UNIVERSITY OF CALIFORNIA SAN DIEGO

Adaptation, Implementation, and Evaluation of Exercise is Medicine into a Student-Run Free Clinic

A thesis submitted in partial satisfaction of the requirements
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of

Public Health

by

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The thesis of Susan Mariscal Glockner is approved, and it is acceptable in quality and form for publication on microfilm and electronically.

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DEDICATION

This is dedicated to my wonderful family and friends who assisted my jump into the 21st century and served as my counselors and personal IT team: Kris Coats, children Katie and Will Glockner, and my husband Bill and of course my running buddy Bella.

"A life is not important except in the impact it has on other lives"

-Jackie Robinson

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ABSTRACT OF THE THESIS

Adaptation, Implementation, and Evaluation of Exercise is Medicine
into a Student-Run Free Clinic

by

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Master of Public Health

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Introduction: Exercise Is Medicine (EIM) addresses barriers to primary care-based physical activity (PA) promotion by leveraging technology-assisted decision support built into the electronic medical record to help providers integrate PA assessment, discussions, and prescription into routine care. This implementation science study describes the multi-stakeholder process used to adapt EIM for the UC San Diego Student-Run Free Clinic Project (SRFCP), led by medical students to serve an uninsured, primarily Spanish-speaking Latinx population), and evaluate it with the RE-AIM framework.

Methods/Intervention: Adaptations to the EIM workflow to align with the SRFCP were made using a multi-stakeholder engaged process and tracked with the Framework for Reporting of Adaptations and Modifications Extended (FRAME-IS). The program was evaluated with the RE-AIM framework.

Results: Process and content adaptations facilitated the integration of tailored components into existing workflows and alignment with patients' dominant Spanish language. Reach and adoption were high, with 62.4% and 89% of patient visits having EMR-documented physical activity vital sign (PAVS: minutes/week) and PA discussions, and 57% agreeing to health coaching. Among all who had more than one PAVS recorded, the mean significantly increased by 18 minutes/week during the third month of the intervention. Patients (86%) interviewed recalled exercise discussions. Medical student questionnaires indicated improvements in confidence of exercise discussions, and decreasing perceived barriers, while implementation team surveys indicated promising acceptability, appropriateness, and feasibility.

Conclusion: Adapting and implementing EIM in an under-resourced community-based clinic demonstrated promising effectiveness and sustainability. Medical students felt confident about overcoming barriers to discussing exercise, while patients found EIM helpful.

INTRODUCTION

Physical Activity in Underserved Populations

Regular physical activity (PA) improves health outcomes ranging from cardiovascular diseases and risks like hypertension (HTN), diabetes mellitus (DM), dyslipidemia, and obesity to cancer, cognitive decline, and mental health.[1-3] Recently researchers have suggested that PA might even provide some resilience to morbidities of COVID -19. [4, 5] Current international guidelines promoted by the American College of Sports Medicine (ACSM) recommend 150 minutes a week of moderate to vigorous physical activity (PA) combined with twice a week strength training. [6] However, only 23% of Americans [7] and 31% of the global population [8] regularly meet exercise guidelines. Multiple studies have reported higher annual costs per capita ranging from $865 to $1400 associated with inadequate physical activity.[9-11] PA can decrease rates of DM, HTN, obesity, depression, and anxiety to achieve better health and reduce costs due to referrals and/or hospitalizations for cardiovascular disease and mental health concerns. [9] Lack of physical activity has been the fourth leading cause of death worldwide, and thus has been labelled as a public health pandemic.[12]

Physical inactivity is pervasive throughout all socioeconomic groups and cultures, but many under-resourced and vulnerable populations report disproportionately higher rates of inactivity. [13] In the United States, populations such as the urban poor, African Americans, and Latinx have less access to safe, convenient locations for exercise as well as access to preventative health care resources. [14-18] Given the disproportionate burdens of diabetes and obesity in the Latinx population, this gap could be reduced by increasing physical activity. [1] Frequently competing priorities such as holding multiple jobs as essential workers, childcare,

elder care, and challenges with transportation might prevent adequate time for leisure exercise.[18, 19] Members of the Latinx community, especially those who are recent immigrants, also encounter language and cultural barriers.[18, 20, 21] Additionally, social determinants of health, which foster lower levels of education and income, make Latinx an at-risk population for less physical activity and more mental stress. [13, 18] Furthermore, members of marginalized populations often live and work in areas with higher levels of environmental hazards, stress, and trauma and have multiple physical and mental co-morbidities, emphasizing the need for PA to reduce these health disparities. [22-24]

On a smaller scale, controlled environment evidence-based interventions (EBIs) for PA have been developed for well-resourced White populations originally, in the past two decades, studies have also shown the benefit of PA short term exercise programs as EBIs for the Latinx population.[24-31] However, to improve health equity and reduce disease burden in members of Latinx communities, interventions with broader reach are needed. [32]

Implementation Science to Reduce Health Disparities: Reach and Adaptations

Implementation science has been focusing on supporting the successful adaptation of EBIs to support their reach of new populations. [32-35] The Practical, Robust, Implementation and Sustainability Model (PRISM),[36] which incorporates the established Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework, is an implementation science model that can guide the implementation of EBIs into real world settings. [37, 38] Peer reviewed frameworks exist to standardize documentation of the adaptations needed to successfully implement EBIs in different contexts. [39-41] Expert Recommendation for Implementing Changes (ERIC) was used to envision which type of the 73 adaptations described

for EBI's would assist this implementation most effectively. [42] The Framework for Reporting of Adaptations and Modifications Extended (FRAME) provides a systematic approach to categorizing adaptations to answer questions: what, when and how modifications occurred, if they were planned or not at what level of delivery, who led the adaptation for what context, and if fidelity was maintained, and their contextual factors.[39] Recently, these concepts were simplified for improving researchers' ease of use in analyzing implementation strategies (IS) with the FRAME-IS.[40] Systematically documenting adaptations to new contexts can support successful implementation of EBIs in diverse populations through improved alignment. [38, 41]

The need to adapt PA EBIs to reach under-resourced communities has been well-documented. [43, 44] For example, in one study of Latinas, a population with lower levels of PA and higher levels of diabetes and obesity, broader reach was achieved by developing an interactive website to improve PA significantly and cost effectively. [45] However, not all members of the Latinx community who would benefit from a PA intervention have access to online resources and offering programs through multiple different delivery channels may help to maximize reach. Given that many members of the Latinx community utilize community clinics for health care, [46] community-based clinics supported by academic medical centers and serving underserved Latinx patients would be ideal testing grounds for adapting and implementing PA EBIs.[47]

Primary Care Providers Can Improve PA Health Equity

As the bedrock of healthcare systems, primary care providers (PCPs) are the first (and sometimes only) point of contact for acute and chronic care, health promotion, and preventative care.[48, 49] These frontline workers, who frequently practice in community-based clinics, are

therefore well-positioned to provide education and resources that promote lifestyle changes such as PA during both routine wellness and chronic disease management visits with their patients from diverse backgrounds.[50-53] Using a tailored exercise prescription as a prevention tool or initial treatment, PCPs could help reduce medication burden for cardiovascular disease, HTN, hypercholesterolemia, DM, and obesity. [9] Research supporting this approach demonstrates that exercise counseling in primary care is more cost-effective (up to $18,000 per QALY gained) than some medications. [54]

However, PCPs face many barriers to this approach, including lack of time, knowledge, and reimbursement for this type of care. [55] Only a third of patients recall having spoken to their PCP about exercise.[56] Although its direct relevance to health is clear, as a lack of PA has been linked to over 25 chronic diseases,[57, 58] physicians and other providers have not consistently provided quality exercise counseling due to numerous gaps in knowledge, time, and health system barriers.[46, 59-61] EBIs have shown that these barriers can be overcome with PCP education and providing time for these PA conversations when funded by grants, yet lasting sustainability has been difficult; maintaining PCP motivation despite time and financial pressures of the clinic environment is key. [62] Time to document such conversations and financial support and services fade as grants and policies expire, thus limiting sustainability.[59]

Exercise Is Medicine (EIM)

Exercise is Medicine began as an initiative of the American College of Sports Medicine (ACSM) in 2007 to encourage implementation of strategies to promote PA in primary care.[63] Its roots date back to 2004 [64] when discussion began of taking PA vital signs after the United States Health Preventative Task Force in 2002 stated that there was insufficient evidence to recommend

PA counseling in primary care.[60] EIM developed its Global Center in 2009 to establish National Task Forces to create regional networks of evidence-based resources for PA education like EIM's Rx for Health handouts. [63] Later, its "EIM solution" linked clinical integration of physical activity as a vital sign to documentation of conversations, focusing on electronic medical record systems with community programs and resources. Kaiser Permanente began using Exercise Vital Signs in 2009 and Intermountain Health care in 2013 labelled them PAVS (physical activity vital signs).[65] The Lancet in 2012 published a series on PA as a result of these global efforts.[8] After these health care sector adoptions and other research were analyzed in 2018, the United States revised and expanded its physical activity guidelines and began the "Move Your Way" public health campaign. [65]

