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Pei Chen

Mackenzie Clark

Michele Sherma

Yvonne Troya

UC Hastings College of the Law, troyay@uchastings.edu

Irena Cenzer

See next page for additional authors

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Authors

Pei Chen, Mackenzie Clark, Michele Sherma, Yvonne Troya, Irena Cenzer, and Josette Rivera



A longitudinal workplace-based interprofessional curriculum for graduate learners in a geriatrics patient-centered medical home

Pei Chen^{a,*}, Mackenzie Clark^b, Michele Sharma^c, Yvonne Troya^d, Irena Cenzer^a,
Josette Rivera^a

^a Division of Geriatrics, Department of Medicine, School of Medicine, University of California San Francisco, San Francisco, CA, USA

^b Department of Clinical Pharmacy, School of Pharmacy, University of California San Francisco, San Francisco, CA, USA

^c Department of Social Work, University of California San Francisco, San Francisco, CA, USA

^d University of California, Hastings College of the Law, San Francisco, CA, USA

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ABSTRACT

Current health professions training programs offer limited longitudinal opportunities in geriatrics and interprofessional collaborative practice (IPCP); these longitudinal opportunities are necessary for a workforce capable of caring for an aging population with complex care needs. We designed a year-long, workplace-based curriculum incorporating interprofessional (IP) preceptorships and formal conferences in which graduate learners from geriatric medicine, pharmacy, social work, and law formed a learners' team, learned about IPCP, and cared for older adults in an academic geriatrics patient-centered medical home. Our curricular objectives were to 1) improve IP collaborative competencies, 2) improve perceived teamness (defined as having core IP qualities of a team), and 3) provide team-based care to older adults.

Our evaluation included learners' self-assessment on IP core competencies, perceived teamness, and the older adults' and their families' perceptions on their team-based care. Learners reported improvement in IP collaborative competencies ($P < 0.001$), but not in teamness ($P = 0.928$). Older adults and their families perceived high quality care, reported confidence in their IP learner care team, and would recommend their team to others. This longitudinal IP curriculum improved IP collaborative competencies, contributed to positive perceptions of team-based care from those receiving care, and presented a longitudinal learning opportunity that models geriatrics-related IPCP. This paper describes key curricular activities, evaluation processes, and resource materials.

1. Format

A team of interprofessional (IP) learners participated in a year-long workplace-based IP curriculum within an academic patient-centered medical home (PCMH) that focuses on geriatrics primary care in a large metropolitan area. This IP learners' team had an empaneled patient population of community-dwelling adults age 70 and above with multimorbidity and complex psychosocial needs in San Francisco. The curriculum incorporated workplace learning (WPL) principles in the design of the weekly direct patient care, team preceptorship, and formal conference activities.

2. Target audience

The IP learners came from local graduate and post-graduate health

sciences, graduate social sciences, and law schools. Health sciences learners included clinical fellows from one-year geriatric medicine and two-year integrated geriatrics and palliative care medicine fellowship programs, pharmacy residents from a one-year community-based residency program, and third- and fourth-year pharmacy students. Within social sciences and law, learners included second-year interns from two-year Master of Social Work programs and second- and third-year law students participating in a Medical-Legal Partnership for Seniors (MLPS) Clinic. See [Table 1](#) for learners' details. The geriatrics placement was optional for all learners except for the clinical fellows whose programs required a longitudinal geriatrics experience. All learners were from professions that we deemed essential to the care of older adults, including law students for legal aspects of the social determinants of health, advance care planning, and long-term care planning. These learners were from local programs that have had experience placing

* Corresponding author. UCSF Division of Geriatrics, Box 1265, 490 Illinois Street, Floor 08, San Francisco, CA, 94143.

E-mail address: pei.chen@ucsf.edu (P. Chen).

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learners in the academic health system.

3. Objectives

The objectives of this year-long workplace-based IP curriculum are as follows:

1. Improve learners' collaborative competencies by co-managing older adult patients.
2. Improve the learners' sense of teamness, defined as the core IP qualities of a team.¹
3. Provide a positive team-based care experience for patients and families.

