professionals, the bustling ED environment, a lack of coordinated care, a silo mentality, and a limited, hierarchical feedback culture.

***Swarm of unacquainted professionals***

We observed multiple residents providing care for an individual patient with a hip fracture. These included residents with different specialty backgrounds, as well as multiple residents from the same background. The most frequently observed supervisors were the emergency physicians, as other supervisors were usually consulted over the phone. Residents or supervisors could handover patients during shift changes (e.g., daytime to evening). In addition to changing residents and supervisors, a changing team of nurses and support staff frequented the patients' rooms. This resulted in a multitude of care handovers between professionals in the ED journey of a single patient.

In each observation, different residents were involved, many of whom were not acquainted with each other. When residents wanted to contact a colleague of another specialty, they often had to search for the right phone number or were misdirected multiple times. In some cases, after finding the right phone number or colleague, they discovered that this individual had been sitting next to them for the entire time.

In the interviews, residents mentioned that the number of residents and supervisors involved with one patient was higher in the academic center than it was in non-academic centers. This included more specialties, as well as more learning professionals, as each specialty could provide interns, residents, and supervisors. Some residents were of the opinion that the involvement of many physicians in the care for a single patient complicated and delayed the patient's ED journey.

> *…and particularly in the collaboration, I found that, because so much time elapsed with each step, that's what was most difficult for me, because it also involves more handover moments. Multiple disciplines. And then it just takes time, and you're also waiting for each other a lot. I found that difficult in the collaboration.* (resident; field interview)

> *It starts with the intern, followed by the resident, the emergency physician, and then the surgical intern and then the resident — the entire gamut, and then for each specialty.* (resident; focus group)

In one observation, the geriatric medicine resident was unaware that both an emergency medicine resident and a trauma surgery resident were involved in the care for the same patient. When discussing team members in the interview, the resident discovered that the emergency medicine resident had been mistaken for the trauma surgery resident. The resident was unaware that, in this academic center, the two specialties were separately involved in the care for patients with hip fractures. This had been different in the resident's previous rotations.

### *Bustling ED environment*

Residents of the various specialties were often caring for multiple patients simultaneously, such that they had to shift their attention between patients. The other ED patients could be multi trauma patients requiring undivided and direct attention from residents. Others warranted detailed analysis by the residents in the ED, due to academic multimorbidity. The residents assigned higher priority to the tasks relating to these other patients than they did to the clinically stable patients with hip fractures.

The residents we interviewed mentioned that the number of acutely ill patients in the ED required them to act swiftly, which at times created a tense working atmosphere.

> *…and in a busy ED, where everything often has to be done in a hurry…* (resident; field interview)

The supervisors we interviewed acknowledged that the other ED patients in this academic center could require more urgent care and therefore rightfully received higher priority, thus resulting

in less time and attention for the patients with hip fractures and interactions with professionals involved.

> *Multiple trauma also simply takes precedence, which also makes sense, doesn't it?* (supervisor; focus group)

### *Lack of coordination*

We observed residents unknowingly performing tasks that had already been completed by their colleagues from another specialty. These tasks included reviewing medication lists, discussing advance care plans, and placing hospital admission orders. At the same time, however, they seemed to overlook other tasks, like consulting anesthesiology for the pre-operative assessment of high-risk patients.



In one patient journey, we observed three residents of different specialties, sitting only a few meters apart, independently consulting two different oncologists to discuss the estimated life expectancy of a patient with metastatic cancer. The residents received slightly different answers and proceeded to create their own treatment plans based on this information.

> *And I really feel that, for hip surgery patients, it's more like we're walking past each other a bit more. And then we do eventually come together: "Okay, so you people are going to operate. So we're going to do the admission."* (supervisor; field interview)

In interviews, residents mentioned that, once it was necessary to transfer leadership from emergency medicine to another specialty, it became unclear who was in the lead for coordinating the care for the patient. In the interviews, supervisors and residents pointed to a lack of stewardship in the care process. Supervisors felt that the steward in the ED should be the specialty physician who would eventually become the leading attending physician for the patient during admission (see Glossary).

> *Yeah, that [transferring leadership] happens in some cases, but there's no fixed moment for it and that's why, in some of the cases, it doesn't come up until a very late moment, or it's unclear. And that also has to do with the fact that we have alternating people who do that [work in the ED], and not all of them are equally well versed in that whole protocol.* (resident; focus group)

During the focus groups, the supervisors and residents debated which specialty should be the attending — and therefore lead — physician in the care for these patients during the admission process. They concluded that this is usually undetermined while the patient is in the ED.

Supervisors used the term "twilight zone" to refer to the time when the various specialties discuss who should be the attending physician while a patient is in the ED.

> *…but in that twilight zone, it's really a kind of negotiation for who it will be. It's not immediately clear who it belongs to. No, it really is a process.* (supervisor; focus group)

Participants agreed that the lack of stewardship in the twilight zone could lead to longer waiting hours in the ED because, during this time, none of the specialty physicians involved would take responsibility for a patient's care process.

> *…but formally, as it stands on paper, but it's apparently not so clear to the resident, you know, as soon as the patient is registered in the ED, until someone, you know, actually takes over the lead treatment, the ED is in the lead. But I do agree with you, and I think you do hear back that the time when someone, like the geriatrician, says "Well, we're admitting the patient; we're now the attending physician." But it could also even be — between entry and, you know, before that decision is made — it can be like three or four hours in between, and that doesn't surprise me.* (supervisor; focus group)

### *Silo mentality*

We observed that residents focused on the tasks, responsibilities, and perspectives needed for the treatment plans of their own specialties. Neither the residents nor the supervisors seemed to be aware of differences in the perspectives, needs, or contributions of other specialties. In some cases, this silo mentality appeared to result in inefficient patient assessment and unaligned treatment plans.

We observed that patients had to discuss the nature of their falls with three different physicians, undergoing similar physical examinations multiple times by residents of different specialties. The residents successively checked the medication list or discussed advance care plans with the patient. The various residents then created their own individual treatment plans based on their own examinations, and in line with the needs of their own specialties.

> *The emergency medicine resident and supervisor agreed that an extensive CT scan was needed to assess a possible cancer for a patient whose hip X-ray gave cause to suspect a pathological fracture. Because the surgery resident was in charge of ordering the CT scan, however, only a scan of the pelvis was ordered.* (field note)

Residents seemed to differ in how they experienced the complexity of a case, based on aspects relevant to the treatment plan for their own specialty. A difference in perceived complexity could hinder IPhC. Conversely, a shared sense of complexity could facilitate IPhC.

*The trauma surgery resident felt that this patient was straightforward, so they discussed and planned the operation with the patient. In contrast, the geriatric medicine resident regarded the decision concerning whether surgery was appropriate as complex. This resident therefore felt that further assessment and interphysician discussion was needed to evaluate peri-operative risks before an informed decision for surgical treatment could be made. This led to frustration between the residents and confusion for the patient and the patient's caregiver, who had to be informed that the surgery that had already been agreed upon had been postponed.* (field note)

*A patient from a hospice presented to the ED with a hip fracture. The residents of surgery, anesthesiology, and geriatric medicine discussed their respective perceptions of the complexity of this decision, and they arranged a meeting between specialties in the ED to create a collaborative treatment plan, thereby resulting in an efficient and comprehensive assessment of the patient.* (field note)



During the interviews, residents and supervisors mentioned that they tended to focus on the tasks relevant to their own specialties and that they had not been aware of how such a focus may have led to inefficiency in the assessment of the patient. Some residents and supervisors mentioned that they considered it irrelevant to discuss the findings of other specialties as long as the outcomes from the perspective of their own silo were favorable.

*I deliberately don't go into that if I know there's going to be a multidisciplinary consultation and so on. I let go of it completely, and I look at the fracture and I assess whether the patient is on anticoagulants and whether I can get away with it in terms of anesthesia, and then I want you to tell me "yes" or "no." I couldn't care less whether I hear this from the assistant or from you. Sorry."* (supervisor; focus group)

*I don't know how you experience it, but I stand up for my own interest. I try to manage that a little bit, and I obviously try to be attentive to the other person's point of view, as long as it's somewhat within the bounds of my interest. And my interest is often, "Do I provide adequate care and does it necessarily have to be here, because I need the room again for the next one..."* (supervisor; focus group)

When asked how residents would rate the complexity of a given patient, they tended to perceive complexity from the perspective of their own specialty, without including or asking about the perspectives of the other specialties.

The following quotations are from two residents responding about the complexity of the same patient:

*Well, not complex. It's actually quite standard.* (resident; field interview)

> *Relatively complex. Because it was, yeah, she was 73, but otherwise, it was a complex case in substantive terms, because she obviously had metastatic renal cell carcinoma and, on the other hand, she had broken her hip. Complex, because apparently it is complex in terms of the hip as well. Because it's not clear cut that we're going to do this or that, so we're considering what to do and how. Moreover, there are multiple leaders, and she's being treated by an oncologist, who also wants to have a say.* (resident; field interview)

The silo mentality was also reflected in some of the interviews, when residents were asked to formulate their learning objectives while working in the ED. Some focused instead on acquiring technical skills within their own professional silos and opted to maintain clear boundaries between silos. In contrast, others felt a need to open up the professional silos and learn about the perspectives of other specialties.

> *I don't know what I would want to learn from them. Because I just like short, clear, and powerful, and that's my job. And the whole business about the cognitive aspects of a patient and so on; yes, that is important, especially postoperatively, but we have the geriatrician for that. So, to be honest, I don't really have a very clear learning objective for myself in that regard. '* (resident; field interview)

> *I think we need to partially get off our own islands, because we really just have tunnel vision.* (resident; field interview)

### *Limited, hierarchical feedback culture*

In our observations, we perceived that interactions aimed at learning or providing feedback between specialties were rare. When feedback was given or received, it usually focused on the medical content of the patient (such as which medication to start or stop). Feedback concerning collaborative practice was absent.

Furthermore, most feedback was downward — from supervisor to resident to intern — and within the individual specialty silos. For example, when discussing collaboration with an emergency medicine intern, one emergency medicine resident reported feeling that the interactions with geriatric medicine and surgery were inefficient but had not discussed this with the supervisor. Upward feedback was rare. One resident stated an opinion that differed from that of the supervisor with regard to the diagnostic tests that were needed. We did not observe any feedback between specialties.

The residents who were interviewed felt they should not "bother the boss" with details concerning collaboration. Many supervisors were combining their supervisory duties with other clinical tasks such as performing surgery or outpatient consultation). For this reason, the residents felt that they were not allowed to disturb their supervisors unless it was truly necessary. Some residents even mentioned that they would not call their supervisors until after all arrangements had been made, thus ensuring that they would not "bother" the supervisor with an unfinished story.

> *Residents — they're not going to ask for help unless they can't figure it out or until they have everything completely clear to themselves and they can just make one phone call and say, "Hey! I'm going to — a good resident is going to — I'm just going to solve it like this."* (resident; focus group)



Supervisors mentioned they did not address IPhC during supervision unless the resident mentioned it on the phone. Residents noted that they rarely discussed collaboration with their supervisors unless a conflict had occurred.

> *In general, collaboration is something you do — at least, I do as a supervisor only when things are completely out of sync and you want to get involved as a supervisor. When you think, "Whoa! What's going on here?" or when you have a resident crying on the line, and you think, "That does it!"* (supervisor; focus group)

Residents perceived the limited amount of upward feedback as a common part of the culture in a hospital. Upward feedback to a supervisor of another specialty was even more difficult, and thus something that residents deliberately avoid.

One of the residents reported often refraining from giving feedback to the residents of another specialty and not providing feedback on collaboration in the workplace unless a patient's health is in jeopardy.

> *I will do it if I think things are really harmful to the patient or if I think things are being done wrong. When things get messy sometimes, I have a strong tendency to just leave it as it is and simply consider it situational. That's often my first inclination.* (resident; field interview)

### How did residents and supervisors reflect on potential improvements on IPhC and learning thereof?

During the interviews, when residents were asked how they had experienced the IPhC, their most common response was, "fine." After we shared our observations during the focus groups, the residents recognized our observations, such as the difficulty of contacting each other within the

ED environment, the silo mentality, and the lack of coordination. In the focus group, residents suggested a number of organizational adjustments as potential improvements, including an up-to-date list of phone numbers and a flowchart of the care pathway. When asked if they actively used the care pathway documents in the ED, however, they reluctantly acknowledged that they rarely did.

To improve IPhC, the residents in the focus groups suggested more explicitly appointing a coordinator to agree on a specific time for consultation between specialties in each patient's journey. This meeting would serve to clarify who is in charge and provide a platform for providing feedback and learning IPhC.

When discussing aspects like the silo mentality and a limited, hierarchical feedback culture, the residents indicated that these cultural aspects could indeed form a barrier to IPhC. They were nevertheless unanimous in their opinion that such aspects are "too big" to address or change.

> *It's really important, but I think arranging it within this framework, that's going to be very difficult.* (resident; focus group)

The supervisors initially felt that the care pathway provided sufficient guidance and that no improvements in collaboration were needed. They questioned the necessity of learning IPhC. Moreover, they noted that there was no time for it in the workplace, and they felt unprepared for discussing IPhC with their residents. Some supervisors feared that interventions aimed at learning IPhC would only constitute an unnecessary increase of their workload.

> *I think, you know, you could go and train everything, but we're all just normal, ordinary doctors. We've all done physician training, so we should be able to talk among ourselves as physicians. Do we have to start training for that too? And of course, we have to make a checklist for that too. All physicians were spoken with, also amongst themselves. No, we're really not going to do that.* (supervisor; focus group)

After we shared our observations, however, the supervisors concluded that they might be largely unaware of how residents interact in the ED.

> *For me as a supervisor, I must honestly admit that it's not always very clear on the phone that perhaps someone has or has had an unpleasant experience.* (supervisors; focus group)

In the second focus group, supervisors responded to having been caught by surprise by some of the observations, such as the consultation of multiple oncologists in a single case and the ordering of a different scan. They had not realized how IPhC currently occurs in the ED and

that it could potentially have serious consequences. They nevertheless struggled to provide potential solutions.

> *A: It's not entirely clear to me exactly where the core of the problem is — where it should be addressed — but something is apparently not going quite right there. That's also what we were all surprised about: that such things are happening.*
>
> *EM: I think that's the most striking thing to come out of these observations. On the other hand, it worries me a bit, because it's not clear how it should be addressed…* (supervisors; focus group)

## DISCUSSION



Our study illustrates how the complex ED workplace context affected IPhC and the learning thereof and provides insight that could strengthen IPhC and the learning thereof. Interactions between residents and supervisors from different specialties were influenced by a variety of contextual aspects, which we organized into five themes: a swarm of unacquainted professionals, the bustling ED environment, a lack of coordination, a silo mentality, and a limited, hierarchical feedback culture. Our data indicate that residents who care for patients with hip fractures in the ED work in a predominantly asynchronous manner and focus primarily on the tasks of their own specialties. Residents and supervisors create treatment plans that are in line with the responsibilities of their respective specialties, without integration and coordination of the perspectives, tasks, and treatment plans of the other specialties involved. Interactions among residents occur primarily through emergent encounters. We did not observe any collective reflection or feedback related to learning IPhC in the workplace. Moreover, supervisors — who are tasked with supporting the learning processes of residents — were often performing other clinical duties and were not present in the ED. Increasing awareness of the potential lack of collaboration and its pitfalls within such an organizational structure is necessary to enhance IPhC and the learning thereof in acute care settings despite contextual challenges.

It is known that outcomes in workplace learning are related to the context within which such learning occurs. Improvements in learning are linked to improvements in clinical practice (7, 9). This suggests that strengthening contextual aspects that facilitate IPhC workplace learning could have an impact on IPhC itself, as well as on the collaborative practice of the residents and supervisors involved. At least theoretically — the context of acute care offers significant potential for learning IPhC in the workplace, given the co-location of residents from various specialties and the swift, efficient IPhC required in acute care (4, 11, 12, 33). Our observations did not provide evidence of compliance with a number of key requirements for successful collaboration

in the observed acute care context. Collaboration in healthcare has been defined as the process by which a team of physicians with different specialties coordinate and align tasks, thereby creating an integrated treatment objective and plan (3, 34). Key requirements are leadership, team identity, and shared mental models (13, 35). The results of this study demonstrate that, despite a clear need for an effective collaborative practice in acute care, the current acute care context drives residents toward the swift execution of tasks relating to their own specialties, and it does not facilitate collaboration or deliberate learning. In order to improve IPhC learning, increased awareness on how this complex context impacts IPhC, clinical decision making and patient outcomes is needed. Also, efforts to address contextual aspects that may hinder IPhC and learning thereof should be made. These efforts will involve alterations in the way in which the care system within the hospital is organized so that interactions aimed at increasing connectivity between specialties are made more appealing for residents working in the ED.

Facilitating workplace learning on IPhC can also bring change to the collaborative practice of residents and supervisors within this complex context. Workplace learning is the most important form of learning to take place during the postgraduate training of residents. It occurs primarily through three main pathways: 1. learning through participation in practice, 2. Learning through observation or role modeling, and 3. learning in interaction with others (e.g., through collective reflection in action)(7, 36). Below, we discuss our findings along the three pathways of workplace learning as a lever for strengthening IPhC in acute care contexts.

