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How team-based are rural or underserved clinics where AHEC scholars train?

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ABSTRACT

Background: Interprofessional collaborative practice is an important feature of delivering high quality patient-centered care. Understanding what students learn during their clinical rotations about how healthcare teams function, particularly in rural and underserved settings is important for addressing health disparities in these populations.
Purpose: To determine the extent to which healthcare teams located in rural or underserved clinics that host AHEC Scholars engage in teamwork and team-based care.
Methods: The 15-item Assessment for Collaborative Environments (ACE-15) instrument, measuring interprofessional teamwork and team cohesion was administered to team members at 17 rural or underserved clinics and demographic information was collected.
Results: Several significant differences in mean ACE-15 scores were found among team types, clinic types and settings: community-based clinics scored higher compared to their university-based counterparts and clinics in rural settings scored higher compared to those in urban settings. Primary care-based teams scored higher compared to non-primary care-based teams.
Conclusions: Training students within healthcare teams across multiple settings and locations is paramount to their preparation for interprofessional work.

1. Introduction

Many health professions schools across the country place health professions students in rural or underserved settings, in part, because training in these areas is associated with increased retention of health professionals for these communities.[1–3] Area Health Education Centers (AHEC), funded by the Health Services and Resources Administration (HRSA), are a key resource for health professions training programs and their students. With over 300 centers across 45 states, AHEC's overarching aims are to recruit, train and retain a health professions workforce dedicated to serving rural and underserved populations.[4] Rural and underserved areas experience persistent, complex health related inequities that can present clinical care challenges.[5,6] Thus, increasing the capacity to provide high quality, team-based care to patients in these settings represents a key issue for health professions training programs. Team-based care is conceptualized as two or more health care professionals working collaboratively with patients and their caregivers to accomplish shared goals.[7] The National Academy of Medicine (NAM) has noted that healthcare is continuing to shift towards more complex teams representing diverse professions in response to an increasingly complex healthcare system with patients requiring more complicated care.[7] When care teams are coordinated and functioning well, patient satisfaction is higher and some studies indicate that health outcomes are improved as well.[8]

2. Background

A broad literature exists on team-based care and interprofessional education; however, the vast majority of papers focus on inpatient care provided in urban settings.[9–11] The literature on team-based care, especially in rural areas is more sparce. We found seven papers published since 2015 on team-based care in rural areas.[12–18] Three of the studies were conducted in Canada, where healthcare delivery differs from the U.S.[12–14] One U.S. based study focused on training nurse

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Table 1
Participant demographic information.

Age	n (%)
Less than 30 years old	46 (24.0)
30–39 years old	71 (37.0)
40–49 years old	33 (17.2)
50–59 years old	23 (12.0)
60–69 years old	14 (7.3)
More than 70 years old	1 (0.5)
Missing	4 (2.1)
Gender	**n (%)**
Female	144 (75.0)
Male	39 (20.3)
Prefer to self-describe	2 (1.0)
Missing	7 (3.6)
Primary role	**n (%)**
Medical assistant	48 (25.0)
Clinical provider	44 (22.9)
Front office staff	17 (8.9)
Clinic nurse	13 (6.8)
Behavioral health	11 (5.7)
Pharmacist	9 (4.7)
Clinic administration	9 (4.7)
Dentist	1 (0.5)
Other	34 (17.7)
Missing	6 (3.1)

practitioner, physical therapy, and occupational therapy students in team-based geriatric care using Telehealth in rural Oklahoma.[15] Another focused on development and delivery of an intervention to improve rural nurses' and unlicensed care providers' confidence in providing palliative care.[16] A third paper presented findings from a scoping literature review on primary care team-based approaches for dementia care in rural settings, which determined that evidence for collaboration to address dementia care in this setting is limited.[17] A fourth paper focused on implementing a team-based approach to reduce opioid medical prescriptions in 20 rural primary care clinics.[18] We found no studies that characterized the level of teamwork in rural or underserved areas where health professions students are routinely placed for clinical rotations.

To address this gap in the existing literature, we conducted a cross-sectional study designed to assess teamwork and team cohesion at rural or underserved clinical training sites that host AHEC Scholars, who represent diverse health professions learners with an interest in rural and/or underserved healthcare. By understanding levels of teamwork and team cohesion at these training sites, we may be able to identify settings where interprofessional teamwork and team cohesion are believed to be the highest along with areas where teamwork could be improved, which would benefit these learners as well as the clinics themselves.