Exercise Is Medicine at UC San Diego Health

Technology-based innovations can create workflow patterns that are efficient and require less time from the already busy PCP through more tailored automation and use of ancillary providers to provide meaningful PA recommendations for patients from diverse backgrounds.[45, 66] EIM has been implemented in UC San Diego Health primary care clinics building an automated processes into the electronic medical records (EMR) system and providing exercise manuals, handouts, and health coaching phone calls with preliminary results showing improved weekly minutes of exercise.[67] When patients check in at each clinic visit, physical activity vital signs (PAVS = number of days a week of exercise for number of minutes per day) are recorded in the EMR (electronic medical record). Then, the EMR is programed to automatically generate its five core components: 1) a calculated PAVS score, 2) a tailored exercise prescription for each patient in the after visit summary (AVS), 3) a link to an online version of a comprehensive

exercise manual, including local San Diego resources (or a physical manual), 4) an automated referral to an optional, free, telephone-based health coach to discuss exercise barriers and goals in greater depth, and 5) an automated banner prompt for the PCP to briefly discuss exercise with the patient and document this discussion with only two clicks using a programmed smart phrase (.EIM). This implementation science project combines quality improvement goals [21] with the PRISM framework [36] and rapid PDSA (plan, do, study, act) cycles[68] to systematically adapt and integrate EIM into the standard clinic workflow.[67]

Preliminary results suggest that EIM is feasible, acceptable, and effective in the clinics in which it has been implemented to date. A comprehensive evaluation, including RE-AIM outcomes and cost-effectiveness analyses, will be forthcoming in the next two years. EIM could expand provider directed exercise counseling to help thousands of Latinx members in the broader community, Federally Qualified Health Centers (FQHCs), and other small community clinics, but would need significant adaptations to address barriers related to linguistic, cultural, and structural barriers. As a result, the EIM team is currently expanding its reach to the Student-Run Free Clinic Project (SRFCP), which is operated by the UC San Diego's School of Medicine.

Student Run Free Clinic Project within the UC San Diego School of Medicine

The Student Run Free Clinic Project (SRFCP) is organized and administered by a combination of over 150 UC San Diego medical students, allied health student volunteers (e.g., pharmacy, dental, translation services, physical therapy, acupuncture, social work) , UC San Diego faculty members, administrative staff, and dozens of supervising volunteer clinical faculty. The SRFCP's mission is to serve an uninsured and largely undocumented population that would otherwise not have access to healthcare, predominately with Mexican origins.[69] In 1997,

UC San Diego medical students and Ellen Beck, MD partnered with the Department of Family Medicine and Public Health of the University of California in San Diego both to serve the wrap around healthcare needs of this predominately monolingual Spanish speaking Latinx population and to train compassionate students desiring to care for an underserved vulnerable population. Primary care is the focus with support from pharmacy and dentistry students, but also provides limited subspecialty consultation in over 20 different areas including mental health.[69] By operating one half day (or night) a week at four different sites, they work to address not only the physical and mental health care needs, but also provide law students and social workers to assist in improving social determinants of their healthcare. As a result, the trust the patients have for the clinic from decades of service could facilitate the successful implementation of EIM. [70, 71]

Barriers for implementation of EIM in this population include low health literacy, low income, high food insecurity, poor access to transportation, and low availability of high-speed Internet. Low reliable Internet access limits their ability to use the AVS (after visit summary) platform in the EMR and thus necessitates a different method of communicating information. Potential facilitators for EIM implementation include a long-term, engaged population of ~350-400) patients, high degree of enthusiasm and trust between the patients, medical students, and doctors from decades of providing free extensive health care, routine food deliveries, help with transportation, and specialty healthcare. The faculty, staff, and volunteers are dedicated to the mission of the clinic and work to improve the social determinants of health and to decrease the prevalence of obesity, metabolic syndrome, cardiovascular disease, and mental health concerns. During the pandemic lockdown, the students began delivering food and medications to the patients' doors allowing a mechanism to deliver written EIM materials.[69] As managers of the SRFCP, student leaders, together with faculty administrators, staff, and researchers, were an

integral part of the implementation team that met weekly or bimonthly for most of 2021. The stakeholders of the SRFCP requested EIM to be adopted into its delivery system to encourage PA for its population of Latinx, who were under-represented in the faculty clinics, and to teach the medical students about exercise as medicine. Exercise is an effective primary or adjunct treatment for all these chronic diseases, making EIM an appealing program for the clinic.

Implementation of EIM to Latinx population at SRFCP

The study described in this thesis used an implementation science lens and the RE-AIM framework[72] to design diverse strategies for the UC San Diego EIM program. This framework was used to reach similar levels of SRFCP patients with EIM, thus helping the SRFCP to adopt the program through engagement of a high percentage of SRFCP providers, making adaptations as necessary and implement EIM with the ability to maintain the intervention through integration of EIM into the clinic workflow with the overarching goal to increase PA (effectiveness). To facilitate this work, we formed an implementation team comprising a lead researcher (SL), the two UCSD faculty physician advisors, the USCD staff EPIC Super-User (and jack of all trades), 1-2 student general managers, a bilingual health coach, and myself (volunteer clinical faculty/physician champion/ researcher). The *implementation team's* overarching goal was to successfully integrate EIM into standard care workflow while the *clinic stakeholders'* aim was to improve physical activity levels among the clinic's Latinx patients while educating students (effectiveness). In San Diego, Latinx individuals represent 34% of the population (census 2019), but only 17% of patients in the UC San Diego Health faculty primary care clinics identify as Latinx. The SRFCP approached the EIM team about implementing EIM due to medical students' expressed interest in improving PA counseling for their patients. To pursue this mutual goal, the

team needed to adapt the EIM program itself as well as the implementation strategies to enable its seamless integration into standard workflow in the different settings.

Adaptations were guided by the RE-AIM framework and used implementation strategies chosen from the ERIC guidelines based on key barriers and facilitators described earlier.[42]

1) Developed the educational materials to promote Latinx culture and language. Exercise prescription handouts and the physical activity manual were translated and back-translated to Spanish, and a bilingual, bicultural, native Spanish-speaking health coach was hired. Previously conducted focus groups with Latinx patients and conversations with the SRFCP promotoras (respected, lay community members trained as health educators) guided the adaptations of the exercise handout and manual to include culturally relevant exercises. For example, a woman hiking with her children emphasized family activities and replaced an elliptical in a gym, and Latin dance videos and soccer replaced lap swimming.

2) Tailored strategies were implemented to overcome barriers and honor a population with low computer/ Internet access and health literacy. The students entered PAVS scores into EPIC since in the SRFCP they serve the role medical assistants play at the faculty clinics. Scheduling the bilingual health coach phone visit during clinic time circumvented patients' inability to make an appointment online. Instead of sending out a link on the AVS with a tailored exercise handout and manual, the students delivered a manual hardcopy with the patient's medications and groceries. To get patient feedback, the lead student manager developed EIM questions for the annual patient phone survey.

3) Conducted ongoing training and clinician implementation team meetings. Student concerns with barriers faced by PA discussions with at-risk patients were addressed via zoom sessions in class. EIM articles, training videos about Epic documentation, examples of how to do a 30 second coaching verbal exercise prescription tailored to the patient's needs, and a video of an exercise coaching visit were posted to the website. Throughout 2021, PDSA[68] cycles were reviewed in weekly implementation team zoom meetings comprised faculty, researchers, staff, and students.

Adaptations for this intervention and its implementation strategies were catalogued in a blend of FRAME and FRAME-IS with the goal of maintaining the fidelity of EIM's five core functions by 1) continuing for EPIC to calculate PAVS, 2) delivering a physical activity handout (renamed from prescription) with directions on how to advance PA, 3) a translated bound PA manual, 4) the option to schedule two bilingual health coach phone calls, and 5) the same provider decision support for medical students to be prompted to document any exercise conversations.

This extension of EIM into the UCSD Student Free Clinic has two sets of beneficiaries: the *priority population* of uninsured and largely Spanish-speaking Latinx and the UCSD *medical students* who administer most aspects of the clinic including lab and pharmacy while also acting as the doctor, nurse, and medical assistant combined. The patients received free quality health care, medications, and food. The students learn how to be doctors while simultaneously being medical assistants and nurses with precepting from volunteer clinical faculty to learn the complexities of providing wrap around care for the uninsured. In this setting the students are not only the secondary beneficiaries, but also the implementors by incorporating new exercise counselling skills to deliver EIM to the patients.

