



Journal of Regional Medical Campuses

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DOI: <https://doi.org/10.24926/jrhc.v8i2.6455>

Journal of Regional Medical Campuses, Vol.8, Issue 2 (2025)

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Professional identity formation among medical students during the COVID-19 era: A longitudinal view from a regional campus

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Abstract

Background

Previously published cross-sectional studies showed the COVID-19 pandemic had a dramatic effect on medical students, including concerns about disruption of their training as well as increases in depression and anxiety. Some also reported their confidence as clinicians was shaken and they were less satisfied with their education. This unique longitudinal study reports an annual measure of professional identity formation termed the career eulogy (CE) before and after the pandemic era. The CE is a previously validated instrument that provides a view into the way medical students hope to be viewed at retirement.

Methods

Ninety-nine students across all years of medical school at a regional rural campus recorded CEs during the summers of 2018 through 2023. Using previously developed professional identity clusters, longitudinal changes were analyzed using generalized estimating equations to account for data collected on each student repeatedly over multiple years. Statistical significance was set at $p < .05$.

Results

Significantly fewer mentions of quality (13% decrease), compassion (46% decrease, $p=.006$), and passion (51% decrease, $p=.007$) clusters occurred post-pandemic. There was a slight return of frequency of quality mentions in the summer of 2022 coinciding with vaccine development and new treatment options, and then a decrease again after a year of the omicron variant wave. Initial analysis showed no change in frequency of the patient relationship cluster, but analysis by gender showed a significant increase in female and decrease in male mentions.

Conclusion

The changes in student CE cluster frequencies can be explained by the fear, uncertainty, and helplessness felt by all providers as well as mistrust of physicians by some patients. The gender difference may show a difference in coping methods used during such an overwhelming time. These findings may provide useful insights as medical educators plan for future pandemics and other disruptions.

Introduction

The dramatic disruption of medical student education caused by the covid pandemic was unprecedented. On March 17, 2020, the Association of American Medical Colleges issued a special communication suggesting that all medical schools pause clinical

rotations effective immediately.¹ The result was that most medical students were removed from their clinical experiences for 4-6 months, with only virtual didactics continued. For the next 18 months, recurrent waves of mutant strains would temporarily overwhelm ICUs, and some students were excluded

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from caring for any covid-positive patients while others were on the front lines. Masks were required for many months in any patient care area. Reports early in the pandemic showed deterioration in mental well-being in 68% of Australian medical students and concern for the effect that the disruption of clinical care would have on their progress in training². A study of 5 American allopathic medical schools also showed higher levels of depression, anxiety and uncertainty about their futures among medical students³. A survey of all US allopathic and osteopathic medical schools showed lower overall medical student confidence and less satisfaction with their education as well as more anxiety because of the pandemic⁴.

A national study using the Association of American Colleges (AAC) Spring 2021 Graduation Questionnaire reported a summary of narrative responses about effects of the pandemic from 2408 students. The responses were centered around issues of virtual learning, social connection, and transition to residency⁵. While some students did report more confidence and empathy when calling patients to provide COVID test results, there were no reported general perception changes in compassion, quality care, or patient relationships. Some did report that the lack of away rotations and in-person residency interviews allowed a break that had a positive effect on burnout.

All previous studies were cross-sectional, and after a careful search working with an experienced medical librarian, we found no publications in English that used a measure before and after resolution of the pandemic. As we began a new curriculum of professional identity formation at our regional campus in 2015, we established a longitudinal project and showed that our students had similar Jefferson Scale of Empathy (JSE) scores to those at large urban campuses as they began medical school and significantly higher scores after the M-2 and M-3 years at our campus. This study also showed what had been published from larger urban campuses, that women at our campus had higher JSE scores than men⁶. We also showed that mentions of compassion on our projective career eulogy instrument correlated well with JSE scores in our students⁷. A qualitative compilation of clusters of responses on the career

eulogy from students just before starting medical school showed that at retirement they wanted to be remembered most for compassion, passion, quality, and patient relationships and women cited patient relationships more often than men⁸.

When the study population included only matriculated medical students at any level, we also found a significant quantitative difference that women were more likely to mention importance of compassion as well as patient relationships in their career eulogies. There was no gender difference in mentions of quality of care⁷.

The purpose of this study was to use our validated longitudinal career eulogy instrument to describe changes in medical student professional identity formation before and after their pandemic experience. Secondly, we sought any differences by identified gender.

