

A Novel Curriculum for Internal Medicine Residents to Care for High-Need, High-Cost Patients

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ABSTRACT

OBJECTIVES: High-need, high-cost (HNHC) patients represent a small proportion of patients in the US, but result in disproportionately higher healthcare utilization. Teaching Internal Medicine (IM) resident trainees to provide high value care for HNHC patients is critical. We sought to improve resident attitudes and increase clinical skills associated with treating HNHC patients by creating a curriculum that leveraged the UCLA Extensivist Program, a patient-centered medical home for HNHC patients.

METHODS: We developed a curriculum for PGY-2 and PGY-3 IM residents centered on caring for HNHC patients over the course of 6, 4h sessions during 1 academic year. Participants completed pre- and post-intervention surveys assessing self-rated attitudes and skills associated with caring for an HNHC patient population.

RESULTS: Twenty-one IM residents completed the curriculum and 41 were in the control group. There were no statistically significant differences in assessed attitudes and skills, but there were trends of improvement, including a decrease in participants who agreed or strongly agreed they felt overwhelmed when seeing patients for posthospital discharge follow up (45.0% pre- to 41.7% post-intervention) and an increase in participants who agreed or strongly agreed they have the skills to successfully transition HNHC patients between inpatient and ambulatory settings (20.0% pre- to 33.3% post-intervention). Participants reported better understanding of resources available to HNHC patients, effective coordination of transitions of care, and comprehensive assessment of social determinants of health.

CONCLUSION: A curriculum to improve resident attitudes and skills associated with caring for HNHC patients was successfully implemented in an IM program at a large academic medical center. The curriculum may be adapted for other training programs; long-term training woven throughout training may be important to significantly improve resident education on how to care for HNHC patients.

KEYWORDS: Medical education, curriculum development, social determinants of health, patient centered medical home

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Introduction

High-need, high-cost (HNHC) patients comprise a small proportion of the US population yet result in a disproportionate amount of healthcare cost and utilization. In 2019, approximately 50% of total healthcare expenditures was accrued by 5% of the US population, and inpatient hospital care accounted for approximately 37% of spending for persons in the top 5% of spenders.¹ The quality of care does not necessarily increase with higher cost; frequently, HNHC patients receive redundant or superfluous care in fragmented healthcare systems that are difficult to navigate.²

Healthcare systems across the US have been challenged to develop integrated systems of care, including patient-centered medical home (PCMH) models that optimize care for HNHC patients by reducing preventable healthcare utilization while also increasing quality and continuity of care. Many innovative interventions that provide wrap around services

and integrated, comprehensive care for HNHC patients exist,³ some of which have demonstrated benefit in reducing emergency department (ED) utilization, hospital stays, and readmissions.⁴

There is an anticipated significant physician workforce shortage in the US,⁵ which further exacerbates the growing need for more physicians who are trained to care for HNHC patients. There is also an increased emphasis on the importance of primary care focused not only on the diagnosis and management of chronic illnesses, but also on the provision of complex care for individuals with disparities and poor engagement in healthcare.⁶ Training physicians to provide high quality care for HNHC patients within integrated systems is therefore critical. Internal medicine (IM) residents would benefit from curricula focusing on developing the skills associated with providing comprehensive and patient-centered care in an integrated system. Such curricula highlighting the delivery of



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patient-centered care have demonstrated increased resident satisfaction.⁷ One institution demonstrated that a patient-centered, transitions of care focused curriculum for IM residents resulted in a reduction in 30-day readmissions for patients admitted with heart failure exacerbations.⁸ In addition, an intensive 4-week curriculum that was developed in a Family Medicine residency program resulted in an increase in self-confidence and desire for residents to provide care for complex patients.⁹

The UCLA Extensivist Program was established in 2017 as an interdisciplinary PCMH for HNHC patients. The Extensivist interdisciplinary team is composed of IM physicians, comprehensive care coordinators, pharmacists, registered nurses, nurse practitioners, and social workers who together provide continuity across inpatient and ambulatory settings for patients meeting the following criteria: diagnosis of a high-risk condition(s) (eg, end stage renal disease, advanced congestive heart failure, cirrhosis) and high utilization, defined as frequent hospitalizations (>1 in one year) and/or ED presentations (>3 in 1 year). Additionally, the Extensivist Program seeks to reduce psychosocial barriers to care (eg, co-morbid mental health disorders, high medication cost) that are common within this patient population.