Implementation was assessed for the three main stakeholder groups: 1) patient phone interviews during their annual clinic satisfaction survey, 2) medical students through quantitative and qualitative surveys, and 3) researchers, administrative faculty, the lead student manager, and staff with meeting agendas and a final Weiner scale survey.[73] Brief pre- and post-implementation student surveys assessed their barriers to discussing exercise and their educational experience with directed follow-up sessions to address concerns. In addition to using patient feedback from their survey to direct adaptations, their physical activity levels (PAVS) scores in EPIC were analyzed to explore program effectiveness. After six months, the implementation team was given the Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM), and Feasibility of Intervention Measure (FIM) survey.[73] Results of this thesis will be incorporated in the manuscript to be delivered in May.

CHAPTER 1

Introduction

Regular physical activity (PA) improves health outcomes ranging from hypertension (HTN), diabetes (DM), dyslipidemia, and obesity to cancer, cognitive decline, and mental health such as depression and anxiety[1, 2] and even COVID -19.[5] Current international guidelines promoted by the American College of Sports Medicine (ACSM) recommend 150 minutes a week of moderate to vigorous physical activity combined with twice a week strength training[7]. However, only 23% of Americans[6] and 31% of the global population[8] regularly meet exercise guidelines. This lack of PA makes it the fourth leading cause of death worldwide and led to its labeling as a pandemic public health problem in 2012.[12]

Physical inactivity is pervasive throughout all socioeconomic groups and cultures, but many underserved and vulnerable populations report higher rates of inactivity.[13] Given the disproportionate burdens of diabetes and obesity in the Latinx population, this gap could be reduced by increasing PA.[1] Frequently competing priorities such as juggling multiple, childcare, elder care, and challenges with transportation prevent adequate time for leisure exercise.[18, 19] Members of the Latinx community, especially those who are recent immigrants, also encounter language and cultural barriers.[18, 20, 21] Additionally, more challenging social determinants of health make Latinx an at-risk population for less PA and more mental stress.[13, 18] Furthermore, members of marginalized populations often live and work in areas with higher levels of environmental hazards, stress, and trauma and have multiple physical and mental co-morbidities, emphasizing the need for PA to reduce these health disparities.[22-24]

To overcome these inequities, primary care providers (PCPs) serving as trusted health figures are well positioned to provide education and resources to their patients about PA.[9] PCPs

are the first (and sometimes only) point of contact for acute and chronic care, health promotion, and preventative care [48, 49]and help serve patients from diverse backgrounds.[50-53] Using a tailored exercise prescription as a prevention tool or initial treatment, PCPs could help reduce medication burden for cardiovascular disease, HTN, hypercholesterolemia, DM, and obesity.[9] Research demonstrates that exercise counseling in primary care is more cost-effective (up to $18,000 per QALY gained) than some medications.[54] However, only a third of patients recall having spoken to their PCP about exercise.[56] PCPs face many health system barriers and have not consistently provided quality exercise counseling due to numerous gaps in knowledge, time, and reimbursement.[46, 55, 59-61] Evidence-based interventions (EBIs) have shown that these barriers can be overcome with PCP education and providing time for these PA conversations when funded by grants, yet lasting sustainability has been difficult. Maintaining PCP motivation despite time and financial pressures in the clinic environment is key. [62] Time to document such conversations fades when financial support and services like grants and policies expire, thus limiting sustainability. [59]

Implementation science has been focusing on supporting the successful adaptation of EBIs to reach new populations.[32-35] The Practical, Robust, Implementation and Sustainability Model (PRISM),[36] which incorporates the established Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework, is an implementation science model that can guide the implementation of EBIs into real world settings.[37, 38] Peer reviewed frameworks exist to standardize documentation of the adaptations needed to successfully implement EBIs in different contexts.[39-41] The Framework for Reporting of Adaptations and Modifications Extended (FRAME) provides a systematic approach to categorizing adaptations to answer questions: what, when and how modifications occurred, if they were planned or not at

what level of delivery, who led the adaptation for what context, and if fidelity was maintained as well as their contextual factors.[39] Recently, these concepts were simplified for improving researchers' ease of use in analyzing implementation strategies (IS) with the FRAME-IS.[40] Systematically documenting adaptations to new contexts can support successful implementation of EBIs into diverse populations through improved alignment.[38, 41]

Exercise is Medicine (EIM) has advocated EBIs that have improved exercise habits toward the goal of 150 minutes per week when used correctly.[57] However, lacking knowledge, self-efficacy, and reimbursement to discuss exercise in practice, physicians and other providers have not consistently provided quality exercise counseling.[59] EIM has been implemented as a computer assisted version in UC San Diego Health primary care clinics requiring less provider time and providing exercise manuals, handouts, and health coaching phone calls with preliminary results showing improved minutes per week of exercise.[67] This tech-assisted EIM combines quality improvement goals [21] with the PRISM framework [36] and rapid PDSA (plan, do, study, act) cycles [68] to systematically adapt and integrate EIM into the standard clinic workflow.[67] Preliminary evaluation with RE-AIM [37] suggests that this EIM program is feasible and clinically effective to date.[67]

The need to adapt PA EBIs to reach underserved communities has been well-documented [43, 44]. Given that many members of the Latinx community utilize community clinics for health care,[46] community-based clinics supported by academic medical centers and serving underserved Latinx patients would be ideal testing grounds for adapting and implementing PA EBIs.[47] The current study reviews its implementation reach to the Latinx population at the Student-Run Free Clinic Project (SRFCP), which is operated by the UC San Diego's School of Medicine. The SRFCP approached the EIM team about implementing EIM due to medical

students' expressed interest in improving PA counseling for their patients. To pursue this mutual goal, the team needed to adapt the EIM program itself as well as the implementation strategies to enable its seamless integration into standard workflow in different settings.

Using RE-AIM framework, [72] this implementation science study **reached** out to a new un-insured Latinx population with health inequities with an **effective** program, enabling the SRFCP to **adopt** EIM and **implement** it into their workflow with the ability to **maintain** the intervention with embedded smart phrases, adaptations to workflow, language, culture, and educational tools for medical students. These adaptations were chosen from the guidelines based on key barriers and facilitators [42] with input from the implementation team comprising the lead researcher (SL), the two faculty physician advisors, the staff Epic Super-user (and jack of all trades), 1-2 student general managers, a bilingual health coach, and the volunteer physician champion/researcher. The *implementation team's* overarching goal was to successfully integrate EIM into standard care workflow while the *clinic stakeholders'* aim was to improve physical activity levels among the clinic's Latinx patients while educating students (effectiveness).

Methods

Setting: The UC San Diego School of Medicine's SRFCP [74] began in 1997 at a church serving the homeless in Pacific Beach both to provide the wrap around healthcare needs of this now predominately housed monolingual Spanish speaking Latinx population and to train UCSD medical students desiring to care for a vulnerable population. Although focused on primary care, it has expanded to four community sites in central San Diego with hundreds of medical students and physician and other volunteers addressing not only the physical and mental health care needs, but also improving the social determinants of their healthcare and access to specialists.[69]

Barriers for implementation of EIM in this population include low food security, health literacy, access to transportation, income, and availability of high-speed Internet. Low reliable Internet access limits their ability to use the EMR's after visit summary (AVS) platform necessitating an alternative method of communication. Potential facilitators for EIM implementation include a long-term, engaged population of ~350-400 patients, and the high degree of enthusiasm and trust between the patients, medical students, and doctors from decades of providing free extensive health care, routine food deliveries, help with transportation, and specialty healthcare. The faculty, staff, and volunteers are dedicated to the mission of the clinic and work to decrease the prevalence of obesity, metabolic syndrome, cardiovascular disease, and mental health concerns. During the pandemic lockdown, the students began delivering food and medications to the patients' doors allowing a mechanism to deliver written EIM materials,[69] As managers of the SRFCP, student leaders, alongside faculty administrators, staff, and researchers, were an integral part of the implementation team that met at least bimonthly for most of 2021.

