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A New Clinical Model for Primary Care: A Critical Component of Healthcare Innovation Zones

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A NEW CLINICAL MODEL FOR PRIMARY CARE: A CRITICAL COMPONENT OF HEALTHCARE INNOVATION ZONES

A Thesis
Presented to the Graduate School of Clemson University

In Partial Fulfillment of the Requirements for the Degree Master of Architecture

by
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Accepted by:
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A NEW CLINICAL MODEL FOR PRIMARY CARE:
A CRITICAL COMPONENT OF HEALTHCARE INNOVATION ZONES
ABSTRACT

The overall aim of this research and design project is to develop a primary care setting that responds to the current changes in the healthcare system and accommodates predicted developments in the future. It takes advantage of opportunities created by the Affordable Care Act and initiatives started under the new Center for Medicare and Medicaid Innovation. One of these includes the creation of Healthcare Innovation Zones as a way to bring integrative, comprehensive health services to a wider population through the network of a teaching hospital, physicians, and other clinical entities. The proposed ambulatory care setting is a model for this clinical entity conceived to reconsider critical components of a Healthcare Innovation Zone.

Through the process of literature review and case study analysis, existing problems and evolving trends in both the healthcare and architectural contexts were identified. Following this process, guidelines were developed that outline architectural design criteria fundamental to this proposed type of primary care clinical entity; these include gradient zones, transparency, simplified circulation, modular planning, pod groupings, open team hubs, standardized care rooms, and transformable space. A model program and site selection criteria are also developed that incorporate
elements critical to defining a Healthcare Innovation Zone and completing one within the specific context of downtown Winston-Salem, North Carolina.

The new model will represent an innovative but attainable design that places the patient at the center of a collaborative network of care providers affiliated with Wake Forest Baptist Medical Center. The spirit of collaboration is intended to bring together the public, patients, providers, and medical students as all users of the space take part in educational experiences. Unlike traditional outpatient clinics, this new setting is conceived as a highly accessible, integrated part of people’s overall lifestyle, merging public, educational, and medical spheres. The facility will function as a support center to informed, active patients and caring, proactive providers who are concerned with preventive measures and comprehensive management, rather than merely reactive treatment. It will be engaged and complimented by forward-thinking individuals who stand at the forefront of developing new practices and technologies to improve the individual’s lifestyle. The center has the potential to become a replicable model that other communities could adopt to further a primary care revolution and ensure higher-quality healthcare to the greater society.
DEDICATION

This thesis is dedicated to my parents, Alan and Marcia, in appreciation for their continuous support of my academic endeavours. It is particularly dedicated to my father for his tireless work in the field of primary care and the energy he continues to commit to improving his patients’ health and to providing sincere, quality care.
ACKNOWLEDGEMENTS

I wish to thank my thesis committee for their support, encouragement, and advice in particular. To David Allison, Dina Battisto, Windsor Sherrill, and Dan Harding: thank you for committing your time to my research pursuits and architectural development. Your constructive criticism and recommendations were valued every step of the way to strengthen my project and push me to think more broadly during its evolution.

To my thesis comrade Lisa: I cannot imagine having gone through this year without you. Having your support and advice were invaluable, as well as having someone else there to understand what I was going through and to commiserate with me through the stressful times.
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**A NEW CLINICAL MODEL FOR PRIMARY CARE: A CRITICAL COMPONENT OF HEALTHCARE INNOVATION ZONES**

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INTRODUCTION

There is a recognized need among healthcare professionals, government leaders, and the general patient population for changes that will be critical to avoid an impending primary care crisis. The scope of this thesis project is to create a design solution that responds to current health and architectural contexts and acts as a vehicle to improve the primary care system, through both an operational and philosophical model as well as the built facility.

Figure 1: A Call to Stem the Impending Primary Care Crisis (http://www.nytimes.com/2008/09/30/health/30brod.html?pagewanted=all&_r=0)
Primary care is a key component to ensuring health and wellness. Traditionally, healthcare in the United States has been more effective at treating acute conditions and has better outcomes for acute and tertiary care as compared to primary care and managing or preventing illnesses, particularly chronic diseases. Yet primary care is an essential field within healthcare that forms the foundation for affecting an individual’s overall health and wellness. According to the World Health Organization, health is not only the absence of disease, but it is “a state of complete physical, mental, and social well-being” (Dubberly et al., 2010). This holistic view of health is better addressed through comprehensive primary care services that support the individual from an early stage, rather than reactive approaches that often come too late to ensure that complete state of well-being.

Dr. Barbara Starfield describes the importance of primary care in her book *Primary Care: Concept, Evaluation, and Policy*. She writes, “In its most highly developed form, primary care is the point of entry into the health services system and the locus of responsibility for organizing care for patients and populations over time. There is a universally held belief that the substance of primary care is essentially
simple. Nothing could be further from the truth" (Willard & Bodenheimer, 2012).

Organizations like the American Academy of Family Physicians define primary care services as a wide-ranging, continuous provision of care that includes diagnosis, treatment, prevention, and education of both acute and chronic conditions. The Institute of Medicine likewise describes primary care as “the provision of integrated, accessible, health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of the family and the community” (Bernstein et al., 2003).

The consequences of effective primary care delivery include lower costs and improved outcomes that result from its continuous care approach. Studies reveal that “an increase of one primary care physician per 10,000 population correlated to a reduction in average mortality of 5.3 percent per year” (Willard & Bodenheimer, 2012). This source further reveals that “the consistency of patients seeing their own primary care clinician is associated with improved preventive and chronic care outcomes, a better physician-patient relationship, fewer unnecessary hospitalizations, lower
overall costs of care, greater patient and physician satisfaction, and reductions in adjusted mortality for older adults” (Willard & Bodenheimer, 2012). In order to ensure an efficient, effective healthcare system in the United States, greater focus should be placed on primary care services and looking at the individual's health with a holistic perspective.

This thesis project begins to explore the existing primary care environment, including the problems and developments in the current system, and compares these to problems and developments found in the architectural environment of existing primary care facilities. A new approach to primary care delivery needs to be developed that addresses the current limitations, and a new model for primary care delivery sites should be developed in tandem to better support the new approach.
Overview of Existing Environments

In both the medical and architectural contexts, a number of limitations exist that fail to support a highly effective primary care system. A growing number of factors together indicate an impending crisis in the field of primary care and demand attention with programmatic and architectural solutions. An aging population and the rise of chronic disease, combined with physician shortages, are increasing the demand for primary care services. Better outpatient facilities are needed to reduce the load on hospitals and divert reliance on emergency departments that are frequently overcrowded, understaffed, and impersonalized. Programmatically, traditional outpatient settings overlook the changing needs and expectations of patients and staff alike, failing to acknowledge the full extent of their potential capabilities.

In response to these conditions, new approaches to care delivery are being developed that focus on the patient and providing more continuous, personalized support. The medical home model is one manifestation of this focus, as well as staffing models that are non-hierarchical and team-based. There is also an overall shift toward more preventive services and encouraging education and self-management to engage
more proactive populations. Revised payment plans and innovative technologies are beginning to respond to these changes by diverting from traditional fee-for-service models and encouraging open, frequent access and communication through both physical and virtual means of contact.

Architecturally, existing primary care facilities often center around the physician with exam rooms and nurse stations organized in clusters around private doctor’s offices. Patients are left in an unfamiliar, alienating environment with limited unsupervised access to certain spaces, and “back of house” clinical processes are kept shrouded in mystery behind closed doors. Evolutions in healthcare trends and user profiles are not being manifested in traditional primary care practices that remain stagnant in patriarchal care deliveries and treatment approaches.

Evolving recognition and consideration of the user’s experience have begun to divert design to being more patient-centric. This has resulted in new facility models being developed that are designed to promote access and convenience for the individual, often with greater technological support. Internally, newer clinics are being designed
now to encourage provider-patient partnerships and integrative care teams through collaborative settings for both patients and staff alike. Additionally, the upfront public zone is being redefined so that more amenities and patient-support areas enhance the waiting experience while providing ‘one-stop-shop’ services and so that facilities are overall more responsive to and engaged with their community surroundings.

Figure 4: Summary of Existing Problems and Evolving Trends in Healthcare and Architectural Contexts (Crews)
Many factors come together to inform the new primary care model that is developed in this thesis project. Other influences are more closely linked to current issues and create a realistic context in which to ground the project, including the Affordable Care Act and the Advanced Medical Home. Provisions and recommendations established by these two elements have directly impacted the design and scope of the proposed model for a new primary care setting. They make it evident that a new architectural model for primary care is needed that better supports a holistic approach to health and wellness. The proposed model will function as a key component within a larger Healthcare Innovation Zone by providing a lifestyle-integrated setting enriched with collaborative, educational spaces to enhance the experience of patients, visitors, and staff alike.

The overreaching mission of the project is to eliminate many of the frustrations that plague patients and providers alike in today’s patriarchal, physician-centered primary care practices. As suggested, the project vision is to generate a new model that promotes continuous, meaningful collaboration between healthcare and social realms. This model is intended to become an integrative support center that brings
both patients and staff greater satisfaction through its holistic approach and its emphasis on education. The architectural design of the support center will foster a richly educational environment as care spaces take on more collaborative qualities that enhance teaching and learning experiences. The three overarching values that form the project’s core vision, as well as their corresponding goals, are outlined below.

1. SUPPORT AN INTEGRATIVE APPROACH TO PRIMARY CARE

2. ENHANCE PATIENT AND STAFF EXPERIENCE

3. ACHIEVE OPERATIONAL EXCELLENCE

Figure 6: Project Visions and Corresponding Goals (Crews)
These goals are further developed into corresponding strategies that influence other project-related considerations, including programmatic choices and site selection. They stem from the briefly described issues and factors that are found in both medical and architectural contexts. The associated strategies that anchor the design decisions made throughout this project are listed to the right.

**comprehensive care**  
Promote a comprehensive approach to health and wellness.

**collaboration**  
Foster collaboration among providers, patients, and all users of the space.

**education**  
Create a setting for enriching educational experiences.

**personalized support**  
Provide personalized attention within a non-institutional environment.

**access**  
Improve access through physical and operational strategies.

**wayfinding**  
Optimize wayfinding for traveling within the facility.

**flow**  
Enhance flow patterns with efficient design and operation.

**flexibility**  
Accommodate future changes through flexibility and adaptability of spaces.

**technology**  
Integrate technology and innovation into design.

Figure 7: Project Goals and Corresponding Strategies (Crews)
In terms of physical design decisions, these conceptual strategies are communicated through a set of proposed guidelines that are conceived of as being fundamental to the new model of better performing primary care settings. These guidelines include the following eight architectural recommendations to be developed in future designs: 1) gradient zones, 2) transparency, 3) simplified circulation, 4) modular planning, 5) pod groupings, 6) open team hubs, 7) standardized care rooms, 8) transformable space.

Programmatically, the project goals and strategies are reflected in the choice of services and inclusion of different spaces, many of which are non-traditional to healthcare settings. The proposed program is divided into three space categories that include public spaces, clinical care spaces, and clinical staff support spaces. Within each of these categories, areas reflect the project’s three overarching visions by providing comprehensive, even alternative, services that enhance user experience and improve facility operations.
The choice of site and the criteria established to determine that site are likewise connected to these goals and strategies. The site selection criteria are meant to be generally applicable to creating and locating a facility that follows the values and guidelines of the newly proposed primary care model. These criteria include 1) a downtown setting, 2) easy access, and 3) community connection. They will be discussed with greater detail in a later chapter, as well as the specific site chosen for this thesis project in the central business district of Winston Salem, North Carolina.