4. Activity description

This year-long curriculum drew on the guiding principles for effective WPL that occurs through participation in routine workplace activities.^{2,3} Our educational methods included 1) active participation individually and collectively in providing care to a panel of older adults, 2) engagement in authentic work activities associated with the operation of the practice, and 3) a formal conference series on fundamental knowledge and skills in geriatrics-related IP care. These activities occurred during a weekly clinic half-day and a 1-hour conference, in which the IP learners learned about the "5Ms" of geriatrics (mind, mobility, medication, multicomplexity, and what matters most).⁴ Fig. 1 depicts the learners involved, the educational methods, the WPL guiding principles, the associated activities, and the goals of the program. To ensure successful implementation, we engaged stakeholders in the workplace a year in advance to prepare for the integration of the IP learners since this PCMH did not traditionally have longitudinal learners.

During patient care and team preceptorship on clinical half-days, the IP learners applied their geriatric knowledge and skills, balanced complex patient care with health system constraints, and collaborated to provide geriatric care.⁵ All of the IP learners would see the patients and their families together synchronously or asynchronously depending on the patients' and families' preferences and the real-time logistics of the clinical half-day. The faculty in geriatric medicine, pharmacy, and social work precepted the IP learner team together, and then, the IP learners' team provided care and recommendations to the patients and their families. The IP learners, with the exception of the law students due to privacy laws, shared patient panels and also collaborated virtually through the electronic health record outside of the weekly in-person clinic half-day. We intentionally aligned the schedules of the clinical learning and authentic work activities by having learners participate in the monthly clinicians' meeting and clinic team meeting. These meetings allowed the learners to gain a deeper understanding of the clinical operations. During the meetings, we also intentionally incorporated

activities that would allow team members to learn more about each other to promote learner inclusiveness and a sense of teamness. These meetings provided the necessary organizational and social context of the healthcare systems in which we operate, highlighted the need for continuous practice-based learning beyond training, and encouraged IPCP in these workplace activities. These experiential WPL activities highlighted the importance of systems-based care in geriatrics.

In addition to the experiential WPL activities, we designed a formal weekly 1-hour conference series following the clinical half-day session that included a set of core geriatrics-related IP topics as well as learner-identified topics using the EFECT framework (Elicit patient-centered narrative, Facilitate a reflective team discussion, Evaluate clinical evidence, Create a shared care plan, and Track outcomes).⁶ Under the EFECT framework, the IP learners co-presented patient-centered narratives by incorporating the patients' values, using existing clinical and/or legal evidence, developing integrated shared care plans with the rest of the team and the patients, implementing the plan, and assessing the outcomes of the care provided. We created the core geriatrics IP topics by integrating the IP collaborative competencies into the competency domains of each profession and by identifying overlap among the professions to ensure that the integration would meet the competency requirements of the professions involved.^{5,7-11} See Table 2 for examples of geriatrics-related IP topics. The conference series provided protected time for reflection and promoted co-teaching, co-learning, social learning, and community-building among the IP learners.

5. Assessment and evaluation

From July 2017 through December 2019, we used the learners' program enrollment information to obtain the number of learners from each profession and tracked attendance. To evaluate the effects of the curriculum on the learners' perception of their IP competencies and teamness, we used two validated self-report questionnaires: a 20-question retrospective pre- and post-session Interprofessional Collaborative Competency Attainment Survey (ICCAS; 1 = strongly disagree, 7 = strongly agree) and a 15-question post-session Assessment for Collaborative Environments (ACE-15; 1 = strongly disagree, 4 = strongly agree), respectively, at the end of the conference sessions when learners from all professions were present.^{1,12} We assigned a unique identification number to each learner for longitudinal data analyses. We obtained feedback from the patients and/or their families using an anonymous questionnaire that included Likert rating scales (1 = very poor, 5 = very good), multiple-choice questions, and open-ended questions to assess their perception on the care they received from the IP learner team. This study was considered exempt by the University of California, San Francisco (UCSF) Human Research Protection Program Institutional Review Board.

Table 1
Patients' and learners' characteristics.

Patients and Learners	Training Level ^b	Length of Participation	Year 1	Year 2	Year 3 ^c	Total
Patients	-	-	33	36	24	93
Mean age ^a (range)	-	-	81.5 (70-93)	81.4 (70-95)	81.6 (70-94)	81.4 (70-95)
Learners						
Geriatrics and integrated geriatrics-palliative care	≥ PGY4	1-year	2	2	2	6
Pharmacy	PGY1	1-year	1	1	1	3
Pharmacy	P3 and P4	6-week	7	7	3	17
Social work	MSW2	1-year	1	0	1	2
Law	L2 and L3	6-month	16	16	8	40
Total number of learners	-	-	27	26	15	68

Abbreviations: PGY, postgraduate year; P, pharmacy school; MSW, Master of Social Work; L, law school.

