



Designing an Interprofessional, Student-Led Clinic with the Patient-Centered Medical Home (PCMH) Model

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Abstract

Students and faculty at the University of Texas Medical Branch (UTMB) embarked on the novel undertaking of establishing a comprehensive, interprofessional clinic treating underserved, uninsured residents of Galveston County, Texas, and the surrounding area, modeled after the patient-centered medical home (PCMH). The need for such a community clinic is evident in relevant literature and patients' suggestions, in addition to local demographic data. The comprehensive nature of this approach to clinic design is apparent in the intricate planning and documents produced by the steering committee, which outline a unique operational structure that optimizes clinic flow. This paper describes the planning, implementation, and future directions of an interprofessional, student-led free clinic operating under the PCMH model that offers a framework for other clinics.

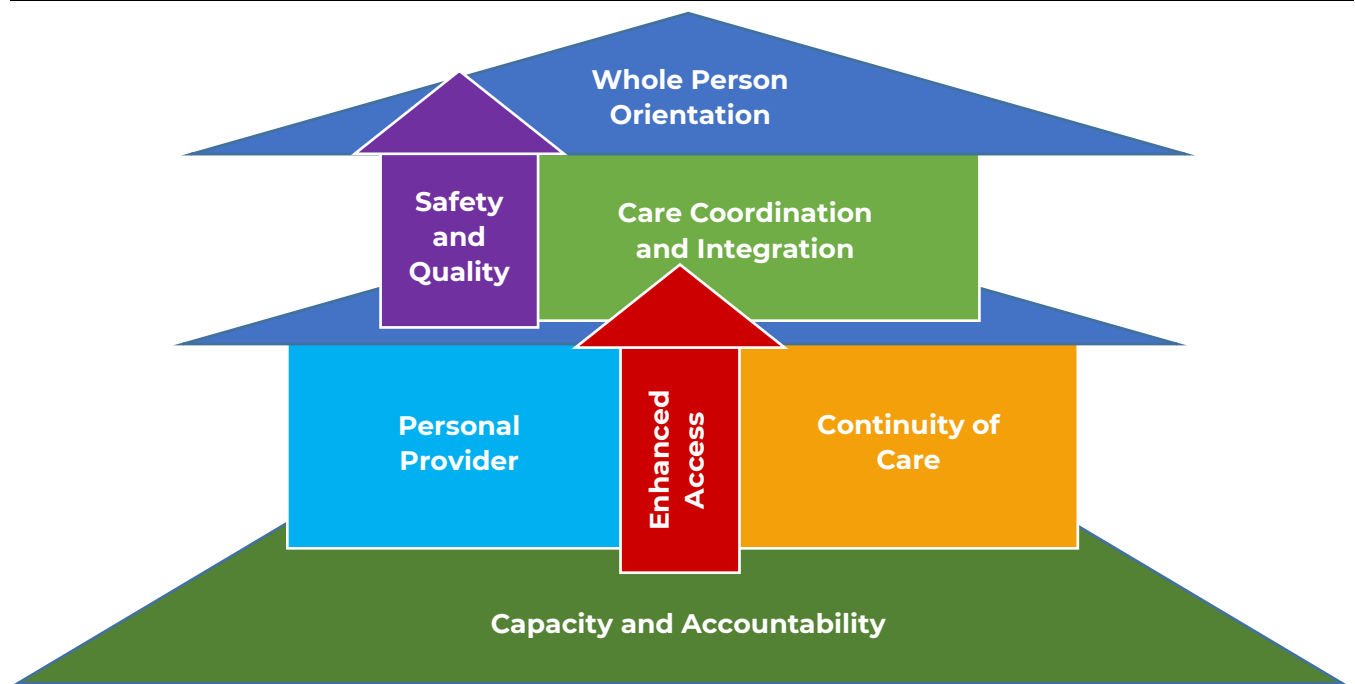
Introduction and Background

With the patient-centered medical home (PCMH) model in mind, the Interprofessional (IP) Clinic was conceived by students at the University of Texas Medical Branch (UTMB) in Galveston, Texas, made possible by grants through the UTMB Health System, the Sealy & Smith Foundation, and local benefactors. UTMB has partnered with St. Vincent's House to provide free or low-cost medical care to the Galveston community since 1984, operating under the title of St. Vincent's Student-Run Clinic and offering services such as general medicine, optometry, dentistry, psychiatry, physical and occupational therapy, and counseling.¹ The IP Clinic resides within the same facility as the parent clinic but is operationally separate: uniting and harnessing common resources under the guidance of the PCMH model. The IP Clinic encompasses a plethora of specialties, with the unique capacity to oversee smaller, focalized teams, such as the Congestive Heart Failure Comprehensive Care Clinic (CHFC3). Clinic personnel aim to provide a "wrap-around" treatment approach, in which patients

