

RESEARCH ARTICLE

Innovating Graduate Medical Curricula for the Next Generation of Physician Leaders: Feasibility and Early Results of a Service-Free, Immersive Learning Model

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Abstract

Rapid changes in the healthcare environment have introduced knowledge content gaps in graduate medical education (GME) programs. Exposing residents to emerging concepts including patient quality, safety, business of medicine and individualized medicine are essential to train the next generation of physician leaders and provide novel skills needed for success in practice. Challenges related to service commitments have traditionally limited GME programs the flexibility to address these gaps.

Within a newly accredited pediatric residency program, the residency program leadership took the opportunity to design and implement a novel curriculum, LEAD (Leadership Executive Academic Development), as a two-week service-free and immersive format where topics including Leadership, Individualized Medicine, Cultural Competence, Ethics, Continuous Quality Improvement (CQI), Safety and Business of Medicine were addressed. Simulated patient encounters correlating to these sessions were additionally included as a method of reinforcing content.

Between the inaugural two cohorts of residents (n=23, academic years 2014-2016), the authors found this service-free and immersive approach was feasible and highly conducive to addressing these innovative topics. Early results from program evaluation revealed that residents highly valued all LEAD sessions (Mean Scores: 4.1-4.7, Scale 0-5) however, leadership and CQI sessions had the highest mean scores reported for didactic content whereas individualized medicine and cultural competence were the most valued as simulated sessions. Additionally, self-efficacy scores were noted to improve in all topics following the implementation of the curricula but were particularly improved in topics including leadership and the business of medicine.

These early outcomes indicate that implementing a highly-structured immersion curriculum is a promising approach to addressing current GME curriculum gaps. Future study of the role of the LEAD curriculum on trainee's skills, competencies and potential career choices is an ongoing programmatic goal.

Key Words: Graduate Medical Education (GME), immersion learning, curriculum, pediatrics, service commitment, innovation, leadership

Word Count: 1,784

1. Introduction

Developing strong physician leaders is a key component to the success of healthcare organizations. However, many current resident training programs are not designed to address leadership skill development in a comprehensive manner.¹ A review of current literature shows emerging models of resident training are being developed to address the gap in skills to develop future physician leaders.^{2,3} Challenges related to broadly implementing these new models persist due to the conflicting demands of service needs across varying institutions.

Recently, Phillips et al. indicated that “Tectonic shifts in graduate medical education” were needed to keep up with the changes that are occurring throughout healthcare and attested to the need to make graduate medical education the a priority across institutions while also developing new training models as strategies to ensure that today’s trainees are prepared for tomorrow’s needs.⁴ Shifting traditional training models to overcome barriers such as service commitments in an effort to address the growing knowledge gaps is the perhaps the first step to adequately teaching residents the added knowledge and skills beyond traditional clinical practice.

Because delivery of healthcare is fundamentally changing due to increased emphasis on quality, safety and overall patient outcome measures⁵ as well as a drive towards value based purchasing⁶ residents in training will benefit from learning about these impactful changes as they learn the core competencies and achieve the clinical milestones necessary to become competence physicians. Specific to pediatric residency programs, innovative leadership programs have shown positive initial results from incorporating leadership skill training into medical curricula with focused topics including managing teams, negotiation,

conflict management,⁷ while other program models have placed an emphasis on hand-off communication, safety, quality improvement, finance and health system operations.⁸ Curricula that address the breadth of these important topics in a single, comprehensive manner have yet to be described yet could effectively expose trainees to topics that they would otherwise only briefly be exposed to or miss entirely during their residency.

Delivery of new curricula is traditionally impacted by service commitments during training.⁹ As a recently accredited program, we took the opportunity to shift away from a service-driven model of curriculum development and towards an educational model of training to implement a leadership curriculum informed by the changing healthcare and training environment, within our broader pediatric resident training curriculum.

Immersion learning has increasingly been utilized as a teaching strategy to help health professionals and students develop competency in novel disciplines.¹⁰ Unlike the existing learning opportunities offered in residency including traditional didactics, noon conference or other periodic teaching sessions, immersion learning is felt to offer learners the opportunity to extract greater value and meaning from the available contents such that knowledge and skills are more efficiently synthesized.