Methods

As part of a longitudinal study of professional identity development among medical students at a regional campus, students completed a "career eulogy" (CE) during the summer of each academic year. The majority of the students identified as women (58/99) and most while completing their first survey were 23 years old (81/99). Most students reported rural upbringing (78/99). The students were presented a blank page with the instructions "Imagine that you are ready to retire from medicine in the distant future. Write a short speech of about 50 words outlining what you would like to be said about you at your retirement ceremony." All participants knew that analysis would be by ID number only, limiting external social desirability bias. Early in the project almost 200 eulogies were coded into recurring clusters by 3 medical educators working separately. Each year, about 5% of initial coding showed some discrepancies, and any differences in combining some verbatim comments into clusters were resolved by meetings of the three until all the clusters were stable^{7,8}. The 10 clusters are as shown in Table One. If words converting to a cluster appeared more than once in an individual CE, the total count was used to represent the degree of emphasis for that cluster. For this study, only the first 4 clusters had enough entries for inclusion.

Because the annual CEs were done at a regularly scheduled administrative meeting, the only results not included in the analysis were for 11 CEs from 4 students who were significantly off schedule so that controlling for year in school was not possible. These were 11/371 (3%) of the total CEs, for a 97% response rate. The 2020 eulogies were done several months into the first wave of COVID infection, and the 2021 eulogies were done several months before the Omicron surge. By the summer of 2022, all major adaptations to the pandemic had ceased although vaccination changes were ongoing.

This study was reviewed by the Baptist Health Deaconess Madisonville IRB and was considered exempt.

Statistical Methods

For the CE clusters of quality, patient relationships, compassion and passion, generalized estimating equations (GEEs) using a negative binomial distribution with a log link function were performed across years 2018 through 2023 after adjusting for students' class year. The negative binomial distribution is often used with count data, instead of the Poisson distribution, when the data exhibits overdispersion (variance is significantly larger than the mean) or the data has an overinflated number of zeros. Some degree of overdispersion existed for most outcomes used and an excessive number of zeros were found in all outcomes because not all clusters were chosen by all students. If the overall test of model effects for each year was significant, uncorrected post hoc pairwise comparisons across each calendar year were performed for the adjusted means. Similar additional analyses also compared gender across years for the four CE clusters.

After assessing the adjusted means for the CE clusters of compassion and passion, tests of linear trends were performed across the years from 2019 to 2023. For the comparison of gender across years post hoc comparisons between gender were performed for each year starting in 2020. Not all scores were obtained each summer as students graduated or newly matriculated, and class size varied.

All tests were 2-tailed with statistical significance set at convention at $P < 0.05$. The SPSS procedure GENLIN in version 29.0 was used to analyze the GEE data. The R package GGLOT produced the figures.

Results

For the CE quality cluster, the overall test of model effect for year was significant, $P = 0.003$ (see Figure 1). Figure 1A shows which years were significantly different from each other. For patient relationship, the effect for year was not significant, $P = 0.312$. A significant linear effect was found for CE compassion, $P = 0.006$ (see Figure 1C). A significant effect was also found for CE passion, $P = 0.025$. Figure 1D shows which years were significantly different from each other. Our previous studies showed gender differences across the CE clusters. For patient relationships, notable gender differences were found across several years starting in 2020 through 2023 (See figure 2). No significant differences by gender across years were found for quality, compassion, or passion.

Table 1. Terms used by students to describe themselves in their Career Eulogies

Terms used by students	Cluster
Seeking excellence; knowledgeable; seeking improvement; the best; quality of care; great doctor; contributed to medical knowledge; left a legacy	Quality
Vigor; excitement; love of medicine; impact on care; persistence; never gave up; never backed away from a challenge	Passion
Empathy; kind heart; sentimental; understanding; sympathetic; every patient mattered; gave patients hope; truly cared	Compassion
Connected with patients; puts patients' needs first; made personal connections; personable	Patient relationships
Always happy; my life was a gift; the journey was fun; the joy of practice; always had a smile; positive attitude	Enjoy life
Brought better care to my town; legacy in my town; very involved in community; educated the community	Community
Taught colleagues; taught community members about their health; hosted medical students	Teacher
Genuinely sought to help others; payment not required	Service
Blessed to serve; faith is central; servant of God; displayed faith through care	Calling
Loyal to family; puts energy into relationship with spouse; love of family	Family
Co-worker, colleagues, fellow physicians	Coworker