receive coordinated care in one visit to maximize their time and strengthen continuity of care. The IP Clinic primarily serves patients who are underserved, marginalized, and of low socioeconomic status (SES); 11.3% of Galveston County residents live below the poverty line and 17.4% of residents under 65 lack insurance coverage.² In addition, Texas' lack of Medicaid expansion under the Affordable Care Act to individuals under 138% of the federal poverty level affects 13,000 Galveston County residents who would otherwise be insured.³ These demographic factors influence the mission and demand for the IP Clinic. As the patient population reflects the diversity of Galveston County, clinic training and operations are geared toward providing the highest quality of care for patients of all backgrounds. Services are provided both on-site and remotely via telehealth to accommodate patient needs. The IP Clinic aims to address the social and environmental factors that affect health, functioning, and quality of life, as well as the medical needs of patients.²

During the planning process, significant efforts were taken to assess current patients' understanding of St. Vincent's resources and their

Figure 1. PCMH model core values⁴



The core principles of the PCMH model, creating a home for the highest quality of care and “wrap-around” services. Adapted from: Richmond Memorial Health Foundation, 2014.

PCMH: Patient-Centered Medical Home

desire for novel services by dispersing carefully drafted surveys (see Appendix A). Survey results revealed limited knowledge of pre-existing programs, such as outpatient clinics and social services. However, services such as the food pantry, emergency financial aid, and legal assistance were better known. In addition, patients indicated an interest in classes addressing substance cessation, lifestyle changes, and mental health. Patient responses helped inform the scope of the new IP Clinic and facilitate provider-patient discussions of on-site resources.

The Patient-Centered Medical Home

The PCMH model has been evolving over the last decade and is revolutionizing primary care. Through pivotal work accomplished by leading entities, including the American Academy of Family Physicians and the American College of Physicians, traditional medical models have been adapted to meet changing population needs and improve primary care.⁵ These adaptations are presented in the PCMH model, with foundational “Joint Principles” established in 2007, including physician directed medical practice, whole