The results of our study demonstrate that residents work and learn from within the silos of their own medical specialties. Interactions reflecting the exchange of perspectives or facilitating alignment and coordination with other specialties are not structurally embedded within the operating procedures of the care pathway. As a result, both the care pathway and the supervisors offer only limited exposure or guidance concerning how effective collaborative interactions between specialties should occur. The limited occurrence of interactions reflecting alignment, shared stewardship, or the exchange of perspectives in current practice hampers the possibility of effectively learning IPhC through participation in practice. In addition, residents often perceive their interactions as adequate, and they are unaware of the existing lack of collaborative practice. This observation is in line with the findings of previous studies showing that residents and supervisors often regard IPhC as common practice, thus possibly raising questions concerning the necessity of learning IPhC (37-39). As revealed by our observations, however, a lack of adequate interactions aimed at integration and coordination between specialties can impede the learning of IPhC, potentially leading to undesirable clinical outcomes (such as ordering the wrong scan or multiple consultations with another specialty physician). To align care tasks and integrate perspectives, current standard operating procedures and care pathways should be adapted to guide and facilitate interactions involving IPhC.

We observed that supervisors were mainly consulted remotely. This creates two limitations for IPhC and the learning thereof by residents. First, it impedes opportunities for residents to observe and learn from their supervisors. Second, it leaves supervisors unaware of when and how residents interact in the ED and causes them to miss opportunities for IPhC and the learning thereof. Supervisors are regarded as important role models in the workplace, and they play a major role in professional development during postgraduate training (7, 40, 41). The limited presence of supervisors in the ED may be related to the fact that academic supervisors are working within a system of care that is increasingly demanding greater clinical productivity from faculty members (40). As a result, they must balance the increasing clinical workload with research and educational responsibilities (42). The demanding environment of clinical practice often separates supervisors and residents into different workplaces, thus potentially obstructing the process of learning through observation and role modeling. This highlights the importance of altering the current organization of care to enable opportunities for residents and supervisors to interact in closer proximity. It could also assist supervisors in adhering to their function of overseeing the integration and alignment of perspectives occurs, in addition to facilitating the learning of IPhC through role modeling.



The residents in our study seemed to perceive barriers to discussing collaborative behavior with their supervisors and with residents from other specialties. The silo mentality and a limited, hierarchical feedback culture apparently constitute the root cause of the absence of fertile ground for learning in interaction through collective reflection in and on action. Previous studies have shown how feedback between specialties could be regarded as difficult and, therefore, purposely avoided (6, 43, 44). The avoidance of feedback between specialties may be related to unconscious beliefs among residents or supervisors about other specialties with regard to professional norms and standards, thereby generating unconstructive power dynamics (6, 38, 45). These power dynamics may explain the hesitance of residents to seek guidance from their supervisors on IPhC and the absence of inter-specialty feedback. The focus groups conducted in our study facilitated collective reflection in which residents and supervisors jointly (in their respective groups) reflected on their observed behavior. The focus groups made participants increasingly aware of the complexity of IPhC and the learning thereof within the context of acute care. In line with previous studies on the role of reflection in workplace learning, this finding indicates that structured, collective reflection can be an effective way in which to address these barriers and facilitate IPhC learning (41, 44).

## Implications

This study highlights the influence of the context on learning IPhC and the need for changes in clinical practice to facilitate the integration of perspectives, coordination, and learning among residents and supervisors in the ED, thereby facilitating IPhC and the learning thereof. Given the multiple contextual factors influencing current collaborative practice, a multifactorial approach is apparently needed in order to strengthen IPhC and the learning thereof (46). In light of the closely intertwined nature of learning and working in postgraduate training, simultaneous adjustments to clinical practice and workplace learning appear necessary. Although the residents and supervisors in this study became aware of the necessity of improving IPhC and the learning thereof, they were unable to provide solutions beyond *ad hoc* logistical adjustments (such as updating telephone directories or adjusting care pathways). Improvements to IPhC and the learning thereof should transcend logistical adjustment and the creation of formal learning interventions focusing on IPhC. Although formal learning activities may increase awareness concerning the necessity of learning IPhC, they are not sufficient, as learning in postgraduate training occurs primarily in the workplace (7). Given the strong connection between the outcomes of workplace learning and the context of the learner, it is important to focus on creating an environment that demands greater connectivity between physicians of different specialties, thereby facilitating IPhC and the learning thereof.

As in our study, in previous literature on the views of supervisors concerning the learning of IPhC, supervisors have expressed a sense that they are underprepared to facilitate the workplace learning on IPhC (6, 40). Supervisors may require tools in order to facilitate the learning of IPhC. It is therefore crucial for further studies to explore ways in which supervisors can facilitate the learning of IPhC in the ED during supervised workplace learning. This could nurture an environment that supports IPhC and the learning thereof within the time and workload constraints imposed by clinical practice. This will require overcoming cultural barriers (such as the silo mentality and a limited, hierarchical feedback culture). Future studies could be used to explore ways of incorporating collective reflection in action into daily practice.

Greater connectivity between physicians of different specialties and the improvement of collaborative practice within the complex setting of acute care demands increased awareness among residents and supervisors regarding their current collaborative behavior and the significance of learning IPhC to improve this behavior. Residents must learn how to create interactions aimed at integration and coordination between specialties. Supervisors must become more aware of resident interactions in the ED and foster an environment that emphasizes the importance of IPhC and facilitates learning in the workplace through role modeling and collective reflection. This may require the reintegration of supervisors into the workplace of residents. Such reintegration may subsequently require a reorganization of care. Research is

needed on how to create work-learning environments that can facilitate the transformation towards collaborative practice in acute care contexts.

## Strengths and limitations

Our study had several strengths, the most important of which is that is based on observations of the residents while working in the ED. This made it possible to provide theoretical insight and to clarify the impact of the current acute care context on the collaborative practice and potential adverse outcomes for patients in the ED. Such ethnographic data add to the results of previous studies on IPhC that have focused on data collection through surveys, as well as an ethnographic study in non-acute settings(8, 47). The results of this study provide insight into differences between the perceived and observed quality of interaction, thereby clarifying the limited insight of physicians concerning the lack of integration, alignment, and leadership. Another strength of our study has to do with the combination of observations with field interviews and focus groups. This allowed participants to reflect on their own collaborative behavior, thus providing an opportunity for workplace stakeholders to share their views on the data.



A group of researchers with diverse professional backgrounds and experiences crystallized themes based on data from multiple sources, thereby improving reflexivity and consistency (28). In addition, the observations in this study were performed by researchers who were familiar with working in the ED as both a resident and a supervisor. Such experience is essential to a focused ethnographic study design (26).

Aside from its strengths, our study is subject to a number of limitations. First, the observations were restricted to office hours. This may have provided an incomplete image of collaboration among residents and supervisors, as collaboration during the evening and night shifts may be subject to different facilitators and barriers. In addition, fewer residents may be present at night, and supervisors may be more difficult to reach. Our choice not to conduct observations during the evening and night shifts was intended to avoid potentially burdening residents during these delicate working hours. However, the experiences residents and supervisors mentioned during focus groups included experiences from weekend, evening and night shifts, suggesting that the themes identified in this study are likely relevant beyond office hours.

Our study was conducted in a tertiary academic center. The outcomes might have been different if the same study had been performed in a different setting. A previous study on differences between academic and non-academic hospitals in the treatment of patients with hip fractures did not show differences in clinical outcomes (20). That study did identify a difference in team composition, with geriatric medicine being relatively under-represented in academic centers (43). In the center observed in the current study, however, co-management with trauma surgery and geriatric medicine was a fundamental part of the care pathway for hip fractures. Therefore,

we believe that our data are also transferrable to ED interactions concerning patients with hip fractures in other large non-academic hospital settings.

We conducted field interviews in the workplace with residents and supervisors involved in the care of patients with hip fractures in the ED. Anesthesiology and orthopedic surgery residents were less frequently observed in the ED, and these specialties were therefore under-represented in the field interviews. In addition, the field interviews were difficult to arrange, given that residents and supervisors were often providing care for multiple patients in the ED. As a result, more residents and supervisors from some specialties participated in field interviews than did those from other specialties. To gather perspectives from each specialty on the data, we ensured that residents and supervisors from all specialties were represented during the focus groups.

## CONCLUSION

Our study demonstrates that, despite its potential for the learning of IPhC, the complex context of acute care is accompanied by challenges relating to collaborative practice and learning in the workplace. Within this context, a lack of integration and coordination in interactions between specialties could increase the risk of adverse patient outcomes. Combined with its characteristically high workload, the absence of role models, a silo mentality, and a limited, hierarchical feedback culture, the ED context poses challenges to IPhC learning. Our findings highlight the necessity of addressing both influential contextual aspects and the learning processes within the workplace to improve IPhC and learning thereof simultaneously. Improving IPhC learning will require increased awareness among residents and supervisors about how contextual factors impede interactions between specialties, as well as the creation of opportunities for collective reflection, feedback and role modeling of residents and supervisors within the complex acute care context.

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# CHAPTER 6

## Summary and general discussion

The care of older adults has become increasingly complex, driven by societal changes such as population aging and increasing multimorbidity. As more specialized physicians become involved in a single patient's care, the risk of fragmented, ineffective care and adverse outcomes rises. Effective, coordinated, and integrated intraprofessional collaboration (IntraPC) is therefore essential. However, IntraPC and acquiring IntraPC competencies do not occur automatically. Previous studies have indicated that deliberate learning opportunities are needed. Yet, current postgraduate training programs seldom provide the structured experiences to cultivate IntraPC competencies. This thesis explored how IntraPC learning can be facilitated during the clinical practice for multimorbid older adults within workplace learning. We aimed to identify, design, and evaluate strategies and interventions that meaningfully support IntraPC learning in complex care settings.

This chapter starts with a concise overview of the main findings, followed by a critical appraisal of main overall findings and methodological considerations. We then present practical implications of this work and highlight avenues for future research, emphasizing the potential of these insights to advance IntraPC in clinical practice.

## SUMMARY OF FINDINGS

Chapter 1 sets the background of this thesis by presenting its central research questions addressed in this thesis and reviewing existing literature on workplace-based IntraPC learning. We present the theorical lenses of workplace learning, learning during clinical supervision and boundary crossing.

Chapters 2 and 3 focus on the development, implementation, and evaluation of the **S**econdary **P**rimary care **I**ntraprofessional **C**ollaboration **E**ducation (SPICE) program. SPICE is designed to facilitate IntraPC learning across the Secondary Care (SC) - Primary Care (PC) interface. We explored potentially effective IntraPC learning activities and what learning outcomes these may yield. In this Design Based Research(DBR) evaluation phase study, we developed, implemented and evaluated SPICE within the daily clinical practice of a geriatric medicine department. Through iterative cycles of design, stakeholders implemented and evaluated six final IntraPC learning activities.



To enable successful implementation in the workplace, the IntraPC learning activities need to be carefully aligned with existing teaching hours, and the patient perspective on PC-SC collaboration needs to be incorporated explicitly. Whereas formal learning activities were successfully implemented with some modifications, challenges to IntraPC workplace learning activities persisted. Limited adherence to workplace learning, could partly be contributed to limited supervisor involvement. Supervisors either questioned the necessity of IntraPC learning or the need for additional learning activities or lacked knowledge on how to address IntraPC learning in the workplace.

Residents who participated in SPICE reported greater mutual understanding, increased awareness of key moments in IntraPC, and had a clear intention to improve alignment across care settings. Through The analytical lens of boundary crossing provided that the most predominant learning mechanisms were identification, coordination, and reflection. However, the creation a new shared clinical practice through transformation remained limited.

In Chapter 3 the longer-term effects of SPICE on collaborative behavior among participating residents were explored using a collective evaluation method: the Effects Forum. This innovative evaluation approach combines focus group interviewing with knowledge co-construction and timeline analysis. Patients, residents and supervisors collectively created a timeline with valuable IntraPC learning opportunities and reflected on what they had learned on IntraPC during SPICE and the consecutive 6 months. They also reflected on how SPICE had influenced their clinical practice.

The Effects Forum enabled participants to jointly reflect on meaningful learning experiences over time. It revealed how meaningful IntraPC learning occurred not only within structured SPICE learning activities, but also through everyday dialogues and reflective moments within subsequent rotations. The learning opportunities lead to increased mutual understanding and insight into the care continuum. These insights drove residents to include more handovers across care settings within their practice. Participants also described a ripple effect of IntraPC learning. Through renewed dialogue and reflection IntraPC learning was deepened and renewed within subsequent rotations. The findings highlighted how dialogue and shared reflection may enable extended IntraPC learning to diverse clinical settings.

Chapter 4 turns to the question how supervisors may support IntraPC learning within everyday resident–supervisor dialogues (RSDs). Although RSDs offered opportunities to address IntraPC learning, these opportunities often remain unutilized. In this ethnographic study, we observed RSDs in a geriatric medicine department to identify both opportunities for and barriers to IntraPC learning within RSDs.

Daily RSDs held potential for IntraPC learning, however, dynamics between residents and supervisors were found to hinder IntraPC learning. These dynamics included perceived time constraints and a predominant focus on monitoring clinical decision-making rather than exploring underlying reasoning and learning processes. We also observed misalignment between supervisors' intentions and residents' interpretations of feedback, as well as difficulties balancing entrustment with learning-oriented discussions. This 'entrustment struggle' could result in the supervisor granting the resident autonomy and limiting supervisory dialogues, at the cost of IntraPC learning opportunities.

These findings suggest that IntraPC learning in RSDs does not primarily require additional time, but rather a shift in how existing interactions between resident and supervisor are approached, experienced and utilized. To improve IntraPC learning in RSDs, supervisors may include not only *what* care to provide, but also *how* care is provided across medical specialties.

Chapter 5 includes an ethnographic study in which we observed interactions among residents from different specialties and their supervisors caring for hip fracture patients in the Emergency Department (ED). We aimed to explore how these interactions reflect IntraPC and how they may subsequently enable IntraPC learning.

The care processes around these patients were often shaped by ad hoc and emergent interactions between multiple residents from different specialties. The ED context was characterized as stressful and filled with a multitude of professionals who worked on their specialty-specific task. In this environment, IntraPC learning tended to remain implicit and secondary to swift

execution of specialty-specific tasks. We observed limited coordination and integration across specialties. This contributed to inefficiencies such as duplication of tasks, tasks being forgotten, and prolonged patient waiting hours. Patients often remained in the ED for extended periods and were asked to repeat the same information multiple times.

While participants pointed to logistical improvements as potential solutions, they also perceived deeper cultural and systems barriers which they felt were too difficult to overcome within the scope of this study.

## INTEGRATION OF FINDINGS

Interactions between medical specialties the current clinical practice are often emergent and fragmented, leading to inappropriate care for older adult patients. Despite the growing need for coordinated and integrated collaboration, residents and supervisors tend to focus on specialty-specific responsibilities and often perceive IntraPC as a straightforward and naturally occurring process. This thesis showed shortcomings in IntraPC are not merely the result of an individual's behaviors. Rather, IntraPC is shaped and reinforced by the ways in which working and learning are organized within the healthcare system. As current clinical practices lack examples of coordinated and integrated IntraPC, residents cannot be expected to develop IntraPC competencies through socialization to current standards of work. This may suggest dedicated IntraPC training programs that facilitate learning integration and coordination across medical specialties are required.



At the same time, the findings in this thesis also indicate that addressing IntraPC exclusively from a medical education perspective is insufficient. Participants of intraPC learning interventions mentioned how the IntraPC learning interventions were useful in creating awareness on the importance of IntraPC and of seeking alignment across medical specialties. However, participants also mentioned that transformation towards a new shared clinical practice or sustained adherence to workplace learning interventions remained limited (Chapter 2). Our longer term evaluation of SPICE showed how explicit attention to IntraPC learning could create a ripple effect of IntraPC learning, spreading dialogues and reflection on IntraPC towards new workplaces (Chapter 3). However, when residents left structured interventions, they returned to workplace contexts that continued to structurally hinder coordination and integration across specialties (Chapter 3, Chapter 5). Local cultures and organization structures within subsequent clinical placements could again reinforce siloed working and hinder coordination across specialties.

This thesis highlights how improving care for older adults through enabling IntraPC learning requires a systems approach, in which learning to provide coordinated and integrated care is supported by the way clinical work is organized. Such an approach acknowledges that working and learning are inseparable and mutually reinforcing processes. This allows IntraPC competencies to develop through socialization to practices where integration across medical specialties is an integral part of everyday high-quality practice. Consequently, efforts to strengthen IntraPC should extend beyond IntraPC learning interventions alone. We also need to address structural aspects of care organization, as well as the ways in which residents and supervisors think, act, and learn within this complex system. Improving care for older adults through improved IntraPC learning therefore requires attention to both the organizational and cultural structures that shape everyday clinical work and the individuals operating within them. The following sections explore these two dimensions by focusing firstly on the clinical context and secondly on the individuals within that context.

