

The Financial Cost of Interprofessional Ambulatory Training: What's the Bottom Line?

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ABSTRACT

Background Team-based care is recommended as a building block of high-performing primary care but has not been widely adapted in training sites. Cost may be one barrier to a team-based approach.

Objective We quantified incremental annual faculty and staff costs as well as potential cost savings associated with an interprofessional (IP) ambulatory training program compared to a traditional residency clinic at the same site.

Methods Cost calculations for the 2017–2018 academic year were made using US Department of Labor median salaries by profession and divided by the number of residents trained per year. Cost implications of lower no-show rates were calculated by multiplying the difference in no-show rate by the number of scheduled appointments, and then by the weighted average of the reimbursement rate.

Results A total of 1572 arrived appointments were seen by the 10 residents in the IP program compared with 8689 arrived appointments seen by 57 residents in the traditional clinic. The no-show rate was 11.5% (265 of 2311) in the IP program and 19.2% (2532 of 13 154) in the traditional clinic ($P < .001$). Total cost to the health system through higher staffing needs was \$113,897, or \$11,390 per trained resident.

Conclusions Total costs of the IP model due to higher faculty and staff to resident ratios totaled \$11,390 per resident per year. Understanding the faculty and staff costs and potential cost-saving opportunities associated with transformation to an IP model may assist in sustainability.

Introduction

Interprofessional (IP) education and collaborative approaches to primary care are associated with positive outcomes for patients and providers, but have not been widely adapted in training settings.^{1–3} While team-based care is recommended as a key building block of high-performing primary care, the transition to team-based care in ambulatory training practices requires changes to clinical workflows, staffing models, and educational programming.^{4,5} Implementation and sustainability of IP training programs necessitates familiarity with the benefits and costs associated with program operation. While an increasing number of cost evaluations in health professions education are available, few compare and contrast different educational approaches and fewer still focus on IP education.^{6,7} Indeed, the Prato Statement by the Society for Cost and Value in Health Professions Education recommends that analyses of cost and value accompany studies of educational interventions.⁸

While it is difficult to demonstrate cost effectiveness in health professions education, cost benefit analyses are key to assessing the value of educational interventions.^{9,10} We developed a team-based training practice that included expanded access hours, a focus on providing follow-up appointments at the point of care, and enhanced staffing to help patients navigate barriers to appointments. We expected that this program would cost more than a traditional residency training practice housed at the same site. The aim of this article is to quantify incremental faculty and staff costs as well as potential cost savings associated with running an IP ambulatory training program compared to a traditional residency training program at the same training site.

Methods Program

The IMPACcT (Improving Patient Access, Care, and cost through Training) program at Northwell Health is a Health Resources Services Administration (HRSA) funded initiative providing team-based clinical practice, IP education, and career mentoring to residents, medical students, physician assistants (PAs), and pharmacy and health psychology trainees who opt into the program.¹¹ Residents are categorical

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Editor's Note: The online version of this article contains the weekly schedule used by the program.

TABLE 1
Interprofessional and Traditional Clinical Practices

Grouping	IMPACcT Clinic	Traditional Clinic
Residents	10	54
Pharmacy students	13	24
Psychology externs	1	0
PA students	8	0
Medical students	32	0
Total clinical sessions per week	7	7
Evening sessions	1	0
Patient access staff	1	3
Medical office assistants	1	3
Physician faculty	1	3
Psychology faculty	0.25 FTE	0.1 FTE
Pharmacy faculty	0.9 FTE	0.5 FTE

Abbreviation: PA, physicians' assistant.

internal medicine trainees at a large urban training program. Trainees participate in huddles, see patients, and are supervised jointly by physician, pharmacy, PA, and psychology faculty, with support from a dedicated medical assistant and patient coordinator. Physician and psychology faculty and support staff are employed by Northwell Health, a large non-profit health organization based in New York State. Pharmacy faculty are employed by St. John's University. These faculty train students at Northwell clinical sites but are funded solely by St. John's University. Residents are selected through an application and interview process based on primary care interest and enter IMPACcT in their second year, bringing their existing patient panel into the program. Students opt into rotations in the IMPACcT clinic as part of their clinical program. Scheduling features include a weekly evening patient care session and follow-up appointments made by the team at the point of care. The weekly schedule is provided in the online supplementary data. A total of 10 residents are trained annually alongside 60 other IP trainees.

Volume and no-show rate at scheduled visits as well as patient demographics were compared between the IMPACcT and traditional clinic. The project was deemed exempt from review by the Institutional Review Board.