The Extensivist resident curriculum is a novel training program that was established to empower trainees to foster comfort and develop the skills necessary to care for HNHC patients in an integrated medical system. Leveraging the resources provided by the Extensivist Program, the curriculum trains residents to identify root causes of health care utilization, recognize the role of psychosocial barriers in limiting access to care, and effectively work within an interdisciplinary team. We predicted that the Extensivist Curriculum would increase IM resident (PGY-2 and PGY-3) self-rated skills and attitudes in caring for an HNHC patient population.

Methods

This study was a survey-based interventional trial that was reviewed and approved by the UCLA Institutional Review Board (IRB) in July 2020, IRB#19-001623.

Study participants

All UCLA PGY-2 categorical and PGY-3 primary care IM residents were eligible to enroll in the study and met our inclusion criteria; other residents were not eligible for the study. The Extensivist Curriculum was implemented for 2 subsets of IM residents based on their ambulatory continuity clinic site and included 15 PGY-2 categorical IM residents whose continuity clinic was located on the main UCLA-Westwood campus and 6 PGY-3 primary care IM residents whose continuity clinic was in the UCLA-Santa Monica and West Los Angeles Veteran's Administration (VA) sites. Thirty-five categorical PGY-2 IM residents whose continuity clinic was located at the West Los

Angeles VA, VA Sepulveda Ambulatory Care Center or Simms/Mann Venice Family Clinic sites, and 6 PGY-3 primary care IM residents with continuity clinic in the UCLA-Santa Clarita and Olive View Medical Center sites were not offered the Extensivist Curriculum but were asked to participate in the study as a control group. A waiver of signed informed consent was approved by the IRB; we received informed consent from prospective participants by providing a study information sheet that was distributed via secured email. Once reviewed, the participants were given the option to enroll in the study by completing the initial survey distributed to them via secure email.

Curriculum

The Extensivist Curriculum was implemented from July 2020 through June 2021 and provided over 6, 4h sessions throughout the academic year. Sessions were facilitated by Extensivist attending physicians in both inpatient and ambulatory settings. Both attending physicians and residents received a syllabus containing goals and objectives for each session and links to key resources (including presentations, peer-reviewed studies, and assessment tools). The sessions included: (1) Introduction to the Extensivist Program, (2) Social Determinants of Health (SDOH), (3) Transitions of Care, (4) Strategies to Reduce Readmissions, (5) Outpatient Management of Medically Complex Patients, and (6) Direct Observation and Evaluation (see Extensivist Resident Curriculum, Supplemental Appendix 1). Residents were expected to evaluate at least 2 patients for inpatient or outpatient consultations and formally present the patients to Extensivist attendings who helped guide evaluation and the development of a comprehensive management plan utilizing the Extensivist interdisciplinary team. Primary objectives of the curriculum included: (1) identify complex patients who would most benefit from a PCMH, (2) understand the key elements of a PCMH and interdisciplinary team to provide comprehensive care, (3) assess and address SDOH and understand the impact on health outcomes, (4) identify biopsychosocial barriers associated with healthcare utilization, including emergency department and hospital admissions, (5) identify interventions to mitigate preventable readmissions and decrease length of stay, and (6) optimize transitions of care for patients across varied healthcare settings.

Survey

A nonvalidated 18-question, anonymous Qualtrics survey was distributed by secure email to all study participants in both the intervention and control groups at 2 timepoints (before and after the year-long curriculum in the intervention group). Participants were asked to provide an anonymous alphanumeric ID code that enabled the opportunity for comparison of pre and post data by resident. The survey evaluated self-reported attitudes and skills regarding providing care to vulnerable and

complex patients (see Supplemental Appendix 2, Extensivist Resident Curriculum Survey).

Statistical analysis

Using the anonymous alphanumeric ID code, only 12 presurvey/postsurvey pairs could be formed, restricting the useable sample size. Thus, to leverage all available responses, the data were treated as between-subjects—with 2 independent groups measured at pre and post—for all analyses. All Likert-type response items were converted to a numeric scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) prior to analysis. Negatively worded items (5 of them) were then reverse coded. Next, factor analyses were performed with 2 and 3 factors specified applying both Oblimin and Promax rotations to examine how the 18-survey items grouped. These factor analyses, combined with expert knowledge contributed by members of the research team, resulted in the items being grouped under “Attitudes” and “Skills” factors. Scale scores were formed for both factors by averaging their respective items (with all items converted to a 1-5 scale prior to averaging), and these 2 scale scores were entered as continuous outcome variables into 2 linear models that included group membership (Extensivist Curriculum vs control group; control as the reference group), time (pre vs post; pre as the reference group), and a group-by-time interaction as predictors. Neither interaction was statistically significant ($P > .05$). Thus, in the final models, the interaction terms were removed. All P -values $< .05$ were considered statistically significant.