## The clinical context, from silos to synergy

In our studies, residents and supervisors worked on specialty-specific tasks in a complex and often stressful environment. Moreover, underlying ideas, beliefs, values, and professional stereotypes influenced how residents and supervisors perceived one another and engaged in intraprofessional encounters. Improving IntraPC therefore requires attention to the conditions that shape everyday interactions across specialties.

To understand how such interaction patterns are produced and sustained, our findings can be meaningfully interpreted through the lens of cultural-historical activity theory(CHAT), and particularly Engeström's concept of interacting activity systems (1). CHAT is a framework that explains how cognition and behavior are shaped by culture, history and social interactions. Using a CHAT lens on healthcare helps conceptualize how clinical work is a collective, goal-oriented activity, shaped not only by individuals but also by social rules, division of labor, tools, and shared understandings.

From this perspective, each medical specialty constitutes an activity system, a collective of professionals with its own object of activity, rules, division of labor, tools, and underlying values. Figure 1 shows examples of how medical specialty activity systems could look like.

However, In everyday clinical practice, residents and supervisors do not act within a single, unified system, but continuously navigate the boundaries between multiple, partially overlapping activity systems. As seen in figure 1, while professionals acting in different systems engage with the same patient, their objects seemed to differ. For example, for surgery, the object is timely operative repair, whereas for geriatrics it is optimal functional outcomes and quality of life.

Interactions across specialties can be understood as boundary crossing, meaning that professionals engage with others who act with objects from different goals, norms, and ways of reasoning. (1-3). More specifically, boundary crossing refers to interactions around sociocultural differences that can lead to discontinuities in action and understanding (1-3). These interactions bring different system logics into contact and expose contradictions between activity systems (1). In the examples from figure 1, a potential contradiction could include how rules within the geriatric medicine system could dictate how an extensive examination of the patient's care needs is required, whereas surgery's rules dictate how swift intervention is beneficial for clinical outcomes.

In clinical practice, these types of contradictions may become visible when residents from different specialties work alongside each other, encountering and negotiating differences in responsibilities, priorities, and perspectives. Therefore, these moments of interaction can create opportunities for learning by making such contradictions visible and open to reflection.



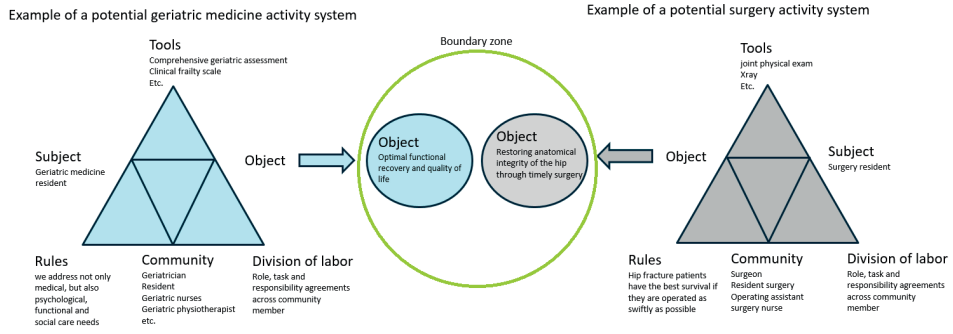



**Figure 1. Two partially overlapping activity systems (geriatric medicine and surgery) involved in the care of a patient with a hip fracture, illustrating boundary crossing between specialties.** Within each activity system, the subject (the resident) engages with an object (the goal of activity) using mediating tools (such as clinical guidelines, assessment instruments, or electronic patient records). This activity is shaped by rules (formal and informal norms, protocols, and values), a community (professionals and stakeholders involved in patient care), and a division of labor (the distribution of roles and responsibilities). The overlap between systems represents boundary-crossing interactions, where differences in objects, rules, and perspectives may lead to tensions but also create opportunities for shared understanding and learning.

In our studies, these contradictions included the differences in priorities, perspectives and differences in experienced care complexity and mental models on good clinical practice. Additionally, we observed that residents and supervisors may remain unaware of these contradictions. Subsequently, these contradictions rarely become explicit topics of collective discussion. Instead, they tend to remain implicit and unresolved, manifesting in fragmented care

practices such as duplicated work, gaps in responsibility, prolonged waiting times, or conflicting diagnostic and treatment plans. In this way, these contradictions hamper IntraPC, instead of providing opportunities for change and learning (Chapter 4 and 5).

In addition, the role of culturally embedded ideas, assumptions, and stereotypes in shaping interactions across specialties became apparent during our studies. Previous research has shown that medical specialties often develop strong internal narratives about their own expertise, as well as about the competence, priorities, and responsibilities of other specialties (4, 5). Within medical specialty silos, professionals may come to regard their own perspective as superior or more central to the care process, positioning professionals from other specialties as more peripheral and deprioritizing their perspectives in the patient's care (6, 7). Moreover, these underlying assumptions may be reflected in everyday professional language in interactions across specialties, where they can subtly reinforce distance, generate friction, and sustain the silo mentality (8). When such assumptions remain implicit, they further inhibit engagement with contradictions at activity system boundaries which may enforce siloed working rather than enable collaborative practice.

While CHAT helps explain why system dynamics within interactions across specialties may lead to fragmentation of care, Engeström's concept of expansive learning provides insight into how such interactions could become productive starting points for change (9). Expansive learning occurs when differences and tensions between specialties are made explicit (1, 9). Through jointly reflection, contradictions can be used to reconsider how care is organized and what both specialties are collectively aiming for (1, 9). In practice, this may involve explicitly discussing differing perspectives on patient management, roles, or priorities, and using these discussions to better align care across specialties.

In the context of IntraPC in the ED, interactions between specialties were often ad hoc and emergent, and were not recognized as boundary activities. Moreover, time, space, and legitimacy to engage with underlying contradictions seemed lacking, which lead to their potential for transformation and learning largely remaining unused.

Addressing the organizational complexities and culturally shaped patterns that may limit explicating and navigating contradictions between specialty activity systems, requires making a priority of discussing different perspectives and assumptions in daily interactions. Doing so shifts workplace interactions from procedural transfers of information to opportunities for collectively creating a shared objective. This is in line with creating a shared object as expansive learning dictates and could entail creating a shared mental model on what good clinical practice means for this individual patient (1, 9, 10). Creating a shared mental model on good clinical practice is the core of IntraPC. In the example in figure 1, this could entail that during interactions

between the geriatric medicine resident and the surgery resident, they develop a shared goal of 'appropriate and efficient care for this patient', discussing how both swift decision-making and careful consideration of treatment options in light of the patient's frailty contribute to this goal.

Creating conditions in which boundary crossing is actively recognized and supported requires deliberate organization modifications. From an activity systems perspective, this involves more than allocating time for interaction; it entails reconfiguring rules, divisions of labor, and opportunities for shared engagement across specialties (1). For example, by making adequate coordination across specialties a shared rule, the organization of care stimulate interactions across specialties. Other interventions could include bringing residents and supervisors from different specialties into closer physical and organizational proximity, embedding structured opportunities for joint activities across specialties in existing interactions, integrating collaborative practices into care pathways, and reducing administrative burdens. In this way, IntraPC can become a legitimate and integral aspect of clinical work, rather than an afterthought or additional task.

### The individuals within the complex context



Whereas the previous section focused on how the clinical context structurally shapes opportunities and creates barriers for IntraPC, this section zooms in on how residents and supervisors experience, interpret, but also respond to this complex environment. A central finding across our studies is that residents and supervisors often perceive IntraPC as routine, self-evident, and therefore not requiring explicit attention (Chapter 2, 4 and 5). This perception limits the legitimacy of IntraPC as a topic for discussion in the workplace and in the learning trajectories of the resident involved. This perception is consistent with existing literature, which shows that supervisors frequently regard collaboration as a given rather than as a competence that requires active guidance and development (11, 12).

However, our findings support previous claims that integration and coordination across specialties does not occur automatically, by demonstrating that IntraPC in clinical practice is far from straightforward. Although interactions across specialties are shaped by differing perspectives, priorities, and implicit assumptions, these differences are rarely explicitly recognized by those involved. Instead, IntraPC tends to remain taken for granted, embedded within routine clinical work. This creates a discrepancy between how collaboration is perceived (as straightforward and self-evident) and how it unfolds in practice (as dynamic, uncertain, and at times fragmented). By framing IntraPC as a simple task rather than a complex, negotiated practice, underlying tensions between specialties may remain obscured. Resident may need to move from self-entrusting IntraPC to engaging with its complexity, whereas supervisors may need to extend their monitoring practices in RSDs to include their role as care system guides.

### Residents: from self-entrustment to engaging with complexity

Navigating the complexity of negotiating contradictions across specialties in clinical practice may lead residents to experience clinical uncertainty. Clinical uncertainty is defined as a dynamic state in which they are unsure about what to think, feel, or do, both in relation to patient care and their own learning (13, 14). This uncertainty is often experienced as unease and the resident or supervisor may interpreted this unease as a lack of clinical competence (15). To manage this unease, residents may adopt coping strategies that can be understood as attempts to render complexity more tractable, by reframing it as simple or controllable (16). These coping strategies may include denial, avoidance, or reductionism (16). Regarding our findings through the lens of clinical uncertainty, the tendency to avoid explicit discussions on IntraPC, to reduce it to task-oriented prompts during RSDs, or to purely focus on medical-technical feedback within existing hierarchical and siloed structures can be interpreted as a reflection of these coping strategies. This can be understood as a way to manage complexity rather than as an indication that collaboration is unproblematic. Paradoxically, this very complexity may thus lead to its simplification or neglect. Additionally, the coping strategies they adopt to deal with complexity, may be further reinforced by clinical training environments that prioritize efficiency, clarity, and individual performance.

Moreover, residents in our studies expressed a preference for working as independently as possible. They indicated that they were reluctant to "bother" their supervisors with questions related to IntraPC, and reported that more extended RSDs could evoke feelings of incompetence and reduced psychological safety (Chapter 4 and 5). In postgraduate training, residents are expected to develop increasing autonomy through participation in clinical practice(17, 18). The workplace culture encourages them to self-regulate their work and learning by determining when supervision is needed and when they can act independently(19). The level of supervision they receive is often interpreted as an indicator of their competence and progression (20, 21).

Additionally, engaging with complexity in learning-oriented dialogue with supervisors also evoked discomfort for residents. Such interactions often involve what has been described as productive struggle, a state of cognitive and emotional challenge that can drive learning(22, 23). Yet, in practice, this productive struggle may be experienced as unease and interpreted as a lack of competence(24). To avoid this discomfort, residents may refrain from initiating reflective or learning-oriented conversations with their supervisors(24). From this perspective, the strong emphasis on autonomy and entrustment can be understood not only as an educational goal, but also as a way of coping with the uncertainty and discomfort associated with learning oriented RSDs. As a result, residents tend to focus primarily on identifying gaps in medical knowledge and regulating self-entrustment in clinical tasks, rather than using RSDs as spaces for joint reflection on the complexity of collaborative practices.

Our findings indicate that this orientation towards autonomy may unintentionally complicate IntraPC learning. Residents may (implicitly) self-entrust IntraPC, assuming competence. This premature sense of competence risks further oversimplifying IntraPC and leads to missed opportunities for discussing care coordination and integration across medical specialties within RSDs. While autonomy through entrustment is essential for professional development, a sole focus on gaining independence may function as a way to manage uncertainty, thereby inadvertently suppressing opportunities for reflection, dialogue, and IntraPC learning.

Engaging with, rather than avoiding, the complexity and uncertainty inherent to working within the healthcare systems, is therefore key to fostering integrated and coordinated care as well as supporting meaningful IntraPC learning in clinical practice(25). Conversations rooted in the real-world clinical context are not only necessary, but potentially more powerful than dialogue and reflection outside of the clinical context such as within formal learning interventions(26). Consequently, while complex clinical environments constrain the space for dialogue, they simultaneously highlight why these dialogues and collective reflections are valuable and how they facilitate collaborative behavior and learning when they do occur. By making residents and supervisors aware of how contradictions between activity systems reside within intraprofessional interactions, they may come to recognize that it constitutes a legitimate and important topic for discussion in everyday practice.



**Supervisors: from medical monitors to care system guides**

Supervisors are an important facilitator in how residents engage with complexity, uncertainty, and IntraPC learning in clinical practice. Supervisory practices can either reinforce the resident's coping strategies or create conditions in which IntraPC becomes a legitimate and meaningful component of clinical decision-making and, consequently, of learning.

We observed that supervisors were often not physically present in the clinical settings where residents worked and were therefore not always aware of how interactions across specialties actually unfolded. During RSDs, the supervisor's focus was predominantly on monitoring patient safety and ensuring correct task execution (chapter 4 and 5). Clinical supervision was largely oriented towards assessing performance, correcting errors, and promoting efficiency (chapter 4 and 5). Learning, in particular IntraPC learning was frequently deprioritized or treated as a separate process. In doing so, supervisors may unintentionally reinforce culturally shaped patterns in which certainty, efficiency, and individual performance are prioritized over reflective dialogue and engagement with the complexity of IntraPC for older adults with multimorbidity.

A key mechanism of workplace learning during resident–supervisor interactions in postgraduate training is through role modelling (11, 18). However, our findings indicate that in current

practice, supervisors are not always well positioned to model effective IntraPC. Supervisors may lack insight into day-to-day residents' collaborative practices, as they are often occupied with competing clinical demands. Therefore, supervisors are not consistently present during interactions across specialties. In addition, they may (implicitly) reinforce siloed ways of working, for example by prioritizing specialty-specific goals over shared decision-making across specialties. If IntraPC is to become a more legitimate topic within RSDs, supervisors need to actively model engagement with IntraPC.

Previous research has shown that the supervisory role places substantial demands on an individual medical specialist, who carries the final responsibility for patient care while simultaneously balancing clinical, educational, research and organizational tasks (27). Managing these multiple responsibilities may provide barriers for supervisors to engage with the collaborative and reflective aspects of the resident's clinical work (11, 28, 29). This suggests that supervisors may benefit from an organization of care that provides them with more opportunities to work in closer proximity with residents. Furthermore, supervisors could benefit from more explicit preparation in how to perform this educational role for residents, particularly with regard to facilitating learning in spite of complex, interdependent care environments.

Compared to residents, supervisors are typically positioned more centrally within the organization of healthcare and are therefore expected to have a broader overview of the healthcare system(6, 30, 31). However, our findings indicate that supervisors were not always aware of the full network of care surrounding a patient, including which specialties were already involved and how care was coordinated across settings (Chapter 5). Creating more space within RSDs to explicitly discuss these care networks may therefore be valuable. In doing so, supervisors can provide context-specific insights into the organization of care and begin to function more actively as care system guides in daily practice.

By adopting this role, supervisors and residents can co-construct a more comprehensive understanding of the care system surrounding a patient. This may enable more deliberate and informed decision-making, ultimately contributing to better coordinated and integrated care across medical specialties. At the same time, such practices contribute to the socialization of residents and supervisors, reinforcing the importance of maintaining an overview of the care system as a core element of good clinical practice. This can be achieved by broadening RSD monitoring beyond *what* care should be delivered to include *how* care is delivered across specialties. For example, supervisors can actively question residents about interactions across specialties, reflect on coordination of care, and discuss tensions or challenges that arise across specialty boundaries.

We observed that feedback interactions were often characterized by a predominantly top-down structure. In addition to modelling IntraPC, supervisors play an essential role as examples of lifelong learning. By actively seeking feedback, reflecting on their own clinical decision-making, and making their uncertainties visible, supervisors can demonstrate that learning is an ongoing and integral aspect of professional practice (32). Such behavior may contribute to increased psychological safety within the workplace, creating space to discuss procedural and organizational aspects of care alongside medical-technical content (33). Creating more space for upward feedback may enable residents to engage more openly in supervisory dialogue, particularly regarding sensitive topics such as uncertainty, conflict, or misalignment across specialties and IntraPC. As these topics are often an integral part of IntraPC interactions, a willingness to explore these topics is essential to IntraPC workplace learning in RSDs (8). In this way, supervisory relationships can become more reciprocal and supportive of learning. To facilitate this shift, supervisors need to embrace a learning-oriented attitude during RSDs, positioning themselves not only as evaluators but also as co-learners.

Taken together, these findings suggest that supervisors do not merely facilitate learning, but can actively shape the conditions under which learning about IntraPC becomes possible. By functioning as guides in the care system and modelling reflective, collaborative practice, supervisors can either reinforce existing siloed patterns or help transform them towards more coordinated and integrated care.



## METHODOLOGICAL CONSIDERATIONS

The studies presented in this thesis employed qualitative research methods. This approach was chosen because qualitative methodologies are particularly well suited to exploring complex social processes and to connecting theoretical concepts with everyday clinical practice. IntraPC and workplace learning are inherently shaped by contextual, relational, and sociocultural factors. Qualitative methods therefore enabled an in-depth exploration of how the clinical context influences interactions between physicians and how learning is shaped through these interactions. By observing everyday clinical practice in detail, the studies were able to identify contextual opportunities and challenges and make them explicit for reflection and improvement. Further research is needed for enhancing transferability of findings and further theory-building on intraPC learning.