^a Age is represented in the unit of years.

^b Training level is designated by the year of the professional program at the beginning of the participation.

^c We included only 6 months of Year 3 in this study due to the COVID 19 pandemic disruption on the IP training programs.

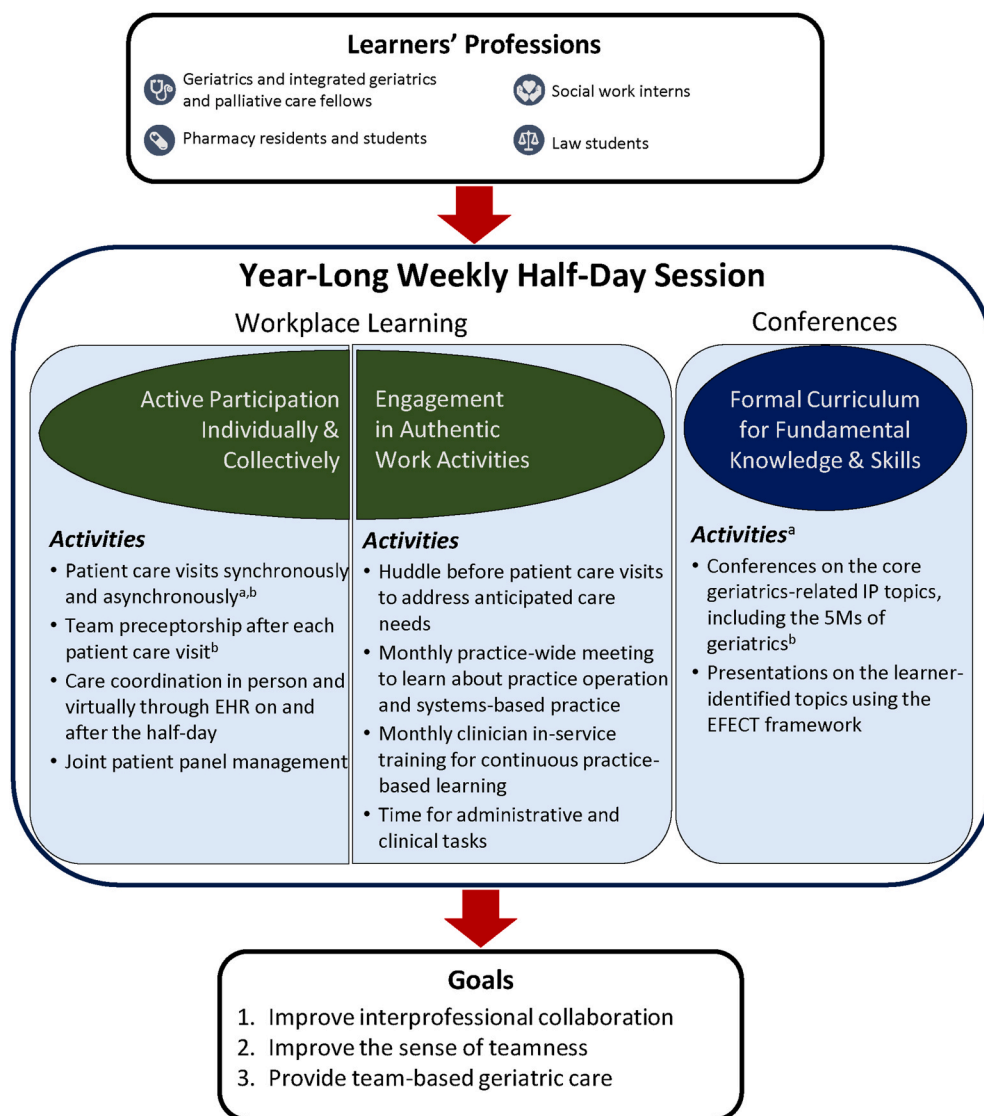


Fig. 1. Program design on the learners involved, the educational methods, workplace learning guiding principles, the associated activities, and the program goals. Abbreviations: EHR, electronic health record; IP, interprofessional; 5Ms, mind, mobility, medication, multicomplexity, and what matters most; EFECT, elicit patient-center narrative, facilitate a reflective team discussion, evaluate clinical evidence, create a shared care plan, and track outcomes. ^a These were activities that law students participated in. ^b The learning of the 5Ms occurred during patient care visits, team preceptorship, and conferences.