Finally, the specific design solution will be presented that responds to the current problems and influences analyzed in literature reviews and case studies. It will embody the stated visions and goals and demonstrate physical examples of implementing the proposed guidelines. The project is both conceptual and architectural in nature, and design decisions clearly link the two realms to show how an improved approach to primary care can be enhanced through an informed, responsive architectural model. The proposal for this clinical entity represents a fully developed scheme for a new model within a Healthcare Innovation Zone that can be adapted to fulfill the needs and context of a variety of settings and help address the primary care crisis.
There is an impending primary care crisis that involves a number of healthcare factors (Bodenheimer, 2006; Mann et al., 2010; Institute for Alternative Futures, 2012). These include demographic (Shrestha & Heisler, 2011), medical (Schappert & Rechtsteiner, 2011), and cultural (Sarasohn-Kahn, 2011) changes that have already begun to affect both staffing and patient populations and will increasingly do so in the future. Additional influences have also begun to sculpt the field of ambulatory care and alter the setting in which it takes place (Bernstein et al., 2003). These factors include technological advances and financial developments that are encouraging a move toward greater outpatient reliance and delivery of services that were previously handled by hospitals (Institute for Alternative Futures, 2012).

Together, these external problems and forces have led to several evolving trends within the context of primary care. These include operational changes that involve new care delivery models, payment options, and supplemental services (ACP, 2006; Mann et al., 2010; Sarasohn-Kahn, 2011). A new approach to primary care is starting to spread throughout many settings in an effort to stem the impending crisis and improve the experience of patients and staff alike, a fundamental vision of this thesis.
Overview of Past and Current Problems

There is an impending primary care crisis that involves factors leading to an imbalance in supply and demand. An aging population and rise in chronic conditions are leading to more people demanding primary care services, as well as policy changes arising from the Affordable Care Act that expand insurance coverage (Sarasohn-Kahn, 2011). At the same time, more primary care physicians are leaving the field without sufficient numbers to replace them, due to dissatisfaction with the primary care work environment. As a result, many patients are also dissatisfied with their primary care experience and the difficulty of accessing quality, personalized care (Mann et al., 2010).

Figure 11: The Crisis in Primary Care: Key Findings (Mann et al., 2010, p. 5)
Physician Shortage

Overall, studies project that there will be a physician shortage in the United States within the next few decades, potentially up to 200,000 by 2020 (ACP, 2006, p.8). In the field of primary care alone, statistics indicate an a shortage of up to 46,000 doctors by 2025 (Mann et al., 2010, p. 13). These predicted shortages are driven by rising demand and falling supply. They have already resulted in shortage areas across the United States, to the point that “more than 56,000 Americans live in areas without the necessary number of primary care physicians” (Redman & Kelly, 2011).

Figure 13: 2009 Health Professional Shortage Areas (Mann et al., 2010, p.11, recreated by Judith Crews)
The supply of physicians practicing primary care has decreased from 50 percent in 1950 to approximately 30 percent in 2007 (Mann et al., 2010, p. 11). This is largely resultant from the increasing amount of dissatisfaction among primary care physicians with their current situation. Many physicians are growing exhausted by the mounting pressure to fit in more and more short appointments that cover a wide breadth of the problems inherent in primary care. According to one source, this operational approach is “due to both low reimbursement levels and increasing work demands” that requires providers “to see more patients and provide more care. Physicians have likened working within these circumstances to being ‘a hamster in a wheel,’ with never-ending patient, paperwork, and administrative duties” (Mann et al., 2010). The current payment model that rewards for quantity of visits rather than quality causes both patient dissatisfaction and physician frustration because of their rushed, overbooked nature (Bodenheimer, 2006).

Dissatisfaction among primary care providers is compounded by a significant salary imbalance compared to other providers practicing outside of primary care. Physicians in internal medicine, pediatrics, and family practice, all areas within primary care,
receive much less compensation compared to specialists (Mann et al., 2010). In fact, some sources reveal that “the median income of specialists in 2004 was almost twice that of primary care physicians, a gap that is widening” (Bodenheimer, 2006).

Recognition of this income gap, as well as the comprehensive nature of the primary care field, has contributed to fewer medical students entering into generalist primary care. According to the American College of Physicians, medical school graduates entering into generalist residency training in the United States decreased from 50% in 1998 to less than 40% in 2004 (“The Advanced Medical Home,” 2006, p. 8). For internal medicine students in their final year of residency, only 27% indicated a future career in general internal medicine, significantly lower than the 54% in 1998 (ACP, “The Advanced Medical Home,” 2006, p. 8).

In response to the existing and increasing shortage of primary care physicians, a new staffing model needs to be developed that helps decrease the dependence on primary care physicians solely. The shortage of primary care physicians can be an opportunity to use other positions within the medical field to fulfill their

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**Figure 15:** Median Physician Income by Field in 2009 (Mann et al., 2010)

**Figure 16:** Proportions of Third-Year Internal Medicine Residents Choosing Careers as Generalists, Subspecialists, and Hospitalists (Bodenheimer, 2006)
responsibilities, and even allows the chance to introduce new positions into a health care team that do not necessarily have traditional medical training. However, the decrease in medical students entering primary care should not be accepted passively; environments that are more supportive of primary care and that allow medical students to appreciate its value and operation should be created, which this thesis project seeks to examine and propose.

Figure 17: More Types of Clinicians and Caregivers (Bentley, 2011)
Aging Population

Numerous studies show that the population in the United States is on an aging trend (Bernstein et al., 2003; Mann et al., 2010; Schappert & Rechtsteiner, 2011). Demographically, a larger proportion of the American population is now older, and this trend will continue to rise over the next few decades. According to one source, “the percentage of individuals aged 65 and older is expected to jump from 12.7 percent of the total U.S. population in 2008 to over 20 percent of the total U.S. population in 2050 (Mann et al., 2010). In other words, by 2050 approximately one in five persons in the United States will be 65 or older (Shrestha & Heisler, 2011).

Along with this aging population comes changes in the healthcare context. Older people tend to suffer from more conditions and seek medical care more frequently than younger populations, leading to an increasing demand in services including primary care. Statistics estimate that the annual number of ambulatory care visits increased by 25 percent between 1997 and 2007, which was “driven both by the aging of the population, as older persons have higher visit rates than younger persons in general, and by an increase in utilization by older persons” (Schappert & Rechtsteiner, 2011). The increased utilization by the elderly is due in part to more
of them living with chronic conditions; approximately 87 percent of people in the United States between the ages of 65 and 79 have at least one chronic disease, and 45 percent live with at least three or more “(Mann et al., 2010).

The aging population will require more sources of care and will increase the need for greater access and services. The role of primary care will be particularly important because it is naturally broad in the type of care provided yet continuous in nature.
Rise in Chronic Disease

Chronic disease affects more than the elderly population. Its growing occurrence has resulted in more Americans now living with one or more chronic diseases. Until now, the focus and strength of the United States healthcare system has been on minimizing illness and treating acute conditions; less emphasis and success has been placed on managing and treating chronic conditions (Dubberly et al., 2010). According to the American College of Physicians, 45% of Americans had a chronic medical condition in 2006, half of whom had multiple chronic conditions; by 2015, it is believed that 150 million Americans will have at least one chronic condition (“The Advanced Medical Home”, 2006, p. 3). The prevalence of chronic illness expected to only continue to rise over the future, with a predicted increase by 42 percent between 2003 and 2023, particularly in cancer, diabetes, and hypertension (Mann et al., 2010).

Chronic disease has significant impact on the healthcare context in the United States. It is responsible for high costs and spending; 75% of U.S. healthcare spending is on the treatment of chronic disease (New England Healthcare Institute, 2009, p. 3). According to the Centers for Disease Control and Prevention, seven out of ten...
Seven in ten deaths in the U.S. are due to chronic disease.

Figure 23: Deaths Due to Chronic Disease (Source: CDC, 2010; created by Judith Crews)

Deaths in the United States each year can be attributed to chronic diseases (CDC, 2010).

Several types of chronic diseases could be prevented or managed through lifestyle changes and modified behavior. According to the Center for Disease Control, four modifiable behaviors lie at the root of the chronic disease crisis: lack of physical activity, poor nutrition, tobacco use, and excessive alcohol consumption. One third of adults in the United States is obese, and one fifth of youth between the ages of six and nineteen is obese. More than one-third of Americans fail to meet the recommendations for aerobic physical activity, and at the same time, one in five Americans smoke. Diet and physical activity together and tobacco use are the top two leading preventable causes of death in Americans, with excessive alcohol consumption coming in third. (CDC, 2010) With better education on healthy lifestyles, disease prevention, and overall wellness, population health within the United States could be improved if more people understood and tried to avoid chronic conditions.
Within the context of this thesis project, the growth in chronic diseases will increase the need for primary care services that can more holistically address the health needs of people who may be suffering from multiple conditions. Unlike specialty fields, primary care environments will need to be more comprehensively based to provide the consistent, constant support that chronic conditions demand. Also importantly, a revised approach to healthcare should seek to counter the rise in chronic conditions through a preventive, rather than treatment-oriented, approach. A primary care model that educates people from the beginning of their care experience on lifestyle and behavioral choices would be better able to reduce the long term outcomes of chronic conditions and possibly the chance of developing a chronic condition to begin with.
Increase in Demand for Primary Care Services

More Americans are making use of outpatient services and settings to receive care, in part because of advances in both medical care and technology as well as reimbursement patterns. In general terms, all types of ambulatory care centers are seeing high patient volumes. One source estimates that “on average, 72 percent of Americans visit an office-based setting for ambulatory care 6.5 times during a year” (Bernstein et al., 2003).

Higher rates of patients visit primary care offices compared to other types of ambulatory care settings; in 2007, 48.1 percent of ambulatory medical care visits were to office-based primary care physician practices (Schappert & Rechtsteiner, 2011, p.3).

Figure 25: Annual Number of Ambulatory Care Visits: United States, 1997-2007 (Schappert & Rechtsteiner, 2011, p. 3)

Figure 26: Age-Adjusted Ambulatory Care Visit Rates by Setting: United States, 1997, 2002, and 2007 (Schappert & Rechtsteiner, 2011, p. 4)

Figure 27: Rising Use and Demand for Primary Care Physician Visits (Bentley, 2011, p. 14)
There is also a rise in demand due to policy changes that expand the client base. The Affordable Care Act passed in 2010 includes provisions that expand insurance coverage to more than 32 million people who will be seeking primary care services (Sarasohn-Kahn, 2011).

The previously discussed issues in the healthcare context combine in many ways to create an overall increase in demand for primary care services. The aging population and rise of chronic disease in particular expand the pool of potential clients. Policy changes like the Affordable Care Act also contribute to an increased demand as more people receive insurance that includes additional covered services traditionally provided by primary care facilities. A new model for facilities should respond to this growing need by offering an easily constructed and flexible center that can accommodate a larger, more diverse clientele, the consideration of which falls into the scope of this thesis project.
Patient Mistrust and Dissatisfaction

Patient dissatisfaction with certain aspects of ambulatory care and the settings in which it is delivered has become a recognized concern within the healthcare industry. Existing outpatient settings are not accommodating or accessible to the average lifestyle because of inconvenient hours and full physician schedules. According to one source, “patients are increasingly dissatisfied with their care and with the difficulty of gaining timely access to a primary care physician” (Bodenheimer, 2006). Compared to other countries, the United States ranks the lowest among ten industrialized countries for making arrangements for patients to see providers after hours, with fewer than 30 percent of practices offering such an option (Sarasohn-Kahn, 2011). Because of difficulties in accessing care, with an estimated three-quarters of adults not being able to see their doctor quickly, more people are turning to the emergency department to receive attention, particularly after regular work hours (Sarasohn-Kahn, 2011).