3. Methods

3.1. Study setting, design, research aims, and study participants

AHEC Scholars is a national program administered by the National AHEC Office[4] for health professions students interested in practicing in rural or underserved communities. In Oregon, the AHEC Scholars program is based at Oregon Health and Science University (OHSU)[19] and student placements in rural or underserved areas occur over 4–12 weeks in coordination with five regional AHECs across the state. Between 75 and 125 students, including those enrolled in dentistry, medicine, nursing, pharmacy and physician assistant programs participate in Oregon's AHEC Scholars program each year. During the two-year AHEC Scholars Program, learners receive specific training on rural and underserved health issues, including social determinants of health, behavioral health integration, cultural competency, interprofessional education, and practice transformation in addition to their clinical training.

This cross-sectional study used a survey instrument designed to assess the extent to which teamwork was present in the clinic setting to evaluate clinical training sites where AHEC Scholars were placed. In addition, we wanted to determine whether differences existed among clinics based on clinic characteristics such as setting, healthcare system type, and care team type. Oregon AHEC staff compiled a list of 26 clinics where AHEC Scholars undertook their clinical training. Potential study participants included all clinic team members, including physicians, nurses, physician assistants, medical assistants, and clinic staff. All study activities were reviewed and approved by OHSU's Institutional Review Board.

3.2. Study instruments

The survey included items that assessed the demographic (gender, age) and clinical characteristics (participant's role in the practice, length of time on team) of study participants as well as information about the clinic size and type, and location of healthcare settings. Perceived teamwork was assessed using the 15-item Assessment of Collaborative

Table 2
Participating clinic information.

	Number of Clinics	Number of Team Members	Category Mean and SD
	n (%)	n (%)	Mean (SD)
Clinic Size			
Less than 5 team members	5 (31.3)	19 (9.0)	3.80 (1.3)
6-10 team members	3 (18.8)	21 (10.9)	7.00 (1.7)
11-15 team members	4 (25.0)	53 (27.6)	13.25 (1.3)
16 or more team members	4 (25.0)	99 (51.6)	24.75 (15.5)
Healthcare System (Type of training site)			
University-based (FQHC primary care, behavioral health, MAT and SDH teams)	8 (50.0)	47 (24.5)	5.88 (3.3)
Community-based (primary care and family medicine clinics)	8 (50.0)	145 (75.5)	18.13 (12.7)
Setting			
Rural	9 (56.3)	157 (81.8)	17.44 (12.1)
Urban	7 (43.8)	35 (18.2)	5.00 (2.31)
Care Team Type			
Primary care-based	10 (62.5)	144 (75.0)	14.4 (12.61)
Non-primary care based[a]	6 (37.5)	48 (25.0)	8.00 (6.69)

[a] Behavioral Health, Cardiology, ENT, MAT, Pharmacy, SDH.

Environments (ACE-15) survey tool.[20] The ACE-15 was designed to assess the extent to which a clinic functions as a team by measuring shared goals, clear roles, mutual trust, effective communication, and organizational support and has a possible range in score of 15–60. The full survey is included in Appendix A. Team cohesion is assessed by calculating the standard deviations generated around the mean of the 15 items, with lower standard deviations indicating higher cohesion and higher standard deviations indicating lower cohesion. Previous validation work included conducting a factor analysis of the 15 items, which supported a single domain of teamwork with 45 % of variance explained. Factor loadings for 14 of the 15 items ranged from 0.58 to 0.76. Cronbach's alpha reliability was high (alpha = 0.91).[20] Each of the 15 items is rated on a 4-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree) by as many clinic members as possible.

3.3. Data collection and analyses

The Oregon AHEC program office distributed paper-based survey packets with administration instructions to clinic managers at each of the 26 rural or underserved clinics where AHEC Scholars had clinical placements during the 2018-19 academic year. Survey administration instructions for clinic managers included administering the surveys to clinic members at a regularly scheduled clinic meeting, gathering the completed surveys, and placing them in a postage paid envelope for return to the Oregon AHEC program office. The surveys were anonymous, and data were collected between May and September 2019. Completed surveys were scanned using the SNAP Software system with quality data entry checks done at random. Data were then further checked for completeness and errors of inconsistency, and corrections were made prior to analyses.