Responses to the survey’s open-ended question (Supplemental Appendix 2, Extensivist Resident Curriculum Survey, #17) were analyzed by study authors and categorized into themes based on collaborative review.

Results

Quantitative results

Survey response rates. Sixty-two internal medicine residents participated in the study; 21 residents (intervention group) completed the year-long Extensivist Curriculum and 41 were in the control group (Table 1). Fifty out of 62 (80.6%) participants completed the presurvey, including 20 out of 21 (95.2%) of the intervention group and 30 out of 41 (73.2%) of the control group. Twenty-eight out of 62 (45.2%) participants completed the postsurvey, including 12 out of 21 (57.1%) in the intervention group and 16 out of 41 (39.0%) of those in the control group.

Attitudes. Before the study intervention, 9 out of 20 (45.0%) participants in the intervention group and 21 out of 30 (70.0%) in the control group either strongly agreed or agreed that they feel overwhelmed before a posthospital discharge follow-up visit (Table 2). There was a decrease in this

proportion upon completion of the curriculum for the intervention group (5/12 = 41.7%), and an increase in the control group (13/16 = 81.3%). In addition, prior to the study intervention, 43 out of 50 (86.0%) among both groups [15/20 (75.0%) of those in the intervention group and 28/30 (93.3%) of those in the control group] strongly agreed or agreed that they feel guilty that they are unable to provide optimal care for medically and/or socially complex patients. The proportion of participants who strongly agreed or agreed with this statement increased in both the intervention (11/12 = 91.7%) and the control group (15/16 = 93.8%) after the intervention.

The majority of participants in the intervention group (18/20 = 90.0% pre- vs 10/12 = 83.3% post-intervention) and the control group (25/30 = 83.3% pre- vs 12/16 = 75.0% post-intervention) felt that as inpatient providers, they were responsible for ensuring that prior to discharge, patients receive in-person education about how and why they take each medication on their discharge medication list. In addition, most participants in both the intervention group (17/20 = 85.0% pre- vs 9/12 = 75.0% post-intervention) and control group (26/30 = 86.7% pre- vs 13/16 = 81.3% post-intervention) felt that they were responsible for following up with patients after they have been discharged from the hospital to ensure that they have been safely transitioned to the ambulatory setting.

Skills. With regard to skills, there was an increase in both the intervention (4/20 = 20.0% pre- vs 4/12 = 33.3% post-intervention) and the control groups (2/30 = 6.7% pre- vs 3/16 = 18.8% post-intervention) in participants that either strongly agreed or agreed that they have the skills to successfully transition HNHC patients between inpatient and ambulatory settings (Table 3). There was an increase in participants who strongly agreed or agreed that they were comfortable identifying the impact of SDOH in these patients in the intervention group (10/20 = 50.0% pre- vs 10/12 = 83.3% post-intervention), but a decrease in participants in the control group (22/30 = 73.3% pre- vs 10/16 = 62.5% post-intervention). There was an increase in participants who strongly agreed or agreed that they typically integrated a clinical pharmacist in the care of their patients with polypharmacy or for their patients who may have difficulty obtaining their medications in the intervention group (5/20 = 25.0% pre- vs 8/12 = 66.7% post-intervention), but a decrease in participants in the control group (10/30 = 33.3% pre- vs 5/16 = 31.3% post-intervention). Further, there was an increase in participants who strongly agreed or agreed that they were able to identify and have access to the necessary interdisciplinary team member to address SDOH in the intervention group (7/20 = 35.0% pre- vs 6/12 = 50.0% post-intervention), but a decrease in participants in the control group (11/30 = 36.7% pre- vs 5/16 = 31.3% post-intervention). Finally, we assessed self-rated comfort level (on a scale of 1-10) in providing interdisciplinary care for complex patients; both groups demonstrated increases

Table 1. Survey response rates.