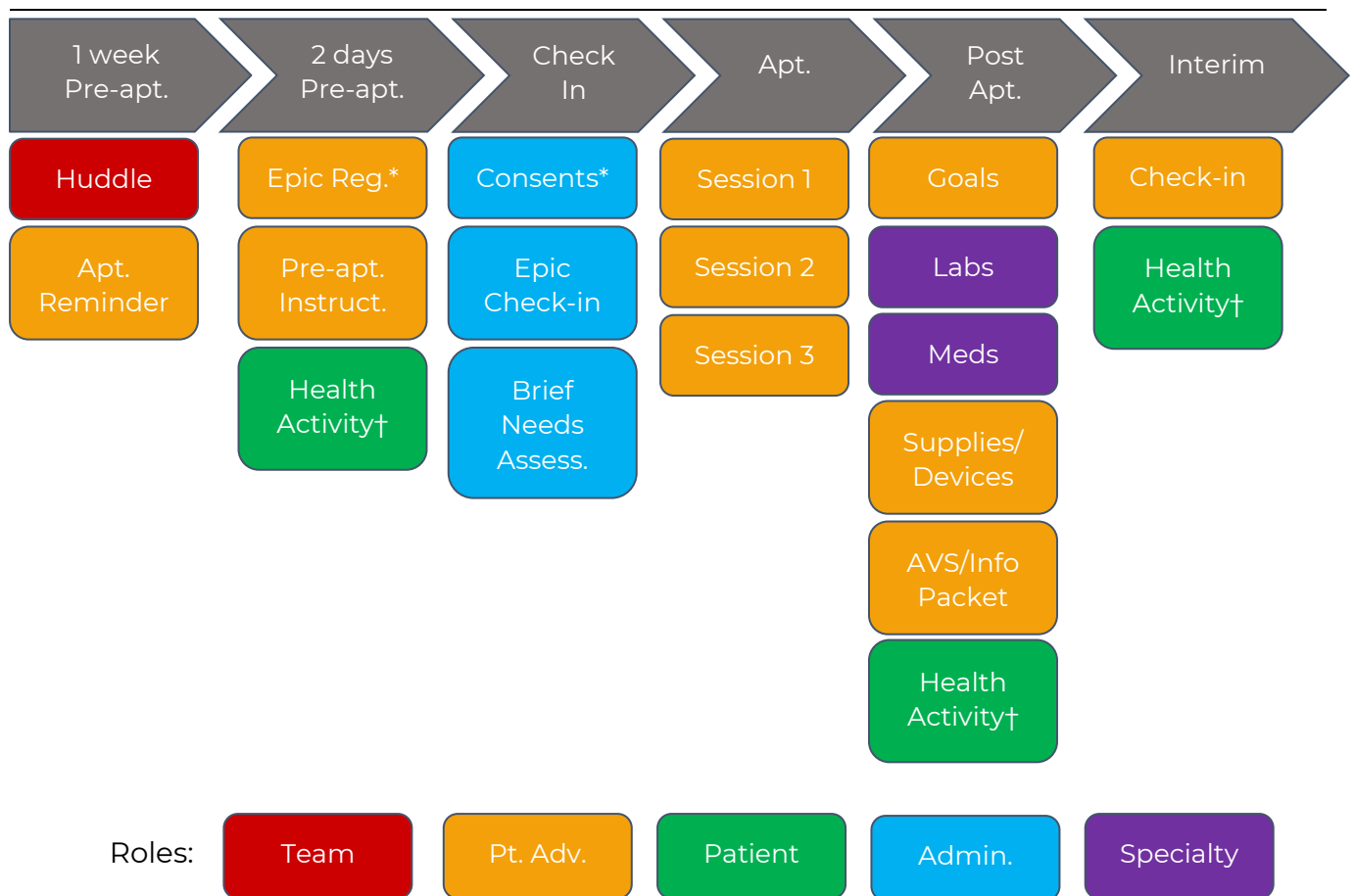
person orientation, and integrated care.⁶ The PCMH model builds upon the conventional medical model and transforms primary care delivery.⁷ The model’s founding principles lead to exceptional attributes: comprehensive, patient-centered, and coordinated care, accessible services, quality, and safety. These 4 core principles are visualized in Figure 1.⁴ These attributes support interprofessional teams of healthcare providers, including physicians, nurses, social workers, therapists, educators, and care coordinators. The benefits of the PCMH model are evident throughout the healthcare field among physicians, patients, and payers by improving quality, reducing inpatient bed demand, and lowering healthcare costs.⁸⁻¹³

Initial studies present promising results regarding the value of the PCMH, reporting improved outcomes, reduced health disparities, and decreased cost of care for vulnerable populations.⁸⁻¹³ Researchers analyzed 33 articles reporting findings on PCMHs in low-income areas.¹² Notable results of the study include reduced emergency room utilization, better clinical outcomes, and improved treatment adherence.¹²

The authors also identified two significant gaps in the literature often overlooked in comparative studies of PCMHs in low-income areas: (1) difficulty in acquiring resources to meet demands of low-income populations, and (2) the multiple, complex needs of low-income populations that may require the support of other “homes,” such as “insurance homes” or “social homes” in addition to the “medical home” of PCMH.¹² Another study found that in a sample of 2,432 primary care practices in Michigan, quality of care and cost improved with the degree to which the PCMH model was implemented.¹¹ The PCMH model has also been found to increase care team

communication, improve timeliness and standardization, thereby increasing patient safety and access to care.⁹ Furthermore, as the PCMH model is adopted on a larger domestic scale, in accordance with supportive research and outcomes, the model continues to boast increases in quality of care regarding chronic and prevalent conditions such as diabetes.¹⁰ Clinics across the country with PCMH recognition and funding are demonstrating improved primary care outcomes, specifically regarding pharmacologic therapy, preventative screenings, and tobacco cessation interventions.⁸ One commonality among these studies is the limitation of resources and demand placed on

Figure 2. IP clinic appointment timeline



A student-run steering committee representing several schools at UTMB developed a chronological schematic for the patient and provider experience surrounding one clinic visit. The timeline begins with preemptive work to optimize the scheduled visit and ends with important steps to provide comprehensive care. Each column represents activities allocated to a specific timeframe, covering integral periods of time for both the patient and providers in order to provide an aerial view of each appointment cycle.