For each clinic, frequencies were calculated for participants' roles in the practice, gender, age, and clinic size (less than 5, 6–10, 11–15 or more than 16 team members). The mean and range were calculated for length of time on the team. A total ACE-15 score was calculated for each participant, then means and standard deviations were calculated for each team. Three of the 15 items were negatively worded to ensure intentional responses, and then were reverse scored, as described in Tilden et al.[20] For comparison purposes, clinics were categorized according to setting (rural, urban), healthcare system type (university-based, community-based), and care team type (primary care-based, non-primary care-based). Non-primary care-based teams included Behavioral Health, Cardiology, Ear, Nose and Throat (ENT), Medication Assisted Treatment (MAT), Pharmacy, and Social Determinants of Health (SDH). An assessment of the distribution of the data revealed that data were not normally distributed; thus, Kruskal-Wallis tests were performed to compare means across the different clinic categories. We further classified clinics using the center point of the mean ACE-15 score and standard deviation for all clinics into four quadrants, including: 1) high teamwork, high cohesion; 2) high teamwork, low cohesion; 3) low teamwork, high cohesion, and 4) low teamwork and low cohesion.[20] Descriptively, clinics falling in the first quadrant (high teamwork, high cohesion) are considered optimally functioning clinics, while those falling into the 3rd and 4th quadrants where teamwork is low are considered less optimal from the teamwork perspective.[20]

4. Results

Seventeen (65.4%), clinics returned completed surveys with 193 team members across all clinics completing the survey. One clinic had only one team member respond to the survey, which was excluded from analyses, bringing the total number of clinics to 16 (61.5%), with 192 team members contributing surveys. Of these, 165 team members responded to all items of the ACE-15.

4.1. Demographic and clinic characteristics

The majority of respondents (61%) were age 39 or under and most identified as female (75.0%) (Table 1). Participants represented diverse roles at the clinic, the majority of which were medical assistants, clinical providers, front office staff and clinic nurses (Table 1). Note that the clinic providers were not asked to report details about their roles, but were likely MDs or DOs, PAs, or NPs. The mean number of team members responding from each clinic was 12.0 (SD = 10.9, range 2–46). Four clinics had 16 or more members, four had 11-15, three had 6-10, and four clinics had five or fewer members (Table 2). Across all clinics, 44 (23.5%) team members had been on the team less than one year, 41 (21.9%) from 1 to 2 years, 49 (25.5%) 3–5 years, and 53 (27.6%) had been on their teams for more than 5 years. Nine (56.3%) clinics were located in rural areas, two of which were university system clinics. The remaining rural area clinics were community-based. Seven (43.8%) clinics, all of which were part of the university system were located in underserved urban areas. Ten clinics (62.5%) were primary care-based (e.g., family medicine, pediatrics) and six (37.5%) were non-primary care-based (e.g., behavioral health, cardiology, pharmacy; Table 2).

4.2. ACE-15 and clinic comparisons

Overall mean ACE-15 clinic scores ranged from 38.7 to 49.8, and standard deviations (SD) ranged from 1.41 to 10.98. There was no statistically significant difference in mean ACE-15 scores among clinic roles. Mean difference in ACE-15 scores among team member length of time on the team was statistically significant with team members that had been on their teams for less than one year scoring higher (M = 48.17, SD = 5.31) than team members that had been on their teams for a year or more. Community-based clinics scored significantly higher on the ACE-15 than did university-based clinics, although team cohesion (lower SD) was greater for the university-based clinics (M = 46.96, SD = 7.48 and M = 43.71, SD = 5.01, respectively; Table 3). Primary care-based clinics scored significantly higher on the ACE-15 and had greater team cohesion (lower SD) compared to non-primary care-based clinics (M = 47.14, SD = 6.76 and M = 43.41, SD = 7.48, respectively; Table 3). Clinics in rural settings scored significantly higher on the ACE-15 compared to clinics in urban settings, although team cohesion (lower SD) was greater for the clinics in urban settings (M = 46.64, SD = 7.42 and M = 44.26, SD = 5.18, respectively; Table 3).

Six teams (37.5%) had mean ACE-15 scores and SDs that placed them in the optimal quadrant (higher teamwork, higher team cohesion). Three (18.8%) of these were in rural settings and three were in urban

Table 3
Teamwork comparisons according to clinic characteristics.

	Number of Team Members Reporting	Teamwork Mean (SD)	p-value[a]
Team Member Time on Team			
Less than one year	42	48.71 (5.31)	0.039
1–2 years	35	45.92 (6.66)	
3–5 years	42	44.79 (6.33)	
More than 5 years	40	44.80 (9.16)	
Healthcare System Type			
University-based	38	43.71 (5.01)	0.002
Community-based	127	46.96 (7.48)	
Setting			
Rural	135	46.64 (7.42)	0.034
Urban	30	44.26 (5.18)	
Care Team Type			
Primary care-based	124	47.14 (6.76)	0.009
Non-primary care-based[b]	41	43.41 (7.48)	

[a] Kruskal-Wallis test.
[b] Behavioral Health, Cardiology, ENT, MAT, Pharmacy, SDH.

Table 4
Classification of Clinics into Team Functioning Categories and their Characteristics.