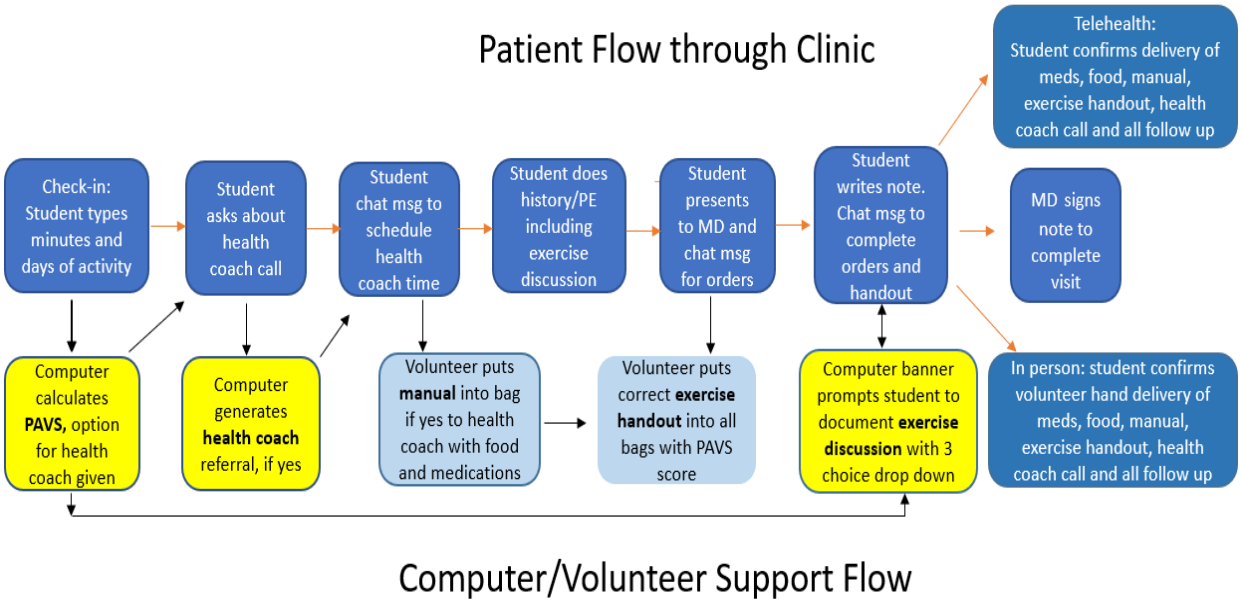

Figure 1: Clinic Workflow

Program Description: Adaptations to the EIM workflow integrated into the UC San Diego Health clinics were made to fit within the SRFCP workflow and to meet the needs of its population frequently lacking smart phones (Figure 1). In the SRFCP setting, the medical students serve as both medical assistants and physicians. Thus, in terms of the EIM workflow, the students record the PAVS, talk with patients about exercise, document these discussions, and deliver the written, culturally and linguistically adapted, PA handout and manual to the patients' homes as part of their standard delivery of medications and groceries following telehealth visits. As some patient visits have resumed onsite during the fall 2021, handouts and manuals were occasionally given in person. A bilingual, bicultural health coach offers telephone or video appointments to patients who accept an exercise health coaching referral. The student physicians used the same .EIM smart phrase for ease of documentation, thus maintaining fidelity to the original core EIM components.

Data Collection - Adaptations: With the overarching goal of providing a model for implementing a program that aims to reduce health disparities in a marginalized population, adaptations were catalogued using a modified blend of FRAME (IS) and FRAME to develop an early example for adapting both the evidence-based intervention (EBI - content) and workflow (implementation strategies).[40] Adaptations were catalogued real-time in an Excel spread sheet by the researchers, and written documentation of timing was achieved through reviewing agenda slides of weekly to monthly implementation team meetings comprised of two medical student clinic managers, the Medical Director and Co-Director of the SRFCP, the SRFCP Epic Super User, the health coach, the Principal Investigator, and the volunteer physician champion in the SRFCP who also served as an investigator on this project.

FRAME (IS) identified seven modules with categories from which to select for each adaption's characteristics: 1) description (EBI or IS), 2) what was modified (content, evaluation, training, or context), 3) what was its nature, 4) what was the goal 5) level of rationale, 5) when in the implementation planning or execution did the adaptation occur, 6) who participated in the decision, and 7) how widespread (to whom).[40] Two additional categories were added: the first - targeting component versus implementation strategy and the last – determining the appropriate RE-AIM intended impact of adaptation. After consensus between the researchers (and implementation team at times), these labels were categorized by groups for commonalities resulting and listed in the first table.

Data Collection – RE-AIM evaluation: Assessment of the success of the implementation process was guided by RE-AIM principles and measured by quantitative and qualitative surveys of the primary three stakeholders: the patients, medical students, and implementation team. Reach and effectiveness data were collected from the electronic medical record (Epic), with data pulled from May 24, 2021, through November 30, 2021. Promotoras asked patients one free response and four Likert and multiple-choice questions relating to EIM during the SRFCP's annual interview process. Provider-level data from PAVS entry and documentation of an exercise discussion in the note were variables analyzed for reach while statistical description and analyses of PAVS scores, demographics, diseases, and utilization of health coaching focused on clinical effectiveness for patients. Adoption, implementation, and maintenance were assessed with surveys of the implementation team after six months and student providers both pre and post implementation with Qualtrics. The implementation team responded to Acceptability of Intervention Measure (AIM), Appropriateness of Intervention Measure (IAM), and Feasibility of Intervention Measure (FIM) surveys (Weiner scale)[73] and

answered three qualitative responses reviewed for themes. Students answered 5-6 questions via Likert scales and multiple-choice in addition to one free response.

Data analysis: Reach and clinical effectiveness data from EPIC were analyzed using SPSS and Excel. Adoption, implementation, and maintenance were assessed with frequency summaries using Qualtrics and Excel to assess feasibility, acceptability, and appropriateness of the three primary stakeholders: patients, medical students, and faculty/staff. Qualitative highlights also were reviewed to make adjustments as needed with some quoted in this report. By triangulating the viewpoints obtained from these stakeholder interviews and questionnaires, implementation and maintenance goals were evaluated.

Results

Adaptations

We made seven adaptations to the core components of the EIM program and organized them in our adaptation framework, provided in Table 1. All adaptations were planned and made in the pre-implementation phase. Table 2 summarizes the frequencies of key characteristics of the adaptations. Adaptations of both components and intervention strategies focused mostly upon 1) tailoring and condensing components and 2) integrating those components into existing workflows to maximize efficiency and ensure sustainability. A combination of administrators and researchers addressed both the clinic unit and patients at mostly the clinician or organizational level during pre-implementation meetings. The primary goals noted were to improve the fit and increase the clinical effectiveness of EIM.

Table 1: Adaptations

Adaptation Description	Component or Implementation Strategy?	WHAT element is modified?	What is the NATURE of the content, evaluation, or training modification?	What is the GOAL?	What is the LEVEL for modification?	WHO coordinates the decision to modify?	HOW widespread is the modification for whom/what?	What is the IMPACT?
Brief description of the adaptation that was made (Try to keep it to 1-2 sentences	**Component** -1.PAVS -2.Diagnosis populated -3.MD discussion/ documentation - Prescription -.Manual - Health Coaching **Implementation Strategy (IS)**: -Training -Facilitation Adapted	- The setting - The format - Personnel involved - The target population - Other: Workflow - Other: Translation/ Culture/ Language	**Which of the following was the primary type of change involved?** - Tailoring to individuals - Condensing a component - Integrating with other programs we are doing	**Which was the primary reason behind this change?** - To enhance the impact or success of the intervention for all or important subgroups (effectiveness) - To make the intervention delivered more consistently; to better fit the SRFCP, clinician needs, patient flow or EHR; for practical reasons (implementation)	-Sociopolitical -Organizational -Implementer - Clinician/ teacher - Patient/ recipient	- Entire or most of team - Practitioner - Administrator - Researcher - Developer - Stakeholder - Coalition - Other	- Individual patient/recipient - Group of patients -Patients who share a characteristic (e.g., language) - Individual clinician/teacher - Clinic unit - Organization - Network system (community) - Specific Implementer - Team leading implementation	- Number or type of patients engaged (reach) - Quality of care or other outcomes (effectiveness) - Participation by teams or staff (adoption) - Efficiency (getting more done faster or with less resources - maintenance)
FC Director added the .EIM smart phrase to the FC templates so that documentation of the PAVS and exercise discussion (or deferral) will be automatic for the student doctors.	MD discussion/ documentation	Other: Workflow	Condensing a component & integrating with other programs we are doing	To make the intervention delivered more consistently; to better fit the FC, clinician needs, patient flow or EHR; for practical reasons (implementation)	Organizational	Administrator & Researcher	Clinic unit	Participation by teams or staff (adoption) Efficiency (getting more done faster or with less resources)
Bicultural students tailored exercise manual for Spanish-speaking Latinx population.	Manual	Other: Translation/ Cultural/ Language	Tailoring to individuals	To enhance the impact or success of the intervention for all or important subgroups (effectiveness)	Patient	Researcher	Patients who share a characteristic	Number or type of patients engaged (reach)

Table 1: Adaptations (Continued)

	Component or Intervention Strategy?	WHAT element is modified?	What is the NATURE of the content, evaluation, or training modification?	What is the GOAL?	What is the LEVEL for modification?	WHO coordinates the decision to modify?	HOW widespread is the modification for whom/what?	What is the IMPACT?
Bilingual/bicultural exercise health coach hired.	Health Coaching	Other: Translations/Cultural/Language	Tailoring to individuals	To enhance the impact or success of the intervention for all or important subgroups (effectiveness)	Clinician	Researcher	Patients who share a characteristic	Number or type of patients engaged (reach)
FC student general manager makes exercise health coach appointment while patient is in FC, consistent with existing workflow for referrals to specialty consults.	IS - Facilitation of health coaching	Other: Workflow	Condensing a component & integrating with other programs we are doing	To make the intervention delivered more consistently; to better fit the FC, clinician needs, patient flow or EHR; for practical reasons (implementation)	Clinician, Implementer	Administrator & Researcher	Clinic unit	Participation by teams or staff (adoption) Consistent delivery of quality care or costs (implementation) Efficiency (getting more done faster or with less resources)
FC students deliver the exercise manual with the brief exercise handout to patients with their medications and food donation bag.	IS - Facilitation of prescription and manual delivery	Other: Workflow	Integrating with other programs we are doing	To make the intervention delivered more consistently; to better fit the FC, clinician needs, patient flow or EHR; for practical reasons (implementation)	Clinician, Patient	Entire or most of team	Clinic unit	Number or type of patients engaged (reach)