*first appointment only; †optional

IP: interprofessional; Apt.: appointment; reg.: registration; Instruct.: instructions; AVS: after-visit summary; assess.: assessment; Pt. Adv.: patient advocate; admin.: administration; UTMB: University of Texas Medical Branch

providers, which impacted the sustainability of PCMH models.⁸⁻¹³ Overall, evidence suggests that PCMH models can improve health outcomes among low-income populations, improve provider satisfaction, and decrease costs.

Designing a free or low-cost interprofessional clinic modeled after the PCMH may provide higher-quality care to underserved populations.¹¹ With evidence already supporting PCMH models to improve clinical outcomes, implementation in underserved communities may begin to bridge care gaps in health systems and increase health equity.¹³

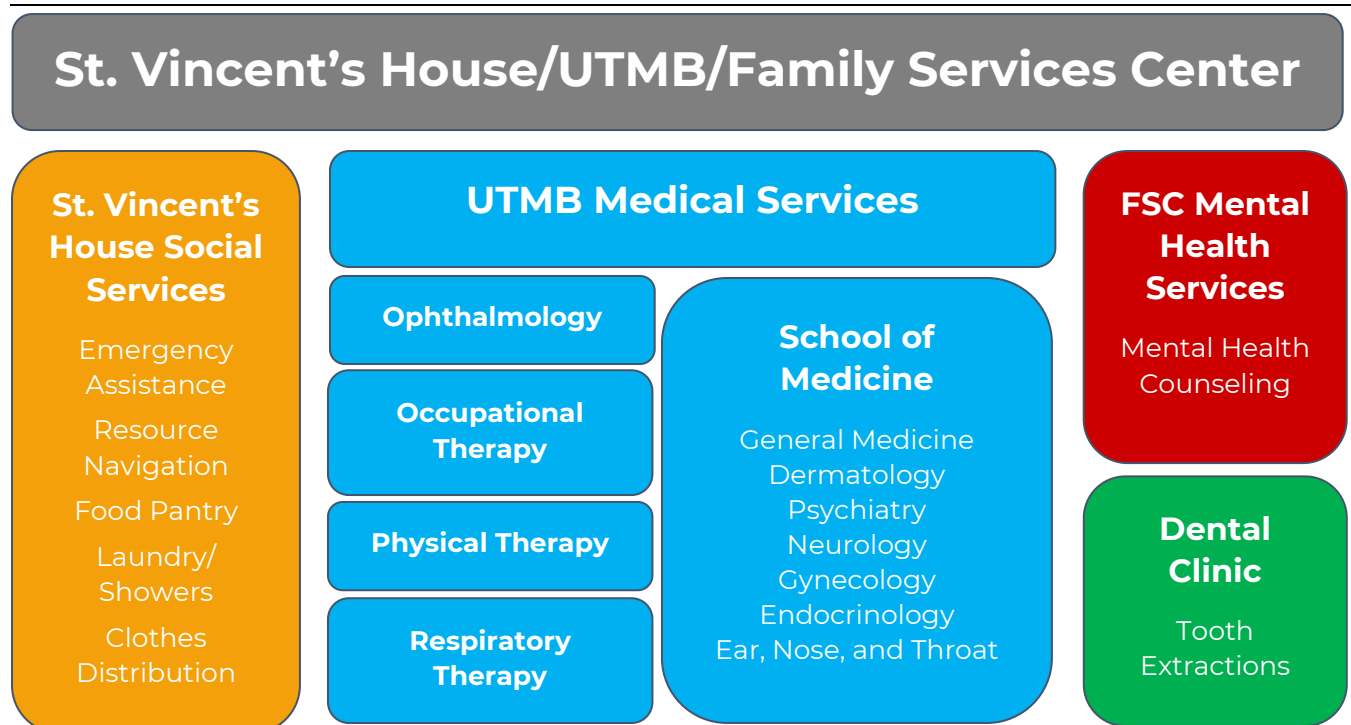
Methods

A steering committee was formed by students across medical, physician assistant, nursing, public health, occupational therapy, physical therapy, respiratory therapy, clinical laboratory science, and nutritional science programs. This committee was further divided into pre-appointment, appointment, post-appointment, and interim