	PRE-INTERVENTION	%	POST-INTERVENTION	%
Intervention group	20/21	95.2	12/21	57.1
Control group	30/41	73.2	16/41	39.0
Total	50/62	80.6	28/62	45.2

in comfort level (intervention group: mean 5.25 pre- to 5.75 post-intervention; control group: mean 5.13 pre- to 5.31 post-intervention).

Linear models. Despite trends toward improvements in measured skills and attitudes in the intervention group compared to the control group on individual items, there were no statistically significant differences in survey responses between groups: In both the model with the Attitudes scale score as the outcome and the model with the Skills scale score as the outcome, the effect of group controlling for time was not statistically significant ($P > .05$), and the effect of time controlling for group was not statistically significant ($P > .05$). As a sensitivity analysis, we ran 2 additional linear models using the 12 participants who completed both the presurveys and postsurveys (10 in the control group and 2 in the intervention group) using group membership to predict (1) post-intervention Attitudes scale scores and (2) post-intervention skills scale scores while controlling for their respective pre-intervention scores. In both models, the effect of group membership controlling for pre-intervention scores was not statistically significant ($P > .05$), likely due at least in part to the small sample size.

Qualitative results

The survey included the following open-ended question (Supplemental Appendix 2, Extensivist Resident Curriculum Survey, #17): “What is the most valuable knowledge and/or skill you have obtained during your Extensivist Curriculum experience?”

Three themes emerged from the answers of residents who participated in the curriculum, including:

1. Development of an understanding of resources that are available for patients in a complex and integrated medical system;
2. Obtaining the skills to assist with the coordination in transitions of care for patients between the inpatient and ambulatory settings; and
3. Development of comfort in comprehensively assessing psychosocial barriers and social determinants of health.

Discussion

This novel resident curriculum sought to improve resident attitudes and skills surrounding caring for HNHC patients.

Despite nonstatistically significant findings associated with our hypotheses, there were trends toward improvement in various self-rated attitudes and skills regarding caring for a complex, HNHC patient population. Specifically, participants in the intervention group demonstrated trends toward feeling less overwhelmed when seeing patients on their schedules for posthospital discharge visits, increased comfort in self-reported skills associated with identifying and addressing SDOH, and more confidence in the ability to utilize an interdisciplinary team to address previously identified SDOH.

Postdischarge ambulatory visits are critical in preventing hospital readmissions,¹⁰ especially for HNHC patients.^{11,12} Our curriculum included dedicated time to perform root cause analyses regarding the etiology for hospital readmissions and to review specific questions and goals associated with post-discharge visits under the guidance of attending physicians, which may have led to participants in the intervention group feeling less overwhelmed with posthospital discharge visits. The corresponding increase noted in the control group may have stemmed from increased resident awareness of the limitations in how they can care for HNHC patients over time and a lack of specific curricula addressing this topic. Comprehensive assessment of SDOH is a key skill necessary to develop patient-centered solutions surrounding psychosocial barriers to health care and should be a priority in order to achieve better health outcomes in the US.¹³ Our study intervention resulted in a trend toward an increase in the self-reported skills associated with identifying SDOH and more confidence in the ability to engage an interdisciplinary team to address SDOH for HNHC patients compared to decreases in the control group. Establishing and integrating interdisciplinary teams to provide support to HNHC patients is a critical need within our healthcare system.¹⁴ Working as a member of an interdisciplinary team was a highlighted and unique feature of our curriculum; the specific curricula highlighting SDOH analysis and applying it in both inpatient and ambulatory settings while also participating in interdisciplinary rounds may have led to the intervention group feeling more comfortable understanding the roles of various interdisciplinary team members and how they could be incorporated in addressing SDOH.

Many participants in both groups felt guilty that they could not provide optimal care for complex HNHC patient populations, and there was an increase in the proportion of participants in both groups who identified feeling guilty after the study

Table 2. Self-reported attitudes.

