Evaluating Clinical Trainees in the Workplace.
On Supervision, Trust and the Role of Competency Committees

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ISBN 9789039363591
Published by Universiteit Utrecht/Utrecht University
Printing: Ridderprint BV, the Netherlands

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Beoordelen van trainees in de klinische werkplaats.
Over supervisie, vertrouwen en de rol van competentiecommissies

(met een samenvatting in het Nederlands)

PROEFSCHRIFT

ter verkrijging van de graad van doctor aan de Universiteit Utrecht
op gezag van de rector magnificus, prof. dr. G.J. van der Zwaan,
ingevolge het besluit van het college voor promoties
in het openbaar te verdedigen op
donderdag 10 september 2015 des ochtends te 10.30 uur

door

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CHAPTER 1

INTRODUCTION

Overview of introduction

This thesis asserts the argument that medical educators must understand trust as an essential element of trainee supervision in the workplace in order to use entrustment to align supervision with trainees' learning needs and prepare them for eventual unsupervised practice. The thesis begins with a review of the literature describing the importance of competence development and also the challenges that have arisen for competency based medical education. This work is grounded in theoretical frameworks including social cognitive theory, the framework of workplace learning, theories about motivation, and theories of group decision-making. Definitions of trust, entrustment, and entrustable professional activities are followed by a review of key literature examining the concept of trust as a strategy for supervision and assessment in medical education. This work herein describes how trust can be operationalized at the level of an individual supervisor working with an individual trainee, or by a program determining its trainees' competence for promotion or advancement to unsupervised practice. This background then prompts the broad research questions that inform the work of this thesis. A statement of the problem for medical educators seeking to ensure that their assessments capture the readiness of their trainees to provide safe, high quality patient care is followed by the specific research questions the investigations in this thesis set out to answer. Brief descriptions of each study in the thesis provide a preview of the chapters that will follow.

Importance of competence development

The medical education community has embraced the concept of competency-based medical education (CMBE) as a framework for ensuring that medical education achieves its aims of training practitioners who will provide high quality patient care.[1] CMBE shifts the focus from what is taught and learned after a given period of time in training, as was the emphasis in the era of objectives-based curricula, to what trainees learn and can do. Therefore, CBME is learner-centered and can allow learners to progress at their own

rate, independent of fixed time schedules, through training. Multiple competency-based frameworks have been proposed to outline the range of knowledge, skills and attitudes that physicians should demonstrate.[2–4] Competencies are described in more detail using milestones, which describe differences between the learners at different developmental levels. Milestones ideally can be used to guide learning and help faculty observe desired learner behaviors and assess them relative to a standard.

Challenges with CBME

Despite the promise of CBME, challenges have arisen in the implementation of this educational framework.[5] Lists of competencies and milestones are designed to capture the range of knowledge, attitudes and skills that learners should possess and be able to demonstrate. As such, the multiple competencies, each with multiple milestones that describe the competency at different developmental levels, become long and potentially unwieldy. This situation, sometimes termed “reductionism,” can prompt assessment procedures that become logistically challenging.[6,7] Strategies to assess competencies consisting of checklists detailing behaviors that together constitute a competency are designed with noble intentions. However, these checklists may be difficult for evaluators due to time pressure or lack of understanding of the original construct, which was the competency to be assessed.

Another challenge with competency-based assessment arises from the deconstruction of performance into component competencies. Although competencies are intended to, as a whole, describe a physician in practice, such as ‘Tomorrow’s Doctor’,[3] the deconstruction of competencies into component parts represents a view of clinical performance that does not align with actual physician activities, which incorporate multiple competencies simultaneously. Consequently, educators and clinical teachers can conclude that competencies and milestones are not aligned with their actual clinical practice, or what doctors actually do in patient care.[8] For example, a

physician's communication with a patient often requires that the physician possess and apply medical knowledge, enact particular communication strategies, and incorporate professionalism in the interaction. One cannot assume that the sum of performance on discrete activities captures overall performance in practice, which is influenced by context and shaped by trainees' motivations, attitudes and prior experiences.[9,10] Decontextualized assessment activities may motivate learners to prioritize preparation for 'tests' rather than prioritizing integration of their skills in service to authentic clinical practice. Therefore, the deconstruction of competence into multiple component competencies and milestones differs from the way that physicians conduct practice. It also differs from the way that supervisors view and assess the performance of their trainees.[11]

This deconstruction of competence can also drive a focus on psychometric aspects of assessment at the expense of a focus on the desired construct to be measured. The desired construct is the provision of safe, high quality patient care in the complex, dynamic clinical environment. Psychometrically sound rating tools are accompanied by strong evidence of validity. This evidence can be amassed through multiple ratings of discrete aspects of performance using standardized tools. Assessment in medical education that aspires toward the psychometric goal of reliability may achieve this aim partly by controlling contextual factors and idiosyncrasy in judgment, and focusing narrowly on measurement of knowledge or skill. This restriction has prompted the proliferation of discrete assessments such as multiple-choice examinations of knowledge and checklist ratings of skills performing particular procedures or interacting with standardized patients. Whether these assessments validly assess stated competencies has been questioned.[12,13] Even simulations and comprehensive standardized patient examinations fail to capture the authenticity and complexity of events encountered during training.[14,15] Assessments that capture performance in practice are critical to ensuring clinical competence.

Theoretical frameworks

The studies in this thesis were informed by theoretical frameworks that guided the approach to understanding trust and articulating the research questions proposed in this introduction. In order to understand a concept such as trust, and how entrustment it influences supervision, learner development, and clinical practice, it is essential to not only to observe supervisors and trainees, or to explore their experiences through interviews or observations, but also to build on frameworks that shed light on why certain phenomena occur in medical education.[16] The theoretical frameworks described in this section informed the work of this series of studies. They did so by capturing and helping explain key aspects of a supervisor's trust in a trainee. Importantly, sociocultural theory addresses the fact that trust is situated within a relationship between supervisor and trainee within a complex and dynamic clinical environment. Components of Bandura's seminal work on the social cognitive theory of learning are relevant: observation, modeling and cognitive processing; behavior; and the environment. Billett's studies of workplace learning, followed by work by Dornan, explicate how learning occurs as individuals enter a workplace, receive guidance from more experienced participants in that workplace, and become members of that working culture and community.

To understand competence, it is essential to consider the context in which it develops, which for medical learners in the clinical workplace. Competence develops and manifests in a social environment. Learning occurs as learners construct new knowledge and make sense of the world around them.[17] For medical learners, then, clinical competence develops in the context in which clinical practice occurs. Constructivists describe how knowledge is constructed in social context, which is the hallmark of sociocultural theory. This theory grew out of behaviorism, which describes how learning occurs as a result of observation and role modeling. Learning also occurs through the process of receiving and incorporating feedback and observing the response

to one's own actions in a social environment. According to social learning theory, learners observe others to create a mental model of a behavior that can be recalled and applied later. In this way, thoughts are an intermediary between a stimulus and a response as the individual thinks about the environment, makes observations, and sets goals. Bandura extended the concept of social learning by emphasizing three critical elements contributing to learning--cognitive processing,behavior, and the environment-- the tenets of social cognitive theory.[18] In practice, a clinical learner plans and anticipates (cognitive), acts (behavior) and reflects upon behaviors (cognitive and metacognitive), all in a dynamic, social, interactive environment with role models, norms, values and culture. In clinical learning, trainees will learn through observing physicians, modeling their behaviors, forming their own understanding of how the behavior is performed, and reflecting on the outcomes of their own performance.

Workplace learning can be viewed as a framework that describes how learning occurs in workplaces. This process differs from classroom-based learning in multiple important ways. Billett studied learning in the workplace across a range of work types and identified two factors that determined how readily and fully learners could participate in those workplaces in order to advance their learning.[19] Workplace affordances describe the ways that the work environment enables participation through the availability of tasks for a learner and the invitational qualities for the learner to take on those tasks. For example, a supervisor who encourages participation, provides guidance and support as needed, and reinforces key learning points is enabling learning. The complementary ingredient for successful workplace learning is learner engagement. The learner in turn must actively participate, and must bring the knowledge, attitudes and social skills necessary for a high level of engagement. Building on these concepts, Dornan developed a model of 'experience based learning' that characterizes the aspects of the context in which clinical learning occurs, the process of learning, and the outcomes that characterize emerging clinical competence.[20] The learning context must enable the learner to interact meaningfully with other providers and patients. Clear learning objectives must be articulated to guide the design of learning

activities. Supported participation describes the ways that supervisors can enable learners to participate in activities appropriate for their knowledge and skills at a point in time. Successful learning would entail both clinical competence and the trainee's progressive development as a confident professional with a strong professional identity.[21]

The literature on the development of expertise emphasizes the role of the supervisor as a critical element. Deliberate practice as a process of achieving mastery entails repetition over hours and years under the guidance of a skillful coach.[22] The role of the coach includes repetitive observation of performance, identification of small and specific areas for improvement, provision of feedback, and repeated observation. The coach must understand the learner's current abilities to select the activities most useful for additional learning.

The concept of the zone of proximal development captures the way that a supervisor identifies learning activities appropriate for individual learners. Vygotsky defined the zone of proximal development as the distance between what the learner can do alone and what the learner can do with the help of a more experienced supervisor or coach characterizes an ideal situation for learning to occur.[23] A learner who practices an activity within this zone and receives feedback to correct any error or omissions may accomplish this activity. Afterward, the learner can complete this activity independently and move on to new, more advanced tasks. In this way, the zone of proximal development shifts as a learner develops expertise. The role of the supervisor is to observe and assess the learner continually to identify current knowledge and skills as well as gaps. The supervisor can then assign activities that address those gaps and provide continued guidance toward mastery. The cognitive apprenticeship typifies this approach to structuring learning experiences; the supervisor sequences learning activities to present increasing challenge to the learner and guides the learner toward greater understanding of how the knowledge and skills gained can be applied in other settings.[24]

Taken together, the theoretical frameworks for this series of studies emphasize the need to examine trust as a social phenomenon, based in the relationship between supervisor and trainee and continuously influenced by contextual factors in the clinical workplace. This information informs the conceptual framework that ties together the studies described in the Chapters in this thesis. The concept of trust from a variety of perspectives is the conceptual framework guided the design of the literature review aimed at building new theory about the factors contributing to trust, as described in Chapter 2 of this thesis. In addition, in studies designed to enhance understanding of how trust develops and guides clinical supervision, the theoretical background informed a conceptual understanding of trust that helped to articulate the questions we asked and the approaches we implemented to use begin to operationalize assessment based on trust.

Trust

Informed by this conceptual background, the studies in this thesis examine how *trust* can be used to guide clinical supervision and facilitate learners' development in the clinical workplace. In order for learning to occur in a clinical context, learners must be allowed to participate. However, in the context of clinical practice, learning, teaching and supervision occur as patient care is provided. Thus, the patient represents an added dimension to the typical work or teaching environment in which the learner and supervisor interact. The supervisor is responsible not only for ensuring that the trainee learns and develops competence, but also that the patient receives high quality, safe patient care. For clinical learners to be able to participate actively at the leading edge of their competence, their supervisors must be comfortable affording them some responsibility for patient care. Trust is the key barrier or enabler of this participation.

- **Trust** comprises a belief or confidence that someone will do something effectively or behave in a certain way.

- To **entrust** is "to give someone the responsibility of doing something or of caring for someone or something."[25]

To make an **entrustment decision** in medical education, the supervisor considers information from multiple observations and other sources of evidence to anticipate future performance. Trust and entrustment decisions differ from traditional assessment and offer a new way of considering the validity of workplace assessment. Assessment typically reports on prior performance, with supervisors retrospectively considering trainees' performance and discerning a series of ratings, often with a summary global rating.[26,27] Entrustment articulates whether the trainee meets expected performance standards and also implies a calculated risk and expression of optimism about performance in future, potentially unfamiliar situations.

Because trust for clinical activities is established in the workplace, entrustment can naturally evolve in the context of workplace based assessment. Norcini describes workplace based assessment by explaining that "an assessment of the work of doctors must be based on their responses to the patients they see."[28] Whereas traditional assessment typically prioritizes standardization, objectivity, and psychometric precision,[29] often in rigorously controlled testing environment, entrustment embraces expert judgment of a professional familiar with the trainee's work in practice. Given that clinical practice is not standardized, both because patients have unique differences and because relevant medical knowledge rapidly evolves, the classical condition for reliability, being reproducibility, may be misaligned. Assessments that solicit reports of what trainees have done in the past are common. In contrast, an entrustment decision represents a forward looking assessment, predicting what the trainee will do in the future.

Understanding trust and how it is established therefore becomes essential. Trusting learners to perform independently requires new approaches to workplace-based assessment that occurs while clinical trainees assume authentic roles in clinical work.[20,30] Just as "performance in practice" involves real-life challenges that cannot be fully anticipated or controlled, assessment

should occur in the dynamic clinical environment to approximate the goal of representing how individuals would behave when unobserved.[31,32]

Entrustment decisions can themselves empower and motivate trainees. The act of trusting a trainee can elicit the desired trainee behaviors and attitudes.[33–35] A judgment about trustworthiness provides formative assessment when coupled with targeted feedback about next steps in professional development. Entrustment facilitates learning by identifying the maximum responsibilities that the trainee can assume at given points of training. By continually specifying qualifications for tasks that comprise independent practice, entrustment maximizes supervised independence while also guarding patient safety. Earned responsibility for tasks important within the workplace grants trainees a meaningful clinical role – thereby operationalizing legitimate peripheral participation as part of workplace learning.[36] Learners develop into functioning members of a workplace through performance of tasks that are increasingly central to the functioning of the workplace overall. In addition to serving the learner, an entrustment decision can instill confidence in the evaluator, patient, and other health providers about the trainee's fitness to perform activities with subsequent patients. In making the entrustment decision, the evaluator relinquishes some responsibility for future patients to the trainee, while retaining a degree of responsibility for patients' outcomes.[37]

Individual teachers and the medical education community as a whole debate how much supervision learners need both to support their own learning and to ensure that patients receive high quality care. Supervisors often perceive a tension between the trust they want to have in their learners to allow for development of competence and the supervision they feel obligated to provide.[38] External mandates about expected amounts of supervision and billing requirements tied to the amount of supervision can obstruct supervisors' implementation of supervision tailored to learners' needs. Mandating high amounts of supervision may not improve current patients' care, and could even jeopardize future patient's care if learners do not experience the autonomy prerequisite for them to gain necessary decision-making skills.[39] As

a result, despite these external forces, educators continue to seek supervisory strategies and definitions that incorporate learners' needs and abilities.[40] For example, Babbott described how supervisors reconcile this tension by "watching closely at a distance" in order to adjust their supervision to the learners' needs and abilities.[41]

Focus on trust and entrustable professional activities in medical education

Motivated by the ongoing need for valid strategies for assessing clinical competence and providing supervision tailored to learners' developmental needs, medical educators have sought solutions to the limitations of CBME. Any solutions must be informed by theories of learning to ensure that assessment reflects the way that learners develop expertise in the clinical workplace. With these potential opportunities for and also challenges with using trust as a guiding approach to supervision of medical learners, researchers have studied the concept with supervisors and learners.

Factors that contribute to a supervisor's trust in a trainee have been described in the literature. Ten Cate and Scheele proposed four factors that would contribute to supervisors' entrustment of their learners: the activity, the working environment, the trainee, and the supervisor.[42] A subsequent focus group study with obstetrics and gynecology supervisors and trainees in the Netherlands revealed that these four factors influenced supervisors' impressions of trainee competence and also the degree of independence afforded the trainees.[43] In addition to competence, self-efficacy was also identified as important for a competent trainee to be able to act independently.[18,43] Sterkenburg surveyed anesthesiologist supervisor and resident trainees regarding what tasks they each felt the trainees should be entrusted to do unsupervised.[44] Their results revealed differences among supervisors, and also between supervisor and trainees. They found that trainees were allowed to perform activities without supervision earlier than those trainees felt qualified to do so and beyond what (the same) supervisors

on average found justified for their level of training. However, later in training, trainees felt they were held back from doing activities unsupervised; i.e. that they could do more than what their supervisors found justified.

The **entrustable professional activity (EPA)** allows for an assessment strategy based on trust. Ten Cate proposed EPAs in 2005 as a framework for assessment of clinical learners that focuses on learners' performance of actual clinical work, not just their competence in a testing situation or their performance of components of a clinical task.[45] An EPA is an essential work activity performed by a professional that requires specific knowledge, skills and attitudes, and results in work that can be observed, measured, and judged. The EPA framework complements CBME because an EPA requires that the clinician incorporate multiple competencies within a single work activity.

Interest in EPAs has grown steadily since the concept was introduced in 2005 EPAs are now the basis for assessment in varied training programs internationally at multiple learner levels. EPAs are the cornerstone of assessment in psychiatry training in Australia and New Zealand and a physicians assistant training program in neurology in the Netherlands.[46,47] In the United States, the Association of American Medical Colleges has defined thirteen Core Entrustable Professional Activities for Entering Residency as the core activities for which medical students should have demonstrated proficiency prior to entering graduate medical training, regardless of intended specialty practice.[48] In multiple specialties of graduate medical education in the United States, specialty boards and other medical educators have defined EPAs for their disciplines using expert opinion and consensus decision-making processes.[49–51]

Entrustment decisions at the group level

In addition to the judgments of entrustment made by individual supervisors, judgments are made by groups at the level of a program regarding which

trainees are competent to advance to the next training level. In graduate medical education, a clinical competency committee performs the function of interpreting performance information to determine a trainee's trustworthiness to advance to the next level of training with increasing scope of unsupervised practice. Responsibilities of a residency clinical competency committee include monitoring resident performance, recommending advancement or remediation where needed, rendering appropriate disciplinary decisions, and providing feedback to learners.[52] Importantly, using a combination of evidence gathered from multiple sources, the committee members make a determination about the trainee's competence for unsupervised practice. The synthesis of information about a trainee's performance into a recommendation for advancement should constitute a judgment to trust the trainee to perform clinical work independently unsupervised, with future patients.[53]

Group decision-making can yield different decisions than individual decision-making, and in some cases, better, more well-reasoned decisions.[54] In the medical education literature, group evaluation of student performance can improve alignment of narrative comments with clerkship grades,[55] yield better characterization of changes in learner performance over time,[56] and increase detection of problematic performance and patterns of performance.[57–61]

From a theoretical perspective, Functional Theory explains small group communication by focusing on the procedures groups follow to achieve rational decision-making, and the outcomes of group decision-making. An organization's (or committee's) structure and process must align with its purpose, and the procedures that groups follow to review and synthesize evidence influence their outcomes.[62,63] Structure includes the participants, how often they meet, and how members are selected, whereas process addresses how a committee reviews evidence, discusses judgments, and weights decision options. The process by which a group makes decisions will vary but should support the task and include input from all members. For instance, the decision-making process may be consensus, majority rule, or group input to a leader who makes the decision. Clearly articulated expectations help ensure that group members understand decision making

criteria, the process to achieve decisions, and the implications for their goals as a committee.[63] With its reliance on rules and procedures, Functional Theory suggests that effective decisions are most likely to result when groups understand the nature of the decision and the alternatives available. Clear expectations and effective leadership also guide group members to appropriate levels of participation, rather than some members dominating discussions, and can help mitigate biases. The effectiveness of group decision-making can be evaluated normatively by comparing the group's procedures to standards for expected rules and procedures based on this theoretical background.

Group decision-making can also introduce biases. An individual bias held by a group member can influence other members to succumb to the same bias.[64,65] Confirmation bias describes the tendency to prefer to both share and receive information that others in the group already know, and individuals are perceived as more knowledgeable when sharing information already known to group members.[66] Groups may coalesce prematurely around decisions that align with individual members' previously held positions or with opinions held by the most powerful members, particularly under stressful conditions of time pressure or high workload.[67] Groupthink occurs when the decision-making process values maintaining harmony within a group but overrides realistic appraisal of all courses of action.[68] The extensive literature on jury decision-making exemplifies study of small group functioning. Elaborating on the structure and process framework, Devine identifies four influences on jury decision making (a) procedural characteristics (instructions given to jury, degree of agreement required for a verdict, number of jurors serving on the jury, acceptable behavior by the jury, set of verdict options, manner and sequence in which courtroom events take place); (b) participant characteristics (diversity, personality, attitudes/values, experience); (c) case characteristics (defendant, strength of evidence, pretrial publicity, expert testimony) and (d) deliberation characteristics (initial verdict preferences, deliberation structure).[69] Research on simulated and actual jury decision-making supports the influence of jury procedural characteristics on the decisions they render. For instance, the deliberations that juries undertake may be take different forms, including

the “evidence-driven” approach of reviewing evidence and collaboratively constructing a story that brings together the evidence, or the “verdict-driven” approach of starting with a vote, followed by discussion of evidence supporting the votes jury members rendered.[70] The evidence-driven approach engenders less disagreement but requires more time to yield a consensus verdict. With more perceived time pressure, a jury, or other group, may yield to an early majority vote; and even when such a vote is followed by deliberations, the final decision usually adheres to the initial vote.[70] In contrast, clearly articulated expectations for the group, and clear understanding of the instructions by group members, yields better decisions less influenced by individual group members’ biases.[71] Juries have some analogies competence committees, by the nature of their charge to make a decision about an individual’s future with a high level of accountability, there are also differences. Competency committees comprise individuals who work together over time as part of their professional activity, and who may personally know the trainees about whom they are rendering judgments.

Social psychology literature explores how group decision-making can yield decisions that differ form individual’s decisions. Individuals are often convened in a group because they bring different pieces of information. When this information is shared, the group can use all available information to render a decision. However, if the group process does not promote sharing of unshared information, groups can defer to the initial information that already known to all group members, or defer to the most powerful members. Without sufficient sharing of information, groups may also tend to find that individual members adhere to their original positions.[67]

In summary, the medical education literature has begun to explain how trust can be used to guide clinical supervisors’ behaviors as they guide their learners to develop essential knowledge and skills on the path toward independent practice. The literature to date suggests that nature and amount of trust between a supervisor and trainee, or between a program and a trainee, resonates with medical educators as aligning with the ways that they make decisions about trainees’ readiness for certain responsibilities.

Therefore, trust appears to be a promising area for further research, with critical unanswered questions. There is a need to understand more fully how trust has been conceptualized and operationalized across disciplines, and how this information can inform medical education. Greater understanding of how supervisors make decisions to trust, or not to trust, their trainees with certain clinical responsibilities, and the factors that influence those decisions, can provide medical educators with the information needed to design training programs based on trust. This design would help ensure that trainees receive the amount of supervision they need to provide safe, high quality patient care, without constraining their learning through excessive supervision. At the program level, greater understanding of how performance information can be synthesized into certifications of readiness for advancement can contribute to current efforts to operationalize group decision-making through clinical competency committees.

Research Questions

The broad research questions that serve as the basis of this work are as follows.

1. What is the nature of trust and how is it understood across disciplines? How do theoretical frameworks inform understanding of the nature and implications of trust in the clinical training environment?
2. What is the experience of trustors (supervisors) and trustees (trainees) with trust?
3. How does the relationship between a supervisor and trainee influence trust formation? What are the critical factors in relationship development that contribute to or impede trust formation?
4. How can training programs develop trust in their trainees to practice with progressively less supervision toward the eventual goal of readiness for unsupervised practice?
5. How can residency training programs use entrustable professional activities to tailor supervision to residents' learning needs and identify activities

that residents can perform without supervision, or with progressively less supervision?

6. What are recommendations to medical educators about how to operationalize supervision based on trust? What types of recommendations can facilitate this aim for the individual supervisor working with a trainee, and also for a program as a whole?

Statement of the Problem

Although the literature has defined contributors to trust, the ways in which trust develops and guides supervision and assessment in clinical education are not well understood. In the face of inexorable assumptions about the need for greater supervision to demonstrate to regulators and the public that current medical care is safe,[39,72] the educational community must respond with the creation of training models that both ensure this aim and also promote future physicians' development of competence. Educational structures that restrain trainees' participation in the name of patient safety may paradoxically jeopardize future patients' care in the hands of new physicians who did not experience the graded autonomy through their training needed for independent practice. Fostering clinical competence is essential to ensuring that these physicians are prepared to provide high quality, safe and effective patient care when they advance to unsupervised practice. Understanding trust can marry the aims of effective patient care and effective training by informing the design of training models grounded in the time-honored apprenticeship model and based on supervisors' identification of learners' abilities and developmental level. In this way, supervision can enable carefully awarded opportunities for autonomy to learners. This thesis describes a series of studies designed to elucidate the process of entrustment at the level of an individual trainee and supervisor, and also at the level of a program determining trust in a trainee to advance to the next stage of training.

Specific research questions

1. What are the conceptualizations of trust in the literature across disciplines? What support is there in the literature across disciplines for the factors identified in medical education research as influencing supervisors' trust in trainees?
2. What are entrustable professional activities that can be used to operationalize supervision based on trust in internal medicine? What is the feasibility of implementing EPAs in graduate medical training?
3. How do individual supervisors understand trust and how does that trust influence their supervision of learners?
4. At the program level, how do educational leaders and clinical competency committees synthesize and interpret trainee performance information to make judgments of readiness for advancement and, ultimately, independent practice?

Overview of studies

The work for this thesis began with a review of the literature on trust to understand the origins of and perspectives on this complex topic. To understand how trust influences supervision requires a firm grasp of the origins and manifestations of trust. Chapter 2 presents a literature review of the conceptions of and perspectives on trust. Literature from a variety of fields including most notably the psychology and business fields, but also basic science, legal criminal justice and medical education and the law, informed this work. Theoretical frameworks that inform clinical learning provided critical conceptual underpinnings to the work. Using a list of four factors identified in the medical education literature as contributors to trust (supervisor, trainee, context and task) we reviewed the literature to explore antecedents and outcomes of trust based on these factors. We also proposed a novel fifth factor as an additional contributor to trust as supported largely by the studies in psychology.

To envision an educational assessment system that incorporates trust as the

basis for supervisory decisions, this work next focused on entrustable professional activities (EPAs). Because EPAs should represent core professional work for physicians, this prompted an effort to identify and implement EPAs in a single field, focusing on internal medicine training. Using national internal medicine milestones, this project, as described in Chapter 2, involved a local Delphi study of internal medicine (IM) educators and residents, with participation from national educational leaders, to identify and prioritize candidate EPAs in internal medicine. Chapter 3 presents the results of this consensus building exercise.

Chapter 4 segues into an application of two identified EPAs within an internal medicine residency. This project describes the development of two EPAs and provides evidence of the feasibility of implementing EPAs as an assessment strategy in a large internal medicine (IM) residency program. Data from both the learner and supervisor perspectives illustrate the potential benefits and challenges of this novel approach to supervision and assessment.

Informed by this literature review and these initial empiric studies, we identified a gap in the literature related to how the factors that contribute to supervisors' trust in trainees interact to foster individual supervisors' development of trust. To understand trust, it became essential to explore how supervisors understand the meaning of trust as they enact supervision based on trust within the workplace. To answer this question, Chapter 5 describes a qualitative study using interviews with internal medicine supervisors at two institutions to query their understandings of the meaning of trust and how they develop trust in their resident physician trainees. This work characterizes the evolution of trust development and highlights barriers and accelerators to trust formation.

Ultimately, residency training programs are accountable for the clinical competence of their trainees and for certifying that those residents are competent upon graduation to proceed to unsupervised, independent practice. In the United States, clinical competency committees are now required infrastructure to operationalize a group decision about each trainee's

trustworthiness for unsupervised practice. In addition, these committees monitor residents' development of competence throughout the training program, and present an opportunity to align learning activities and supervision with trainees' abilities and learning needs. Trust can serve as the key to this alignment. Chapter 6 describes a qualitative study of residency program directors to explore the perceived purposes and outcomes of residency competency committees across specialties. By examining the work of these committees with both struggling and typical residents, this work provides a rich characterization of the challenges clinical competency committees face in gathering, synthesizing and interpreting performance information to make well-informed judgments of resident competence and ensure trustworthiness for advancement to unsupervised practice. Chapter 7 extends this work by using the literature on group decision making to identify potential challenges and biases as well as best practices for clinical competency committees.

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CHAPTER 2

UNDERSTANDING TRUST AS AN ESSENTIAL ELEMENT OF TRAINEE SUPERVISION AND LEARNING IN THE WORKPLACE

PUBLISHED AS:

Hauer KE, Ten Cate O, Boscardin C, Irby DM, Iobst W, O'Sullivan PS. Understanding trust as an essential element of trainee supervision and learning in the workplace. Adv Health Sci Educ Theory Pract. 2014 Aug;19(3):435-56.

Abstract

Clinical supervision requires that supervisors make decisions about how much independence to allow their trainees for patient care tasks. The simultaneous goals of ensuring quality patient care and affording trainees appropriate and progressively greater responsibility require that the supervising physician trusts the trainee. Trust allows the trainee to experience increasing levels of participation and responsibility in the workplace in a way that builds competence for future practice. The factors influencing a supervisor's trust in a trainee are related to the supervisor, trainee, the supervisor-trainee relationship, task, and context. This literature-based overview of these five factors informs design principles for clinical education that support the granting of entrustment. Entrustable professional activities offer promise as an example of a novel supervision and assessment strategy based on trust. Informed by the design principles offered here, entrustment can support supervisors' accountability for the outcomes of training by maintaining focus on future patient care outcomes.

Clinical teachers wrestle daily with how much autonomy to grant trainees for patient care. This challenge stems from the need to ensure quality patient care while also delegating increasing levels of responsibility to learners. One key variable in aligning the goals of patient care and learning is *trust* between the supervising physician and trainee. We argue that trust acts as a gatekeeper to the learner's increasing level of participation and responsibility in the workplace. In this article, we examine the literature on trust and propose a model for how trust modulates clinical participation, learning and autonomy.

For clinical learners to progress, they must earn their supervisors' trust. Learning in the clinical environment occurs through participation, as learners move from novices watching clinical practice to participants assuming limited and then more complex roles in patient care. Understanding trust is essential because meaningful participation in clinical activities requires that trainees be trusted by their supervisors to perform with increasing levels of independence and competence.

Trust entails believing or having confidence in someone or something.[1] To entrust an individual with something is to "assign a responsibility to or put something into someone's care."[2] Trust develops between supervisor and trainee as "an emergent state" influenced by the interactions, context, and situation,[3] as well as individuals' information processing, thoughts, and motivations. Although medicine as a profession historically has valued individual autonomy in service to one's patients,[4,5] clinical training environments necessitate that supervising physicians share and even relinquish some autonomous responsibility to trainees for patient care activities. Entrustment recognizes not only trainees' competence, but also their habits of mind and professional traits that predict how they will behave in future clinical situations.[6] Trainees experience variation in how they are supervised and the amount of trust their supervisors have in them for unsupervised activities.[7,8] Without trust, trainees can be perpetually marginalized to an assisting or observational role and left unprepared for eventual unsupervised practice. Over-trust, which occurs when someone

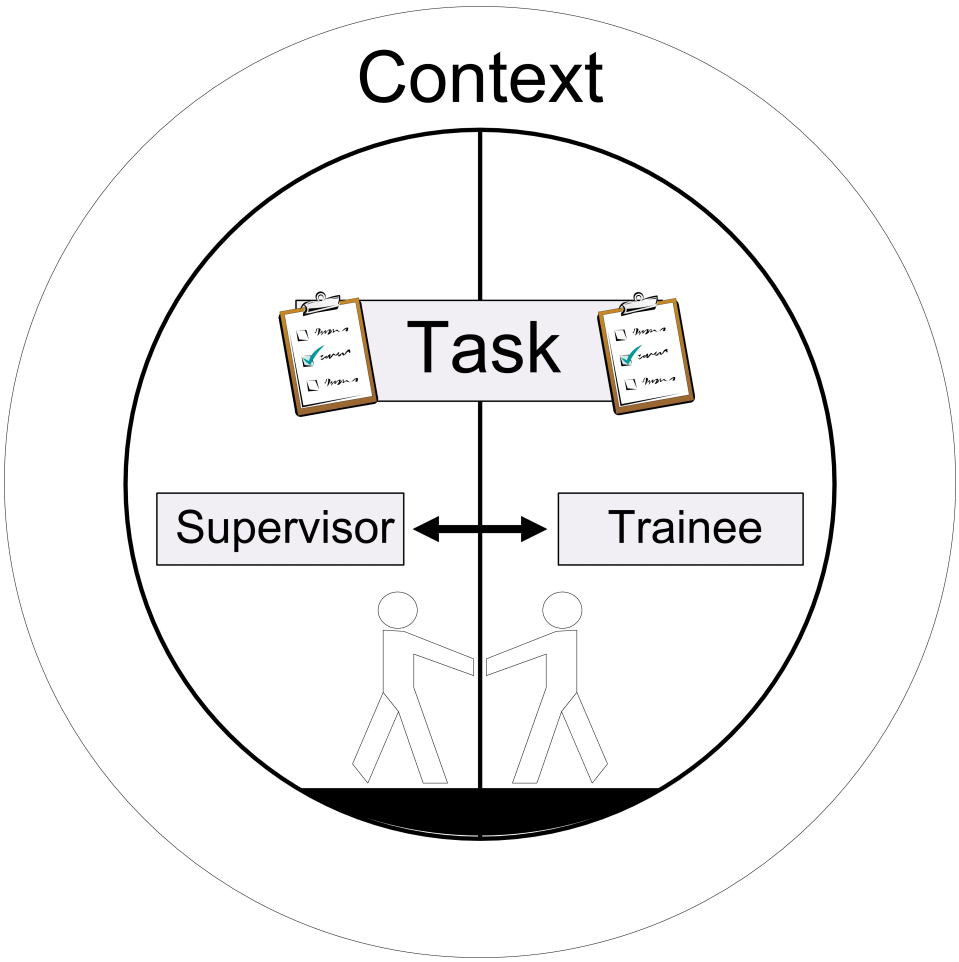
trusts an individual more than is appropriate for the situation, can perpetuate inaccurate assessment of trainee ability and risk unsafe patient care.[9]

The supervisor-trainee dynamic and the trust between them can be productively examined through the theoretical lens of sociocultural theory and legitimate peripheral participation in communities of practice.[10] Workplace learning occurs as learners assume authentic roles that advance patients' care together with other health care team members.[11] Participating in the workplace builds knowledge, familiarizes learners with the setting and people involved, and provides exposure to the range of tasks and problems.[12] As learners acquire workplace knowledge, supervisors can afford them more independent responsibility. Through this evolution of learning and clinical participation, entrustment is engendered.

Recent research in medical education has provided empirical evidence about how supervisors develop trust in trainees. Ginsburg identified trust as a major theme influencing supervisors' evaluations of residents.[13] Supervisors reported incorporating their perceptions of residents' credibility and willingness to seek help when determining how much they trusted those residents. Experienced clinicians confirmed that interpersonal and professional characteristics are critically important for entrustment.[14] Two studies have independently identified four broad factors that influence supervisors' trust in medical trainees: supervisor, trainee, context, and task.[6,15] For clinical trainees, interactions and relationships with supervisors are critical ingredients for learning, and trust is formed within the context of these workplace relationships. As emphasized in the nursing and psychology/organizational behavior literature, the inherently interpersonal nature of trust highlights the relationship between supervisor and trainee as an additional factor contributing to trust formation, along with supervisor, trainee, context, and task.[3,15]

We propose a model that explains how trust enables clinical participation through these five factors - supervisor, trainee, supervisor-trainee relationship, context and task (Figure 1).

Figure 1 A model of how trust enables clinical participation through five factors



This conceptual framing can inform understanding of how supervisors reconcile complex information into a judgment to trust a trainee, and how those judgments may be both richly informed and potentially biased. The exploration of each of these five factors and the literature supporting their contributions to trust (Table 1) generate guidance in the form of design principles on how to structure learning and assessment to facilitate entrustment decisions.