Even if an appointment can be made, patients are also growing frustrated with long wait times and the high cost of visits. As a result, studies are showing a rise in alternative care methods, including self-help or retail settings; a Kaiser report
revealed that “33 percent of consumers had ‘relied on home remedies or over-the-counter drugs instead of seeing a doctor’ in the past 12 months because of cost concerns” (Dubberly et al., 2010). Long wait times also tend to be followed by short appointments that limit the time spent educating patients on their health and that can leave the patient feeling confused. These short, episodic bouts of care make it difficult for patients to establish strong relationships of trust with their primary care provider, who should be their primary point of contact and resource related to health and wellness. The traditional fifteen minute visit “is not even close to enough time” to cover comprehensive and quality care services (Mann et al., 2010).

Key demographic changes have also been often overlooked by the healthcare field. Today’s society tends to be more knowledgeable and capable, accustomed to being proactive and handling personal matters. The “DIY” or “Do It Yourself” movement is widely popular, with more individuals engaging in self-help programs like Weight Watchers or other behavioral change programs (Dubberly et al., 2010). They have also become accustomed to one-stop shopping environments like Wal-Mart and Target that can fulfill a wide range of needs in one location. The healthcare environment, in
comparison, lacks similar levels of accommodation and fails to capitalize on patients’ abilities and desires to better manage their own health. Traditional primary care models continue to place the doctor in a hierarchical position over the patient in an imbalance of power that is frustrating and demeaning to today’s more-informed or more proactive individual. One source describes the current healthcare framework as placing providers in position of power over patients by taking care of them without educating them; the patient is expected to follow the physician’s orders as a more passive being who receives treatment (Dubberly et al., 2010).

The current healthcare structure exhibits a disturbing failure to respect the capabilities of patients. Today’s average individual is different in many ways than the patient of the past; new facilities should be designed to accommodate these changes. They should take into account the desires of the patient, which in many cases means giving greater responsibility to the patient and allowing him or her to play a more active role in health management. New care settings that focus on convenience and that allow a personalized experience to promote the role of the patient should be developed to achieve higher client satisfaction.
The dominant trend in primary care delivery is moving away from a physician-centered approach to a patient-centered approach, which is manifested in a number of ways outlined in the adjoining figure. This is corroborated by a number of sources, including Jane Sarasohn-Kahn with THINK-Health, who writes in an article sponsored by the California HealthCare Foundation that “the key difference between the traditional and emerging worlds of primary care will be in patient-centeredness” (5).

Consideration for the staff is still an essential element in the development of these new models.
of a new primary care model, a model which is more greatly “focused on prevention, healing, and chronic care delivered in the lowest cost/highest access setting” (Stavins et al., 2011). The holistic attention of this new model is illustrated in its seven core considerations that influence both the operations and design of outpatient environments. These include patient/family-centered care, safety, quality, flexibility, efficiency, staff support, and technology (Stavins et al., 2011). The overarching goals of this thesis project incorporate many of these same considerations or address them in bundled strategies for creating a new primary care model that will achieve the three previously described core visions.

In the following sections, the evolving trends in primary care will be further developed to demonstrate many of the influences for this thesis project, both in terms of operational or program decisions as well as design decisions.
Medical Home Models

The development of the medical home model is one manifestation of changes that are beginning to evolve in the healthcare context toward more patient-centered or holistic approaches to primary care. In response to noted problems in the current delivery of care, the medical home, or health home, model embodies concepts and principles that are meant to improve an individual’s experience in the healthcare environment. As one source explains, “though the word “home” suggests a tangible place, in actuality the health home is a set of practices that health care institutions can adopt to increase coordination between providers and provide comprehensive primary care” (Cantor et al., 2011). This model supports preventive care techniques that are essential for stemming the primary care crisis.

The basic premise of the medical home closely aligns with the overarching visions of this thesis project, to support an integrative approach to primary care, to enhance patient and staff experience, and to achieve operational excellence, as well as a number of key goals including personalized support. This alignment is evidenced in the following definition of the medical home concept: “all people should enter the medical system through a portal that manages their health holistically
(comprehensive primary care, physical health, mental health, health education, etc.), treats them as individuals (with knowledge of their history, risk factors, concerns, and specific perspectives), and provides the highest-quality care efficiently (including both treatment and clinical prevention)” (Cantor et al., 2011). The patient-centered medical home (PCMH) is the most widely spread and utilized model at this time. Its seven joint principles endorsed by a number of physician associations are listed below (ACP, 2007):

- Personal physician
- Physician directed medical practice
- Whole person orientation
- Care is coordinated and/or integrated
- Quality and safety
- Enhanced access
- Appropriate payment

Together, these elements can better ensure a comprehensive, patient-centered approach to primary care that is important for improving both the patient and the staff care experience.
The medical home model has been found to improve both practice processes and care outcomes, elements that are instrumental in achieving operational excellence. Bodenheimer writes that “learning collaboratives have catalyzed primary care practices – particularly in community health centers, integrated delivery systems, and academic medical centers – to implement components of the Chronic Care Model, effecting impressive improvements in process and outcome measures” (Bodenheimer, 2006). The Chronic Care Model was an early framework established by Dr. Ed Wagner that informed the development of the current medical home model. On top of this are indications that this evolving delivery model is capable of reducing costs even while improving outcomes; both quality and economy are improved through the medical home approach (Nyberg & Vickery, 2012). More information regarding medical home model background, specific studies, and outcome information can be found in the appendix.

While the PCMH is more widely recognized and utilized within the medical home model approach, other home models are continuing to evolve that expand in scope. For example, the concept of Community-Centered Health Homes (CCHH) has been
developed that expands its perspective to the community and its connection to or influence on patients, rather than the patient as an individual. This approach builds on the ideas of community-oriented primary care (COPCs) that were developed by the last generation and has as its defining attribute an “active involvement in community advocacy and change” (Cantor et al., 2011). Primary care settings that tend to invoke the model of the community-centered health home include community health centers and safety-net clinics.

The development of the medical home model represents an important step toward a patient-centered approach to healthcare delivery. Gaining recognition as a patient-centered medical home, or similar, indicates that a practice or care organization is conscientious in respecting the needs and wishes of the patient, and it can receive compensation in return. Even the use of the term “home” implies a strong sense of connection between the patient and the facility and implies that the facility is meant to be a familiar, even every day, setting. Another type of medical home model, the advanced medical home, will be discussed in a later section as one of the key influences and foundational premises for this thesis project.
Another important trend developing in healthcare is a greater focus on prevention and management, supported by comprehensive, continuous care, rather than episodic treatment. In part, this approach has evolved to respond to several different pressing issues addressed previously, including the rise in chronic disease and increased demand for primary care services. By focusing on preventive measures and training patients to manage their own health better, patients take on greater responsibilities and decision-making through their elevated status. This not only helps lessen the burden on practitioners through greater sharing of responsibilities, but it also helps to improve patient satisfaction by capitalizing on the “do it yourself” movement and patient proactivity.

Balanced patient-provider partnerships are a key component of effective prevention and management training; these more symmetrical, nonhierarchical relationships should focus on collaboration, discussion, coaching, and assisting, rather than the traditional prescribing and adhering (Dubberly et al., 2010). Encouraging preventive measures and improved lifestyle behaviors should set the foundation for an individual’s health plan; teaching patients how to manage their health should
support the development of that plan. As one source explains, “preventive care [is]
providing the educational tools and resources to enable patients to better manage
their healthcare. It’s also about patients partnering with their providers to take
charge of their long-term health” (Nyberg & Vickery, 2012).

Through this evolving healthcare focus, patients will become more active participants,
empowered by the training of health professionals. It will help ease the current
dissatisfaction and mistrust among patients by allowing for greater transparency
between patient and provider. As patients become better trained to understand
and prevent unwanted conditions from occurring, or learning to manage them if
they do, the ‘mystery’ of healthcare and the role of the omniscient physician are
reduced. A number of sources corroborate on the importance of patient-focused
apprenticeship and recommend a variety of ways to achieve this goal: “putting
patients in the center of health care will mean reaching out and empowering them,
helping them navigate the system, providing self-help tools and electronic access
to personal health information, and managing transitions from one care setting to
another” (Sarasohn-Kahn, 2011).
In effect, promoting patients’ involvement allows them to become the ‘designer’ of their own health plan. This user-driven activity is becoming more prominent in other fields besides healthcare as user initiative and capability continue to increase. As one source explains, “self-management reframes patients as designers, an example of a shift also occurring in design practice – reframing users as designers” (Dubberly et al., 2010). The physical design of primary care environments should likewise support this notion of the patient not only as partner but also as designer. It should promote personalized attention through strategies that accommodate individual user preference and choice.

The shift in focus toward prevention and management, rather than treatment and episodic care, will warrant the creation of primary care clinics that are adaptable to different types of users with varying levels of self-management capabilities. They will need to be able to support education and training, as well as provide spaces in which patients and providers can hold constructive discussions and mentoring sessions in a partnership based on more continuous care.
Collaborative Care

“Key to addressing the workforce challenge is defining primary care as a team activity and refocusing the roles of all types of primary care providers, ensuring that the appropriate practitioner is matched to the work” (Mann et al., 2010). The recognized burden on primary care physicians and jobsite dissatisfaction among providers necessitates changes in staffing models that are currently under development across the United States.

![Development of Collaborative Care Teams](apractisclinic.com)

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<table>
<thead>
<tr>
<th>Role in Typical Primary Care Office</th>
<th>Role in Team-Based Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCP • Reactively treats acute conditions in majority of patient visit • Minimal specialist referral follow-up • Little care standardization</td>
<td>PCP • Proactively provides standardized chronic, preventive care • Manages and leads multi-level care team • Coordinates with specialists, hospital to provide cross-continuum care continuity</td>
</tr>
<tr>
<td>NP, PA • Not always staffed in practices • Primarily dedicated to acute care • May not see patients independently</td>
<td>NP, PA • Actively owns patient management • Leveraged for same-day and extended hours access • Sees patients with minimal supervision</td>
</tr>
<tr>
<td>RN • Triage incoming patient calls • Spends majority of time on acute patient ailments</td>
<td>RN • Prioritizes time for patient follow up • Proactively contacts patients encouraging self-management • Physician, patient can schedule RN for patient education</td>
</tr>
<tr>
<td>LPN • Functions similarly to MA</td>
<td>LPN • Involved in patient education, self-management support • Co-leads group visits • Triage patient phone calls using protocols</td>
</tr>
<tr>
<td>MA • Rooms patients, takes vital signs, assesses reason for visit</td>
<td>MA • Screens patient needs, reviews chart, labs, goals in pre-visit review • Performs pre-physician services such as foot screening</td>
</tr>
</tbody>
</table>

![Redefined Individual Roles for Team-Based Care](Bentley, 2011)
A provider team allows a more continuous, holistic care delivery compared to the traditional hierarchical, solo physician-operated practice. Physicians working alone lack the time to conduct a full range of examination, diagnosis, treatment, and prevention education during the typical patient visit timeframe. Particularly in primary care, physicians are limited on time to provide supplemental evidence-based services that support prevention and chronic care management (Bodenheimer, 2006). According to one source, “it would take 10.6 hours per working day to deliver all recommended care for patients with chronic conditions, plus 7.4 hours per day to provide evidence-based preventive care, to an average panel of 2500 patients” (Bodenheimer, 2006).

