Family Medicine

ORIGINAL ARTICLE

Telemedicine Competencies in Family Medicine Clerkships: A CERA Study

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ABSTRACT

Background: While the Association of American Medical Colleges (AAMC) designated cross-disciplinary telemedicine competencies, curricular implementation is at disparate stages across medical schools and with significant curricular gaps. We investigated factors associated with the presence of telemedicine curriculum in family medicine clerkships.

Methods: Data were evaluated as part of the 2022 CERA survey of family medicine clerkship directors (CD). Participants answered questions about telemedicine curriculum in their clerkship, including whether it was required or optional, whether telemedicine competencies were assessed, the availability of faculty expertise, volume of visits, student autonomy in visits, CD's attitude about the importance of telemedicine education, and awareness of the Society of Teachers of Family Medicine's (STFM) Telemedicine Curriculum.

Results: Ninety-four of 159 CDs (59.1%) responded to the survey. Over one-third of FM clerkships (38, 41.3%) did not teach telemedicine and most CDs (59, 62.8%) did not assess competencies. The presence of telemedicine curriculum was positively associated with CDs' awareness of STFM's Telemedicine Curriculum (*P*=.032), attitude of CDs toward importance of telemedicine teaching (*P*=.007), higher level of learner autonomy in telemedicine visits (*P*=.035), and private medical schools (*P*=.020).

Conclusions: Almost two-thirds of clerkships (62.8%) did not assess telemedicine competencies, and fewer than one-third of CDs (28.6%) considered telemedicine education as important as other clerkship topics. CDs' attitudes were a significant determinant of whether teaching of telemedicine skills occurred. Awareness of telemedicine education resources and higher learner autonomy in telemedicine encounters may promote integration into clerkship curriculum.

INTRODUCTION

While the Association of American Medical Colleges (AAMC) designated cross-disciplinary telemedicine competencies in 2021,[1] curricular implementation is at disparate stages across medical schools with significant curricular gaps.[2–5] One survey of 156 interns demonstrated that only 12% felt "at least moderately" prepared to conduct telemedicine visits.[6] In our Council of Academic Family Medicine's Educational Research Alliance (CERA) survey of family medicine (FM) clerkship directors, we investigated factors that were associated with the presence of telemedicine curricula.

METHODS

Data were evaluated as part of a CERA survey,[7] distributed annually to FM clerkship directors (CDs) to Liaison Committee on Medical Education or Committee on Accreditation of Canadian Medical Schools accredited schools. The survey was distributed via the online platform SurveyMonkey to 148 US and 16 Canadian family medicine CDs between June 2022 and July 2022. Two undeliverable emails, and three respondents stating they were not CDs, were removed from the pool. During the survey, 15 new CDs were identified and invited to participate, resulting in a total of 159 invitations. The study was approved by the American Academy of Family Physicians Institutional Review Board.

Survey questions were developed following literature review on barriers for telemedicine teaching, including lack of faculty expertise,[8] limited student autonomy in encounters,[9] and competing curricular priorities. Faculty expertise was determined by asking CDs whether preceptors possessed necessary expertise to teach and assess telemedicine competencies. Questions included dichotomous, multiple choice, and interval scale questions measured by Likert scales.

We performed descriptive statistics for medical school, clerkship, and CD characteristics, and scope of telemedicine teaching. We used mean and standard deviations for continuous variables and proportions for categorical variables. The presence of telemedicine curriculum was operationalized as a dichotomous variable: "yes" (whether required or optional) and "no" (nonexisting). We tested the associated factors using χ^2 for categorical variables and one-way analyses of variance for continuous variables. We set significance at P=.05, using IBM SPSS software version 24 (SPSS Inc, Armonk, NY).

RESULTS

Ninety-four of 159 clerkship directors (59.1%) responded to the survey. Table 1 shows medical school CD, and clerkship characteristics. Surveyed medical schools were geographically diverse, but consisted mostly of public schools (65, 69.1%). CDs, mainly female (56, 60.9%), averaged 7.6 years in their roles. Clerkships primarily occurred in the third year (91, 96.8%). For most clerkships (55, 58.9%), students spent at least half their rotation with community preceptors.

