The Importance of and the Complexities Associated With Measuring Continuity of Care During Resident Training: Possible Solutions Do Exist

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BACKGROUND AND OBJECTIVES: Evolutions in care delivery toward the patient-centered medical home have influenced important aspects of care continuity. Primary responsibility for a panel of continuity patients is a foundational requirement in family medicine residencies. In this paper we characterize challenges in measuring continuity of care in residency training in this new era of primary care.

METHODS: We synthesized the literature and analyzed information from key informant interviews and group discussions with residency faculty and staff to identify the challenges and possible solutions for measuring continuity of care during family medicine training. We specifically focused on measuring interpersonal continuity at the patient level, resident level, and health care team level.

RESULTS: Challenges identified in accurately measuring interpersonal continuity of care during residency training include: (1) variability in empanelment approaches for all patients, (2) scheduling complexity in different types of visits, (3) variability in ability to attain continuity counts at the level of the resident, and (4) shifting make-up of health care teams, especially in residency training. Possible solutions for each challenge are presented. Philosophical issues related to continuity are discussed, including whether true continuity can be achieved during residency training and whether qualitative rather than quantitative measures of continuity are better suited to residencies.

CONCLUSIONS: Measuring continuity of care in residency training is challenging but possible, though improvements in precision and assessment of the comprehensive nature of the relationships are needed. Definitions of continuity during training and the role continuity measurement plays in residency need further study.

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to a particular clinician-patient relationship characterized by loyalty and trust.⁸

Interpersonal continuity is a feature that is especially important in family medicine as it recognizes the role of the physician-patient relationship in health and satisfaction.⁹ A core feature of interpersonal continuity is strong communication¹⁰ that develops during residency supported by an intentional curriculum.¹¹ This concept was reaffirmed by the Future of Family Medicine Report,¹² which underscored patients’ strong desire for a personal physician who knew them and who would take into account their own individual culture and value systems in that relationship. Unfortunately, interpersonal continuity is not well characterized from a measurement perspective.⁸ In 2003, Saultz additionally characterized interdisciplinary or team-based continuity as care that allows previous knowledge of the patient to be available when the patient requires a range of services spanning the medical specialties.⁸ An essential feature of all these types of continuity is the relationship between a patient and physician that includes personal and medical information about that patient, a shared location, and knowledge of the contextual features behind this physician-patient relationship.

Evolutions in care delivery in patient-centered medical homes, such as case management and multidisciplinary team-based care, have influenced important aspects of continuity. A single health care professional often cannot meet all of a patient’s health care needs. In addition, multidimensional aspects of care continuity, such as assessing continuity of care, requires better precision from the perspectives of patients, health care clinicians individually, and the entire health care team. Exploring how continuity enhances patient-centered care from these three perspectives is critically important, especially during residency, when complexities in scheduling and rotation structures can erode the continuity experience for residents and patients. Typical means of assessing continuity of care for physicians in practice involve calculations using numerators and denominators associated with patient visits linked to the physician as the identified primary care provider (PCP). Unfortunately, challenges exist in generating similar calculations in many residences when the electronic health record (EHR) does not allow a direct link between a panel of patients and a resident.

The Accreditation Council for Graduate Medical Education (ACGME) Program Requirements for Graduate Medical Education in Family Medicine related to continuity of care (Table 1) indicate residents must participate in a curriculum that focuses on the development of the interpersonal trust relationship between a clinician and patient.¹⁴ The requirements also include that residents be primarily responsible for a panel of continuity patients, integrating each patient’s care across all settings, including the home, long-term care facilities, the family medicine practice (FMP) site, specialty care facilities, and inpatient care facilities.³,¹⁴ An additional requirement is that residents participate in and assume progressive leadership of appropriate care teams to coordinate and optimize care for a panel of continuity patients. Despite these requirements, there is no guidance on how continuity of care should be measured to document compliance. Rather, each residency program is expected to determine its own definition and methodology for measuring continuity. This approach could easily introduce measurement error when measuring across programs, not just within them, which affects our ability to draw conclusions about the effects of patient continuity on learner outcomes. Thus, many important educational research questions in graduate medical education could be answered with greater accuracy if measures of continuity of care were improved and standardized.