A key strength of this thesis is its strong orientation toward clinical practice. The studies translate abstract theoretical concepts such as learning mechanisms in workplace learning and boundary crossing into concrete descriptions of how physicians interact in daily care delivery. By doing so, the research provides insight into how daily interactions in the workplace shape

both IntraPC and IntraPC learning in the complex care for older adults. These insights help to make the concept of IntraPC learning more tangible and actionable within clinical practice and subsequently in postgraduate training.

Another strength lies in the focus on both the residents and supervisors as well as interactions between both. While much of the literature on workplace learning focuses primarily on residents, the studies in this thesis explicitly examined the resident–supervisor dynamics in which learning is co-constructed.

Furthermore, the studies were conducted in close collaboration with the clinical field. Participants were not only involved as part of observations and interviews, but also engaged in reflecting on and interpreting of the findings. This close interaction with residents and supervisors enhanced the practical relevance of the research and contributed to the credibility of the findings by ensuring that interpretations resonated with the lived experiences of residents and supervisors.

The analytical process was further strengthened by the interdisciplinary composition of the research team. The inclusion of researchers with different professional backgrounds including clinicians from PC and SC backgrounds, educationalists and educational researchers allowed for the incorporation of multiple perspectives during the analytical process, enriching interpretation of the data and strengthening the credibility of the findings.

Despite these strengths, several limitations should be considered when interpreting the results. First, the studies in this thesis aimed to understand how sociocultural contexts shape interactions between physicians and how learning occurs during these interactions. Consequently, the findings are strongly grounded in the studied contexts and generalizability is therefore not evident. While qualitative research does not aim for statistical generalizability, the detailed, nuanced descriptions of themes provided in this thesis and the strong incorporation of (learning) theory, does promote the transferability of the findings to other settings.

While the precise manifestations of the observed phenomena may vary across contexts, the themes appear recognizable across a variety of clinical environments in both PC and SC (19, 34, 35). As such, they provide useful analytical lenses for examining workplace learning and IntraPC in other healthcare settings.

Another limitation relates to the study setting. Many of the studies were conducted within the Department of Geriatric Medicine at Radboudumc. This clinical context, characterized by high patient complexity and multimorbidity, provides a particularly relevant setting for studying IntraPC. Care for older patients often involves multiple physicians from different specialties.

At the same time, this department has been actively engaged in IPECP and IntraPC for several years, which may lead to different challenges to IntraPC than in department where IntraPC is a newer concept.

Despite this focus, the studies still identified substantial challenges in coordinating IntraPC and facilitating IntraPC workplace learning. This suggests that even in settings with a strong commitment to integrated and coordinated care, important barriers to IntraPC learning remain as a result of challenges presented by the clinical context.

Finally, this thesis focused specifically on IntraPC rather than Interprofessional Education and Collaborative Practice (IPECP). This focus was deliberate, as IntraPC has received relatively limited attention in the literature compared to IPECP. By providing deeper insight into the dynamics specific to IntraPC, this thesis contributes to a more nuanced understanding of IntraPC, highlighting how the organization of work, internal professional narratives within specialty activity systems, and ambiguities in roles and leadership responsibilities shape interactions across specialties and impact patient care.



This raises the question of whether the strict conceptual distinction between IPC and IntraPC is always useful in practice. Future research could explore whether these domains should remain analytically separated or whether more integrated approaches, such as focusing on promoting the development of integrated care through communication, reflection, and collaborative practice, may provide a more inclusive and holistic perspective on working and learning within complex healthcare systems.

## REFLEXIVITY

Rather than aiming to eliminate subjectivity, the studies in this thesis acknowledge the researcher's perspective as a valuable resource in interpreting complex social phenomena. From a constructivist perspective, the findings presented in this thesis are understood as co-constructed through the interaction between the researchers, participants, and the clinical context in which the study was conducted. By making this perspective explicit, we aimed to enhance reflexivity, transparency, and credibility of the analysis, while providing a rich and contextually grounded understanding of IntraPC in clinical practice.

My personal background as a geriatrician provided invaluable insights into both the clinical context and postgraduate training, which informed the data collection and analysis. During my time as a PhD candidate, I underwent a professional development across clinical, educational, and research domains. At the beginning of this journey, I was working as a resident in geriatric

medicine, which enabled me to bring a resident's perspective to the data. Over the course of the studies, I completed my postgraduate training and became a supervisor within the studied department. This transition allowed me to reflect on my earlier experiences as a resident while gaining insight into the perspectives and challenges faced by supervisors in workplace learning.

In addition to clinical experience, my teaching and research competencies developed throughout the project, providing both practical and theoretical insights that supported a rigorous and nuanced interpretation of the data. This resulted in a more comprehensive understanding of the findings from clinical, educational, and scientific perspectives.

My experiences and assumptions may have shaped my sensitivity to specific aspects of IntraPC, such as complexity, uncertainty, and interdependence. As a result, certain patterns in the data may have been foregrounded, while others may have received less attention.

Furthermore, my presence as a researcher may have influenced participants' behavior and the way they articulated their experiences, particularly when discussing sensitive topics such as uncertainty. As I became a clinical supervisor during the study, my role as a frontline observer was intentionally reduced to prevent residents from feeling psychologically unsafe and to minimize the potential impact of the data collection on residents' authentic behavior.

In line with a constructivist approach, reflexivity was treated as an ongoing and integral part of the research process. Regular discussions within the research team, which consisted of clinicians, a psychologist, educationalists, and educational researchers, enabled critical examination of emerging interpretations and helped to challenge implicit assumptions. All team members shared a strong interest in understanding teaching, learning, working and collaboration in postgraduate clinical training and held multiple roles within patient care, research, and education.

This interdisciplinary composition was central to the research process. We frequently exchanged perspectives, explicitly discussed differences in our approaches to data collection and analysis, and reflected on how our positionalities as both professionals and researchers shaped the research process. These ongoing reflexive practices contributed to a rigorous and comprehensive analysis of the complex, multidimensional nature of IntraPC and learning in the clinical workplace.

## IMPLICATIONS FOR FUTURE RESEARCH

The findings of this thesis open several avenues for future research. Firstly, while participants often mentioned increasing time for interactions is key to improve IntraPC, our findings indicate that the presence of everyday interactions alone is insufficient to ensure meaningful

engagement with different specialties' perspectives. This suggests that increasing the frequency of interaction alone is unlikely to improve IntraPC unless accompanied by changes in how these interactions are understood and used for reflection and coordination. Future research could instead examine how such interactions can be leveraged or adapted to foster more substantive exchanges, focusing on the conditions and practices that enable participants to move beyond surface-level contact toward more coordination and integration across medical specialties. Engeström's Change Laboratory methodology may offer a promising approach in this regard, as it is specifically designed to support participants in collectively identifying, analyzing, and working through tensions in their everyday work practices(1).

Second, this thesis demonstrates that the organization of care and workplace learning are closely intertwined. Future research is therefore needed to explore how changes in care organization and workplace learning can be aligned and developed concurrently, enabling these processes to reinforce one another instead of being treated as separate initiatives.

Third, the findings of this thesis underscore the central role of supervisors in shaping how residents engage with complexity, uncertainty, and IntraPC. Future research could therefore focus on the exploration of the role of uncertainty in IntraPC. Additionally, studies could explore the development and evaluation of targeted faculty development initiatives that support supervisors in acquiring the competencies of care system guides. In particular, research could explore how supervisors can be supported in moving beyond performance-oriented supervision towards approaches that actively engage with uncertainty, facilitate reflection, and make IntraPC an explicit and legitimate topic of discussion. The insights generated in this thesis, particularly regarding role modelling and care system guidance, may serve as a foundation for designing and evaluating such interventions.



Fourth, this thesis introduced the use of collective evaluation methods, such as the Effects Forum, to explore longer-term learning effects of workplace-based interventions. Future research could explore how such collective evaluation approaches can be implemented on a larger scale and how they might be integrated more systematically within (postgraduate) medical education. This includes exploring how collective evaluation can contribute to continuous professional development within clinical teams and in teaching contexts, and how it can be embedded within existing educational structures and quality improvement processes.

Finally, future research could further examine the transferability across IntraPC learning and IPECP. While this thesis focused specifically on IntraPC learning, the findings suggest that many of the challenges observed, such as unclear roles, fragmented team structures, and coordination difficulties, are likely to become even more complex when multiple professional groups are involved. Future studies could therefore explore how learning approaches that address

collaboration among physicians may connect with broader efforts to support collaboration across professional boundaries.

These implications for research call for a shift from studying IntraPC as a competency within medical education and instrumental process of input-output towards understanding how IntraPC and IntraPC learning is shaped, simplified, and sometimes undermined by the very systems and practices in which it is embedded.

## IMPLICATIONS FOR PRACTICE

The findings of this thesis suggest that improving IntraPC and IntraPC learning in clinical practice requires interventions at multiple, interconnected levels. Rather than focusing solely on individual competencies, meaningful change depends on aligning the organization of care, the legitimacy of collaboration as a topic for reflection, and the ways in which learning is facilitated in everyday clinical practice.

First, improving IntraPC requires attention to how clinical work is organized. Current structures often reinforce fragmentation by separating specialties physically, organizationally, and culturally. To support more integrated and coordinated IntraPC, organizations should create conditions that enable repeated, meaningful interactions across specialties. This may include increasing physical and organizational proximity, integrating collaborative practices into care pathways, and reducing administrative burdens that limit opportunities for interaction. Such structural changes are essential to move from siloed practices towards more coordinated and synergistic care.

Second, IntraPC needs to be recognized as a legitimate and integral part of clinical work, rather than as a self-evident or additional task. As demonstrated in this thesis, collaboration is often perceived as routine and therefore not requiring explicit attention, which limits opportunities for reflection and learning. Clinical environments should therefore create space for explicitly discussing collaboration, such as during morning report, handovers, and RSDs. During these discussions, residents and supervisors may reflect on how decisions are aligned across specialties, how responsibilities are negotiated, and how care is coordinated for complex patients. Making IntraPC visible as a topic of dialogue is a crucial step towards improving both practice and learning.

Third, current educational practices in RSDs in postgraduate training often emphasize efficiency, closure, and the progression towards independent practice through entrustment. While autonomy is essential, an exclusive focus on performance and rapid decision-making

may discourage engagement with uncertainty and limit opportunities for reflection. Workplace learning could be strengthened by incorporating efficient, strategic exploratory and reflective discussions on IntraPC in RSDs, particularly around complex or ambiguous situations. This includes acknowledging uncertainty, discussing interdependencies across specialties, and engaging with tensions that arise in collaborative care. Such an approach may support the development of IntraPC competencies and enable residents to better navigate the complexity inherent to IntraPC.

Finally, supervisors play a crucial role in shaping how IntraPC is enacted and learned in clinical practice. As shown in this thesis, supervisory practices can either reinforce task-oriented, siloed approaches or promote more collaborative and reflective ways of working. Supporting supervisors in adopting a more explicit role as care system guides and role models of lifelong learning is therefore essential. This includes modeling how to engage with uncertainty, actively reflecting on collaboration, and making visible how decisions are made across specialties. Additionally, through the supervisor inviting residents for more reciprocal forms of feedback may enhance psychological safety and encourage more open discussions about collaboration and complexity.

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# CHAPTER 7

## Dutch Summary (Nederlandse samenvatting)

De maatschappij verandert door dubbele vergrijzing. Het aantal ouderen toe en ouderen leven ook langer. Deze groep wordt gekenmerkt door toenemende multimorbiditeit: het gelijktijdig voorkomen van meerdere chronische aandoeningen. Ons zorgsysteem heeft hierop gereageerd met vergaande specialisatie, waarbij voor iedere aandoening specifieke zorgprofessionals beschikbaar zijn. Dit leidt ertoe dat bij één oudere patiënt een veelvoud aan zorgprofessionals betrokken kunnen zijn. Goede samenwerking tussen de betrokken professionals is essentieel om tot gecoördineerde en geïntegreerde zorg te komen. Uit onderzoek blijkt dat onvoldoende samenwerking leidt tot een verhoogd risico op negatieve uitkomsten voor zowel patiënt als zorgprofessional. Daarom is het bevorderen van effectieve samenwerking al geruime tijd een belangrijk onderzoeksgebied.

In de literatuur wordt onderscheid gemaakt tussen:

- Interprofessioneel samenwerken(IPS): zorgprofessionals van verschillende disciplines, zoals verpleegkundigen met artsen en paramedici, werken samen binnen één persoonsgericht behandelplan.
- Intraprofessioneel samenwerken(IntraPS): zorgprofessionals binnen één discipline met verschillende specialisaties, zoals geriaters met huisartsen en chirurgen, werken samen binnen één persoonsgericht behandelplan.

Eerdere onderzoeken laten zien dat het leren van IPS en IntraPS niet vanzelf gaat. Er wordt daarom opgeroepen om hier al tijdens de opleiding expliciet aandacht aan te besteden. Hoewel de literatuur over leren IPS de afgelopen jaren sterk is gegroeid, blijft de kennis over leren IntraPS echter beperkt.

De praktijk toont dat er verschillen zijn tussen IPS en IntraPS. In intraprofessionele teams zijn rollen en taakverdelingen vaak implicieter, en is regievoering vaker onderwerp van discussie dan in interprofessionele teams. Dit roept de vraag op in hoeverre inzichten uit interprofessioneel leren samenwerken toepasbaar zijn op intraprofessionele contexten. Daarom richt dit proefschrift zich specifiek op intraprofessioneel leren samenwerken.

In **hoofdstuk 1** introduceren we het centrale thema van dit proefschrift en beschrijven we relevante inzichten uit literatuur ten aanzien van intraprofessioneel leren samenwerken.

Leren IntraPS vindt veelal plaats tijdens werkplekleren. Werkplekleren is leren door deel te nemen aan de dagelijkse praktijk. Werkplekleren wordt gekenmerkt door een sterke contextafhankelijkheid, waarbij leeruitkomsten en leermechanismen worden beïnvloed door de omgeving waarin geleerd wordt. Dit benadrukt dat context-specifieke kennis over hoe

leren IntraPS op de werkplek plaatsvindt, kan bijdragen aan het ontwikkelen van effectieve werkprocessen die leren IntraPS faciliteren.

Tijdens het werkplekleren vindt leren IntraPS plaats tijdens interacties tussen arts in opleiding tot specialist (AIOS) en supervisor en/of tussen AIOS van verschillende specialismes.

- Leren tijdens interacties tussen AIOS en supervisor. Dit wordt ook wel gesuperviseerd werkplekleren genoemd en kan bijv. gebeuren door gesuperviseerde deelname aan de praktijk, wederzijdse observaties of gesprekken tijdens deelname aan de praktijk.
- Leren tijdens directe interacties tussen AIOS. Hierin wordt beschreven dat AIOS zich aan de grenzen van klinische praktijken bevinden en dat interacties rondom die grens een sterk leerpotentiaal hebben. Dit wordt beschreven in de theory van 'Boundary Crossing' (grensoverstijging) die vier verschillende leermechanismen onderscheidt:
    - Identificatie: inzicht krijgen in de rollen, taken en verantwoordelijkheden van de collega aan de andere kant van de grens
    - Coördinatie: Inzicht krijgen in de processen die de grens overstijgen.
    - Reflectie: Het andere perspectief kunnen innemen en evalueren hoe beide kanten elkaar beïnvloeden.
    - Transformatie: gezamenlijk een nieuwe praktijk creëeren

      Deze leermechanismen kunnen behulpzaam zijn in het verkennen, ontwerpen en evalueren van leerkansen en opbrengsten tijdens deze interacties tussen artsen met verschillende specialismes.



In eerdere onderzoeken zijn kansen voor leren IntraPS geïdentificeerd, zijn competenties geformuleerd en zijn ontwerpprincipes voor IntraPS leeractiviteiten ontwikkeld. Hoe deze kansen, competenties en ontwerpprincipes vertaald kunnen worden naar concrete werkprocessen en leeractiviteiten, is echter nog niet onderzocht. In de studies beschreven in **hoofdstuk 2 t/m 5** gingen we daarom op zoek naar manieren om leren IntraPS vorm te geven in de dagelijkse praktijk.

In **hoofdstuk 2 en 3** beschrijven we de ontwikkeling, implementatie en evaluatie van de werkplekleermodule Transmuraal Intraprofessioneel Leren Samenwerken (TILS, internationaal SPICE). Deze module richt zich op arts-assistenten uit eerste- en tweedelijns vervolgopleidingen die gezamenlijk stagelopen op de afdeling geriatrie van het Radboudumc.

**Hoofdstuk 2** bevat een ontwerp-gericht onderzoek (design based research) waarin, in nauwe samenwerking met onderzoekers, onderwijskundigen en zorgprofessionals uit eerste en tweedelijn, TILS werd ontwikkeld. Dit resulteerde in twee werkplekleeractiviteiten en vier formele leeractiviteiten. Via iteratieve cycli van ontwerp, implementatie en evaluatie werd

onderzocht in hoeverre de activiteiten uitvoerbaar waren, welke aanpassingen nodig waren en wat de leeropbrengsten waren.