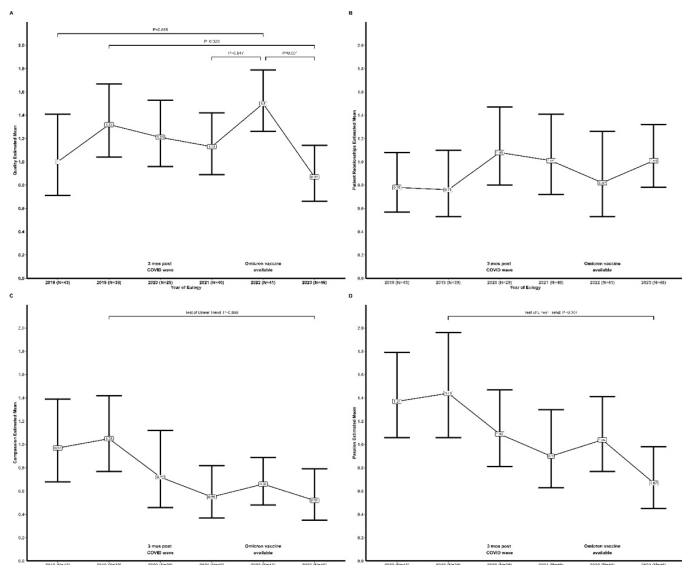


Figure 1: CE clusters estimated means across calendar year (2018 through 2019), adjusted for medical student class years (pre-matriculation, pre-M2, pre-M3, pre-M4 and pre-residency). For A, the overall test of model effect was significant (Wald Chi-Square = 18.36, DF=5, P=0.003); for B, no significance was found (Wald Chi-Square = 5.94, DF=5, P=0.312); for C the test of linear trend from 2019 through 2023 was significant (Chi-Square = 7.47, DF=1, P=0.006); for D the test of linear trend from 2019 through 2023 was significant. (Chi-Square = 7.21, DF=1, P=0.007). Error Bars reflect 95% confidence intervals.

sometimes significant differences occur between genders starting in 2020.

Discussion

This analysis provides a unique longitudinal view of the changes in professional identity formation before and after a cataclysmic event for these students. In addition, these students at this small regional campus are immersed in a daily apprenticeship model that means that their changes might well reflect the changes they perceived in their faculty. From our perspective of one of these faculty involved in daily community practice (KW), the regional dean that meets almost daily with these students (WJC), as well as two current residents who were students during the worst of the epidemic, we offer our interpretations of the meaning, including some surprises. Quality, compassion, and passion clusters significantly declined in frequency post-pandemic. Compassion and passion clusters show a steady decline, and there was a transient one-year return in the quality cluster. Medical students were working long hours and observing their physician mentors working long, hard hours with limited PPE and high patient to staff ratios.⁵ All felt fear and hopelessness during the initial stages of the pandemic. Even when circumstances got somewhat better as hospitalizations decreased and a vaccine was available near the end of 2020, there was a lot of mistrust of the medical community. As they considered their professional identity, medical students might be expected to have a decreased passion for the profession in this setting of mistrust, and to have uncertainty about their ability to provide quality care and connect with their patients. Similarly, the compassion fatigue that came from all the death around them and the consternation of vaccine denial would be expected to creep into their professional identity reflections, but this requires further study to confirm.

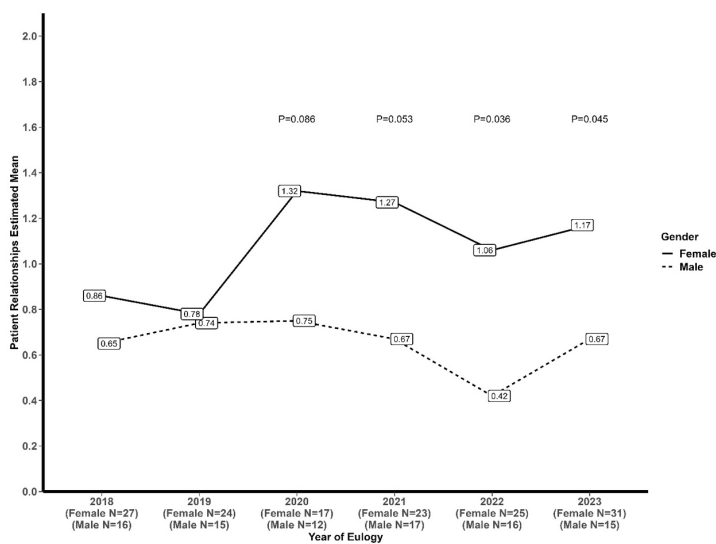


Figure 2: CE patient relationships estimated means across calendar years by gender, adjusted for medical student class years (pre-matriculation, pre-M2, pre-M3, pre-M4 and pre-residency). Noticeable and