Table 1 Summary of factors that affect clinical supervisors' trust in medical trainees

Facet and Components	Description	Implications for entrustment	Source (Author, Year)
Supervisor			
Clinical competence	Clinical skills expertise	Supervisor's own clinical skills inform approach to supervision of trainee	Kogan et al., 2010[16]
Assessment expertise	Expertise in judging performance	Experience and expertise in observing, rating performance enhance judgment of entrustment	Govaerts et al., 2011[17]
Familiarity with clinical context	Knowledge of the people, patterns of interaction, and workflows	Orientation to culture and expectations in the environment for new supervisors informs and calibrates their assessments	Johnson et al., 2001;[18] Sutkin et al., 2008[19]
Attitudes and propensity to trust	Dispositional characteristic of the supervisor	Certain personality characteristics and sets of experiences influence supervisor's likelihood of trusting a trainee	Costa et al., 2001[20]
Accountability	Accountability to patients trainee will encounter in the future	Supervisor feels accountable to trainee, patients, and society	Ulmer et al., 2008[21]

Trainee			
Competence and experience	Trainee's aptitude, experience, clinical skills, clinical reasoning	A trainee earns a supervisor's trust through successful completion of clinical tasks	Brower et al., 2000;[22] Brower et al., 2009;[23] McAllister, 1995;[24] Mayer et al., 1995[25]
Attitudes and habits of mind	Habits of ongoing self-assessment: anticipatory reflection, reflection-in-action and reflection-on-action	Trainee appropriately seeks and incorporates feedback in challenging or unfamiliar situations	Sargeant et al., 2010;[26] Blatt et al., 2007;[27] Mamede et al., 2008;[28] Teunissen et al., 2009[29]
Insight	Discernment of own limitations and knowing when to ask for help	Trainee demonstrates awareness of own limitations and appropriate use of supervision	Ginsburg et al., 2010;[13] Papadakis et al., 2005[30]
Self-confidence and willingness to ask for help	Willing to take on new challenges and approach unfamiliar or adverse situations without overconfidence	Trainee advances own learning through new challenges, using resources when needed	Bénabou et al., 2001;[31] Grant and Dweck, 2003[32]
Relationship between supervisor and trainee			
Relationship formation	Characteristics of and interactions between supervisor and trainee	Similarity of expectations and approach to clinical practice between supervisor and trainee, and efforts of trainee to work with and align with supervisor, influence relationship formation	Severinsson and Borgenhammar, 1997;[33] Hosmer, 1995;[34] Chambers and Long, 1995[35]
Relationship interference with assessment	Role ambiguity of supervisor as coach, advocate or evaluator	Supervisor's understanding of role and attachment to trainee affects ratings and willingness to rate	Ginsburg et al., 2010;[13] Deketelaere et al., 2006;[36] Cavalcanti and Detsky, 2011;[37] Regehr et al.,

			2007[38]
Shared expectations	Defining and communicating expectations for performance, and using expectations to frame feedback to trainee	Common understanding of expectations facilitates trainee's development toward performance that will earn supervisor's trust	Kramer, 1998;[39] Landy et al., 1978;[40] Webb, 1997[41]
Amount of contact between supervisor and trainee	Contact ranging from initial impressions to longitudinal interactions	Longitudinal interaction allows supervisor to compare trainee current performance with past performance	Hasnain et al., 2001[42]
Context			
Affordances in the workplace	Opportunities for trainee's legitimate participation and autonomy in the workplace	Legitimate participation and opportunities to contribute to work allow trainee to demonstrate competence and build skills	Lave and Wenger, 1991;[10] Govaerts et al., 2007;[43] Billett, 1996;[44] Bandura, 2001[45]
Features of the setting that inform generalizability to other settings	Resources, staffing, support, patterns of interaction	Supervisor assumes some risk in determining boundaries of trust for new and future situations	Tjosvold and Tsao, 1989[46]
Opportunities for familiarity with context	Understanding of the healthcare system	Trainee works collaboratively (teamwork) and effectively within the health care system	Hauer et al., 2009;[47] Hirsh et al., 2007;[48] Young et al., 2011[49]
Workload	Amount and duration of work and duty hours	Excessive work hours decrease performance and promote trainee burnout, both of which diminish supervisor's trust	Dyrbye et al., 2010;[50] Kashner et al., 2010;[51] Levine et al., 2010[52]
Timing of observation	Time spent on observation and rating	Supervisors make valid judgments based on frequent observations and timely ratings	Anim et al., 2009[53]
Workplace culture	Hidden or enacted/observe	Culture influences supervisor and	Stern and Papadakis,

	d curriculum of clinical practice	trainee behaviors, including understanding of the purpose of assessment	2006;[54] Gaufberg et al., 2010[55]
Task			
Sequencing	Tasks advance over time based on learner's learning needs	Trainees develop skill to perform increasingly more advanced tasks over time	Dornan et al., 2007;[11] ten Cate, 2006[56]
Task complexity	[5757]Task complexity - simple to complex	Complex tasks require more observations and delays judgment of entrustment	Lee and See, 2004;[58] Jackson and Kroenke, 1999[59]
Patient complexity and risk	Medical complexity, psychosocial and communication challenges	Patient complexity requires defining entrustment for higher level patient management skills	Quirke et al., 2011;[60] Mulder et al., 2010;[57] Schillinger et al., 2004[61]

We conducted a non-systematic literature search of the English-language literature focused on studies of trust in medical education, nursing, psychology, and business settings. One author (KEH) searched the MEDLINE, PsycINFO, Web of Science, and CINAHL databases for citations by using terms related to trust in the context of supervision, evaluation, assessment, and interpersonal relationships. Additionally, authors manually searched the bibliographies of relevant articles and identified articles from personal knowledge of the field. This selective approach yielded a broad range of literature that we synthesized to clarify and expand what has been identified in the medical education literature about supervisors' trust in their trainees to date.[6,14,15] There are situations of trust that we did not include due to their distinctions from trust in the context of supervisory relationships, such as trust within therapeutic counseling relationships and public trust in law enforcement.[62–64]

Supervisor contributions to trust

The clinical supervisor identifies learning opportunities and empowers the trainee to take on increasing levels of responsibility to enable learning. However, supervising clinicians vary in their threshold for trusting trainees with responsibility for more autonomous practice.[15] Clinical supervisors' expertise

in clinical practice and learner assessment, their experience, attitudes (reflective behavior, self-confidence, propensity to trust), and perceived accountability all affect judgments about trainees.

Expertise: Supervisors' own clinical competence and experience influence their rating of trainees' clinical skills,[16] and in turn their trust in those trainees. Compared with novice supervisors, who focus on reporting rather than interpreting discrete behaviors, experienced supervisors make inferences and incorporate contextual factors into impressions and judgments that can inform entrustment decisions.[17] Supervisors' skill in diagnosing a learner's level of competence is essential for understanding performance and planning next steps in the learner's development.[65] This ability to interpret the trainee's actions is derived from the supervisor's prior experience, similar to the process of clinical reasoning.[17] Supervisors observing trainees analyze performance against their own or predetermined and validated expectations.[66] They use either an analytical, checklist approach (e.g. miniCEX)[67] or, as described in a review of several studies, a holistic approach based on impressions analogous to pattern recognition in clinical diagnosis and the global impression of expert raters.[68] Both strategies are used to evaluate trainees just as they are used to evaluate clinical problems,[43,69] and both can lead to trust when the supervisor observes desirable performance.

Experience: Supervisors' roles in the educational and heath care system also affect their supervisory behaviors and expectations of learners.[70] For example, an experienced inpatient supervisor working with a new team of residents and students spends the first days assessing each learner's level and learning needs. The supervisor might review a resident's written orders or recheck portions of the history until confirming that the resident's information and management has been reliable. Supervisors combine this direct knowledge of trainees' performance with their knowledge about graded levels of supervision to adapt learning opportunities to learners' developmental needs.[65,71] Supervisors ideally identify appropriately challenging tasks to promote learning through work. At times, though, they may feel pressure to prioritize work tasks

that help advance patient care but are less optimally suited to learners' developmental needs.[72,73]

Supervisors new to a context need support to gain skill in supervising learners effectively. Novice teachers struggle with self-confidence in their teaching and decisions about how much control to try to exert over their learners.[74] In clinical settings, more junior supervisors may hesitate to relinquish responsibilities to even qualified trainees. The terms 'resintern' (resident doing intern work) or 'resattending' (attending doing resident work) pejoratively describe how more senior physicians can do the work that should be entrusted to more junior team members. New supervisors may benefit from being partnered; for example, collaboration between junior and senior schoolteachers allows for shared goals and expectations for learners, and exchange of feedback among teachers achieves better learner outcomes.[18] Clinical supervisors might also be expected to assess more capably trainees' trustworthiness in a work environment where they are familiar with local expectations of learners, patterns of interaction among care providers, and norms around supervision.

Attitude/Habits: Propensity to trust is the willingness to trust, which is largely a dispositional characteristic.[20] Personality, along with influences of experience and culture, shapes propensity to trust. Supervisors who impart positive attitudes and enthusiasm toward teaching and clinical care create positive learning environments that allow trainees to thrive and develop secure relationships with them.[19,75,76] Simultaneously demonstrating their own attitudes toward learning and habits of mind, including processes of reflection and adjustment in their teaching and supervision, allows supervisors to both meet learners' needs and model essential skills.[77] Demonstrating reflection, awareness of the impact of one's actions, and openness to sharing one's questions can enable trainees to develop similar attitudes and habits that will earn supervisors' trust.

Accountability: Clinical supervisors modulate their entrustment decisions by balancing goals for patient safety with progressively greater learner

autonomy.[21] Ultimately, supervisors aim to create a learning environment that does not sacrifice, and ideally enhances, high quality, safe patient care. Guided by a focus on learning through participation, a supervisor may aim to optimize learning activities based on trainees' readiness to perform them. As the accountable party for patients' wellbeing and safety, a supervisor shoulders responsibility for an entrustment decision, knowing it will grant that trainee the opportunity to provide future patients' care with progressively decreased levels of supervision. Insufficient appreciation of the implications of entrustment for trainees and patients can diminish a supervisor's motivation to render honest judgments about a trainee's weaknesses.[78,79] Dudek et al., 2005; Cleland et al., 2008) For instance, a supervisor may find it simpler to 'pass' a trainee than to call out a major performance concern against trainee protests, even though addressing the concern would clearly prepare the trainee to provide better patient care in the future. Supervisors who lack clarity about the tasks the trainee is performing or is capable of performing, and the appropriate level of supervision needed, can hinder learning.[80] Conversely, high trust in others with low accountability creates a precarious situation vulnerable to errors.[3]

In summary, supervisors' clinical and teaching expertise, experience in the context, attitudes, and sense of accountability inform their ongoing observation, assessment and decision-making, which determine their trust in the learner. Appropriate trust enables participation in developmentally appropriate learning opportunities. The supervisor can then iteratively observe and assess to support further learning[81] based on anticipating entrustment decisions. Faculty development that articulates expected performance standards can guide faculty members in implementing meaningful assessment of learners' trustworthiness for unsupervised activity (Table 2), which outlines recommendations for learner assessment based on entrustment.

Trainee contributions to trust

Trainees' competence and experience, as well as their attitudes, habits of mind, and self-confidence, all influence their supervisors' trust in them. Through the lens of workplace learning and legitimate peripheral participation, trainees' engagement represents their efforts to participate, and their skills and attitudes earn them additional opportunities for participation.[10,82] Ideally, trainees are highly engaged, and their supervisors provide them opportunities to perform clinical tasks aligned with their learning level to enable their development of expertise. Trainees can thus gain knowledge through participation that helps the work of the group and earns them more trust from their supervisors.

Competence: Trainees' competence, which encompasses their aptitude, prior experience, and clinical reasoning, informs entrustment.[83,84] Trustees' competence has been identified as critical to development of trust from a supervisor across the fields of business and psychology.[22–25] Trainees' demonstrated ability to act autonomously and successfully engenders trust.[23,85] In medical training, trainees develop skill in independently identifying familiar clinical patterns, building elaborate illness scripts, and applying previously learned information to new situations. The trainee who describes how she frames a case or how she sees a current patient as similar or different than a prior similar patient makes these skills transparent for the supervisor. Supervisors can recognize these signs of readiness for entrustment for increasingly less supervised practice.[86,87]

Attitudes/Habits: Trainees' attitudes and habits of mind are essential elements of professional formation[88] that influence supervisors' willingness to trust them with clinical work. Other professional qualities important for entrustment include self-awareness and habits of lifelong learning. Anticipatory reflection, reflection-in-action and reflection-on-action are habits of self-monitoring that should develop during training and continue into clinical practice.[26] Trainees exhibiting these behaviors perform better with standardized and actual patients[27,28] Trainees who seek feedback perceive that it benefits their

learning and are more oriented toward learning than performance goals.[29] Conversely, trainees who avoid feedback and self-reflection and fail to learn from experience are subsequently more likely to lose their license.[30] Supervisors infer that trainees who show insight into personal strengths and limitations will more readily seek help in challenging situations and incorporate feedback.[13] A review of the literature suggests that, by self-assessing, trainees show their supervisors how they will seek information to fill knowledge and experience gaps and approach future situations.[69] Given trainees' desire to maintain their own credibility, educational climates that engage trainees in appropriate requests for supervisory support may enhance their trustworthiness.[89] The opportunity to earn trust itself motivates desired outcomes of training, including confidence in performing autonomously and professional maturation.[11,90]

Wijnen-Meijer et al asked experienced clinical educators in the Netherlands and Germany which general trainee features lead them to trust trainees to perform critical tasks.[14] Agreement was striking, including an evidence-based approach, discernment of limitations, active personal development, teamwork and collegiality, concise communication, empathy, openness and an active listening attitude toward patients, taking responsibility, coping with mistakes, and showing safe clinical practice and risk management behavior. Many of these represent attitudes and habits that pertain frequently in clinical practice.

Self-confidence: Trainees' self-confidence and self-regulation of their learning motivate them to embrace new challenges and approach unfamiliar or adverse situations with confidence, all of which can earn them supervisors' trust.[31,32,45] Barriers to earning supervisors' trust can stem from trainees' fear and/or overconfidence. Fear of the consequences of assessment or a perception of negative intent of evaluators can prompt trainee suspicion, self-consciousness, and withdrawal, all of which would lead a supervisor to deem the trainee untrustworthy.[39] Trainees may worry that constructive feedback will inhibit future opportunities rather than facilitate development.[91,92] A review of the literature shows that over-confident trainees may ignore certain information, fail to seek help, or suffer cognitive biases in clinical diagnosis

such as failing to gather or incorporate sufficient information and anchoring, all of which can also diminish trust formation.[93] For instance, trainees may fail to tell their supervisors about complaints from patients, readmissions, or unexpected emergency department visits that could have been avoided, either because they do not appreciate the significance of these events, or because they wish to preserve their reputation rather than learn from new patient information.

In summary, trust is engendered based on both trainees' competence, as manifested by their knowledge and clinical performance, and their attitudes toward learning, interactions, and feedback-seeking. Ideally, their training environment and curriculum support self-regulated learning, including habits of reflection, appropriate help-seeking, and self-improvement (Table 2). In conjunction with supervisors' contributions, trust forms in the context of an emerging supervisory relationship.

Relationship between supervisor and trainee contributions to trust

Trust formation within a relationship reflects an interpersonal dynamic, concordance regarding expectations, and amount of contact. Effective supervision necessarily involves development of a trusting relationship between supervisor and trainee, defined as belief in the other's word and willingness to act based on that individual's words or actions.[33–35]

Interpersonal dynamic: The supervisor-trainee relationship can either facilitate or impede entrustment. Relational signaling theory explains how signals (communications and actions) from trainee to supervisor convey a desire to form and sustain a relationship through alignment toward shared goals.[94] The shared goal of caring for patients leads supervisor and trainee both to act in the best interest of the patient. Relational signaling also influences the supervisor's and trainee's response to each other, ideally with trust-building behaviors such as appreciating each other's perspectives, showing integrity, and demonstrating flexibility when indicated. Supervisors are more likely to praise, and perhaps trust, trainees who approach clinical medicine in similar

fashion to their own.[13] Trust entails an affective component that can potentially overwhelm the cognitive component of entrustment, as in the situation of intense personal feelings or transference.[95] A strong relationship can also hinder a robust judgment by impeding honest communication or introducing bias.[17,37] Ambiguity regarding the supervisor's role as advocate or coach who promotes development of competence versus evaluator who judges performance can influence willingness to predict future performance.[37,38] Learners are particularly sensitive to this role conflict in their supervisors.[72] Supervisors may wish to be viewed favorably by learners and avoid the consequences, both interpersonal and legal, from identification of struggling learners.[78]

Concordance: Shared understanding of expectations between learners and supervisors regarding requirements of the activity being performed and its relevance to patient care establishes a foundation for trust.[39–41] As shown in a literature review, supervisors who engage learners in an iterative process of feedback and re-assessment based on those expectations promote learners' development into trustworthy professionals who learn through their experiences.[96] Too commonly, though, learners receive vague or insufficient feedback that hinders their own determination about their performance relative to expectations. One cause for inadequately articulated feedback can be supervisors' lack of familiarity with individual learners' performance level or expectations for their stage of training.[15]

Amount of contact: The amount of contact between trainee and supervisor is an oft-cited ingredient for accurate, successful assessment in medical education.[47] Supervisor familiarity with a trainee falls on a continuum from almost no knowledge, with assessment based on brief impressions, to extensive knowledge. Within minutes of interacting with a trainee, a supervisor begins to form impressions influenced by trainee characteristics and the nature of their work together. Initial impressions may constitute important judgments; for example, history-taking behaviors manifested within the first three minutes correlate with global ratings of clinical reasoning over a 15-minute encounter.[42] In the psychology field, trained and untrained observers

predicted outcomes of marriages over a six-year period based on affect manifested in three-minute observations of communication.[97]

Conversely, supervisors with ongoing knowledge of their trainees render judgments differently, as longitudinal relationships change the information that informs trust. [96] Early in a relationship, trust formation is often based on recognition of demographic similarities between two individuals; over time, shared experiences and knowledge inform trust formation.[98] An ongoing relationship allows interpretation of trainee performance in relation to past performance and detailed formative feedback targeted to areas needing improvement. Longitudinal integrated clerkships model such a system where longitudinal contact (and hence relationship) with ample formative feedback mitigate evaluation concerns stemming from lack of familiarity.[99]

In summary, the trainee-supervisor relationship influences trust formation based on shared experience and expectations. Sufficient, in-depth contact time enables relationship formation and the supervisors' appraisal of the trainee's learning level, abilities, and next steps in development within the learning environment (Table 2)

Table 2 Design principles for a learning and assessment system based on entrustment of clinical trainees for unsupervised practice

	"Traditional" structure for supervising trainees that can inhibit entrustment	**Design principles for supervision of trainees that support entrustment**	**Rationale**	**Main related factor(s)**
Training	Supervisors receive no training, or training focused on evaluation without attention to learner assessment and feedback.	Supervisors receive training in clinical supervision, feedback, and assessment of medical trainees.	Supervisors should recognize and be able to articulate appropriate performance expectations for trainees. They need to incorporate performance information into a	Supervisor

			judgment about trainees' trustworthiness for unsupervised practice.	
Individual tailoring	Trainees are assigned tasks based on year of training or staffing needs without individualization based on learning needs and milestones achieved.	Trainees are intentionally entrusted with designated tasks as they meet milestones and given increased opportunity for the unsupervised practice of those tasks.	As trainees earn greater trust, they should be allowed to practice those tasks in an increasingly independent manner.	Task
Inviting supervision	Trainees feel embarrassed, uncomfortable or unable to seek help from supervisors.	The educational and work climate encourages trainees to seek appropriate requests for supervisory support in unfamiliar clinical situations.	Trainees can be trusted to seek supervision when needed.	Trainee, context
Climate of reflection	The educational and clinical culture rewards clinicians who share knowledge and discourages questioning and uncertainty.	Educational programs and the clinical work environment foster a culture of self-reflection, self-assessment and lifelong learning in trainees and supervisors. Assessment strategies capture these behaviors.	Trainees will seek and incorporate feedback to improve their performance over time and engage in lifelong learning strategies with feedback on their progress in this area.	Trainee, context
Longitudinal relationship	Trainees and supervisors work together for brief periods in hospitals and clinics with frequent turnover of team members.	Clinical schedules facilitate longitudinal contact between supervisors and trainees.	Stable, longer term relationships, support entrustment decisions and pacing toward competence. Trainees who are required to adapt constantly to new	Context, trainee-supervisor relationship

			systems and care teams may not be able to earn or show qualification for unsupervised practice.	
Gradual building of responsibility	Trainee assessment uses general end-of-rotation evaluations, sometimes without reference to competencies, milestones, or expected criteria for performance.	Trainee assessment aligns with developmentally sequenced competencies and milestones that ultimately demonstrate that the trainee has achieved competence to deliver safe and effective unsupervised patient care.	Supervisors should assess trainee performance based on developmentally sequenced competencies and milestones. Trainees should have the opportunity to be assessed performing tasks independently to advance their scope of unsupervised practice.	Supervisor, task
Grounded entrustment decisions	Trainee responsibilities are based on workplace needs and year of training, without consideration of appropriate supervision needed for individual trainees.	Entrustment decisions are informed by multiple sources of evidence that are collected in stable learning environments. Entrustment decisions determine trainees' future clinical responsibilities.	Multiple pieces of evidence bring together aspects of trainee, task, context, supervisor, and trainee-supervisor relationship to inform entrustment decisions.	Overall – interplay of factors

Context contributions to trust

Contextual aspects of clinical work that influence the learner's participation and consequently the supervisor's ability to trust the learner with responsibility include: workplace affordances (the invitational qualities and supports that enable learners to participate actively);[82] the work environment including the

healthcare system, training cycles, duty hours, workload and timing for observations; and workplace culture.

Workplace affordances: The degree to which the workplace affords or offers opportunities for participation in authentic work activities powerfully affects learning,[82] performance, and supervisors' assessment of that performance. Opportunities for trainees' legitimate participation and autonomy in the workplace are necessary for supervisors to judge trustworthiness.[10,17,32,82] Evaluators seek evidence of outcomes of learners' actions and their professional interactions in determining entrustment.

Work environment: The work environment can enable or deter trust formation. An under-resourced clinical environment with insufficient infrastructure or personnel could impede trainees' completion of clinical tasks, or alternatively require the trainee to perform at higher levels of responsibility.[100] For example, while alone in a hospital at night, a trainee might manage an unstable patient independently without an on-site supervisor. In this scenario, trust is afforded even though a supervisor may never have consciously decided that the trainee earned that trust. To a point, the stress in these situations may enhance performance, but excessive independence can become overwhelming and reduce performance quality.[101] In more well-resourced health care systems, some tasks are completed by others, potentially depriving the learner of those opportunities or alternatively enabling the trainee to spend time on more challenging tasks. For instance, trainees may not learn to do venipuncture if ancillary staff are always available to do so. As supervisors judge trainees' trustworthiness to perform tasks, they must determine the extent to which the entrustment generalizes to other settings.[46] Entrustment is thus contextual, but trainees must ultimately be able to apply both theoretical and practical knowledge across a range of settings.

Systems issues: Familiarity with a context builds trainees' nuanced understanding of the healthcare system and microsystems, and promotes robust teamwork and interdisciplinary communication.[47,48] Yet, trainees must adapt quickly to frequent transitions in today's clinical environment.[102] A major

transition occurs each July when United States medical trainees simultaneously advance to higher levels of responsibility, and a recent review shows how patient outcomes and care efficiency can suffer.[49] Supervisors expect that more supervision will be required because trainees have not yet been assessed and evaluated for entrustment.

Workload: Trainees' work hours and workload have prompted studies showing that working excessive hours and/or multiple night shifts is associated with fatigue and burnout that can compromise performance.[50] Clinical schedules may facilitate or impede supervisors' observations of trainees that are necessary to determine entrustment. Frequent observations and timely ratings enable determination of competence; frequent handoffs and staggered shifts can mean that team members rarely see each other's work. While efforts to optimize the work environment could improve trainees' performance, assessment aimed at predicting trainees' future performance should incorporate understanding of differences in the workload and hours they will experience after training.[53]

Workplace culture: Entrustment occurs within a particular workplace culture. The hidden curriculum entails messages that learners glean from people around them outside the context of the formal or stated curriculum.[103] The hidden curriculum informs supervisors' and trainees' understanding of professional behavior and acceptable methods of communication. Supervisors both model and observe whether trainees adhere to group norms, values, and behaviors,[54] and violations of group standards will diminish entrustment.

In summary, learning environments and cultures that optimize workload and promote greater professional development have several key features. They facilitate task assignment appropriate to learning, foster robust communication and professionalism skills, and include community-building activities.[99,104–106] (Table 2) All of these can foster entrustment decisions for clinical tasks.

Task contributions to trust

The nature of a patient care task affects a supervisor's assessment of trainee trustworthiness. Task selection based on sequencing, complexity and risk can be designed to facilitate trainees' participation and a judgment of entrustment.

Sequencing: Successful workplace learning requires supported and guided participation, such that trainees can actively engage in the tasks afforded to them, and their supervisors can challenge them to perform at successively higher levels.[11] Tasks to be performed and judged should be meaningful parts of clinical practice that arise frequently or, for infrequently occurring activities, have high impact on patient care outcomes. Learning is optimized as a developmental process in which learners have graded opportunities for participation. For example, a trainee may be able to gather history and physical examination data before generating management plans within an inpatient team. A task can fall within a zone of proximal development, between tasks that they can perform independently and tasks they are only able to perform with assistance. Within this zone, task performance can contribute to progressive skill building.[107]

A supervisor who can identify an appropriate learning task useful for patient care and provide relevant guidance can set the stage for skill development and eventually entrustment. Defined competencies and milestones can guide developmentally sequenced learning activities and assessments.[108,109]

Task complexity: The cognitive and psychomotor complexity of the task assigned to the trainee should align with the trainee's readiness to perform the task and earn further trust. Successful execution of a simple task in a straightforward situation could readily prompt an evaluator to render a judgment to trust the trainee to repeat that task. However, a judgment about performance with a more complex task would likely require more observation and information.[58,110] The nature of the activity and how much it varies with each occurrence may also determine whether one or multiple observations are needed for a judgment.

Risk: A task carries a certain degree of risk for the patient, and supervisors will want higher degrees of trust to allow trainees to perform high-risk procedures and activities.[15] Patients with complex psychosocial or medical presentations may test the boundaries of a trainee's interpersonal skills[59] and complicate entrustment decisions. High-acuity patients with life-threatening illness may comprise a separate category of entrustment decision for more advanced learners.[60] As the trainee learns through experience, progressive entrustments can allow for increasing levels of independence and confidence in future performance.[57]

In summary, tasks are ideally selected intentionally to be 'right-sized' for trainees to learn and demonstrate essential skills. Recognizing trainees' simultaneous roles as learners and care providers, task selection should satisfy both educational and patient care needs. Assessment based on entrustment can potentially achieve these dual goals.

Design principles to support entrustment decisions

Trust is essential for informing judgments regarding trainees' readiness for less supervised, autonomous workplace activity. We have reviewed the literature on the inter-related factors that contribute to a supervisor's decision to deem a trainee trustworthy. From our conceptualization, entrustment entails the interplay of influences related to the supervisor, trainee, supervisor-trainee relationship, context, and task. (Figure 1) Our framing shows the inter-connectedness of factors that contribute to forming the trust needed to enable trainees' clinical participation and learning. For trainees to undertake increasingly complex responsibilities for patient care, they must participate and be assessed within the work context, focused on a shared purpose of providing high quality patient care.

Supervision based on entrustment fosters the supervisor's accountability not only for trainees' learning but also for their future patient care outcomes. That is, the supervisor anticipates how trainees will care for patients in the future. For learners, entrustment can motivate desirable behaviors and attitudes.

Trainees who are challenged to learn through the experience of participating in patient care will experience the rewards of contributing to work accomplishment. The opportunity to earn trust can strategically motivate learners to perform in ways that earn them further trust, and in the dynamic and highly situational context of medical practice, educators should aim to ensure that trainees who earn entrustment can experience new opportunities for unsupervised practice afterward. A focus on entrustment therefore promotes collaborative supervisory relationships focused on shared goals for learning and patient care in the present and future. The context of the work environment informs the degree to which the supervisor perceives that entrustment portends performance in other settings. In addition, context includes the work values and culture that promote learning as a social process.

Our synthesis of the literature on entrustment supports design principles for supervisors' responsibilities in a learning and assessment system to maximize learning and opportunities for entrustment. Recognizing that our review is centered in a Western culture and experience in medical education, we propose these principles that could operate within this context of training, supervision, and hierarchy. As we articulate how a system would operate with trust as a focus, it is important to compare to the traditional approach (Table 2). Faculty with clinical and supervisory expertise prepared to assume responsibility for entrustment decisions frame this decision-making in the context of accountability for future patient care. Trainees progressively assume greater independent responsibility aligned with their individual skill levels while developing habits of mind, in a climate that prompts them to recognize and reflect on their own strengths and invite supervision as needed. Trainees learn the value of developing into "trustworthy" clinicians through a curriculum that inculcates the professionalism necessary for a career that entails earning the trust of patients and colleagues.[111] The work environment is attentive to scheduling challenges and engages trainees in some longitudinal relationships. Assessment based on defined competencies and milestones captures the range of trainee behaviors that are foundational for entrustment. The program ensures that entrustment decisions are

appropriately meaningful for the trainee by allowing gradual building of responsibility and new opportunities for unsupervised practice.[57]

Entrustable professional activities (EPAs) exemplify assessment based on trust, as an emerging strategy for supervision grounded in the trust a supervisor holds in a trainee to perform a given activity.[57,84] EPAs form "part of essential professional work in a given context" and "should be entrusted only to those individuals who have adequate competency to carry them out."[15,56,57,112] Assessment based on EPAs defines the degree of independence or supervision with which a trainee can be entrusted to perform a workplace task. Based on professional experience and understanding of the activity, the supervisor making an entrustment decision incorporates information from observations and inferences to render a forward-looking judgment about future performance of an activity.

In conclusion, the literature guides us to appreciate the crucial role of trust in clinical supervision through consideration of issues related to the supervisor, trainee, supervisor-trainee relationship, context, and task. With understanding of entrustment in trainee assessment, supervisors and educational programs can enable trainees to participate in the workplace as important members of a community of practice with responsibilities that advance the work of the clinical group and trainees' development toward independent practitioner status. Further research to provide evidence of validity regarding entrustment decisions, including the consequences for future patient care, would build confidence in this approach to assessment within the educational community and the public. Studies on supervisors' experience of achieving trust in learners and the influence of the supervisor-trainee relationship, context, and task would expand on the information presented. Implementation of clinical learning and assessment strategies based on entrustment decisions will require adapting the structure of trainee learning experiences, including their supervisory relationships and tasks, to facilitate informed entrustment.

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CHAPTER 3

IDENTIFYING ENTRUSTABLE PROFESSIONAL ACTIVITIES IN INTERNAL MEDICINE TRAINING

PUBLISHED AS:

Hauer KE, Kohlwes J, Cornett P, Hollander H, Ten Cate O, Ranji SR, Soni K, Iobst W, O'Sullivan P. Identifying entrustable professional activities in internal medicine training. J Grad Med Educ. 2013 Mar;5(1):54-9.

Abstract

Introduction: Entrustable Professional Activities (EPAs) can form the foundation of competency-based assessment in medical training focused on performance of discipline-specific core clinical activities. For graduate training, identification of EPAs encompassing Internal Medicine (IM) milestones is needed to operationalize competency assessment using EPAs.

Methods: Through a modified Delphi technique, we conducted a two-step cross-sectional survey of IM educators at a three-hospital IM residency program; residents completed one survey. Participants rated the importance and appropriate year of training to reach competence for 30 proposed IM EPAs. Content validity indices (CVI) identified essential EPAs. We conducted independent sample t-tests to determine IM educator-resident agreement and calculated effect sizes. Finally, we determined the effect of different physician roles on ratings.

Results: Thirty-six IM educators participated; 22 completed both surveys. Twelve residents participated. Seventeen EPAs had a CVI of 100%; 10 more exceeded 80%. Educators and residents rated the importance of 27 of 30 EPAs similarly. Residents felt that 10 EPAs could be met at least a year earlier than educators.

Conclusions: IM educators had a stable opinion of the EPAs developed for this study and residents generally agreed. Using this approach, programs could identify EPAs building on the proposed list for resident evaluation.

Introduction

The public expects that medical trainees are competent to practice independently by completion of training.[1,2] Although competency assessment often focuses on discrete competencies,[3] which are defined qualities that trainees develop over time, medical practice involves integration of knowledge, attitudes and skills from multiple competency domains. Entrustable Professional Activities (EPAs) are an approach to operationalize competency-based assessment holistically. EPAs address real-life physician tasks essential for a particular specialty that require specific training and yield measurable outcomes.[4,5] EPAs describe features of work, whereas competencies are features of the trainee. EPAs facilitate competency-based assessment in clinical practice via decisions of entrustment, implying trainee qualification to perform an EPA with a certain degree of independence.

To build an assessment system based on EPAs, the first critical step is identifying physician tasks that exemplify essential activities. EPA selection builds evidence for the validity of the assessment by ensuring that the EPAs represent tasks central to clinical competence.[6] This study aimed to identify EPAs aligned with national milestones through a local Delphi study of internal medicine (IM) educators and residents, and to demonstrate a procedure applicable for identifying EPAs in other settings.

Methods

Design: This is a two-step cross-sectional survey study of IM educators and IM residents. We used a modified Delphi technique to generate consensus opinion about IM EPAs.

Setting: The study site was University of California, San Francisco (UCSF). The IM residency includes 128 categorical and 49 primary care residents. Residents rotate through three hospitals (tertiary care, public county, Veterans Affairs).

Participants: Participants were among 68 Department educational leaders (program, associate program, site and fellowship directors; chief residents). Participants were invited to two half-day retreats for orientation to competency-based assessment and EPAs. A convenience sample of 12 of 16 residents on their ambulatory rotation completed the survey. The Institutional Review Board approved the study.

Procedures

Instrument development. Three IM clinician educators (KEH, JK, PC) and one education researcher (PSO'S) drafted 30 potential EPAs based on literature review on EPAs, American Board of IM milestones,[7] Residency Review Committee (RRC) and Accreditation Council for Graduate Medical Education (ACGME) program requirements,[1] proposed pediatric EPAs,[8] and their own expert opinions of internists' essential activities (i.e. the essential work of IM residents and practicing physicians, recognizing that different clinicians allocate their clinical time differently). The mapping of the potential EPAs to existing training standards and involvement of multiple experts contribute to evidence of content validity.[6]

We used the Delphi technique to develop consensus opinion about proposed EPAs, with sequential anonymous surveys of experts, quantitative feedback about prior responses and full data inclusion.[9]

Round 1: At the first retreat, participants independently rated each EPA for importance using a 0-4 scale (0=absolutely do not include, 1=not very important, 2=kind of important, 3=important, 4=very important), and training year (PGY1-3) that an IM resident should be competent to conduct it independently. (Appendix 1) Participants could suggest additional EPAs.

Round 2: At the second retreat, participants received the same rating sheet and their individual Round 1 ratings, mean group ratings and standard deviations for the importance question, and mode for the Round 1 training

year question. Participants independently rerated importance and year for each EPA.

For additional evidence of content validity of candidate EPAs,[6] we administered the survey to a convenience sample of 12 senior residents on their ambulatory care rotation.