Consequently, newer models are beginning to recognize the value of non-physician providers by expanding the pool of potential team members. These members may include ‘health coaches’ or other types of health educators, nutritionists, behavioral health specialists, and even social workers or other allied health professionals (Sarasohn-Kahn, 2011; Sweetland et al., 2012). The Affordable Care Act supports this collaborative care model through clauses that increase the supply of nurse
practitioners, physician assistants, and certified nurse midwives in an effort to expand the primary care workforce (Sarasohn-Kahn, 2011).

Utilizing a team approach helps expand access and improve the care experience for patients (Sarasohn-Kahn, 2011). Better outcomes and higher quality of care can be achieved through increased access and offering more means of communication between patients and providers. Frequently, non-physician providers are used to provide virtual support to patients through email and web-based patient portals for more routine preventive services or managing less complex chronic conditions (Bodenheimer, 2006). A network of providers who may even work out of remote locations provides a higher level comprehensive care and wider range of services. Coordination of different providers through a team-based approach is important to ensure continuous care and well-managed patient information. “When health care professionals are not communicating effectively, patient safety is at risk for several reasons: lack of critical information, misinterpretation of information, unclear orders over the telephone, and overlooked changes in status” (O’Daniel & Rosenstein, 2008). In contrast, the newer “collaborative, team-based model focuses
on reducing hospitalization, emergency room visits, and readmissions, with primary care providers serving as team leaders who coordinate care with specialists, nurses, and other professionals” (Nyberg & Vickery, 2012).

The idea of collaborative care has expanded beyond consideration of a varied staffing base alone to include patients in the team and the process of managing care. “As Melanie Swan reports, ‘a collaborative co-care model is starting to evolve for healthcare delivery... the patient’s role may become one of active participant, information sharer, peer leader and self-tracker, while the physician’s role may become one of care consultant, co-creator and health collaborator” (Dubberly et al., 2010). Team-based models involving patients help reduce or remove the hierarchy in patient-provider relationships; this new form of rapport is an important trend that supports the patient-centered medical home model and the shift toward preventive and self-managed care. In some cases, it has even been suggested that the patient replaces the physician at the center of the coordinated care team, who then plays a greater role of leadership rather than central focus (Sarasohn-Kahn, 2011).
The move toward collaborative, team-based care will have a clear effect of the physician shortage discussed earlier. However, the benefits of provider teamwork is substantiated by the improved outcomes for patients, particularly in the opportunities it opens for linking health and wellness more directly to an individual’s daily lifestyle. Team-based staffing will require clinical support spaces to be redesigned so that constant, direct communication is easily achieved and team members can work side by side in an open space. The typical division of space into private offices will no longer be as valid an option as providers work together in a more flexible, integrated system. Both current and future health providers will have to learn to work more closely together, and an enriching, well-designed environment will help encourage the shift away from a divisive, hierarchical approach.
Another evolving trend is the development and reliance on better health information technology that more efficiently coordinates patient data and makes it more readily available. Operational practice is enhanced through this type of support and can help address the healthcare problems that are associated with burdened physicians, rising chronic disease, and increased demand for primary care services. Health information technology importantly “frees up physician time during visits, provides all members of the primary care team with timely access to patient information and aids in the overall coordination of care” (Mann et al., 2010).

This greater integration of technology support is also a response to patient dissatisfaction as it now allows the individual to better understand, track, and review his or her medical data. Studies have shown that patients want to use technology to manage their own health in a more balanced team-focused, patient-provider relationship. According to one source, “the most commonly cited consumer request related to health information is for personal medical records to follow them around wherever they get care. Added to this, more than two-thirds of American adults surveyed would like to have email access to their doctor to discuss their health or to
see their electronic health records” (Sarasohn-Kahn, 2011).

<table>
<thead>
<tr>
<th>Feature</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making it possible for electronic health records (EHRs) to be shared between your physician, hospital, rehab center, lab, etc.</td>
<td>7-1%</td>
</tr>
<tr>
<td>Providing more information electronically, such as access to discharge and follow-up care instructions after hospital stay</td>
<td>73%</td>
</tr>
<tr>
<td>Email access to your doctor so you can ask questions and discuss your health via email</td>
<td>71%</td>
</tr>
<tr>
<td>Implementing electronic health records (EHRs)</td>
<td>69%</td>
</tr>
<tr>
<td>New technologies that enable your physician to remotely monitor your wellness and vital statistics</td>
<td>64%</td>
</tr>
<tr>
<td>Introducing more telemedicine capabilities</td>
<td>62%</td>
</tr>
<tr>
<td>Providing access to your personal health record (PHR) through Internet portal or private website</td>
<td>61%</td>
</tr>
</tbody>
</table>

Figure 49: What Patients Want (Sarasohn-Kahn, 2011, p. 24)

Technology provides more outlets for communication and contact between patients and providers. It can help reduce the volume of face-to-face visits that in fact are not necessary to provide quality care services. Sources indicate that one in four primary care visits could have taken place over the phone between a patient and a nurse, rather than on-site between a patient and physician (Sarasohn-Kahn, 2011). It also creates opportunities for patients to contact remote specialists during...
their primary care visit, an important component of comprehensive, coordinated care. Primary care providers also benefit from this outside resource, as one source explains: “communicating via technology also expands the professional network by connecting physicians with specialists remotely – allowing for collaboration and care solutions that were unimaginable twenty-five years ago” (Nyberg & Vickery, 2012).

The evolution of health information technology has allowed it to spread outside the clinical setting to the home. Home-monitoring systems support patient self-management and encourage individuals to be actively engaged in their health. These systems allow patients to track traditional lifestyle statistics and share these with their primary care physician or team. Home-monitoring systems can range from tracking existing conditions and chronic diseases to general health and wellness indicators to behavioral and personal factors (Dubberly et al., 2010). Studies show that approximately two-thirds of people would like to have the technological means of allowing their provider to monitor their wellness and vital signs remotely, a desire that can now be realized with developed technology (Sarasohn-Kahn, 2011). Other sources propose concepts for future developments in technology, calling for people

Figure S1: Using Remote Means of Contact to Improve Patient Access to Care (http://telemedicine.ucsd.edu/index.cfm?p=executive_overview)
“to imagine personal-health dashboards, applications for tracking your sensor data based on the Web or mobile phones” (Dubberly et al., 2010).

Technology advances open up greater opportunities for patients to incorporate health into their lifestyle. Health information technology will be essential in the process of patient education, training, and subsequent management. It also expands the potential of collaborative care by connecting to remote participants. Consequently, new primary care facilities will need to better integrate technology into every space; the speed at which technology changes will also mandate attention to flexibility and adaptability in accommodating equipment. New clinics should view technology as a way to infuse innovation and personalization into the setting, and the treatment of advanced technologies should help facilities set a distinguishable identity that speaks to their progress and advancement.
Revised Payment

Traditional payment models have encouraged episodic care delivery in fee-for-service reimbursements. Compensating physicians for patient volume or quantity rather than quality of care delivered has resulted in short, rushed visits that contribute to shortcomings within the field of primary care (Bodenheimer, 2006). The pattern of sporadic, short visits discourages physicians from covering prevention and management topics during the visit timeframe. A number of sources corroborate that fifteen minutes is no longer nearly enough time for a quality visit to take place (Sarasohn-Kahn, 2011; Mann et al., 2010); yet, the fee-for-service payment method promotes the higher through-put and faster turnaround time of this operational model. Services that are awarded higher payments are often prioritized over those that are less compensated because of their relative newness or more inherent nature. According to the American College of Physicians, “care management, proactive or unplanned care, active cross-discipline management, and even some preventive care are often uncovered services or are poorly reimbursed (“The Advanced Medical Home”, 2006).

Newer payment models focus on continuous care with bundled or comprehensive
payment. This evolving trend supports concepts like the patient-centered medical home and preventive care by encouraging patients to utilize care services rather than penalizing them with a fee each time. Bundled payments or capitated payments can allow patients to access the facility and receive care frequently without an associated fee each time. At ‘concierge’ clinics, for example, patients can pay an additional annual fee to receive more attention and time from the physicians. At other practices that are often linked to larger employer networks, like Massachusetts General Hospital or Dartmouth College, covered employees can receive a comprehensive, blanket coverage for their utilization of the associated health care facility, as is the case with the Ambulatory Practice of the Future and Dartmouth Health Connect.

Health management and continuous care are much easier to support with this method that allows more fluid, frequent interaction between patient and provider, even to the point of casual drop-ins to the healthcare facility. As one source points out, “bundled payments, value-based health plans… will incorporate incentives for health providers to address prevention and wellness, prevent hospital readmissions, and engage patients in more self-care (Sarasohn-Kahn, 2011). Revised payments
are also being considered in light of evolving care delivery methods that are more difficult to bill for than traditional methods. Virtual and email communication, for example, pose an interesting development in payment plans, particularly as they are being utilized at increasing rates across the industry.

Operationally, the adoption of a capitated or bundled payment plan supports the concept of patient-centeredness and encourages greater continuity and time spent at the primary care facility. Moving away from a fee-for-visit approach encourages people to come to site as often as they want without penalty and to look to it as a center of multiple resources. Architecturally, more spaces should be created that are less commonly found in traditional clinical settings; these might include lifestyle health and wellness areas that are open to the public and require no clinical supervision. Likewise, the examination room itself should be complemented with less institutional settings that focus more on discussion and wellness support.
Architectural problems compound issues already existing in the healthcare context. They stem from institutional primary care settings and help undermine both the real and perceived quality of care provided to patients, as well as the staff’s working environment. Traditional outpatient facility design accommodates increasingly outdated models that lack a comprehensive consideration of patient and staff needs. The typical doctor’s office and exam room are characterized by overly compartmentalized and hierarchical spaces that are both isolating for staff and alienating for patients.

Evolutions in design practices have begun to demonstrate greater consideration of the user’s comfort, convenience, and overall experience. Recent trends in outpatient settings include providing more amenities and collaborative spaces to better support patients and staff. In addition, integrated technology is allowing even greater personalization of these areas and enhancing access, quality, and continuity of care. Newer facilities such as the Waldron Health Centre are also being located and designed with stronger connections to the community in response.
Overview of Past and Current Problems

Traditionally, clinic and exam room efficiency and hygiene were two of the primary focus areas of clinical design; while these are important, they can also lead to institutional, minimalist designs that are more alienating than welcoming to patients. Traditional designs also tend to support physician-centric, hierarchical practices that can be demeaning to patients and other members of the staff team. These facilities are characterized by internal boundaries, separated services, and misallocated space that restricts more innovative, collaborative care approaches.