Costs

For the first full academic year of the program (July 2017 through June 2018), we compared costs to the health system associated with the IP clinic to those of a co-located traditional clinic that trains 60 residents and 24 pharmacy students per year. Both programs meet Accreditation Council for Graduate Medical

Objectives

We quantified annual faculty and staff costs as well as potential cost savings associated with an interprofessional (IP) ambulatory training program compared to a traditional residency practice at the same site.

Findings

Total cost to the health system through higher staffing needs was \$113,897 or \$11,390 per trained resident, but no-show rate was significantly lower in the IP practice.

Limitations

This evaluation was limited to a single program at one institution and did not include start-up costs or total collections or charges.

Bottom line

Understanding the faculty and staff costs and potential cost-saving opportunities associated with transformation to an IP model may assist in dissemination and sustainability of IP training.

Education (ACGME) staffing requirements for resident supervision, including a maximum ratio of learners to faculty of 4:1 and a longitudinal precepting experience. Both clinics operate on a 4+1 schedule of inpatient and outpatient medicine, have equivalent numbers of patient care sessions, and have otherwise equivalent overhead costs.¹²

To determine the cost of IMPACcT clinic relative to the traditional clinic, we developed a financial cost model incorporating costs of each professional on the team based on staffing ratios from both programs, as shown in TABLE 1. To adhere to the 4:1 trainee to faculty ratio and ensure optimal IP education, pharmacy and psychology faculty precepted alongside physician faculty. Calculations were made using US Department of Labor median salaries by profession for the state of New York and include a standard organizational benefit load of 25%.¹³ Pharmacy faculty salaries, though paid by St. John's University independent of Northwell Health, were included in total costs.

Cost Savings

No-show rate was expressed as a percent and calculated for each clinic by dividing a clinic's total number of arrived appointments by the total number of scheduled appointments. Because the clinic is generally completely booked, for this analysis we assumed that the cost of a no-show appointment is the average revenue from a patient. We note that there is additional value from a lower no-show rate, such as enhanced care coordination; however, for simplicity, we only quantified the revenue impact. Mean savings was calculated by multiplying the difference in no-show rate between the clinics by the number of scheduled appointments, and then by the weighted mean of the clinic's reimbursement rate for visits. Chi-

TABLE 2

Faculty and Staff Costs of Interprofessional Model Relative to Traditional Model

Position ^a	Median Salary ^b	Practice	Clinician	Resident	Ratio	Total Cost	Difference
Physician	\$189,160	Traditional	1	2.5	0.4	\$83,707	\$22,172
		IMPACcT	1	2	0.5	\$105,879	
Psychologist	\$103,000	Traditional	0.1	8	0.01	\$794	\$15,271
		IMPACcT	0.25	2	0.13	\$16,065	
Medical office assistant	\$38,580	Traditional	1	3	0.33	\$14,823	\$7,676
		IMPACcT	1	2	0.5	\$22,499	
Coordinator	\$40,790	Traditional	1	3	0.33	\$16,384	\$8,485
		IMPACcT	1	2	0.5	\$24,869	
Total for health system							\$53,605
Pharmacist	\$127,310	Traditional	0.5	8	0.06	\$9,592	\$60,292
		IMPACcT	0.9	2	0.45	\$69,884	
Total across health systems							\$113,897

^a Faculty and staff assisted medical, PA, psychology, and pharmacy students in addition to residents through work in the IMPACcT clinic.^b <https://labor.ny.gov/stats/lswage2.asp>.

square tests were used for statistical analysis and performed using Excel 2010 (Microsoft Corp, Bellevue, WA).

Results

During the study year, a total of 1572 arrived appointments were seen by the 10 residents in the IMPACcT program (157 patients per resident) compared with 8689 arrived appointments seen by the 57 residents in the traditional clinic (152 patients per resident). Demographic factors including age, gender, ethnicity, and insurance type were similar between the IMPACcT and traditional clinic patient populations. The no-show rate was 11.5% (265 of 2311, SE $\pm$ 0.0056) in the IMPACcT and 19.2% (2532 of 13 154) in the traditional clinic, indicating 7.7% (SE $\pm$ 0.0027) more patients attended scheduled appointments in the IMPACcT than the traditional clinic ($P < .001$).

Faculty and staff to resident ratios were higher in the IP model than the traditional residency training model, as shown in TABLE 2. To train the 10 residents, the IP model cost an additional \$15,272 in psychology salaries, \$22,172 in physician salaries (faculty: resident 1:2 IP vs 1:2.5 traditional), \$60,292 in pharmacy salaries, \$8,485 in coordinator (1:2 IP vs 1:3), and \$7,676 in medical assistant salaries (1:2 IP vs 1:3).^{14,15} The total cost was \$113,897 or \$11,390 per trained resident.