Hieruit bleek dat voor succesvolle implementatie de leeractiviteiten zo veel mogelijk moeten aansluiten bij bestaande onderwijsmomenten, dat er voldoende aandacht moet zijn voor het patiëntperspectief, dat werkplekleeractiviteiten stevig ingebed moeten zijn in de dagelijkse praktijk en dat betrokkenheid van supervisoren essentieel is. Met name de laatste twee aspecten vragen nog extra aandacht.

In de evaluatie onderzochten we leeropbrengsten en onderliggende leermechanismen, waarbij we *boundary crossing* gebruikten als theoretische lens. Deelnemende arts-assistenten gaven aan dat zij belangrijke momenten van transmurale samenwerking beter herkenden, dat eerste- en tweedelijns arts-assistenten elkaar beter leerden begrijpen en dat zij hun handelen meer op elkaar wilden afstemmen. Deze leeropbrengsten leken vooral samen te hangen met identificatie, coördinatie en reflectie, terwijl transformatie nog beperkt zichtbaar was.

In **hoofdstuk 3** onderzochten we de langere termijn effecten van TILS op het gedrag van AIOS en de klinische praktijk. Hiervoor maakten we gebruik van een innovatieve evaluatiemethode uit het sociale domein: het Effectenplein. In het Effectenplein worden alle belanghebbenden gezamenlijk uitgenodigd om te reflecteren op de effecten van een interventie, waarbij focusgroep interviews worden gecombineerd met tijdlijnanalyse en co-constructie van kennis.

Voor deze studie nodigden we arts-assistenten uit die minimaal een half jaar eerder TILS hadden gevolgd, evenals supervisoren en patiënten die tijdens de stage betrokken waren geweest bij de zorg. Gezamenlijk creëerden de deelnemers een tijdlijn met momenten die zij waardevol vonden voor het leren IntraPS. Hierop stonden de TILS interventies, maar ook dagelijkse gesprekken tussen eerste- en tweedelijns artsen en ook gesprekken met collega's op hun volgende werkplek.

De belangrijkste opbrengsten konden worden samengevat in drie thema's: inzicht in het zorgcontinuüm, verbeterd wederzijds begrip en een 'olievlek-effect' van IntraPS leren. Het inzicht in het zorgcontinuüm leidde ertoe dat arts-assistenten vaker actiever overdroegen tussen eerste en tweede lijn. Het verbeterde wederzijdse begrip leidde tot de intentie om het werk beter op elkaar af te stemmen.

Het 'olievlek-effect' hield in dat arts-assistenten op nieuwe werkplekken bleven reflecteren op samenwerking en nieuwe gesprekken gericht op leren IntraPS aangingen met collega's. Tegelijkertijd gaven deelnemers aan dat de nieuwe werkplek context niet altijd faciliterend was om deze inzichten toe te passen, wat nieuwe uitdagingen met zich meebracht.

In **hoofdstuk 4** richtten we ons op de het leren IntraPS binnen gesuperviseerd werkplekleren. Eerdere studies lieten zien dat arts-assistenten kansen zien om leren IntraPS te integreren in supervisiegesprekken, terwijl supervisoren twijfelen aan de noodzaak van leren IntraPS of zich onzeker voelen over hoe zij dit kunnen vormgeven.

In een etnografische studie observeerden we supervisiegesprekken en onderzochten we in hoeverre en op welke manier leren IntraPS daarin voorkwam. Ook bekeken we welke aspecten dit leren belemmerden of bevorderden. Na iedere observatie werden de betrokken AIOS en supervisor los van elkaar geïnterviewd. Daarin verkenden we hoe ze dit supervisiemoment hadden ervaren, of zij leren IntraPS hadden ervaren in dit moment en wat leeropbrengsten waren. Na afloop van de observaties en interviews, werden de resultaat voorgelegd aan focusgroepen met AIOS en supervisoren.

We vonden dat in allerdaagse gesprekken tussen AIOS en supervisor frequent kansen waren voor leren IntraPS, zoals wanneer er een taak voor een ander specialisme werd geformuleerd, wanneer er gereflecteerd werd op hun eigen rol in het zorgnetwerk van de patiënt of wanneer er (impliciet) een oordeel werd geuit over een ander specialisme.

Deze leerkansen werden niet altijd benut. Dit leek samen te hangen met verschillende dynamieken tussen AIOS en supervisor, namelijk ervaren tijdsdruk, een monitoringsfocus, een mismatch tussen feedbackintentie en interpretatie, en een dilemma tussen toevertrouwen en leren.



De ervaren tijdsdruk maakten dat AIOS andere aspecten in de supervisie prioriteerden boven leren IntraPS. Echter bij het vergelijken van gesprekken waarin IntraPS leerkansen wel of niet werd benut, werd geen verschil in duur gezien.

In de gesprekken tussen AIOS en supervisor lag de focus op het monitoren van de medisch technische inhoud van het patiëntencontact. Medisch technisch leren werd geprioriteerd boven leren IntraPS. Feedback gericht op leren IntraPS, werd soms foutief geïnterpreteerd als feedback gericht op medisch technisch handelen of communicatie tussen arts en patiënt. Hierdoor gingen uitkomsten gericht op IntraPS soms verloren.

In het thema dilemma tussen toevertrouwen en leren werd gezien dat er binnen het opleidingscontinuum geen optimaal moment wordt ervaren voor leren IntraPS. Supervisoren gaven aan dat jongerejaars AIOS nog te druk zijn met de medisch inhoud voor leren IntraPS. Aan de andere kant gaven ouderejaars arts-assistenten aan dat ze samenwerken een basisvaardigheid vonden die ze al moesten beheersen en waar ze hun supervisor niet mee willen ‘lastigvallen’.

**Hoofdstuk 5** beschrijft een etnografisch onderzoek naar leren IntraPS op de spoedeisende hulp. In de acute zorg is effectief samenwerken van belang om in korte tijd tot een passend behandelplan te komen. Bij multimorbide ouderen met complexe zorgvragen, is in de acute zorg vaak gelijktijdig de expertise nodig van meerdere medisch specialisten. Oudere patiënten die komen met een heupfractuur zijn hiervan een voorbeeld. De spoedeisende hulp als werkplek biedt echter uitdagingen voor samenwerking, waaronder het feit dat teams samenstellingen voor iedere patiënt totaal anders kunnen zijn en dat een team eigenlijk bijna nooit meer in exact dezelfde samenstelling opnieuw samenkomt.

We observeerden interacties tussen AIOS en supervisoren in de acute zorg voor heupfractuur patiënten. Ook keken we naar hoe er geleerd wordt tijdens deze interacties. Deze observaties werden gevolgd door veldinterviews met geobserveerde AIOS en supervisoren. Na de observaties en veldinterviews werden overkoepelende thema's en opvallende observaties besproken in focusgroepen met AIOS en supervisoren.

Hierin zagen we hoe de complexe spoedeisende hulp context het samenwerken en samen leren beïnvloedde. Er loopt een veelvoud aan zorgprofessionals rond die elkaar niet kent en elkaar vaak niet konden vinden. Er werd onder hoge druk gewerkt voor meerdere patiënten tegelijkertijd, die vaak ook complexe problematiek hadden. Vaak ontbrak regievoering, waardoor taken dubbel of niet uitgevoerd werden. Ook viel een silo mentaliteit op waarbij AIOS gericht waren op het efficiënt uitvoeren van de taken passend bij hun eigen specialisme. Bovendien observeerden we een hiërarchische feedback cultuur, waarin feedback vooral binnen specialismes van supervisor naar AIOS naar coassistent werd gegeven.

Supervisoren waren vaak slechts op afstand betrokken en vaak niet bewust van hoe interacties tussen AIOS daadwerkelijk verliepen. Initieel werden door deelnemers vooral logistieke oplossingen aangedragen, maar een systeemaanpak lijkt aangewezen waarbij oog is voor de combinatie aan contextfactoren binnen de IntraPS op de spoedeisende hulp.

**Hoofdstuk 6** is de algemene discussie van dit proefschrift waarin we kritisch reflecteren op onze bevindingen, deze in relatie tot de literatuur plaatsen en eventuele implicaties voor verder onderzoek en de praktijk formuleren.

Onze resultaten laten zien dat samenwerking niet vanzelf ontstaat, maar sterk wordt beïnvloed door de organisatie van de zorg en de manier waarop professionals werken en leren. In de zorg voor oudere patiënten blijkt samenwerking vaak gefragmenteerd, doordat artsen primair handelen vanuit hun eigen specialisme. Deze fragmentatie is geen individueel falen, maar een logisch gevolg van hoe zorg en werk georganiseerd zijn.

Dit heeft ook consequenties voor het leren: samenwerking krijgt weinig expliciete aandacht en wordt grotendeels impliciet aangeleerd. Omdat de huidige werkwijze gekenmerkt wordt door beperkte integratie en coördinatie tussen specialismen, kan niet verwacht worden dat arts-assistenten vanzelf leren IntraPS.

Tegelijkertijd lijkt een focus op formeel leren op zichzelf onvoldoende. Hoewel formele leeractiviteiten het bewustzijn en inzicht in het belang van intraprofessioneel samenwerken vergroten, blijkt het in de praktijk moeilijk om deze inzichten toe te passen binnen een organisatie die samenwerking en gezamenlijk leren structureel belemmert.

IntraPS in de zorgpraktijk vraagt om een bredere benadering. Door dagelijkse interacties expliciet te benaderen als momenten van boundary crossing, door samenwerking te begrijpen als een proces binnen een complex adaptief systeem, en door meer ruimte te creëren voor leren, bijvoorbeeld door naast de inhoud van de zorg ook te kijken naar het proces en de rol van de supervisor te herdefiniëren als 'gids' in het zorglandschap, kan worden bijgedragen aan meer gecoördineerde en geïntegreerde zorg voor multimorbide ouderen.



# CHAPTER 8

## Appendices

## Chapter 2: appendix 1: First draft of SPICE learning activities

| Title | Learning activities |
|---|---|
| **Formal learning activities** | |
| Kick Off | A meeting to introduce SPICE and get to know each other and each other's specialty background. Ice breaking exercises are used to create a safe environment for IntraPC learning, such as:<br>Two truths one lie about your specialty: residents discuss which of three statements about their specialty is false.<br>The prejudice game: residents discuss what are common prejudices about their specialty and reflect on the effect of prejudice on IntraPC<br>Describing each other's workday: SC residents try to describe the workday of the PC residents and vice versa.<br>The imaginary line: residents rank their specialty according to statements such as 'other physicians are familiar with what my specialty's responsibilities are'.<br>The activity ends with reflection on how the newly acquired knowledge of each specialty could impact IntraPC with this specialty. |
| Rich Pictures | Residents are asked to prepare a drawing on a topic related to IntraPC between PC and SC. Topics could include:<br>'What is your most/least successful PC/SC collaboration'<br>'What is important for PC/SC IntraPC'<br><br>Each drawing is then discussed during the formal learning activity. If participants cannot explain a drawing, the other participants try to describe the drawing through the following steps:<br>What is depicted in the drawing?<br>What is the coherence between the elements of the drawing?<br>What did the drawer try to tell us through this drawing?<br>Then the drawer can clarify his/her drawing. The group discusses how the insights provided by the drawing may translate to their own collaborative behaviour. |
| Patient Journey | A PC and SC resident prepare a presentation about a patient one of them has seen during their recent clinical work. Instead of focusing on the medical context of this patient, they describe the journey the patient has made through PC and SC with to questions like:<br>What moments of collaboration between physicians have occurred?<br>How did these physicians collaborate, through letters, over the phone etc.?<br>Was the collaboration sufficient or could this have been improved?<br>What can be learned about IntraPC from this patient journey?<br><br>The session ends with the residents' reflecting on their own collaborative practice and formulating what they aim to improve in their collaborative behaviour. |
| Supervisors training | Firstly, a member of the design group provides an introductory presentation on the different formal and informal SPICE learning activities for PC and SC supervisors. Secondly, the PC and SC supervisors familiarize themselves with the topic of IntraPC between PC and SC through a session of Rich Pictures for PC and SC supervisors. |

| **Informal individual workplace learning activities** | |
|---|---|
| Joint consultation in secondary care | A PC and an SC resident will see a patient together. Afterwards, the PC and SC residents discuss the similarities and differences between their consultation styles:<br>What did they learn from the consultation?<br>Would the treatment plan made by SC be helpful for PC?<br>What would have happened if this consultation had occurred in PC?<br><br>The residents formulate how they aim to improve their own consultation with these new insights. |
| Referral phone | A PC and SC residents are responsible for the referral phone today. All phone calls will be answered by the residents, under the supervision of the attending SC supervisor.<br><br>At the end of the day, the residents discuss the phone calls they have had:<br>Was the PC physician's referral question clear?<br>Did the answers provided by the residents in SC help the referring PC physicians?<br>What would you have done if you had been the referring PC physician?<br><br>The session ends with the residents' reflecting on their own collaborative practice and formulating what they aim to improve in their collaborative behaviour. |
| Dialogue with primary care | When the resident encounters a dialogue with a PC resident or supervisor during their clinical practice, as during a hospital discharge handover, the resident ends the conversation with evaluative questions explicitly discussing the handover. These questions may be:<br>How did you experience this handover?<br>Is the treatment we discussed feasible in PC?<br>What may I improve on in my handover skills?<br>What do you need from SC during a handover?<br><br>The resident reflects on this dialogue with their daily supervisor. What did you learn from this discussion? What do you intent do change in your collaborative behaviour? |
| Joint consultation in primary care | An SC resident visits PC and works together with PC physicians in their daily practice to get to know the PC context.<br><br>At the end of the day, the SC resident discusses the similarities and differences between their consultation styles with the PC supervisor or resident at the visiting location:<br>What did they learn from the consultation?<br>Would the treatment plan made by SC be helpful for PC?<br>What would have happened if this consultation had occurred in PC?<br><br>The SC resident formulates how they aim to improve their own consultation with these new insights. |

## Chapter 2: appendix 2: Context of Dutch healthcare professionals

| | |
|---|---|
| General practitioner (GP) | Doctor 'working in the frontline of a healthcare system, taking the initial steps to provide care for any health problem(s) that patients may have […] including prevention, diagnosis, cure, care, and palliation. |
| Elderly care physician | Doctor working in long-term care for elderly people and chronic patients, mostly in a nursing home. In the Netherlands this is a PC specialty. |
| Geriatric medicine | Doctor working in acute care for frail elderly in a hospital setting. They work includes outpatient consultation as well as inpatient clinical practice. |
| Primary care (PC-setting | The first, community-based medical care. The PC doctors are (amongst others) GPs or elderly care physicians. The gatekeeping role of PC doctors makes them responsible for adequate referral of patients to hospital care. |
| Primary care resident (PC resident) | In this study, PC residents are GP residents and elderly care residents. The postgraduate PC training involves a 3-year competency-based program. The PC residents provide patient care in the PC setting (first and third year). During their second year, PC residents undertake other placements, amongst which is a hospital (6-9 months). |
| Medical specialist | Doctor providing specialist medical care. Mostly offered in hospital settings, where both inpatient and outpatient clinics are combined |
| Secondary care residents (SC residents) | Doctor in training for medical specialist. The postgraduate medical specialist training involves a 4-6-year competency-based programme. The medical specialist residents provide patient care in a hospital, or other secondary care setting (SC). In this study, this includes residents in geriatric and internal medicine |

## Chapter 2: appendix 3: interview guides

### In-Depth interview

***Introduction***

Do you think it is meaningful to learn about intraprofessional collaboration through SPICE?
What is your experience with SPICE?
Do you notice any effect of SPICE on intraprofessional collaboration between primary and secondary care? If yes, what did you see?
What are the effective elements in SPICE? Which activities contribute to learning intraprofessional collaboration between primary and secondary care?
Did you miss anything during SPICE?
Where there any activities that were not effective for learning intraprofessional collaboration?
Do you have any suggestions to improve SPICE?

**For residents**

What did you learn from SPICE?
Did SPICE make you change your intraprofessional collaboration in daily practice? If so, what will you change?

**For Supervisors**

What did residents learn during SPICE activities?
What do you and/or residents intent to change in their intraprofessional collaboration?
Do you observe a change in intraprofessional collaboration between residents before and after SPICE?

SPICE learning activities general questions based on observations
Specific SPICE learning activities
Did you get a chance to read through the SPICE reader before the first learning activity?
What did you think of the SPICE reader?

Teach the Teacher (for supervisors)
Did you prepare yourself with the e-learning before the teach the teacher session? If yes, what did you think of the e-learning and preparation exercise?

What did you think about the teach the teacher learning activity with primary and secondary care educators/supervisors?
Do you have any suggestions how we could improve the teach the teacher?

Kick-off
What is your opinion on the Kick-off?
During this activity, we tried different discussion formats, one of them was 2 truths 1 lie. We tried this with personal topics and specialty related topics. What did you think of this?
Did you feel safe or 'at ease' to be your completely honest self and say what you want during the kick off?
What would you need to feel safer during the kick-off?
Do you have any suggestions on how we could improve the kick off?