subcommittees focused on troubleshooting problems at each point in the appointment chronology, with the products of their efforts summarized in Figure 2. The pre-appointment subcommittee established guidelines on communication with patients before their appointment using the electronic medical record (EMR). The appointment subcommittee developed a protocol consisting of patient pre-registration two days prior to their appointment, a “team huddle” among staff before the appointment, and check-in procedures during the appointment. The post-appointment subcommittee determined wrap-up procedures for each visit, including laboratory testing, medication orders and referrals, and patient goal-setting. The interim subcommittee determined protocols that gauged patient progress between appointments to minimize no-show rates and poor patient satisfaction at future appointments.

The steering committee envisioned certain positions and roles to achieve operational efficiency.

Figure 3. St. Vincent’s House services



Due to UTMB's devotion to interprofessional practice, the IP Clinic boasted representation from multiple departments across the Galveston campus including the Schools of Medicine and Health Professions and Ophthalmology. The university's clinical efforts were coupled with auxiliary services provided by St. Vincent's House.

UTMB: University of Texas Medical Branch; FSC: Family Service Center; IP: Interprofessional

Upon submission to the Institutional Review Board (IRB) at the University of Texas Medical Branch, a research regulatory specialist with jurisdiction at the university deemed the paper a "Project Summary," confirming that the project does not meet the requirements of "human subject research" and does not require IRB approval or oversight.