The no-show rate for the IMPACcT clinic was lower than the no-show rate for the traditional clinic. Given an average weighted reimbursement rate of \$80.53 per visit, a 7.7% lower no-show rate corresponded to a total potential increase in revenue of \$14,330 for the academic year, which offset the

total operating cost. This represented 8.7% of the total incremental operating cost of the IP model.

Discussion

To innovate while adhering to federal funding constraints on graduate medical education, it is important to calculate the cost of educational interventions.¹⁶ Given the clinical and workforce related imperative to move to team-based primary care, understanding the costs and potential cost savings of an IP model is important. We calculated costs of the IMPACcT program as well as changes in revenue associated with the program due to a lower no-show rate. Increased operating costs due to higher faculty and staff to resident ratios totaled \$11,390 per resident per year. Much of these costs were due to enhanced in-person services of psychology and physician faculty in the IP training clinic to adhere to ACGME and American Psychological Association requirements while optimizing IP education.

A team-based model of primary care practice is recommended by major professional organizations to improve outcomes for patients and providers but brings higher costs. Traditional training models have produced a shortage of primary care providers.¹⁷ Residents who train in team-based environments may be more likely to enter the primary care workforce.¹⁸ The strengths of this approach include measuring staff and faculty costs, associated with a team-based approach involving care coordination, as recommended by Foo et al.⁶ This approach may also be generalizable to practice settings deploying different providers or staffing ratios. As one offset to higher costs in the IP practice, the program had a lower no-show

rate (11.5% vs 19.2%, a 7.7% difference). Care coordination facilitated by the work of the patient access coordinator and extended hours may be responsible for this difference.¹⁹ The patient access coordinator called patients to remind them of appointments, helped patients navigate transportation and logistical barriers, and opened acute slots when patients indicated the need to reschedule appointments.

In an academic setting, some of the costs associated with the IP model may be funded by grants and other agreements. Net expenditure within our practice was lower than \$113,897, as the existing faculty structure absorbed the higher staffing ratio; additional faculty and staff were not hired or diverted from other teaching activities, and pharmacy faculty were funded by an independent institution. Staff in our program did receive a promotion and higher salary upon joining the program, along with enhanced care coordination responsibilities. In scaling up a team-based model to the practice level, there may be a need to hire additional faculty to meet increased precepting and teaching demands, or faculty may commit time to this program and be unable to participate in other clinical, research, or teaching activities. Practice agreements such as the pharmacy collaboration between Northwell Health and St. John's University may afford access to expertise of key professionals who are externally funded.

There may be educational and clinical opportunities to offset the increased cost of an IP model. Tuition dollars from additional students trained could potentially be used to offset increased faculty expenditures. Improved screening rates obtained through an IP model is another potential offset to program costs. For example, colorectal and depression screening rates were higher in our IP practice, each of which has been shown to be potentially cost saving.^{20,21}

Limitations to this evaluation include a single program at one institution. As this was a retrospective evaluation, findings are correlative rather than causative. Our cost analysis was limited to a single year of study observation and did not include appointment type, which may impact no-show rate. A Hawthorne effect cannot be ruled out. Start-up costs, including faculty time to plan and administer the program, conduct faculty development, and recruit trainees were not included in this analysis; neither were total collections or charges calculated. Department of Labor estimates and internal benefit load data was used to avoid accessing individual salary data. The specific values generated in this analysis may be different from other institutions. Other confounding variables may contribute to differential no-show rates, including more motivated

trainees opting into the program and more experienced and highly paid patient access coordination in the IP clinic.

Future work calculating total collections and fill rate in an IP model would demonstrate efficiency opportunities more fully. Value-based care models that pay for performance may represent one potential funding stream for efficient care. Quality measures, health care training, and the patient experience represent important outcomes not studied in this analysis.

Conclusions

Training an IP cohort required additional faculty time and mentorship, which added costs totaling \$11,390 per resident per year but created additional educational opportunities. Understanding the faculty and staff costs and potential cost-saving opportunities associated with transformation to an IP model may assist in sustainability and dissemination of an IP approach.