Analysis: We undertook several analyses to support the validity of the EPA list. For each proposed EPA, based on Round 2 ratings, we calculated a content validity index (CVI),[10] the proportion of educator participants who rated importance as 3 or 4, with the expectation that items for which 80% or more of participants assigned those ratings had sufficient content validity. We also examined average variance changes between rounds to demonstrate that the method decreased variance. We conducted analysis of variance for each EPA final rating comparing primary care, hospitalist (including chief residents) and specialist physicians. Because our sample size was small, we examined effect size, partial eta-squared, defining effect sizes under 0.3 as small, around 0.5 as moderate and around 0.8 or higher as large.[11] We compared educator-resident ratings using t-tests and report effect sizes.

Results

Of 41 educator retreat participants, 36 completed at least one survey (87.8%) and 22 (53.6%) completed both. Respondents represented all three hospitals. Educator respondents included 16 hospitalists, 9 primary care physicians, and 11 specialists at all ranks (instructor; assistant, associate, full professor). Twelve residents completed one survey.

Table 1 shows CVIs for the 30 EPAs. Seventeen had a CVI of 100%, 4 more exceeded 90%, 6 more exceeded 80% and 3 fell below the 80% standard. The average variance for Round 1 EPA ratings was 0.54 and decreased as expected through the Delphi to 0.43. Table 1 shows mean final (Round 2) importance ratings for the EPAs from educators and from residents' single

survey. Three EPAs, all pertaining to inpatient general medicine teams, received mean ratings of 4.00 (SD=0), indicating consensus about importance for IM trainees. Participants' write-in responses did not reveal thematic trends for additional EPAs, but identified components of listed EPAs including professionalism, teamwork, quality, and teaching.

Table 1 Validity information for 30 Proposed Internal Medicine (IM) Entrustable Professional Activities (EPAs)

EPA	CVI % rating[a] 3, 4	Mean rating[b] (SD) IM educator	Mean rating[b] (SD) resident	Effect size[c]	Mode Training year[d] by IM educator	Mode Training year[d] by resident	Partial eta square[e]
Evaluate and manage a new problem in a continuity ambulatory patient requiring coordination of care between providers and across settings	100	4.00 (.00)	4.00 (.00)	n/a	2	2	n/a
Admit and manage a medical inpatient with a new acute problem on a medical floor	100	4.00 (.00)	4.00 (.00)	n/a	2	1	n/a
Admit and manage a medical inpatient with an acute exacerbation of a chronic problem on a medical floor	100	4.00 (.00)	4.00 (.00)	n/a	2	2	n/a
Lead a family meeting to discuss serious or sensitive news with patient and/or family and other health providers	100	4.00 (.00)	3.92 (.29)	.51	2	2	n/a
Perform initial H&P, develop problem list and plan for new ambulatory patient in continuity practice	100	3.96 (.19)	4.00 (.00)	.25	1	1	.05
Provide continuity care, conducting interval visits, for primary care patients with multiple chronic conditions	100	3.96 (.19)	4.00 (.00)	.25	3	2	.11
Develop and implement a safe discharge plan for a patient from the acute care setting	100	3.96(.19)	3.83(.39)	.48	1	1,2	.11
Discuss serious news with a patient and/or family (bad news, end-of-life care planning)	100	3.93 (.26)	3.75 (.45)	.54	2	2	.10
Provide continuity care, conducting interval visits,	100	3.93 (.26)	3.92 (.29)	.04	2	1,2	.06

for primary care patients							
Triage medically ill patients to an appropriate level of care	100	3.93 (.26)	4.00 (.00)	.32	2	1,2	.03
Access medical information to provide evidence based care for adult patients	100	3.93 (.26)	3.50 (.52)	1.06	3	1	.23
Identify and manage acute, emergent problems	100	3.93(.26)	3.92 (.29)	.04	2	2	.03
Provide urgent and emergent cross-coverage care to medicine inpatients	100	3.78 (.42)	3.58 (.79)	.36	1	1	.19
Lead a team in managing multiple inpatients	100	3.75 (.44)	3.58 (.52)	.43	2	2	.12
Recognize and diagnose common non-internal medicine (surgical, neurologic, dermatologic, etc.) problems and appropriately refer to subspecialty care	100	3.68 (.48)	3.83 (.39)	.33	2	1,2	.10
Diagnose and co-manage patients with complex problems needing subspecialty care (inpatient or outpatient)	100	3.56 (.51)	3.67 (.49)	.18	3	2	0
Manage information and knowledge for personal learning to improve care delivery and to educate others(journal club, etc.)	100	3.46 (.51)	3.42 (.52)	.08	3	2	.08
Institute palliative care appropriately in collaboration with palliative care specialists	96.4	3.46 (.69)	3.25 (.87)	.27	2	2	.02
Perform behavioral counseling with a patient	92.9	3.36 (.62)	3.08 (.67)	.44	2	1	.23
Provide medical consultation for patients on non-medical services	92.6	3.07 (.47)	2.92 (.79)	.26	3	3	.02
Admit and manage a medical ICU patient	92	3.16 (.55)	3.67 (.49)	.88	2	2	.05
Identify and address a quality improvement need in a clinical setting	89.3	3.07 (.54)	2.83 (1.03)	.34	3	2	.01
Provide telephone management of an acute problem for an ambulatory patient	88.9	3.41 (.69)	2.83 (.94)	.75	3	2	.12
Provide care to an inpatient or outpatient non-English speaking patient, using appropriate translator services	88.9	3.30 (.67)	3.42 (.67)	.15	1	1	.05
Develop and implement an action plan based on review of performance data for one's ambulatory patient panel	85.7	3.14 (.65)	2.92 (.90)	.28	3	2,3	.22

Provide inpatient and outpatient care for patients with challenges in access to care that appropriately addresses those challenges	82.1	3.21 (.74)	2.83 (.94)	.47	3	1,2,3	.10
Conduct or participate in a scholarly project (research, QI, education, other)	82.1	2.93 (.54)	2.67 (1.16)	.34	3	3	.15
Participate in and lead an inpatient cardiopulmonary resuscitation	64.3	2.79 (.79)	3.17 (.84)	.47	3	3	.03
Provide initial management and contribute to postoperative care for patients presenting with surgical problems	60.7	2.75 (.70)	2.58 (1.00)	.21	3	2	.02
Perform common procedures in internal medicine (LP, thoracentesis, central line, arthrocentesis)	46.4	2.57 (.69)	3.00 (.95)	.54	3	2	.02

[a]CVI = content validity index, the percentage of respondents who rated this EPA as 3 (important) or 4 (very important)
[b]Rating scale: 0=absolutely do not include, 1=not very important, 2=kind of important, 3=important, 4=very important
[c]Efect size = absolute value (faculty mean-resident mean)/ pooled standard deviation
[d]Training year by which trainee should be trusted to perform this activity independently
[e]Effect size for comparing differences across primary care, hospitalist and specialist physician ratings; not applicable when all physicians gave the same rating

Educators and residents rated importance for 27 of 30 EPAs similarly. Residents rated “Admit/ manage a medical ICU patient” higher than educators (*d*=0.88), whereas educators rated higher than residents “Access medical information to provide evidence-based care” (*d*=1.06) and “Provide telephone management of an acute ambulatory problem” (*d*=0.75). There were four modest differences in which educators rated the EPA higher than residents (family meeting, discharge plan, serious news, access to care) and two in which residents assigned higher ratings (procedures, resuscitation). Educator and resident opinions differed about the training year by which residents should be trusted to perform multiple of the EPAs (Table 1). Residents rated 10 EPAs at least one year earlier than educators.

Three ratings by primary care physicians, hospitalists and specialists differed significantly with small effect sizes (0.22-0.23). For all three, primary care physicians rated EPA importance higher than hospitalists and specialists. (Table 1)

Discussion

Meaningful assessment in graduate medical training requires evaluating performance of core professional activities. This study shows a procedure for identifying activities that educators in a large IM training program identify as central to training. Resident respondents agreed with these ratings. This information can guide assessment focused on entrustment of trainees to perform EPAs independently.

We found greatest consensus and highest ratings for inpatient-oriented EPAs. This endorsement may indicate familiarity with inpatient training based on historical training models rather than the ideal structure of the future, or the inclusion of the many hospitalists in our sample. Proposals for enhancing the amount and nature of ambulatory IM training reinforce the importance of both ambulatory and inpatient EPAs for robust skills assessment.[12]

Residents rated year of training earlier than educators for one-third of proposed EPAs, consistent with findings in anesthesia training.[13] This discrepancy likely reflects differences in clinical experience and realities of clinical practice at teaching centers, in which trainees assume wide-ranging responsibilities, perhaps when they themselves do not feel qualified. Responsibilities are typically assigned by training year rather than assessments demonstrating qualification. Innovative service redesign may help align teaching and supervision with service requirements.[14] Interestingly, educators in our three specialty groups perceived importance of the EPAs quite similarly, a finding that may attest to the list validity, and/or a common institutional perspective.

Study limitations include the single institution design and that some educators only completed one survey. Other clinicians, including those outside university settings, might have rated the items differently. The large proportion of hospitalists in our sample reflects the proportion of teaching faculty overall as well as the time residents spend on the inpatient service, but could have increased emphasis on inpatient-oriented EPAs.

Based on our careful review of requirements for IM programs including those from the RRC, we have reasonable confidence that the list of EPAs covers the field of general IM and represents core activities of the specialty. However, it is possible that other educators or training programs would prioritize other activities, or use other wording for the listed activities. The four educators who developed our list used national resources and also considered how internists allocate their time. There may be other relevant EPAs not included in our survey, but none of the participants offered such suggestions. Study strengths include the range of educational leader participants from three diverse teaching hospitals.

This study presents the foundation for using specific EPAs for competency- and milestones-based assessment of IM residents. Our participants supported the value of core inpatient and outpatient EPAs that could form the basis of an assessment system grounded in core professional activities of the specialty. The degree to which EPAs can balance common national goals and institution-specific priorities remains to be determined. Studies tracking development of competence could provide additional evidence of validity regarding “relationship to other variables"[6] such as in-training examinations or future clinical performance, for particular EPAs. However, studies should acknowledge that, by definition, EPAs allow for trainees to achieve competence at different rates. Further research is needed to determine methods of implementing EPAs as well as supervisors’ ability and willingness to trust residents to perform activities with increasing independence.

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Appendix 1: EPA rating form

Please rate each potential EPA below by answering 2 questions

1. How important is it for internal medicine trainees to become competent to perform this item during training (1-5 scale: absolutely do not include / not important (1) to very important (5))
2. By the end of what year of residency training (PGY) should an attending be able to trust a resident to perform this activity independently? (PGY-1, PGY-2, PGY-3)

EPA
Admit and manage a medical inpatient with a new acute problem on a medical floor
Admit and manage a medical inpatient with an acute exacerbation of a chronic problem on a medical floor
Identify and manage acute, emergent problems
Develop and implement a safe discharge plan for a patient from the acute care setting
Admit and manage a medical ICU patient
Provide urgent and emergent cross-coverage care to medicine inpatients
Perform common procedures in internal medicine (LP, thoracentesis, central line, arthrocentesis)
Discuss serious news with a patient and/or family (bad news, end-of-life care planning)
Perform behavioral counseling with a patient
Provide medical consultation for patients on non-medical services
Participate in and lead an inpatient cardiopulmonary resuscitation
Perform initial H&P, develop problem list and plan for new ambulatory patient in continuity practice
Evaluate and manage a new problem in a continuity ambulatory patient requiring coordination of care between providers and across settings
Provide continuity care, conducting interval visits, for primary care patients
Provide continuity care, conducting interval visits, for primary care patients with multiple chronic conditions
Lead a team in managing multiple inpatients
Manage information and knowledge for personal learning to improve care delivery and to educate others (journal club, etc.)
Identify and address a quality improvement need in a clinical setting
Provide telephone management of an acute problem for an ambulatory patient
Develop and implement an action plan based on review of performance data for one's ambulatory patient panel
Provide inpatient and outpatient care for patients with challenges in access to care that appropriately addresses those challenges
Recognize and diagnose common non-internal medicine (surgical, neurologic, dermatologic, etc.) problems and appropriately refer to subspecialty care
Diagnose and co-manage patients with complex problems needing subspecialty care (inpatient or outpatient)
Provide initial management and contribute to postoperative care for patients presenting with surgical problems
Provide care to an inpatient or outpatient non-English speaking patient, using appropriate translator services
Lead a family meeting to discuss serious or sensitive news with patient and/or family and other health providers
Triage medically ill patients to an appropriate level of care
Access medical information to provide evidence based care for adult patients.
Conduct or participate in a scholarly project (research, QI, education, other)
Institute palliative care appropriately in collaboration with palliative care specialists
Other (Specify)

CHAPTER 4

DEVELOPING ENTRUSTABLE PROFESSIONAL ACTIVITIES AS THE BASIS FOR ASSESSMENT OF COMPETENCE IN AN INTERNAL MEDICINE RESIDENCY: A FEASIBILITY STUDY

PUBLISHED AS:

Hauer KE, Soni K, Cornett P, Kohlwes J, Hollander H, Ranji SR, Ten Cate O, Widera E, Calton B, O'Sullivan PS. Developing entrustable professional activities as the basis for assessment of competence in an internal medicine residency: a feasibility study. J Gen Intern Med. 2013 Aug;28(8):1110-4.

Abstract

Background: Graduate medical education programs assess trainees' performance to determine readiness for unsupervised practice. Entrustable professional activities (EPAs) are a novel approach for assessing performance of core professional tasks.

Aim: To describe a pilot and feasibility evaluation of two EPAs for competency-based assessment in internal medicine (IM) residency.

Setting/Participants: PGY-1s and attendings at a large IM residency program.

Program Description: Two EPAs (Discharge, Family Meeting) were piloted.

Program Feasibility Evaluation: 28/43 (65.1%) PGY-1s and 32/43 (74.4%) attendings completed surveys about the Discharge EPA experience. Most who completed the EPA assessment (10/12, 83.8%, PGY-1s; 9/11, 83.3%, attendings) agreed it facilitated useful feedback discussions. For the Family Meeting EPA, 16/26 (61.5%) PGY-1s completed surveys, and most who participated (9/12 PGY1s, 75%) reported it improved attention to family meeting education, although only half recommended continuing the EPA assessment.

Discussion: From piloting two EPA assessments in a large IM residency, we recognized as inadequate our reminder systems and time dedicated for completing EPA requirements. Collaboration around patient safety and palliative care with relevant clinical services has enhanced implementation and buy-in. We will evaluate how well EPA-based assessment serves the intended purpose of capturing trainees' trustworthiness to conduct activities unsupervised.

Introduction

To fulfill their mission, graduate medical education programs must ensure that trainees are competent to practice medicine. The Accreditation Council for Graduate Medical Education (ACGME) six core competencies aim to address outcomes rather than the process of medical education.[1] Milestones (discipline-specific developmental achievements toward competence) ideally facilitate meaningful workplace-based assessment over time.[2–4] However, efforts to implement competency-based medical education have been stymied by practical challenges and assessment questions. Competency-based assessment tools, while potentially psychometrically strong, can prompt narrow focus on aspects of individual competencies,[5] and improper implementation of assessment tools with inadequate faculty training limits the information gained.[4,6]

Entrustable professional activities (EPAs) are a novel method of operationalizing competencies and milestones in the context of actual clinical work.[7] By definition, an EPA reflects relevant competencies and milestones, requires skills and knowledge, addresses a professional task with a recognizable output, and can be observed and judged by an expert. EPAs naturally focus on holistic performance of actual physician tasks. Assessment based on EPAs addresses the need to determine whether trainees are ready for unsupervised practice, and can enable granting of entrustment of a trainee to conduct certain activities unsupervised, based on assessment of performance of those activities.

This paper describes the development and feasibility of two EPAs for competency-based assessment in a large internal medicine (IM) residency program.

Setting and Participants

Setting: The University of California, San Francisco (UCSF) IM residency includes 62 PGY-1s (interns) who rotate to university, Veterans Affairs, and public county hospitals. Prior to and concurrent with EPA-based assessment

implementation, trainees were assessed with end-of-month global evaluations by faculty, residents, and students; 1-2 annual mini-Clinical Evaluation Exercise (mini-CEX) encounters rated by faculty in continuity clinics; and an in-training exam. Each resident has an advisor serving on a Committee on Housestaff Evaluation and Feedback (CHEF) for discussion of academic progress, career planning and wellbeing.

Program Description

A Department of Medicine assessment leadership group developed two EPAs in spring 2011 and piloted them for assessing PGY1s during the 2011-12 academic year.

EPA development: We formed an assessment leadership group consisting of the residency program director, associate chair for education, associate program director for evaluation, two department of medicine faculty with medical education expertise, and chief residents. This group organized two retreats for IM residency leaders, including other associate program directors, residency advisors, fellowship directors, chief residents and residents. At the first 2-hour retreat, participants discussed limitations of the current evaluation system, reviewed the ACGME competencies and IM milestones, and learned about EPAs.[1,4,8] Participants rated the relevance of potential IM EPAs.[9] At a second three-hour retreat, participants reviewed the potential EPAs including comments from the first retreat. They heard two presentations on connecting milestones to EPAs. The leadership group subsequently held monthly meetings with additional faculty involved in the clinical services.

EPAs: Based on rankings of potential EPAs from the residency retreats and discussions of the assessment leadership group with key stakeholders in the residency curriculum and clinical services, two pilot EPAs were selected for assessment:

(1) Inpatient “Discharge” - aligned with interests of quality improvement and patient safety leaders. (largely achievable by PGY-1s)
(2) “Family Meeting” to discuss difficult information with patients and families -- aligned with existing categorical PGY-1 curriculum within a palliative care rotation. (achievable primarily by PGY-2s)

The leadership group developed the EPAs following the format used in a competency-based workplace curriculum for physician assistants.[10,11] As shown in Appendices 1 and 2, each EPA includes a title, setting, learning goals, description, relevant IM competencies and milestones,[4] other information that informs performance of this EPA, and a strategy for determining whether the trainee can be trusted to perform this activity independently.

Table 1 summarizes the requirements for assessment for the two EPAs. Prior to the study, PGY-1s managed inpatient discharge with direct supervision from the team PGY-2/3 and team supervision by the attending. The Discharge EPA comprises a meeting between the PGY-1 and medicine ward team attending to review the discharge plan and discharge summary for a recently hospitalized patient. Using a standardized rubric based on literature summarizing elements of effective care transitions, the attending provides feedback to the PGY-1 and makes an assessment of entrustability to be used by the CHEF advisors.[12–14] (Appendix 3)

The multi-year Family Meeting EPA-based assessment begins with categorical PGY-1s. In a one-week mandatory palliative care rotation, PGY-1s observe a senior resident, fellow, or attending conduct a conversation about serious illness and/or goals of care. Each PGY-1 then completes a written reflection with a brief description of the family meeting, reconsideration of the meeting from multiple perspectives, identification of personal learning goals, and an action plan. (Appendix 4) After entering the reflection into an electronic portfolio, the PGY-1 receives written feedback from palliative medicine faculty and fellows. This portion of the EPA assessment was piloted in 2011-12.

Table 1 Summary of Two Entrustable Professional Activity Assessments Piloted in an Internal Medicine Residency

EPA title	Discharge EPA	Family Meeting EPA
EPA description	Develop and implement a safe discharge plan for an inpatient from the acute care setting	Observe a family meeting to discuss serious or sensitive news with patient and/or family
PGY level	PGY-1 to PGY-2	PGY-1 to PGY-2
Curriculum	1-hour didactic on writing discharge summaries Two 1-hour noon conferences on safe patient discharge – didactic and small group exercise 1-hour interactive session for interns to review peers' discharge summaries and give feedback Monthly PGY-1 ward orientations, includes site specific key elements of patient discharge	1 week Palliative Care Rotation includes participating in family meetings and goals of care discussions 1 hour noon conference on running a family meeting Online modules and selected papers for self-directed learning as part of the 2 hour long critical reflection exercise
Setting	4-week inpatient general medicine ward rotation at University Hospital	1-week inpatient palliative care rotation at Veterans Affairs hospital
Activity	For initial activity, PGY-1 discharges ward patient including completing discharge summary	PGY-1 observes a family meeting PGY-2/3's lead family meeting
Assessment	EPA rubric completed by ward attending with PGY-1 PGY-1 reflection in portfolio	PGY-1 writes a critical reflection based on observations of a family meeting PGY-1 receives written feedback on reflection from pre-specified faculty/fellows PGY-2 and PGY-3s observed leading at least 3 serious illness conversations and receive structured, timely feedback

Faculty and intern development: A chief resident and associate program director, both charged with quality improvement and patient safety education, educated interns and faculty about the Discharge EPA. Orientation included a session on EPA-based assessment at a Hospital Medicine faculty meeting, email orientation information to attendings before their time on the medical service, and individual orientation for those not at the faculty meeting. Family Meeting EPA faculty development happened at a faculty meeting; the EPA assessment occurred in the PGY-1 palliative care rotation to allow time for intern education both about the content and an introduction to the EPA.

Program Feasibility Evaluation

We evaluated feasibility of the two pilot EPA-based assessments using several metrics for evaluating feasibility studies:[15] survey response rate, EPA assessment completion rates, participant satisfaction and willingness to do the EPA assessment. We also solicited barriers to doing EPA assessments. Three survey questions addressed perceived skill improvement, feedback usefulness with the EPA and a recommendation about continuing the EPA assessment, along with space for written comments about barriers to completing the activities. The Institutional Review Board approved the study.

Results: The Discharge EPA assessment was piloted at the university hospital beginning July, 2011. All forty-three PGY-1 and attending pairs on service were eligible to do the EPA assessment and received surveys. Of those, 28 (65.1%) PGY-1s and 32 (74.4%) attendings completed surveys. (Table 2)

Table 2 PGY-1 and attending surveys: Experiences with 2 Entrustable Professional Activity (EPA) Assessments

	PGY-1 N (%)		Attendings N (%)		Mean rating*	SD
Discharge EPA						
Surveys sent	43	100%	43	100%		
Responses	28	65.1%	32	74.4%		
Participated in Discharge EPA	12	42.9%	11	34.4%		
The inpatient discharge EPA improved my discharge planning skills.	8	66.7%	5	45.5%	3.55	0.93
The inpatient discharge EPA facilitated a useful feedback discussion.	10	83.3%	9	81.8%	3.36	1.12
I recommend continuing to use the inpatient discharge EPA.	10	83.3%	7	63.6%	3.36	1.12
Did not participate	16	57.1%	21	65.6%		
Reason						
▪ I did not know about it	9	56.3%	11	52.4%		
▪ I didn't have time	5	31.3%	7	33.3%		
▪ I forgot about it	1	6.3%	3	14.3%		
▪ No answer	1	6.3%	0	0		
Interested in participating						
▪ Yes	15	93.8%	19	90.5%		
▪ No	1	6.3%	2	9.5%		
Family Meeting EPA						
Surveys sent	26	100%				
Responses	16	61.5%				
Participated in Family Meeting EPA	12	42.9%	11	34.4%		
This EPA improved my attention to family meeting education.	9	75.0%			3.57	0.90
The EPA critical reflection was useful for my learning.	6	50.0%			4.04	0.88
I recommend continuing to use the EPA.	6	50.0%			4.09	0.87
Did not participate	4	25.0%				
Reason						
• I did not know about it	4	100%				
Interested in participating						
• Yes	2	50.0%				
• No	1	25.0%				

*1-5 Likert scale, 1 = strongly disagree, 5 = strongly agree

Of the 43 pairs, twelve PGY-1s and 11 attendings who completed surveys had done the Discharge EPA assessment. Both PGY-1s and attendings responded favorably about the EPA assessment: 8 PGY-1s and 5 attendings felt it improved their discharge planning skills, and 10 PGY-1s and 9 attendings felt it facilitated useful feedback discussions. Over 90% of those who did not do the EPA assessment wished to participate. Not knowing about the EPA or not having time were the most commonly identified barriers to participating. (Table 2)

The Family Meeting EPA assessment was implemented in July, 2011 at the Veterans Affairs Hospital. Of the 26 PGY-1s who completed the palliative care service and thus received surveys, 16 (61.5%) completed the survey and, of those, 12 completed the EPA assessment. (Table 2) The majority (12, 75%) of respondents endorsed that the EPA improved their attention to family meeting education; half found the critical reflection useful for learning and recommended continuing the EPA assessment. The 4 non-participants cited not knowing about the EPA as the barrier to participation.

Discussion

In our pilot of two EPA-based assessments in IM residency, participating PGY-1s and attendings found EPA activities useful for learning and feedback. Among non-participants, interest in participating was high. We identified barriers to participation that reflected the multiple time demands in the inpatient setting and challenges in disseminating information about a new assessment system in a large program.

We designed this initial implementation to evaluate the feasibility of using EPAs that can be the basis for milestones-based assessment; we did not study performance levels or entrustment at this pilot phase.[15,16] Our feasibility study shows that we could orient interns and faculty, both groups are willing to participate in this assessment method, and all could identify advantages to the system. However, participation rates were low. Strategies to increase

adherence to completing the EPA assessments are needed. As with any assessment system, EPAs require ongoing administrative support for monitoring compliance and reminding trainees and faculty to complete expected activities. We found that frequent email reminders improved compliance, and we have increased endorsements and reminders about EPA assessments from program leadership.

Our pilot reveals barriers to and lessons about integrating EPA assessments with clinical work. We found it challenging to engage PGY-1s and faculty on an inpatient rotation with high service expectations, despite their stated interest in EPAs. Interns feel tension balancing work and learning, and the culture may prioritize immediate work duties.[17] PGY-1s and attendings struggled to find time together to review a patient discharge, discuss feedback, and complete a short rubric. Limited trainee-supervisor contact[18] will impede informed entrustment decisions. Better understanding of the time required for each component of EPA-based assessment and practical strategies to build EPA-based assessment into the workday are needed. Based on initial feedback, PGY-1s now are advised to login to their portfolio at the meeting to review expected elements of the discharge process and upload the completed rubric, both for time-efficiency and for exchanging technical knowledge of the portfolio. Several factors may explain the higher participation rate with the Family Meeting EPA assessment than the Discharge EPA. Housing the Family Meeting EPA assessment within a required palliative care rotation allowed more time for EPA orientation and discussion with fewer completing clinical responsibilities.

Our implementation strategy was strengthened by collaboration with key clinical service and curriculum leaders. The Discharge EPA advances the Division of Hospital Medicine patient safety and quality agenda that prioritizes a care transitions curriculum for residents. Thus, hospitalist faculty had both educational and patient safety incentives to participate. The Family Meeting EPA occurs within an existing intern palliative care rotation with dedicated faculty interested in both education and advancing palliative care quality. Synergies between education and clinical goals are important in the current

environment of increased demands for both clinical supervision and clinical productivity.[19]

Future studies are needed to evaluate how effectively EPA assessments capture meaningful aspects of residents' performance, particularly trainees' trustworthiness to practice independently in the future. Judgments of entrustment will entail collating assessment information from multiple observations from multi-disciplinary team members about performance of an activity. In complex care environments, methods of capturing an individual's contributions to team performance will be needed. We also plan to share the pertinent milestones for each EPA with interns and attendings on rubrics and portfolio pages to build understanding of the components of expected performance. We believe that PGY-1 enthusiasm may have been lower for the Family Meeting EPA than the Discharge EPA because of the intern's relatively passive role; the reflection exercise is a preparatory step for a senior resident activity leading family meetings.

Next steps in our pilot will be to elevate the use of EPA assessments to inform decisions of entrustment[10] through review of performance by each advisor who sits on the competence committee. Because each EPA is mapped to multiple competencies and milestones, this review of resident performance and entrustment can capture the milestones assessment required by the ACGME. However, we are developing our strategy for evaluating milestones within an EPA, and for determining whether entrustment for an EPA guarantees successful achievement of all embedded milestones. Balancing innovations in assessment with regulatory requirements is a challenge in any educational program; our experience suggests that EPAs are an assessment strategy that allows for program innovations while also assessing multiple key milestones.[3] We will need remediation tasks for residents, identified through EPA-based assessment, who require additional experience to reach the entrustability threshold.

This study has limitations. This project represents a pilot innovation at a single institution with two EPAs to date. Not all eligible participants completed the

activities or surveys. We do not know if faculty respondents completed faculty development or whether participants were more likely to do the EPA assessments. More nuanced understanding of barriers to PGY-1 and attending participation and solutions for each are needed before EPAs can be used for granting entrustment for unsupervised practice of certain activities. We cannot yet determine the degree to which our EPAs enhance education and assessment, although our learners and attendings attested to some value.

Our results show the potential for EPAs to enhance IM trainee assessment focused on competence in practice. We plan to develop additional EPA-based assessments, including EPAs currently being initiated in outpatient and emergency/urgent care settings. Future work should focus on outcome measures to show whether performance on EPAs correlates with performance of other duties and practice outcomes.

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Appendix 1 Inpatient Discharge EPA

Inpatient Discharge Entrustable Professional Activity (EPA)

UCSF Internal Medicine Residency

Setting: general medicine inpatient

EPA: Demonstrate the ability to develop and implement a safe discharge plan for a patient and then a series of patients from the acute care setting

Learning goals for interns

- Implement high quality discharge plans to ensure safe transitions in care
- Conduct inter-professional discharge planning with social work and case management staff, interprofessional colleagues, the inpatient team, and outpatient providers

Description

- Work with ancillary health providers (i.e. social workers, case managers, nurses) to determine the discharge plan
- Educate a patient and/or family about the discharge plan, and follow up care plans
- Schedule follow up appointments
- Create a plan for follow up of pending test results at the time of discharge
- Reconcile the discharge medications with the admission medication list
- Complete a discharge summary

Information that informs intern's performance of this EPA:

- Attendings' global evaluations
- Residents' global evaluations
- Attending review of one discharge summary – assessed with rubric, written and verbal feedback to intern
- Intern follow up information about patient's post discharge course
- Could include phone call to patient or proxy (family, PCP), discussion with nurse who called patient, information about follow up visits
- Intern fills out structured form – addresses quality issues
- Reports back to team
- Intern portfolio entry on patient discharge experiences, self-assessment regarding progress on milestones, learning goals

How to determine that the intern can be trusted to perform this activity independently?

- Review above information 2-3 times per year = progress review
- Global evaluations, any other assessments, resident reflection forwarded to CHEF advisor
- Intern meets with CHEF advisor

Main competencies and milestones addressed with this EPA

- Patient care
  - Recognize when to seek additional guidance
  - Provide appropriate preventive care and teach patient regarding self-care
  - Customize discharge plan in the context of the patient's preferences, overall health
- Medical knowledge
  - Demonstrate sufficient knowledge to treat common conditions that require hospitalization and follow up care
  - Demonstrate sufficient knowledge of socio-behavioral sciences that affect discharge planning
- Practice Based Learning
  - Develop a system to track, pursue, and reflect on clinical questions regarding patient management plans
  - Integrate clinical evidence, clinical context, and patient preferences into decision-making
  - Respond welcomingly and productively to feedback from all members of the health care team including faculty, peer residents, students, nurses, allied health workers, patients and their advocates
  - Actively seek feedback from all members of the health care team
- Interpersonal and communication skills
  - Provide timely and comprehensive verbal and written communication to patients/advocates
  - Engage patients/advocates in shared decision-making for therapeutic scenarios and management plans
  - Demonstrate sensitivity to differences in patients (race, culture, gender, sexual orientation, socioeconomic status, literacy, and religious beliefs)
  - Effectively communicate with other caregivers including primary care providers to maintain appropriate continuity during transitions of care
  - Effectively communicate plan of care to all members of the health care team
  - Provide legible, accurate, complete, and timely written communication
- Professionalism
  - Demonstrate empathy and compassion to all patients
  - Carry out timely interactions with colleagues, patients and their designated caregivers
  - Ensure prompt completion of clinical and administrative tasks, discharge summaries
  - Advocate for individual patient needs
- Systems-based practice
  - Manage and coordinate care and care transitions from the acute care setting to subacute, rehabilitation, or skilled nursing care or home.
  - Appreciate roles of a variety of health care providers in discharge planning, including consultants, therapists, nurses, home care workers, pharmacists, and social workers.
  - Work effectively as a member within the interprofessional team to ensure safe transitions in care.
  - Recognize systems issues that increase the risk for error during care transitions
  - Reflect awareness of common socio-economic barriers that impact patient care and ability to adhere to discharge plans

Appendix 2 Family Meeting EPA

Family Meeting Entrustable Professional Activity (EPA)

UCSF Internal Medicine Residency

Setting: inpatient medicine ward or general internal medicine continuity clinic

EPA: Lead a family meeting to discuss serious or sensitive news with patient and/or family and other health providers

Learning goals for interns and second year residents

- Learn to conduct a meeting with a patient and/or family to discuss serious news during internship
- Conduct a meeting with a medical team and patient/family to discuss serious news as an intern and/or second year resident

Description

- Establish rapport with the patient and/or family
- Assess the patient/family's understanding of the patient's current condition
- Summarize the patient's medical course and current medical condition
- Deliver serious/sensitive news with clarity and compassion
- Elicit patient/family goals and preferences
- Involve other care providers in the discussion
- Establish a plan of care for the patient

Information that informs performance of this EPA:

- Attendings' global evaluations
- Other team members' global evaluations
- Attending feedback on the encounter using rubric
- Resident reflection – brief write up of how the PGY2 thinks s/he's doing on milestones and learning goals

How to determine that the PGY2 can be trusted to perform this activity independently?

- Review above information 1-2 times per year = progress review
- Global evaluations, attending feedback, resident reflection forwarded to CHEF advisor
- PGY-2 meets with CHEF advisor
- Resident who cannot be entrusted by the midpoint of the PGY2 year could receive additional guidance to be on track to be entrusted by end of PGY2 year, and to teach this skill to PGY1s and PGY2s in the R3 year

Main competencies and milestones addressed with this EPA

- Patient care
  - Seek and obtain appropriate, verified, and prioritized data from secondary sources (e.g. family, records, pharmacy)
  - Obtain relevant historical subtleties that inform and prioritize both differential diagnoses and diagnostic plans, including sensitive, complicated, and detailed information
  - Role model gathering subtle and reliable information from the patient for junior members of the healthcare team
  - Recognize when to seek additional guidance
  - Customize care in the context of the patient's preferences and overall health
- Medical knowledge
  - Demonstrate sufficient knowledge of socio-behavioral sciences – i.e. health care economics, medical ethics, medical education
- Practice Based Learning
  - Determine if clinical evidence can be generalized to an individual patient; Customize clinical evidence for an individual patient
  - Communicate risks and benefits of alternatives to patients
  - Integrate clinical evidence, clinical context, and patient preferences into decision-making
  - Respond welcomingly and productively to feedback from all members of the health care team including faculty, peer residents, students, nurses, allied health workers, patients and their advocates
  - Actively seek feedback from all members of the health care team
  - Calibrate self-assessment with feedback and other external data
  - Reflect on feedback in developing plans for improvement
  - Maintain awareness of the situation in the moment, and respond to meet situational needs
  - Reflect (in action) when surprised, applies new insights to future clinical scenarios, and reflect (on action) back on the process
- Interpersonal and communication skills
  - Provide timely and comprehensive verbal and written communication to patients/advocates
  - Effectively use verbal and non-verbal skills to create rapport with patients/families
  - Use communication skills to build a therapeutic relationship
  - Engage patients/advocates in shared decision making
  - Role model effective communication skills in challenging situations
  - Actively seek to understand patient differences and views and reflect this in respectful communication and shared decision-making with the patient and the healthcare team
  - Engage in collaborative communication with all members of the health care team
- Professionalism
  - Demonstrate empathy and compassion to all patients
  - Demonstrate a commitment to relieve pain and suffering
  - Provide support (physical, psychological, social and spiritual) for dying patients and their families
  - Provide leadership for a team that respects patient dignity and autonomy
  - Recognize scope of his/her abilities and ask for supervision and assistance appropriately
  - Serve as a professional role model for more junior colleagues
  - Recognize when it is necessary to advocate for individual patient needs and effectively advocate

- Treat patients with dignity, civility and respect, regardless of race, culture, gender, ethnicity, age or socioeconomic status

- **Systems-based practice**
  - Understand unique roles and services provided by local health care delivery systems
  - Manage and coordinate care and care transitions across multiple delivery systems including ambulatory, subacute, acute, rehabilitation, and skilled nursing
  - Negotiate patient-centered care among multiple care providers.