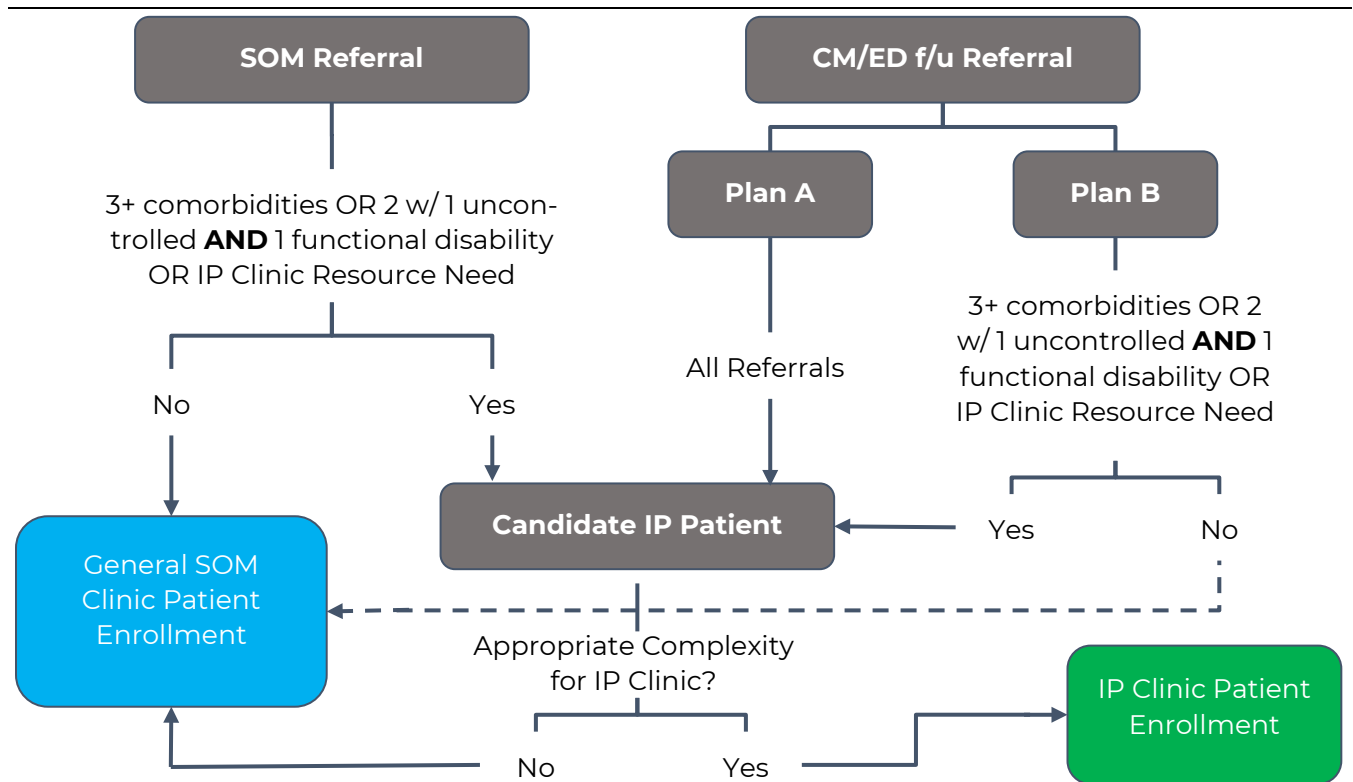
Results

Opening the Clinic

With the groundwork laid by the steering committee, a series of clinic rehearsals were scheduled to assess clinic flow and identify unaddressed logistical gaps. Over several weeks, three practice clinics were scheduled with five to eight students acting as patients, who attended three 15-minute sessions as projected. Once the clinic began normal operations, these sessions

would be scheduled according to each patient's specific needs and the providers to which they were referred. As the rehearsals concluded, a debriefing session was held to discuss positive aspects of the process and provide critical feedback. This feedback included identification of patient flow bottlenecks, inhibitory gaps in communication, and difficulties with integrating distinct provider roles. The debriefing offered rich insight into the complexities of the multifaceted clinic after experiencing a trial firsthand, opening the floor for problem-solving and adaptation of the clinic before accepting patients. With the support of UTMB and St. Vincent's House, the IP Clinic was able to open its doors in early 2021, offering a wide variety of services to patients at one visit. At its inception, these services included general medicine, respiratory therapy, occupational therapy, mental health counseling, social services and case management, nutritional, cooking, and

Figure 4. Patient referral and selection



The IP Clinic had several referral sources at its inception in order to establish a patient base and provide enough cases to stagger over the appropriate duration. The two main referral sources were School of Medicine referrals and those from CM/ED at local UTMB hospitals.

SOM: School of medicine; CM/ED: Case Management/Emergency Department; f/u: follow-up; IP: interprofessional; UTMB: University of Texas Medical Branch

immigration law classes, laboratory tests, medication management, ophthalmology screening, dental screening, and congestive heart failure monitoring, as seen in Figure 3. Appendix B provides a better understanding of the personnel needed to power these interprofessional teams.

The IP Clinic received referrals from the pre-existing student-run clinics encompassed by St. Vincent's Clinic (e.g., general medicine and occupational therapy), community partners, and the UTMB Emergency Department. Appropriate referrals were defined as patients having three or more comorbidities, two comorbidities with one being uncontrolled and a functional disability, or a patient needing to use a specific resource offered by the IP Clinic. The IP team selected services carefully according to the patients' referrals and primary needs. These services were scheduled as consecutive sessions, lasting fifteen to thirty minutes, as seen in Figure 4.

The coexistence of many specialties in-house or in close connection through referrals is ideal for patients with diverse medical, psychological, and socioeconomic challenges. Imagine, for illustration, that a patient enters the clinic with uncontrolled diabetes and congestive heart failure. Traditionally, this patient would be seen by a primary physician and referred to specialists (e.g., endocrinology and cardiology) for care beyond the evaluating physician's expertise. This paradigm would require scheduling multiple appointments, often in different locations. With the IP Clinic, this patient would be initially evaluated by general medicine physicians and students. As indicated, appropriate labs may be drawn in-house, an ophthalmology screening may be scheduled for diabetic retinopathy, and diuretics and beta-blockers may be ordered at the in-house pharmacy or a local pharmacy at a reduced cost. After identifying the critical nature of the uncontrolled heart failure, the physician may refer the patient to the specialized CHFC3 for enrollment in a program with biweekly monitoring and medication management. If the evaluating physician identifies challenges such as difficulty engaging in daily activities and depressive symptoms, they may refer the patient to occupational therapy and counseling, respectively, with the outstanding advantage of these specialties being available in the same building and potentially

during the same appointment.