Figure 56: Problems in the Architecture Context (Crews)

**Drawback #1**
*Isolated Physicians*
- Physicians work in private offices
- Separated from rest of clinical staff
- Limited face-to-face communication with co-workers

**Drawback #2**
*Inflexible Exam Rooms*
- Small exam rooms at 90 square feet
- Limited space for caregivers and staff
- Variation in design of rooms limits uses

**Drawback #3**
*Inefficient Design*
- Large waiting space contributes to patient delays
- Communication challenges as clinical staff workspace spread across unit

Figure 57: Examples of Limitations in Traditional Clinic Design (Bentley, 2011, p. 9)
Physician-Centric Design

Traditional clinic design emphasizes the role of the physician and organizes other spaces around the primary provider office. In the physician-centric clinical module, groups of exam rooms are clustered around the private office of their associated physician. Nursing stations are decentralized and located near each physician office and medical supplies (Vickery, “Clinic Design: The Clinic Module,” 2012). This type of design can force patients to walk unnecessarily long distances to reach their exam room and can create confusing networks of unclear circulation paths that are mixed between patient and staff use. Shared resources are not utilized to their full potential, particularly when nursing stations are divided into smaller satellite stations that prevent effective coordination of care delivery.

With the move toward team-based care and staffing models, the traditional physician-centered clinical layout is no longer valid or practical. The layout should focus on the patient’s experience and movement throughout the setting, as well as the staff’s experience of working in a supportive, collaborative environment. Providing open team spaces reduces the hierarchy established by a physician-centered approach and allows greater trust and communication to develop. Patients will be more likely

Figure 58: Clinic Module E - Physician-Centric
(Source: HGA, “Trends in the Clinic, 2012; diagram created by Judith Crews)
to frequent the clinic if they can anticipate a personalized experience that responds to their needs and wishes. Staff members will benefit from an enriched open setting of connected work stations that promote continuous education and shared responsibilities.

Figure 59: Traditional Row of Exam Rooms for Each Physician Office
(http://blog.lesliesaul.com/inspiration/the-evolution-of-corporate-interior-design-from-openness-to-openness/)
Institutional Environment

Another important fault in current clinical design is the institutionalism many settings communicate. In these settings, the patient experience is often secondary to other concerns such as operational efficiency and minimizing facility or capital cost. Minimalist exam rooms are one manifestation of this practice as clinics operating under the fee-for-service model try to squeeze in as many exam rooms as possible to accommodate higher patient volumes and maximize throughput. Though the FGI Guidelines recommends a minimum of 80sf of clear floor area in standard exam rooms, this base standard inhibits patient comfort while limiting staff interaction and collaboration. As one source elaborates, “clinics that focus on fast, convenient care often have compact, uniform exam rooms that have just enough room for an exam table, supply storage, basic seating, and possibly a small staff work area” (Vickery, “Clinic Design: The Exam Room,” 2012).

A traditional patient room, as illustrated by HGA architects, is less than 100 square feet with minimal space for extra family members or a larger care team. The patient zone is an uncomfortable corner next to the door that has poor visibility to the physician’s monitor in the opposite corner. A large exam table dominates the
space and leaves little to no room for supportive discussions or educational opportunities.

**Exam Room Size Assessment**

<table>
<thead>
<tr>
<th>&lt;90 SF</th>
<th>100 SF</th>
<th>110–120 SF</th>
<th>150+ SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>“An Anachronism”</td>
<td>“A Tight Fit”</td>
<td>“The Sweet Spot”</td>
<td>“Unnecessary for Most”</td>
</tr>
<tr>
<td>Inflexible; limited “wiggle room” to accommodate extra care team member, caregiver, mobile equipment and side-by-side consult</td>
<td>Currently sufficient for most visits but limited flexibility to accommodate team-based care, electronic information sharing</td>
<td>Comfortably accommodates three distinct zones for provider, patient and family, as well as clinical and IT equipment</td>
<td>Financially challenging for most practices, used primarily for consult-intensive specialties such as oncology</td>
</tr>
</tbody>
</table>

Figure 62: Exam Room Size Assessment (Bentley, 2011, p. 41)
In the past, the image of the clinic has been that of a foreign, austere setting that is avoided until necessary. Small exam rooms were cluttered with medical equipment used only by the provider to examine the patient. A large exam table dominated much of the available space and rendered the patient more submissive and subordinate stretched out on the table in a vulnerable position. If family space was provided, it usually appeared as a chair or two against the wall, far from the patient. The facility’s overall aesthetic traditionally reflected this same sterility with finishes and furnishings that spoke to hygiene and efficiency rather than patient experience and comfort, essential factors within the vision of this thesis project.

A new design should better respond to the perceptions of both patients and staff who spend often substantial amounts of time in the setting. The facility should become an inviting, interactive destination that encourages family support, both in the exam room and other public support spaces for lifestyle amenities. Following these design concepts will help the setting change from an institution utilized for treating an illness to a healthy support center.
Internal Boundaries and Separation of Services

Physician-centric design and excessive institutionalism are linked to the continued over-reliance on internal boundaries within healthcare settings that divide members of the clinical staff into isolated rooms and disconnected areas. While a certain number of private rooms are necessary to conduct medical visits and protect patient privacy, existing clinics perpetuate inefficient hierarchies and separated services that detract from providing open, quality care that brings patients and providers together in an enriched, collaborative environment.

The rigid separation of clinical areas reduces opportunities for communication and education among all types of user groups. Previous clinical layouts tend to locate nurses’ stations in areas remote from the physician’s work space or office area, as illustrated in the clinic layout on the following page (Nyberg and Vickery, 2012). The traditional clinic also tends to have “separate, distinct locations for patient, nurse, medical assistant and physician communication” (Sweetland et al., 2012).
Figure 67: Clinic Module E - Physician-Centric (HGA, "Trends in the Clinic, 2012; diagram created by Judith Crews)
The separation of services also forces patients to make multiple stops during a routine visit and can make the patient experience comparable to being on an assembly line. Disconnected, isolated spaces for activities like registration, taking vitals, examination, consultation, data entry, follow-up, and check out create complicated flow processes and waste both time and energy of patients or staff. In a larger context, current clinics tend to be designed as isolated care delivery sites that lack the technology and architectural expression for connecting to a larger network of providers at remote sites. Internally-focused clinics demonstrate design features that fail to accommodate the necessary technology and open shared spaces for accommodating rotating or visiting specialist support.

Creating distinct boundaries between public and clinical zones reinforces the image of the clinic as a being a sterile, even alienating, setting. The separation of spaces shrouds the clinical zone in an aura of mystery and can make the patient less trusting of and isolated from the care providers. Reducing the amount of internal boundaries would allow greater collaboration and partnership to take place in a setting that seeks to function as a healthy and lifestyle support center.

Figure 68: Traditional Patient Flow Map
(Bentley, 2011, p. 26; recreated by Judith Crews)
In many primary care clinics, space is often misallocated by providing a significant proportion of ‘back of house’ support spaces compared to public or patient use spaces. Administration and office support areas tend to take up too much of the upfront zone that should be dedicated more to amenities that support the patient’s experience. Storage for medical records, for example, can require a large amount of square footage for a passive function that receives sporadic use by the staff and is off-limits to patients. Changing to electronic medical records will help reduce the need for this excessive record storage over time and save on space allocation.

Oversized administrative and office support areas can also create a strong boundary between the upfront zone and the rest of the clinical care areas. This reinforces the atmosphere of internal boundaries and reduces opportunities for transparency and open communication or flow between the two areas. More patient and family support areas should replace large office support spaces and create opportunities to enhance the patient experience as well as provide personalized attention to the individual’s needs. Alternative methods of registration and check-in offer means to reduce the need for inflated, institutional waiting areas and sub-waiting areas.
Instead, these steps could become integrated into other spaces that could help improve the efficiency of the practice's operations and simplify the patient's flow throughout the visit by reducing the number of disparate stops needed.

Figure 71: Clinic Module E - Physician-Centric (HGA, “Trends in the Clinic, 2012; diagram created by Judith Crews)
A new model for primary care centers should seek to minimize the space needed for administrative and office support areas. Exam and consult rooms should be designed so that more of the post-appointment activities can take place within that room, rather than the patient having to make multiple stops on the way out. The reception area should also be designed to improve the speed of check-in by allowing patients to self-register and input data, saving the time and space needed for receptionists. Greater reliance on digital data and electronic health records would also reduce the need for large medical record storage, which could be moved further from the upfront and administrative areas to deeper within the support spaces or even off-site. Reducing the amount of space needed for these back of house activities would allow more space to be dedicated to patient and family use, encouraging people to see the center as a non-institutional, visitor-friendly environment.
Overview of Evolving Trends

According to one source, “in the design field, clinical and operational perspectives combined with innovative architectural approaches will be needed to create the best designs for evolving health care delivery” (Sweetland et al., 2012). This same source suggests that the physical design of outpatient care facilities should consider evolving changes in the following elements: information technology, open team centers, flexible standard rooms, and patient-centered environments (Sweetland et al., 2012).

These elements and more are discussed in the following sections that describe different trends that are evolving in healthcare design in response to both the physical and operational problems noted previously. Other important developments include the expansion of care services to new or alternative types of settings, collaborative spaces that promote interaction among patients and staff, and reaching out the community in new ways that respond to contextual needs. Together, these changes to the built environment begin to create an improved setting that channels visions and goals parallel to those of this thesis project.

Figure 72: Three Goals of Ambulatory Facility Design of the Future (Bentley, 2011, p.15)
One evolving trend in the built environment is the development of new architectural facility types that help improve patient access and are generally located in areas more convenient to people’s everyday routine. “Every day, many consumers cannot get to a doctor at convenient times and locations, so they get care where they can access it and when they want it: from emergency rooms, retail clinics, or a growing array of options outside of the conventional doctor’s office” (Sarasohn-Kahn, 2011). These newer options for primary care sites should be placed in locations that relate to people’s daily activities and events and may include schools, work sites, stores, homes, or even the virtual world (Sarasohn-Kahn, 2011).

For example, the number of community health centers and safety-net clinics is rising as a way to provide health services to the underinsured or uninsured. Health centers, which may include federally-qualified health centers, are community-based and patient-directed to better serve the surrounding populations. They focus on vulnerable populations in medically underserved areas that include people of all races, ages, and insurance coverage (US Department of Health and Human Services, 2012). Community health centers receive the greatest use by underinsured patients.
(55% of visits) and by patients under age forty-five (65% of visits).

Other settings that are more accessible and accommodating to the working person’s lifestyle are also becoming more popular. These include retail and worksite clinics, and even home settings supported by information technology, that are designed to provide easy, convenient care to patients who are already balancing busy lifestyles. Retail clinics are receiving more usage because of their open scheduling and shorter wait times, and they projected to grow in number from 4,500 to 6,000 in the next five years (Mehrotra et al., 2008). Many of them are located in retail pharmacies like CVS or superstores like Wal-Mart that are often a stop on people’s daily routine and

Figure 75: Visits by Primary Care Setting and Payment Source: United States, 2008 (Hing & Uddin, 2010)

Figure 76: Rise of Retail Clinics (http://mjperry.blogspot.com/2010_06_20_archive.html)
are also already designed to maximize user convenience. They receive the greatest use by people between the ages of eighteen and forty-four, most often for treating a simple acute condition or forms of preventive care including immunizations (Mehrotra et al., 2008). This population based approach tends to value settings that can reduce wasted time or unnecessary waiting; as one source explains, “retail clinics might be particularly attractive because it is often difficult to obtain a timely PCP appointment and because EDs have long waiting times” (Mehrotra et al., 2008). While this architectural type continues to develop, there is concern that retail clinics will disturb the continuity of primary care physician-patient partnerships because of their attention to providing episodic care rather than providing continuous, preventive care and chronic disease management support (Mehrotra et al., 2008).