Table 2 shows the scope of telemedicine education. Most clerkships (54, 58.7%) included teaching on telemedicine, equally distributed between required (28, 30.4%) and optional (26, 28.3%). Almost two-thirds of clerkships (59, 62.8%) did not assess telemedicine competencies. Fewer than one-third of CDs (26, 28.6%) considered telemedicine education as important as other topics, most considered it "much less" or "somewhat less" important (74, 70.3%). Forty-nine CDs (53.9%) were aware of STFM's Telemedicine Curriculum, with 11 (12.1%) clerkships currently using it. For most clerkships, telemedicine visits accounted for fewer than 10% of visits. Over half of CDs (51, 56.7%) rated learner autonomy lower in telemedicine compared to in-person visits.

Several variables were examined for correlation with the presence of a telemedicine curriculum (Table 3), including faculty telemedicine expertise, CDs' awareness of STFM's Telemedicine Curriculum, CDs' attitudes about the importance of telemedicine education, learner autonomy in visits, telemedicine volume, public vs private school, clerkship design (block vs longitudinal), and use of community preceptors. The presence of telemedicine curriculum was positively associated with awareness of STFM's Telemedicine Curriculum (P=.032), attitude of CDs about the importance of telemedicine teaching (P=.007), higher level of learner autonomy in telemedicine visits (P=.035) and private medical schools (P=.020).

DISCUSSION

Over one-third of FM clerkships (41.3%) did not teach telemedicine skills. While previous studies cite lack of faculty expertise as a barrier,[8] preceptor expertise was not a significant factor in our study. Rather, CDs' awareness of the STFM's Telemedicine Curriculum was more likely to determine whether telemedicine teaching occurred. This suggests the importance of off-the-shelf curricula to facilitate implementation. Additionally, private schools were significantly more likely to have telemedicine curricula than public schools, suggesting potential differences in administrative structure, curricular flexibility, use of community vs faculty preceptors, or availability of resources that may play a role in equitable access to telemedicine education.

Almost two-thirds of clerkships (62.8%) did not assess telemedicine competencies, a critical element in a competency-based framework for determining learner readiness toward increasing independence.[10,11] A possible explanation is that fewer than one-third of CDs (28.6%) considered telemedicine education as important as other clerkship topics. Implementing longitudinal curricular designs with stepwise acquisition of telemedicine skills may prevent overburdening clerkship curricula, for example, if effective interpersonal communication ("webside manner") skills are taught in preclerkship, then clerkship curriculum can focus on teaching and assessing physical examination and clinical reasoning.

This study is limited to the experiences of family medicine CDs; the absence of a telemedicine curriculum in this clerkship does not preclude the possibility that it may exist elsewhere in the medical school curriculum. Although awareness of STFM's telemedicine curriculum was correlated with the presence of a telemedicine curriculum, it is notable that 41.8% of CDs were aware of the curriculum and not using it at the time of the survey. Our survey did not assess CDs' intent to use this curriculum or assess why they chose not to use this curricular tool. Finally, although our response rate was similar to previously published CERA studies, response bias may impact study findings.

An important challenge in telemedicine precepting is effectively integrating learners into clinic workflows, while providing appropriate autonomy and supervision, rather than learners primarily shadowing preceptors.[12] Faculty development promoting effective precepting models,[13] as well as the creation of entrustable professional activities (EPAs) to assess telemedicine competencies, can empower clerkship students to function with increasing autonomy in preparation for residency. Clinical symptoms appropriate for telemedicine will evolve with emerging safety research and the incorporation of digital health tools.[14] In this rapidly shifting environment, coordination among medical organizations (AAMC, AAFP, STFM) to develop up-to-date, high-quality resources with standardized, competency-based content would promote broader integration of telemedicine curricula and benefit learners, teachers, and patients.