Rich Pictures
What is your opinion on Rich Pictures?
Does Rich Pictures contribute to learning intraprofessional collaboration between primary and secondary care?
Rich Pictures consists of three different sessions, two themed on the current way of collaboration and how it can be improved and one on the patient perspective. What do you think about this? Do you have any suggestions on how we could improve Rich Pictures?

Referral telephone
What is your opinion on holding the referral telephone?
Does holding the referral telephone contribute to learning intraprofessional collaboration between primary and secondary care?
Do you have any suggestions on how we could improve holding the referral telephone?

Joint consultation in secondary care
What is your opinion on Joint consultation in secondary care?
Does Joint consultation in secondary care contribute to learning intraprofessional collaboration between primary and secondary care?
Do you have any suggestions on how we could improve Joint consultation in secondary care?

Joint consultation in primary care
What is your opinion on joint consultation in primary care?
Does joint consultation in primary care contribute to learning intraprofessional collaboration between primary and secondary care?
Do you have any suggestions on how we could improve Joint consultation in primary care?

Patient journey
What is your opinion on patient journey?
Does patient journey contribute to learning intraprofessional collaboration between primary and secondary care?

Do you have any suggestions on how we could improve patient journey?

Final questions
At the end of each learning activity we asked to write down your most important learning outcome, what do you think about that?
How can we make sure SPICE alters your way of intraprofessional collaboration between primary and secondary care?
What do you think about the amount of learning activities in SPICE? Is it too much or not enough? Did we miss anything or should we add something?
Do you have any final remarks left?

***Interview guides Focus groups***

**Focus group with residents**

How do you learn for each other during SPICE?
How could SPICE become more incorporated in your daily work at the geriatrics department at Radboudumc?
How can we create a commonly joint practice that includes intraprofessional collaboration?

**Focus group with supervisors**

What do you notice in residents after they've participated in SPICE? What made you think of intraprofessional collaboration between primary and secondary care?
Do you feel like your role as supervisor has changed as a result of SPICE? E.g. do they ask different questions, do they have different expectations of you as a supervisor?
How do you learn from each other during SPICE? How do you learn from residents or colleagues participating in SPICE?
How could SPICE become more incorporated in your daily work at the geriatrics department at Radboudumc?
How can we make sure SPICE improves intraprofessional collaboration of the participating supervisors and residents in their own context?

## *Chapter 3: appendix 1: SPICE program*

### *Aim*

Primary care (PC) and secondary care (SC) residents learn intraprofessional collaboration(IntraPC) together during their co-location at the department of geriatric medicine of the Radboudumc in order to improve their collaborative practice and provide more coordinated and integrated care for frail older adult patients.

### *Design of SPICE*

SPICE was created through Design Based Research by a team of educationalists, researchers, residents and supervisors, who combined IntraPC competencies and design principles (table 1 and 2) with boundary crossing theory (box theoretical background)

Each activity uses boundary activities between PC and SC, such as referral or hospital discharge, boundary objects, such as letters or phone calls, or boundary workers, such as PC residents in the patient journey of frail older adults. The formal learning activities are taught every month in a three-month cycle by a teacher with expertise in interdisciplinary education.

### *Curriculum*

SPICE is a 3-6 month program that is taught throughout the entire year, consisting of four formal learning activities and two workplace learning activities (table 3). Residents enter SPICE upon the start of their rotations in geriatric medicine. SPICE takes three to six months depending on the duration of the resident's rotation in geriatric medicine: three months for residents in internal medicine and general practice, and six months for residents in geriatric medicine and elderly care.

Every month, one of the formal learning activities occurs during the regular teaching hours in the workplace. The three activities for residents repeat every three months. Every week, residents are reminded of workplace learning opportunities during SPICE Tuesday.

Before the start of SPICE, supervisors in the geriatric medicine department were introduced to the topic of IntraPC through an introduction for supervisors.

**Box: theoretical background – boundary crossing**

**Theoretical background – Boundary Crossing**

Boundary crossing theory is helpful in understanding IntraPC learning that may occur during PC and SC resident co-locations and can provide insight into how this learning may be improved. This theory describes the learning potential of working across boundaries. In this theory, boundaries are defined as sociocultural differences leading to discontinuity in action and interaction. An example of a boundary with significant learning potential is the PC-SC interface.

Boundary crossing occurs while working with boundary objects, boundary workers and boundary activities.

Boundary objects are physical artifacts that cross the boundary and have meaning on both sides.

Boundary activities are activities that occur around the boundary. In the case of the PC-SC interface,

Boundary workers are people that work across the boundary, 'building bridges' between the two sides.

In the case of the PC-SC interface, boundary objects could be referral or discharge letters, boundary activities are hospital admission or discharge and boundary workers could be PC residents during their SC geriatric medicine rotations.

In boundary crossing, four important learning mechanisms are described:

- In identification, learners gain insight into the roles, responsibilities and tasks involved in working on both their own and the other side of the boundary.
- In coordination, learners gain insight into the communicative connections across the boundary and learn ways to communicate across the boundary.
- In reflection, learners make and take perspectives on the processes of crossing the boundary, to gain a deeper understanding of the interactions taking place on both sides of the boundary.
- In transformation, learners collectively create new strategies for collaboration across the boundary, leading to a new shared collaborative practice

**Table 1: IntraPC competencies**

| Competencies |
| --- |
| Relationship building:<br>With patients and doctors |
| Transparent collaborating:<br>be able to provide clarity on the process of collaboration and on roles and responsibilities of those involved |
| Reflective practising:<br>To be willing to acknowledge mistake, give and receive feedback |

**Table 2: IntraPC design principles and competencies**

| |
|---|
| **Culture** |
| 1. The patient is the starting-point for working and learning |
| 2. Build relations with intraprofessional (primary–secondary care) colleagues |
| 3. Apply the principle that, in a intraPC partnership, we are all different but operate on a basis of equity |
| **Connecting contexts** |
| 4. Facilitate learning together by working together |
| 5. Facilitate the acquisition of knowledge of one another's work contexts and activities to promote good collaboration. |
| **Making the implicit explicit** |
| 6. Collaborate on patients and pay deliberate attention to two-way learning from different perspectives. |
| 7. Purposely discuss intraPC collaboration during daily work activities. |
| 8. Supervisors themselves engage in intraPC as role models. |
| 9. The training team engages explicitly in intraPC with the aim of delivering quality patient care and achieving continuous quality improvement. |
| 10. Bodies responsible for specialty programme goals define intraPC as a competency that *every* doctor should have. |
| 11. Supervisors, teachers and residents work to ensure that every resident knows how to engage in intraPC upon completion of their training. |
| 12. Residents transfer intraPC lessons and apply them in their own work contexts. |

**Table 3 Learning activities**

| Learning activities | Goal | Design principles |
|---|---|---|
| **Formal learning activities** | | |
| Kick Off | A meeting was held during regular teaching hours to introduce SPICE and get to know each other and each other's specialty background. Ice breaking exercises were used to create a safe environment for IntraPC learning, such as:<br>• Two truths one lie about your specialty: residents discussed which of three statements about their specialty was false.<br>• The prejudice game: residents discussed what were common prejudices about their specialty and reflected on the effect of prejudice on IntraPC.<br>• Describing each other's workday: SC residents tried to describe the workday of the PC residents and vice versa.<br>• The imaginary line: residents ranked their specialty according to statements such as 'other physicians are familiar with what my specialty's responsibilities are'.<br><br>The activity ended with reflection on how the newly acquired knowledge about each specialty could impact IntraPC with this specialty. | 0<br>1<br>2<br>3<br>4 |
| Rich Pictures | In this session held during regular teaching hours**,** residents were asked to prepare a drawing on a topic related to IntraPC between PC and SC.<br>Topics could include:<br>'What is your most/least successful PC/SC collaboration'<br>'What is important for PC/SC IntraPC'<br><br>Once every three months, this session is dedicated to the topic:<br>'What is important for a patient regarding PC/SC IntraPC'<br><br>Each drawing was then discussed during the formal learning activity. If participants could not explain a drawing, they tried to describe the drawing through the following steps:<br>4. What is depicted on the drawing?<br>5. What is the coherence between the elements on the drawing?<br>6. What did the drawer try to tell us through this drawing?<br><br>Then the drawer could clarify his/her drawing. The group discussed how the insights provided by the drawing could be translated to their own collaborative behaviour. | 0<br>1<br>2<br>3<br>11 |

| | | |
|---|---|---|
| Patient Journey | In this meeting held during regular teaching hours, a PC and an SC resident prepared a presentation about a patient one of them had seen during their recent clinical work. Instead of focusing on the medical context of this patient, they described the journey this patient had made through PC and SC, using questions like:<br>• What moments of collaboration between physicians have occurred?<br>• How did these physicians collaborate, through letters, over the phone etc.?<br>• Was the collaboration sufficient or could it have been improved?<br>• What can be learned about IntraPC from this patient journey?<br><br>The session ended with the residents reflecting on their own collaborative practice and formulating what they aimed to improve in their collaborative behaviour. | 0<br>3<br>4<br>10<br>11 |
| Introduction for supervisors | Firstly, a member of the design group provided an introductory presentation on the different formal and informal SPICE learning activities for PC and SC supervisors.<br>Secondly, the PC and SC supervisors familiarized themselves with the topic of IntraPC between PC and SC through a Rich Pictures session for supervisors only. | 0<br>3<br>7<br>8<br>9 |
| **Informal individual workplace learning activities** | | |
| SPICE day | Each Tuesday during the morning handover, residents were encouraged to choose one moment in clinical practice in which they would pay dedicated attention to IntraPC. This could include:<br>• Carrying the referral phone<br>• Discussing IntraPC aspects of referral/discharge letters<br>• Partaking in joint consultation between a PC and an SC resident<br>• Performing outpatient consultation triage.<br><br>At the end of the day, residents reflected on these activities with their supervisors. With their new insights, the resident and the supervisor together formulated what they aimed to improve in their collaborative behaviour. | 0<br>1<br>3<br>4<br>5<br>6<br>11 |
| Joint consultation in primary care | SC residents visited PC and worked together with PC physicians in their daily practice to get to know the PC context.<br><br>At the end of the day, the SC residents discussed the similarities and differences between their consultation styles with the PC supervisors or residents at the visiting location:<br>• What did they learn from the consultation?<br>• Would the treatment plan made by SC be helpful for PC?<br>• What would have happened if this consultation had occurred in PC?<br><br>The SC residents formulated how they aimed to improve their own consultation with these new insights. | 0<br>3<br>5<br>6<br>11 |

## Chapter 3: Appendix 2: interview guide

***Welcome everyone,***

***Step 1: Introduction***

We are gathered here for an Effects Forum on the SPICE program. My name is Moderator 1; I am a geriatrician and a PhD candidate in the field of intraprofessional collaboration (IntraPC) learning. I am joined by Moderator 2 and Moderator 3, and we are grateful for your presence and participation in this Effects Forum.

Why are we conducting this Effects Forum? Healthcare is becoming increasingly complex, and collaboration among professionals is more essential than ever. Currently, care is often fragmented, with each professional developing their own treatment plan. For the future, we aim to achieve integrated care across primary and secondary care through intraprofessional collaboration. In such collaboration, all involved physicians jointly develop a shared care plan, with the patient at the center.

The SPICE program is designed to prepare future physicians for this approach. Since February 2021, we have implemented the "Secondary Primary Care Intraprofessional Collaboration Education" module, an educational program on collaboration for medical residents working in the Department of Geriatric Medicine at the Academic hospital XX in XX. This program specifically focuses on collaboration across the boundaries of the hospital, between primary care (PC) and secondary care (SC), for example, between general practitioners and geriatricians.

Today, we are convening an Effects Forum with participants from diverse backgrounds to explore the impact of this program on individual residents or supervisors, on interpersonal relationships, and on healthcare as a whole. We aim to do this by drawing on your experiences and narratives.

The Effects Forum is a method for engaging in dialogue, comparable to a focus group. All opinions and perspectives are welcome; there are no right or wrong answers. Your contributions will be used for a scientific publication; however, all data will be pseudonymized and cannot be traced back to you.

If you agree to participate under these conditions, I kindly ask you to sign the informed consent form and return it to me, or email it to me if you are participating digitally.

### *Step 2: Check-in*

Before we begin, we will start with a brief check-in round. We will use the "popcorn method," meaning you may contribute whenever a thought occurs to you rather than speaking in a fixed order. This round is solely for sharing; we will not respond to each other yet. We will spend approximately five minutes on this.

Before answering, please briefly introduce yourself by stating your name and professional background.

The question is:

"What do you consider important in intraprofessional collaboration across the PC–SC interface?"

### *Step 3: Establishing the Timeline*

Now that everyone has checked in, we will begin the Effects Forum. The aim is to explore moments along a timeline during which you learned about IntraPC.

We will first identify these moments to construct a clear timeline, spanning from the start of your participation in SPICE until now. The predefined SPICE activities have already been placed on the timeline.

We are now interested in experiences that have stayed with you and in which you learned something about collaboration. These can include experiences during structured workplace learning activities (such as "SPICE tuesday" or joint consultation in PC), but also experiences from your personal life, patient encounters, or other relevant situations. There are no right or wrong answers.



### *Step 4: Effects Master and Identifying Effects*

You will receive post-it notes and pens; digital participants have been provided with a link. We will now examine several of these moments in more detail.

If you believe you hear an effect being described, please write it down on a post-it or as a comment on the digital platform. I would like to ask one of you to take on the role of "effects master."

As the effects master, if you identify an effect that you would like to explore further with the group, please signal this to me. We will then discuss collectively whether we indeed consider it an effect. You are also encouraged to ask follow-up questions if you wish to learn more about someone's contribution.

Consensus is not required regarding the content of the effect, but agreement is needed on whether it constitutes an effect. Once the effect is clearly defined, we will write it on a post-it and place it on one of the posters: effects at the individual level, effects on interpersonal relationships, or effects on healthcare delivery. My colleague, Moderator 3, will assist you with this process.

### *Step 6: Prioritizing Moments*

We will now select several of the identified moments for further discussion, following a chronological order. Which moments do you consider most important to prioritize?

### *Step 7: Discussing Timeline Moments*

For each situation:

*Narrative*

What was the situation? Could you briefly describe it?
What was your role in this situation?
What happened? (Probe into context, cognitions, relationships, and system-level factors.)

*Actions*

What did you do, and why?
Who was involved? Do others recognize this situation?

*Effects*

What did you learn from this experience?
What has changed? (Probe into context, cognitions, relationships, and system-level factors.)
How do others perceive this?

### *Step 8: Concluding the Timeline*

We are approaching the conclusion of the session. I would like to ask each of you to write down one effect and place it on one of the posters.
Could you briefly explain the effect you have identified?

### *Step 9: Reflection on the Effects Forum Session*

In the final minutes, we will reflect on what you have learned from this session.
What do you take away from this session?
What will you do differently as a result?

## Chapter 4 Appendix 1: interview guides

### *interview guide in-depth interview*

Thank you for agreeing to participate in this interview. Before we begin, do you consent to the interview being recorded and used for scientific research?
This study aims to investigate how interphysician collaboration learning opportunities may be utilized for workplace learning in the interactions between residents and supervisors. We conducted observations, followed by this interviews to clarify certain aspects of what was observed. There are no right or wrong answers—we are interested in your perspective. Do you have any questions before we start?
Alright, first question: How do you look back on the observed supervision moments?
What was your goal for these supervision sessions?
What is important to you in supervision?
What role does learning interphysician collaboration play in that?
I'd like to discuss a few notable observations with you: [insert observations]
Do you recognize this moment?
How did you experience that moment?
What did you learn from it?
What did you learn about interphysician collaboration from it?
[if needed, insert more observations]

### *Interview guide: focus group*

Good afternoon everyone, and welcome to this focus group for the study on interphysician collaboration learning. In this study we would like to explore with you what opportunities exist for learning interphysician collaboration during workplace learning, and how these opportunities can be better utilized.
Do you agree to participate, with your data being used pseudonymously for a scientific publication? To do so, this session will be recorded—do you also agree to that? If so, could you please sign the informed consent form and hand it in to me?
In this focus group, we are curious about your perspective on the data collected from the observations and interviews. There are no right or wrong answers—we are primarily interested in your point of view. Are there any questions before we begin?
First, the observing researcher will provide an overview of the results.
We conducted 44 observations in which we mapped the learning process during supervision. From this, we identified six themes that complicate intraprofessional learning. These are (see table).
Now that you've heard these themes, what comes to mind? Follow-up probing questions:
Do you recognize these themes? Why or why not?
How do these themes affect you?