Clinic Characteristics		Team Function Quadrants			
		Quadrant 1 Most Optimal	Quadrant 2	Quadrant 3	Quadrant 4
		Higher Teamwork Higher Team Cohesion[a]	Higher Teamwork, Lower Team Cohesion[b]	Lower Teamwork, Higher Team Cohesion[c]	Lower Teamwork, Lower Team Cohesion[d]
		n (%)	n (%)	n (%)	n (%)
All Clinics		6 (37.5)	5 (31.3)	3 (18.8)	2 (12.5)
Setting	Urban	3 (18.8)	2 (12.5)	2 (12.5)	0 (0)
	Rural	3 (18.8)	3 (18.8)	1 (6.3)	2 (12.5)
Healthcare System	University-based	3 (18.8)	2 (12.5)	3 (18.8)	0 (0)
	Community-based	3 (18.8)	3 (18.8)	0 (0)	2 (12.5)
Care Team Type	Primary care-based	4 (25.0)	3 (18.8)	2 (12.5)	1 (6.3)
	Non-primary care-based	2 (12.5)	2 (12.5)	1 (6.3)	1 (6.3)

[a] Mean ACE15 > 45.04, SD < 5.65.
[b] Mean ACE15 > 45.04, SD > 5.65.
[c] Mean ACE15 < 45.04, SD < 5.65.
[d] Mean ACE15 < 45.04, SD > 5.65.

settings, three (18.8%) teams were community-based and three were university-based systems, and four (25.0%) were primary care-based. Five teams (31.3%) were in quadrant 2 (higher teamwork, lower team cohesion), three (31.3%) teams were in quadrant 3 (lower teamwork, higher team cohesion) and two (12.5%) teams were in quadrant 4 (lower teamwork, lower team cohesion) (Table 4).

5. Discussion

In this study, we assessed perceived teamwork and team cohesion in 16 rural or underserved clinic settings where AHEC scholars undertook their clinical rotations. We found variability in both perceived teamwork and team cohesion across all clinic settings, with statistically higher teamwork scores in community-based clinics compared to university-based clinics. We also found that primary care-based teams had higher teamwork and team cohesion scores compared to non-primary care-based teams, the latter of which includes behavioral health. It may be that turnover is higher in university settings and among teams that address behavioral and mental health services, which could affect perceived teamwork and team cohesion.[21] It is also possible that community-based health systems, which are primarily rural, are inherently more close-knit and collaborative because their relative isolation means team members have to rely on one another more than do those in clinics in university-based systems, which are more likely to be located in urban areas.[22] Tilden et al.[20] validated the ACE-15 with 192 participants representing 16 teams. The mean team scores ranged from 43.6 to 58 with an overall mean of 47.7 (SD = 6.4), while the current study found a tighter range in mean teamwork scores of 38.1–48.7, and a slightly lower overall mean of 46.21. The team sizes in this study were smaller than in the Tilden study, which may account for the smaller range in scores.

Because interprofessional education is an important tenent of the AHEC Scholars Program, we wanted to assess teamwork and team cohesion in these clinical training sites to better understand the quality of the learning environment along with identifying typical characteristics of a clinical setting that optimizes teamwork. Our findings suggest improvements could be made in both teamwork and team cohesion in the majority of clinic settings we included in this study. Just over one third (37.5%) of participating clinics fell into the most optimal quadrant and 31.3% fell into quadrants characterized by lower teamwork. About one third (31.3%) of participating clinics fell into the second quadrant, indicating that while teamwork was high, there was also less agreement among team members about how well they functioned as a team. These findings have implications as demonstrated in prior research, which indicated that health professional students can readily describe what they see as effective interprofessional collaborative practice (ICP) as well as what is ineffective or what doesn't work well in the delivery of patient care in rural or underserved settings.[23] Students also report that working in settings with well-functioning teams positively impacts their learning experience and that the reverse is also true, such as when experiences including hierarchical clinic structure and poor communication constrain the opportunity to learn alongside other team members.[23]

The fact that students can make these observations suggests that their prior training in ICP, which is described in Jones et al., 2021,[24] may facilitate them undertaking teamwork strategies in their own clinical work after training is complete. It is interesting to note that university-based systems and to some extent non-primary care clinic types tend to have a more hierarchical structure compared to community-based systems in the primary care setting. In contrast, this study found no significant difference in ACE-15 scores across the different roles within a clinic. When combined with our findings that a higher sense of teamwork is found in rural versus urban settings and primary care versus non-primary care, one may infer that the optimal interprofessional educational environment for a clinical student is rural primary care. Further, if the goal is to increase the number of healthcare professionals who live and work in rural or urban underserved communities, knowledge of the characteristics that are more likely to motivate students to return to a particular setting is valuable for health professions educators to know. Ultimately, this knowledge could have implications when designing experiential learning curricula that positively impact the communities where care is most needed.