Few studies exist where immersion learning models have been utilized in graduate medical education, likely due to the inability to separate residents from their service obligations. Moreover, little data is available describing the role of immersive learning models in combination with simulation as a mechanism of engaging residents in new knowledge or skill acquisition. However, considering the extent and breadth of new training content in addition to the abstract and often non-clinical knowledge addressed, an intensive, highly structured learning

model could efficiently engage trainees in these new topics.

2. Methods

In an effort to shift existing learning models in GME, the Johns Hopkins All Children's Hospital Pediatric Residency program implemented a series of 1-2 week longitudinal training curriculum, *Leadership Executive Academic Development (LEAD)* where seven innovative topics (Leadership, Individualized Medicine, Cultural Competence, Ethics and Professionalism, Continuous Quality Improvement, Patient Safety and Business of Medicine) are delivered to our residents during immersive 1-2 week sessions where they are protected from clinical duties to be able to participate in this unique curriculum.

A Delphi process was utilized to develop the core framework of the LEAD curriculum. Two separate academic retreats were conducted between 2011-2012 and included hospital administrators, finance leaders, physicians, nurses, and leaders in pediatric medical education from JHH, JHACH and other U.S. academic institutions. During the retreats, interprofessional teams were created where each team reviewed survey data gathered between JHH, JHACH and two other pediatric residency programs on their self-reported curricular gaps. Each team identified a created a list of "new competencies" based on existing curricular gaps based on iterative discussions. A summative white-paper was created as a result of the retreats that identified the learning objectives of the LEAD curriculum (available for review on request).

After the broad learning competencies were identified, residency program leaders then focused on designing and writing the

detailed content of each LEAD session grounded in immersive learning theory. Curricula were developed for each training year (LEAD I-III) with the goal that each year concepts are newly introduced as well as reviewed. In an effort to focus the faculty expertise needed for each topic, sessions are structured to span over a full day such that all topics were presented in an immersive learning model over a 5-10 day period (Table 1). Subtopics were subsequently identified and assigned to local and/nor national experts such that each day includes discussions by several pediatrics leaders. A variety of teaching/learning methods were utilized in the LEAD curriculum including pre-study reading, individual reflection, didactic lectures, group-based learning (case discussions, exercises or group reflections), and simulation (simulated cases and role play). Learning objectives for each session are subsequently reinforced with standardized patients and simulated case scenarios at the end of each one-week training period resulting in two full days of structured simulation.

Residents received an electronic pre-test survey one week prior to the sessions and subsequently completed a post-test electronic survey one week following the sessions. The surveys assessed knowledge and self-efficacy in each topic (Scale 0-100, higher score correlating to self-reported knowledge or self-efficacy). Additionally, residents complete a feedback survey assessing each individual session's perceived value in their training (Scale 0-5, higher score correlating to higher perceived value). Mean scores for pre/posttest surveys were calculated by training year and differences compared via standard deviation. At the time of this submission, LEAD II and LEAD I have been formally implemented and evaluated. LEAD III evaluation is currently in progress.

Table 1: Leadership Executive Academic Development (LEAD): Topic Sub-Topic Content