What do these themes bring to mind for you?
What could we do to improve collaborative learning, keeping these themes in mind?
What would be needed for that?

| | |
|---|---|
| Dichotomy of Learning and Working | Learning and working are perceived as two separate processes that (often) cannot occur simultaneously. |
| Recognizing and Interacting with Learning Opportunities | There are many opportunities for learning intraprofessional collaboration, but these moments do not always seem to be recognized or utilized. Examples include:<br>A judgment about another specialist is implied through tone of voice or a change in atmosphere by the resident.<br>The resident discusses another specialist's request for help.<br>The supervisor gives the resident the task of contacting another healthcare provider |
| Supervisor Interaction Style | We observed three interaction styles among supervisors:<br>**Passive**: supervision based on questions posed by the resident<br>**Reactive**: the resident takes the lead, while the supervisor probes with follow-up questions<br>**Proactive**: the supervisor takes the lead and shares personal experiences<br>Behavior may vary between individuals and depending on the topic of conversation. Proactive interaction appears to more often lead to learning moments about collaboration. |
| Perception of Shortcomings by Residents | When learning moments are created during supervision, residents may feel that they are "not good enough" as doctors. This feeling appears to increase the longer the supervision lasts. |
| Difference Between Intended and Actual Learning Outcomes | The supervisor creates a learning moment about collaboration, but the resident may take away a completely different lesson. |
| Reflection on Learning and Application in Practice | Even when learning about collaboration occurs, there is not always reflection on how this learning can be translated into new practices. |

## Chapter 5: appendix 1: interview guides

### *Field interviews*

1. Did you collaborate with other actors in the care pathway in the ED?
2. How did you collaborate with these actors?
3. How did you experience the collaboration with the various other parties involved?
4. Why did you collaborate in this way?
5. How did you communicate with the other parties?
6. Were your responsibilities and those of the other parties clear?
7. How could the collaboration be improved?
8. What would you like to learn from or about the various parties involved?
9. How complex did you consider this collaboration?

### *Focus group with supervisors*

*Introduction (17:00–17:05)*

I would like to welcome everyone to the focus group for the LISAH study. My name is Maarten van der Ven, and I am a clinical geriatrician. LISAH stands for Learning Intraprofessional Collaboration in Ad Hoc Team in the Hip Fracture Care Pathway. This study examines how collaboration and collaborative learning take place in the ED within the context of care for elderly patients with hip fractures. The goal is to identify suggestions for improving collaboration and learning, so that a joint treatment plan can be created with a focus on the patient.

In the focus group, there are no right or wrong answers. We are looking for your perspectives. The focus group will be recorded, but the data will be processed using pseudonyms.

In the first phase of the study, we conducted observations and interviews. We would now like to discuss some of the issues emerging from those observations and interviews with you to see whether and how we could improve care for this group of patients.

Do you have any questions before we get started?

I would like to ask you to read the informed consent form and, if you agree, sign it and return it to me.

Let's start with a brief round of introductions. Please state your name and position.

Okay then. Let's now start discussing the observations.

*Question 1 (17:05–17:15)*
In the process of our observations and interviews, supervisors noted that, when caring for patients with hip fractures, they actually work only with their own residents, and not so much with other specialists.

Does this sound familiar to you?

In what sense does this affect the way you work, and why?

Do you see a point for development in this regard and, if so, what would you like to see change?

What would this require?

*Question 2 (17:15–17:25)*
During the observations, in terms of supervisors, it was mainly the emergency room physician who was seen attending and consulting with the various residents involved.

What do you think about that?

In what sense does it influence the manner of working, and why?

How could it be different?

What would this require?

*Question 3 (17:25–17:35)*
We have seen that many moments of consultation between residents take place when residents meet "by chance." They primarily share what they have been doing up to that point. We did not see them take time for such matters as dividing tasks or coordinating responsibilities. The supervisors were not actually involved in this process. So, it seems that everyone has their own ideas concerning what they are going to do, but this is not coordinated in advance. As researchers, this led us to question whether and to what extent it is clear who is in charge.

Does this sound familiar to you?

In what sense does this affect the way you work, and why?

How could it be different?

What would this require?

In the focus group with residents, we noticed that there were differing views on who was in charge, and they felt that it was the job of supervisors or policymakers to address this. What do you think about this?

*Question 4 (17:35–17:45)*
We observed that the physicians involved all made and reported their own policies. For example, we observed that the surgical resident had already discussed an operation, but that Geriatrics then actually wanted to hold a multidisciplinary consultation first.

In another example, there was a case in which the fracture was unclear and a CT scan was needed for a patient with a suspected malignancy. The ED physician said, "Let's do a CT scan of the thorax/abdomen as well." It then turns out that Surgery had already requested a CT scan of the pelvis, and Geriatrics had not yet been informed of the suspected malignancy.

In this regard, the policies that are being drafted still seem to be aligned to only a limited extent.

What do you think about that?
In what sense does this affect the way you work, and why?
How could it be different?
What would this require?

*Question 5 (17:45–17:55)*
We observed that feedback was given between residents. This often concerned such matters as whether to discontinue medication or which IV should be started. We did not actually see any points at which they discussed how consultation should take place. In one of the interviews, a resident indicated that it was very annoying not to know what a colleague had already discussed with the patient. The resident had never given feedback on this, however, and would do so only if the patient's life were in danger.

Does this sound familiar to you as supervisors?
In what sense does this affect the way you work, and why?
How could it be different?
What would this require?

The residents indicated that this would require a change in culture. They think that supervisors play a role in this regard. For example, if some supervisors push for this, it would become contagious. What do you think about this?

*Question 6 (17:55–18:05)*

In one observation, there was a patient with a suspected pathological fracture in the ED. In this case, the surgical resident, the emergency medical resident, and the geriatrics resident each went in turn to consult with oncology independently. The residents had two different oncologists on the line. And then everyone got a slightly different answer. We also observed that patients are examined three times and that medication is checked three times. In another case, a geriatrics specialist was called by three different residents, each of whom picked up a fragment of information.

Many things are thus duplicated by the various residents, and different information arrives at different stakeholders.

What do you think about this?
In what sense does this affect the way you work, and why?
How could it be different?
What would this require?

*Question 7 (18:05–18:15)*

Between interns and residents, we observed that time was taken to reflect on the particular case (e.g., What went well? Why did we do it this way?). This did not happen between residents, however, nor between supervisors. During the observations and interviews, it emerged that there is no time for joint reflection on the work process in the workplace.

What do you think about this?
In what sense does this affect the way you work, and why?
How could it be different?
What would this require?

*Question 8 (18:15–18:25)*

In the aforementioned case, Surgery found the choice very simple — Operate? Yes or no? In contrast, Geriatrics considered the choice quite complex, due to dementia/comorbidities, etc.

In the interviews, we learned that different specialties had different views and perspectives on the complexity of cases.

What do you think about this?
In what sense does this affect the way you work, and why?
How could it be different?
What would this require?

*Wrap-up (18:25–18:30)*
Having heard all this, are there any issues that have not been highlighted yet?

Which of the themes mentioned is the most important, as far as you are concerned? Which should be changed or addressed tomorrow, if not sooner, so to speak?

Thank you for your time and participation.

**Focus group with residents**
*Introduction (17:00–17:05)*
I would like to welcome everyone to the focus group for the LISAH study. My name is Maarten van der Ven, and I am a clinical geriatrician. LISAH stands for Learning Intraprofessional Collaboration in Ad Hoc Team in the Hip Fracture Care Pathway. This study examines how collaboration and collaborative learning take place in the ED within the context of care for elderly patients with hip fractures. The goal is to identify suggestions for improving collaboration and learning, so that a joint treatment plan can be created with a focus on the patient.

In the focus group, there are no right or wrong answers. We are looking for your perspectives. The focus group will be recorded, but the data will be processed using pseudonyms.

In the first phase of the study, we conducted observations and interviews. We would now like to discuss some of the issues emerging from those observations and interviews with you to see whether and how we could improve care for this group of patients.



Do you have any questions before we get started?

I would like to ask you to read the informed consent form and, if you agree, sign it and return it to me.

Let's start with a brief round of introductions. Please state your name and position.

Okay then. Let's now start discussing the observations.

*Question 1 (17:05–17:15)*
We conducted observations and interviews from the time a patient with a suspected hip fracture arrived in the ED until the time the patient left the ED. In doing so, we observed that there are often many different physicians involved with one patient. This includes both many different specialists (e.g., radiology, ED, surgery, orthopedics, cardiology, geriatrics), as well as many different physicians from the same specialty.

What do you think about this?
In what sense does this affect the way you work, and why?
Do you see this as a point for development and, if so, what would you like to see change?

*Question 2 (17:15–17:25)*
During the observations, we noticed that physicians who were jointly caring for one patient were looking for each other, calling, and sometimes coming to the conclusion that they had been sitting next to each other the whole time. It seems that physicians collaborating in the care for the same patient do not know each other.

Does this sound familiar to you?
In what sense does this affect the way you work, and why?
How could it be different?
What would this require?

*Question 3 (17:25–17:35)*
We have seen that many moments of consultation between residents take place when residents meet "by chance." They primarily share what they have been doing up to that point. We did not see them take time for such matters as dividing tasks or coordinating responsibilities. So, it seems that everyone has their own ideas concerning what they are going to do, but this is not coordinated in advance. As researchers, this led us to question whether and to what extent it is clear who is in charge.

Does this sound familiar to you?
In what sense does this affect the way you work, and why?
How could it be different?
What would this require?

*Question 4 (17:35–17:45)*
In one observation, there was a patient with a suspected pathological fracture in the ED. In this case, the surgical resident, the emergency medical resident, and the geriatrics resident each went in turn to consult with oncology independently. The residents had two different oncologists on the line. And then everyone got a slightly different answer. We also observed that patients are examined three times and that medication is checked three times. In another case, a geriatrics specialist was called by three different residents, each of whom picked up a fragment of information.

Many things are thus duplicated by the various residents, and different information arrives at different stakeholders.

What do you think about this?
In what sense does this affect the way you work, and why?
How could it be different?
What would this require?

*Question 5 (17:45–17:55)*
We observed that the physicians involved all made and reported their own policies. For example, we observed that the surgical resident had already discussed an operation, but that Geriatrics then actually wanted to hold a multidisciplinary consultation first.

In another example, there was a case in which the fracture was unclear and a CT scan was needed for a patient with a suspected malignancy. The ED physician said, "Let's do a CT scan of the thorax/abdomen as well." It then turned out that Surgery had already requested a CT scan of the pelvis, and Geriatrics had not yet been informed of the suspected malignancy.

In this regard, the policies that are being drafted still seem to be aligned to only a limited extent.

What do you think about this?
In what sense does this affect the way you work, and why?
How could it be different?
What would this require?

*Question 6 (17:55–18:05)*
In the aforementioned case study, Surgery found the choice very simple — Operate? Yes or no? In contrast, Geriatrics considered the choice quite complex, due to dementia/comorbidities, etc.

In the interviews, we learned that different specialties had different views and perspectives on the complexity of cases.

What do you think about this?
In what sense does this affect the way you work, and why?
How could it be different?
What would this require?

*Question 7 (18:05–18:15)*
During the observations and interviews, it emerged that there is no time for joint reflection on the work process in the workplace. This was observed between interns and residents, but not between residents. For example, a patient is not discussed in an interdisciplinary manner.

What do you think about this?
In what sense does this affect the way you work, and why?
How could it be different?
What would this require?

*Question 8 (18:15–18:25)*
In the interviews, it emerged that it's easy for you to address each other about the medical content — you should start this IV and discontinuer this medication, etc. — but you are not so quick to give each other feedback about how you collaborate (e.g., about when or how consultation takes place, whether the other party has already discussed policy with the patient without consultation, etc.). For example, one resident found it quite awkward that the resident from another specialty came in and took over the conversation and had come to already discuss a policy. But she indicated that she would not be so quick to communicate this to the surgical resident unless it would directly result in harm to the patient.

What do you think about this?
In what sense does this affect the way you work, and why?
How could it be different?
What would this require?

*Wrap-up (18:25–18:30)*
Having heard all these observations, are there any issues that have not been highlighted yet with regard to collaboration aimed at person-centered care in the ED?

Which of the themes/observations that we have discussed today do you consider the most important? Which should best be addressed as soon as possible?

Thank you for your time and participation.

## Chapter 5: Appendix 2: Definitive codebook observations and field interviews

Coding occurred in Dutch, inductive codes were categorized in codes on collaboration and codes on learning.

### SAMENWERKING

#### *Actoren*

- Actor-supervisor
- Actor-arts-assisstent of PA
- Actor-co-assistent
- Actor-patiënt/mantelzorger
- Actor-verpleging

#### *Emotie*

#### *Mooie quote*

#### *Interactie*

- Vorm
  - Telefonisch overleg
  - Fysiek overleg
  - Elkaar toevallig treffen
  - Via een proxy
- Inhoud
  - Hulp aanbieden
  - Medisch inhoudelijk
  - Context patiënt
  - Context bespreken
  - Complexiteit casus
  - LO verrichten
  - DD bespreken
  - Aanvullend onderzoek aanvragen
  - Aanvullend onderzoek bespreken
  - Uitleg over procedure
  - Opties bespreken
  - Medische handeling verrichten
  - Planning maken
  - Doelen stellen
  - Conclusie/Beleid bespreken

- Afwijken van het protocol
- In consult vragen
- Terugkoppeling
- Gevoerd beleid
- Bevindingen
- Beleid samen maken
- Behandelplan opstellen
- Planning maken
- Doelen stellen
- Dubbel werk verrichten
- Complexiteit samenwerking
- Beoogde samenwerking benoemen
- Consulent introduceren
- Samenwerking benoemen
- Delen persoonlijke mening
- Elkaar verbeteren/corrigeren
- Belofte voor ander doen
- Taakverdeling maken

- Belemmerende/bevorderende factoren
  - Bereikbaarheid
  - Logistiek
  - Ervarenheid actor
    - Ingewerkt zijn
  - Het impliciete expliciet maken
  - Elkaar kennen
  - Drukte
  - Tijd hebben
  - Laagdrempeligheid
  - Te veel actoren betrokken
  - Openstaan voor adviezen van anderen
  - Samenwerking supervisor alleen met eigen AA
  - Afstand
  - Samen komen
  - Verwachtingen bespreken
  - Duur
  - Monodisciplinair werken
  - Blinde vlek voor acties van anderen
  - Niet van alle betrokken actoren op de hoogte zijn
  - Vooroordelen hebben

- Eigen verantwoordelijkheden kennen
- Elkaars werkwijze kennen
- Elkaars rol kennen
- Elkaars kracht kennen
- Oneens zijn met elkaars manier van werken
- Transparantie naar elkaar
- Elkaar eerder betrekken
- Moment voor samenwerking afspreken
- Samenwerking achter de schermen in de gaten houden
- Rapportage maken

- In dezelfde ruimte, geen contact
- In dezelfde ruimte, wel contact
- Kenmerken van de ruimte

• Drukte
• Kleine ruimte
• Sfeer

- **Kenmerken actoren**
  - **Ervarenheid**
    - **Nieuw op plek**
    - **Nieuw in rol**
  - **Andere achtergrond/opleiding**

- Interactie is
  - Impliciet
  - Expliciet

***Geen interactie***

- Beleid autonoom maken
- Monodisciplinair werken

***Gevolg van huidige interactie***

- Dubbel werk verrichten
- Beleid autonoom maken
- Blinde vlek voor acties van anderen

***Beweegredenen voor huidige manier van interactie***

- Gewenning
- Geen noodzaak zien voor samenwerking

***Complexiteit (samenwerking/interactie/casus)***

- Complexiteit samenwerking

***Rolverdeling***

- Impliciet
- Expliciet
- Hoofdbehandelaarschap

***Verantwoordelijkheden***

- Leiding nemen

***Taakverdeling***

- Taken op zich nemen
- **Taken geven**
  - **Supervisor geeft opdrachten aan assistent**
  - **Assistent geeft opdrachten aan coassistent**
  - **Supervisor geeft opdrachten aan coassistent**

***Benodigdheden***

- **Telefoonnummers**
- **Juiste interventies**
- **Juiste persoon treffen/bereiken**
- **Elkaar kennen**
- **Elkaars akkoord**

**LEREN**

***Leermoment***

- **Typering van leren**
  - **Moment**
    - **Uitleg geven**
    - **Elkaar toetsen**
    - **Vragen stellen**
    - **Elkaar feedback geven**
    - **Reflectie**
    - **Supervisie**
    - **Kans voor leren**
  - **Leerdoelen stellen/bespreken**

***Belemmerende/bevorderende factoren***

- **Drukte**
- **Geen leerbehoeften**
- **Geen reflectie**

***Leerbehoeften***

**Gemiste kans voor leren**

**Suggesties voor leren**



# SUPPLEMENTARY MATERIALS

**List of abbreviations**
**List of publications**
**Data management statement**
**Curriculum Vita**
**PhD portfolio**
**Dankwoord**

## LIST OF ABBREVIATIONS

IntraPC: Intraprofessional collaboration
IPhC: interphysician collaboration
IPC: interprofessional collaboration
IPECP: InterProfessional Education and Collaborative Practice
PC: Primary Care
SC: Secondary Care
RSD: Resident-Supervisor Dialogue
DBR: Design Based Research
DPrins: Design Principles
ED: emergency department
IPS: interprofessioneel samenwerken
IntraPS: Intraprofessioneel samenwerken

## LIST OF PUBLICATIONS

### Publications within this manuscript

1. van der Ven M et al. The impact of context on interphysician collaboration and learning: A focused ethnography around hip fracture patients in the emergency department. SSM - Qualitative Research in Health. 2025;7:100566

2. van der Ven M. *et al.* 'A ripple effect of learning': evaluating intraprofessional workplace learning in postgraduate medical education through collective evaluation. *BMC Med Educ* (2026). https://doi.org/10.1186/s12909-026-09777-5

3. van der Ven M. et al. 'An Offer You Can't Refuse': Opportunities for Intraprofessional Collaboration Learning in the Workplace. Perspect Med Educ. (2026) DOI: 10.5334/pme.1863

### Other publications

1. van der Ven M et al. [Unplanned readmissions of frail elderly patients: a retrospective analysis of admissions in a teaching hospital]. Ned Tijdschr Geneeskd. 2015;159:A9211.