Appendix 3 Evaluation Rubric for Inpatient Discharge Entrustable Professional Activity (EPA)

Intern Name:

Faculty Reviewer:

Complexity of Discharge (circle one):
Straightforward Moderate Highly Complex

Technical evaluation of D/C Summary	Yes	No	Comments
Timely completion of D/C summary (on day of discharge)?			
D/C summary accurately and concisely convey the following:			
Discharge diagnosis			
Concise hospital course by problem			
Discharge medications and doses			
Follow up needs/plans			
Pending tests			

Global Evaluation of D/C Plan	Yes	No	Comments
Adequate PCP Communication			
Multidisciplinary Communication			
Follow up care arranged			

Global Assessment of Independence	Done Indepen-dently	Done with Direction	Not Done	Comm ents
Discharge needs recognized				
D/C planning started early				
Ancillary recommendations followed-up				
Independently remembers necessary items of D/C Plan				
Home Assessment				

Overall Summary Score: Level Awarded _____

Assignment of an EPA Level: *Interns should achieve a level II-III by the end of intern year. Second year residents should obtain a level III-IV by the end of second year, and Third year residents should reach level IV-V by graduation from residency.*

Levels:

I Intern has knowledge and some skill, but is not allowed to perform the EPA independently.

II Intern may act under proactive, ongoing, full supervision.

III Intern may act under reactive supervision, i.e., supervision is readily available on request.

IV Resident may act independently.

V Resident may act as a supervisor and instructor.

Appendix 4 Family Meeting EPA - Critical Reflection Guide

Overview of Critical Reflection

Reflection (looking back on an experience) is different than Critical Reflection. Critical Reflection is the process of analyzing, questioning, and reframing an experience for the purpose of learning and improving practice. It is an important skill for medical professionals to learn from past experiences and to further develop their clinical skills.

- Know that while the guidelines may seem restrictive, research shows that without such prompts people write anecdotes with little or no evidence of learning.
- Novice reflectors usually 1) just describe their experience and/or 2) draw conclusions with no input from other people or sources. Even when done thoughtfully, this leads to missed opportunities for learning since we can't know what we don't know or assume the experiences and interpretations of others will be the same as ours.

Key components of Critical Reflections include:

- Linking the current experience with past, and concerns about future experiences
- Considering the experience from multiple perspectives (ie: patient, family and provider)
- Stating the lessons learned
- Planning for future learning or behavior

Family Meeting Critical Reflection Instructions

- As the first step towards completion of the Family Meeting EPA, you are being asked to critically reflect on a family meeting or conversation you observed are participated in focusing on serious illness and/or end-of-life care (i.e. goals of care discussions, treatment preferences, breaking bad news to/with a patient and/or patient's family).
- Please write your reflection in the SOAP note format detailed below (Adapted from UCSF LEaP Guidelines)[20]

S: Subjective is a brief depiction of the experience so others can follow your analysis. Consider writing about:

- What happened: the situation and context, including your thoughts/feelings at the time *(Content)*
- How it happened. How did the facilitator perform? What went well? What didn't? *(Process*)

O: Objective should be the area where you reconsider the experience from multiple perspectives. Go beyond imagining others' perspectives to supporting your thoughts with data. Suggestions include:

- Use open-ended, open-minded questions to elicit opinions, interpretations and feedback from the palliative care team, the patient/family, and other individuals at the meeting
- Consulting the medical literature or other sources of relevant information (see recommended resource list on the portfolio template for the Family Meeting EPA)
- Incorporating information from web-based resources

A: Assessment requires analysis of the family meeting/difficult discussion to integrate the subjective and objective data with current and past experience. The purpose of the assessment is to develop a new understanding of the situation and/or identify future personal practice and learning goals. Consider the following:

- Based on your own strengths and weaknesses what would be your challenges in running meetings similar to this experience; what areas do you feel you need to work on?
- How did this experience relate to your past experiences?
- How has this analysis affected how you will approach similar situations in the future?

P: Plan should consist of action items which can be accomplished and evaluated in the upcoming intern year and revisited later to track your professional development. Remember, the best plans are "SMART" (specific, measurable, attainable, relevant, and timely).

CHAPTER 5

HOW CLINICAL SUPERVISORS DEVELOP TRUST IN THEIR TRAINEES: A QUALITATIVE STUDY

IN PRESS AS:

Hauer KE, Oza SK, Kogan JR, Stankiewicz CA, Stenfors-Hayes T, Ten Cate, O, Batt J, O'Sullivan PS. How clinical supervisors develop trust in their trainees: a qualitative study. Medical Education.

Abstract

Context: Clinical supervisors oversee trainees' performance while also granting them increasing opportunities to perform independently. While the factors contributing to supervisors' trust in their trainees to conduct clinical work have been identified, how trust develops shaped by these factors remains less clear.

Objectives: To determine how supervisors develop and experience trust in their resident (post-graduate year-2 and 3) trainees in the clinical workplace.

Methods: Internal medicine inpatient supervisors at 2 institutions were interviewed about the meaning and experience of trust in resident trainees. Using a phenomenographic approach, investigators coded and analyzed the transcript data.

Results: Forty-three supervisors participated. Supervisors characterized the meaning of trust from the perspectives of trainee competence and leadership or from their own perspective needing to provide more or less supervision. Supervisors initially considered trust usually independent of prior knowledge of the resident, and then used sources of information about trust to develop their judgments of trust. Sources, which incorporated inference, included supervisors' comparison to a standard, direct observation of the trainee as a team leader or care provider, or stakeholder input from team members, patients and families. Barriers and accelerators for trust formation related to the residents, supervisor, resident-supervisor relationship, context and task. Trust formation had implications for supervisors' roles, residents' increasingly independent provision of care, and team functioning.

Conclusions: From a general starting point, supervisors develop trust in residents informed by observation, inference, and information gathered from the team and patients. Judgments of trust yield outcomes defined by supervisors' changing roles, residents' more independent care provision, and team functioning. The implications of these findings for graded resident

autonomy aligned with learning needs can inform the design of training environments to enable readiness for unsupervised practice.

Introduction

The goal of medical training is to prepare learners for unsupervised practice. Clinical supervisors are therefore charged with overseeing trainees' performance while also granting them increasing opportunities to perform independently. Whereas supervisors observe some aspects of their trainees' performance directly, they also explicitly or implicitly make decisions to entrust their trainees with various responsibilities that they supervise at some distance.[1] Trust entails "dependence on something future," and to entrust an individual with something is to "assign a responsibility to or put something into someone's care."[2,3]

Studies in medical education have identified factors that contribute to supervisors' trust in trainees.[4] Trainees' competence, as manifested in their knowledge and skills, recognition of their own limitations, willingness to seek help, self-efficacy, and conscientiousness all influence their supervisors' trust in them for independent practice.[5–7] Supervisors' own clinical and supervisory skills and experience influence their ability to identify trainees' level of competence,[8] as does their personal tendency to trust. The context and culture of the work environment along with task complexity and familiarity influence assignment and completion of responsibilities.[9] Demanding workloads and residents' own desire for independence may lead residents to be afforded independence before their supervisors feel they are ready.[5,10,11] The relationship between supervisor and trainee constitutes another important contributor to judgments of entrustment as the two discern each other's abilities and styles.[4] Supervisors and trainees may negotiate roles and responsibilities iteratively as they develop rapport and learn each other's approaches and expectations.[12] The degree of mutual trust between supervisor and trainee informs the supervisor's assessment of the trainee's readiness for independent practice.[6]

Multiple theoretical perspectives can inform deeper understanding of how trust influences supervision. Using research on trust from multiple fields, we proposed a model describing how supervisors' trust in trainees is essential for trainees' participation in the workplace.[4] Trust frames judgments about

readiness for progressively greater independence and thus aligns with the developmental approach to learning in the workplace valued in milestones-based education.[13,14] However, given the relevance of contextual and sociocultural aspects of the relationship between supervisor, trainee, and the social context in which learning occurs, a sociocultural perspective can elucidate how learning emerges as a trainee interacts within a social context.[15] To optimize learning, trainees must actively strive to participate and the workplace must invite participation appropriate for their learning needs. Trust encompasses both an attitude toward a trainee and also an action done differently based on that trust.[16] These two components of trust prompt interest in how trust grounds supervisors' invitation for participation at the leading edge of the trainee's competence. Vygotsky's zone of proximal development describes the gap between learners' capability and the capability they could achieve with supervisors' guidance; supervision aimed at this gap promotes skill acquisition and mastery.[17] Thus, theoretical underpinnings of this work address the context and social interactions inherent in clinical training, as informed by sociocultural theory and communities of practice, and the learner's current abilities and supervisor's understanding of those abilities as informed by Vygotsky's work on supported development.[15,18,19]

Informed by research and theory, we identified a gap in the literature related to how factors that contribute to supervisors' trust in trainees interact to foster individual supervisors' development of trust and how supervisors understand the meaning of trust as they supervise within the workplace. This study explores the different ways that supervisors develop trust in their trainees, the factors that influence trust, and the outcomes of this trust for supervision and learning. Findings can inform how programs structure supervisory relationships and faculty development to ensure trainees' development of competence for independent practice.

Methods

Design: This is a qualitative study using a phenomenographic approach, which enables examination of how different individuals experience a phenomenon, which in this study is trust.[20,21] The differences in how trust develops and is experienced, and how these may relate to one another, constitute the 'outcome space', or findings, of the study.[22] Phenomenography appreciates the interactions among findings, and trust development is known to be influenced by multiple factors within a social context.

Participants and setting: Participants were internal medicine (IM) supervisors at two different large United States academic IM residency programs with hospitalists (internal-medicine physicians who focus on the care of hospitalized patients) to ensure including supervisors with direct experience with residents. We used two sites in different geographic areas to broaden our perspective on trust as it may relate to institutional culture. The two sites were a convenience sample. Eligible supervisors had attended on the inpatient IM service in the prior three months and worked with a resident for at least seven days. Each supervisor led an IM team with one resident (post-graduate year [PGY] 2 or 3), two interns (PGY-1), and one or two medical students. The supervisor and resident worked together for two weeks at site 1, and for one to two weeks at site 2. We chose to focus on inpatient IM because the service structure incorporates both individual supervision and frequent opportunities for unsupervised activities.

Supervisors received an email invitation to participate; non-respondents received up to three email reminders. Participants received a $15 coffee card. The institutional review boards at the participating institutions approved the study.

Data collection: Participants completed a seven-item demographic survey and a 30-minute semi-structured interview in person or by telephone between July 2013 and January 2014. Supervisors described (Appendix A) trust development and what it means to trust a resident with patient care responsibilities. Based on prior work, prompts addressed influences on trust

related to the supervisor, resident, working relationship with the resident, particular tasks, and context.[4,5] One trained research assistant (JB) with experience in qualitative interviewing and one trained investigator (CAS) conducted the interviews, which were audiorecorded and transcribed by a professional transcription service.

Analysis: Data analysis occurred concurrent with data collection until the research team determined that no new themes were emerging (saturation).[23] Consistent with a phenomenographic approach, data analysis aimed to identify how supervisors conceptualized the meaning of trust in their residents and develop trust, and how aspects of their different experiences (as captured in categories or codes in the data) related to one another and informed supervision behaviors.[22,24,25] Previously described factors that contribute to trust formation served as sensitizing concepts, which inform the initial direction of qualitative data analysis without limiting identification of new understandings.[26]

The research team included IM clinicians with supervisory roles and research experience (KEH, SKO, JRK, CAS), medical education researchers (TSH, OTC, PSS) and a research assistant (JB). Data analysis began with the primary investigator (KEH) reading 10 full transcripts, and three investigators reading two transcripts each (SKO, JRK, JB); all made notes of important concepts related to trust. The primary investigator outlined a preliminary codebook (list of codes with definitions and examples), and then read the portion of 9 additional transcripts related to the question about the meaning of trust and refined the codebook to reflect identified themes. Three investigators (SKO, JRK, JB) read 5 additional transcripts each from among this group and confirmed and expanded the themes in the codebook. The investigators discussed these themes and finalized the codebook.

These investigators (KEH, SKO, JRK, JB) then applied the codes to all transcripts. The two coders for each transcript met to reconcile discrepancies through discussion, and brought questions to the other coders for consensus adjudication. In the next analysis phase, these investigators reviewed

transcript passages by code to focus on the meaning of trust, how it formed, and how it influenced behaviors. Over multiple meetings informed by review of transcript passages, these investigators discussed and refined the concepts in the data and sought supporting and disconfirming examples, using a process of negotiated consensus.[27] By examining the primary data to find relationships among the codes, the authors generated a figure describing the experience of trust formation (Figure 1). The principle investigator reviewed whole transcripts again to confirm findings and seek all perspectives. We used Dedoose software to code and retrieve data (SocioCultural Research Consultants, LLC).

We took steps to enhance the trustworthiness of the findings. We considered reflexivity[28] through including a team of clinicians who serve as supervisors who experience trust in learners, and non-clinician researchers, who together engaged in dialogue to question and challenge one another's assumptions throughout the analysis. The study team also used a process of investigator triangulation.[20] The investigators not directly involved in coding reviewed the major findings and used their expertise in supervision, medical education and research to help clarify and critique findings. For model development, the primary investigator designed the figure and then iteratively shared it with co-investigators who compared the draft model to the study results and provided feedback about areas to add or emphasize. These changes included the role of inference in judgments of trust, the facts that supervisors' role shift manifested in varying ways, and that different versions of schedule asynchrony at the two sites affected trust. The primary investigator presented study results in grand rounds presentations to faculty supervisors at the two study sites and received further feedback and critique of the findings, which were then incorporated into the final manuscript and model.

Results

The analysis included 43 interviews. At site 1, 30 of 38 invited faculty participated; 8 declined. Two recordings failed, and thus 28 interviews were included. Interviews lasted an average of approximately 27 minutes (range 18-44 minutes). At site 2, 15 of 29 invited faculty participated and all 15 interviews were included; 6 others agreed to participate but did not because the study seemed to achieve saturation, 1 had worked with the resident fewer than 7 days, and 7 declined. Twenty-three of 43 participants were female. Participants included 5 professors, 5 associate professors, 25 assistant professors, and 8 instructors. The mean number of years attending was 6.8 (range 1-21 years). Thirty-four participants were hospitalists; the other 7 primarily outpatient general internists and 2 other clinicians functioned as hospitalists while working in the hospital. The mean number of weeks attending inpatient per year was 10.8 (range 2-32 weeks).

Meaning of trust

Many supervisors described the meaning of trust as exemplified in the resident's competence and team leadership. Supervisors perceived resident competence demonstrated in the resident's independent clinical decision-making as the primary decision-maker for patient care within the team and communication with patients and health care team members. Team leadership manifested within the team in the resident's daily organization and execution of team rounds and care plans and role modeling of professional leadership and patient care. Resident competence in patient care and team leadership as a supervisor of more junior team members often co-occurred, with competence inferred through rounds behaviors:

I pay very close attention to what the resident is doing and it's not just their clinical decision-making, but how they seem to be handling the aspects of both, providing good care while being a good supervisor. (022)

The observation of clinical competence with substandard leadership skills diminished supervisors' trust. Another characterization of the meaning of trust was from the perspective of self; either the supervision that supervisors felt obligated to provide or the comfort they felt when they perceived that appropriate patient care was occurring.

Supervisors trusted based on residents' recognizing their own limitations and knowing when to seek help:
[Trust] means that I have confidence in their ability to make safe decisions, to care for the patient, and that they will come to me if there's any doubt as far as how to proceed safely. (026)
Trust in a resident's patient care inferred from team leadership was exhibited in the resident's supervision and coaching of interns and students and management of team rounds: *"[Trust] means that … I can trust them to run rounds. It means that when they are teaching the students and interns I can trust that what they're telling them is correct." (035)* Leadership encompassed organizational skills, sharing of knowledge with more junior team members, and a positive, professional disposition. Team leadership skills were described as both an activity to be entrusted and also informative as a 'proxy' about trustworthiness for clinical activities such as managing patient problems and performing procedures.

How trust develops

Supervisors described how they experienced trust developing over time (as shown in Figure 1; items from the figure are indicated in **bold** font in results): from various **starting points**, through a period of supervisor trust formation influenced by **barriers** and **accelerators** to trust, and to the realization of **trust outcomes**.

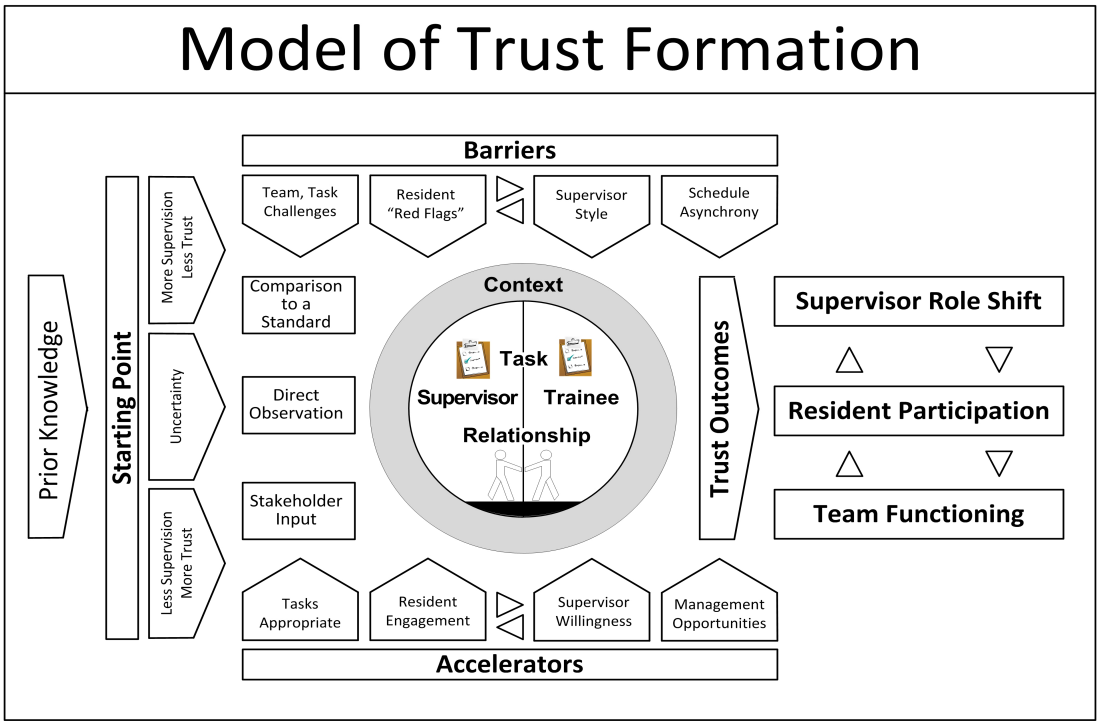
Participants described thinking about trust as soon as they started working with a new resident. Different supervisors indicated three different **starting points**: (1) **less supervision/more trust**, described as a 'leap of faith'; (2) **more supervision/less trust**, described as 'trial and error' in which high supervision occurred and problems prompted more supervision (3) **uncertainty** about where to start in terms of trust and guidance. Regardless of the starting point endorsed, supervisors used similar strategies for initial supervision, such as checking the resident's work *'behind the scenes'* and making themselves readily available. Many who said they trusted the resident still frequently checked resident work to ensure that trust was justified. One

supervisor starting from a position of high trust qualified it with intentionally high availability:

I usually let them work independently right from the get-go. I have a technique, which I call proximity management…I try to position myself close by and do my work from near where they are so that if they have questions they can just lean over and tap me on the shoulder. (035)

Another who found the **starting point** a time of great uncertainty explained: *"That first or second day is always kind of a gray area." (046)* Two supervisors employed strategies to expedite determination of trust by reviewing clinical scenarios with the resident that probed the residents' clinical reasoning, either scenarios related to patients on the team, or hypothetical scenarios. Some with a starting point of low trust had difficult decreasing their supervision even when they did trust more over time.

Figure 1 A Model of Trust Formation



Whereas prior knowledge of the resident was often available, supervisors expressed ambivalence about its usefulness. Prior knowledge of a resident derived from the resident's reputation, other supervisors, information available through the supervisor's leadership role in the program, or previous work with the resident as a PGY-1 or in the ambulatory setting. Although supervisors often received "signout" about the resident from the prior supervisor, they perceived this information as non-specific: "*It's usually, 'Resident is great; interns are wonderful.' So, you know, not a whole lot of detail." (073)* Supervisors questioned how best to incorporate prior knowledge of resident performance into their supervision and judgments of trustworthiness. They described examples of both negative and positive prior knowledge about the resident that contradicted their own experience. Therefore, some supervisors concluded that the best approach was to avoid bias by *"giving the resident a clean slate."* (040)

Judgments about trust usually occurred quickly within hours to days. Many supervisors described forming impressions that sufficed to draw conclusions about trust within *"a few days", "a call cycle"* (4 days) or sometimes as long as *"a magic number somewhere between one and two weeks*". A few reported

that this process occurred within the first day observing residents leading rounds, teaching and engaging in clinical decision-making.

Sources of information for trust development

Trust in a resident's patient care was informed by **comparison to a standard, direct observation or stakeholder input**. (Figure 1)

Comparison to a standard occurred in several ways. Comparison to self frequently informed trust. Supervisors used terms such as *'mirror'* and *'extension of my eyes and ears'* to describe how they appraised residents' performance based on what they themselves would have done. One explained how trust means that, *"Everything that I would have done for the patient, the resident is doing." (024)* Some also compared the resident to their past selves, surmising what they would have done when they were residents. These comparisons were often broad and general, across domains of decision-making, patient evaluation and management, and communication. Particular examples included the supervisor feeling that a resident ordered more tests than s/he would have (027), showed similar amount of concern about particular patient problems (034), or identified the same patient data for discussion and intervention that the attending noticed (074).

Some supervisors described how trust occurred even when residents' behaviors differed from theirs. These supervisors sought to distinguish differences that constituted correct versus incorrect patient management. One explained evolving from assessing *"what's their personality and what's their style, to what's their competence." (027)* Some acknowledged differences that represented an equally good alternative approach, whereas a few observed residents making better decisions than they would have. Some explained that residents' explanations of the reasoning supporting differing decisions restored trust:

Trust doesn't always mean that they have to do what I would do every single time, but that I understand their thought process and their skill enough to know that a decision is safe for the patient. (070)

Supervisors also commonly determined trust using a normative approach. The comparison standard for residents' performance was the supervisor's personal expectation for the residents' training level, institution, or time of year:
The general expectations of the resident [at XXX] who has done a certain number of rotations at a certain point of the year add to the baseline sense of where a resident should be at that point. That helps calibrate me on how much I need to provide oversight. (038)

Direct observation of clinical care and team leadership also informed judgments of trust. Participants' examples of direct observation usually addressed events on team rounds. Supervisors highlighted residents' skills in asking the right questions to team members or patients, making decisions, and generating appropriate management plans as indications that the resident could be trusted.
How they present themselves in rounds, if they have a clear sense of what is going on, what they're worried about, at the bedside rounds, if they ask the appropriate questions, if they're concerned in the appropriate way….If I see that registration, both in non-verbal and verbal cues, that they understand that this patient is sick and X, Y, Z needs to get done, then I feel like a little bit more autonomy is warranted. (027)

Stakeholder input, which included input from other team members, was an uncommonly mentioned information source about trustworthiness. A few supervisors mentioned hearing feedback from the PGY-1s or students about the residents' leadership, or observing the interns providing quality patient care, and inferring the resident's trustworthiness. A few supervisors defined trust based on the observation that patients had received high quality, safe care. These descriptions were not described using specific criteria. They rarely derived from direct patient comments about their perceptions of their care but rather through inferring that patients were treated appropriately or satisfied with their care.

Barriers and accelerators for trust formation

Barriers and accelerators related to the resident, the supervisor, the resident-supervisor relationship, the context and task influenced trust judgments, as shown in Table 1. Barriers included concerns about residents' disposition and professionalism that could raise '**red flags**;' contextual **challenges** related to other team members, tasks, workload, and **schedule asynchrony**; and a **supervisor's style** to trust less and check resident work more. Barriers to trust also arose after experiences of misplaced trust. These were uncommon among our participants, and examples tended to address residents who demonstrated generally good decision-making, but then when facing a particularly complex patient, did not know how to manage the situation appropriately and did not seek help promptly. Other examples of misplaced trust also arose when residents appeared more confident than their competence warranted or did a procedure considered above their training level while away from direct supervision. One attending explained the latter as, "Even the ICU attending was shocked at this cowboy kind of attitude." (042) **Residents' engagement** via enthusiasm and befitting confidence; **appropriate task complexity**, workload, and challenging **management opportunities** for the residents' competence; and **supervisors' willingness** to trust all enhanced trust. Frequent supervisor-resident communication and shared expectations for roles and interactions characterized supervisor-resident relationships that fostered trust. Greater supervisor experience and willingness to trust, coupled with opportunities for observing the resident manage particularly sick patients, also engendered trust.

Table 1 Accelerators and Barriers for Trust

Category of barrier or accelerator	Description	Quotations
Barriers		
Resident	• Traits labeled as "Red flags" by supervisors	*When you go do bedside rounds you see how they talk roughly to patients and then that kind of raises some red flags (084)* *Somebody who just comes across as very arrogant would be a red flag to me that I need to supervise them a little more closely (026)* *If a resident is very hasty or speedy, or makes judgments or clinical decisions very quickly, I think that I get involved a little bit sooner thinking that perhaps they may have not considered all of the information going into a clinical decision. (047)*
Supervisor	• Junior status • Fixed work habits with low propensity to trust	*I'm responsible for the patients and so I kind of keep an eye on things. When they admit at night, even before they call me to kind of run the list, I have already looked over everything in the computer and I have looked over their orders (080)*
Supervisor-resident relationship	• Mismatch between supervisor and resident expectations for interactions • Resident discomfort with giving and receiving feedback in the relationship • Resident seeking help inadequately or excessively	*[Detailed supervisor expectations are] a little bit of a threat [for the resident] because they're supposed to be the team leaders. (035)* *I just felt like our working relationship wasn't as strong as with the current resident, where I really felt that they were kind of an extension of me like I was saying in the beginning where they're, you know, I feel confident that they can go and be my eyes and ears sort of because I didn't feel that kind of melding and development of professional rapport with this person. (045)*
Context	• Asynchronous schedules with different starting days, days off • High* or low census • Less experienced or capable team members • Walk rounds structure with attendings participating	*I kind of led things because he came on two days after the rest of us started together, so initially it was like him learning everyone. (084)* *When it is really busy, … I feel the need to supervise more or just be much more hands on with the resident and at least offer to help with things that I might allow someone to do independently and in other situations if it weren't so busy just to maintain the flow of patient care (024)*
Task	• Task complexity* or supervisor past observation that residents need help	*Some of the things that just come up a little bit less frequently and where experience is really a premium to dealing with this situation (079)*

	with task • Rare tasks	
Accelerators		
Resident	• Resident enthusiasm • Appropriate resident confidence	*His confidence and enthusiasm combination really gave me a better sense of who he was and allowed me to give him a little bit more leeway in terms of making decisions on his own. (037)*
Supervisor	• Experience as a supervisor • Desire to teach, role model approaches to independent practice • Personal supervision style	*I'm actually learning to let them be autonomous, as long as they're not gonna hurt the patient. (040)* *It may be a situation where I want to model a style of approaching a complex situation or complex problem. (020)* *By nature I'm a little bit less micromanaging. (027)*
Supervisor-resident relationship	• Shared sense of ownership for team • Shared expectation for resident independence • Frequent communication • Bidirectional feedback • Rapport	*We sat down together at the beginning and established together how we would want to run the team. (033)* *I try to see my role as a direct mentor really to the whole team, but particularly to the senior resident. So, my relationship with the senior resident is to be, I hope more like a coach (043)* *It was clear to me that my resident wanted to take that [goals of care] discussion on herself and it wasn't something I was used to not being present for, but after discussing with her, her approach to the patient and what she aimed to get out of that discussion, I was fine with her doing it without my being there. (070)*
Context	• Opportunities for supervisor to observe resident managing sick patients, multiple duties • High census*	*With the diversity and volume of patients that we had, it was pretty easy to figure out what he could be trusted or not trusted to do. Observing that volume early on made it easy to figure out. (024)* *No matter what, the higher your census, the harder it is to micromanage the team. (075)*
Task	• Routine tasks • Complex patient problems*	*When it comes to senior residents, I trust that if they've reached that level, they are able to perform at least basic tasks. (074)* *That to me was a huge trust building exercise, because I got to see that this is a senior resident who doesn't shrink in the face of a serious [patient care] situation. (041)*

*High census and task complexity mentioned as both barrier and accelerator

Outcomes of trust

Trust formation influenced different **trust outcomes**, including supervisors' roles, resident participation and team functioning.

Supervisor role shift entailed changes in supervisors' own roles and behaviors. Supervisors commonly characterized the meaning of trust based on how much time they spent checking resident work: *"To trust a resident means in part that I don't have to check up on every little detail." (034)*. One such outcome was a personal change from primarily providing clinical care to teaching PGY-1s and students, and/or serving as a consultant to the resident. Another outcome of trust was a change in supervisors' attitude toward less anxiety about their supervisory role, more relaxation and greater ability to sleep at night; one summarized, *"Just how easy I slept at night."* (081)

Supervisors perceived that their trust in the resident enabled **resident participation** more independently in providing patient care. As a supervisor moved away from checking as many aspects of the residents' work, the resident seemed to appreciate increased independence:
He knew that I was available to help, but wasn't going to make all the little micromanaging decisions… we worked together frequently as colleagues in addition to that hierarchical, 'you're the attending, I'm the resident' kind of relationship. (035)

Supervisors highlighted changes in team **functioning** and team dynamics as an outcome of trust formation. Rapport and relationship building among all team members, as manifested by enjoying one another's company and laughing, showed that a supervisory relationship was successful, with the supervisor serving a coach or mentor role. This type of success was described as *"implicit"* or *"obvious*."

With low trust, or before trust occurred, these outcomes were not possible, although supervisors sometimes mentioned them as goals. A starting approach of **more supervision/less trust** seemed to persist for some supervisors, limiting their achievement of trust outcomes until they realized the limitations of fixed lack of trust and modified their supervision.

Discussion

Our findings describe how supervisors judge trustworthiness for clinical practice, enact supervision based on trust, and experience subsequent outcomes of this trust. Trust develops from a starting point often uninformed by prior knowledge of individual residents. Instead, trust formation can be informed by supervisors' understanding of general performance standards and their observations of leadership and clinical care. Barriers and accelerators for trust, variably identified by supervisors, relate to previously identified contributors to trust formation and highlight the importance of resident disposition and professionalism, supervisor characteristics, shared expectations for the working relationship, and the amount and complexity of team workload. These relational and contextual factors reinforce the relevance of considering trust, since it influences clinical learning. This information can guide development of supervisors within a training environment enriched with intentionally selected learning tasks and supervision provided at the leading edge of trainees' competence to foster readiness for unsupervised practice.

The use of phenomenography enabled us to characterize different perspectives among participants regarding the development of trust during intensive working relationships, as shown in Figure 1, and to appreciate the range of initial approaches to trust and importance of different contributing factors. Our supervisors' varied descriptions of the influences on trust portrayed dynamic paths based on starting point toward judgments of trust and, for some, achievement of educational and team outcomes that solidify the importance of trust for learning. At the core of trust is the supervisor-trainee relationship, a less frequently described factor contributing to trust, is enhanced by shared expectations for the working relationship and ongoing communication. Relationship encompasses an interpersonal dynamic that can be fostered with similarity between two individuals as well as the amount of contact between them.[4] A relationship enhances the supervisor's ability to adjust supervision to each learner's supervisory needs.[29] For example, with a strong relationship, the trainee can feel more comfortable seeking help, receiving feedback, and incorporating changes.[30] We found that perceptions of a strong resident-supervisor relationship seemed to enable more specific

feedback delivery that could promote more specific guidance about residents' development, as has been identified previously.[31]

Our findings illustrate how trust development can be understood as a progressive process from a starting point through to outcomes, although starting points, influencing factors, and outcomes vary among supervisors. Perhaps surprisingly, supervisors expressed ambivalence about the value of the often very general prior information they held or received about residents. While some supervisors trusted based on residents' training level, others made a determination of trust rapidly within hours to days. Work on impression formation suggests that trust may be influenced by early interactions as supervisors aim to categorize trainees into broad groups.[32] The current context of frequent rotations and brief relationships on inpatient teams may lead supervisor and resident to value and expect interactional styles that encourage rapid acclimation.[33] Similarly, 'swift trust' defines the ways that teams rapidly develop trust based on shared goals and clearly defined roles within a time-pressured environment.[34] Situations that require teams to start working together quickly with high stakes, as occurs with medical teams, prompt the need for swift trust. This context raises the question of how trust formation might differ in longer-term relationships. Levin describes how, with time, trust is based less on personal similarity or common behavioral expectations and more in knowledge of shared perspectives.[35]

Our participants described the process of developing trust as complex and sometimes nebulous. Supervisors inferred trust for patient care activities using information gleaned from rounds leadership or other sources. Others have similarly described how proxy information can inform trust in the absence of sufficient direct observation of specific behaviors.[7,36] Our supervisors also often considered resident performance using broad, general terms. Ginsburg similarly described how supervisors described a trainee's performance using 'meta-competencies' that did not align with the multiple competencies defined in a national framework.[37] Our participants used general assessments of patient care outcomes in assessing resident performance, but did not describe in much detail what metrics they used or particular outcomes they expected.

This situation could leave residents uncertain about what steps to take to develop or demonstrate behaviors that earn supervisors' trust, other than perhaps avoiding red flag behaviors such as defensiveness or dishonesty. This holistic approach to supervision may need to be reconciled with the current expectation for milestones-based assessment of performance. Although we have identified factors contributing to trust, as well as barriers and accelerators, our findings suggest that the experience of developing trust can be a synthetic, holistic judgment that perhaps cannot be fragmented into milestones.[38]

The interaction of barriers and accelerators influenced the evolution of trust formation. (Table 1) Commonly cited barriers for our participants related to the clinical environment, which comprises a complex system with team members rotating continually and asynchronously. Returning to the theoretical frameworks for this study, these barriers show how the social context in which learning occurs can enable or impede residents' participation, and consequently their opportunity to earn trust. Wenger's work on communities of practice suggests that residents should move from a position of peripheral participation to a more central role in patient care, a situation that would change the supervisor from having the central role in patient care to a supportive role.[39] Conversely, others have reported that residents may increasingly play the role of team leader, or manager, in the current era of more elaborate coverage schedules.[40] Our participants themselves, as a group of attendings committed to and experienced with inpatient teaching and clinical care, represent a group of potential accelerators of trust. This group could present an opportunity to focus faculty development on education, supervision and trust. For example, trust could be accelerated with supervisor training on assignment of tasks at the right learning level for trainees.

Once trust is established, our model indicates the consequences of that trust. Trust formation shifts supervisors' roles as it elevates residents' participation in care, to the benefit of the entire team (Figure 1). A judgment of trust in the resident influenced supervisors' views of their own roles as consultants and teachers rather than care providers. The importance of this shift is supported

by literature emphasizing the role of a clinical teacher as a facilitator of learning in the workplace.[41] Residents in our study who earned trust were described as able to function with less supervision as care providers and team leaders. The literature on communities of practice identifies this engagement and maturing identity within the workplace as empowering for advancing participation.[42] Adding credence to the importance of trust within teams, our participating supervisors described how their ward teams achieved high levels of cohesiveness and functioning when they trusted their residents. Teams mature as members develop clear understanding of other team members' roles and abilities, to the benefit of both patient care and learning.[43]

This study has limitations. We interviewed faculty from two large United States university-based institutions that both have established hospitalist programs staffing the majority of inpatient supervisor positions. Faculty supervisors in other specialties or at other institutions might have responded differently. Consistent with the phenomenographic tradition, our qualitative methodology did not corroborate supervisors' descriptions of their residents or other team members with other data sources such as observations or surveys. Hospitalists, who comprised the majority of our participants, typically have short-term, intensive contact with multiple residents; this exposure may limit the judgments of trust that could occur with longitudinal relationships. However, hospitalists' experience with large number of residents also strengthens this study.