	Daily Themed Topic	Sub-Topics
Week 1	Leadership	<ul style="list-style-type: none"> • Individualized Learning Plans and Career Development • Optimizing Communication Among Teams • The ACH JHM Advising Framework: Scholarship, Career and Educational Development to enhance your roles as LEADERS • Everyday Leadership in Actions • Myers Briggs Review of Results: What is your Leadership Style? • Next Steps as a Young Physician Leaders
	Individualized Medicine	<ul style="list-style-type: none"> • Introduction to Individualized Medicine • Understanding the Tools for Individualized Care • Integrate Individualized into Practice: Case Studies Reflecting the Spectrum Individualized Care • <u>Next Steps in Leadership with Individualized Medicine</u>
	Cultural Competency	<ul style="list-style-type: none"> • The Basics of Culture • How Does Culture Affect Health Outcomes? • What are Health Disparities and how does the Scientific Literature Address Health Disparities? • How to get past “Getting by” and Effectively Work with a Medical Interpreter • Next Steps as Leaders in Culture Session Wrap Up
	Simulated Sessions (Week 1)	<ul style="list-style-type: none"> • <i>Leadership</i>: Managing difficult learners and their needs on a ward team • <i>Individualized Medicine</i>: Addressing genetic data with a family • <i>Cultural Competence</i>: Using an interpreter in teaching a Limited English Proficient family about an insulin regimen
Week 2	Ethics/Professionalism	<ul style="list-style-type: none"> • Foundations of Clinical Ethics • Ethics Case Analysis and Group Reflections • Professionalism in Pediatrics • Introduction to Ethics in Research with Children and Adolescents
	Continuous Quality Improvement	<ul style="list-style-type: none"> • The Framework of Continuous Quality Improvement • Fundamentals of Continuous Quality Improvement in Everyday Healthcare • Quality Improvement Tools and Case Study • A Look at the Data and Patient Outcomes
	Patient Safety	<ul style="list-style-type: none"> • The High Stakes Importance of Safety • Everyday Safety • Engineering Safer Healthcare • Case Studies in Clinical Care
	Business of Medicine	<ul style="list-style-type: none"> • Introduction to the Current Landscape of the Business of Medicine • Pragmatic Business of Medicine: Billing and Coding 101 • Scope of Practice and Medical Legal Framework
	Simulated Sessions (Week 2)	<ul style="list-style-type: none"> • <i>Ethics 1</i>: Addressing Tetanus vaccine hesitancy with a dirty wound • <i>Ethics 2</i>: Addressing parents seeking alternative enhancement for treatment • <i>CQI</i>: Identify a barrier to care in a drill-down model • <i>Safety</i>: Disclosing medication errors to a family

3. Results

Completion rates for pre/post test surveys ranged from 100% and 75% on LEAD I/LEAD II curricula respectively. Pre-test scores in each of the topics were variable with the lowest mean scores noted in

leadership (55.2) and business of medicine (53.3). Post-test scores were consistently increased in each topic (Figure 1) following the sessions with the greatest increases in self-efficacy observed in leadership and business of medicine sessions.