SURVEY QUESTION	STRONGLY AGREE OR AGREE				MISSING DATA*
	INTERVENTION		CONTROL		
	PRE	POST	PRE	POST	
I feel overwhelmed when I see that these patients are scheduled to see me for a postdischarge/hospital follow up visit.	9/20 (45.0)	5/12 (41.6)	21/30 (70.0)	13/16 (81.2)	0
I feel guilty that I am not able to provide optimal care for my most medically and/or socially complex patients.	15/20 (75.0)	11/12 (91.6)	28/30 (93.3)	15/16 (93.7)	0
In the past 6 weeks, I paid little attention to the social and or personal impact of an illness on at least one of my medically and/or socially complex patients.	5/20 (25.0)	3/12 (25.0)	10/30 (33.3)	4/16 (25.0)	0
In the last year, I had little emotional reaction to the death of at least one of my medically and/or socially complex patients (in the inpatient or outpatient settings).	7/20 (35.0)	3/12 (25.0)	9/30 (30.0)	5/16 (31.2)	0
I felt guilty about how I treated at least one of my medically and/or socially complex patients from a humanitarian standpoint.	7/20 (35.0)	7/12 (58.3)	17/30 (56.7)	8/16 (50.0)	0
I feel that I have an important role in guiding the comprehensive care (medical decision making leading to appropriate treatment and prevention of disease) as the PCP of my most medically and/or socially complex patients.	16/20 (80.0)	10/12 (83.3)	28/30 (93.3)	16/16 (100.0)	0
As an inpatient provider, I am responsible for ensuring that prior to discharge my patients receive in-person education about how and why they take each medication on their list.	18/20 (90.0)	10/12 (83.3)	25/30 (83.3)	12/16 (75.0)	1
As an inpatient provider, I am responsible for calling or emailing my patients' primary care providers at the time of discharge.	6/20 (30.0)	6/12 (50.0)	9/30 (30.0)	6/16 (37.5)	1
As an inpatient provider, I am responsible for ensuring my patients attend a follow-up appointment after discharge.	10/20 (50.0)	5/12 (41.7)	16/30 (53.3)	7/16 (43.8)	1
As an outpatient provider, I am responsible for following up with my patients after they have been discharged from the hospital to ensure they have been safely transitioned to the outpatient setting.	17/20 (85.0)	9/12 (75.0)	26/30 (86.7)	13/16 (81.2)	1

*Missing Data: one participant did not provide responses to items 11 to 14.

intervention. Additionally, only a minority of participants felt they could successfully transition HNHC patients between inpatient and ambulatory settings both before and after our intervention. These findings indicate that improving higher-level attitudes and skills such as guilt and transitions of care, respectively, may require more advanced training beyond 6 half-day sessions, and addressing these topics as a woven thread throughout residency training may be beneficial. There may have been an increase in feelings of guilt in providing optimal care after residents were exposed to more HNHC patients over time given time and structural constraints related to IM resident ambulatory training and difficulties in providing close continuity of care to these patients who would likely benefit most from frequent care. Further, difficulties that residents may encounter in engaging robust interdisciplinary support likely impact optimal transitions of care. Future studies may consider targeted assessment of these findings and specific interventions (ie, providing residents with more longitudinal access to interdisciplinary support) to improve them.

Qualitative data collected based on responses from an open-ended question in our survey indicated that some participants felt they benefited from the curriculum, especially regarding

developing an understanding of system-based resources for HNHC patients, acquiring skills to coordinate transitions of care, and developing comfort in the assessment of psychosocial barriers and social determinants of health. These responses indicate the value of our curriculum and the importance of reinforcing these topics in curricula for IM residents.

There were several limitations in our study; we had a limited sample size based on the number of PGY-2 and PGY-3 trainees and given the nature of resident training and existence of various ambulatory training sites, the residents we compared (intervention vs control) received variable outpatient training. For example, the PGY-2 and PGY-3 trainees in the intervention group trained in the UCLA-Westwood and Santa Monica clinics, respectively, while the PGY-2 residents in the control group trained at multiple other sites. Patient populations in these clinical sites are varied. The UCLA-Westwood and Santa Monica sites are hospital-based clinics associated with a quaternary care health system, while other clinical sites (West Los Angeles VA, VA Sepulveda Ambulatory Care Center, Simms/Mann Venice Family Clinic, UCLA-Santa Clarita, and Olive View Medical Center) vary in location and patient population and may have a variable proportion of HNHC

Table 3. Self-reported skills.