Our findings have implications for learner assessment and curriculum design. Since trust is a key component of team functioning, supervisors benefit when trust can be assessed early. Trust could be standardized using trust-based ratings scales and entrustable professional activities.[44,45] Mechanisms to structure the observation, interpretation and documentation of varied aspects of trainee performance could enable a system of usefully communicating about resident performance from one supervisor to the next. Defining a standard frame of reference,[46] constructing meaningful and understandable rating scales, and enabling supervisors' concurrent assessment of trainees' skills and patient care outcomes would also enhance assessment based on

trust.[47] Given the complexity and dynamic evolving nature of trust, rating scales would need to be coupled with faculty observations of trainees' clinical care, rater training about the nature of trust as a calculated risk and forward-looking judgment, and frame of reference training.[46] Our findings also show that trust can inform design of curricular structures and supervision that provide residents with opportunities aligned with their learning needs at the leading edge of their knowledge and abilities. Consistent with the zone of proximal development, targeting learning activities within that zone between what a resident learner can do alone versus with guidance enables a program to maximize learning and development.[17]

In conclusion, our findings illustrate that supervisors' development of trust in trainees is a complex process. Inpatient supervisors place little stock in prior information about trainees but rely heavily on comparisons to standards and proxy information, which they supplement with direct observation of clinical care and leadership. Understanding where trust starts and how it evolves can inform efforts to educate supervisors about how to maximize opportunities to achieve trust over the time that they work with trainees. By tailoring the learning environment to trainees' learning needs and becoming aware of the beneficial outcomes of trust, supervisors may be better able to operationalize supervision based on trust.

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Appendix 1 Trust Study Interview Guide

Introduction:
Thank you for participating in this interview. We appreciate your time and willingness to share your thoughts and experiences. Our goal is to understand, from your perspective as an attending, how you interact with and supervise a senior resident. The purpose of this study is to understand the process of supervision, not to gather any information about specific residents. Please do not use any team members or patient names or identifying information. I would like to record this interview and have it transcribed. Your name and any identifying information will be removed from the transcript and will not be used during the analysis. Is it okay with you if I record the interview?

TURN ON RECORDER
This is an interview with (*interviewer*) with Dr. (*study ID*). Today is (*date*).
We know that attendings are making decisions about when to trust their resident to act independently and when to supervise more closely. We are interested in learning about attendings' decisions about when to give residents more or less independence. Please focus your answers on your experience with your current senior resident (not the intern).
1. What does it mean to you to trust a resident with patient care responsibilities?
(Probe as needed)

- How do you know that?
- How do you decide when you are comfortable letting the resident work independently?
- Can you say more about that?

2. What makes you decide if you trust a resident with a certain task or not?

- Can you give me an example of a time you decided to trust a resident with a certain task?
- How about a specific time you decided not to trust a resident with a certain task?
- What tasks or aspects of patient care did you feel that you could rely on the resident to complete independently?
- Can you tell me more about how you knew that?
- Are there situations where you have not been certain how much supervision you needed to provide? Can you tell me about that?

3. I'd like to ask a bit about your working relationship with your most recent senior resident. Can you tell me about that?

- What were your first impressions of this resident?
- How did the relationship evolve over your time working together?
- Why did these impressions change?
- Have you known him/her before?
- Or had you known about him/her from others?
- What are your expectations of your interactions with him/her? How did you communicate those with the resident?
- What do you think his/her expectations of your interactions are?

(Probe as needed) Are any other things that help you know you have a good, or not good, relationship or rapport with a resident?

4. There can be particular resident characteristics that influence how much you feel you need to supervise. What is it about this resident that influenced your thinking about how you supervise him/her?

- (Probe if they are stuck): Are there any resident traits or behaviors that affect your style or level of supervision?
- Thinking of a different resident you worked with recently, would you add anything different? (allow interviewee to compare/contrast)

5. Going back to the resident you recently worked with…
- Were there times that you felt your resident should have sought help but did not? Can you tell me about that?
- (If this didn't occur with current resident): Did this occur with a different resident in the past? Can you tell be about that?

6. We recognize that issues related to the particular month can affect the way that you interact with your resident. For instance, team census, types of patients on the service, and issues related to the other team members, all might influence an attending's interactions with the resident.
- What particular situational issues affected your interactions with the resident during this time?
- How did those issues influence your level of supervision?

7. Do you feel that you have had enough experience with this resident to determine whether or not you can trust him/her to complete tasks independently?
- Why or why not?
- If not, what kind of experience with a resident do you feel would you need to determine whether you can trust him/her to complete tasks independently?

8. Is there anything else you'd like to add about what it means to you to trust a resident with patient care responsibilities?

That concludes the interview. Thank you very much for participating.

CHAPTER 6

RESIDENT COMPETENCE REVIEW IN GRADUATE MEDICAL EDUCATION: A QUALITATIVE STUDY

PUBLISHED AS:

Hauer KE, Chesluk B, Iobst W, Holmboe E, Baron RB, Boscardin CK, Ten Cate, O, O'Sullivan PS. Resident competence review in graduate medical education: a qualitative study. Academic Medicine. 2015 Apr 17. [Epub ahead of print]

Abstract

Purpose: Although clinical competency committees (CCCs) are now required in graduate medical education, how residency programs understand and operationalize this mandate for resident performance review is unclear.

Method: Investigators conducted semi-structured interviews with 34 residency program directors (PDs) at 5 California public institutions in 2013 and used conventional content analysis to identify major themes.

Results: Programs with and without CCCs perceived their purpose and conducted their procedures in evaluating resident competence oriented toward one of two paradigms: a *problem identification model,* which predominated, and a *developmental model.*

The problem identification model, which focused on identifying and addressing performance concerns, used performance data such as red-flag alerts and informal information shared with PDs to identify performance problems. Timely data acquisition and synthesis to inform individual residents' developmental trajectory within the developmental model was described as challenging. PDs highly valued committee members' expertise as educators to corroborate problem identification and enhance credibility of the committee's outcomes. Faculty training in application of milestones in a developmental model to CCC work was minimal. PDs were highly committed to performance review and perceived it as adequate for residents with problems but potentially deficient for the remainder.

Conclusions: Residency programs orient their resident performance review toward problem identification; a developmental approach is uncommon. Clarification of the purpose of residency performance review along with efficient information systems that synthesize performance data and engage residents and faculty in purposeful feedback discussions could enable meaningful implementation of milestones-based assessment.

Introduction

Medical educators assess trainees' performance to determine whether they have achieved competence to provide high quality, safe medical care. Increasingly, there is a public expectation that training programs have processes in place to ensure that future physicians are prepared for independent practice. Internationally, educators have defined competencies, and more recently milestones, to articulate desired aspects of physician performance and serve as the basis for assessment.[1–3]

Whereas completion of graduate medical training within a specific discipline in an accredited program for a prescribed number of years has historically defined readiness for practice for nearly all trainees, mechanisms to confirm trainee competence are now receiving closer scrutiny. Competency and milestones-based education seeks to ensure that all trainees are prepared for practice and competent in key activities.[4,5] Milestones are intended to serve as a framework to support individual residents' learning as a coherent and logical sequence of experiences tailored to their learning needs. Although the abstract nature of competencies can complicate their use,[6] milestones aim to clarify progress to be assessed in specific competency domains.

Though GME program directors (PDs) have always been responsible for monitoring resident performance, in the United States, the Next Accreditation System (NAS)[7] now requires that, within graduate medical education (GME) programs, clinical competency committees (CCCs) measure residents' progressive attainment of competence. As of 2013, CCCs must review all resident evaluations semiannually and report on milestones to the ACGME.[1] Nonetheless, this mandate comes with unanswered questions about how these committees should approach their work to render judgments of competence. Decisions about what will be evaluated and how information will be synthesized into a judgment about learner performance reflect underlying assumptions about the purposes of the review process.[8,9] The information sources available to CCCs, the ways that they share and use the information, and their perceptions of their decision-making accountability can all reflect

their understanding of the scope and nature of their responsibilities for learners and patients. Synthesizing information about a trainee's performance into a recommendation for advancement ultimately constitutes a judgment to trust the trainee to perform clinical work independently and unsupervised with future patients.[10]

From these perspectives of interpreting performance information for the purpose of guiding and ensuring residents' development of competence, this study sought to describe the current state of CCCs in GME. Although CCCs are now required in residency programs, little information exists in the literature to guide their work. It is unknown how these committees approach their charge or perceive their purpose, or how their operations align with their intentions. This study aims to characterize residency CCCs, understandings of their purpose, and the ways in which they use performance information to make judgments about residents' competence. Study results will identify current practices to help educators address the relationship between assessment and curricular design, learning and outcomes. At a pivotal time for assessment in GME, study findings can provide baseline insights about how residency PDs, as both leaders and end users of the CCC process, perceive their charge and their accountability for ensuring residents' competence.

Method

Study design

This is a qualitative study using conventional content analysis, which seeks to describe a phenomenon through the examination, coding, and interpretation of data to identify themes.[11] Investigators conducted semi-structured interviews with residency PDs at five institutions in California, United States, in 2013. Anticipating variability across programs, the study design used interviews to gain in-depth understanding of PDs' perceptions of their CCC procedures and results achieved. The Institutional Review Board at the University of California, San Francisco, approved the study.

The research team included the principal investigator (KEH), with experience studying and conducting performance assessment and serving on a student competency committee. The research assistant (JB) who conducted the interviews has extensive experience in qualitative interviewing and research. Remaining team members brought expertise in research methods (BC, CKB, OTC, PSO) and competency-based education across institutions. (WI, ESH, RB).

Sample

To maximize diversity of responses, the investigators chose stratified purposive sampling[12] of residency PDs from the Universities of California Schools of Medicine at Davis, Irvine, Los Angeles, San Diego, and San Francisco. Programs were classified as larger or smaller, and procedural or non-procedural (Appendix 1). Using a random number generator to increase generalizability and assure representation, investigators selected 8 residency programs from each participating institution (3 large procedural, 3 large non-procedural, 1 small procedural, 1 small non-procedural) and invited PDs to participate. After the initial interviews, additional residency PDs from each of the participating institutions were invited after randomly selecting 1 from each category at each institution (large procedural, large non-procedural, small procedural, small non-procedural), anticipating achieving saturation within these additional participants.

Data collection

The principal investigator (KEH) conducted 3 pilot interviews with UCSF fellowship directors and refined the interview guide for clarification.

Potential participants received an email invitation to participate. Non-respondents received up to three follow-up email invitations. Participants provided verbal consent and completed a 7-item electronic questionnaire and one interview. The questionnaire queried respondent specialty; gender; age; years as a CCC chair, PD, and/or associate PD; and number of residents in the program. A single trained research assistant conducted phone interviews

lasting approximately 30 minutes with each participant between January and May 2013, after the announcement about but just prior to the July 2013 deadline for the 7 Phase 1 specialties to adhere to the NAS requirement to have a competency committee.[7] Interviews were recorded; a professional transcription service transcribed them verbatim. Participants did not receive compensation.

Interview questions solicited descriptions of CCCs, including membership composition, member training, committee leadership, frequency of meetings, and resident performance data available. (Appendix 2) For programs without a functioning CCC, the PD was asked to describe the process used to review resident performance. All participants described, without using any identifying information, the review process for a recent example of a struggling resident, and an example of a typical (non-struggling) resident. Questions addressed PDs' perception of the main purpose their committee or review process served, pros and cons of their current procedures, and any anticipated changes to their procedures.

Five investigators (KEH, BC, WI, EH, JB) read 2 to 4 early transcripts for clarity; subsequently, 1 unclear question was dropped, and 2 questions were added.

Analysis

Two investigators (KEH, JB) extracted descriptive information about each program, including presence of a committee, number of members, frequency of meetings, and any other committee that also reviewed resident performance.

For the qualitative analysis of themes, investigators conducted transcript coding iteratively with data collection using the constant comparative method[13] and discrepant case analysis.[14] One investigator (KEH) read the first 10 interviews and generated initial themes. Four additional investigators (BC, WI, EH, PSO) each reviewed 5 to 6 randomly selected transcripts from that group of 10, reviewed the themes in a draft codebook, and met with the principal

investigator to contribute codebook additions and revisions. The codebook was then finalized. Two coders (KEH, JB) each independently coded all remaining transcripts. They resolved discrepancies through full transcript review and discussion.

Regular investigator meetings amongst this diverse group with multiple perspectives served the purpose of triangulation.[15] Based on the initial (open) coding, the investigators reviewed and discussed the data to identify and refine larger emerging themes.

Dedoose Version 4.5 (SocioCultural Research Consultants, LLC, Los Angeles, CA) web application software was used for coding, organizing, and retrieving data.

Results

Thirty-four of 60 (56.7%) invited residency PDs participated in interviews. Nine additional PDs agreed to participate but did not either because of schedule constraints or because the study had achieved thematic saturation. Consistent with our sampling procedure, participants included 22 large and 12 small programs, representing 15 procedural and 19 non-procedural specialties. The participation rate by school varied from 33.3% to 75.0%. Respondents included 23 men and 11 women.

Overall, 31/34 (91%) respondents completed the demographic survey. Respondents' mean age was 48, ranging from under 35 to 66 years. They had served as PD for an average of 7 years (n=30 respondents, range 1-21), comparable to PDs nationally.[16] Fourteen had previously served as an associate PD. The number of current residents in each program averaged 39 (range 0-99; one small program did not currently have residents).

Description of clinical competency committee structure

Twenty-one of the 34 study programs currently had CCCs. Twenty-two respondents had chaired a CCC or equivalent group for an average of 5.6 years (range 1-18 years). Committee membership ranged in size from 3 to about 25 members, although many interviewees described that attendance varied and was less than the full possible membership. Meeting frequency varied weekly to yearly. Ten programs with committees described second venues for discussing resident performance, such as a broader education committee or a general faculty meeting; these venues allowed for early identification or more in-depth discussion of struggling residents.

Purpose of resident evaluation

From our analysis, two major paradigms emerged that characterized how programs with and without CCCs perceived their purpose in evaluating resident competence: these paradigms aligned with the tenets of a *problem identification model* and a *developmental model.* The problem identification model predominated. This model viewed the primary purpose of resident performance review as identifying the few residents with problems. The implicit assumption with this model was that participating in the residency program would lead most residents to competence and success by the end of training. In contrast, the developmental model viewed education as a planned series of steps toward mastery. The underlying orientation that all residents were learners informed a focus on guiding residents' progressive development, without necessarily singling out "problem" residents. Some programs had elements of both models.

The results below describe three major themes and how they apply within each model. Participant study identification numbers are listed in parentheses with illustrative quotations. The major themes and associated subthemes are listed here and summarized in Table 1: 1. Use of performance data: variety of tools, clinical systems data and informal data; 2. Committee member engagement: qualifications, contributions to credibility, and decision-making; and 3. Implications for residents: committee review consequences, feedback

received, and risks. Results then describe participants' perceptions of the effectiveness of their performance review processes with each model.

Use of performance data

Resident performance data came from *tools* implemented in the residency program along with *clinical systems data* and *informally gathered data*. Although programs used a large variety of assessment *tools*, evaluation data for the resident performance review process constituted primarily supervisor global evaluations and knowledge examinations.

With the problem identification model, valued aspects of these data were timely recognition of outliers, usually as low score alerts, and corroboration of performance problems from more than one information source, including a verbal report from a clinical supervisor. Despite ongoing data collection, CCC members were viewed as important additional sources of information at committee meetings to supplement what was written in evaluations, particularly about concerns. Consequently, committee members were selected in large part based on their contact with residents across sites. Committee members' experience with residents informed an overall understanding of their competence and any performance problems, particularly in small programs and procedural specialties, whose characteristics facilitated direct observation. *Clinical systems data*, such as incident reports and complaints from patients or interprofessional staff, constituted important 'red-flag' problem identification mechanisms. These triggered PDs and CCCs to review other performance data such as prior supervisor evaluations and verbal comments from other supervisors, and then to generate plans to intervene. Multiple respondents described the value of *informally gathered information* they obtained through hallway conversations with faculty and chief residents and through emails from faculty. This information was "usually about a problem, not something that's positive." (1011)

Respondents described challenges with efficiently gathering and synthesizing evaluation data for committee review that seemed to impede their ability to

implement the developmental model. One program director described the challenge of synthesizing information efficiently to characterize a resident's progress:

Our efficiency with gathering the data right now, it takes way too long….I can't, for example, think about or record in it where they are developmentally, or where they are on achieving clinical competence and clinical independence. (0901)

Despite widespread use of multiple assessment tools, such as for multisource feedback, peer evaluations, and directly observed skills, most respondents did not use these data to characterize each resident's developmental trajectory. Neither clinical systems 'red-flag' tools nor informal data were mentioned in the context of informing a developmental model of performance review. Some respondents did describe performance expectations or milestones based on year of training that could serve as the foundation for the developmental model.

Committee member engagement

PDs perceived that committee members' *qualifications* enabled them to add *credibility* to performance review process and contribute to *decision-making* about resident advancement. At 14 of the 21 programs, CCC members received training for their committee roles, typically via distribution of program goals, objectives or milestones. A few held annual or biannual faculty development sessions on assessing residents. Respondents opined that group performance review added *credibility* by contributing more opinions about residents with concerns, supporting the PD in making difficult decisions, and reconciling conflicting information.

Across programs, the problem identification model relied heavily on faculty members' *qualifications* via their perceived status as expert, dedicated educators and clinical supervisors to prepare them for their performance review responsibilities.

It's both kind of learn as they go and then understanding of what our assessment strategies are, how we use them and they pick it up as they attend more and more committees, but there isn't specific training. (5817)

The performance standard to which residents were compared was these faculty members' general knowledge of resident performance - their normative frame of reference. *Decision-making* about residents was commonly dichotomous (performing adequately or not) and inferred rather than determined by systematic deliberation or voting. The absence of concerns regarding a particular resident was taken to imply readiness for advancement, and decision-making usually focused on residents with concerns. Consequently, CCCs and PDs often did not discuss, or review detailed data regarding, the majority of residents. *Decision-making* focused on problem identification was described as very efficient – "It usually takes a minute or two" per resident (0771) and "very easy for the other faculty." (4399) Respondents found it difficult to help residents with variable performance ratings, and managed these situations through additional data gathering, either through committee members' discussing their own direct experience or by contacting other clinical faculty.

Infrequently, respondents described using a developmental model for analyzing resident progress. Respondents did not describe specific faculty training on a developmental model for resident performance review. Some with CCCs were beginning to apply milestones or step-wise expectations for progress that would support use of a developmental model. Four respondents specifically described engaging CCC members by sharing performance data for all residents. Some expressed trepidation about the value and workload involved with comparing performance against milestones for decision-making, and whether it would really enhance the *credibility* of the committee decisions: "I just don't want to dampen the spirit of my faculty that do this really well already with more lists and checklists and demands." (0370)

Implications for residents

Implications for residents of the performance review process included whether *committee review* addressed each resident, how *feedback* was delivered, and where potential *risks* to the resident existed. Sixteen committees *reviewed* all residents at least briefly at each meeting; others discussed only struggling residents. One program with more in-depth review of all residents explained:

Their scores, their evaluation scores and the comments from the last six months since the last time we met are projected for each resident in the lecture room and then we discuss each resident individually. (4399)

Nearly all programs described providing feedback to residents after meetings, usually biannually.

The problem identification model allocated most performance review time to residents with performance problems: “There aren’t examples of people we’ve talked about who were doing just perfectly well.” (1582) High performing residents, identified by evaluation tools or committee members’ personal knowledge, were sometimes discussed regarding nominations for awards, fellowships or faculty positions. Programs oriented toward problem identification described sending *feedback* reports to residents; some scheduled feedback meetings with the PD whereas others relegated to the resident the responsibility for figuring out how to use the feedback. These feedback meetings allocated minimal time on areas for growth; one program director described giving a resident feedback as follows:

Regarding themselves, I just don’t have much to say, that they’re doing a good job. I just encourage them to still do a good job. (2800)

Multiple respondents perceived *risks* with performance review as a potentially biased process. Apprehension existed that sharing performance information (forward-feeding) within large or representative committees, rather than serving as the content of helpful feedback to residents, could harm residents if members learned damaging information about them. Perceiving clinical supervisors’ reluctance to document performance concerns in writing, PDs invited verbal or email reports of concerns or used anonymous resident

performance reviews. Some PDs sensed that residents were nervous to meet with them for feedback.

With a developmental model, milestones guided performance review and identification of residents' relative strengths and weaknesses across multiple domains of competence. *Feedback* discussions prioritized identification of an improvement area for the resident to work on. One program director explained:

These benchmarks are great because it lets us have a very transparent communication with our residents as to what the goals and benchmarks of residency are and then as well as with the faculty. (1570)

Some programs enlisted resident advisors who attended CCC meetings to inform more in-depth feedback and learning planning. Another approach described to enhance feedback usefulness was providing aggregate data about the other residents in the program to contextualize performance. The developmental model seemed to mitigate concerns about the *risks* of performance review because progressive maturation was expected and all residents would have areas for growth.

Table 1 Two major paradigms that characterize how residency programs perceived their purposes and processes in evaluating resident competency

Theme	Subtheme	Implications for competency committees	
		Problem identification model	**Developmental model**
Use of resident performance data	Evaluation data	-May be inaccurate or incomplete -Delayed -Difficult to synthesize; incompletely synthesized for committee	-Quantitative metrics -Benchmark or milestone for comparison of resident performance -Time consuming to synthesize and use
	Clinical systems data	-'Red flag' alerts -Hospital incident reports -Patient or nurse complaints	-Clinical systems and multisource feedback not typically integrated into performance review
	Informal data	-Hallway conversations, emails to program director (PD) or chief resident -Focus on performance concerns	Not described
Committee member engagement	Committee member qualification via:	-Teaching experience -Duration of time on the committee -General ability to gauge resident performance	-Training for committee work -Knowledge of benchmarks and milestones -Use of national guidelines and tools to frame faculty development
	Contributions to credibility of committee process	-Provide opinions about residents with concerns -Support program director in making decisions -Reconcile conflicting information available to committee	-Assess performance using benchmarks or milestones -Committee member comments supplement milestones information
	Decision-making	-Decision making implicit, assumed for most residents	-Based on synthesized data -Compares performance to milestones - Assumes range of performance among residents -Committee makes decision about advancement
Implications for residents	Committee review	-Focus on global performance -Minimal discussion of residents without concerns -High performing residents discussed in context of award nominations, fellowship and job recruitment, further praise	-Focus on performance against milestones -Individual areas of relative strength and weakness -Incorporates multiple domains of performance

	Feedback	- Resident receives feedback report; resident is responsible for figuring out how to respond -No follow up of response to feedback at next meeting	-Feedback framed in developmental language -Feedback delivered in meeting by program director or longitudinal advisor
	Dealing with Risks	-Potential bias through information sharing among committee members - Faculty reluctance to document concerns in writing	-Transparency through clear communication of benchmarks or milestones to faculty and residents

Evidence of effectiveness of performance review

Almost all respondents expressed high confidence in their performance review processes. The grounds they cited varied, from gestalt impressions of effectiveness based on a sense that their "end product" (the trainees) was excellent, to the less common description of a rigorous, data-driven process in which every resident was carefully assessed. Sources of confidence were the experience and commitment of individual faculty and the group as a whole. Some respondents qualified their positive convictions with ambivalence, such as saying that the process was "adequate" or "80% good"; one said, "I feel reasonably well, I guess, as well as I could, unless someone comes up with some better ideas." (7415)

Some shared misgivings that their processes were effective for residents identified as having problems but perhaps not for other residents. One respondent expressed uncertainty about residents' trajectory toward competence:

"If someone were to ask me, 'Is this second-year resident in a position where they can [do this particular clinical activity]?'... That's a question I'd like to be able to answer for every second-year resident." (3651)

Nonetheless, this respondent concurred with most others that all residents could perform necessary activities by graduation and were praised by fellowships and employers.

Future directions

When asked about anticipated changes to their resident performance review, PDs' opinions varied about the degree to which adding or changing an existing committee would simply satisfy requirements versus add value. Some PDs predicted that a current committee would demonstrate adherence to ACGME expectations by just changing its name or providing documentation "in name only," while the more effective work would continue to occur outside of formal resident performance reviews. Respondents predicted that performance review with milestones would necessitate more time and better electronic systems for data capture, synthesis and presentation. Many were hopeful that milestones would provide more granularity and specificity than reviews based on global evaluations or overarching competencies. Common uncertainties addressed how faculty would understand milestones, how discrepant performance across milestones would be managed, and whether the new system would be better than current procedures.

Discussion

Our findings illustrate the ways that residency programs engage in resident performance review through broad data collection and varying approaches to information synthesis. Analyses identified two paradigms guiding performance review, a problem identification model and a developmental model. Decision-making about resident advancement under the problem identification model is implicit, with the assumption that most residents will become successful by the end of training, consistent with the dwell time or tea-steeping model of medical education.[17,18] Most programs focus more strongly on problem identification than on a developmental approach and question how milestones will be advantageously operationalized at this pivotal time of new requirements for milestones-based assessment and reporting.[18] These findings reveal questions, concerns, and aspirations that residency programs harbor about

how the developmental model, the goal of the NAS, will support individualized paths to competence.

The two models identified that frame resident performance review exemplify tenets of quality assurance and quality improvement. The problem identification model serves a quality assurance purpose by identifying performance concerns. PDs' descriptions of the risks of this model for residents are consistent with interpretations of quality assurance as necessary to identify outliers, yet potentially punitive and prone to generating defensiveness.[19] Residents may infer under this model that the best course of action is to stay out of trouble and that minor performance deficits are tolerated unless they rise to the level of being labeled performance concerns. Even with a genuine desire for performance feedback to guide learning, trainees can fear appearing incompetent or jeopardizing relationships with supervisors.[20] This scenario, in which formative feedback is perceived as high-stakes summative information, jeopardizes the intended value of milestones as a tool to guide all residents' efforts to become better. The developmental model of performance review, by incorporating milestones-based assessment, aligns with quality improvement, which proactively incorporates strategies for continuous improvement. Just as the emphasis on quality improvement in patient care has required medical professionals to learn and change their behaviors, the developmental model of resident performance review similarly requires changing culture and procedures. Assessment processes under this model aspire to be learner-centered and empower residents with the motivations and skills, supported with feedback and coaching, to self-improve toward competence for independent practice.[21,22] These two models may coexist in residency programs, although it is possible that some program directors, particularly those with high-performing residents, may prioritize using resources to provide intensive, milestones-based support or remediation for the small number of residents who are identified as not meeting benchmarks.

The study shows that programs can incorporate elements of both the problem identification and developmental models for resident performance review and

determinations of competence. For example, a developmental approach can inform solutions to identified problems. However each model foregrounds a particular emphasis – the problem identification model emphasizes immediate patient safety (by attempting to weed out potentially dangerous “problem” residents); the developmental model emphasizes residents’ individual development and the quality of patient care provided throughout residents' careers. Milestones could enhance the problem identification model by grounding conversations in clear performance expectations and elucidating underlying etiologies of performance outliers. Whereas problem identification systems such as alerts to PDs consume faculty time in investigating the situation, a more learner-centered orientation as is envisioned with competency- and milestones-based education may engage residents in doing some work currently done by their faculty, such as proactively identifying and addressing their own areas for growth.[4] Going forward, the NAS has mandated that CCCs embrace the developmental strategy for evaluation of every resident’s progress using milestones, and our findings suggest that PDs and CCCs will benefit from guidance in implementing this new mandated developmental approach.

Respondents expressed concern about the time required to assess resident performance and anticipated it could be more onerous under the developmental model. However, the problem identification model also requires resources, and programs may under-appreciate the work currently done within and outside of CCCs to collect informal data to supplement routine evaluations. Our respondents’ programs typically allocated limited or no time for reviewing average and high performing residents in committee. The ideal amount of time for reviewing these residents is unknown, although likely more than currently occurs. Nonetheless, there will continue to be a need to balance ideal practices with efficiency. It is possible that milestones will enable reaching judgments more efficiently if evaluators and committee members understand and apply them effectively with the aid of robust information technology.[23–25] The modest amount of faculty development our participating programs conducted to prepare faculty for CCC participation suggests that

augmented faculty development will also be needed for committees to accomplish their goals of effective group decision-making.[26,27]

Based on review of participants' experiences and their perceptions of the effectiveness of their processes, as well as investigators' analysis of the ways that performance review supports residents' development of competence, suggested practices for resident performance review emerged that would support the aims of the NAS. CCC members must have criteria for performance review that include milestones and define what constitutes competence. Clinical supervisors and residents themselves need to receive performance milestones and understand how they are applied. CCCs should view performance data for each resident before discussion, and should review all residents in the program. The use of multiple data sources coupled with timely data synthesis facilitates efficiency in the committee setting, as does pre-review and synthesis of performance information by a small group prior to a full committee meeting. To facilitate each resident's trajectory toward competence, committees can review each resident's progress over time by revisiting areas of focus or concern from prior meetings. Enlisting a resident advisor to discuss evaluations with the resident rather than just sending feedback passively can help the resident identify next steps in learning.

This study has limitations. Participants were PDs at five public institutions in one geographic region, potentially limiting generalizability of our findings. However, a large number of respondents participated across specialties. Our questions about competence review may have steered respondents to showcase their best or idealized practices. There were no observations of CCCs to confirm their procedures. The study occurred during a time of change in performance review requirements, and our respondents may be continuing to evolve their practices, although our findings suggest that greater adoption of the developmental model may be difficult for programs.

The emergence of competency-based medical education and milestones-based assessment challenges medical educators to find meaningful strategies to assess trainees' performance. Residency programs in our study report

functional strategies for identifying performance outliers yet many struggle to understand the trajectory of all residents' development. The uneasy coexistence of these two paradigms suggests that, for CCCs to fulfill the vision of supporting individual paths toward competence, information systems to manage and synthesize performance data, clear understanding of the purpose of CCC performance review, and a culture that welcomes constructive feedback to residents are needed. These ingredients could empower residency programs to ensure residents' readiness for independent practice and fulfill their obligation for public and educational accountability of the GME system.

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Appendix 1 Detailed study methods – recruitment

Because program size can influence program director and faculty knowledge of individual residents, we included both large and small residency programs, based on the typical number of residents enrolled per year. We classified programs as large (Anesthesia and Perioperative Care, Emergency Medicine, Family and Community Medicine, Medicine, Neurology, Pediatric, Psychiatry, Obstetrics & Gynecology, Surgery) or small (Dermatology, Laboratory Medicine, Neurological Surgery, Pathology, Physical Medicine and Rehabilitation, Ophthalmology, Orthopedic Surgery, Otolaryngology, Radiation Oncology, Radiology, Urology) and procedural (Anesthesia and Perioperative Care, Emergency Medicine, Neurological Surgery, Obstetrics & Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Surgery, Urology) or non-procedural (Dermatology, Family and Community Medicine, Laboratory Medicine, Medicine, Neurology, Pathology, Pediatric, Psychiatry, Physical Medicine and Rehabilitation, Radiation Oncology, Radiology). We obtained email addresses from each school's graduate medical education office or website.

Appendix 2 Interview guide – clinical competency committee chairs

Introduction

Thank you for participating in this interview. We appreciate your giving us your time and sharing your expertise. Our goal is to understand how residencies in different specialties and institutions review resident performance and competence. This interview will ask you to describe how your program reviews resident performance information either by you or a committee, and how you make judgments about residents who are competent or may need more work to achieve competence. Please do not use any resident names or identifying information in answering these questions.

Interview questions and probes
There are many different ways that residencies review their residents' performance. We'd like to understand more about the different ways that programs are doing this. You may use different assessment tools, and we are interested in who or how that information is reviewed. Could you tell me about how your program reviews resident performance? Probes to use if answers not provided: • Do you have a competence/performance committee? If so, what is it called? • Who chairs the committee? • Including the chair, how many members are on the committee? • Who is on the committee – what are their educational roles? • When or how does your committee decide to meet? • Does your committee meet regularly or ad hoc? • About how often does the committee meet? • If ad hoc, can you explain how a meeting is triggered? • Does your competency, promotions (or equivalent name) committee discuss all residents or only those with performance concerns? • How are residents identified for discussion? • Who identifies them? • Are there any other committees or groups that discuss resident performance?
There can be particular residents who are struggling. Without using any names or identifying information, I'm going to ask you to think of a specific struggling resident whom your committee recently discussed. Could you describe that discussion? Probes to use if answers not provided: • How was that resident identified as struggling? • What kind of information did the committee discuss? • Who shared the information? • How did the committee make a determination/judgment? • What kinds of information did they use? • Probe: can you tell me more about how that conversation unfolded? What comments did people in the room make? Did everyone speak? • Probe: can you describe how that decision is reached? Does every member vote? How do you deal with different opinions in the room? • What are the plans for follow up? • Was this a typical example? Why or why not? • What are the other ways that struggling residents may be identified for

discussion at your committee?

Now I'd like to shift gears to talk about a resident who is *not* struggling. Without using any names or identifying information, I'd like to ask you now about a recent example of a discussion about a particular resident that your committee had about one of your typical residents. Can you walk me through how the process unfolded?

Probes to use if answers not provided:

- What information did the committee discuss?
- What kinds of information does the committee use to make a determination?
- Who shared the information?
- What strategies or tools does your program use to assess residents?
- What types of information about resident performance does your committee review? Tell me how the committee members see this information. – when (did they see it in advance of the meeting or at the meeting?), do they always see it or just in certain situations
- Did the group have a sense of where this resident is developmentally? Do you use milestones? Is this a benchmark you use?
- How did the discussion flow? Did the group reach consensus? If not, what kind of final decision was reached, and how?
- Is this example similar or different to your group's typical discussions of resident performance? How? What else can happen? What other kinds of information might people use?

Do committee members receive any training or guidelines related to assessing resident performance?

- Can you tell me about that?
- When, how often do they receive this information?
- What is the content?

Or if not committee, focus item on the person who reviews resident performance

What do you see as the main purpose your committee is serving?

Even though you are a chair/participant, what's your personal take on the pros and cons of how your committee reviews resident performance?"

- Confidence in process
- Confidence in judgments made
- Strengths of your committee's process
- Challenges that you experience
- Probe confidence about each of these steps: judgment/decision/action

Now I would like to ask you to think into the future. Are there ways that you envision your competency committee/procedures changing in the future?

Is there anything else you'd like to add?

Thank you.

CHAPTER 7

ENSURING RESIDENT COMPETENCE: A QUALITATIVE STUDY OF GROUP DECISION-MAKING TO INFORM THE WORK OF CLINICAL COMPETENCY COMMITTEES

SUBMITTED IN A SHORTER FORM AS:

Hauer KE, Ten Cate O, Boscardin CK, Iobst W, Holmboe ES, Chesluk B, Baron RB, O'Sullivan PS. Ensuring resident competence: a qualitative study of group decision-making to inform the work of clinical competency committees.