5.1. Data analysis

To analyze the IP competencies, we controlled for multiple surveys per learner since an individual learner could participate in multiple sessions, and performed paired t-tests to compare the differences in the retrospective pre- and post-session mean scores of each of the ICCAS five constructs (communication, collaboration, roles and responsibilities, patient-centered care, and conflict management and team functioning; range 1–7) and in the mean total ICCAS score (range 20–140); we reported effect size using Cohen’s D.^{12,13} For the construct analyses, we included only learners who answered all the questions within each construct of ICCAS; we included only learners who answered the entire ICCAS for the analysis of the total ICCAS score. To analyze teamness, we summed the scores of the ACE-15 responses (range 15–60).¹ We examined whether the ACE-15 score changed over time as learners participated in the sessions and limited the analysis to 10 sessions, since this is the maximum number of sessions all learners could participate in together at the same time during the academic year. We examined the mean ACE-15 score by the session number. We used mixed linear regression models, adjusting for repeated scoring by the same individuals, to assess the change of ACE-15 scores as learners attended additional sessions. For the analysis of the ACE-15, we included only learners who answered the entire ACE-15. From the patients’ and/or

families’ feedback questionnaires, we performed descriptive statistics on the quantitative data and a thematic analysis of the qualitative data. We used STATA 16.1 (StataCorp, College Station, TX) and SAS 9.4 (SAS Institute, Inc., Cary, NC) for analyses.^{14,15}

6. Results

A total of 68 learners participated in the IP curriculum during the study period (Table 1). Learners from at least two professions were present for 100% of the sessions, and a total of 11 learners participated in at least 4 sessions together. The total number of surveys completed by the learners was 223. The average number of surveys completed per learner was 3.2 surveys (SD 3.28).

The learners rated their IP collaborative competencies higher after the sessions. The mean score for each of the five constructs and the mean total ICCAS score were significantly higher after all of sessions (Table 3). The mean total ICAAS score was 106.13 (SD 18.02) and 123.65 (SD 15.67, Cohen’s D = 1.03, P < 0.001) at the beginning and the end of the sessions, respectively.

After 10 sessions, the learners did not perceive higher sense of teamness (Fig. 2). All learners participated in a session at least once, including 3 IP faculty who completed ACE-15 and identified as life-long learners participating in a valuable IP learning experience. The mean

Table 2
Examples of geriatrics-related interprofessional topics.

Domain	Geriatrics Interprofessional Topics	Professions
Caring for the Older Adult	Advance care planning and related legal issues	G, L, SW
	Caregiver stress and burnout	G, SW
	Driving	G, L, SW
	Elder Mistreatment	G, L, SW
	Interprofessional team member roles and responsibilities	G, L, P, SW
	Long-term care planning and related legal issues	G, L, SW
	Medication management: addressing adherence and deprescribing for polypharmacy	G, P
Systems-Based Care	Social determinants of health	G, L, P, SW
	Care coordination with community pharmacies, durable medical equipment providers, home health agencies, hospitals, residential care facilities, skilled nursing facilities, and social services	G, P, SW
	Community resources	G, L, P, SW
	Health delivery models and payment systems	G, P, SW
	Medicare and Medicaid	G, L, P, SW
	Anxiety and depression	G, P, SW
Geriatric Syndromes	Delirium	G, P, SW
	Dementia	G, L, P, SW
	Dizziness and falls	G, P, SW
	Osteoporosis	G, P
	Pain	G, P
	Sleep disorders	G, P, SW
	Urinary incontinence	G, P

Abbreviations: G, geriatric medicine; L, law; P, pharmacy; SW, social work.

score for ACE-15 after the first session was 52.85 (N = 71, SD 5.41). Learners who participated in 5 sessions reported a mean score of 54 (N = 7, SD 5.23), and after 10 sessions, the mean score was 52.25 (N = 4, SD 6.55; P = 0.928).