Table 1: Adaptations (Continued)

Adaptation Description	Component or Intervention Strategy?	WHAT element is modified?	What is the NATURE of the content, evaluation, or training modification?	What is the GOAL?	What is the LEVEL for modification?	WHO coordinates the decision to modify?	HOW widespread is the modification for whom/what?	What is the IMPACT?
Patients surveyed via telephone as part of their annual FC survey as opposed to sending it via MyChart. Since an oral survey is expected to take more time, the survey has been condensed to fewer and briefer questions.	IS - Facilitation	Other: Workflow, Setting	Integrating with other programs we are doing	To make the intervention delivered more consistently; to better fit the FC, clinician needs, patient flow or EHR; for practical reasons (implementation)	Organizational	Administrator	Clinic unit	Participation by teams or staff (adoption) Efficiency (getting more done faster or with less resources)
Medical students complete all program components typically divided between Medical Assistant and physician.	Is - Training	Other: Workflow, Setting	Integrating with other programs we are doing	To make the intervention delivered more consistently; to better fit the FC, clinician needs, patient flow or EHR; for practical reasons (implementation)	Organizational, Clinician	Administrator	Clinic unit	Efficiency (getting more done faster or with less resources)

Component or Implementation Strategy?

Adaptations were made to components as well as implementation strategies. Three of the components were modified (EMR note, EIM manual/handout, and health coach), and four of the adaptations involved implementation strategies, which were focused on the facilitation of training medical students and integrating EIM into their workflow.

What element is modified?

Modifications were made to the workflow, the setting, and the program components themselves (e.g., translation and cultural adaptations).

What is the nature of the content, evaluation, or training modification?

Most modifications were made to the workflow to integrate with other programs being done but condensing components and tailoring to individuals were also noted.

What is the goal?

The main reason driving adaptations was to deliver the intervention consistently to better fit the SRFCP, clinician needs, patient flow or EHR for practical reasons to aid implementation.

What is the level of the modification?

Most modifications were targeted for the clinician or organization.

When is the modification initiated (detailed by planned versus unplanned)?

All adaptations were planned during pre-implementation (the first 6 months of 2021), in part trying to follow previous research guidelines (and thus not in the table).[75] The winter COVID surge required the EPIC programmers to focus on that until late spring, thus prolonging our implementation by two months and enabling a thorough vetting and discussion about potential changes necessary during pre-implementation meetings while awaiting EIM to be "turned on" in the EMR for the SRFCP.

Table 2: Frequency of Adaptations

	EIM	Bi-cultural Manual	Bicultural Coach	Make HC appt	Deliver Manual / Rx	Patient Phone Survey	Medical Student as Provider	Total
Which component and/or intervention strategy is adapted?								
Component- Discussion	1							1
Component- Manual		1						1
Component-Health Coach			1					1
IS - Facilitation				1	1	1		3
IS - Training							1	1
WHAT is modified?								
Setting						1	1	2
Other: Workflow	1			1	1	1	1	5
Other: Translation/ Culture/Language		1	1					2
What is the NATURE of the content, evaluation, or training modification?								
Tailoring to individuals		1	1					2
Condensing a component	1			1				2
Integrating with other programs	1			1	1	1	1	5
What is the GOAL?								
To enhance impact		1	1					2
To improve fit	1			1	1	1	1	5
What is the LEVEL for the modification?								
Organizational	1					1	1	3
Implementer				1				1
Clinician			1	1	1			3
Patient		1			1			2
WHO coordinates the decision to modify?								
Entire or most of team					1			1
Administrator	1			1		1	1	4
Researcher	1	1	1	1				4
HOW widespread is the modification for whom/ what?								
Patients		1	1					2
Clinic unit	1			1	1	1	1	5
Organization								1
What is the IMPACT?								
Reach		1	1		1			3
Adoption	1			1		1		3
Efficiency (maintenance)	1			1		1	1	4

Who coordinates the decision to modify?

Given the small size of the implementation team and the high frequency of meetings, most adaptations were consensus driven by the entire team and coordinated by the administrator and researcher equally.

How widespread is the modification for whom/what?

Most adaptations remained at the clinic level, though the two tailoring the content of EIM were targeted to patients.

What is the impact?

The desired impacts were 1) maximizing reach; 2) program fit with the target population; and 3) sustainability of the program by focusing on efficiency.

Patient Characteristics

The primarily Latinx population (92% of 305 participants) had an average age of 57 (SD=10) years. Nearly three quarters were female with 55% having diabetes and 62% having hypertension which had similar proportions for those with both 1 PAVS and two or more PAVS (Table 3). This subset of the population (n= 237) with 2 or more PAVS was created specifically to best evaluate individual PAVS changes over time with paired t tests. The overall PAVS baselines averaged 127 minutes per week (SD=116) which was nearly identical for females (128, SD=120), males (129, SD=109), and those with diabetes (128, SD=108). Only, people with hypertension had significantly lower baselines (119, SD=109) compared to those without (145, SD=128, $p< 0.05$). Although both groups had the same likelihood of accepting the offer for health coaching, those with only 1 PAVS were less likely to complete that visit (12%) than those with 2 or more PAVS (26%, $p =0.013$).

Table 3: Baseline Demographics/ Diseases by number of PAVS scores per person

	Total Patients (n=305)		Patients with at least 2 PAVS (n=237)	Patients with only 1 PAVS (n=68)	
	Patients (%)	**Baseline PAVS (SD)**	**Patients (%)**	**Patients (%)**	**p Value**
Overall	305	128 (117)	237	68	
Age (mean, SD)	57 (11)	128 (117)	57 (10)	59 (12)	
Gender:					
Female	225 (74%)	128 (120)	178 (75%)	47 (69%)	.322
Male	80 (26%)	129 (109)	59 (25%)	21 (31%)	
Ethnicity					
Hispanic	283 (92%)	127 (116)	217 (92%)	66 (97%)	n/a (Low n)
Non-Hispanic	3 (1%)	185 (117)	2 (1%)	1 (1.5%)	
Unknown	19 (6%)	144 (126)	18 (7%)	1 (1.5%)	
Diabetes					
Yes	168 (55%)	128 (108)	133 (56%)	35 (51.5%)	.497
No	137 (45%)	129 (127)	104 (44%)	33 (48.5)	
Hypertension					
Yes	190 (62%)	119 (109)	148 (62%)	42 (62%)	.918
No	115 (38%)	145 (128)	89 (38%)	26 (38%)	
Coach Offer Accepted					
Yes	128 (42%)	127 (116)	101 (43%)	27 (40%)	.883
No	140 (46%)	127 (114)	107 (45%)	33 (49%)	
Missing	37 (12%)		29 (12%)	8 (12%)	
Coach Visit (1) Completed					
Yes	70 (23%)	134 (126)	62 (26%)	8 (12%)	0.013*
No	235 (77%)	133 (118).	175 (74%)	60 (88%)	

RE-AIM Evaluation

Reach was defined by the percentage of visits at which a PAVS was entered into the computer which was 58% of the number of visits.

Effectiveness was operationalized using PAVS outcomes over time. Baseline PAVS were similar across groups characterized by demographic information and chronic disease diagnoses except people with hypertension trended toward a lower PAVS baseline (119, SD=119) than those without hypertension (145, SD=128, p=.059) (Table3). The overall sample (n=305) was also comparable to the smaller sample (n=237) that had their PAVS recorded twice in all characteristics except the completion of a health coach visit, which occurred more in the group with two or more PAVS (26%) than those with only one PAVS (12%). Among those patients who had two or more PAVS recorded, their PA increased 22 minutes per week (SD=134, p<.001). However, the wide standard deviation with the smaller mean difference makes it difficult to draw firm conclusions.

Adoption had two components: at the clinic level and at the individual attending physician level. All four clinic sites (Downtown, Normal Heights, Pacific Beach, and Golden Avenue) had attendings whose students recorded PAVS and had EIM notes documented in the chart for 100% of clinic adoption. Since the medical students worked with multiple attendings as non-licensed physicians, the EMR was evaluated at the attending physician level as it could not track this data at the student level. Of the 32 attendings signing these visits, only two physicians never signed a note with an exercise discussion for an adoption rate of 94% with a range from 0-100% PAVS. When PAVS recorded were broken down by the supervising attending, the EMR revealed a physician uptake low of 24% to a high of 100% to having their student record the PAVS.