Ongoing Efforts

The IP Clinic continues to survey patient needs to inform their plan of care and connect them to appropriate resources. One such example is the CHFC3. Candidates are referred and initially evaluated by student volunteers with faculty supervision. Those who meet program criteria are seen twice weekly for medical care, occupational therapy, respiratory therapy, nutritional counseling, and vitals monitoring. Team members meet weekly to round on patients and review the appointment schedule. IP Clinic patients also have access to ophthalmologic and dental screening services, including tooth extraction performed by an on-site dentist. Case managers and social workers assist patients with financial concerns and access to community resources, such as applying for local, state, and federal programs. Patients who lack reliable transportation may receive paid rides to and from their appointment free of charge. While receiving care at the IP Clinic, patients are provided a pamphlet and information regarding the resources available through St. Vincent's Clinic in order to provide comprehensive care and address social determinants of health (see Appendix C).

In March of 2021, St. Vincent's Clinic transitioned to a new EMR software. This transition facilitated social determinants of health screening that was consistent and trackable. Patient appointments could be staggered such that the attending physician sees a new patient every fifteen minutes while student providers and residents see other patients simultaneously. The previous EMR could not schedule appointments in such short increments and was unable to incorporate different specialties into an inclusive schedule. Furthermore, the new EMR allows providers across St. Vincent's and UTMB to communicate more effectively, smoothly update and access medical records, and provide uninterrupted care to the patient, even between facilities.

Discussion

We sought to provide the PCMH model of care to the Galveston community by creating the first-

Table 1. Roles and responsibilities

Role	Responsibilities
Student Provider	<ul style="list-style-type: none"> • Perform H&P • Document encounter in EMR system
Provider Patient Assistant & Liaison (pPAL)	<ul style="list-style-type: none"> • Prepare exam room space for attending provider • Submit orders for medications and lab work in EMR • Navigate resources for care team during encounter
Patient Advocate & Liaison (PAL)	<ul style="list-style-type: none"> • Partner with individual patients to navigate sessions • Conduct new patient evaluations and SMART goals
Attending Provider	<ul style="list-style-type: none"> • Responsible for medical decision-making • Responsible for signing prescription and laboratory orders in EMR
Front Desk	<ul style="list-style-type: none"> • Greet patients as they arrive • Check in patients for their appointments • Obtain signatures on appropriate consent forms • Arrange transportation to and from the clinic • Schedule follow-up appointments • Upload necessary documentation to patient's medical record
Pharmacy Manager	<ul style="list-style-type: none"> • Dispense and refill prescribed medications from the in-house pharmacy
Laboratory Manager	<ul style="list-style-type: none"> • Obtain blood samples ordered for point-of-care and send-out lab tests • Conduct ordered point-of-care lab tests in-house

Clinic position responsibilities were clearly defined to provide efficiency and streamline patient encounters. Appropriate training was provided for each position, with associated quizzes and demonstration of material mastery before volunteering at the clinic.

H&P: history and physical; EMR: electronic medical record; SMART: specific, measurable, attainable, relevant, time-bound

ever IP Clinic affiliated with St. Vincent's, steered initially by student committees. Initial barriers to implementation included insufficient staffing and allocation of expertise, with action steps including a transition to new EMR software and more extensive recruitment of students from UTMB, which alleviated resource strain and improved the clinic's efficiency. One challenge experienced during clinic implementation included unprepared volunteers, which was addressed by increasing the rigor of training materials. Compromised continuity of care due to handoff procedures and transiency of volunteers was another challenge that arose, which was addressed by adapting techniques during the huddle and pairing patient advocate liaisons (PALs) to patients throughout their care at the clinic (see Table 1 for a description of this role). However, several specialties and resources have yet to be entirely incorporated into the clinic. These include speech therapy, community gardening classes, nutrition classes, fall prevention classes, and immigration law classes and consultations. Additional points of improvement for the clinic include communication between professionals, assessing volunteer needs and establishing

consistent personnel, revising door signage, adjusting the physical space to optimize clinic flow, and facilitating collaboration between the IP Clinic and CHFC3 to provide coordinated care. Future aims of the IP Clinic are to sustain the array of services currently being offered and develop new services that fulfill unaddressed needs without sacrificing the quality of patient care or staff coordination. With increased development and data collection on PCMHs in the future, we hope that more patients can be seen with higher quality care and lower costs, ultimately providing long-term improvements to patient wellbeing.