A total of 93 patients with an average age of 81.4 years at the time of their initial visits received care from the IP learners' team (Table 1). Eight died by the end of the study period and 43 patients and/or their

Table 3
Retrospective pre- and post-session differences in ICCAS construct mean score and mean overall score.^a

Constructs	Pre-Session		Post-Session		Paired T Test			
	N ^b	Mean (Range, SD)	N ^b	Mean (Range, SD)	N ^b Paired	Cohen's D	Difference	p-value
Communication	211	5.45 (3–7, 0.81)	211	6.21 (4.2–7, 0.72)	206	1.033	0.780	<0.001
Collaboration	214	5.29 (2–7, 1.08)	209	6.26 (2.7–7, 0.79)	206	1.017	0.960	<0.001
Roles and Responsibilities	208	5.2 (2–7, 1.02)	209	6.17 (2.25–7, 0.84)	203	1.031	0.959	<0.001
Patient-centered care	202	5.12 (1–7, 1.19)	195	6.11 (2.7–7, 0.91)	189	0.904	0.963	<0.001
Conflict management, team functioning	187	5.4 (2.2–7, 0.98)	182	6.21 (3–7, 0.83)	174	0.910	0.821	<0.001
Total ICCAS score	175	106.13 (54–140, 18.02)	167	123.65 (71–140, 15.67)	158	1.028	17.405	<0.001

Abbreviation: ICCAS, Interprofessional Collaborative Competency Attainment Survey.

^a Possible mean scores for each of the ICCAS construct ranges from 1 to 7. Possible mean total score for the ICCAS ranges from 20 to 140. Higher score represents greater perceived interprofessional collaborative competencies.

^b N represents learners who completed all of the questions within each construct for the construct analysis or within the entire ICCAS for the total ICCAS analysis.

families completed the feedback questionnaire (50.6%) with 20 of them (46.5%) requiring some assistance to complete it. The patients and/or their families rated highly the care they received from the team (N = 41, mean 4.63, SD 0.57), their confidence in the team (N = 41, mean 4.66, SD 0.52), and the likelihood of their recommendation of the team to others (N = 39, mean 4.64, SD 0.48). The patients and/or their families positively answered open-ended questions regarding the most valuable experience they had with the IP learners' team. Their responses encompassed themes around: the patience and compassion of the team ("very patient with slowness/repetition" and "the team is very caring"), the team's communication skills and collaborative effort ("they are listening" and "this is a 'team' effort with obvious interaction among them"), the team's ability to address questions and care needs ("you feel welcomed and questions about the care are addressed well" and "the ability to talk over all health and emotional issues with the clinicians and pharmacist"), the comprehensiveness of the care ("the team tries to understand the whole of me"), and patient- and family-centered care ("they work with both my dad and me to ensure both of our needs are met").

7. Impact

This year-long workplace-based curriculum contributed to improved learners' IP collaborative competencies and their ability to deliver team-based care to older adults. All learners collaborated with at least one learner from each profession in a conference session. After each session, the learners' self-perceived IP collaborative competencies improved. The patients and/or their families reported receiving high quality care, had confidence in their IP care team, and would recommend their team to others. Our curriculum answered the calls upon IPE to prepare an IP workforce capable of caring for an aging population with complex care needs and addressed a gap in the literature on longitudinal workplace-based methods to achieve this goal.^{16,17}

Our program overcame common, well-cited shortcomings of geriatrics-related IPE curricula in health professions training programs,

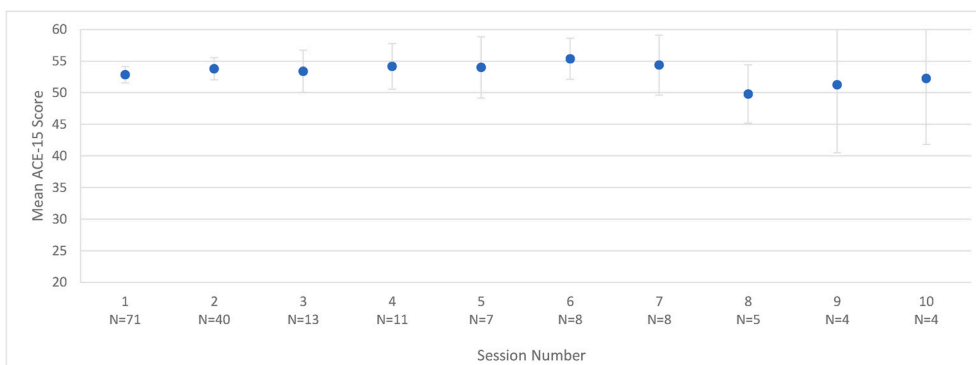


Fig. 2. Mean ACE-15 score reported at the end of each session.

Abbreviation: ACE-15, Assessment for Collaborative Environment.