The Length of Training Pilot (LoTP) in family medicine¹⁵,¹⁶ is a case control study that is exploring the impact that length of training (3 versus 4 years) has on several learner outcomes. The study will address several research questions, including the effect length of training has on patient continuity and on graduates’ ability to practice in the evolving health care system. To address these questions, accurate measures of continuity of care are needed at the level of the patient, the resident, and the health care team. The purpose of this paper is to characterize the challenges in measuring interpersonal continuity in family medicine residencies and how these might be overcome.

Methods

The LoTP Evaluation team (authors PAC, AE, and MPE) spent the first year of the pilot exploring how best to measure interpersonal continuity among residents in the FMP and tested several approaches that identified specific challenges. We initially conducted a literature review, then interviewed key informants, and collated findings from observational field notes of the LoTP participating programs. The experience of defining, simplifying, and applying continuity calculations was more challenging than anticipated, resulting in poor quality data after several attempts. We then held telephone conferences with residency faculty and staff to better define the challenges. This led to the inclusion of continuity of care measurement as a group discussion topic at a national meeting attended by faculty and staff from the 17 programs participating in the LoTP (3-year or 4-year training models). We specifically focused on measuring interpersonal continuity at the patient, resident, and health care team levels. Extensive field notes were collected for all interactions on measuring continuity. We used classical content analysis with open and axial coding¹⁷ to identify emergent themes representing measurement challenges presented here, the final versions
of which were achieved using a consensus process. Findings from the discussions at this meeting led to our identification of challenges and possible solutions in measuring continuity of care in residency training. All activities presented here were reviewed and approved by the Oregon Health & Science University’s Institutional Review Board (IRB# 9770).

Results
To organize this information, we approach the challenges and solutions from the three levels initially identified: (1) continuity at the level of the patient, (2) continuity at the level of the resident, and (3) continuity at the level of the health care team. Table 2 describes each challenge and offers potential solutions, which are described in more detail below.

Continuity at the Level of the Patient

The measurement of continuity from the patient’s perspective can be characterized as, “How often are patients interacting with the resident primary care provider (PCP) assigned to oversee their care?” (Figure 1). This calculation would include the total number of health care visits all patients assigned to a resident had over a given time period (eg, 1 year) as the denominator with the numerator reflecting the number of those visits the patients had with their assigned resident PCP. While this calculation may appear to be straightforward, we learned when attempting to apply it that technical challenges exist for measuring continuity at the level of the patient.

Challenge #1. Attributing a panel of patients to an individual provider, faculty, or resident can be technically complicated. Such difficulties include how to attribute new patients or patients visiting the practice only once for a specific purpose (eg, sports exam) or only once in 2 years. Assigning all new patients to providers throughout the practice in a targeted fashion rather than randomly, including those who never return to the practice after the first visit, will artificially inflate both the numerators and denominators in the continuity calculation. Many healthy people need only one visit per year, so eliminating these patients is problematic, since many of these patients still consider themselves a part of the practice, and they should be included in the practice’s population management efforts. Setting criteria that includes appropriate responsibility for population management, a minimal number of health care visits, or clarification of the intention of new patients to establish the practice as the site for their primary

