Program Outcomes in Hybrid Versus In-Person Paramedic Education: A National Cross-Sectional Analysis

Shea L. van den Bergh[1], Jacob C. Kamholz[1,2] Christopher B. Gage[1,2], Kayla M. Riel[1,2] , Lisa Collard[4], Michael G. Miller[4], Ashish R. Panchal[1,2,3]

1. Research Team, The National Registry of Emergency Medical Technicians, Columbus, Ohio, USA; 2. College of Public Health, The Ohio State University, Columbus, Ohio, USA; 3. Department of Emergency Medicine, The Ohio State University, Columbus, Ohio, USA; 4. Committee on Accreditation of Educational Programs for the Emergency Medical Services Professions, Rowlett, Texas, USA

Introduction

- Paramedic education has traditionally relied on in-person instruction
- Hybrid models that blend online and face-to-face learning are becoming increasingly common
- Despite this shift, paramedic educational programs utilizing hybrid instruction remain insufficiently described in literature

Objective

- We aimed to characterize paramedic educational programs using hybrid instruction and examine their association with program characteristics and outcomes

Methods

Study Design, Setting & Population

- We conducted a cross-sectional analysis using data from the 2022 Committee on Accreditation of Educational Programs for the EMS Professions (CoAEMSP) Annual Report
- Programs were characterized as hybrid if <80% of the curriculum was delivered in person. We excluded programs with <5 students for stable estimates
- Education delivery included technology requirements, support services, and instructional format
- Hybrid programs reported the percentage of their program that is asynchronous, synchronous, and blended
- We examined program characteristics, performance metrics (percent attrition, first and cumulative third attempt pass rates), and resource assessment matrix (RAM) compliance

Analysis

- We used descriptive statistics (frequency, %; median, interquartile ranges [IQR]) for program characteristics
- Wilcoxon rank-sum or Chi-square testing was used to evaluate differences between hybrid and in-person programs
- To better understand the distribution of hybrid education, we used spatial analysis to represent the percentage of hybrid programs that are asynchronous, synchronous, or blended

Results

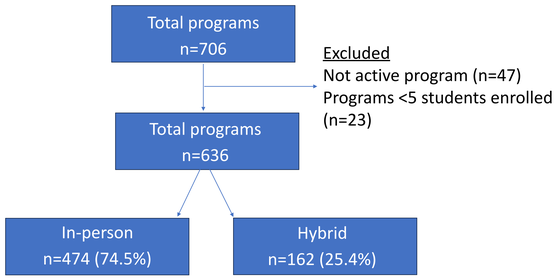

Figure 1. Flow chart showing excluded programs and programs defined as in-person or hybrid

Table 1. Program characteristics separated by in-person and hybrid programs *Abbreviations: RAM, Resource Assessment Matrix; NASEMSO, National Association of State Emergency Medical Services Officials.*

*p < 0.05

Characteristic	In-person (median, IQR) n=474	Hybrid (median, IQR) n=162
Total Enrolled	19 (11, 29)	18 (12, 32)
Total Months to Completion	12 (11, 15)	13 (12, 17)
Total Graduates	15 (9, 24)	14 (9, 25)
Total Hours of Instruction	1188.5 (1075.0, 1320.0)	1193.0 (1090.0, 1354.0)
Pass Rates		
1st Attempt	73.6% (55.6, 87.2%)	72.5% (60.0, 87.0%)
Cumulative 3rd Attempt	91.7% (80.0, 100%)	90.0% (80.0, 100.0%)
Percent Attrition*	16.7% (9.5, 26.6%)	20.0% (12.0, 29.4%)
Meets RAM Minimum (n, %)	353 (74.5%)	107 (66.0%)
NASEMSO Region (n, %)		
East	82 (17.3%)	27 (16.7%)
Great Lakes	109 (23.0%)	25 (15.4%)
South	176 (37.1%)	74 (45.7%)
West	55 (11.6%)	16 (9.9%)
Western Plaines	52 (11.0%)	20 (12.3%)

Table 2. Reported hybrid program requirements

Characteristic	Frequency (%)
Faculty Members Trained in On-line Delivery	146 (90.1%)
Requirements Program Provides	
Attendance Standards	154 (95.1%)
Internet Connectivity	133 (82.1%)
Real-time Information Technology Support	145 (89.5%)
Technology (Hardware/Software)	138 (85.2%)

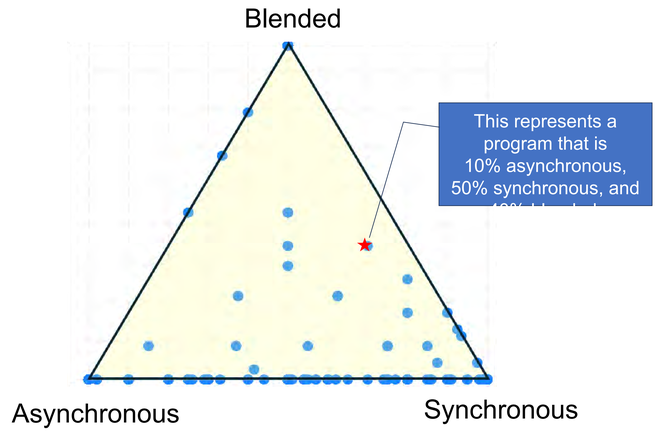

Figure 2. Spatial representation of hybrid program curriculum delivery between asynchronous, synchronous and blended

Limitations

- This study was limited by inability to account for the causes of high attrition, such as student characteristics
- This study may also be limited by recency bias, as programs complete the CoAEMSP report two years after cohorts graduate

Conclusion

- Paramedic educational programs with hybrid instruction demonstrate comparable pass rates to in-person programs but experience higher attrition
- The most common hybrid program requirements were faculty trained in on-line delivery and attendance standards
- Most hybrid programs are either asynchronous or synchronous, with few who report being blended
- In the face of workforce challenges, caution is needed when utilizing hybrid instruction due to the impact on attrition

Acknowledgements:

We would also like to thank the hard-working EMS clinicians providing patient care and protecting the public of the United States