The sample size (N) on the x-axis represents the number of learners that participated in the session and completed the ACE-15. The y-axis represents the range of ACE-15 scores with a maximum of 60. The possible ACE-15 score range is 15–60.

including sporadic geriatrics and IPCP learning opportunities, and narrow-scope disease-focused training.^{18–21} The longitudinal design of our curriculum went beyond the typical workplace-based IPE reported in the literature and allowed us to use the 5Ms framework to address the diverse needs of older adults, who are particularly susceptible to the impact of the social determinants of health and the negative effects of multimorbidity, polypharmacy, and health inequities.^{22,23} The longitudinal format allowed regular follow-up for chronic disease and medication management, community resource linkage, advance care planning, and legal advocacy. The WPL activities in the forms of patient care and system-based learning, reinforced by the formal conferences, led the IP learners to develop shared goals, co-learn, co-teach, and practice geriatrics-related IP skills together by caring for older adults and their families longitudinally. While our evaluation did not include the effects of this program on clinical outcomes given our small patient sample size, our patients and their families described a perceived positive impact on their care.

Our results did not show improvement in the perception of teamness based on the ACE-15 score over time. The ACE-15 score was high in the beginning and remained so throughout the 10 sessions. One reason might be that the IP learners who selected this placement had high interests in IPCP and were therefore more likely to rate teamness high from the beginning. Also, the different durations of learners' participation due to course schedules disrupted team composition and could have affected the sense of teamness over time.

We recognize several limitations. Due to the small sample size of the IP learners, we did not ask for demographics or information about the learners' professions on the surveys, as collecting this information could affect the learners' willingness to provide constructive feedback about the curriculum. The complexity in the IP learners' schedules and varying lengths of participation also affected data collection and analyses. The self-selected nature of the IP learners might have inflated self-perceived IP collaborative competencies and teamness. Given the relationships that the IP learners' team built with the patients and their families over time, patients and families might have rated the team highly to please the team despite the use of an anonymous questionnaire.

There are several factors to consider regarding the design and stability of this longitudinal workplace-based geriatrics IPE curriculum. This was a single-site study in an urban location where there is a high density of different professional schools, thus facilitating face-to-face interactions among the IP learners. If professional schools are geographically dispersed, then the IP learners might need to interact asynchronously or virtually for patient care and conferences. Asynchronous and virtual interactions could affect self-perceived IP collaborative competencies and teamness.²⁴ Another consideration is the recognition of each profession's clinical, legal, and ethical boundaries which can affect the design of the program. We included the law profession to address issues related to advance care planning, Medicaid, and long-term care. However, due to privacy laws, law students could only meet with patients for legal counseling after formal consent, and attorney-client ethical rules further restricted the extent to which synchronous IP patient care visits could take place. During the conference, law students adhered to patient confidentiality by presenting cases of patients not under the care of the IP learners' team. Finally, stability of the program depends on the presence of the IP faculty preceptors. Our IP faculty had different funding sources for these educational efforts, including from clinical care, their professional schools, educational grants, and philanthropy. Regular assessment of the faculty's funding sources is necessary to ensure the sustainability of the program.

This study demonstrated a novel geriatrics IP learning community that prepares IP learners to care for older adults. Future work could explore the long-term impact on the IP learners' preparedness in IPCP and geriatrics-related work placement post-training.

8. Required materials

Additional resources can be accessed via <https://app.box.com/s/24yvsbyzx43yikzq9e8z7441xpy8kofk>.

Impact statement

We certify that this work is novel. This paper specifically addresses the limited literature that describes longitudinal geriatrics interprofessional education in graduate education.

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Sponsor's role

The funding sources were not involved in the study design; the collection, analysis, and interpretation of the data; and the writing of the manuscript.

CRedit authorship contribution statement

Pei Chen: Conceptualization, Methodology, Investigation, Data curation, Writing – original draft, Supervision, Project administration, Funding acquisition. **Mackenzie Clark:** Conceptualization, Methodology, Investigation, Writing – original draft. **Michele Sharma:** Conceptualization, Methodology, Investigation, Writing – original draft. **Yvonne Troya:** Conceptualization, Methodology, Investigation, Writing – original draft. **Irena Censer:** Data curation, Writing – original draft. **Josette Rivera:** Conceptualization, Methodology, Writing – original draft, Supervision, Funding acquisition.

Declarations of competing interest

None.

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