### Table 1: ACGME Program Requirements for Family Medicine Related to Continuity of Care

<table>
<thead>
<tr>
<th>Section: IV.A.6</th>
<th>Continuity of Care Residency Program Requirements: Curriculum Organization and Resident Experiences</th>
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<tbody>
<tr>
<td>IV.A.5.d)</td>
<td>• Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.</td>
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<tr>
<td>IV.A.5.d).(1)</td>
<td>• Residents are expected to communicate effectively with patients, families, and the public, as appropriate, across a broad range of socioeconomic and cultural backgrounds.</td>
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<tr>
<td>IV.A.6.a)</td>
<td>• Each resident must be assigned to a primary FMP site.</td>
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<td>IV.A.6.a).(1)</td>
<td>• Residents must be scheduled to see patients in the FMP site for a minimum of 40 weeks during each year of the program.</td>
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<td>IV.A.6.a).(1).(a)</td>
<td>• Residents’ other assignments must not interrupt continuity for more than 8 weeks at any given time or in any 1 year.</td>
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<tr>
<td>IV.A.6.a).(1).(b)</td>
<td>• The periods between interruptions in continuity must be at least 4 weeks in length.</td>
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<td>IV.A.6.a).(2)</td>
<td>• Experiences in the FMP must include acute care, chronic care, and wellness care for patients of all ages.</td>
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<td>IV.A.6.a).(3)</td>
<td>• Residents must be primarily responsible for a panel of continuity patients, integrating each patient's care across all settings, including the home, long-term care facilities, the FMP site, specialty care facilities, and inpatient care facilities.</td>
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<tr>
<td>IV.A.6.a).(3).(a)</td>
<td>• Long-term care experiences must occur over a minimum of 24 months.</td>
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<td>IV.A.6.a).(4)</td>
<td>• Residents should participate in and assume progressive leadership of appropriate care teams to coordinate and optimize care for a panel of continuity patients.</td>
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<td>IV.A.6.a).(5)</td>
<td>• residents must provide care for a minimum of 1,650 in-person patient encounters in the FMP site.</td>
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ACGME—Accreditation Council for Graduate Medical Education

FMP—family medicine practice
Table 2: Technical Challenges and Potential Solutions Associated With Measurement of Patient Continuity

<table>
<thead>
<tr>
<th>Type of Continuity</th>
<th>Technical Measurement Challenge</th>
<th>Potential Solutions</th>
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<tbody>
<tr>
<td>Patient-Level Continuity</td>
<td>Variability in empanelment approaches for all patients</td>
<td>• Define the empanelment approach and apply it with patients who meet empanelment criteria at the practice.</td>
</tr>
<tr>
<td>Challenge 1</td>
<td>Scheduling complexity in different types of visits</td>
<td>• Characterize the types of health care visits that occur so this can be taken into account in the continuity calculations.</td>
</tr>
<tr>
<td>Resident-Level Continuity</td>
<td>Variability among residency programs in their ability to attain continuity counts at the level of the resident</td>
<td>• Negotiate at the institutional level or with the EHR vendor to allow patients to be assigned to residents and to develop data extraction capabilities that generate the numbers needed for continuity calculations.</td>
</tr>
<tr>
<td>Challenge 3</td>
<td>Make-up of the health care team is fundamentally dynamic, especially in residency training</td>
<td>• Repurpose specific fields in the EHR in ways that will allow for recording the continuity resident.</td>
</tr>
<tr>
<td>Team-Level Continuity</td>
<td>Make-up of the health care team is fundamentally dynamic, especially in residency training</td>
<td>• Maintain a daily continuity log of visits separate from the EHR to track resident visits and counts. Include the type of health care visit in the log.</td>
</tr>
</tbody>
</table>

Figure 1: Patient Level Continuity

This calculation would include a denominator of the total number of health care visits all patients who were assigned to a Resident “A” had over a given time period (eg, 1 year) with the numerator reflecting the number of those visits the patient had with Resident “A.”
health care would better elucidate patient empanelment.

Challenge #2. Practice scheduling protocols can affect continuity for patients in varying degrees. There is often great difficulty in creating systems within practices that balance the provision of quick access for patients who need it for acute issues with the maintenance of continuity for those who would more benefit from seeing a clinician who knows them well and with whom a trusting relationship has been built. Many practices use nurse practitioners, physician assistants, or designated acute care sessions to increase access for patients with acute care needs rather than attempting to schedule the patient with his or her own PCP. This approach would decrease the continuity rates for all clinicians, while it enhances access to the practice for emergent needs. Prioritizing patient preference for an earlier appointment with a different provider relative to a later appointment with their assigned PCP also affects continuity. Thus, recording the type of health care visits that occur as part of the continuity equations will assist in interpreting continuity measures in important ways.