Abstract

The expectation for graduate medical education programs to ensure that their trainees are progressing along milestones toward competence for unsupervised practice has prompted formal requirements for group decision-making. The literature on how groups are comprised, share information and render decisions can inform the work of residency clinical competency committees by highlighting vulnerabilities and best practices for groups. This study used data from interviews with residency program directors to explore their experiences with group decision-making about residents' performance. We used a qualitative design with deductive content analysis to examine how committees' procedures influence their outcomes. Results highlighted three themes. Group *member composition* showcased the value placed on the complementarity of members' experience and lessons they had learned about performance review through their teaching and committee work. *Group processes* revealed strengths and limitations related to the group's understanding of its work, leader role, and information sharing procedures. *Time pressure* was perceived as a threat to the thoroughness of the performance review process and members' ongoing participation. Implications of these findings include the risks for committees that arise with homogeneous membership and processes that arise through experience rather than deriving from a well-articulated purpose of their work. Limited resident performance information and compressed time to deliberate may constrain group outcomes. Recommendations for maximizing the effectiveness of clinical competency committee processes, including their access to and interpretation of information, to yield evidence-based, well-reasoned judgments are presented.

Background

Graduate medical education programs are expected to demonstrate trainees' readiness for advancement to the next level of training and eventually unsupervised practice. With increasing enthusiasm for competency-based education,[1] methods to assess and document competence as well as identify resident performance problems are essential. Establishing clinical competence committees is a strategy to ensure review of trainee progress. Group decision-making can yield better, more well-reasoned decisions than individual decision-making.[2] In undergraduate medical education, group evaluation of student performance improves alignment of narrative comments with clerkship grades[3] and yields better characterization of changes in learner performance over time, compared to individual evaluations alone.[4] Group discussion increases detection of students' and residents' problematic performance and patterns of performance.[5–9]

Group decision-making in graduate medical education is an increasing mechanism for programs to assume accountability for graduates' competence for practice. In Canada, which is in transition to milestones and new program requirements, the Residency Program Committee (RPC) attests to the resident's readiness to sit for the Royal College certification examinations.[10] In the United States (U.S.), the Accreditation Council for Graduate Medical Education (ACGME) 'Next Accreditation System' expects programs to report regularly on resident performance on competencies and milestones.[11] Using a combination of learner assessment data gathered from multiple sources, these groups, termed *clinical competency committees*, synthesize information to evaluate progress on milestones and make a determination or recommendation about each trainee's competence and development toward readiness for unsupervised practice.

After a review of major databases and article references, we identified a body of literature beyond medical education on group decision-making that can help characterize the work of clinical competency committees, including how they are populated and how they use information. Key principles from this

literature, described here and in Table 1, explain how group decision-making entails individuals coming together and processing information to reach a collective decision.[12] Ideally, many individuals together sharing information achieve better decisions than would a single individual. However, studies and reviews in the psychology and organizational behavior literature have explored the complexities of group decision-making, including the influence of group composition and group procedures on a group's outcomes. Social decision scheme (SDS) theory describes the processes by which groups move from individual preferences toward group decisions.[13,14] Accordingly, the composition of group membership is a critical determinant of the group's outcomes. SDS theory addresses how size and diversity of membership influence the range of perspectives and preferences the group considers and reconciles. SDS theory also shows how group procedures during group meetings to review and synthesize evidence influence their outcomes.[15] Studies have highlighted the importance of distinguishing shared versus unshared information to understand group deliberations.s[16] Shared information is held among multiple group members, whereas unshared information is known only to one or a small number of members. In the context of clinical competency committees, this information would include information about individual trainee performance from any sources. In general, more information sharing leads groups to better decisions.[17] As shown in columns 1 and 2 of Table 1, key aspects of the structure and processes of groups highlight both the advantages and possible risks involved with group decision making.

Table 1 Group decision-making: Aspects of groups that influence their outcomes

Theory/principle relevant to group decision making	Key aspects	Implications for clinical competency committee outcomes based on study interviews
Social decision scheme theory (SDS):	Social decision schemes are the methods used by a group to combine individual responses into a single group decision (Stasser 1999)[14]	Groupthink: Describes how groups think or make decisions dominated by a desire for group cohesiveness and unanimity overrides appraisal of alternatives; groupthink discourages creativity or individual responsibility. (Janis 1982)[18]
Member composition		
• Member characteristics	• Heterogeneous groups performs better than homogeneous[19] (Stone & Kagotani 2013)	• Definitions of heterogeneity in committees focus on certain parameters (clinical site, sometimes seniority) but not others (interprofessional, patient)
• Group size	• With defined procedures, large groups tend to outperform small groups[16,19] (Stasser & Titus 1985; Stone & Kagotani 2013) • However, in large groups, members may go with group opinion rather than think of their own opinion (social loafing)[20] (Karau & Kipling 1993)	• Committees often involve many faculty or, in smaller programs, all faculty • Many examples of 'everyone just agrees' or 'we don't look for problems'
Group processes		
• Group understanding of its work	• A shared mental model is a shared understanding of a group's work that improves group performance[21] (Jonker et al. 2010)	• Varying opinions and questions about need for committee and for milestones-based review
	• Group cohesion, insulation are antecedents of groupthink[22] (Esser 1998)	• Committees are cohesive, as shown by high respect for the faculty, 'we've all been doing this together a long time' • Assumption that they are and will continue to be cohesive • Strong confidence in their decision-making

	• Insulated groups consider fewer alternatives and make poorer decisions than groups that are not insulated.[23] (Wittenbaum et al. 2004)	• Some committees are insulated and doing work the same way they did years ago, whereas others are incorporating national guidelines or ideas from national meetings
	• Default position at start of group work strongly influences outcomes[24] (Devine 1999)	• Common assumption that residents will perform well
	• Perception of group work as an intellective task (has a correct answer that group members can show others) versus judgmental task (absence of a correct answer; relies on judgment)[25] (Laughlin and Ellis 1980)	• Committees vary in the degree to which they view performance review as an intellective task by analyzing performance against milestones, versus a judgmental task based on subjective impression
Group leader role	• Group leader or more senior, powerful, or confident members can dominate decision-making.[12] (Kerr and Tindale 2004) • Group leader influences degree to which members will seek and hear new information.[26] (De Dreu et al. 2008)	• Frequent program director perception that members will go along with chair opinion • Committee member role as reporting information about experience with resident rather than contributing to decision-making
Information sharing procedures	• More information sharing leads groups to better decisions.[27] (Stasser and Titus 1987)	• Limited performance information available to members in some committees; more and more structured information available to members in others
	• Information sharing is enhanced with a structured discussion process that invites elaboration[17,28,29] (Mesmer-Magnus and DeChurch 2009; van Ginkel and van Knippenberg 2012; Seibold & Meyers 2007) • Sharing written information versus just relying on group member memory increases the	• Committees vary from using unstructured information to presenting information in a structured way for every resident • Some committees share written performance information during meeting

	chances of information being incorporated into group decisions.[30] (Xiao and Eastmure 2014)	
	• Social pressure can be minimized through structured voting and acknowledgement of diverse opinions.[12] (Kerr and Tindale 2004)	• Program directors commonly report that all members can talk in committee meeting, but do not all structure a way to ensure that everyone participates in decision-making
	• Information that all group members know (shared information) carries more weight than information that only one or a few members know (unshared information). Group processes should be structured to invite diverse opinions and comments from all members[12,31] (Kerr and Tindale 2004; Klocke 2007)	• Committees often welcome comments from all members, but members' participation can be ad hoc and is not structured • Program directors know information about resident performance that they sometimes share and sometimes do not share with the committee
Effects of time pressure	• Time pressure leads to lower quality decisions.[24,32] (Neck and Moorhead 1995; Devine 1999)	• Program directors perceive high time pressure for committees
	• New or unshared information is more likely to emerge with longer discussions[24] (Devine 1999)	• There is inadequate time to discuss particularly non-struggling residents

Despite its potential benefits, group decision-making can introduce biases that can be prominent, or alternatively, can be counteracted with careful planning. Groupthink, first described by the psychologist Janis, epitomizes vulnerability to logical thinking for groups; it entails the thinking that individuals engage in to maintain harmony within a group, to the point of overriding realistic appraisal of all courses of action.[18,33] In this regard, the group leader plays an important role by either welcoming new information and diverse opinions, or conversely, promoting conformity to a preset norm.[32] Group members may defer to powerful members,[34] and individuals may feel pressure to maintain a

reputation as aligned with the group. Active group training can minimize biases in group decision-making.[31] Well-designed instructional strategies can promote a shared mental model to enhance group performance.[35,36] However, with time pressure or high workload, groups tend to make decisions based on shared information and may fail to draw out and incorporate all information into a more thoughtful decision. Longer deliberations increase the likelihood of unshared information emerging.[37] Thus programs may need to weigh goals of greater information sharing, collaboration, and efficiency to optimize their outcomes.

Informed by the literature on group decision-making, this study examines data from residency program directors to explore how residency clinical competency committees, now embraced by the graduate medical education community, interact and use information to make judgments about trainee competence. The purpose of the study is to explore how the procedures used by residency clinical competency committees to process and share information may influence their outcomes. These findings highlight helpful and deleterious group behaviors. This understanding can inform design of committee procedures and information-sharing strategies to help them best determine and support trainee competence development.

Methods

Study design

This is a qualitative study using deductive thematic analysis and informed by the framework method. This methodology enabled us to develop a frame from key concepts in the literature as shown in Table 1 (columns 1, 2), and we then analyzed our data for evidence of those concepts. The data for this study comes from previously described work (Hauer, in press). For the original study data collection, we conducted semi-structured interviews with residency program directors at five institutions in California, U.S., in January through May, 2013. Interviews provided detailed descriptions of program directors' experience and perceptions with their resident performance review procedures. The University of California, San Francisco, Institutional Review

Board approved the study.

Sample

We used stratified purposive sampling[38] of residency program directors at the Universities of California Schools of Medicine at Davis, Irvine, Los Angeles, San Diego, and San Francisco. After classifying programs based on size (large, small) and type (procedural, non-procedural), we used a random number generator to invite varied program types from each site. After inviting 12 programs per school, we achieved thematic saturation and ceased invitations.

Data collection

After 3 pilot interviews, we invited potential participants by email. Participants completed one interview with a trained research assistant lasting approximately 30 minutes. A professional transcription service transcribed the recorded interviews verbatim. Interview questions solicited descriptions of clinical competency committees, including membership composition, member training, committee leadership, committee discussions, frequency of meetings, and resident performance data available. Thirty-four program directors participated in interviews; 21 programs had clinical competency committees at the time of the interviews. In the absence of a current clinical competency committee, questions addressed current procedures used for resident performance review.

Analysis

As previously described (Hauer, in press), investigators conducted transcript coding concurrently with data collection.[39] The investigator team comprised medical education leaders with experience in leading graduate and undergraduate training programs and educational researchers. For the initial data analysis, four investigators and the research assistant (KEH, BC, WI, EH, PSO, JB) participated in codebook generation base on review of 10 transcripts, after which one investigator (KEH) and the research assistant (JB)

each coded the remaining transcripts. They reviewed discrepancies through discussion and review of the entire transcript.

For the current study, we conducted a non-systematic search of the English-language literature focused on studies of group decision-making in medical education, psychology, and organizational behavior contexts. One author (KEH) searched the MEDLINE, PsycINFO, Google Scholar and Web of Science databases for citations using terms related to group decision-making, organizations, group dynamics, committee membership, and clinical competence. Additionally, authors manually searched the bibliographies of relevant articles and identified articles from personal knowledge of the field. Table 1 summarizes key points from the literature on group decision-making, including the processes used by groups that influence their outcomes, and how the literature enhances understanding of the work of clinical competency committees.

Our literature review informed the next step, in which we conducted deductive thematic analysis of our data. We created a frame from the literature review by drawing on the framework method, which facilitates analysis through comparing and contrasting key themes generated from qualitative data within and across participants. [40] We deductively coded our data for concepts that exist in the decision-making literature to determine how those concepts occur in the context of clinical competency committees. We created a table based on the framework, and investigators (KEH, BC, EH, WI, CB, OTC) identified coded data that aligned with elements of the framework. The principle investigator reviewed all charted data in the draft table to confirm coding into the categories.

We used Dedoose Version 4.5 (SocioCultural Research Consultants, LLC, Los Angeles, CA) web application software for coding, organizing, and retrieving data.

Results

We characterized group decision-making processes described by our study participants in terms of member composition and group processes (Table 1). For each of these components, we present the ways that committees organized their work and insights about their effectiveness and limitations, summarized below and in column 3 of Table 1.

Member composition

Membership composition of clinical competency committees entailed member characteristics and group size. Participants described how the people who were in the room hearing information and sharing their own experiences with residents contributed to the group's outcomes.

Member characteristics. Program directors endorsed the value of diversity and representativeness of membership in the performance review process. Multiple benefits of membership diversity and representativeness were described. Wider representation seemed to lead to better buy-in for decisions about residents and engaged the faculty in the training program as a whole.

Many endorsed the ways that their committee members were representative as they described how members were selected to achieve representation from varied clinical sites and clinical units (such as inpatient, outpatient, critical care). They also valued inclusion of faculty who had recently worked with or submitted performance evaluations about the resident. One explained, *"There are limitations to just written evaluations only. By having somebody who works at that site and has also observed the resident, they can put the performance into context. (5427)*

Member seniority was described as influencing the nature of contributions to committees. Senior faculty contributions were generally considered unequivocal because of their *"deep experience" (1582)* with the performance review process. Program directors valued these members' experience seeing a range of resident performance levels and with the residency training

program overall. In addition, senior faculty seemed to understand committee procedures well. As one explained,

"There are very seasoned, mature people who have seen things come, and they say, 'We had something like this ten years ago, and this is kind of how it played out,' and that's helpful for the other people on the committee who don't have the same kind of development for the position as the chair of the committee or myself would have." (4082)

Some respondents also identified chief residents as adding diverse perspectives to the identification or remediation of performance problems. However, there were mixed opinions about chief residents' role in performance assessment due to their near peer status with residents. One respondent described, *"I've gone back and forth on whether to include chief residents." (6859)* Benefits were weighed against confidentiality issues among near peers. One described chief residents participating in the initial problem identification, but then, *"They are excluded for the problem discussion time when we have a particular resident issue." (1755)*. Some programs resolved this dilemma by involving chief residents partially or fully outside of the full committee meeting.

Other aspects of diversity were notably absent from program directors' responses. Committees included mostly clinical faculty members and sometimes a chief resident or a program coordinator. In some programs, residents had mentors who delivered feedback from the committee, but their presence or role on the committee was not consistent across these programs. The perspectives of interprofessional health care providers, patients, or experts in assessment were not mentioned by our participants as potential or actual contributors to their committees or to the assurance of safe and effective patient care.

Group size. Group size was another important dimension that program directors considered. Committees varied from 3 to over 20 members. In some,

the faculty as a whole defined the group's size because they constituted the committee membership, or the group that held an initial discussion of resident performance prior to the committee. Contributions from a large number of faculty were generally seen as a strength: *"You get a lot of different opinions so that you can get a better acceptance of that particular residents' performance." (0367)*

Committees that employed small numbers of members described homogeneous groups of experienced educators who understood the process well but did not generate much diversity of opinion. One participant weighed the tensions regarding group size:

"I think involving more people, the better, although that group shouldn't be too large, because, as I mentioned, it takes a lot of time to train people to read through the files and what things to look for and what things are key." (7415)

Another said, *"With more people, then there's gonna be more opinions, so the process can be much more drawn out and more difficult." (0410)*

Group processes

Participants described group processes as entailing the group understanding of its work, group leader role, and information sharing procedures.

Group understanding of its work. Interviewees described a range of understandings of their committee members about the purpose and nature of their work conducting resident performance review.

Participants varied in how they characterized the nature of their work. There were different amounts of time committees spent determining levels of competence versus planning or monitoring remediation. Respondents' discussion of their committees' work was limited when focus was on residents who were not achieving minimum competence. One explained how, with a focus only on struggling residents, a committee did not need to meet to discuss other residents:

“The committee would be there in name and only activated if necessary, but that is not going to change our day-to-day processes, because those folks are not going to have the time to commit to evaluate the residents.” (1051)

Commonly, respondents felt that committee members’ understanding of their work developed with experience over time through committee participation rather than through a formal declaration about the nature of the work. Much of their knowledge of resident performance review was tacit and acquired ‘on the job’. Respondents expressed high confidence that, in most situations, their committees could easily identify residents who were performing as expected or not. Having more experienced faculty members as part of the committee was perceived as beneficial for tapping into institutional memory for past comparisons and solutions. When asked to define a successful resident, one respondent explained:

“We don't define that, we don’t have a specific description but just completely base it on [committee members’] common sense and their experience with the resident… most [committee members’] have been in this program for a long time so they know.” (2800)

Another explained how, with experience, the recognition of adequate or inadequate performance was intuitive and did not require additional formal clarification. Comments commonly reflected norm-referenced standards, comparing residents to others in the same program, both past and current, guided by year of training.

“We’re putting a ton of energy to figure out a bigger and better and more elaborate ways to grade residents, and a lot of that energy is wasted and misplaced… you have to know if residents are competent. We’ve always known that.” (9979)

Experience also constituted the mechanism by which members learned how the committee functioned to achieve its purpose. In the absence of explicit explanation of procedure for group functioning, members learned these procedures through participation. Although they appreciated the experience of

more senior committee members, some participants raised concerns that junior members' lack of experience with the committee impeded their ability to contribute in ways that seemed to advance the committees' work:

"We had a couple of newer faculty members and I do definitely get that sense that maybe their lack of comment is more about not knowing the rules rather than not having information that we want to hear. I will take a little more care with that." (0901)

One who had recognized the challenges to junior members' participation without explicit procedures explained:

"What we do is some targeted faculty development, and it really has been more around, 'What should be our criteria?' ….. It's that in-practice training with some faculty development introductory sessions here and there." (0901)

A minority of participants described detailed efforts at faculty development for their committees aimed at generating a shared mental model of the group's work. Strategies to accomplish this goal included having clinical competency committee members also serve on a larger educational committee that conducted faculty development and understanding of goals (1582), or faculty development for committee members about identifying resident performance problems. (4082) Uncommonly, programs conducted detailed analyses of their expectations with the explicit goal of articulating levels of resident performance. One participant described an ongoing need to translate items on ratings scales to consistent frames of reference for faculty:

"It's a matter of me trying to explain to the attendings who are having to use our particular assessment methods what those numbers mean on an evaluation so that Attending A and Attending B both have the same idea in mind in terms of what a three or a four or a five constitutes in terms of performance." (6859)

Lack of criteria to assign consequences made it difficult for some committees to know what to do for a resident who was underperforming, despite a list of

options such as sending written communications of concern of varying degrees of severity.

Group leader role. Most group leaders described their roles as broad in scope and important for group outcomes. Respondents perceived a high degree of committee responsibility and accountability residing with the program director and/or committee chair. This responsibility manifested for some during committee meetings as the chair directed both procedures and decision-making. One explained other members' role in this context as: "*They kind of, frankly, just usually defer to the committee chair and myself." (9301)*

Others portrayed active member engagement during committee meetings but implied that ultimately the chair directed decision-making. In this situation, members listened and reported their experiences with individual residents. Some program directors explained how they guided the group to a decision: *"I make suggestions for the group, saying, 'this is what I think we can do' and then they approve that." (2546)* Engaging the faculty more actively in the decision-making process was mentioned as a goal that could enhance committee work by making members more invested.

None of the participants described examples in which the committee made a decision that conflicted with the leader's preference. Even in the context of diverse opinions, participants described the group talking until consensus. Committees sometimes returned discrepant information to the resident to review and reconcile.

Most participants nonetheless valued their committees as enhancing the validity and credibility of their decisions. Participants endorsed that, by soliciting additional information from committees and having others involved, they were able to make more informed decisions. They were reassured that residents would perceive those decisions coming from a group rather than the program director, thus diminishing the risk of the program director being perceived negatively by a resident needing intervention. As one participant said, *"It easier for a program director in that you're not the only one making the decision, and I think it's a little more democratic that way." (0263)*

Some perceived the committee lessening the burden of resident performance review by diffusing the attribution of responsibility despite the program director doing most of the actual decision-making. For others, the presence of a committee seemed either not to affect, or to exacerbate, the amount of work for the program director. As one explained, *"I kind of do all the work and the follow-up. They're great teachers and things, but all they need to do is comment, listen and talk. There is nothing that they have to do."(4399)*

The program director or chair role also extended beyond the committee meeting time. When the committee ran out of time, the program director or chair, sometimes with a small number of others, made decisions later. Alternatively, at some programs, the program director handled resident performance issues mostly alone, until a problem seemed to persist or escalate, in which case the program director brought it to the committee to discuss. The criteria for escalating to committee involvement were not clearly defined.

Some group leaders identified the risk of bias with a sole leader. One anticipated that an upcoming change to their leader role would enhance fairness of their procedures: *"Instead of having a chair of this committee where I'm running the show, we have a select few clinical faculty who are giving their time to give their views." (1570)*

Information sharing procedures. Information sharing among committee members varied. Some committees described systems to share information from multiple sources so that everyone in the group had the same picture of a resident's performance. A minority systematically shared information during a meeting to portray the quantity of certain resident experiences, performance ratings, or narrative data. This was sometimes done through written or projected information in the room: *"Our resident review committee meets three to four times of the year and we review every resident at each of those meetings including some of their recent work on rotations; all of the evaluations we have." (1331)*

Providing information that allowed for rating residents within their cohort

and/or along a developmental course added structure. Other systematic approaches included appointing a resident mentor, advisor, or team lead to speak first, before opening discussion to the larger group (0901) or always soliciting comments first from the member who worked with the resident most recently. (1570)

Commonly, committees did not structure discussions. For example, some described discussions without clear end-points: *"It's a group process. It's not really like, 'What's your vote?'" (1755)* Others suggested that deliberations lacked purpose, didn't really seem necessary, or were very brief: *"Essentially, the data are presented, and no one really has much to say, but positive things. So there's not much that needs to be said – then they just would kind of move on."* (0410)

For some committees, effective deliberation and decision-making seemed to occur more readily outside of the formal committee: *"I would say that the committee actually becomes more effective outside of the formal reviews because we get together, put our heads together and come up with solutions." (6859)*

The nature and quality of performance information available to the committee related in part to ease of data collection. For instance, one participant described the ease of collecting lecture attendance data into a very complete spreadsheet of information. Others identified written examination data being readily available to share. Commonly, respondents lamented limitations in the information available for the committee. They felt challenged to synthesize information and have it ready for sharing with group members. Also, the quality of clinical performance information from written end-of-rotation evaluations was often viewed with skepticism.

Some compared the content of written evaluations to the content of comments shared in the meeting, and perceived that meeting comments were more honest, complete, or contextualized. Many respondents proudly endorsed the fact that anyone present could speak at the committee meeting. Information shared by a member during the committee meeting often carried important

weight. Program directors often had more information than other committee members. They described that people continually brought them information informally. Participants did not describe an information sharing strategy of providing resident performance information with members in advance of committee meetings.

Effect of time pressure

Time pressure was viewed as a threat to the performance review process. Exacerbating factors included conflating remediation with performance review; because remediation planning was so time consuming for some committees, performance reviews for other residents seemed to be short-changed. Some program directors shared how devising remediation plans consumed inordinate committee time. A common assumption was that new expectations for performance review would increase work rather than redefine how current work should be done. They recognized there would be a learning curve as they developed and refined their methods of performance review, but did not trust that they would ultimately achieve efficiency.

Some participants envisioned general or specific strategies to enhance the effectiveness or efficiency of the performance review process. Specific strategies under consideration focused on improving data collection and data synthesis such as synthesizing collected information more frequently for reporting back to residents, but not discussing all data during committee meetings (0901) or extracting *"the nitty gritty"* from current evaluations (0370) to try to capture new outcomes information related to milestones. Others considered training observers to provide more specific information or introducing new tools. Many desired electronic evaluation systems that effectively enabled synthesizing information. Some hoped to improve the clinical competency committee process by reducing the burden of meeting time. Strategies suggested scheduling meetings well in advance and using resources such as written tools or scripts from the school's graduate medical education office or national specialty organizations.

Discussion

From reports by residency program directors, we gathered characterizations of group performance review procedures and determined how those procedures aligned with lessons learned about group decision-making from the literature. Our participants' views on group membership revealed consistent value placed on members' experience as clinical teachers and group members. However, there seem to be unrecognized opportunities to minimize bias and enrich the range of perspectives represented. We found a large range of procedures among committees, with local norms and unspoken traditions often driving committee procedures. This situation can lead groups to be insulated, rather than appreciating the scope of resident performance and decision options possible. The confidence we heard from our participants may reflect both their roles as group leaders who possess in-depth information about residents, as well as the confidence of their groups who have longstanding experience working together. However, literature on deficiencies of graduating residents and fellows should prompt caution rather than confidence.[41,42]The intense pressure on clinical competency committees, and particularly their chairs, to document review of each resident in a timely fashion, should prompt efforts to achieve efficiency while also incorporating a diverse range of data and opinions into group deliberations. Below and in Table 1, we summarize these themes about group membership, procedures, and time pressure, and identify risks and opportunities for residency clinical competency committees.

Our participants invested efforts to optimize the diversity and size of their clinical competency committees. These efforts are supported by literature showing how membership composition influences group outcomes. Group composition determines the range of opinions present at the outset of a meeting; these preferences are major determinants of members' opinions at the end of a deliberation.[16,24] We repeatedly heard about the value of certain types of representativeness (site, educational role) but not others (diverse health professions). Members outside the mainstream group in terms of their position and knowledge can improve group functioning through greater

consideration of alternatives.[43] A particular type of diverging perspective mentioned by our participants was that of junior faculty. Multiple program directors found that junior members, in contrast to longstanding committee members, had trouble contributing meaningfully because they did not understand unspoken group norms. Hierarchy may also stifle junior members' participation. It is possible that senior faculty could be less informed regarding the general competencies and their assessment than their colleagues who are closer to training. Systematic strategies to solicit all group members' input to capitalize on the range of perspectives present can maximize group effectiveness.

While the optimal size for a clinical competency committee is not known, literature supports the benefits of larger committees.[14,19] Dating back to the 18th century, the Condorcet Jury Theorem illustrated mathematically how larger groups can make better decisions than smaller groups.[44] As perceived by our participants, balanced against this benefit is the importance of weighing size versus quality of membership.[45] As a committee becomes larger, the last members added may contribute less substantively than initially selected members due to their possessing fewer qualifications or less motivation, and these newer members may require more training. Programs with a small number of faculty may have limited options to achieve larger committee size.

Effective groups share a common understanding of their work. A shared mental model is a knowledge structure held by members of a group that enables them to interpret information consistently, explain findings, and determine actions appropriately for their charge.[21,46,47] Within a group, a shared mental model encompasses understanding of both the task to be done and the teamwork and collaboration needed.[21] For clinical competency committees, a shared understanding would constitute the way in which members describe, understand, and predict resident performance. Without a shared mental model, variation in participants' knowledge, communication, and attitudes can impede group performance.[48] We found evidence of programs not integrating milestones into their assessment tools or into their committee discussions, or having members who varied in their understanding

of the use of milestones, to the point that the purpose of and mechanism for reporting performance information and making judgments of competence did not seem to be clear. Faced with new requirements,[11] some of our participants adapt them into existing systems rather than determining how that system should be modified to achieve a clear purpose.

The literature about groups, and groupthink, supports our participants' report that, as committee members work together over time, they are increasingly likely to develop implicit shared understandings and make decisions accordingly, without necessarily articulating how that process occurred.[22] Group cohesiveness and long experience working together build confidence among group members that they are doing good work.[49] Such group cohesiveness and lack of structured procedures for decision-making are antecedents of groupthink.[22] As characterized by the concept of groupthink, groups high in cohesiveness and confidence can dismiss or suppress both others' and their own members' opposing views in favor of group unanimity. In the case of clinical competency committees, the confidence that the group will accurately interpret resident performance because of their past experience with other residents may not be fully justified since those decisions were not based on demonstration of competence using milestones. We recommend formalized procedures to guard against groupthink.

Program directors commonly perceived that committee members used a "gestalt" perspective to define their criteria and discern how to make decisions about both resident performance and committee functioning. This approach to resident performance review is defined as a judgmental approach, which requires group members, or just the program director, to use their own opinions to generate decisions.[25] In contrast, others used defined expectations or milestones and structures for information sharing to frame committee work as an intellective task that could lead to an evidence-based determination. Some wondered whether milestones could help them convert performance review from more of a judgmental to an intellective task. The ideal may be a combination of intellective analysis informed by high quality, diverse performance data, with committee members present to review and interpret

information to generate a group judgment supported by evidence.[50] Group members who bring experience with the metrics and the trainees would understand performance information in the context of a program's clinical settings, culture, and people. Their work product would become a forward-looking judgment about their trust in the trainee ultimately to practice unsupervised.[51]

Our participants' responses demonstrated that it is possible to share information among committee members so that everyone in the group has the same, complete picture of a resident performance, but this approach requires work. The literature supports that sharing information with all members enhances decision-making,[17] but that the randomness of who attends meetings and what they choose to share could limit or bias the information that is shared.[52] Our data show that personal narratives from committee members shared at the meeting seemed to be treated differently than the other types of information – not organized in a systematic way, but rather revealed during the committee meeting itself, and potentially upstaging other data. The extent to which this procedure is beneficial or deleterious is not known;[53] our participants viewed it as beneficial but often in the context of limited or incomplete other data. This situation highlights the need for clinical competency committees to have not only better learner assessment data using multiple tools and sources, but also structured processes for sharing it.

Our data highlight how, in clinical competency committees, the group leader can have powerful and multifaceted effects on group decision-making. A group leader can shape members' understanding of their task and of the need to share information to achieve optimal outcomes.[28] A hierarchy with a dominant, charismatic or autocratic leader can stifle information sharing or introduction of new information, and favor conformity. [24,26,49] Conversely, a group leader's strategies to invite participation can counteract the tendency for members lower on the hierarchy to be passive.[54] Although we did not query group members about the leader role, our program director participants characterized how power is often centralized with them, via their knowledge about residents that is not always fully shared with the committee. Post hoc

information gathering after committee meetings, particularly about residents with performance concerns, represents an additional source of 'unshared information' and excludes committee members from decision-making about a resident's progress. Time pressure, common for clinical competency committees reviewing multiple residents, exacerbates the risk of a group leader or dominant member disproportionately influencing group outcomes.[34] While the ACGME in the U.S. views the committee as advisory and affords final responsibility for decisions about resident advancement to the program director,[55] strategies for balancing information sharing among a committee chair and group members would benefit the group's deliberations. Given our findings that program directors seem to have more extensive information about residents, further guidance for them about how best to filter and share that information efficiently with members is needed. Further research could explore the extent to which clinical competency committee members feel either engaged or disenfranchised in the context of varying strategies to promote participation and information sharing.

This study has limitations. We gathered information from residency program directors who participated in or led committees, but we did not interview other committee members or observe committees to determine their actual conversations. Our study occurred during the transition to ACGME-required clinical competency committees, and programs may be continuing to evolve their procedures. Some requirements about these committees may continue to change; for example, the ACGME has recently further defined the role that chief residents may play in clinical competency committees,[55] and Canadian requirements will be released in the future. We do not have a measure of the correctness of committees' decisions regarding resident competence to advance in their training. Authors came from two countries, and findings may not represent the experience in other areas.

In conclusion, we reviewed the literature on group decision-making to examine the strengths and potential vulnerabilities that clinical competency committees face in determining residents' competence to advance toward unsupervised practice. Recommendations based on this study are shown in Table 2.

Committee members' commitment and experience, while highly valued, must be viewed cautiously and balanced with the benefits of novel perspectives that may question or re-examine longstanding assumptions. The limitations of group cohesion, gained through experience, can be acknowledged to embrace the opportunities for new ways of reviewing information and making judgments about residents. Perhaps most importantly, ongoing faculty development and refinement of understanding of the purpose of resident performance review using milestones is needed to ensure that committee members share a unified understanding of the purpose of their work for ensuring high quality, safe patient care.

Table 2 Recommendations for clinical competency committees based on study findings and the literature on group decision making

Topic	Recommendation for clinical competency committees	Supporting references
Group composition: membership	Committees should include members selected or assigned to represent disparate opinions	Klocke 2007; Schulz-Hardt et al 2006; Scholton et al 2007[56–58]
Group composition: membership	Committees should include include new or rotating members, in addition to more experienced members, to ensure novel perspectives.	Lewis 2007[59]
Group composition: size	Larger committees outperform smaller, as long as larger membership does not sacrifice member knowledge or commitment	Stasser 1999; Stone and Kagotani 2013[19,60]
Group process: group understanding of its work	Committee members should have a shared mental model and be committed to performance goals	Jonker et al. 2010; Cannon-Bowers et al. 1993; Tindale and Kameda 2000[46,61,62]
Group process: information sharing	Sharing more information, and sharing unique information not known to other committee members, improves the group's knowledge, increases cohesiveness, and leads members to feel better about the work.	Mesmer-Magnus and DeChurch 2009; Gruenfeld et al 1996[63,64]
Group process: sharing written information	Sharing written information, rather than just relying on committee members' memory, increases information sharing.	Xiao and Eastmure 2014[30]
Group process: structuring discussions	Structured group discussions, versus unstructured, facilitate information sharing that increases	Mesmer-Magnus and DeChurch 2009; Klocke 2007[56,63]

	the likelihood of relevant information becoming available to group members. Structure can entail soliciting multiple perspectives and weighing of alternatives, including risks and benefits of different courses of action for resident.	
Group process: group leader soliciting perspectives	Committee chairs can encourage members to share, discuss, and integrate information rather than prioritizing ready agreement among members.	van Ginkel and van Knippenberg 2012[28]
Group process: group leader encouraging elaboration, exchange	Committee chairs can use elaboration strategies by repeating and summarizing, inquiring about additional information, and encouraging information exchange.	Marta 2005; van Ginkel and van Knippenberg 2012[28,65]

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CHAPTER 8

DISCUSSION

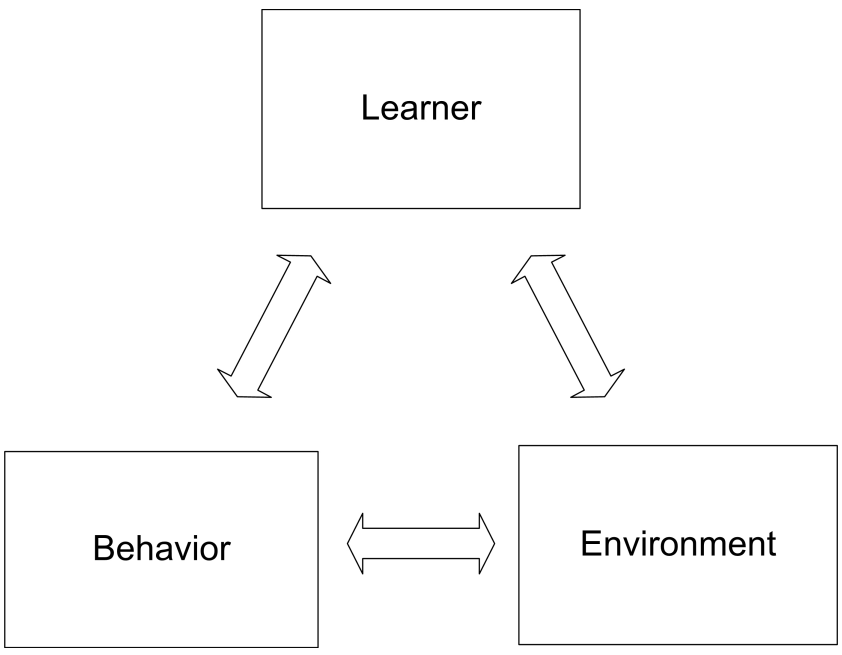
Background

This thesis set out to explore how trust is used in the supervision of medical learners. Supervising physicians face dual responsibilities in deciding what activities can be safely and appropriately delegated to learners in the provision of patient care, and when it is safe to do so. Supervisors are simultaneously responsible for advancing their learners' skill development and also ensuring optimal, safe patient outcomes.[1] In an ideal learning environment, supervision would be informed by trainees' abilities and learning needs, and supervisors and trainees would share common expectations for learners' performance.