SURVEY QUESTION	STRONGLY AGREE OR AGREE			
	INTERVENTION		CONTROL	
	PRE	POST	PRE	POST
I have the skills to successfully transition medically and/or socially complex patients with high cost and high needs between inpatient and outpatient settings.	4/20 (20.0)	4/12 (33.3)	2/30 (6.7)	3/16 (18.8)
I am comfortable identifying the impact of social determinants of health in a medically and/or socially complex patient.	10/20 (50.0)	10/12 (83.3)	22/30 (73.3)	10/16 (62.5)
I typically integrate a clinical pharmacist in the care of my patients who I have identified as having polypharmacy or for my patients who may have difficulty obtaining their medications.	5/20 (25.0)	8/12 (66.7)	10/30 (33.3)	5/16 (31.3)
I am able to identify and have access to the necessary interdisciplinary team member to address previously identified social determinants of health.	7/20 (35.0)	6/12 (50.0)	11/30 (36.7)	5/16 (31.2)
On a scale of 1–10 (10 being most comfortable), please rate your comfort level of providing interdisciplinary and optimal care to your most medically and/or socially complex patients.	5.25 (mean) ± 1.43 (SD)	5.75 (mean) ± 1.76 (SD)	5.13 (mean) ± 1.55 (SD)	5.31 (mean) ± 1.25 (SD)

patients. We thus could not control for the patient population and associated unique training received by each resident, which in addition to limited sample size, may have impacted both their baseline and post-intervention attitudes and skills in caring for HNHC patients. Future studies may include residents who all participate in the same continuity clinic site and randomly assigning them to control versus a curricular intervention. Our study included PGY-2 categorical and PGY-3 primary care residents based on ease of scheduling with these particular groups, and the advanced nature of the care required by HNHC patients was likely more suitable for senior residents. This did, however, limit our sample size to a fixed study

population, which precluded the need for power analysis. It may be important for future studies addressing curricula regarding caring for HNHC patients to include a broader range of trainees, or specifically target curricula to those with lower baseline self-reported attitudes and skills.

The study survey was developed by study investigators and included questions to assess the unique elements related to the curricular intervention. These questions were categorized into attitudes and skills, which were self-reported, subjective measures that are susceptible to confounders; the survey was not validated nor pilot tested. The use of validated measures, such as resident burnout using the Maslach Burnout Inventory or Mini Z Resident (Mini ReZ) survey, may be considered in future studies.^{15,16} Future studies may choose to assess resident skills using Accreditation Council for Graduate Medical Education (ACGME) milestones which include evaluations of patient care and systems-based practice.¹⁷

Further limitations include our low sample size in addition to low participant response rates, especially in post-intervention groups, which may be attributed to the challenges associated with obtaining high survey response rates from physicians and especially those in training¹⁸; given these low response rates post-intervention, we treated pre- and post-intervention groups as independent samples (unmatched). Thus, the conclusions we reached should be interpreted with caution. Future studies may consider strategies to improve response rates, including administering surveys in-person and/or reducing the time period between pre- and post-survey assessments. Finally, given constraints associated with IM residency training and limited available time for elective curricula, the intervention we provided was relatively short (6, 4h sessions) when compared to others⁹ and considering the challenging goals of improving attitudes and increasing skills in residents to care for a complex patient population, which likely require more intensive and long-term training.

Our study indicates that many IM residents do not feel that they have the optimal attitudes or skills to care for our most vulnerable and complex patients. There is a necessity for curricula that provide IM residents with the necessary training to improve attitudes and skills associated with caring for HNHC patients, especially as we expect the number of patients with chronic illnesses and thus increased complexity to rise over time.¹⁹

Conclusion

The UCLA Extensivist Program which provides comprehensive and patient-centered care to a population of HNHC patients, was leveraged to provide a novel curriculum highlighting key components of comprehensive care with the support of an interdisciplinary team to help patients thrive within a complex medical system. This curriculum is adaptable to other IM programs aiming to teach residents specific skills to provide comprehensive care to a vulnerable, complex patient population. Future studies that include a higher number of

participants and improved response rates will be helpful to further elucidate the importance of integrating curricula focused on caring for HHNC patients.

Author contributions

JK, JJ, and SM were involved with study conception and design, data collection, analysis and interpretation of results, and manuscript preparation. TT and MS were involved with data collection, analysis and interpretation of results, and manuscript preparation.

Ethics

All procedures performed in this study were in accordance with the ethical standards of the UCLA Institutional Review Board. The study was approved by the UCLA IRB (#19-001623).

Informed consent

Informed consent was obtained from all individuals participating in the study.

Supplemental material

Supplemental material for this article is available online.

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