Conclusion

In the past decade, advances in the PCMH model have shown promising improvements in quality of care, cost of service, and patient and provider satisfaction. This article seeks to inform the implementation of this evidence-based model at other clinics in the pursuit of comprehensive care delivery. This record highlights the complexities and primary considerations to be addressed throughout the planning process, including the organization of planning teams, the

establishment of effective interprofessional collaboration, and the optimization of clinic flow. Significant time and effort should be expended to create a thorough plan regarding the incorporation and interaction of each discipline, with an emphasis on interprofessional representation during preliminary phases for diverse insight and successful implementation.

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Disclosures

The authors have no conflicts of interest to disclose.

References

1. St. Vincent's House. Home [Internet]. Galveston (TX): St. Vincent's House; 2021 [accessed 2022 July 27]. Available from: <https://www.stvhope.org/> [LINK](#)
2. United States Census Bureau. QuickFacts: Galveston County, Texas [Internet]. Washington (DC): United States Census Bureau; 2021 [accessed 2021 Dec 15]. Available from: www.census.gov/quickfacts/galvestoncountytexas [LINK](#)
3. Buettgens M, Blumberg L, Pan C. Characteristics of the Uninsured in Texas, 2018: Spotlight: Galveston County [Internet]. Washington (DC): Urban Institute; 2018 Dec [accessed 2021 Dec 5]. Available from: urban.org/sites/default/files/2018/12/10/galveston_county_characteristics_of_the_uninsured_in_texas_factsheet.pdf [LINK](#)
4. Richmond Memorial Health Foundation [RMHF]. Patient Centered Medical Home Collaborative Model of Care [Internet]. Richmond (VA): RMHF; 2014 [cited 2022 July 27]. Available from: <https://pcmh.wpengine.com/community-dashboard-draft/pcmh-development/> [LINK](#)
5. Arend J, Tsang-Quinn J, Levine C, Thomas D. The patient-centered medical home: history, components, and review of the evidence. *Mt Sinai J Med.* 2012 Jul-Aug;79(4):433–50. [LINK](#)
6. American Academy of Family Physicians, American Academy of Pediatrics, American College of Physicians, and American Osteopathic Association. Joint Principles of the Patient-Centered Medical Home [Internet]. 2007 Mar [accessed 2022 July 20]. Available from: http://www.aafp.org/dam/AAFP/documents/practice_management/pcmh/initiatives/PCMHJoint.pdf [LINK](#)
7. Agency for Healthcare Research and Quality [AHRQ]. Defining the PCMH [Internet]. Rockville (MD): AHRQ; 2021 Sep [accessed 2021 Nov 20; updated 2022 Aug]. Available from: <https://pcmh.ahrq.gov/page/defining-pcmh>. [LINK](#)
8. Shi L, Lee DC, Chung M, et al. Patient-centered medical home recognition and clinical performance in U.S. community health centers. *Health Serv Res.* 2017 Jun;52(3):984–1004. [LINK](#)
9. Khanna N, Shaya FT, Gaitonde P, et al. Evaluation of PCMH model adoption on teamwork and impact on patient access and safety. *J Prim Care Community Health.* 2017 Apr;8(2):77–82. [LINK](#)
10. Carlin CS, Peterson K, Solberg LI. The impact of patient-centered medical home certification on quality of care for patients with diabetes. *Health Serv Res.* 2021 Jun;56(3):352–62. [LINK](#)
11. Paustian ML, Alexander JA, El Reda DK, et al. Partial and incremental PCMH practice transformation: implications for quality and costs. *Health Serv Res.* 2014 Feb;49(1):52–74. [LINK](#)
12. van den Berk-Clark C, Doucette E, Rottnek F, et al. Do patient-centered medical homes improve health behaviors, outcomes, and experiences of low-income patients? a systematic review and meta-analysis. *Health Serv Res.* 2018 Jun;53(3):1777–98. [LINK](#)
13. Anderson DR, Olayiwola, JN. Community health centers and the patient-centered medical home: challenges and opportunities to reduce health care disparities in America. *J Health Care Poor Underserved.* 2012 Aug;23(3):949–57. doi: 10.1353/hpu.2012.0099 [LINK](#)