Though the ACE-15 has been used in prior studies to assess students on ICP knowledge before and after training,[25–27] these findings are not directly applicable to the current study and therefore cannot provide insights into the interpretation of these data. Fortunately, teamwork and team cohesion can be bolstered through training and supports,[28,29] and we plan on developing training interventions for lower performing clinics to assist with team development skills. Future research should include both observational and interventional research using the ACE-15 to measure teamwork and team cohesion across settings and before and after collaborative practice training, which would contribute findings on the ACE-15 to existing literature and further aid data interpretation. Surveying learners on their ICP experiences in the clinic and comparing those findings to the same clinic's ACE-15 scores could also help illuminate the relationships between teamwork, team cohesion, and learner experiences. Furthermore, research has shown analyzing learners' thoughts and reflections about their experiences in various health system types, clinical settings, and care team compositions aids in the understanding of how and where these students choose to live and work after graduation.[30] The knowledge gained from

analyzing students' experiences while on clinical rotations has the potential to transform how educators design clinical curricula, vet clinical sites, and provide feedback to the clinical faculty.

Strengths of this study include that we were able to assess clinics representing a variety of settings (e.g., rural, urban), care teams (primary care-based, non-primary care-based) and healthcare systems (university-based, community-based) where AHEC Scholars rotate. In addition, comparisons among clinics allowed us to identify areas where ICP trainings or support might improve teamwork and, therefore, learners' clinic experiences. Weaknesses include that some clinics had few team members reporting, which may not fully reflect those clinics' teamwork and team cohesion. In addition, we only included clinics in Oregon which limits the generalizability of these findings. Lastly, the ACE-15 measures perceived teamwork and team cohesion, which may not reflect actual team functioning.

6. Conclusion

We found that community-based primary care clinics have a higher degree of interprofessional teamwork and team cohesion compared to their counterparts in university-based specialty clinic settings, suggesting that training healthcare professions students across multiple settings and locations is an important component of their preparation for interprofessional work. Further, the lower perceived teamwork and/or lower team cohesion found in a majority of clinics where AHEC Scholars rotate as part of their clinical training indicate that intervention research is needed to understand how best to improve learning environments for students toward building their interprofessional collaborative practice skills.

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CRediT authorship contribution statement

Cynthia Taylor: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing. **Patricia A. Carney:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing, Funding acquisition. **Curt Stilp:** Conceptualization, Methodology, Investigation, Writing – review & editing, Funding acquisition. **Eric M. Wiser:** Investigation, Writing, Conceptualization, Writing – review & editing.

Declaration of competing interest

None

Appendix A. ACE-15 Assessment of Collaborative Environments

Instructions: The interprofessional "health care team" refers to stable members of the care team (excluding volunteers, trainees, or others temporary team members) who provide care and support in a particular context or for a particular panel of patients. Please rate "the team" as a whole as you respond to the questions. Although some team members may differ from the majority, try to score "the team" as if it were a single entity.

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. Team members contribute to setting and evaluating goals for improving the practice	1	2	3	4
2. The team has a culture of mutual continuous learning	1	2	3	4
3. The team fosters a culture of continuously improving communication	1	2	3	4
4. The team is well supported by the overall organization (e.g., practice improvement is encouraged; team training is supported)	1	2	3	4
5. Team members fail to appreciate each other's values and diversity ®	1	2	3	4
6. Team members appreciate each other's roles and expertise	1	2	3	4
7. Team members have the autonomy to implement their part of the plan once the patient's needs and goals are clear	1	2	3	4
8. The team is effective in assigning and implementing administrative tasks (e.g., leadership, recordkeeping, meeting facilitation, etc.)	1	2	3	4
9. Team members do not feel safe bringing up concerns about roles and responsibilities for discussion, proactive improvement, and prevention ®	1	2	3	4
10. All voices on the team are heard and valued	1	2	3	4
11. The team encourages trust by paying attention to important personal or professional connections (e.g., celebrating achievements, milestones, etc.)	1	2	3	4
12. Members of the team are active listeners and pay close attention to the contributions of others, including the patient and family	1	2	3	4
13. The team engages in routine, frequent, meaningful evaluation to improve its performance	1	2	3	4
14. Team members tend not to recognize their own limitations in knowledge and skills ®	1	2	3	4
15. The team constructively manages disagreements among team members.	1	2	3	4

® are reverse scored items.

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