Implementation was a composite of the above PAVS entered (58%) and EIM note documentation (66%), in addition to a referral being made to a health coach (tracked at 19% on average) and delivery of the exercise manual. The health coach referral varied by attending physician from 0 to 60%. Because the clinic workflow precluded tracking the fifth core component (after-visit summaries) being delivered, those were not measured but 63% of the manuals were used by 8 months and 42% of patients recalled receiving a manual at 3 months.

Maintenance of EIM will be monitored over time via surveys, interviews, and EMR documentation review.

Patient, Provider, and Implementation Team Feedback

Patient Interviews

During the annual summer promotora survey of SRFCP patients (n=103), over 85% recalled discussing exercise with their student provider in the first few months of early implementation (Figure 3). Most patients recalled the offer of health coaching (74%) and accepting that offer (70%) and then recalled completing it (21%) during early implementation (chart documented 19% at 8 months). Also, early in implementation, 35% recalled receiving a manual, and a count of physical manuals at 8 months sent out of the clinic indicated that 157 had been delivered so approximately reaching half of the patients (Appendix Figure 5).

During these interviews, the promotoras asked: “how helpful was the PA support?” Most (64%) of patients found it helpful, but when the follow up for the unsure answer was detailed, the patients open responses grouped as a theme that the students had been helpful but the patients were not sure about the health coach because they had just spoken or were about to speak to the HC and thus did not know how well they would do. As previously resulted (Figure 3), most

patients remembered discussing exercise with the student physician and desired health coaching but had not yet had that consultation. Typical responses included “Haven’t talked to a counsellor yet.” This survey was done only 1-2 months into the implementation due to pragmatic considerations: July-August was the time for the annual patient survey and thus the only time during the year to receive patient feedback, yet EIM had only begun in late May. The comments were translated by promotoras, such as “more hours” for exercise coaching options and “just having advice about exercise would be good.”

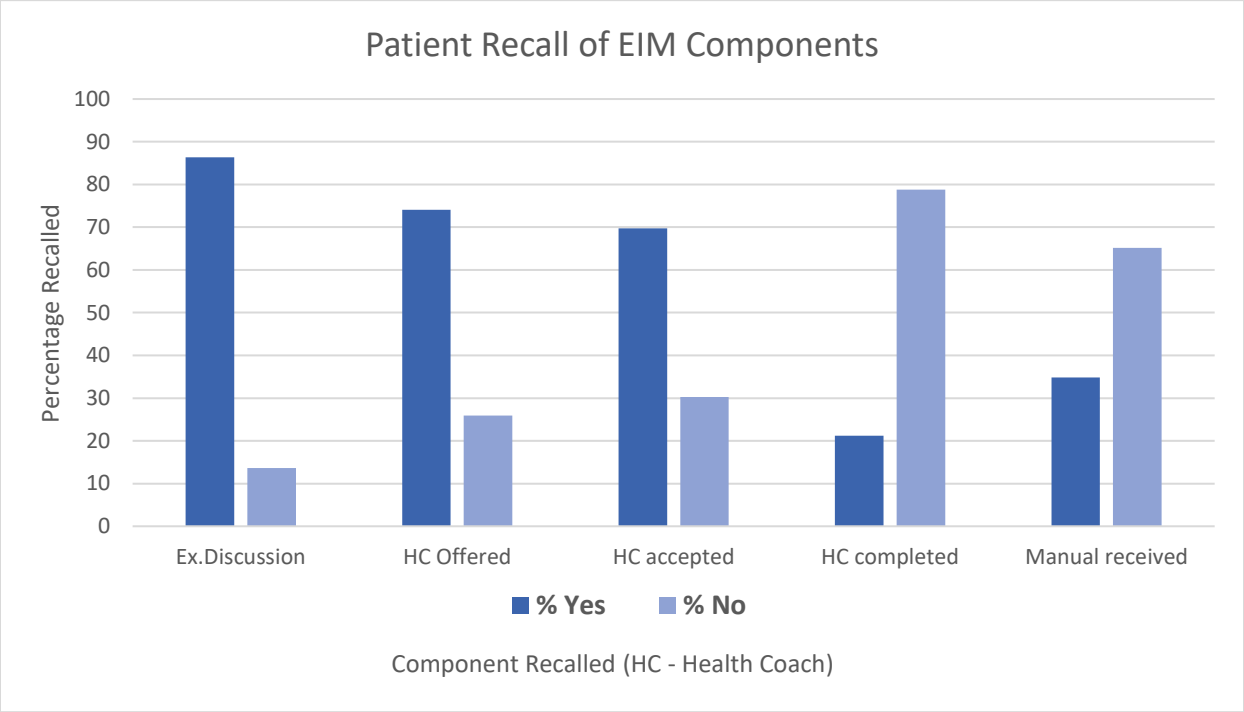

Figure 2: Patient Recall of EIM Components- early implementation (July-August 2021)

Student Class Questionnaires

Deployed during class, questionnaires (n= 71 pre, and n= 64 post-implementation) of medical students revealed improved confidence (75%) in discussing exercise with patients despite barriers after their training and use of EIM. Almost all barriers were reduced, most

noticeably in their lack of training (from 66% pre to 15% post-implementation), followed by reductions in concerns over their comfort, knowledge, and availability of resources (Figure 4). The only barrier that did increase notably was not having enough time for an exercise discussion (up from 49% to 66%). The students' thoughtful qualitative responses helped shape further training and workflow. Concerns about "class privilege," what resources…are feasible," and a common theme of "not want[ing] to shame patients… with demanding work schedules" were addressed at an additional training session by the researcher.

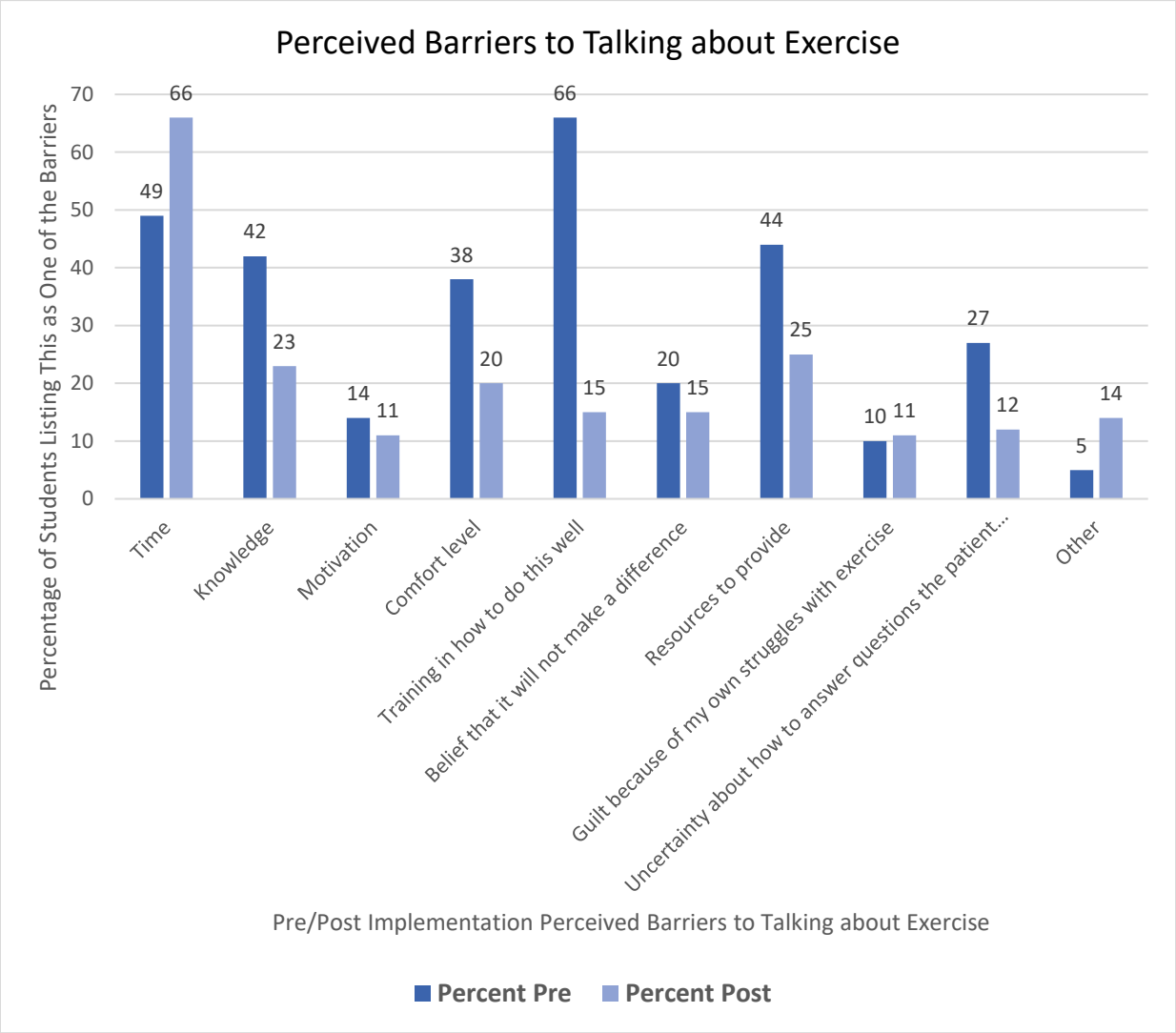

Figure 3: Student's barriers to exercise discussions over time (April vs. December)

Implementation Team Survey

Finally, the implementation team survey used Weiner scales (range:1-5, with 5 high) which demonstrated good acceptability (AIM mean score of 4.5), appropriateness (IAM – 4.35), and feasibility (FIM - 4.29) (Figure 5). The highest mean was 4.5 for acceptability (overall AIM), while the lowest scores were with feasibility with two neutral responses for "not as easy" with four "agreeing" but none "completely" within FIM. All six implementors "agreed" that EIM was "fitting" for appropriateness (IAM), Open-ended comments by the implementation team included benefits such as "a great way to talk quantitatively about exercise," and challenges like "training new learners" and getting "the correct clicks" established into the routine.