Worksite clinics are likewise growing in usage again, following a decline starting in the 1970s due to infrastructural changes in the economy and industry. Currently, one-quarter to one-third of large employers have clinics either on-site or near the work site, and this number is likely to grow due to clauses in the Affordable Care Act that promote employee-provided prevention and wellness programs (Sarasohn-
There are economic benefits to employers for providing worksite health support; according to Helen Darling, president of the National Business Group on Health, “employers are seeing the health centers as a way to get more for their money” because they can reduce healthcare costs through promoting health and preventing disease (Sarasohn-Kahn, 2011). Better health care services result in fewer days missed, better worker productivity, and fewer on-site injuries or disability days (Sarasohn-Kahn, 2011). These worksite clinics and wellness services may be managed by third-party vendors or hired clinical staff on-site or may be offered off-site at nearby facilities through contractual arrangements with community health providers (Sarasohn-Kahn, 2011). More progressive businesses are also starting to incorporate full-time wellness coaches into their on-site wellness programs (Nyberg & Vickery, 2012).

Sources suggest the need for greater innovation in facility location and design to better accommodate patients and improve access. New ideas point to solutions in creating a new facility typology or relying more heavily on technology to expand communication and contact. “Providers may need to consider extending primary
care services to locations far beyond traditional settings such as hospitals, doctors’ offices, and bricks-and-mortar clinics.” (Sarasohn-Kahn, 2011) The new types of settings that have developed highlight the characteristics with which patients are concerned, including accessibility, convenience, and expanded services at a ‘one-stop shop.’ Newly designed clinics should incorporate these same strategies but with better design alternatives than those offered by retail clinics, for example, that lack individualized patient support and are designed to be easily replicated, uniform prototypes within a larger branded identity. These new types of settings also reveal important trends concerning the users; more government-funded settings like health centers and community health centers are providing services to the underinsured, uninsured, minority, and elderly populations. However, the insured, professional-age individual who would benefit significantly from health education and prevention training is largely excluded from these policy changes. The need for a primary care center that caters to this population group is essential to reducing the threat of the ever-growing ‘primary care crisis.’
Patient-Centric Design

Newer facilities are responding to many of the principles set forth by the patient-centered medical home and similar operational models by creating physical environments that likewise enhance the patient experience. Building layout and design can reduce patient stress and encourage a sense of personal attachment to the facility. The overall layout provides easy access from the surroundings and improves flow with clear circulation routes or repeated hierarchical elements rather than serpentine circulation paths through a disorganized clutter of program spaces. Wayfinding within the facility can be achieved by a variety of navigational cues and orienting features. At the Whittier Clinic in Minneapolis, a neighborhood clinic completed in 2010 by HGA Architects, color branding on the exterior facade is repeated throughout the interior with a paired symbol or motif to designate different pods; patients receive a card following check-in that corresponds to which pod their exam room is located in. Not only do the colors form an aesthetically pleasing and unifying element in the facility design, but they also help ease the language barrier in communicating directions to a distinctly multi-lingual patient population (Nyberg & Vickery, “Community Feedback”, 2012).
Incorporating natural daylight and views to the exterior surroundings is also being implemented more in new facility design. Strategies that are linked to these design goals aid patients in finding their way through the facility by intuition and recognition of familiar landmarks outside the building. Highly glazed circulation spaces and patient-focused areas promote opportunities for both daylight and views. These are evident in the North Portland Clinic, completed in 2007, that introduces a wall of glazing along its south facade to bring daylight into circulation and gallery spaces, as well as views out to the street. This facility also respects cultural sensitivities by incorporating murals by a local artist into this gallery space (“Mahlum”, 2009).

Allowing patients to have greater choice in how they receive care and engage in the space is also being translated through patient-focused designs, such as those that offer an option of different types of waiting or treatment spaces. This concept of engaging visitors in their surroundings encourages them to be more proactive and involved, which should also translate to their self-management approach in healthcare. Providing personalized flow processes and self-directed experiences now allows patients to determine how they wish to receive care and in which
type of environment. For example, at the Brooklyn Infusion Center, the entry area is designed so that patients have a choice of self check-in at a kiosk or registering through a traditional receptionist. Following this decision, they can decide which type of treatment setting they prefer, either a private treatment room or an interactive space within the ‘Central Garden,’ and move unsupervised to this space. They can also choose to engage in non-clinical activities that in a flexible public art gallery adjacent to the entry area (“Transforming the Patient Experience”, 2011).

Exam room design is another key space category that is beginning to better support patient-provider partnerships and invests greater activity and responsibility in the patient. “The most successful exam rooms streamline work processes, help alleviate ‘white coat anxiety’ for patients, and break down barriers by placing the caregiver side-by-side with the patients as patients take greater ownership of their healthcare” (Vickery, “Clinic Design: The Exam Room,” 2012). More facilities are even moving away from the traditional exam room and providing consultation or “talking” rooms instead. Studies show that approximately one-fifth of ambulatory care visits in 2007 resulted in diagnoses of conditions other than acute illness or injury, revealing that
in many cases the institutional exam table is not necessary (Schappert & Rechsteiner, 2011). Instead, settings that support more collaborative or discussion-based visits are evolving in healthcare design. These can appear as care suites, with a consult room preceding each exam room in a 1:1 ratio or as a 2:1 configuration with one exam room flanked by two consultation rooms, also referred to as the “three-part exam room” (Nyberg & Vickery, 2011, p.190-192). Other design approaches include the “exam + rooms” design of a larger exam room, usually 130 to 140 square feet, that accommodates more space for education demonstrations or additional members of the patient’s care team or family (Nyberg & Vickery, 2011, p. 191).

The evolution of larger exam rooms creates space for a discussion area with furnishings that encourage providers and patients to sit side by side and review tests or results around a table. These exam room round-table areas are evident in a number of newer primary care designs, including the Ambulatory Practice of the Future, Adelante Healthcare Mesa, and Dartmouth Health Connect. Many of these settings are also trying to reduce the amount of institutional clutter within these exam rooms to make them more inviting and patient-friendly. Built-in medical
equipment and warmer material palettes and finishes help reduce the sterility and clinical aesthetic of exam rooms. In the Mill City Clinic, for example, equipment is hidden behind sleek dark-stained cabinetry, and local artwork and reading materials enliven the walls. At Dartmouth Health Connect, the exam rooms walls are painted in warm tones of orange and yellow and contain portions of exposed brick to create a more residential or familiar aesthetic.

Clinics that are moving toward a patient-centered design approach should reflect greater consideration of the patient’s experience and seek to create an environment that is supportive and familiar to the average individual. In order to reduce stress for the patient or visitor, travel through the space should be clear and simple to reduce confusion and disorientation. The setting can become more inviting for visitors through materials or even artwork that are reminiscent of home or the local culture. Even allowing the patient to have greater choice in how they move through the space or how they engage within the space gives them a greater sense of control, rather than submission, that is important to communicate a sense of empowerment.
Collaborative Spaces

While clinical modules have begun to develop better collaborative areas for staff, moving from divided offices to open proximate spaces, a next phase of design will be necessary to ensure staff members are truly working integratively as a cohesive but diversely skilled team. Team-based pods are being utilized in some facilities now as a way to help organize the building into smaller components from which a set of staff members operates together. These are repeated team-based modules of both clinical and support spaces that include open, collaborative spaces for the staff. Christine Vickery writes that “as the collaborative care model is becoming more prevalent, designers have been locating nurses’ stations and physicians’ offices close to each other (or eliminating private offices altogether) to provide shared work areas and more opportunities for communication” (“Clinic Design: The Clinic Module”).

In some pod layouts, these spaces are arranged at the far side of the pod and include a row of distinct physician workstations across an open circulation space from a similar row of nurse workstations. An example of this design appears in HGA’s Lake Region Clinic. In other pod layouts, the room modules are generally oriented around a large, open staff hub area. Examples of facilities that use this approach to lay out
their core collaborative staff areas include the North Portland Clinic, Smiley’s Clinic, and the Whittier Clinic.

These larger team spaces are a more flexible design alternative or supplement to multiple private offices. They begin to address the previously mentioned issue of internal boundaries and physician-centric design; “the open team center is one design response to the traditional clinic that has separate, distinct locations for patient, nurse, medical assistant and physician communication” (Sweetland et al., 2012). Overall, these areas tend to be larger than shared spaces in the past and result in work areas increasing in proportion to exam rooms to support greater collaboration and reliance on computerization (Stavins et al., 2011). They improve communication among staff members as well as increased visibility and transparency between providers and patients, important components within this thesis project.

Collaborative spaces are becoming more important not only in healthcare design but in many other fields as well as the value of teamwork and shared decision making gains deeper respect and more frequent use. In primary care settings,
collaborative spaces that allow multiple providers to interact as a team are vital to providing a comprehensive, holistic package of care delivery. These team-based settings create an organizational opportunity to lay out the clinic according to pods that host various care teams. Group exam or consult settings are also appearing more frequently that replace individual exam rooms. All group or team areas should be flexible, open spaces to accommodate both large and small meetings, as well as formal and informal interactions; even niches along corridors are proving to be beneficial areas for impromptu collaborations.
Supplemental Amenities

The concepts of patient-centeredness and a holistic view toward health have helped create a trend for incorporating more wellness-oriented spaces and services into the design of outpatient primary care facilities. As previously discussed, traditional facilities often have large administrative and office support areas and limit the amount of space allocated to patient-focused support areas. In newer models, the reduction of certain administrative spaces allows opportunities to create space for non-traditional programs that support a more comprehensive approach to health. At the Allve wellness center, for example, a cooking demonstration kitchen is included on-site, as well as a healthy cafe and community garden, to encourage users to eat more nutritiously and learn how to have a balanced diet. The facility also offers an exercise room and indoor walking paths to support rehabilitation programs and promote fitness and activity among all visitors to the site (Johnson & Speck, 2012).

Other facility types are also evolving that are specifically intended as health and wellness sites that provide alternative medicine services. These often incorporate behavioral health programs and spaces as a component of their advanced comprehension, and they promote patient education and collaboration with
providers, goals that are particularly relevant to this thesis project. At Duke Integrative Medicine, for example, the program incorporates a Spa and Body Awareness area to complement the more traditional exam spaces. A carefully designed and landscaped Zen Garden accompanies dispersed meditation spaces that provide flexible, calming areas for patients. Additional nutrition services are housed in a cooking demonstration area with an adjacent café that support patients, visitors, and even staff alike with healthier eating options (“Duke”, 2003).

It is important for supplemental amenities to be available for staff access as well or to provide additional amenity areas for the providers. Amenities for staff use can help recruit and retain providers and encourage them to remain within the field of primary care, an objective that is crucial to help curb primary care provider shortages. In-demand younger providers often bring more expectations for what should be offered at the workplace; as one source explains, “they [Gen Yers] expect to work long hours, so they expect their work environments to accommodate their personal needs...benefits such as on-site gym facilities, alternate work settings, child care, and flexible work schedules” (Redman & Kelly, 2011).
Practice of the Future, an on-site fitness room is provided for the staff. At the Whittier Clinic, a staff relaxation room houses a massage chair that allows providers to relax and rejuvenate as their schedule allows (Molly Jacques, 16 Oct. 2012). As another source suggests, “to recruit and retain the best, institutions must create space that supports staff. Access to natural light, lounges, and adequate work space are desired amenities, and in turn, competitive recruitment tools” (Stavins et al., 2011).