Continuity at the Level of the Resident

This level of continuity refers to the extent to which residents are seeing patients who have been assigned to them at the location where they are serving as their primary health care provider (Figure 2). This calculation would have a denominator of all patient visits for a resident within a given timeframe (eg, 1 year), with the numerator being the number of those visits that were with patients assigned to his/her panel.

Challenge #3. Obtaining continuity counts at the level of the resident varies among residency programs. Not all programs can assign a resident as the PCP in their EHR so resident empanelment is varied. This occurs for a variety of reasons, such as practice structure, billing restrictions, or EHR function. Participants indicated, as has been reported elsewhere, that functional aspects of the EHR are lacking. Even when the resident is identified as the PCP, extracting the data needed to perform continuity calculations can be both difficult and time-consuming, especially if the residency lacks adequate resources and institutional support for EHR data extraction. Several
LoTP programs mentioned this type of calculation would have to be done by hand to ensure accuracy.

Few residencies would have the resources to establish a systematic tracking mechanism separate from the EHR to capture resident visits with their assigned patients. Solutions to this challenge involve negotiations at the institutional level or with the EHR vendor to allow patients to be assigned directly with a resident PCP and to develop data extraction capabilities that generate the numbers needed for continuity calculations. It may also be possible to repurpose fields in the EHRs to identify the continuity resident. Another possible solution would be to maintain a daily continuity log separate from the EHR to track resident visits and counts. It would be important to include the type of health care visit in the log in order to calculate continuity for both acute and non-acute visits. If this were done prospectively and systematized in a way that made it part of the typical workday, it might be feasible to implement.

**Continuity at the Level of the Health Care Team**

As mentioned earlier, Saultz defined interdisciplinary or team-based continuity as care that allows previous knowledge of the patient to be available when the patient requires a range of services spanning the medical specialties. A more recent and widely accepted definition of “team-based care” that is consistent with the World Health Organization’s principles of primary health care and is inclusive of the Institute of Medicine’s six aims for improvement is: “The provision of comprehensive health services to individuals, families, and/or their communities by at least two health professionals who work collaboratively along with patients, family caregivers, and community service providers on shared goals within and across settings to achieve care that is safe, effective, patient-centered, timely, efficient, and equitable.”

Given the growing support for a team-based model of care and the accreditation requirement that residents actively participate in and lead a health care team for a panel of continuity patients, measuring continuity at the level of the health care team is important.

Findings derived from our field notes indicate that patients often relate to the medical assistants and nurses in significant ways, and several studies point out that patient satisfaction improves with team-based care. Continuity with a team, especially with physician assistants and nurse practitioners who may be more consistently available than faculty and residents, will likely become increasingly important as the PCMH continues to evolve. From a measurement perspective, it is impossible to avoid overlap in calculations of continuity from a resident and a health care team perspective. To be consistent, the calculation would need to define the specific members of the health care team, and calculation of continuity from the team perspective would include empaneled patient visits as the denominator, and the numerator would be the number of those visits that occurred with any member on that team (Figure 3).

### Challenge #4. The make-up of a health care team is dynamic, especially in residency training, where residents leave the team annually at graduation and new members join. Methods for distributing continuity patients from graduating residents vary greatly among residency programs. In addition, new professionals join the team as new clinical services are broadened (eg, a social worker added as behavioral health becomes more integrated). It may be necessary to identify the core members of the team for measurement purposes and classify the more fluid members of the team into a flexible category, with this group included in continuity calculations on some occasions and not on others.

**Additional Continuity Themes that Emerged**

Regardless of how continuity is defined, residency directors taking part in the LoTP all felt that continuity was important in that it characterizes a valuable relationship shown to predict better health outcomes, and they were in agreement that the exact definition of continuity should be better defined.

Philosophical questions about the goal or need for continuity during residency also arose as part of our work. Findings from our field notes captured such issues as whether true continuity can be achieved in the relatively short period of residency. Some program directors question the validity of any continuity measure because “not every relationship-building interaction occurs during a clinic visit.” Additionally, some program directors view continuity as a cultural component in family medicine rather than a metric to be measured, and they suggest that measuring resident attitudes about continuity and its effect on them and patients would be more valuable than calculating continuity indices.