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TABLE 1. Demographics

Medical School Characteristics*	
Type of Medical School (N=93)	
Public	65 (69.1)
Private	28 (29.8)
State/Location of Medical School (N=94)	
New England (NH, MA, ME, VT, RI, or CT)	8 (8.5)
Middle Atlantic (NY, PA, or NJ)	10 (10.6)
South Atlantic (PR, FL, GA, SC, NC, VA, DC, WV, DE, or MD)	20 (21.3)
East South Central (KY, TN, MS, or AL)	6 (6.4)
East North Central (WI, MI, OH, IN, or IL)	10 (10.6)
West South Central (OK, AR, LA, or TX)	8 (8.5)
West North Central (ND, MN, SD, IA, NE, KS, or MO)	8 (8.5)
Mountain (MT, ID, WY, NV, UT, AZ, CO, or NM)	7 (7.4)
Pacific (WA, OR, CA, AK, or HI)	4 (4.3)
Canada	13 (13.8)
Clerkship Director Characteristics (N=94)	
Years in Current Clerkship Role	7.6±6.0
Gender (N=92)	
Female	56 (60.9)
Male	36 (39.1)
Ethnicity (N=90)	
Asian	24 (26.7)
Black/African American	3 (3.3)
White	57 (63.3)
Middle Eastern/North African	1 (1.1)
Choose not to disclose	5 (5.5)
Years Since Graduation	18.9±17.0
Percentage of Protected Time to Serve as Clerkship Director? (N=92)	31.6±17.8
Class Size (No. of Students) (N=94)	150.4±68.7
Clerkship year (more than one answer)	
M1	3 (3.2)
M2	15 (16.0)
M3	91 (96.8)
M4	11 (11.7)
Clerkship Design (N=94)	
Block only	65 (69.1)
Longitudinal	5 (5.3)
Both block and longitudinal	24 (25.5)
No regional campuses	2.9±6.1
Percentage of Clerkship Students Sent to Regional Campuses (N=91)	
0%	39 (42.9)
1%-25%	25 (27.5)
26%-50%	7 (7.7)
51%-75%	4 (4.4)
76%-100%	16 (17.6)
Percentage of Students Spending Half of Their Rotations With a Community Preceptor (N=92)	
0%	14 (15.2)
1%-25%	14 (15.2)
26%-50%	9 (9.8)
51%-75%	25 (27.2)
76%-100%	30 (32.6)

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* N differs across variables due to missing answers.

TABLE 2. Scope of Telemedicine Teaching and Services

Telemedicine Competency Teaching (N=92)	
Required	28 (30.4)
Optional	26 (28.3)
Nonexisting	38 (41.3)
Existence of Assessment of AAMC Telemedicine Competencies*	
Communication in telemedicine visits: including establishing rapport and creating a therapeutic environment (professional appearance, setting, and confidentiality)	28 (29.8)
Data collection and assessment: obtaining a medical history and conducting an appropriate physical examination in a telemedicine encounter	22 (23.4)
Patient safety and appropriate uses: recognizing limitations of telemedicine visits and appropriate uses	19 (20.2)
We do not assess telemedicine competencies	59 (62.8)
Awareness of STFM's National Telemedicine curriculum (N=91)	
Yes, I am aware and currently using	11 (12.1)
Yes, I am aware and not currently using	38 (41.8)
No, I am not aware	42 (46.2)
Importance of Telemedical Education to Other Topics Covered in Family Medicine Clerkship (N=91)	
Much less important	17 (18.7)
Somewhat less important	47 (51.6)
Just as important	26 (28.6)
Somewhat more important	1 (1.1)
The Proportion of Preceptors With Expertise to Teach and Assessing Telemedicine Competencies (N=88)	
None	6 (6.8)
<25%	28 (31.8)
25%–50%	25 (28.4)
51%–75%	13 (14.8)
>75%	16 (18.2)
Students' Volume of Exposure to Telemedicine Visits (N=90)	
None	1 (1.1)
<10%	70 (77.8)
11%–25%	17 (18.9)
26%–50%	2 (2.2)
Level of Autonomy of Telemedicine Encounters as Compared to In-Person Visits (N=90)	
Much more autonomy in video visits compared to in-person visits	1(1.1)
A little more autonomy in video visits compared to in-person visits	4(4.4)
Equal autonomy compared to in-person visits	31(34.4)
A little less autonomy than in-person visits	15(16.7)
Much less autonomy (primarily shadowing)	36(40.0)
Not applicable: our students to do not engage in telemedicine encounters	3(3.2)