Expanding the traditional range of services and spaces within a primary care setting is one method of allowing it to become better integrated into an individual’s everyday lifestyle. Incorporating lifestyle support spaces and amenities can improve patient satisfaction as they are able to accomplish multiple tasks within a one-stop setting. These supplemental spaces also reflect the diversification of the care team, which may include members from non-clinical backgrounds; the facility can become more operationally efficient by incorporating all necessary resources for patient education and training, as well as providing the staff with amenities that support their busy lifestyle. Space for amenity services should be kept flexible to allow for interchangeable programs and a range of user type and number.
Community Outreach

Offering supplemental amenities works in tandem with another evolving trend that shows more and more healthcare facilities trying to reach out to the surrounding community in innovative ways. For example, main public waiting areas are serving more functions now in response to the community’s needs. “In some instances, they serve as a community gathering spot with such amenities as coffee shops and public education spaces with computers for patient education” (Vickery, “Clinic Design: The Waiting Room”, 2012). Other sources recommend that clinics connect to their surroundings by offering space for community programs and social activities, or by featuring art and architectural elements that relate to specific cultural groups in the area (Keller et al., 2011).

Incorporating public spaces and programs into the entry areas brings more people into interaction with the facility. It supports the notion of healthcare facilities acting as daily lifestyle support centers, rather than strictly institutional settings that only offer treatment and care services. Community-focused spaces soften the image of the facility and help blur the traditionally rigid boundaries between public and clinical realms. On the Owatonna Healthcare Campus, for example, a Wellness Walk
provides an open space that brings together patients, providers, and the public. It features program areas like a coffee and gift shop, a reflection center, and a solarium along a path that begins at the main entry and loops through the ground floor. The Wellness Walk is designed for “encouraging people to walk for health... and serves as an invitation to the community to come to the site on a regular basis, not only for illness but for health as well” (Nyberg & Vickery, 2011, p. 40).

Access to the facility and its public services is easier when the site is integrated with community activities.
In many cases, this involves consideration of the site’s landscaping and external connection to existing public areas in close proximity. According to Christine Vickery, “the natural environment and sustainable landscaping continue to gain importance as healthcare organizations focus on well-planned spaces that help patients relax and feel welcome.” Plazas, gardens, and other landscaped areas can help link a facility to the surroundings (Vickery, “Clinic Design: The Entry Sequence,” 2012).

More facilities are also beginning to provide adaptable community or meeting space, particularly in areas close to the entry or that can be isolated for use after typical clinic hours. These community rooms create opportunities for health education as well as public gatherings or special programs (Sweetland et al., 2012). They tend to integrate a degree of transformability to accommodate different types of activities and sizes of user groups and are able to support both public and clinical meetings. The Whittier Clinic, Adelante Healthcare Mesa, and Allve wellness facility are just a few examples of facilities that are now devoting spaces to flexible community use.
Integrating art or open gallery spaces into the facility is another design strategy that is becoming more common. The North Portland Clinic is a clear example of this trend, as well as the Mill City Clinic, Brooklyn Infusion Center, and Waldron Health Centre, which all incorporate open areas for displaying art or other exhibits, either in a specific space or within a larger multipurpose area like a multi-story atrium. Cafes, grocery marts, or farmers markets are likewise appearing more frequently in the design of a facility’s upfront spaces to support a more comprehensive approach to healthcare and also make the site more convenient to visitors as a one-stop-shop destination. Adelante Healthcare Mesa, for example, features a healthy café and grocery on site that are complemented by periodic farmer’s markets and a garden container program (Wingler et al., 2012).

Allowing the public realm to bleed into the healthcare setting is an evolving trend that helps facilities to reduce their institutional branding. Incorporating open meeting spaces for the community will help the facility to establish a presence within the city; it opens the communication between clinical functions and social functions. These rooms should be located near the entrance to the primary care center so that they
are easily accessible and can be isolated for use after typical office hours when the clinical zone is closed to the public. Transparent materials will open these spaces up further to the community, giving them high visibility from inside the clinic, from the exterior street, or both. The provision of community spaces can also be supported by material choices and artwork that reflects the community and the local culture.
Technology

The operational benefits of health information technology have been previously discussed, yet the physical response to evolving technological changes is also a key aspect in architectural design. As one source explains, “the real game changing nature of technology will further drive design as touch interfaces, self-measuring devices, virtual examinations, gesture technology, and augmented reality transform how care is provided in the near future” (Stavins et al., 2011). Evolutions in clinical design are better accommodating technology and providing a higher degree of adaptability to support technological changes in the future.

One manifestation of technology’s influence is the development of the telemedicine room to promote alternative methods of communication and improved access to care. These rooms are larger than standard exam rooms so they fit additional equipment needed for virtual consultations between patients and a remote specialist or support provider. These rooms also provide space for the patient’s on-site provider or care team to be present during the virtual consultation, another reason for the increased size. The Open Door Community Health Center is one example that incorporates telemedicine rooms into its design, as well as the Lake Region Clinic.
Self check-in areas and patient kiosks are other technology-supportive design strategies that increase patient responsibility, choice, and access. Entry and reception areas are now being designed with designated spaces for patients to self-register or enter electronic data into the clinic’s system. They still tend to be supported by traditional registration areas that include a staffed desk to accommodate different types of patient preference, as evidenced in the Ambulatory Practice of the Future, Adelante Healthcare Mesa, and the Brooklyn Infusion Center. At Adelante Healthcare Mesa, a personal pager system like those commonly found in restaurants allows patients to utilize the surrounding upfront amenities so that their wait is a more engaging, productive experience (Wingler et al., 2012).

The pace at which technology changes requires flexibility with how it gets integrated into healthcare settings. Its influence and effect have a profound impact on how care is being delivered and how both patients and staff experience healthcare settings. Technology can expand accessibility and communication virtually without bounds; it can allow practices to operate on a 24-hour basis as patients communicate via phone or computer with any member of their care team, or even with remote...
specialists during typical office visits. However, there is an important balance with integrating technology; while it is a valuable tool, it should also not be allowed to isolate the patient from providers. It should support partnerships as an accessory tool, rather than the central focus. Overall, the role and use of technology should be such that allows the facility to operate with efficient excellence and innovation, helping staff to complete tasks with ease and speed, and patients without the assistance of clinicians.
Education is an essential element in being able to break an unwanted cycle, learning from the past to improve the future. In the healthcare context, this means understanding the factors attributing the primary care crisis and how they can be remediated through a proactive, comprehensive approach to health. In the architectural context, it means looking at the limitations of traditional settings and designing with greater flexibility to support new and future care methods. Education is an important bridge between past and future, shortcomings and successes.

A major claim of this thesis project is that education should be a key component of primary care, evident in its practice approach and physical design. The idea of evidence-based design is rooted in observing or testing a setting and is likewise linked to becoming more educated on which practices are most effective. This thesis seeks to develop a new model that supports educating patients and staff on quality care and health management; it will be a much-needed testable prototype for understanding better care delivery methods, called for by many sources. This chapter outlines the unique aspects of this thesis by defining the notion of a Healthcare Innovation Zone and the role of education within this network.
Two important influences appear as legitimate grounds on which to form a foundation for this thesis project that is directly linked to today’s healthcare context and to the near future. They outline significant elements that impact the healthcare environment and establish claims and recommendations that are relevant to both operational and architectural design decisions. One is the Affordable Care Act, which was recently passed in 2010 and specifically appeals for the formation of Healthcare Innovation Zones, a concept that this thesis seeks to develop more clearly in architectural terms. The other influence is the development of the Advanced Medical Home, an approach envisioned by the American College of Physicians that currently lacks physical definition and opportunities for testing.

In both cases, there is a recognized need for change within the existing system and a call for new solutions that could be addressed in the architectural realm as well as the political or conceptual. These two key drivers create an opportunity for this thesis project to function as a response to a request, even a demand, for a new primary care model.
The Affordable Care Act

The Affordable Care Act [ACA] is an important piece of public policy that helps define the current healthcare environment and has repercussions that will extend into the future. These effects are important to consider as the act includes policies that greatly impact the potential clientele for a primary care facility. It also includes policies that are related to specific services or reimbursements that should be considered when planning a new facility in order to take advantage of certain incentives and prepare for changes in service demands.

Specific sections within the ACA alter the past pool of potential users and traditionally offered services, as well as the way payment and care is delivered and will be delivered in the future as various clauses continue to be enacted. Overall, the number of insured individuals in the United States will increase by 32 million people. This includes expansion of the Medicaid program, coverage for early retirees, coverage for young adults on their parents’ plan until age 26, and offering tax credits for middle and low-income families or small businesses that provide insurance benefits to workers (HealthCare.gov, 2012). The Affordable Care Act impacts the way care to these groups and the general population is handled; for example, physicians

Figure 121: Expansion of Insurance Coverage (HealthCare.gov)
will be more tied to outcomes as payments change to being based on the quality of care provided. Payments will also be revised through a bundled payment pilot program that takes a more holistic and comprehensive approach to healthcare, a concern that is likewise reflected in the $15 billion granted to creating a Prevention and Public Health Fund (HealthCare.gov, 2012).

The focus on prevention and population health is evident in the expansion of free services that are also included in the Affordable Care Act. More free preventive services will be offered that cover a range of immunizations, screenings, and counseling. The acts describes sixteen covered preventive services for adults, such as screenings for blood pressure, cholesterol, and type 2 diabetes and counseling for alcohol misuse and obesity. Twenty-two covered preventive services are extended to women that include well-woman visits and screenings for breast cancer or osteoporosis, among others. Children receive twenty-seven covered services, such as a range of screenings, behavioral assessments, and immunization vaccines. Medicare recipients are also given additional services that include an annual wellness visit as part of their personalized prevention plan. (HealthCare.gov) These expansions are
important because they will contribute to a rising demand for preventive services and create an opportunity to better address a comprehensive approach to health and wellness within the primary care context.

The design of the physical environment will likewise need to respond to this expanded user pool and their various needs. The architectural context for health care and health maintenance should communicate parallel concerns through patient-centric settings that define the facility as an integrative support center that speaks more to promoting health than treating disease. With the increase of services such as wellness visits and the establishment of personalized health plans that encourage repeated, continuous interaction between individuals and their providers, primary care centers will need to be designed with more personalized, supportive attention to patient and staff experience. This will mean designing spaces to be more welcoming and familiar, as opposed to alienating and institutional, to encourage individuals to take advantage of these covered services and maximizing their overall health and wellness.
Portions of the Affordable Care Act are devoted to the creation of the Center for Medicare and Medicaid Innovation that introduces new opportunities for creating innovative care models. Title III of the ACA describes the new center and the scope of its associated tasks that are clearly outlined in the Framework of New Program Considerations and Criteria. Key recommendations for developing new care models include creating comprehensive models that use provider groups to coordinate care and support health management within a system of care institutions that are encouraged to test methods and share the resulting information with the larger network (Title III, Section 3021, i-xv). Recommendations also relate to payment approaches by establishing “models that transition primary care practices away from fee-for-service based reimbursement and toward comprehensive payment” (Title III, Section 3021, i). Technology is another important component of the CMI’s focus and using a health information technology-enabled provider network to coordinate care (Title III, Section 3021, v).