**Discussion**

This analysis has identified four challenges that must be overcome to accurately measure interpersonal continuity of care during residency training at the level of the patient, the resident, and the health care team. Solutions exist to overcome these challenges involving empanelment approaches, scheduling complexity, resident-level data capability, and the dynamic landscape of team-based care. However, before efforts to address these challenges are undertaken, more work is needed to define methods that can be used in most residencies. Currently, residency program requirements exist related to interpersonal continuity at the resident and the health care team level, and programs have flexibility to define and measure continuity using their own methodology. Unfortunately, this approach could introduce measurement error and
doesn’t allow analysis of continuity across programs, which is a barrier to studying trends in residency training for this important component of primary care.

It is likely that any standardized approach to calculating different types of continuity will still need to account for residency and practice features that affect continuity either positively or negatively. Collecting these contextual variables along with numerators and denominators will help ensure that estimates of continuity are as reliable, reproducible, and valid as possible. In addition, collecting this additional information would allow researchers to account for these variables in the analysis of continuity data across multiple programs.

Our discussion of measuring continuity as a part of the LoTP raises the issue of whether continuity during residency is achievable. The inconsistent resident clinic schedules due to varying rotation service demands and away rotations, and the relatively short time in residency training can make it very difficult for residents to experience continuity of care with a panel of patients. This problem is further compounded when scheduling approaches prioritize timely access to care over continuity with the resident PCP. On the flip side, most programs escalate time spent in the practice over the course of training to increase the volume of visits, which should, in turn, enhance continuity by providing better access for patients to see their assigned resident PCP.

Visits made with patients in other settings, such as hospitals or maternity wards, are not typically counted in the resident continuity numbers but likely represent important continuity relationship experiences surrounding major life events. During these events, residents have an opportunity for frequent or in-depth patient interactions around medical, social, and psychological issues that can greatly influence the impact they can have on patient outcomes. Measures of the resident experience of continuity are lacking, but if they were available, valid, and reliable, their use in research could provide valuable insights about how to structure training to enhance continuity for residents.

The experience of continuity from the patient’s perspective has been reported to be related to security, confidence, and trust, and using patient experience measures could be more important metrics for continuity relationships through questions such as “I have a family physician who knows me well.” Conversely, the experience of continuity from the resident’s perspective could come from asking residents questions such as “I have patients that I know very well.” Successful interpersonal communication skills are crucial for both exceptional patient care and for lasting patient provider relationships. These are all features of residency training expected to successfully occur as part of continuity visits with patients. Without accurate measures of interpersonal continuity, vital information about physician training will be lost. If the physician-patient

This calculation would include a denominator of the total number of team-empaneled patient visits that occurred in a given time frame (eg, 1 year) and a numerator reflecting how often those visits occurred with any health care provider on the patient’s team.
relationship is considered an essential feature of family medicine training, which must be developed through patient interactions, perhaps it is the quality of the relationship, rather than the quantity of it that is the most influential and meaningful aspect to measure. These ideas deserve further study.

This report is limited in that only 17 programs were included in our discussion of measuring continuity in family medicine residencies, and their views are not necessarily representative of other residencies. Thus, we may not have identified all possible challenges. However, the programs participating in the LoTP include a diversity of sizes, geographic regions, and institutional settings, and they are all actively engaged in measurement activities as part of the evaluation plan for the LoTP, so they bring a thoughtful and comprehensive approach to this discussion.

In conclusion, viewing continuity through a patient, resident, and team lens is a useful construct, but current challenges make accurate continuity calculations at these levels difficult in residency settings. Improving precision and assessment of the comprehensive nature of the continuity relationships will take more effort to ensure that measures of this variable are accurate, valid, reliable, and, most importantly, meaningful. Definitions of continuity during training and the role of continuity measurement in residency are needed to advance educational and clinical research in this area.

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References