In an era in which the effectiveness of medical education is measured not by what is taught or what is assumed to be present as a skill after a designated duration of training, but rather by the outcomes of learning, educators have embraced competency frameworks as the basis for defining expected outcomes. Competency-based assessment incorporates assessment of a range of desired behaviors among physicians and medical trainees, including their patient care, interpersonal and communication skills, and professionalism.[2,3] However, competency-based assessment has limitations, including the deconstruction of physicians' practice into component tasks, and the potential failure to capture supervisors' overall impressions of performance.[4,5] A promising approach to assessment of clinical performance is the use of entrustable professional activities. Entrustable professional activities are activities important in a specialty, setting, or major transition point in training that are essential to the practice of medicine that require demonstration of competence in a range of domains.[6] Assessment of learners using this approach entails a judgment to trust the learner performing the activity with a certain amount of supervision (and conversely, independence) in actual clinical practice. The appeal of assessing learners based on the framework of entrustable professional activities is the authentic applicability to practice in the workplace. A judgment to trust the learners entails a forward-looking prediction regarding future performance.

Operationalizing assessment based on entrustable professional activities requires defining the essential activities of practice. The activities are specialty-specific and may vary with the setting of practice.[1,7] The essential activities addressed may differ based on learners' training level, with the expected roles becoming progressively more complex as a learner develops and gains experience. As supervisors decide how to assign these activities, they balance their accountability to learners with their accountability to patients. Supervising physicians face dual responsibilities in deciding what activities can be safely and appropriately delegated to learners in the provision of patient care. Supervisors are responsible for advancing their learners' skills development and also ensuring optimal patient outcomes and safety.[1,8,9]

Several theoretical frameworks informed the work of this thesis. Social cognitive theory articulates how learning occurs through social interactions. Bandura described how learners observe and model others' behaviors and attitudes.[10] Learning is a social process by which learners implement behaviors they have observed, and interpret the reactions of others to those behaviors. Social cognitive theory thus characterizes human behavior through a social lens, with ongoing reciprocal interactions between cognitive, behavioral, and social/environmental influences.[11] Bandura's reciprocal relationships between learner, behavior and environment are shown in the figure.



Clinical learners continuously construct new knowledge as they interact with the people and structures around them. The learner constantly

observes others functioning within the environment. Learning occurs as a dynamic interplay between the individual learner, the learner's behaviors, and the supervisors and overall environment.[12] Vygotsky proposed a zone of proximal development through which more experienced people (in the clinical workplace, this would be supervisors in the workplace) identify next steps for the learner's development and provide opportunities to practice further and receive feedback.[13] Guided by this theoretical background, educators can consider how assessment therefore may be structured to appreciate and build upon this interactive way that learners observe, behave, construct knowledge and learn to participate in the workplace.

Dornan's experience-based learning model extends this understanding by offering a helpful perspective regarding the ways that clinical learners engage in the workplace and achieve outcomes of that training, and also how the workplace enables learners' participation.[14] Similarly, the workplace learning framework proposed by Billett describes how learners enter a new workplace and learn through invited participation.[15] They not only acquire personal benefit but they also contribute to conducting work that needs to be done. Through this completion of actual, authentic work, medical trainees not only learn and gain skills, but they also achieve the satisfaction and self-efficacy that stem from meaningful contributions in the workplace. Benefits to trainees can be coupled with benefits to the workplace itself. In the case of medical training, the completion of essential patient care work shifts the learner from a position of being a burden or cost to the workplace to a position of providing benefit. This result can enhance self-efficacy and motivation. Perhaps more importantly, participation provides learners with the knowledge and skills they will need to become the next generation of physicians, capable and empowered to provide high quality patient care.

Bandura's work on modeling provides further insight to explain how social learning theory addresses learners' motivation. Enactive learning describes how learning occurs as a result of one's actions.[11] Learners are more likely to model and adopt behaviors that they believe will lead to positive outcomes. Therefore, motivation may come from external rewards for the learner, such

as awards or new, higher-level opportunities, or internally driven rewards such as greater self-confidence or personal satisfaction. Behaviors that yield positive outcomes, as perceived the learner, are more likely to yield learning than behaviors that don't yield such outcomes.

The theory of self-regulation of learning builds on social cognitive theory to explain further how learners think and behave in ways that help them to achieve their goals.[16,17] With clear goals, learners will adjust behaviors, reflect, and incorporate feedback in order to achieve progress.[18] A learning environment that provides structure regarding the goals of learning, but also provides learners some agency or choice over some aspects of goal-setting and choice of activities, fosters self-regulated learning. Learners who train in this kind of environment can realize the benefits of opportunities to experience individual paths toward competence and prepare for future situations in which they will not have supervisors immediately available and need to functions independently.

Implications of social cognitive theory for educational settings that informed the work of the studies in this thesis address the ways that opportunities to participate in the clinical workplace and earn entrustment can promote learning. Learners should be exposed to supervisors who model how patient care should be conducted. Clearly stated outcomes of training should be articulated, including the quality of patient care to be provided and the opportunity for learners to earn entrustment. Learners should have the opportunity to practice clinical activities and receive feedback.[19]

From Billett's studies of workplace learning, important concepts emerged about the necessary ingredients in the workplace to allow for people who are new to the workplace to participate, learn, and grow.[15] In contrast to learning that occurs in classrooms or through reading and studying, learning in the workplace occurs by doing. Learners participate alongside more experienced workers, and thereby learn to do the work of the group. The workplace offers invitational qualities, termed affordances, that allow for learners' participation, and the learners in turn bring the knowledge and attitudes, termed

engagement needed to participate. In the case of medical training, the traditional apprenticeship model may seem ideally suited to enacting a workplace learning approach. However, this apprenticeship model is threatened by regulations that restrict trainees' duty hours, mandates for supervisors' presence during clinical care, and scheduling complexities that limit the amount of longitudinal contact between individual supervisors and learners.[20,21] Thus, greater attention to structures that allow for learners' active participation is critical to ensure that medical trainees have the opportunities to participate actively in clinical care in order to learn essential knowledge and skills. The opportunity to earn entrustment with responsibilities can enable this essential participation.

Several aspects of the clinical workplace must be considered to understand how entrustment may occur. From the supervisor's perspective, the supervisor must be willing to afford, or grant, permission for the trainee to contribute actively to the provision of patient care. This willingness is based on trust. It is apparent that this trust forms in a social environment, as the supervisor and trainee interact in service to their patients. The patient serves as a critical third party as the learner participates under the guidance of a supervisor. The environment in which this interaction occurs comprises the work systems, culture and norms that dictate clinical care. In addition, the environment prompts many of the ways in which supervisors and learners interact – how they set expectations, negotiate feedback, and enable or restrict new and different ways for the learner to participate.

Lave and Wenger's examination of participation in the workplace further emphasizes the centrality of meaningful roles and responsibilities for learning. Their seminal work entitled *Situated learning: legitimate peripheral participation (1991)* summarizes how new workers in a workplace move over time from being outside the work group to becoming progressively more active participants.[22] Initially, as outsiders, newcomers to the group may observe, but they lack both the know-how and the permission to engage with more experienced people in the workplace. Over time, under the guidance of a longer-standing member of the work environment, new members (trainees in

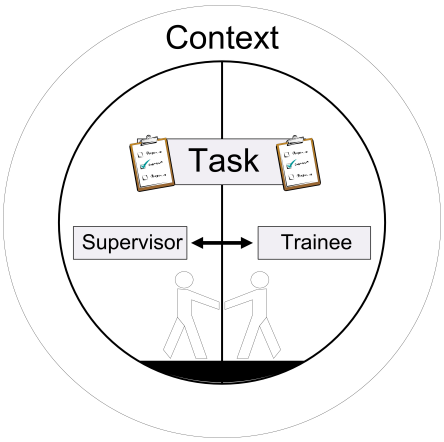
the medical environment) learn to do some activities of patient care, and also learn how the routines and norms of the group that influence how members communicate and behave. For this change to occur, new participants progressively gain knowledge and skills that enable them to participate.[23] Their supervisors in turn must trust them to participate appropriately.

These theoretical perspectives emphasize the social nature of learning and the importance of participation. This background highlights the need to explore how supervisors in a work environment make decisions and conduct their work to either inhibit or invite learners' participation, serve as role models, and provide feedback. The work of this thesis has explored the concept of trust, which is important to understand because it facilitates trainees' active roles and "acts as a gatekeeper to learners' increasing level of participation in the workplace." In fact, trust has always been present within medical education as a tacit assumption. Supervisors accept a certain amount of vulnerability in allowing trainees to conduct clinical care with varying degrees of supervision. The goal of this thesis is to offer language, characterize perspectives, and analyze experiences regarding trust that can contribute to a shared mental model regarding trust and enable supervision and advancement decisions based on trust.

Summary of findings from studies

In order to understand trust, we first turned to the literature to examine how this concept has been studied and understood in other fields. This literature review emphasized the importance of looking beyond the medical education literature to examine a concept more fully using multiple lenses. Literature in the nursing, psychology and business fields enhanced the range and depth of perspectives on the nature of trust and supplemented the literature from medical education. Thus the first paper in the thesis (Chapter 2) characterizes trust and aims to build theory.

The literature review on trust identified the factors that contribute to a supervisor's trust in a trainee to perform patient care activities. The concept of trust, operationalized as the act of entrustment, happens regularly as supervisors work with trainees. From this review, we proposed a model that explains how trust enables clinical participation through five factors—supervisor, trainee, supervisor-trainee relationship, context and task (Fig. 1).



This framing informs understanding of how supervisors reconcile complex information into a judgment to trust a trainee, and how those judgments may be both richly informed and potentially biased. The five factors are all essential contributors to trust, such that changing any one of them will accordingly change level of trust given to each learner.

- The supervisor factor incorporates the supervisor's own clinical competence, expertise in both teaching and assessment, preparation for a supervisory role, attitudinal factors such as confidence and propensity to trust, biases, familiarity with the context, ability and willingness to delegate responsibilities to trainees, and understanding of and attention to patient safety.
- The trainee factor incorporates the learner's learning level, ability to apply knowledge and skills in both familiar and novel situations, clinical and communication skills competence, and experience with particular patient problems and work settings. The trainee's insight into personal strengths and limitations, willingness to ask for help, confidence in personal skills and abilities, willingness to act autonomously, ability to reflect insightfully on their own performance and propensity for seeking and incorporating feedback are also important components of the trainee factor. The trainee's interpersonal skills with supervisors and colleagues influence those individuals' trust in that trainee.

- The relationship factor is new in the medical education literature on trust, but finds extensive support in the broader psychology literature. The rapport between supervisor and trainee, the similarities or differences in their expectations for the working relationship, the concordance of their backgrounds and approaches, and their perspectives on the relationship as a social one that variably prioritizes either harmony or a hierarchical or evaluative interaction, all influence trust formation. The nature of the relationship between evaluator and learner can also influence the judgment to trust because of the influence of mentoring, hierarchy, and accountability within the relationship.
- The context factor includes aspects of the workplace such as the resources available to workers, the infrastructure, workload, schedule, time and space for clinical care and teaching, and overlap in working time between supervisors and learners.
- The task factor addresses the complexity of tasks available to the learner to perform, the frequency with which those tasks occur (common or rare), and the sequencing of tasks appropriate to the learners' needs and abilities.

The exploration of each of these five factors that comprised our proposed theory of trust and the literature supporting their contributions to trust generated guidance in the form of design principles on how to structure learning and assessment to facilitate entrustment decisions. These design principles address the aspects of social cognitive theory essential for learning and therefore performance, related to the interactions among learner, behavior and the environment. We proposed that supervisors and trainees should receive training about performance expectations to inform their shared understanding of entrustment decisions. This alignment helps learners to identify and model the desired behaviors, and ensures that feedback to the learner reinforces those behaviors. In turn, entrustment decisions should lead to trainees' greater independence performing tasks for which they have been determined trustworthy. Otherwise, the entrustment process will not carry meaning for them. As such, the learner's motivation and self-efficacy are enhanced. Structural aspects of the environment of a training program that can support supervision based on trust incorporate some component of

longitudinal relationship between supervisor and trainee as well as intentional sequencing of learning activities. These design features can scaffold a developmental trajectory for the learner. Entrustment decisions at the program level should be informed by multiple sources of evidence and should influence trainees' future awarded (allowed) responsibilities.

Our 5-factor model of trust can serve as a framework for clinical education to guide the design of teaching and assessment activities. The concept of trust has been well studied in diverse fields but is a newer concept for organizing supervision within the field of medical education. However, our research and experience as educators support the fact that trust as a driver of supervisory behaviors has strong face validity for supervisors. Our findings resonate with the recent literature illustrating that clinical performance and assessment are highly contextual;[24] similarly, trust forms within a particular environment and is shaped by that backdrop. Within this 5-factor model, the relative contributions of each factor to trust will vary within each supervisor-trainee interaction. Therefore, every supervising physician and every trainee will need to develop an appreciation of how trust can be engendered to maximize learning and promote safe patient care.

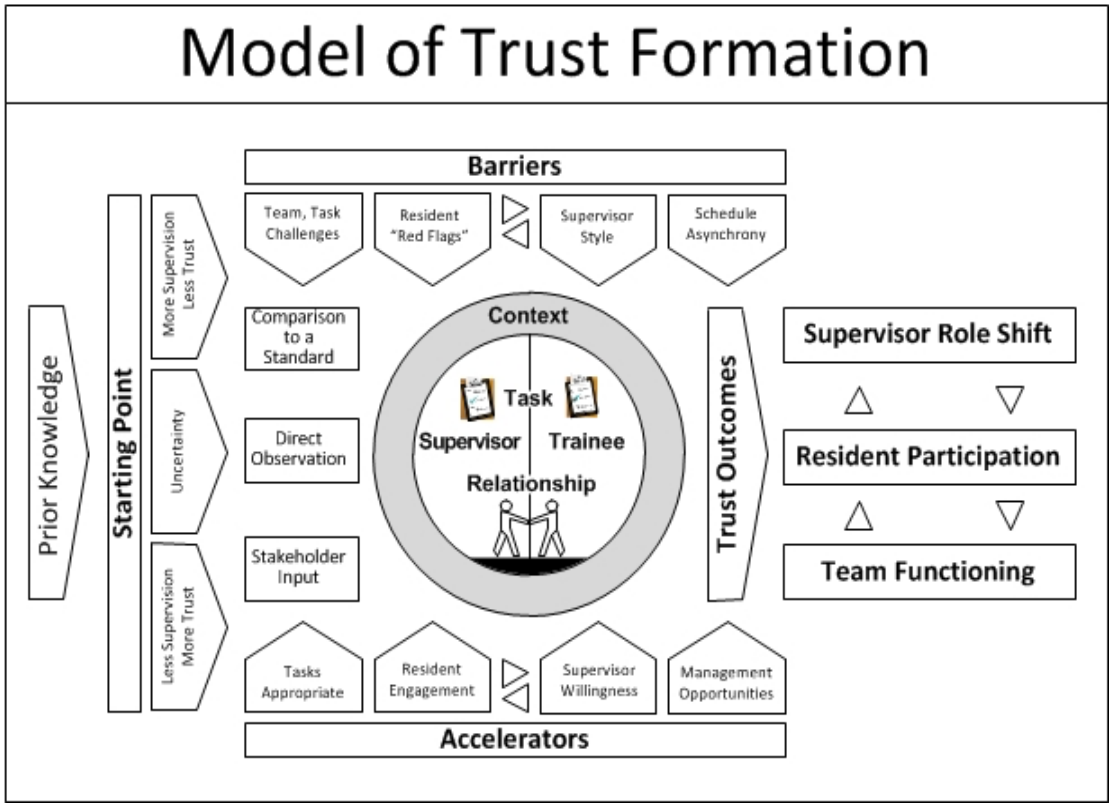
In addition to a strong theoretical framing, an assessment system based on trust also demands rigorous attention to buy-in and feasibility within an educational program as a whole. For example, educators and learners within a training program must comprehend and agree that the assessment system measures the construct it is intended to measure. Entrustable professional activities inherently make sense to clinicians as the essential work they do in patient care.[6] As Crossley has explained, trust, which supervisors implicitly or explicitly consider in making decisions about how much supervision to provide, can serve as a useful basis for assessment.[8,25] As such, an assessment system based on trust, operationalized through entrustable professional activities, can enable clinicians to assess their trainees performing essential clinical work.

With this broad information about the nature of trust, we then explored how to go about building an assessment system based on entrustment decisions. We initially identified entrustable professional activities that would together constitute the core of internal medicine practice and thus represent the essential activities to assess in resident trainees. As described in Chapter 3, in order to build an assessment system based on entrustable professional activities, the first critical step is identifying physician tasks that exemplify essential activities. Entrustable professional activity selection builds evidence for the validity of the assessment by ensuring that the activities represent tasks central to clinical competence.[26] We conducted a Delphi study to identify entrustable professional activities aligned with national defined internal medicine milestones through a local Delphi study of internal medicine educators and residents. Through this process, we determined that educators and trainees within our program generated high consensus on a list of activities and the year of training by which residents should be able to perform them. This study provides an example of a scholarly approach to initiating the process of implementing EPAs within an assessment system based on trust. It therefore serves the purpose of demonstrating a procedure that can be used to identify entrustable professional activities in other settings.

In a next study, (Chapter 4) we described the development and feasibility of two entrustable professional activities for competency-based assessment in our internal medicine residency program. The size and complexity of our program brought feasibility to the forefront in this initial attempt to build an assessment system based on entrustable professional activities. We selected two activities that aligned with clinical service needs and local clinical educators' focus and commitment. These two activities addressed patient discharge from the hospital and serious illness communications. We learned that the entrustable professional activities facilitated useful feedback conversations between supervisors and trainees. Consistent with our expectations that entrustable professional activities would draw attention to important physician work in real-time, the activities engendered discussions about trainee's performance of this work. However, implementation of the entrustable professional activities raised logistical challenges in terms of the

administrative oversight and faculty and resident training needed to ensure that the entrustable professional activities were assessed in a timely and rigorous way. These feasibility issues must be addressed in any program, particularly in large and complex training programs, to enable making high-stakes assessment decisions about residents' trustworthiness for unsupervised practice. Our study also highlighted the critical importance of making trust meaningful for residents. A resident who is entrusted to perform a clinical activity with less supervision than previously required must see that outcome play out to enjoy the satisfaction of greater autonomy.

To advance this work in implementing entrustable professional activities, it became increasingly important to explore how supervisors approach decisions about entrustment. Therefore, this thesis next undertook examination of trust from the perspective of clinical supervisors to explore how they conceptualize trust and operationalize it in their supervision. (Chapter 5) We recognized a gap in the literature about how this process occurs. The literature has outlined the factors that contribute to supervisors' trust in trainees but not yet explained how these interacting factors come together in the dynamic clinical training environment to influence trust. In our study of inpatient internal medicine supervisors, we found that supervising attending physicians rely little on available prior knowledge of residents gathered by others, and rather form their own judgments about residents' trustworthiness for patient care activities rapidly within days to a week of initiating work with the resident. Judgments about a resident derived from observation of team leadership or patient care, as well as from inference. Supervisors described different sources of standards for comparison used to assess residents' trustworthiness, and characterized accelerators and barriers to trust formation related to the environment in which care occurred. Our findings generated a new, expanded model of trust formation in the clinical workplace.



These findings can inform the design of workplace learning environments characterized by learning experiences tailored to trainees' needs and abilities, and supervision strategies designed to foster trainees' growth toward unsupervised practice. The finding that supervisors typically start anew in determining trust, relying on information about training level but not individual information about the residents' prior performance, suggests that systems are needed at the program level to systematically certify trustworthiness. Otherwise, residents would find that they needed to repeatedly earn the trust of supervisors over time for the same patient care activities. This situation could serve to inhibit residents' advancement to higher levels of performance of more complex activities.

These concerns prompted us next to examine trust at the level of a training program, as described in Chapter 6. Ultimately, decisions to trust trainees to advance to unsupervised practice occur when a program graduates a trainee. Within a training program, educational leaders amass performance information through educators' experience with trainees and through formal assessments. As part of this thesis, we examined this process by studying clinical

competency committees. We interviewed residency program directors across specialties in the state of California to characterize the committees, to explore program directors' understandings of their purpose, and the ways in which they use performance information to make judgments about residents' competence. We identified that clinical competency committees, and programs without functioning committees at the time of the study, more commonly focused on identifying problems with resident performance, rather than bringing clarity to the developmental progression of all residents. This situation means that the 'no news - good news' paradigm that assumes that residents without problems are appropriately developing essential competence, and which has characterized postgraduate training programs for decades, commonly persists despite the addition of clinical competency committees. Under this paradigm, most residents would not receive holistic, competency-based review of their performance. Many participants described the group decision-making as implicit and default – the idea being 'we just know' when residents are performing well. Thus, although the findings implied a level of trust by programs in their residents, respondents often did not articulate how this trust developed or what criteria were used. For residents, it would be difficult to identify what steps to take to earn trust, except to avoid being identified as manifesting performance problems.

Questions from this study led us to seek further information from the broader literature on group decision making for insights that could inform the work of clinical competency committees. The purpose of the final study in this thesis (Chapter 7) was to determine, drawing on the literature on group decision-making, how the procedures used by residency clinical competency committees to make judgments of entrustment of trainees influence the quality of their outcomes. We searched for literature on group decision making in the medical education, psychology and organizational behavior fields. This literature emphasized that the information available to committees, and the ways that committee or group members share that information, are crucial to their outcomes. Greater information sharing, and more systematic processes for drawing out information that is initially not known to all group members, enhances decision-making. Group insularity stemming from homogeneity of

membership with limited definitions of diversity and longstanding collaboration breeds confidence in the group's work that may be unfounded and result in inadequate consideration of alternative decision options. Indeed, our participants described resident advancement as a default assumption and reported experiencing high levels of agreement among committee members.

Emergent themes

Trust, and therefore assessment, as a forward-looking judgment

The use of trust as the basis for supervision and assessment represents a departure from traditional assessment strategies. Commonly, supervisors have assessed their trainees at the end of a period of time of working together by recalling how the trainee performed and completing a rating scale accordingly.[27] These evaluations are often referred to as 'end-of-month' or 'end-of-rotation' evaluations. They can suffer recall bias, particularly because they are often completed well after the period of time in which the supervisor worked with the trainee. Supervisors may not feel accountable, because they can perceive that their responsibility for that trainee ends at the time of completing the work together. Concerns about learner dissatisfaction or legal ramifications may prompt artificially inflated reports of performance.[28] In contrast, trust, as a forward-looking judgment, inherently incorporates an anticipated view of the future. Trust conveys confidence in someone about something that will happen in the future, even if not observed.

Trust as a multilevel process in training: an individual judgment, a program's certification of readiness for advancement, and declaration of accountability for safe patient care

This work also demonstrates the layers of trust that occur regarding a trainee within a training program. The individual supervisor makes judgments to trust the trainee with tasks within a particular clinical setting, such as a clinic or inpatient ward. Although the concept of judgment can invoke concerns about

subjectivity or unfairness, multiple assessments by experienced supervisors can collectively represent the range of a learners' performance under varying conditions.[29] This information can be aggregated and interpreted for a well-rounded view of a trainee. At the level of a training program as a whole, a judgment to trust can be rendered by a group such as a clinical competency committee. Although these program-level decisions may be implied passively in the context of the absence of problems with performance, the educational community is embracing the idea that the wisdom of a group through a formal process of performance review yields better judgments than individual or implicit judgments.[30] Trust serves trust as a gatekeeper for safe patient care. As such, it allows both the individual supervisor and a training program overall to demonstrate their accountability to the public through the awarding of entrustment decisions to qualified trainees.

Trust formation within a relationship

This work emphasizes the importance of relationship in judgments of trust, both at the individual level and the level of a program. Trust inherently entails a dynamic interaction between two individuals, and relationships that lack trust tend to be unsustainable, unproductive, and/or unsatisfying. Based on our literature review, we proposed that 'Trust formation within a relationship reflects an interpersonal dynamic, concordance regarding expectations, and amount of contact.' Our subsequent study of supervisors regarding their trust in trainees confirmed the relevance of relationship and characterized it further. Our participants viewed relationships as 'working relationships' in the context of rotations lasting typically two weeks or less. They emphasized the importance of sharing expectations, although with different perspectives regarding whether expectation setting should be driven primarily by the supervisor versus the trainee. This interesting variability is an area of further study that may influence both the supervisor's development of trust in the trainee and the trainee's feelings of readiness for greater independence. That is, the supervisor who observes the trainee articulate expectations and then

sees those expectations play out facilitates a productive working relationship already based within a trust-building interaction. We also found that, in the common context of relationships over brief periods, relationship formation did occur and mature over periods of two weeks of intensive contact (the typical duration among our study participants), and was perceived as richer with greater contact, and threatened with asynchronous schedules and multiple days off. However, the duration and amount of contact between supervisor and trainee occurs in different formats throughout the current training environment. For example, multiple short contacts may build trust over time if dispersed with adequate frequency and spacing, rather than a lot of contact in a short period of time.[31] These contextual features all affect trust formation.

Evolution of trust over time

At the individual level of the relationship between supervisor and trainee, trust evolves from a starting point that varies from high trust to caution. With starting points at both of these extremes, supervisors described checking certain aspects of trainees' work and observing their practice, and adjusting their trust level accordingly. Overall, nearly all achieved trust in their trainees during the time they had worked together. Accordingly, supervisors described confidence in their ability to determine trust in trainees over their two-week intensive time working together. This relatively rapid trust formation may reflect the nature of inpatient teaching, in which working relationships are now often measured in the span of weeks. 'Swift trust' develops in teams that have clearly defined roles and responsibilities, as can be said of inpatient ward teams.[32] However, our clinical supervisors' rapid assessment of trust may also owe credit to their experience providing clinical care and working with trainees. Entrustable professional activities were initially conceptualized as essential professional work that that would be familiar and important to clinicians. The fact that supervisors feel able to determine trust confirms that entrustable professional activities resonate for them as clinicians and can facilitate their ability to conduct assessment of trainees, a process that can occur within the context of brief working relationships.

Trust as a learning tool

This thesis examines trust from a theoretical perspective and also with a practical lens. Social cognitive theory articulates how the environment shapes learning. Medical education research, like medical education itself, occurs in a highly complex environment that cannot be fully standardized or controlled. Within this dynamic environment, it is important that any assessment activity carries meaning for learners and aligns with their learning activities. That is, learners should appreciate the rationale for an assessment, identify connections to their current learning, and see how the results of the assessment will influence their future learning and performance. This recommendation is supported by a constructivist view of learning in which learning is a developmental process with assessment closely matched to each learner's current developmental stage.[33]

Similarly, with a focus on trust, the implications of assessment are that each learner who is entrusted with an activity will be allowed the opportunity to perform that activity with less supervision in the future. Using language proposed by ten Cate & Scheele, Mulder operationalized this awarding of entrustment through "statements of awarded responsibility."[34,35] This opportunity can motivate learning. Self-regulation theory describes how learning occurs when learners set goals and implement particular strategies to achieve those goals.[16] When faced with assessments, learners appraise both the likelihood and amount of impact they anticipate from an assessment, and this appraisal in turn affects the amount of learning that occurs.[36] For entrustment to be a desirable goal, training programs must clearly define the activities that can be entrusted, the standards for entrustment and the outcomes of that entrustment. Self-determination theory supports the idea that the granting of new, justified responsibilities is likely to stimulated intrinsic motivation because it may satisfy the three psychological needs of competence, autonomy and relatedness.[37] Outcomes that bring more work or less desirable work for the entrusted trainee could counteract the success of assessment based on trust. For example, if an entrusted trainee now is assigned a much larger number of patients or duties than before entrustment,

the workload could counteract the motivational benefits of entrustment.

Barriers to using trust as the basis for assessment

The studies in this thesis highlight barriers to the use of trust as the basis for supervision and assessment of trainees. Ideally, trust would inform supervision provided in a developmentally appropriate fashion that allows for graded autonomy.[38] The reality of shorter and shorter working relationships may threaten this process.[21] Clinical placements may not be well structured to support learners' development of competence over time.[39] In our study of supervisors' trust in trainees, supervisors that worked with their trainees for two weeks felt this timeframe was sufficient to determine trust. However, those who worked together for less than two weeks, started the service at asynchronous times, and had asynchronous days off sometimes said that time was insufficient to determine trust.

Another challenge in the use of trust as the basis of assessment is that of operationalizing meaningful implications of entrustment decisions. Programs are often compelled to plan schedules well in advance and assign individual supervisors to trainees randomly. Therefore, making adjustments to clinical service assignments, or pairing a supervisor who knows a trainee with that trainee, becomes logistically difficult. In order for something to change for a trainee based on trust, the supervisor needs to know what the trainee has formerly been entrusted to do, and the clinical service needs to offer opportunities to do activities at the leading edge of the trainee's competence. Solutions to this dilemma can include official systems for certification of trustworthiness for a clinical activity.[35]

We heard examples of this type of system related to a procedural signoff at one of our two study sites. Attendings said that they knew when they did not need to directly supervise a procedure based on this signoff. Enthusiasm for this clear example of what can change for a learner based on entrustment must be tempered with additional questions about the durability of an entrustment decision. We heard one example of a resident who had earned

entrustment for a procedure but then over time no longer recalled how to do this procedure safely.

As with many activities in medical education, time represents a barrier to the use of entrustment in supervision and advancement decisions. Clinician educators often feel that their time is already at the limit of their capacity, and that education-related activities that will add time are prohibitive. However, the reality is that individual observation of trainees providing patient care is an essential function for a supervising clinician. Time efficient strategies to teach and observe learners integrate clinical care, targeted brief observations, and feedback so that ongoing learner assessment becomes routine.[40,41] To protect patients, and to ensure that the next generation of physicians is fully prepared to provide safe patient care and grow as lifelong learners, a high quality assessment system is non-negotiable. In our work particularly based on the studies of clinical competency committees, we have suggested strategies to enable this assessment to occur efficiently and effectively. For example, there is a need to develop electronic systems for efficient data capture and synthesis. Structuring group meetings according to best practices identified from the literature, and from examination of current clinical competency committees, will be helpful. The ACGME has since drafted a Guidebook for Clinical Competency Committees that draws on some of the work in this thesis and consolidates recommendations succinctly in one place. The group leader role within a clinical competency committee is a particular area for focus, since the group leader can inhibit information sharing through the power of hierarchy and the strategies used to facilitate the meeting, or conversely invite broad participation and implement strategies to enable structured information sharing and focused deliberations.

Limitations and strengths

This thesis has limitations. First, there are threats to the generalizability of our findings. Several of the studies in this thesis focused on internal medicine, although our clinical competency committee study encompassed multiple

specialties. Considering trust from the perspective of internal medicine allows exploration of this concept as it applies to supervision in a cognitive specialty. In contrast, procedural specialties such as surgery and anesthesia have outcomes that can be more readily defined and measured, as has been done in studies of learning curves for procedures. As such, we have provided insight into how trust is used by supervisors in a non-procedural field. It may be helpful to replicate and extend findings related to individual supervisor-trainee relationships within other fields. Our studies were based in the United States. Examination of these concepts related to individual and group-level determination of trust within international programs would enhance generalizability and perhaps identify differences based on the structure or culture of programs. A notable example of a difference in training environment would be the greater constraints on working hours in European Union countries, with the consequence of even less time for supervisors to observe learners. Our study of clinical competency committees occurred at time of transition, in which programs without committees are now required to add them. It would be useful to revisit these questions after programs have established the formal procedures and routines of their clinical competency committees.

Strengths of this thesis stem from the theoretical base, variety of research methods and sources represented, and diverse strengths of the co-investigators on the research teams for the various studies. This work has theoretical grounding in the social cognitive theory of learning, and also draws on workplace learning, communities of practice, theories of motivation and and theories regarding group decision-making. Together, these theories and frameworks provide the conceptual lenses through which trust is examined and operationalized in the work of this thesis. In addition, the thesis represents theory generating work regarding the factors contributing to trust and the evolution of trust between supervisor and trainee. The studies in this thesis employ multiple research methods, including first a narrative literature review beyond the bounds of medical education, which has yielded broad and deep information about the nature of trust from multiple perspectives, and analysis of group functioning and challenges to effective group process. Medical educators forming competency committees can identify best practices and

learn from the cautions exemplified in the literature on groupthink. The other studies in this thesis have employed primarily qualitative methods, including content analysis and the framework method. The quantitative methods in this thesis have included a Delphi study and calculations of content validity indices (CVIs). Finally, the studies in this thesis address the continuum of medical education across the spectrum of undergraduate to graduate medical education.

Implications – suggestions for medical educators

The findings from this body of work provide implications relevant for medical educators. First and foremost, this information can guide programs in framing supervision and assessment around the concept of trust, with assessment activities that align with defined competencies and milestones. Although this ideal may be recognizable to readers as consistent with tenets of competency based medical education, our findings suggest that this process is not always explicit or well defined. The risks of individual educators varying in their conceptions of the definition of competence are many, including that trainees will not receive feedback framed in an actionable way, and that their supervisors will not show trust in them commensurate with their demonstrated readiness to perform activities.

Returning to the theoretical underpinnings of the work in this thesis, we can see social cognitive theory predicates that learning occurs as the learner observes and interacts with others and conducts behaviors in the workplace. The focus then must be on imparting the ways that people interact and conduct their daily routines to complete the work so that learners can engage, process information, construct new information, and incorporate it into their performance. Thus learning must be understood as a social process, and one that can be unpredictable as it arises alongside the completion of work in a dynamic work environment. With this view of learning, learners, like physicians out of training, consequently feel motivated to not only contribute as legitimate members of the workplace but also to learn continually.[42] The opportunity to

earn trust is an example of a way to operationalize a motivating factor that is structured based on qualifications determined by supervisors conducting observations in the workplace.

Understanding the key contributors to judgments of trust as described in this thesis can inform several aspects of the design of educational experiences for medical trainees. At the level of individual supervisors and trainees, recommendations for medical educators are to:

- Structure supervisor-trainee relationships to include continuity. Appreciation of the ways that trust evolves over time from an initial starting point that is often uninformed by prior knowledge of the trainee's performance can help programs to structure supervisor-trainee relationships more productively. For example, incorporating a longitudinal relationship within a training program that relies on rotational experiences is recommended.
- Create procedures for transmitting information about a trainee's performance ('handoff' of the trainee) from one supervisor to the next. Formalizing procedures to sign off information about learners, or engage learners in their own learning planning, would also enhance the productivity of transitions in supervision and setting. This mechanism also can help avoid the redundancy of each supervisor discovering anew the trainees' abilities and learning needs. For example, this procedure has been formalized at the program level with statements of awarded responsibility in physician assistant training in the Netherlands.[35] Such a procedure could be done between individual attendings in the way that they handoff their patients. This process could also be managed by the learner through the use of portfolios to foster self-reflection and learning planning.[43] In this way, learners would articulate their own strengths and learning needs and be comfortable sharing that information with supervisors.
- Educate faculty about trust. This thesis shows that faculty supervisors vary in how they conceptualize trust. A consistent approach to perceiving trust necessitates a shared mental model for supervision.[44] Currently, some of the variation in understanding of trust reflects the multifaceted nature of trainee work. Because residents serve multiple roles, providing patient care and

serving as team leaders, they draw on a range of knowledge, clinical skills and communication strategies that different supervisors view differently. Thus residents are integrating and applying the complex skillsets that define the broad constructs of competency domains or roles in competency frameworks. However, some of the variation in expectations for the prerequisites to trust could cause confusion or uncertainty for trainees working with multiple supervisors over time. Indeed, we heard of variable approaches from supervisors about how they go about defining and setting expectations with their trainees. A shared goal for the establishment of trust as a guide to supervision would help supervisors and trainees to approach their interactions consistently.