References

1. Zwarenstein M. Interprofessional collaboration: effects of practice-based interventions on professional practice and healthcare outcomes. *Cochrane Database Syst Rev*. 2009;(3):CD000072. doi:10.1002/14651858.CD000072.pub3.
2. Mulvale G. 'Gearing up' to improve interprofessional collaboration in primary care: a systematic review and conceptual framework. *BMC Fam Pract*. 2016;17:83. doi:10.1186/s12875-016-0492-1.
3. Reeves S, Perrier L, Goldman J, Freeth D, Zwarenstein M. Interprofessional education: effects on professional practice and healthcare outcomes. *Cochrane Database Syst Rev*. 2013;2013(3):CD002213. doi:10.1002/14651858.CD002213.pub3.
4. Bodenheimer T, Ghorob A, Willard-Grace R, Grumbach K. The 10 building blocks of high-performing primary care. *Ann Fam Med*. 2014;12(2):166–171. doi:10.1370/afm.1616.
5. Gupta R, Dube K, Bodenheimer T. The road to excellence for primary care teaching clinics. *Acad Med*. 2016;91(4): 458–461. doi:10.1097/ACM.0000000000001100.
6. Foo J, Cook DA, Walsh K, Golub R, Abdalla ME, Ilic D, et al. Cost evaluations in health professions education: a systematic review of methods and reporting quality. *Med Educ*. 2019;53(12):1196–1208. doi:10.1111/medu.13936.
7. Schreurs S, Cleutjens K, Oude Egbrink MGA. Increasing value in research: cost evaluations in health professions education. *Med Educ*. 2019;53(12):1167–1175. doi:10.1111/medu.14007.

8. Maloney S, Reeves S, Rivers G, Ilic D, Foo J, Walsh K. The Prato Statement on cost and value in professional and interprofessional education. *J Interprof Care*. 2017;31(1):1–4. doi:10.1080/13561820.2016.1257255.
9. Walsh K, Reeves S, Maloney S. Exploring issues of cost and value in professional and interprofessional education. *J Interprof Care*. 2014;28(6):493–494. doi:10.3109/13561820.2014.941212.
10. Tekian A, Harden RM, Cook DA, Steinert Y, Hunt D, Norcini J. Managing the tension: From innovation to application in health professions education. *Med Teach*. 2020;42(3):333–339. doi:10.1080/0142159X.2019.1687871.
11. Block L, LaVine NA, Martinez J, Strawser J, Lu C, Fornari A, et al. A novel longitudinal interprofessional ambulatory training practice: the Improving Patient Access Care and cost through Training (IMPACcT) Clinic [published online ahead of print May 7, 2020]. *J Interprof Care*. doi:10.1080/13561820.2020.175159.
12. Accreditation Council for Graduate Medical Education. ACGME Common Program Requirements (Residency) effective July 1, 2019. <https://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRResidency2019.pdf>. Accessed December 10, 2020.
13. New York Department of Labor. Occupational wages. <https://labor.ny.gov/stats/lswage2.asp>. Accessed December 10, 2020.
14. Association of American Medical Colleges. AAMC Faculty Salary Report. www.aamc.org/data-reports/workforce/report/aamc-faculty-salary-report. Accessed December 10, 2020.
15. U.S. Department of Labor. Salary Finder by Occupation. <https://www.careeronestop.org/toolkit/wages/find-salary.aspx?keyword=Pharmacists&soccode=291051&location=NEW%20YORK>. Accessed December 10, 2020.
16. Wynn B. Opening the “black box” of GME costs and benefits: a conceptual model and a call for systematic studies. *J Grad Med Educ*. 2015;7(1):125–127. doi:10.4300/JGME-D-14-00751.1.
17. Schwartz MD. Health care reform and the primary care workforce bottleneck. *J Gen Intern Med*. 2012;27(4):469–472. doi:10.1007/s11606-011-1921-4.
18. Committee on the Governance and Financing of Graduate Medical Education; Board on Health Care Services; Institute of Medicine; Eden J, Berwick D, Wilensky G, eds. Background on the Pipeline to the Physician Workforce. In: *Graduate Medical Education That Meets the Nation’s Health Needs*. Washington, DC: National Academies Press; 2014.
19. LaVine N, Verbsky J, Coletti DJ, Block L. Enhanced scheduling support to improve continuity of care in a resident training clinic. *J Grad Med Educ*. 2020;12(2):208–211. doi:10.4300/JGME-D-19-00605.1.
20. Jiao B, Rosen Z, Bellanger M, Belkin G, Muennig P. The cost-effectiveness of PHQ screening and collaborative care for depression in New York City. *PLoS One*. 2017;12(8):e0184210. doi:10.1371/journal.pone.0184210.
21. Ran T, Cheng CY, Misselweitz B, Brenner H, Ubels J, Schlander M. Cost-effectiveness of colorectal cancer screening strategies—a systematic review. *Clin Gastroenterol Hepatol*. 2019;17(10):1969–1981.e15. doi:10.1016/j.cgh.2019.01.014.



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