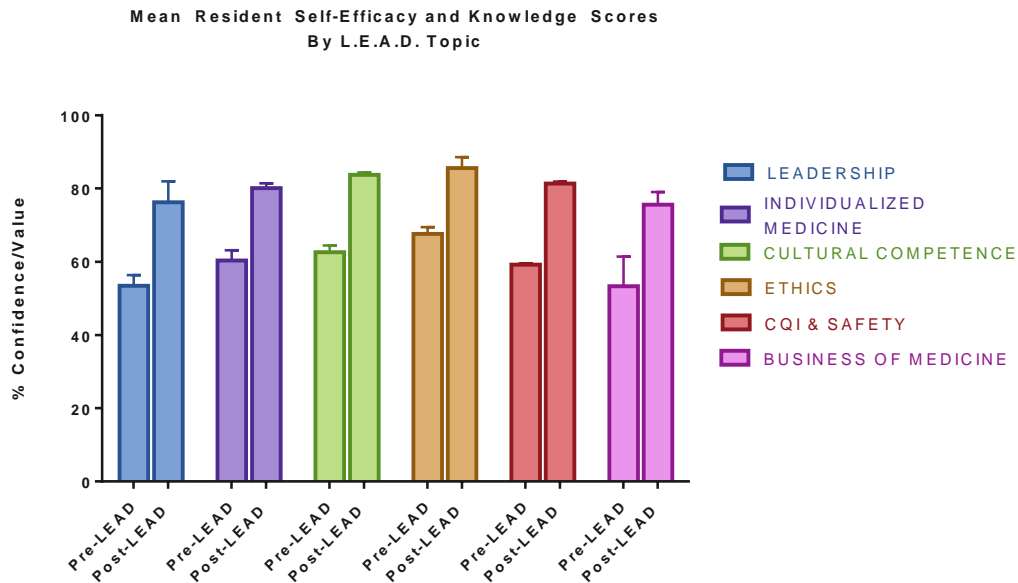


Figure 1. Resident Self-Efficacy and Knowledge Scores

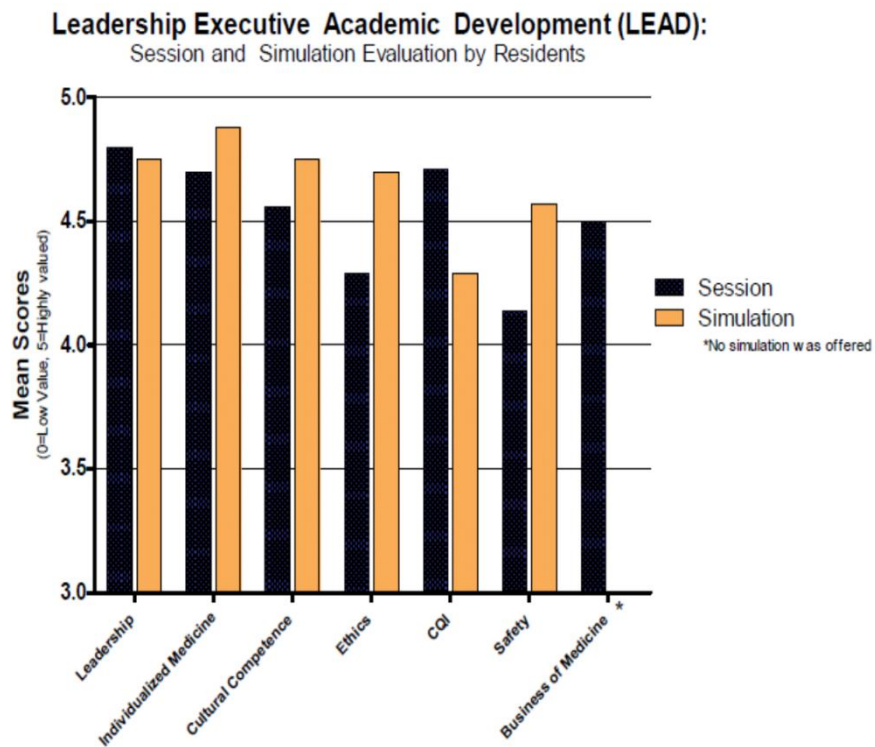


Figure 2. Resident Perceived Value Scores of LEAD Topics and Simulated Sessions

Results from our feedback evaluations revealed the highest mean scores for perceived value occurred with the leadership and CQI sessions (mean scores 4.8, 4.7 respectively) as well as for the individualized medicine and cultural competence simulated sessions (mean scores 4.7 respectively). Though a simulation session was not offered for the business of medicine session, residents valued the content discussed in these sessions overall.

4. Discussion

Residency training has traditionally been challenged by time constraints within which to add new curricular content. In addition, methods by which to teach residents novel topics in healthcare have traditionally relied on delivering content via 30-60 minute didactic sessions nested within the clinical service responsibilities of trainees. Without addressing these barriers to both time commitments and novel content introduction, it will be difficult for us to train the next generation of physicians to be prepared for the current healthcare landscape.

We have demonstrated that utilizing series full-day, immersive sessions on innovative GME topics was feasible within a categorical training program where a variety of teaching modalities including formal didactics, case-studies, team-based discussions and simulation were utilized. The curriculum development process was informed by inter-professional members of both the institution and the program which facilitated introducing timely and clinically relevant content. Our pre-test information demonstrated that self-efficacy was lowest in the topics of leadership and business of medicine suggesting that these should be topics that are more centrally addressed in undergraduate medical educational settings as well as within residency. Our results indicate that our sessions increased

residency reported self-efficacy in each LEAD topic. Further, residents highly valued all sessions both as content and as simulated sessions.

The authors recognize the limitations of the results of this program, including the small number of residents who have initiated the LEAD curriculum model thus far and that there was variance in the didactic methods, and faculty utilized within each topic. This makes it difficult to standardize our value and self-efficacy scores however, general comparisons are still possible. It may additionally be challenging for other programs to replicate the entirety of LEAD as a non-clinical curriculum however, each of the topics could be carved into to single day-sessions that may better lend themselves to be introduced within the conference structure of a program. Despite these limitations and based on these early results, we conclude that considering new teaching frameworks and content is of value from an educational perspective and correlates with sessions that were highly valued by residents. Our residents additionally utilize LEAD knowledge and skills within professional learning communities that meet regularly throughout the year thereby providing continued opportunity to revisit and reinforce these innovative topics.