2. Wijnands I, van der Ven M et al. [Robust care for frail older adults] Socares 2025

## DATA MANAGEMENT STATEMENT

### Ethics and privacy

This research project was conducted in accordance to the Helsinki declaration as well as in accordance with the Dutch Law, in particular concerning General Data Protection Regulation.

The Ethical Review Board of the Netherlands Association of Medical Education (Nederlandse Vereniging voor Medisch Onderwijs) granted approval for the studies described in chapters 2 till 4 (File number 2020.7.3 for chapter 2 and 3 and 2023.5.4 for chapter 4). A statement that the study was not subject to the Dutch Medical Research Involving Human Subjects Act (WMO), was obtained from the recognized Medical Ethics Review Committee 'METC Oost-Nederland' for Chapter 5 (Filenumber: 2022-13470). The CMO Radboudumc granted approval for the studies described in chapter 5 (Filenumber: 2022–13470).

Participants were included in the studies in chapter 2 till 5, which all participated on voluntary basis, and gave written informed consent for publication of their pseudonymized data.

The sensitivity and confidentiality of the raw qualitative data makes sharing of the data without compromising confidentiality and privacy impossible, therefore consent for sharing of the raw data was not asked from the participants.

The pseudonymization key was stored on a secured network drive that was only accessible to members of the project who needed access to it because of their role within the project. The pseudonymization key was stored separately from the research data.

*Data collection and storage*

Data from chapter 2 – 5 were collected through observations, interviews and focus groups involving patients, residents and supervisors. Atlas.ti version 24.0.0 was used to analyze these qualitative data. During data collection and analysis, atlas libraries were stored on a secure drive owned by Radboudumc Department of Geriatric medicine.

After study completion, raw data from chapters 2-5 are archived in their original form in a Data Acquisition Collection (DAC) in the Radboud Data Repository. This raw data includes individual observations fieldnotes and interview and focus groups transcripts. Atlas.ti libraries were stored in the Radboud Documentation Collection (RDC). These secure storage options safeguard the availability, integrity and confidentiality of the data.

## Data sharing

Chapter 3,4 and 5 are published in open access journals. Chapter 2 has been submitted for publication and is currently under review.

The storage of data was guided by the Findable, Accessible, Interoperable and Resusable (FAIR) principles. The data underlying chapter 2-5 are not suitable for reuse because this qualitative data are strongly rooted in the studied context, making the sharing of data restricted by privacy and ethical restrictions. These data will be archived with closed access in DACs and RDCs of the Radboud Data Repository for 10 years after termination of the study.

The table below details where the data and research documentation for each chapter can be found on the Radboud Data Repository (RDR).

| Chapter | RDR - DAC | RDR - RDC | NAME DATA REPOSITORY | License or Data Use Agreement (DUA) |
|---|---|---|---|---|
| 2 | ru.rumc.tils_ t0000939a_dac_579 | ru.rumc.tils_ t0000939a_rdc_491 | Transmuraal Intraprofessioneel Leren Samenwerken | RUMC-RA-DUA-1.0 |
| 3 | ru.rumc.effect_ t0000938a_dac_005 | ru.rumc.effect_ t0000938a_rdc_923 | Evalueren van leren samenwerken | RUMC-RA-DUA-1.0 |
| 4 | ru.rumc.slic_ t0000936a_dac_484 | ru.rumc.slic_ t0000936a_rdc_151 | Intraprofessioneel leren in supervisie | RUMC-RA-DUA-1.0 |
| 5 | ru.rumc.lisah_ t0000937a_dac_267 | ru.rumc.lisah_ t0000937a_rdc_578 | Leren samenwerken op de SEH | RUMC-RA-DUA-1.0 |

## CURRICULUM VITAE

Maarten is geboren op 6 juli 1993 in Eindhoven. Hij ging naar het VWO van het Pleincollege Bisschop Bekkers in Eindhoven. Van 2011 tot 2017 volgde hij de opleiding geneeskunde aan de Radboud Universiteit. Hij begon in 2018 met de medisch vervolgopleiding tot klinisch geriater. Deze rondde hij in 2023 af, waarna hij als klinisch geriater aan de slag ging in het Radboudumc.

Passie voor onderwijs en opleiding loopt als een rode draad door zijn carrière. Zo nam hij tijdens zijn geneeskunde opleiding deel aan verschillende onderwijs gerelateerde activiteiten: hij was lid van het StudentenOrganisatie voor Onderwijs en Studie(SOOS) bestuur binnen de faculteit geneeskunde, hij organiseerde het Landelijk Medisch StudentenOverleg congres, hij was betrokken bij de taakgroep bachelor herziening geneeskunde en hij was lid van de opleidingscommissie geneeskunde. Tijdens zijn vervolgopleiding nam hij deel aan de commissie landelijke kennistoets geriatrie, volgde hij de topclass medisch onderwijs en organiseerde hij een landelijke scholingsdag vanuit de Junior Nederlandse Vereniging voor Klinisch Geriatrie (jNVKG) beroepsvereniging.

Ook in zijn eerste jaren als geriater is hij actief betrokken geweest bij verschillende activiteiten binnen onderwijs en opleiding. Hij was onder andere als docentambassadeur Medisch faculteit betrokken bij het Radboud Universiteit Teaching and Learning Centre (TLC) en gastdocent Geriatrie voor de Hogeschool Arnhem Nijmegen(HAN) bij de opleiding tot Physician Assistant (PA).

Tijdens zijn opleiding tot klinisch geriater ontstond ook de kans om een wetenschappelijke weg in te slaan in zijn ambitie binnen medisch onderwijs en opleiden. Vanuit de onderzoekslijn gericht op Intraprofessioneel leren samenwerken kon hij zijn opleiding combineren met parttime onderzoek doen wat leidde tot het huidige proefschrift.

Na afronding van zijn proefschrift wil hij zich richten op een verdere ontwikkeling als klinisch geriater bij de afdeling geriatrie in het Radboudumc en als docent en onderzoeker binnen het medisch onderwijs en opleiden.

## PHD PORTFOLIO

Department: **Geriatrie**
PhD period: 01**/01/2021 01/08/2026**
PhD Supervisor(s): **Prof. dr. C. Fluit, Prof. dr. W. Kuijer-Siebelink**
PhD Co-supervisor(s): **Dr. N. Looman**

| Training activities | Hours |
|---|---|
| **Courses** | |
| Radboudumc - eBROK course | 42,00 |
| Kwalitatief interviewen | 16,00 |
| Radboudumc - Scientific integrity | 20,00 |
| RU - Writing Scientific Articles | 96,00 |
| introductiecursus kwalitatief onderzoek in de gezondheidszorg | 16,00 |
| Kwalitatieve analyse | 16,00 |
| Radboudumc - In the lead - Radboudumc introduction for PhD candidates | 12,00 |
| RU - Effective Writing Strategies | 75,00 |
| Subtotal | 293,00 |
| **Seminars** | |
| RHA research community | 27,00 |
| Subtotal | 27,00 |
| **Conferences** | |
| Geriatriedagen (2023) | 8,00 |
| MMV congres (2023) (two workshops) | 8,00 |
| Geriatriedagen (2024) (poster presentation) | 16,00 |
| NVMO congres (2024) (oral communication) | 16,00 |
| EUGMS (2024) (poster presentation) | 24,00 |
| MMV congres (2024) | 8,00 |
| Geriatriedagen (2025) | 8,00 |
| Onderwijsdagen (2025) (organisation) | 50,00 |
| NVMO congres (2025) (workshop) | 16,00 |
| AMEE (2025) (symposium) | 24,00 |
| Onderwijsdagen (2026) (organisation and workshop) | 50,00 |
| Geriatriedagen (2026) (workshop) | 8,00 |
| NVMO congres (2026) | 16,00 |
| Subtotal | 252,00 |

| | |
|---|---|
| **Teaching** | |
| Gastdocent Hogeschool Arnhem Nijmegen | 60,00 |
| Subtotal | 60,00 |
| **Supervision** | |
| Supervision research rotation resident geriatric medicine | 90,00 |
| Supervision research rotation resident geriatric medicine | 90,00 |
| Supervision research internship medical student | 90,00 |
| Subtotal | 270,00 |
| Other | |
| Radboudumc - General Radboudumc introduction for research personnel | 9,00 |
| Subtotal | 9,00 |
| | |
| **Total** | **911,00** |

## DANKWOORD

Dan is het nu tijd om de honing uit de kast te pakken. Dit proefschrift was er niet geweest zonder de steun van de mensen om me heen. Met de onderstaande tekst wil ik dan ook graag de mensen bedanken die me hebben bijgestaan in de reis die ik maakte bij het schrijven van dit proefschrift.

Allereerst wil ik graag mijn **begeleidingsteam** bedanken.

Beste Lia, jouw passie voor het leren op de werkplek was een enorme drijfveer voor mij om met dit proefschrift echt de praktijk te gaan veranderen. Onderweg heb ik ondertussen erg genoten van jouw wijsheden die me op weg hielpen. Deze wijsheden zullen me dan ook mijn hele carrière bijblijven. 'Kill your darlings', 'Leren is niet altijd leuk' en 'we zijn weer tot een hoger niveau van verwarring gekomen' zijn een greep uit jouw gevleugelde uitspraken die me altijd weer een stapje verder konden helpen. Maar de allerbelangrijkste is toch wel: 'Werken is leren'. Ondanks de ogenschijnlijke eenvoud van deze wijsheid, heeft het in mijn denkpatronen een tijdje gekost om helemaal te doorgronden. Nu is het een soort mantra in mijn werkwijze waardoor ik mijn leven lang kan blijven leren van jou. Het was een genoegen om nog te mogen behoren tot de groep promovendi die je tot de eindstreep bleef begeleiden ondanks je pensioen. Ook de winterse barbecues in jullie mooie tuin zijn een onvergetelijke herinnering aan dit traject. Tot slot ook hartelijk dank voor al je steun in uitdagende tijden, waarin jij als gids ons naar een passende afloop kon begeleiden.

Beste Wietske, jouw methodologische, analytische en kritische blik was onmisbaar in mijn team. Je kon precies de vinger op de zere plek leggen, zowel in het wetenschappelijke werk als binnen mijn ontwikkeling als onderzoeker. Je hebt me hiermee geholpen om mijn horizon te verbreden en ruimte te maken voor de leeraspecten van een promotieonderzoek. Waar ik als lerende praktijkprofessional begon, heb je mij de onderzoekersbril aangereikt, was je een moreel kompas en nam je mij mee op sleeptouw op congressen, scholingen en bij vergaderingen in de breedste zin van je praktijk. Hopelijk scheiden onze wegen nog niet en gaan we samen nog mooie vervolgstudies uitvoeren.

Beste Natasja, jij ging mij voor als onderzoeker naar intraprofessioneel leren en hebt de weg voor mij gebaand binnen de organisatie en binnen het onderzoek. Jij kon zowel praktische tips geven uit jouw promotieonderzoek als je perspectief als psycholoog delen. Vooral ook jouw vaardigheden binnen het verzamelen van data met interviews en focusgroepen heb ik als zeer waardevol ervaren. Je scherpe oog voor machtsdynamieken was van grote waarde tijdens de data analyse van de verschillende hoofdstukken. Hopelijk blijven wij goed interprofessioneel samenwerken, ook na de verdediging van dit proefschrift.

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In deze periode heb ik een tweetal **mentoren** mogen hebben. Indira Tendolkar, dank voor je bijdrage als mentor en later als afdelingshoofd ad interim van onze afdeling. Ook dank aan Philip van Eijndhoven, die in het staartje van dit traject is ingesprongen om als mentor bereikbaar te zijn.

Dan wil ik graag de **co-auteurs** van de verschillende studies bedanken.

Dieneke, daar onze wegen inmiddels gescheiden zijn, was jij als opleider en collega een bijzonder figuur voor mij. Zonder jouw visie en passie was dit proefschrift er niet geweest. Ik wens je veel wijsheid in de nieuwe uitdagingen die nu op je pad komen.

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**De afdeling geriatrie**

Beste collega-geriaters, arts assistenten, secretariaat, afdelingsleiding, onderzoekers, verpleegkundig specialisten en physician assistants! Hartelijk dank voor de prettige samenwerking die wij afgelopen tijd hebben gehad. Hierin hebben we als groep mooie ontwikkelingen doorlopen en komen we steeds weer een stapje verder. Ieder van ons heeft een warm hart voor de oudere patiënt, een neusje voor passende zorg en een groot rechtvaardigheidsgevoel. Naast collega's waren jullie in veel van mijn onderzoeken ook de participanten. Hartelijk dank dat ik in jullie drukke agenda's mocht inbreken voor interviews, focusgroepen en observaties. Ik heb in deze periode als clinicus, opleider, docent en onderzoeker dan ook veel van jullie mogen leren.

**De promovendi en senior onderzoekers van het Radboud Health Academy RLE en aanhangers**

Haai lieve collega's! Hartelijk dank dat ik afgelopen jaren ook lid heb mogen zijn van jullie team. Daarin had ik een duidelijke rol: de stress-prinses. Op 106 hebben we veel gelachen, gehuild, geschreeuwd en van elkaar geleerd. Jullie boden mij inhoudelijke verdieping én luchtigheid in tijden waar het omhoog houden van alle ballen veel van mij vroeg. Hopelijk mag ik komende jaren meegenieten van de verschillende mooie onderzoeken waar jullie mee bezig zijn. Wellicht kunnen we in de toekomst ook samen verdere onderzoeken gaan uitvoeren.

**Collega's bij het Radboud Teaching and Learning Centre**

Lieve kernteamleden en collega-docentambassadeurs! Hartelijk dank voor de bijzondere gesprekken die ik met jullie heb mogen hebben, de ontwikkeling die ik bij jullie heb mogen doormaken en de mooie dingen die we samen hebben gemaakt. In het bijzonder hartelijk dank aan de commissie Onderwijsdagen, waar ik vanuit de verschillende onderwijsinstellingen van Nijmegen mocht leren hoe hoger onderwijs er in de praktijk aan toe gaat.

**Collega's uit de opleiding geriatrie**

Tijdens mijn opleiding en nadien heb ik veel steun gehad aan mijn intervisieclubje: Lies, Mahlet, Madelon, Moniek, Fleur en Enya. Als jonge ambitieuze geriaters vormden we direct een mooi clubje waar we veel hadden aan het uitwisselen van verhalen (lees vooral ook het uitwisselen van frustraties). Ieder van ons heeft haar eigen uitdagingen gehad afgelopen jaren, maar is toch blijven strijden. Wij vertegenwoordigen op een mooie manier dat geriaters niet saai, suf en grijs zijn, maar kleurrijk, bevlogen en inspirerend. Keep spreading the word!

Dan was ik hier niet geweest zonder mijn lieve vrienden.

Lieve **No gezelligheidsname 3.0.1** (de getallen zijn een essentieel onderdeel): Marielle, Noortje, Kars, Lieke, Chloe, Lonneke en Christina. We hebben elkaar tijdens de introductie van de studie geneeskunde ontmoet. Inmiddels zijn we allemaal andere kanten op gevlogen, maar blijven we een hechte club. Aan de mensen die zich in onze buurt begeven hebben afgelopen jaren, excuses voor de gehoorschade. Wij zijn een stelletje (stress)kipjes bij elkaar en ik geniet van ieder chaotisch moment met jullie. Dank voor het aanhoren van mijn drama, dank voor het delen van jullie drama, dank voor de gezellige etentjes, weekendjes, uitjes, en dank voor het schilderen van ons huis (een gelegenheid waar mijn schoonvader nog frequent over te horen is). Ik kijk al uit naar onze volgende bizarre film avond.

Dan mijn lieve **vrienden uit de master geneeskunde**: Michelle, Sascha, Maaike, Joey en Mathijs. Daar we begonnen als feestende 20-ers, zijn we inmiddels toch wel erg burgerlijke 30-ers geworden afgelopen tijd. Het is fijn om in de waan van de dag in onze drukke banen,

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## Dan natuurlijk nog mijn lieve familie en schoonfamilie

**Schoonfamilie**, ik voel me bijzonder gelukkig dat ik als Brabo zo snel mocht inburgeren in Twente. Daar ik af en toe nog moeite heb het Twents goed te verstaan, kunnen we elkaar vinden in het bourgondische leven. Dank voor alle warmte die jullie bieden en zoals ik zo mooi van jullie heb geleerd: dit proefschrift 'Pakt de paling in'.

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