Abbreviation: AAMC, Association of American Medical Colleges; STFM, Society of Teachers of Family Medicine.
* More than one answer is allowed.

TABLE 3. Variables Associated With the Presence of Telemedicine Curriculum Among Family Medicine Clerkships (N=94)

	Presence of a Telemedicine Curriculum	Lack of Telemedicine Curriculum	P Value
Proportion of Preceptors Who Have the Expertise to Teach and Assess Telemedicine Competencies			.173[a]
None	2 (4.0)	4 (10.50	
<25%	12 (24.0)	16 (42.1)	
25-50%	16 (32.0)	9 (23.7)	
51-75%	8 (16.0)	5 (13.2)	
>75%	12 (24.0)	4 (10.5)	
Awareness of STFM National Telemedicine Curriculum			.032[a]
Yes, I am aware and using it	10 (18.9)	1 (2.6)	
Yes, I am aware and not using it	23 (43.4)	15 (39.5)	
No, I am not aware	20 (37.7)	22 (57.9)	
Importance of Telemedicine Teaching as Compared to Other Topics Taught in Family Medicine Clerkships			.007[a]
Much less important	5 (9.4)	12 (31.6)	
Somewhat less important	26 (49.1)	21 (55.3)	
Just as important	21 (39.6)	5 (13.2)	
Somewhat more important	1 (1.9)	0 (0)	
Volume of Exposure to Telemedicine Visits During the Clerkship			.114[a]
None	0 (0)	1 (2.6)	
<10% of the visits	37 (71.2)	33 (86.8)	
11%-25% of the visits	13 (25.0)	4 (10.5)	
26%-50% of the visits	2 (3.8)	0 (0)	
Level of Autonomy of the Students in Televisits as Compared to In-Person Visits			.035[a]
Much more autonomy in video visits compared to in-person visits	0 (0)	1 (2.6)	
A little more autonomy in video visits compared to in-person visits	4 (7.7)	0 (0)	
Equal autonomy compared to in-person visits	16 (30.8)	15 (39.5)	
A little less autonomy than in-person visits	12 (23.1)	3 (7.9)	
Much less autonomy (primarily shadowing)	20 (38.5)	16 (42.1)	
Not applicable: our students to do not engage in telemedicine encounters	0 (0)	3 (7.9)	
Type of Medical School			.020[b]
Public	32 (59.3)	31 (83.8)	
Private	22 (40.7)	6 (16.2)	
Design of Clerkship			.367[a]
Block only	35 (64.8)	29 (76.3)	
Longitudinal	2 (3.7)	2 (3.7)	
Both block and longitudinal	17 (31.5)	7 (18.4)	
Percentage of Students Who Spend at Least Half of the Rotation Time in the Practice of a Community Preceptor			.667[a]
0%	6 (11.3)	8 (21.1)	
1%-25 %	8 (15.1)	5 (13.2)	
26%-50 %	5 (9.4)	4 (10.5)	
51%-75 %	14 (26.4)	11 (28.9)	
76%-100%	20 (37.7)	10 (26.3)	
Clerkship Directors' Years Since Graduation	20.7±11.2	16.7±9.2	.074[c]
Clerkship Directors' Years in Current Position	8.3±6.3	7.4±5.7	.211[c]
Number of Students in One Class	147.1±71.6	156.5±65.2	.523[c]
Number of Regional Campuses	3.7±7.3	2.2±4.0	.339[c]

[a] χ^2; [b] Fischer exact test; [c] One-way analysis of variance.