At the level of a program:

- Define expected learning outcomes, such as entrustable professional activities, within a training program. Entrustable professional activities define the essential work of a professional. The process of defining these activities allows for a shared understanding among educational program leaders, teaching faculty, and trainees. Without this common conception of the goals of training, it is challenging or impossible for supervisors and trainees to identify the focus of decisions about whether trust a trainee. The process of defining entrustable professional activities also guides educators in designing learning and assessment activities that will be appropriate for learners' needs.
- Use design and implementation strategies that will enable meaningful use of trust to guide supervision and assessment. For trainees to be motivated to earn trust, it is important that they perceive that earning trust will be beneficial for them. The knowledge that they will have greater autonomy and be allowed to perform activities at new levels of independence, as well as take on new responsibilities for new patient care activities, should engage them. Potential interferences, such as the risk of too much responsibility or longer hours, faculty confusion about what learners are allowed to do, or a mismatch between what learners can do and what opportunities exist in their learning context, should be recognized and addressed.
- Recognize the importance of feasibility while building a system of

assessment based on entrustable professional activities, and adopt strategies to enhance feasibility. Our implementation work with entrustable professional activities showed that determinations of trust and subsequent supervision based on that trust were difficult to operationalize and communicate across a large program. Participants in our studies discussed the complexity of the training environment, and how supervisors constantly balance their dual responsibilities to their learners and their patients. Decisions about trust often occur in the context of the supervision of other team members and competing demands for documentation and accountability to clinical services. The literature on change management can be helpful in articulating how to define the need for change, communicate this need and how it will occur to stakeholders, educate supervisors and trainees, and conduct ongoing evaluation of the process.[45]

- Explore how to apply the concept of trust across the medical education continuum. The use of common frameworks across the medical education continuum ensures that learners and their supervisors have common understanding of their roles and their work. In addition, a common framework inspires learners by showing them how the activities they are doing align with the work of their supervisors, role models and mentors. As such, these activities are perceived as authentic professional work rather than as busy-work that is unrelated to actual practice. Early work on entrustable professional activities for early medical learners, the undergraduate medical education trainees, has led to definitions of entrustable professional activities for learners entering core clinical clerkships[46] and for the entry point to residency.[47]

Implications for future research

The findings from the investigations within this thesis suggest exciting opportunities for further study.

Learner perspective

As the subject of their supervisors' trust, learners are the trustees who

experience a change in their roles and responsibilities within a training program as a result of earning their supervisors' trust. An intriguing area for further research would be to explore what it means to learners to earn trust, and how they perceive that this trust influences their learning and the activities they perform. Trust is also considered as something personal, but it is unclear to what degree trainees would perceive the trust they earn within an institution after a summative entrustment decision as something they bear responsibility for maintaining going forward. Competency-based medical education has been criticized as reducing performance to a list of milestones or tasks that may be perceived by learners as achievements to acquire, but that have little value for them.[48,49] An alterative approach of a program of assessment to support learning emphasizes longitudinal competence development, ongoing feedback, and the expectation for learners' active participation in reflection and learning planning.[50] Further study could explore how learners use information about trust to set and achieve improvement goals that ultimately help them to earn in the future. By enhancing intrinsic motivation, the opportunity to be entrusted can stimulate learning itself.[37,51]

Supervisor perspective

There is a need for training in the use of trust as the basis of supervision and assessment. Our research suggests that faculty supervisors learn to supervise and trust 'on the job' through functioning as supervisors and reflecting on their experiences, and sometimes receiving feedback from their trainees about their supervision. Supervisors feel able to determine trust using a variety of information sources, although they start from different points and prioritize different information. These finding raises questions. The facts that supervisors learn this skill through experience and face many questions through that experience indicate a need for training in supervision. The most effective format for training in supervision, and who should provide that training, is not known. Research is needed to find out whether certain didactic or in the field experiences, or group or individual activities, influence the subsequent quality of supervision provided. Connecting this training to trust would entail guiding supervisors to understand performance expectations,

methods of determining the needed level of supervision versus learner autonomy based on a determination of trust, and implementing supervision accordingly.

Training in supervision raises practical questions that can also be subjects of further study. How much training is needed, and when that training should occur, are unknown. Should this training occur upfront, or in an ongoing format? Our findings suggest that, at least when prompted by our interview questions, supervisors engage in reflection on the successes and challenges they have had as supervisors. This reflection could prompt revisions to one's supervisory approach. Structures for this reflection in group settings would be another potential venue for faculty training.

Outcomes of training under a model that uses supervisors' trust to guide supervision should also be identified and assessed to determine if the training is effective and also if the correct outcomes are being measured in the right ways. The ultimate goals of medical training are to produce competent physicians and improve patient care. Initial measurement of outcomes using trust for supervision might focus on supervisors' confidence and attitudes about supervision, or observations or recordings of their supervisory behaviors. However, more robust outcome measures would address trainees' ability to perform key clinical activities, such as entrustable professional activities, unsupervised. This type of outcome would indicate that those trainees had been afforded the opportunity to practice unsupervised and had the requisite knowledge, skills and attitudes to do so. Measures of patient outcomes, including health outcomes, health care utilization, satisfaction, and cost would connect training outcomes to the quality of patient care. A systematic review of the effects of residency training on patient outcomes concluded that adequate supervision leads to better outcomes than no supervision.[52] This finding prompts questions about how 'adequate supervision' is defined and operationalized, and the ways that using entrustment can facilitate that matching of supervision to supervisory needs to enhance patient outcomes.

The context in which entrustment decisions are made represents another needed area for further inquiry. Context has been identified in the work in this thesis as well as in other work as an important factor contributing to a supervisor's decision to trust a trainee. Important features of the context are described in work in this thesis, including the health care system, the other team members working with a supervisor and trainee, and the workload assigned to the supervisor. Questions therefore arise about the transferability of entrustment decisions. What are the boundaries of entrustment decisions across types of settings and team structures? What is the durability of entrustment decisions?

There interest in using trust and entrustable professional activities to inform supervision across the continuum of medical education prompts suggestions for additional investigation.[46,47] Further study can help clarify the ways that entrustable professional activities can be used throughout training. The entrustment scale proposed by Ten Cate holds at its higher levels the learner's ability to perform the task without supervision.[53] How supervision should be defined and structured for learners earlier in training who are gradually gaining competence is yet to be determined. Student-level entrustable professional activities, just as with resident-level entrustable professional activities, could be used to articulate the vision and objectives of a curriculum. However, the ways that trust can be applied to supervision of students, and how that interfaces with supervisors' accountability to their patients, their billing organizations, and the public is yet to be determined.

Program perspective

Clinical competency committees offer another compelling area for further study of entrustment. These committees, as a mandated structure that is new for many specialties within graduate medical training, constitute both a challenge and an opportunity for training programs. It is important to maintain focus on the goal of characterizing the developmental progression of each resident as an individual, in order to achieve one of the idealized aims of competency based education, namely individual paths toward competence.[54]

Unanswered questions for these groups include how clinical competency committees can best collect and synthesize information for their group members in a way that supports judgments of entrustment. These data can not only inform the work of clinical competency committees but also enable rich feedback to learners, rather than the current model in which evaluation information is used almost entirely used for summative purposes. There is an urgent need, as articulated passionately by our study participants, for more efficient methods of data aggregation. However, the right data must be collected. Milestones can be reductionist, a problem that can be addressed through sampling rather than exhaustive measurement, inclusion of narrative as well as numerical comments to characterize observed behaviors more fully and methods to synthesize information to characterize trainee performance.[48] Therefore, more understanding about the design and implementation of assessment tools, and synthesis of information gathered with those tools, for workplace-based assessment is needed.[55] Our participants also advocated for the value of informally collected information from hallway conversations and emails about trainees. Further study into the ways that this information can be collected, either informally as is currently done or formally, and how it can be made available to committee members, would provide needed guidance for clinical competency committees. Our work also suggests a need for making this information available to residents in a useful format to advance their individual development of competence.

The literature on group decision making, summarized in this thesis, can be used to examine the processes used by clinical competency committees to improve their work. Further examination of how committee procedures align with what is known about best practices and vulnerabilities in group decision making can help ensure that committees do not suffer the well-recognized pitfalls for groups, such as bias and groupthink.[56]

Measurement perspective

The use of trust in assessment can be examined more closely as a strategy to address pervasive challenges in the assessment of workplace-based performance. The literature on assessment in the clinical workplace has identified limitations in the way that educators have traditionally approached measurement of learner performance.[57] Priority placed on psychometrics goals of reliability and 'objectivity' in standardized settings has limitations. This ideal has been challenged as educators have realized that, in the workplace, raters vary in the way they rate the same performance, and even rater training does not remove this variability. This variability needs to be explored and appreciated. Learners as well vary in their performance, based on case-specific knowledge and skills as well as other contextual factors that influence their daily performance. Workplace-based assessment must be aligned with what learners and supervisors actually do.[25] Similarly, entrustable professional activities have been proposed as a framework for assessment that makes sense to clinicians as consistent with what they are implicitly already doing as part of their work supervising their learners. Assessment is a judgment that values supervisors' experience and impressions. Therefore, assessment based on trust, as compared to traditional assessment forms, may align better with the ways that clinicians make judgments about their learners.[58] More study is needed to clarify how supervisors (raters) make judgments to trust individual trainees with particular tasks, including the information sources they consider and cognitive processes they use. Additional research could examine different ways to measure the outcomes of that trust, and trainees' perceptions of their readiness for that entrustment. The work on factors related to formation of trust can help identify the sources of variability in the performance ratings.

Conclusion

The research projects described in this thesis were designed to contribute to the growing literature on judgments of trust and the process of entrustment as a strategy for assessment of clinical learners in medical education. The

studies in this thesis expand understanding of the nature of trust and contributors to trust, and the processes by which both individual supervisors and groups of medical educators interpret information to make decisions to trust individual trainees. This thesis also examines some of the implementation issues that arise in introducing an assessment system predicated on trust. Future studies can further expand knowledge of how to optimize assessment based on trust to ensure that trainees are prepared to conduct the clinical practice they will undertake without supervision at the conclusion of training.

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Summary

This thesis describes a group of studies designed to explore the concept of trust as the basis for supervision in clinical education. Despite the promise of competency-based medical education (CMBE) to ensure that trainees achieve desired outcomes of training, challenges have arisen in the implementation of this educational framework due to reductionism and educators' sense that competencies and milestones do not capture their impressions of trainees' ability to complete clinical work. Drawing on conceptual work on social cognitive theory by Bandura, Billett's and Dornan's studies of workplace learning, Vygotsky's zone of proximal development, and theories of group functioning, this thesis examines trust through qualitative exploratory and quantitative empirical studies. The aim of the thesis is to provide guidance about incorporation of trust to inform both clinical supervision and learners' development in the clinical workplace.

Trust commonly determines whether supervisors allow clinical learners to participate actively in clinical care at the leading edge of their competence. The proposal of entrustable professional activities (EPAs) as a new framework for assessment has generated much enthusiasm among educators. In this framework, supervisors can make entrustment decisions by observing and assessing learner performance and anticipating how learners will conduct future performance unsupervised. Entrustment decisions challenge supervisors to adjust their supervision to learns' needs and to be accountable for their assessments, and motivate learners to become contributing members of the workplace by performing essential tasks. However, there has been a gap in the literature regarding the nature of trust and how supervisors understand and implement trust in their supervisory relationships and clinical work. Thus, the research questions that guided this thesis work aimed to characterize conceptualizations of trust in the literature across disciplines, identify and implement EPAs for assessment, and characterize both individual supervisors' and training program leaders' understanding of trust as a guide for judgments of readiness for unsupervised practice.

A literature-based overview (Chapter 2) of trust identified five factors contributing to supervisors' trust in their trainees: the supervisor, trainee, supervisor-trainee relationship, context, and task. These inter-related factors together explain how entrustment enables trainees' clinical participation and learning. A supervisor's clinical expertise and attitudes enable informed decision-making to relinquish certain responsibilities to learners, appropriate to their emerging development as clinicians, and assumption of a supervisory rather than hands-on role. The trainee's clinical competence and willingness to seek help constitute essential ingredients for more independent practice. The relationship between supervisor and trainee highlights the inherently social nature of trust and brings focus to the importance of interpersonal communication, feedback, and sharing of expectations in trust formation. The context includes the many dynamic forces in the current clinical environment, including limited duty hours and numbers of days working together, team approaches to care, and complex systems of care. The task factor incorporates the acuity, complexity, and number of patients as well as the particular aspects of patients' care that need to be completed by trainees or other providers. Our synthesis of the literature on factors contributing to entrustment informed design principles we proposed to optimize supervisors' use of entrustment to facilitate trainees' learning and participation:

- Experienced, trained supervisors would be prepared to make entrustment decisions during supervision.
- Trainees would take on progressively more advanced and diverse responsibilities that matched their levels of competence and would develop the insight, skill and confidence to reflect, identify weaknesses, and seek supervision as needed.
- Supervisors and trainees would share common understanding their working relationship and how they can collaboratively achieve trust
- The work environment would optimize schedules and work assignments to enable trainee participation within complex systems, including incorporation of some longitudinal relationships with supervisors
- Task assignment would appreciate trainees' readiness through sequencing and tailoring to individual learning needs.

These recommendations should culminate in a procedure for making formal entrustment decisions that have meaningful implications for trainees. As such, patients could receive care by providers with demonstrated competence for that care. This work supports the use of EPAs as a promising assessment strategy that can recognize the inevitable influence of context in assessment and incorporate supervisors' professional experience and expertise into forward-looking judgments about trainees' future performance.

To envision operationalizing assessment using EPAs, and anticipate the challenges and opportunities, we next set about to identify and implement EPAs within a large training program. Through a modified Delphi technique, we surveyed internal medicine educators and residents about the importance and appropriate year of training to reach competence for 30 essential tasks in the field. (Chapter 3) Results yielded 17 EPAs with full consensus as essential internal medicine physician tasks. These results informed a pilot and feasibility evaluation of two EPAs for competency-based assessment in the same residency program. (Chapter 4) The two EPAs were selected based on high ratings in the initial Delphi study as well as enthusiastic support from clinical service leaders as priorities for clinical care improvement, education and assessment. The two EPAs (patient discharge from the acute care setting, family meeting for communication about serious illness) were perceived by both supervisors and residents as facilitating useful feedback discussions that were more specific and actionable than typical feedback discussions. Participants identified barriers related to the EPA reminder systems and their own competing time demands. These studies prompted the need for future work to determine how entrustment decisions can be practically and meaningfully operationalized based on observations of performance and synthesis of assessment information.

As a next step (Chapter 5), we examined how supervisors currently understand and experience trust in their resident trainees in the clinical workplace. Through interviews with clinical supervisors, we explored their perceptions of the meaning of trust and how it informs their clinical supervision. We found that the concept of trust resonated strongly with

supervisors as a familiar and frequently used way of determining the amount and nature of supervision needed. They varied in how much trust they initially felt for trainees and which sources of information modulated their trust. They perceived trust formation as an individual assessment largely uninformed by prior information about a resident's performance. Successful trust formation evolved supervisors' roles away from direct supervision toward more consultation and teaching duties, enhanced residents' independence, and influenced the entire team's experience. These findings prompted suggestions for constructing a training environment that offers intentionally selected learning experiences and adapts supervision to the leading edge of trainees' competence. Procedures to formalize assessment of trust can include trust-based ratings scales, EPAs, and structured observations. Supervisor training should define a standard frame of reference, show how to use rating scales, and provide strategies for concurrent assessment of trainees' skills and provision of patient care. Curricular design should build in learner opportunities that align with their learning needs and motivate them to earn trust.

The work of this thesis then examined judgments of trust at the level of a training program. Interviews with graduate medical education program directors across specialties at five institutions examined their procedures for group review of resident performance. (Chapter 6) We identified two guiding paradigms described by our study participants: a *problem identification model,* which predominated, and a *developmental model.* The problem identification model focused on identifying and addressing performance concerns, often raised through clinical systems or informal comments that alerted program directors to problems. The developmental model sought evidence of each resident's increasing competence as measured with milestones along a developmental trajectory. Respondents found it challenging to acquire and synthesize data efficiently to support a development model. The focus on problematic performance seemed to stifle provision of feedback to learners in many programs. Within clinical competency committees, members brought experience and commitment that were perceived by program directors as valuable. However, members

received minimal training to guide their work. The implications of these findings include a need to clarify the purpose of clinical competency committees in assessing trainee performance and supporting individual paths toward competence. A clear purpose along with information systems for data collection and management would better enable training programs to support trainees' growth toward readiness for independent practice and ensure programs' accountability to patients and the public.

The final study in this thesis (Chapter 7) examined the group decision-making procedures used by clinical competency committees to understand how those procedures influence group outcomes. A literature search on group decision-making in the fields of psychology, organizational behavior, and business yielded key findings about how groups are populated and how they use information. Social decision scheme (SDS) theory explicates the processes by which groups move from individual preferences toward group decisions. Bias is an inherent risk in group decision-making. The literature on groupthink describes how group can coalesce around priorities for consensus and harmony at the expense of incorporation of diverse opinions. Time pressure can exacerbate this risk and stifle information sharing and deliberations.

With this background, we examined our data from residency program directors to explore how their committee procedures influence their outcomes. Three themes emerged: Group *member composition* favored selection and retention of physician committee members who represented various clinical sites and remained in their committee roles over time. *Group processes* revealed variable group understanding of its work, dominant leader roles with sometimes-narrow member roles, and limited information sharing procedures. Recommendations for clinical competency committees resulting from this study include inclusion of diverse membership with broader definitions of diversity and active participation from new and experienced members, use of data management strategies that enable sharing performance data about all residents with committee members, and member training to promote a shared mental model about committee purpose, ways to interpret performance information, and actions to take. The group leader role should enhance efficient committee functioning while enabling broad participation rather than

constraining member participation.

In conclusion, emergent themes from the body of work in this thesis are:

- Trust, and therefore assessment, as a forward-looking judgment
- Trust as a multilevel process in training: an individual judgment and a program's certification of readiness for advancement.
- Trust formation within a relationship
- Evolution of trust over time
- Trust as a learning tool
- Barriers to using trust as the basis for assessment

Grounded in the tenets of sociocultural theory of learning and the framework of workplace learning, this thesis examined trust as the basis for clinical supervision that will maximize learners' participation, and therefore learning, in the workplace. Understanding of the key contributors to judgments of trust from the literature and studies with clinical supervisors and program directors informs recommendations for designing clinical training environments that promote trainee competence.

Samenvatting

Dit proefschrift beschrijft een aantal studies die samen het concept vertrouwen als de basis voor supervisie in klinisch onderwijs onder de loep nemen. Ondanks de belofte dat competentiegericht medisch onderwijs (competency-based medical education; CMBE) ervoor zorgt dat trainees de gewenste uitkomsten van opleiding bereiken zijn er belemmeringen in de implementatie van dit educatieve kader, door reductionisme van het competentieconcept en het gevoelen onder opleiders dat competenties en mijlpalen ("*milestones*"[1]) hun indrukken van een trainee's vermogen om klinisch werk uit te voeren niet goed weergeven. Dit proefschrift onderzoekt het concept *vertrouwen* met kwalitatieve verkennende en kwantitatieve empirische studies, gestoeld op conceptueel werk rond de *Social Cognitive Theory* van Bandura, Billet's en Dornan's onderzoek naar leren op de werkplek, Vygotsky's Zone van de Naaste Ontwikkeling, en theorieën over het functioneren van groepen. Het doel van dit proefschrift is om inzicht te geven over hoe vertrouwen toegepast kan worden in klinische supervisie en in de ontwikkeling van trainees op de klinische werkplek.

Vertrouwen bepaalt doorgaans of supervisoren klinische trainees actief laten deelnemen in klinische zorgactiviteiten waarin ze bijna of net bekwaamheid hebben bereikt. Opleiders hebben zich enthousiast getoond over het idee om zogenaamde toe te vertrouwen professionele activiteiten, of Entrustable Professional Activities (EPAs), te gebruiken als een nieuw raamwerk voor beoordeling van bekwaamheid. Met dit framework kunnen supervisors vertrouwensbeslissingen nemen door een trainee te observeren en beoordelen, en te voorspellen hoe een trainee in de toekomst zonder supervisie zal functioneren. Vertrouwensbeslissingen maken het noodzakelijk voor supervisoren om hun niveau van supervisie aan te passen aan de behoeften van trainees en om verantwoordelijkheid te nemen voor beoordelingen; ze motiveren trainees om bijdragen te leveren op de werkplek door essentiële taken te verrichten. Er is echter een gebrek aan literatuur

[1] Milestones zijn de door het accreditatieorgaan van de medische vervolgopleidingen in de VS voorgeschreven ontwikkelingsstadia van AIOS waarover regelmatig gerapporteerd moet worden

aangaande het karakter van het vertrouwensconcept en de manier waarop supervisoren vertrouwen interpreteren en toepassen in supervisierelaties en klinisch werk. De onderzoeksvragen die de kern van dit proefschrift vormen hadden daarom als doel de conceptualisering van vertrouwen in de literatuur vanuit verschillende vakgebieden in kaart te brengen, om Entrustable Professional Activities (EPA's) voor beoordeling te identificeren en implementeren, en om te karakteriseren hoe zowel individuele supervisoren als opleiders in functie vertrouwen interpreteren als een leidraad om te beoordelen of een trainee gereed is voor zelfstandig werk in de klinische praktijk.

Een literatuuroverzicht over vertrouwen (Hoofdstuk 2) leverde vijf factoren op die bijdragen aan het vertrouwen van supervisoren in hun trainees: de supervisor, de trainee, de relatie tussen supervisor en trainee, de context en de taak. Deze onderling gerelateerde factoren verklaren hoe vertrouwen een voorwaarde is voor een trainee om deel te nemen aan klinisch werk en aan leren op de werkplek. De klinische expertise en attitude van een *supervisor* leiden tot gefundeerde besluitvorming om bepaalde verantwoordelijkheden aan een trainee over te laten, passend bij zijn of haar ontwikkelingsniveau als clinicus, alsmede het goed vervullen van de rol als supervisor rol in plaats van de "hands-on" clinicus rol. De trainee's klinische competentie en bereidheid om hulp te vragen zijn essentiële ingrediënten voor toenemende zelfstandigheid. De relatie tussen supervisor en trainee wijst op het inherente sociale karakter van vertrouwen en vestigt aandacht op het belang van interpersoonlijke communicatie, feedback, en het delen van verwachtingen in de vorming van vertrouwen. De *context* omvat de vele dynamische invloeden in de huidige klinische omgeving, zoals de beperking van de werktijd voor artsen in opleiding tot specialist, het aantal dagen van samenwerken, team benaderingen van patiëntenzorg en complexe zorg systemen. De factor *taak* omvat het aantal patiënten, de complexiteit en de ernst van hun condities, en de specifieke aspecten van patiëntenzorg die door trainees of andere zorgverleners uitgevoerd moeten worden. Gebaseerd op onze synthese van de literatuur aangaande factoren die bijdragen aan vertrouwen kwamen wij tot

de volgende ontwerpprincipes voor supervisoren om vertrouwen optimaal te integreren in klinisch onderwijs en begeleiding van trainees:

- Ervaren, getrainde supervisoren moeten geneigd zijn om vertrouwens-beslissingen te nemen gedurende supervisie
- Trainees moeten toenemend diepere en bredere verantwoordelijkheden toegewezen krijgen op geleide van hun niveau van bekwaamheid en moeten het inzicht, het vermogen en het zelfvertrouwen ontwikkelen om te reflecteren op hun vakmatig handelen, eigen zwakke punten te identificeren en om supervisie te vragen indien nodig.
- Supervisoren en trainees zouden een gemeenschappelijk inzicht moeten hebben in hun werkrelatie en in hoe zij gezamenlijk vertrouwen kunnen opbouwen
- De werkomgeving moet roosters en taakverdeling optimaliseren om deelname van trainees in complexe systemen mogelijk te maken, met inbegrip van een vorm van een longitudinale relatie met supervisoren.
- Taakverdelingen moeten rekening houden met het feit dat trainees op bepaalde momenten klaar zijn voor zelfstandig functioneren, en hiertoe een aangepaste volgorde van taken (“sequencing”) realiseren, afgestemd de op individuele leerbehoefte.

Deze aanbevelingen moeten uitmonden in een procedure voor het nemen van formele vertrouwensbeslissingen die betekeningsvolle gevolgen hebben voor trainees. Op die manier kunnen patiënten zorg ontvangen van zorgverleners met bewezen bekwaamheid voor die zorg. Dit werk ondersteunt het gebruik van EPA’s als een veelbelovende evaluatiestrategie die rekening houdt met de onvermijdelijke invloed van context op beoordelingen en van professionele ervaring en expertise van supervisors op uitspraken over trainees’ toekomstige prestaties.

Wij hebben vervolgens, met als doel de beoordeling met behulp van EPA’s te operationaliseren en uitdagingen en mogelijkheden in kaart te brengen, EPA’s geïdentificeerd en toegepast in een groot opleidingsprogramma. Via een gemodificeerde Delphiprocedure vroegen we opleiders en arts-assistenten interne geneeskunde voor 30 essentiële taken aan te geven hoe belangrijk

bekwaamheid is en in welk jaar van de opleiding bekwaamheid bereikt zou moeten worden (Hoofdstuk 3). Dit leverde 17 EPAs op waarover volledige consensus bestond dat ze essentieel zijn voor de internist. Deze resultaten legden de basis voor een pilotproject in hetzelfde opleidingsprogramma, om de haalbaarheid van bekwaamverklaringen met betrekking tot twee EPAs te evalueren. (Hoofdstuk 4). De twee EPAs werden geselecteerd op grond van hoge waarderingen in de eerste Delphistudie en de enthousiaste steun van het klinische afdelingsmanagement vanwege de hoge prioriteit voor de verbetering van klinische zorg, opleiding en beoordeling. Zowel supervisoren als art-assistenten waren van mening dat deze twee EPA's (*ontslag van patiënten uit de acute zorginstelling* en *gesprekken met familie over ernstige ziekte*) aanleiding geven tot nuttige feedback die meer specifiek en actiegericht zijn dan de typische feedbackdiscussies. De deelnemers aan het onderzoek identificeerden barrières rond de betrouwbaarheid van voorzieningen om hen te herinneren aan EPA-beoordelingen en tijdgebrek in het licht van concurrerende prioriteiten. Deze studies gaven aan dat meer onderzoek nodig is om vertrouwensbeslissingen (bekwaamverklaringen) te realiseren op basis van observaties van trainee-activiteiten en van een synthese van diverse beoordelingen, op een praktische en zinvolle wijze. Als een volgende stap (Hoofdstuk 5), onderzochten wij hoe supervisoren momenteel vertrouwen in arts-assistenten in de klinische werkplaats interpreteren en ervaren. Door middel van interviews met klinische supervisors verkenden we hun beleving van de betekenis van vertrouwen en hoe het hun klinische supervisie beïnvloedt. Het bleek dat het concept van vertrouwen sterke weerklank vond bij supervisoren als een bekende en vaak gebruikte manier om de mate en aard van supervisie te bepalen. Zij verschilden onderling in hoeveel vertrouwen zij in het begin hadden in trainees en in de bronnen van informatie waarop hun vertrouwen berustte. Zij zagen het opbouwen van vertrouwen als een individuele beoordeling die met name berust op voorafgaande informatie over de prestaties van een arts-assistent. Het succesvol opbouwen van vertrouwen werd gezien als een verandering in de rol van supervisor waardoor er in plaats van directe supervisie meer aandacht komt voor consultatie en lesgeven, de arts-assistent meer zelfstandigheid kan krijgen met een invloed op de ervaringen van het hele

team. Deze bevindingen brachten ons tot de aanbeveling om een leerklimaat te creëren waarin bewust gekozen leerervaringen worden aangeboden en de supervisie wordt aangepast aan de individuele bekwaamheid van een trainee. Procedures voor het formaliseren van de beoordeling van vertrouwen kunnen beoordelingsschalen, EPA's, en gestructureerde observaties omvatten. Training van supervisoren moet er voor zorgen dat er een standaard referentiekader is, moet laten zien hoe beoordelingsschalen gebruikt moeten worden en moet strategieën bieden voor gelijktijdige beoordeling van de vaardigheid van trainees en waarborgen van de zorgverlening voor de patiënt. In curriculumontwerp moeten er mogelijkheden voor trainees gecreëerd worden die aangepast zijn aan hun leerbehoeftes en ze motiveren om vertrouwen op te bouwen.

Vervolgens nam het werk in dit proefschrift de beoordeling van vertrouwen op het niveau van een opleidingsprogramma onder de loep. Via interviews met opleiders van arts-assistenten in verschillende specialismen aan vijf instituten onderzochten wij de procedures voor team-beoordeling van de bekwaamheid van arts-assistenten (Hoofdstuk 6). Wij identificeerden twee leidende beginselen die de deelnemers in het onderzoek onder woorden brachten: een *probleemidentificatiemodel,* wat de overhand had, en een *ontwikkelingsmodel.* Het probleemidentificatiemodel is gericht op het identificeren en aanpakken van zorgwekkende prestaties, vaak onder de aandacht gebracht via het klinische werk of via informele opmerkingen waardoor opleiders gewaarschuwd worden over problemen. Het ontwikkelingsmodel zoekt bewijsmateriaal voor elke arts-assistent, door toenemende competentie aan te tonen via de *milestones* in een ontwikkelingstraject. Respondenten vonden het moeilijk om gegevens ter ondersteuning van een ontwikkelingsmodel efficiënt te verwerven en te synthetiseren. De focus op problematische prestaties leek het geven van feedback in veel opleidingsprogramma's te belemmeren. Opleiders zagen de ervaring en inzet die leden van klinische competentie commissies bijdroegen als waardevol, maar commissieleden kregen hoegenaamd geen training in deze werkzaamheden. Deze bevindingen

impliceren dat de rol van klinische competentie commissies (CCC's[2]) in de beoordeling van trainee-bekwaamheid en in de ondersteuning van individuele trajecten op weg naar competentie verhelderd moet worden. Duidelijkheid van rol en doel, samen met informatiekanalen voor het verzamelen en beheren van gegevens zou opleidingsprogramma's beter in staat stellen om trainees te ondersteunen in hun groei naar gereedheid voor zelfstandige praktijkvoering en zou de verantwoordelijkheid van opleiders naar patiënten en het publiek kunnen garanderen.

De laatste studie in dit proefschrift (Hoofdstuk 7) onderzocht collectieve besluitvorming procedures die klinische competentie commissies toepassen om te verhelderen hoe zulke procedures groepsuitkomsten beïnvloeden. Een literatuuronderzoek naar collectieve besluitvorming in de vakgebieden psychologie, organisatiekunde en bedrijfskunde leverde belangrijke bevindingen op over de manier waarop groepen worden samengesteld en hoe ze informatie gebruiken. "Social decision scheme" (SDS) theorie expliciteert de processen waardoor groepen van individuele voorkeuren tot groepsbesluiten overgaan. Bias is een inherent risico van groepsbesluitvorming. De literatuur over groepsdenken beschrijft ook hoe een groep zich kan verenigen rond prioriteiten voor consensus en harmonie ten koste van de integratie van verschillende meningen. Tijdsdruk kan dit risico vergroten en de uitwisseling van informatie en beraadslagingen onderdrukken. Tegen deze achtergrond analyseerden wij de data van opleiders om the verhelderen hoe de werkwijze bij hun commissie hun uitkomsten beïnvloedden. De volgende thema's kwamen naar voren: qua *Groepssamenstelling* bleek vooral dat selectie en retentie van clinici in de commissie vanuit verschillende klinische afdelingen en die lang lid bleven van de commissie gunstig uit te pakken. Qua *groepsproces* bleek dat groepen varieerden in hoe zij hun taak opvatten, dat er vaak dominant leiderschap was met soms beperkte rollen voor groepsleden, en dat er weinig procedures waren voor het uitwisselen van informatie. Deze studie leidde tot aanbevelingen voor klinische competentie commissies om naar diversiteit in

[2] Clinical Competence Committees zijn de door het accreditatieorgaan van de medische vervolgopleidingen in de VS verplicht gestelde opleidingsteams

lidmaatschap te streven, bredere definities van diversiteit en actieve deelname door nieuwe en ervaren leden te hanteren, datamanagementsystemen te gebruiken die het mogelijk maken om beoordelingsgegevens over alle arts-assistenten met commissieleden te delen, en training van commissieleden om een gezamenlijk mentaal model te ontwikkelen over het doel van de commissie, de wijze waarop gegevens geïnterpreteerd moeten worden en de te ondernemen acties. De groepsleider moet er voor zorgen dat de commissie efficiënt functioneert maar tegelijkertijd bevorderen dat er eerder brede in plaats van beperkte participatie is van groepsleden.

Samenvattend komen de volgende thema's uit het werk van dit proefschrift naar voren:

- Vertrouwensbeslissingen als een toekomstgerichte beoordelingsaanpak
- Vertrouwensbeslissingen als een proces op meerdere niveaus: zowel individuele beoordeling als bekwaamverklaring door een opleidingsprogramma voor de gereedheid voor een volgende ontwikkelingsstap
- Het opbouwen van vertrouwen in supervisor-trainee relaties
- Vertrouwensontwikkeling in de loop van tijd
- Vertrouwen als leermiddel
- Barrières bij het gebruik van vertrouwen als de basis van bekwaamverklaringen.

Dit proefschrift onderzocht vertrouwen als de basis voor klinische supervisie dat de participatie, en daardoor het leren van trainees op de werkplek zal maximaliseren, gestoeld op de principes van sociaal-culturele theorieën aangaande leren en het framework van leren op de werkplek. Zowel de literatuur over de belangrijkste factoren die bijdragen aan vertrouwensbeslissingen als de empirische studies met klinische supervisoren en opleiders leiden tot aanbevelingen over het ontwerp van klinische leeromgevingen die competentie van trainees bevorderen.

Acknowledgments / Dankwoord

I am deeply thankful to Dr Olle ten Cate, Dr Patricia O'Sullivan and Dr Christy Boscardin for their expert mentorship, inspiration and support throughout the doctoral program. They are extraordinary coaches, researchers, and role models. Thanks also to Dr David Irby and Dr Catherine Lucey for their vision and support in helping initiate and sustain a doctoral program in medical education at the University of Utrecht and UCSF.

Thanks to the American Board of Internal Medicine, the UCSF Office of Research and Development in Medical Education (RADME) and the Department of Medicine for funding projects included in this thesis and supporting my participation in the doctoral program.

I gratefully acknowledge the participants and other mentors in the UCSF doctoral seminar group – Carrie Chen, Lauren Maggio, Bridget O'Brien, Arianne Teherani, and John Young. I appreciate your invaluable patience, guidance, insight, and good cheer. Thanks to Joanne Batt and Victoria Ruddick for administrative support for projects in this thesis.

Lastly, I wish to thank my family, without whom this work would not have been possible. I am grateful to my husband and three children for their love, patience and enthusiasm for my journey in the doctoral program.

Curriculum Vitae

Karen Hauer is Professor of Medicine in the Department of Medicine at the University of California, San Francisco (UCSF)[3]. She earned an undergraduate degree in Human Biology at Stanford University. She then completed medical school, internal medicine residency, and chief residency at UCSF. She served as Director of Internal Medicine Clerkships at UCSF for 17 years and is past president of the Clerkship Directors in Internal Medicine national organization. In 2015, she was appointed as the first Associate Dean for Competency Assessment and Professional Standards at UCSF. She has served as the Director of the California Consortium for the Assessment of Clinical Competence. She is an active researcher in medical education with over 80 peer-reviewed publications and a research mentor for fellows, residents and students, with a focus on new models of clinical learning in the workplace, competency-based medical education, learner assessment and remediation. She is a practicing primary care general internist and attends on the hospital medicine service. She is married and has 3 children.

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