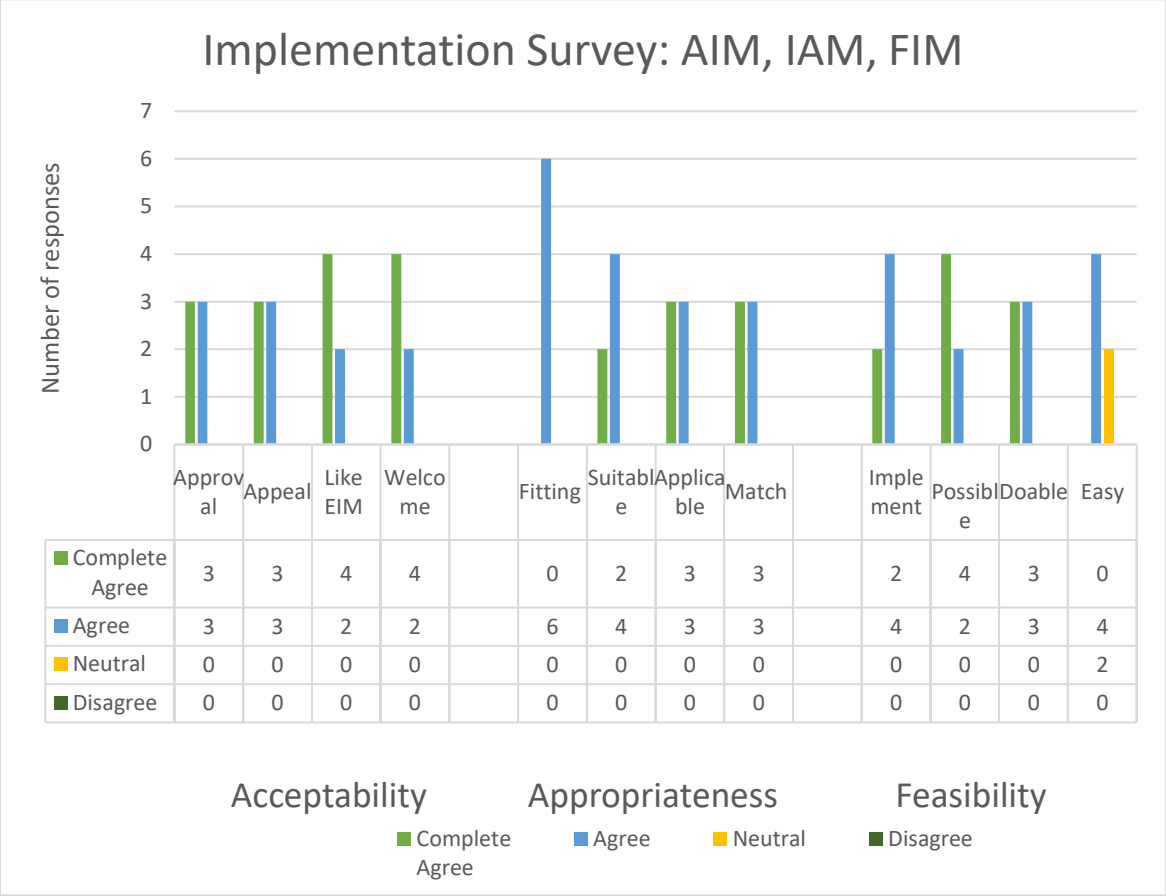

Figure 4: Weiner Scales for Implementation Measurement from Team (score scale 1-5)

Discussion

We successfully adapted and implemented the physical activity (PA) intervention Exercise is Medicine in the UC San Diego Student Run Free Clinic Project (SRFCP), which serves low-income, uninsured, primarily Latinx patients in under-resourced communities. Medical students working as providers received training and successfully implemented the adapted EIM program within this new context. Our objectives of tracking adaptations while reaching out to a lower-resourced community with an existing evidence-based program and maintaining fidelity to its five core elements were achieved with an appropriate, acceptable, and feasible implementation.[76]

As a result of the co-creation of the implementation of EIM with the students, faculty, and staff of the SRFCP, all adaptations were planned and made pre-implementation. Most programs implemented in real world settings experience a combination of planned and unplanned adaptations happening both before and during implementation.[41] With intent we worked with the SRFCP months in advance to determine and plan the adaptations needed during the pre-implementation as McCarthy and colleagues (2021) have suggested.[75] Common themes were tailoring components to improve reach and improving fit for sustainability; however, the contexts and timing were quite different, and our implementation project was co-created with the SRFCP as one administrative team and thus were planned during the long pre-implementation process - see appendix for details (Table 4). These adaptations were captured real time with a structured spreadsheet similar to that of Rabin and co-authors (2018)[41] for accurate, detailed documentation using a blend of FRAME[39] and FRAME-IS[40] since this project similarly required modifications of both the program components and implementation strategies. This study, like McNulty et.al (2019) and others focused on co-creating with communities of color to adapt

flexible approaches. [32, 33, 54, 77] In this unique population with the moderate number of patients (~350-400) and large number of student-providers (~120) sometimes turning over monthly and quarterly, an easily learned stable workflow was prioritized for sustainable implementation with the goal of quality enhancement similar to Kilbourne, et al (2019)[78]. Thus, "workflow" as a category of the "What is modified?" was added rather than just using the "other" variable.

RE-AIM was successfully used with triangulation like McCarthy et.al. (2021) as a framework to plan and evaluate adaptations.[42, 79] Unlike traditional PCP visits in which exercise is discussed one-third of the time,[56] implementing EIM into the SRFCP demonstrated over 85% of patients recalling their discussion about exercise. Simultaneously, almost 90% of EMR notes had smart phrase documentation of exercise discussions during the first three months which was sustained but dropping by same 8-month mark to 66% in EMR extractions. However, only 58% of the visits had the PAVS recorded as a measurement of reach at that same 8-month time frame. High adoption rates of 94% of attendings' remembering to discuss exercise at some visits compares favorably to other EIM programs in the early stages of implementation like Linke et.al (preliminary data 2021).[67]

We evaluated clinical effectiveness using self-reported PAVS data recorded in the EMR This report did not differentiate between work, transportation, or leisure activity like another study which measured similar baseline cross-sectional ranges of PA,[9, 13] but the PAVS baseline in our study was in a comparable range overall at 127 minutes per week (SD=116), and nearly identical for females , males, and people with or without diabetes. In Valero-Elizondo, et. al's 2012 general population study, 53% patients reported exercising less than 150 minutes/week and in Arredondo et al's (2016) accelerometer-based study Latinx averaged 70-160 minutes/week including work and transportation exercise. The current study population with 92% Latinx

middle aged Latinx with over half with multiple comorbidities was over-represented compared to the population of San Diego in general (30%. US 2021 census) and to the original study in UCSD's primary care clinics (17%) improves diversity of EIM, [67]perhaps improving generalizability to other uninsured communities on the lower side of the digital divide. Surprisingly, health coaching did not impact a change in PAVS. Perhaps those getting health coaching were healthier with higher PAVS at baseline and not returning for a clinic visit or health coaching as frequently. Future studies could divide the sample into a group that started at zero or in the lowest quartile of exercise and examining the effect of health coaching into two groups and randomize health coaching, but community partners might not want to deny that option except in a cross-over or stepped wedge trial. Furthermore, targeting only all inadequately exercising patients for effective change in PAVS rather than offering health coaching to all as this study did might add clarity to this current pragmatic approach.