In the quality cluster, there was a steady decrease, except for an outlier in the summer of 2022. It is reasonable to assume that the quality cluster may have been impacted by the new information and ever-changing guidelines that have persisted even up until the present time. New research had to be done on this virus initially, and even the most seasoned physicians were having to learn and adapt each day,

resulting in a bit of hopelessness. Every few weeks it seemed that guidelines for testing, isolating, treating, and immunizing patients were changing. This uncertainty caused physicians and students to question their ability to be a great doctor and provide the best care to their patients. It could be that the return of quality mentions in 2022 reflects the availability of a new Omicron vaccine and increased treatment options, which allowed some stability and confidence with treating this virus. The resident authors (MA and UA) reported that during this time when they volunteered as students at vaccine clinics and provided advice on vaccination this provided some reassurance that they could provide quality care again. Then the subsequent drop in 2023 was after another year of increasing infections with the Omicron strain and low acceptance rates of the newer vaccine.

Despite this decline in the above clusters, the patient relationship cluster was remarkably stable over time, suggesting that this may be more resilient. However, when analyzed by gender, a remarkable difference was found. For those students that identify as females, the patient relationship cluster actually steadily increased in frequency. In contrast, the patient relationship cluster showed a decrease post-COVID in those that identify as males. Although this was unexpected, previous publications provide some insight. Besides the effect of gendered social norms, a review of 29 publications also reported that female primary care physicians demonstrated significantly more active patient partnership behaviors, more patient centered communication overall, and their visits were 10% longer⁹. In a previous study of this student population pre-pandemic, women consistently mentioned patient relationship clusters more than men across all years of medical school, particularly after the second year¹⁰. The male resident author (UA) reported that during his time as a student, he coped by temporarily focusing on the objective clinical details of each case, sometimes finding it difficult to connect with each patient as he had previously and since. The female resident (MA) reported that her coping reaction was more naturally to invest time and energy understanding the widely differing patient expectations and beliefs.

Limitations and Strengths

These results are from medical students at one rural campus that employs an apprenticeship model providing an unusually close working relationship with practicing community faculty. Extrapolation can only be to students in similar circumstances. The previous studies from this campus show that our students start with similar measures of empathy to larger urban schools, but show higher scores during medical school.^{6,7} Studies using the CE in other environments are needed. The groups were not large, but there were no findings near significance that would be likely to reach significance if the groups were larger. There was significant variation around the mean, a result to be expected when students' expression of a complicated concept is categorized into clusters. And a worldwide pandemic precluded the use of a contemporaneous control group. It is also possible, if unlikely, that there was some other force contemporaneous with the pandemic that was actually responsible for the changes seen. Much as in the difference between statistical significance and clinical significance, it is difficult to assess the true meaning of the change in clusters. In the previous studies and annual professional identity sessions using the Career Eulogy, these clusters were seen as important and representative of what these students truly hope to be. The primary strengths of this study are the extremely high response rate and the repetitive longitudinal measures across six years with the pandemic timed roughly in the middle.

Conclusion

This longitudinal study showed that after the COVID-19 pandemic, medical student professional identity formation measures showed significant decreases in mentions of quality, compassion, and passion. In the total group, there was no change in mentions of the patient relationship cluster, but the genders diverged, with females significantly increasing these mentions while males significantly decreased. No gender differences were found in the other three clusters. As medical educators reflect and plan for the inevitable next pandemic, these changes may be useful to consider. Interventions and curricula formed during the last crisis could be refined, studied for outcomes such as the CE clusters, and prepared for rapid deployment. In addition, some elements may be integrated into standard curricular objectives to equip students with tools to approach the next upheaval

even if it is non-infectious. Strategies to support hopeful resolution would be expected to minimize negative effects on student compassion, passion, and belief that they can provide quality care. More study into gender differences and continuing longitudinal measures as the pandemic effect recedes are needed.

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