5. Conclusions

The gap in leadership training within residency will need to be addressed by educational leaders in order to enhance not only our patient care but also in training highly qualified physicians prepared for the current and future challenges of health care. We have developed and implemented a leadership development program within residency training that has valued by trainees and demonstrated improvements in self-efficacy as it relates to newer topics in health care. Continued curriculum

evaluation of LEAD within our 3-year residency program is planned. Unique to the program, we also plan to study the impact of multidisciplinary collaboration as a means of fostering understanding of LEAD-related content. This concept will be a central focus of our programmatic outcomes moving forward. Prioritizing leadership training as well as other novel topics related to patient care delivery is necessary to allow young physicians to successfully become leaders in practice within the new era of healthcare. This innovative educational approach incorporated content delivery methods informed by members from multidisciplinary teams with an immersive learning model that included simulated clinical sessions. Early positive results support the feasibility of immersion learning with resident evaluation reporting high value within the delivered content and could serve as a model to other training programs as it relates to leadership development.

Declaration of Interest: There are no conflicts of interests reported by any of the authors that contributed to this manuscript.

References

1. Blumenthal DM, Bernard K, Bohnen J, Bohmer R. Addressing the leadership gap in medicine: residents' need for systematic leadership development training. *Acad Med.* 2012 Apr;87(4):513-22. <http://journals.lww.com/academicmedicine/pages/articleviewer.aspx?year=2012&issue=04000&article=00025&type=abstract>
2. Frich JC, Brewster AL, Cherlin EJ, Bradley EH. Leadership development programs for physicians: A systematic review. *J Gen Intern Med.* 2014 Dec 20. Doi: 10.1007/s11606-014-3141-1. <http://link.springer.com/article/10.1007/s11606-014-3141-1>
3. Fromme HB, Whicker SA, Mahan JD, Turner TL. Update in medical education for pediatrics: insights and directions from the 2010 literature. *Med Educ Online.* 2012 May 18. Doi:10.3402/meo.v17i0.14433. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3357112/>
4. Phillips RL, Jr., Bitton A. Tectonic shifts are needed in graduate medical education to ensure today's trainees are prepared to practice as tomorrow's physicians. *Acad Med.* 2014 Nov;89(11):1444-1445. http://journals.lww.com/academicmedicine/Citation/2014/11000/Tectonic_Shifts_Are_Needed_in_Graduate_Medical.17.aspx
5. Dougherty D, Shiff J, Mangione-Smith R. The Children's Health Insurance Program Reauthorization Act quality measures initiatives: moving forward to improve measurement, care, and child and adolescent outcomes. *Acad Pediatr.* 2011;11(3 suppl):S1-S10. [http://www.academicpedsjnl.net/article/S1876-2859\(11\)00059-3/abstract](http://www.academicpedsjnl.net/article/S1876-2859(11)00059-3/abstract)
6. Porter ME. A strategy for health care reform—toward a value-based system. *N Engl J Med.* 2009;361(2):109-112. <http://www.nejm.org/doi/full/10.1056/NEJMp0904131>
7. Kuo AK, Thyne SM, Chen HC, West DC, Kamei RK. An innovative residency program designed to develop leaders to improve the health of children. *Acad Med.* 2010 Oct;85(10):1603-8. <http://journals.lww.com/academicmedicine/pages/articleviewer.aspx?year=2010&issue=10000&article=00017&type=abstract>
8. Ackerly, DC, Sangvai DG, Udayakumar

K, et al. Training the next generation of physician-executives: an innovative residency pathway in management and leadership. Acad Med. 2011 May;86(5):575-9.

<http://journals.lww.com/academicmedicine/pages/articleviewer.aspx?year=2011&issue=05000&article=00016&type=abstract>

9. Blum AB, Shea S, Czeisler CA, Landrigan CP, Leape L. Implementing the 2009 Institute of Medicine recommendations on resident physician work hours, supervision and safety. Nat Sci Sleep. 2011;3:47-85.

<http://www.dovepress.com/implementing-the-2009-institute-of-medicine-recommendations-on-resident-peer-reviewed-article-NSS>

10. Zink T, Halaas GW, Finstad D, Brooks KD. The rural physician associate program: the value of immersion learning for third-year medical students. J Rural Health. 2008 Fall;24(4):353-9. <http://onlinelibrary.wiley.com/doi/10.1111/j.1748-0361.2008.00181.x/abstract;jsessionid=10529AAF60ED6C0B862A0B0C2658706D.f03t01>