Multiple stakeholder viewpoints were actively solicited to triangulate data to corroborate findings (Figure 5). In patient interviews with promotoras, 64% of patients found EIM helpful and were interested in having a health coach phone call despite only recall 19% completing it (21% by EMR extraction) likely due to competing priorities in this population such as lack of time (Chang, et.al 2018) and chronic stress (Gallo, et. al, 2014).[18, 20] The patients recall of the EIM components to varying degrees (discussions, health coaching visits, and manuals) early in implementation provided some corroboration of the EMR data and suggests fidelity to the core components of EIM being maintained with the workflow adaptations to fit the SRFCP. Additionally, pre/post student surveys reported greater confidence and fewer barriers to discussing exercise, which was likely due to a combination of training and practice in delivering EIM to their patients during the interim months..[46, 55, 59-62] The only barrier that increased after

student training was time; perhaps more knowledge and comfort led to longer, more thorough exercise discussions by students as PCPs. Using the validated Weiner scale,[73] the implementation team comprising medical school faculty, staff, and students in addition to researchers and a health coach felt that implementing this EIM program into the SRFCP was successful with their mutually developed adaptations. They agreed (or "completely agreed") that it was acceptable, appropriate, and feasible program for the setting. Additionally, the students' thoughtful responses to surveys guided training as they were stakeholders, clinicians, implementors, and researchers.

Limitations

Implementation science has the potential to address health care disparities and improve health equity using intentional adaptations.[19, 21, 32, 33, 35] This project, with its unique provider and patient populations, limits generalizability to all Latinx but might provide some guidance toward useful adaptations in other uninsured populations that are less frequently studied.[49] Statistically, consideration should be given to the non-normal distribution of the PAVS with its skewed nature with many patients starting with zero activity at baseline but also with a smaller bump at the high end of 420 minutes/week of people (max time computer entry) exceeding an hour a day. Thus, this data set had large standard deviations, but could be assessed with paired t tests to examine individuals smaller pre-post mean differences. By using a pre-post study design and no concurrent, randomized control group, this pragmatic study could not statistically infer causality.

Future Plans

Scaling out this tech supported EIM into Federally Qualified Health Centers that serve both the uninsured and Medi-Cal populations might benefit from similar adaptations for implementation to populations who do not have access to web-based electronic systems. Next steps for this project are to use student and patient surveys annually for surveillance of

maintenance and to explore fidelity to the core components using the EMR. We will also conduct a more detailed analysis of the impact of health coaching visits on PA levels and explore the impact on longer term clinical outcomes such as diabetes, hypertension, and obesity. Our goal is to ensure sustainability of EIM training and services in this setting and to serve as a model for other Free Clinics to implement with adaptations newer digital interventions like EIM.

Conclusions

Adaptations focused on streamlining workflow and integrating with other programs to improve fit at the clinic level to maximize reach, adoption, and clinical effectiveness were planned and tracked in a blended FRAME-IS. Key components of the EIM program were adapted to align with the SRFCP patients and workflow in a new setting where medical students acted as providers for uninsured Latinx patients with limited computer access. Patient reach, clinic/provider adoption, implementation, fidelity, and clinical effectiveness guided by RE-AIM for both planning and evaluation purposes led to the stakeholders' goals to improve patients' physical activity and to build students' confidence by decreasing barriers to exercise discussions.

Strengths include a focus on an underserved and low-resourced community, the SRFCP's motivation and commitment to integrate EIM into its standard workflow, and an opportunity for medical students to learn and practice ways to address healthy lifestyle behaviors and prevention in routine care. Training physicians-to-be might impact the delivery of exercise information to future generations. Evaluation of this EIM implementation at the UC San Diego SRFCP using mixed methods from patient, provider, and implementation team perspectives indicated good feasibility, acceptability, and appropriateness for these adaptations that might guide successful programs and prompt future implementation science research to improve gaps in preventative care for communities by reducing the digital divide in health care.

Appendix

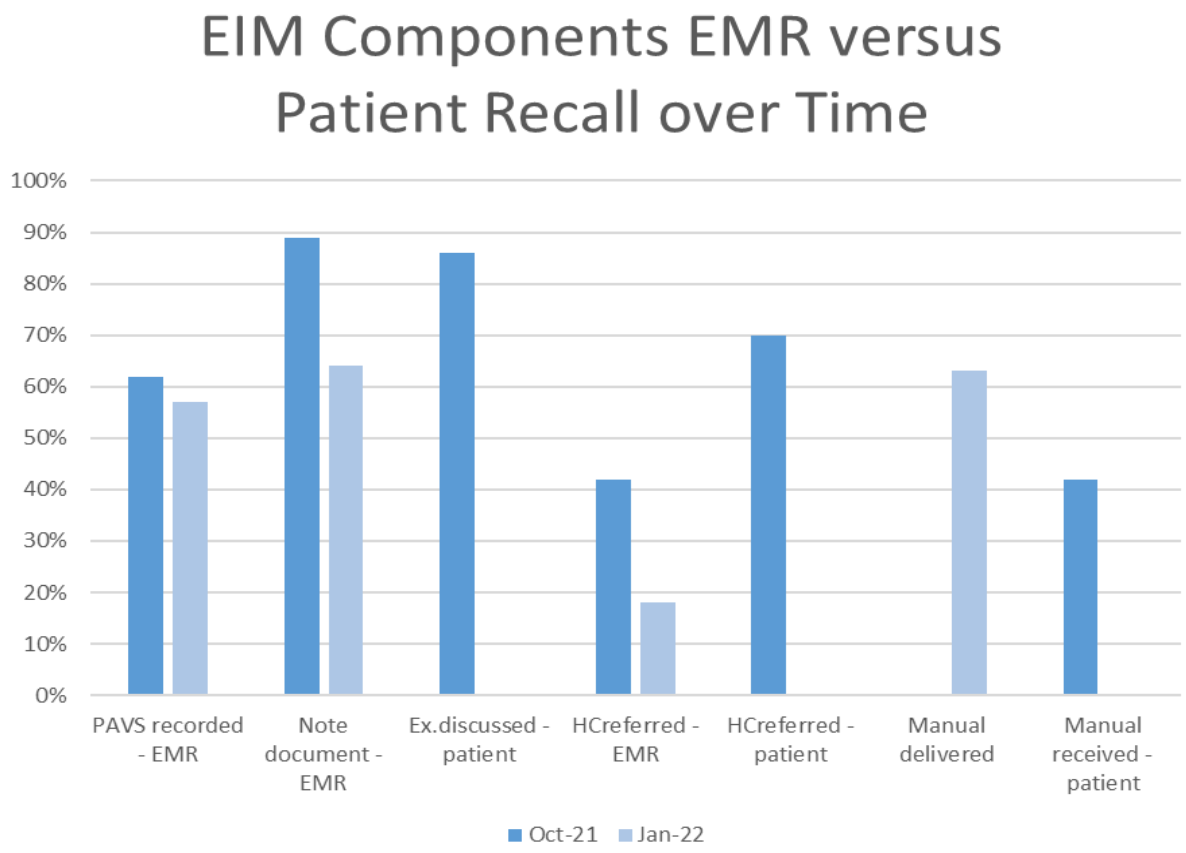

Figure 5: Triangulation - Student engagement with EIM components PAVS, note, and health coaching referral documented in EMR in mid-implementation (October 2021) and later implementation (January 2022) versus Patient Recall in early implementation (August 2021)

Table 4: Discussion – Comparison to McCarthy, et. al. (2021)

TOPIC	MCCARTHY, et.al. (2021)	EIM in SRFCP
Methods		
Multiple methods and sites	X (5 - nationally)	X (4 – San Diego)
Patient number in sample	4200	305
Population/ setting	Veterans leaving hospital	Latinx outpatient (most women)
Implementers	Nurses and hospitalists	Students and family doctors
Core interventions	4	5
Structured database	X – weekly, multiple people	X – real time, two researchers
Interview	X	X
Member checking	X	Team meetings + surveys
Triangulation	X	X
Time	2 years (1, and exit)	1 year (4, 6/7, 9, 12 months)
Results		
Number of adaptations	49	7
Adaptations per site	Varied	Same – same implementors
Timing of adaptation	Most mid (30), 1 pre, 6 early	All pre
Most common adaptations	Target pop (recruitment -22 and personal changes – 9)	IS (4), component (2) workflow (5) , setting & population (2)
Who responsible?	Local clinicians (20), team (12)	Admin and researcher (both 4) for clinicians (part of both)
Why was change made?	Increase patients contacted (14), and to better fit (10)	Better fit (5), and extend impact (2)
Intended impact	Not consistently documented and improved implementor satisfaction; more + than neg	Efficiency (4), and reach and adopt (both 3)- all positive
Proactive (planned) or not	Yes (recruitment -30) No (reactive -8) turnover	All planned, turnover is clinic norm and thus planned for
Discussion		
Context	Early- reach, Later during implementation -Sustainment Recommended for future: "create compensatory strategies to support buy-in beyond individual personal"	Pre-implementation planned for sustainment following McCarthy et.al. recommendation
Unplanned changes	Driven by context; important positive changes to sustain	More context known pre-implementation so not needed
Capturing impact real time	Difficult – try MADI (Kirk, et.al)	Limitation – added category post implementation and used recall
Member check in/meetings	Done monthly during but not extracted and not started significantly during pre-time	Done weekly to monthly real-time begun 5 months in advance as co-creation with clinic staff

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