The Center for Medicare and Medicaid Innovation has already begun to set up a number of programs that are relevant to primary care and embody the previously
described scope and framework recommendations. These include programs for bundled payments, Health Care Innovation Awards, and a Comprehensive Primary Care Initiative that recognizes the historic gap in attention to primary care: “primary care is critical to promoting health, improving care, and reducing overall system costs, but it has been historically under-funded and under-valued in the United States” (Centers for Medicare and Medicaid Services, 2012).

Linked to the qualifications of this thesis project is the State Innovation Models Initiative, which is a competitive pilot program that asks states to take the initiative in “planning, designing, testing, and supporting evaluation of new payment and service delivery models in the context of larger health system transformation” (Center for Medicare & Medicaid Innovation, 2012). Along with this initiative is the overall goal of raising population health and lowering health risks, and $275 million is dedicated to funding models that states develop that work to achieve this goal and the other provisions established by the CMI for more comprehensive, multi-player solutions.
The most crucial element of the new center’s program considerations is the idea of the Healthcare Innovation Zone. The Affordable Care Act specifically calls for the CMI to develop and test innovative models that are associated with “Healthcare Innovation Zones, consisting of groups of providers that include a teaching hospital, physicians, and other clinical entities, that, through their structure, operations, and joint-activity deliver a full spectrum of integrated and comprehensive health care services to applicable individuals while also incorporating innovative methods for the clinical training of future health care professionals (Title III, Section 3021, xviii).

Figure 127: Components of the Healthcare Innovation Zone (Crews)
This thesis project seeks to develop one key component of this Healthcare Innovation Zone, the ‘clinical entity,’ as an important bridge between medical and public realms. The concept of the Healthcare Innovation Zone begins to address the problems discussed earlier by focusing on integrative, coordinated care delivery and an enhanced approach to healthcare. A new model for primary care should likewise be developed that better responds to the innovative ideas represented in this healthcare network and provides a health-focused support setting for patients, staff, and public alike. Its architectural design should align with its conceptual goals of collaboration as well as education as a way to integrate health into everyday life.

The ACA defines the elements that will be important to consider in this new, innovative care delivery models. It begins to suggest the services and even spaces that should be developed to promote coordination among these different entities and also to support integrated, comprehensive care delivery for patients. The idea of the Healthcare Innovation Zone also incorporates consideration of the medical staff and the education and training of providers, goals that are elemental to this thesis project and directly respond to existing primary care problems with physician
shortages. Altogether, the proposed model for a new clinical entity within a Healthcare Innovation Zone creates an important opportunity to respond to the impending primary care crisis by developing an improved support setting that focuses holistically on prevention, education, and management of health.

The influence of the Affordable Care Act is necessary to consider when developing the design for a new primary care model. The act’s policies change the potential pool of users as well as staff; increasing the number of people who will be demanding primary care services as more people have access to insurance and as more services are covered by insurance. Staffing will also be reevaluated as team-based care is encouraged with support from professionals with non-traditional medical training, leading to a more holistic approach for care delivery. The proposal for a newly developed Healthcare Innovation Zone is a defining element and overall premise of this thesis project. It acts as a realistic motivator to create a new primary care model that brings together innovative operations and architectural design.
The patient-centered medical home and the advanced medical home are essentially the same model in theory and mission. What is commonly referred to as the patient-centered medical home, endorsed by the American Academy of Family Physicians, is referred to as the advanced medical home by the American College of Physicians. The American College of Physicians is currently still developing the evidence-based guidelines that need to be established for designating practices as advanced medical homes, and is exploring various options for improved delivery methods and design. The proposals for advanced medical home certification relate back to the core principles of patient-centered care and the Chronic Care Model, detailed to the right (American College of Physicians, 2006).

Improved care delivery is needed that links patients and personal providers in a comprehensive form of engagement. The advanced medical home model aims to achieve higher quality through patient-centered care; it “acknowledges that the best quality of care is provided not in episodic, illness-oriented, complaint-based care – but through patient-centered, physician-guided, cost-efficient, longitudinal care that encompasses and values both the art and science of medicine” (ACP, 2006).

**Key Attributes of the Advanced Medical Home:**

1. Use of evidence-based medicine and support tools to guide decision-making
2. Use of the Chronic Care Model (CCM) to organize care delivery while providing better care for those with or without a chronic disease
3. Creation of an integrated, continuous care plan within the context of a provider-patient partnership
4. Improved access through alternative communication methods, i.e. telephone or email
5. Establishment of key quality indicators to trace health improvements in clients
6. Use of technology to support information exchange and patient access to health information
7. Participation in feedback programs that provide performance levels and further recommendations

Figure 128: Key Attributes of the Advanced Medical Home (Source: ACP, 2006)
Within this model, the patient is framed as an engaged, proactive participant with the physician acting as facilitator, coordinator, advocate, and partner to the patient. There is a focus on education and training so that patients can become skilled at understanding and managing their own health. Using information technology is a key component in the model that is meant to further education, care planning, care coordination, and performance monitoring of the providers (ACP, 2006). The model recognizes that the “improved functional and clinical outcomes are the product of an informed, activated patient and a prepared, proactive practice team” (ACP, 2006). These concerns are aligned with the visions of this thesis project and help to inform design decisions so that the architectural design of the advanced medical home aligns with its conceptual design.

Current descriptions of the advanced medical home lack a physical reality that would...
help translate its goals into a physical reality that is able to tested and observed. The American College of Physicians indicates an interest in utilizing evidence-based practices yet lacks a valid infrastructure in which to test its conceived model. This thesis project represents an opportunity to develop such a physical setting that would respond to the call by providers and better accommodate their needs and desires, as well as those of patients around which the model is focused.

The principles of the advanced home model clearly point to a solution that focuses on a packaged delivery of customized care that should be provided in a setting that is likewise comprehensive, personalized, and collaborative. It will need to provide spaces for interactive partnerships to develop and support enriching educational and training experiences. It will also need to be easily and frequently accessed, in part because of the revised payment approach proposed by the advanced medical home model that parallels a boutique or concierge approach rather than the fee for service approach.

Creating a facility that enhances the medical staff’s working experience will also
be essential. The ACP stresses the importance of teaching and educating future professionals so that they are better prepared to work in a home model environment. This can be best achieved by placing them directly in such an environment while they are still students; giving students the opportunity to “receive ‘translational education’ that allows them to translate the knowledge they have learned into effective and high quality care of patients” will ensure better outcomes and help stem the primary care crisis (ACP, 2006). It will also help recruit and retain potential primary care providers by providing on-site training experience that gives them greater exposure and connection to the primary care context. This setting needs to be an innovative, enriching environment in order to effectively capture the interest of young professionals. It should promote valuable opportunities for cross-collaboration among different care providers through open, transparent spaces that encourage teamwork, peer learning, and continuing education.

The recommendations set forth by the American College of Physicians reflect the developments in a healthcare approach that centers on the patient and providing comprehensive, continuous care. They help provide the framework for this
project, which functions as a response to the calls for consideration and testing of certification criteria envisaged by the ACP. In response to these guidelines, new primary care clinics should focus their energies on creating environments that support collaborative, holistic care. This will require changes to the way staff areas are designed so that care teams can replace independently working physicians. It will also require reexamining the exam room, or replacing the exam room, so that it is more patient-centric than physician-centric. Programmatic changes will include improving access, expanding services, altering payment, and sharing information through technology support.
Bringing education into the clinical setting is a proposed response to the previously outlined problems in both the healthcare and architectural contexts. By nature, it encourages a collaborative, innovative environment that is beneficial for creating better outcomes and higher quality care delivery. The new primary care setting should support teaching and training between patients and providers and between experienced and emerging medical professionals.

Architects and their healthcare clients are developing new typologies that better accommodate educational opportunities, in a range of settings that include health education institutes or academic medical campuses, and even academic clinic modules, as well as evolving hybrid models. These facilities are all designed to promote learning and enrichment, as well as many of the other stated goals of this thesis project, including collaboration, personalized support, and comprehensiveness. The continued exploration and refinement of this area of architecture will be important to create settings for enhanced patient and staff education that is essential to stemming the primary care crisis. Lessons can be learned from all of these building types about how to design more user-friendly, educational spaces.
The Importance of Educating Patients and Staff

One of the primary goals and unique elements of this thesis proposal is the creation of a healthcare environment that actively supports the education of patients and staff alike. Patient education can be instrumental in staunching the impending primary care crisis as individuals learn to manage their health and avoid acute or chronic conditions. Patient education helps with better adherence to the provider’s orders by creating an understandable foundation for self-management and prevention; it can be supported through more intimate, individual exam or consult room settings or in a more collaborative, group environment. According to one source, “recent data indicate that shared appointments can improve patient satisfaction, quality of life and quality of care indicators” (Mann et al., 2010).

This collaborative educational setting should be available for the staff as well, particularly in a concerted effort to recruit residents to the field of primary care. The American College of Physicians strongly encourages changes to the education of practitioners in order to improve the quality of care and to respond to evolutions in healthcare delivery, including the development of the advanced medical home; “to better prepare physicians for practice in settings using the advanced medical
home model, changes in training will be needed in undergraduate and graduate medical education as well as in continuing medical education” (ACP, 2006). Future professionals will need to learn to work in settings that support team-based approaches to providing comprehensive, collaborative care. In order to ensure a smoother transition to the evolving trends in primary care approaches discussed earlier, resident students “should understand the principles of best models of care, and should have an opportunity to see how such models are effectively utilized” in well-functioning, architecturally appropriate settings (ACP, 2006). The proposed new model for an educationally-enriched healthcare setting should enhance the experience of students and practicing providers alike through opportunities for teamwork, peer training, and continuing education. These needs can be directly addressed through an architectural language that infuses innovation and openness into every level of detail and allows transparent communication and information exchange to permeate throughout the facility and the greater network of a Healthcare Innovation Zone.
Health education institutes exist outside the immediate realm of healthcare settings that provide care, yet they provide important illustrations of architecturally relevant collaborative, educational spaces. One example of this is the Edmonton Clinic Health Academy, which actually connects via skywalks to an outpatient building. The academy promotes collaboration and flexibility, as well as functionality and efficiency in its design, all of which are directly relevant to this thesis project.

It supports “academic collisions” by vertically stacking programs rather than isolating them to one floor (Shelow, 2012). This same concept is evident at the Phoenix Health Sciences Education Building, which incorporates niche spaces into hallways and even stairway landings to accommodate impromptu meetings and collaborative sessions. These are open spaces that encourage interest in those who pass by and allow permeable opportunities for education.

Design solutions related to adaptability are also evident in these facility types. The Academy’s Discovery Mall connects areas throughout the facility and features flexible meeting and office space for rotating incubator projects. 90 percent of the
The top three floors have removable partitions so that the space is more flexible and adaptable for these changing programs. (Shelow, 2012) Modular furniture and building systems at the Phoenix Health Sciences Education Building support various types of educational programs, meetings, and group sizes.

Transparency is also a key design feature of newer health education settings, as well as wayfinding. Their primary functions are education and research related, and these innovative, research-intensive areas are often put on display, both inside and outside the building. At the Edmonton Clinic Health Academy, a large interior “main street” runs the length of every floor while a central atrium space provides an open setting for researchers, students, and faculty to meet and discuss. (Shelow, 2012) The Phoenix Health Sciences Education Building uses exposed structure and glass walls in a majority of its conference and meeting rooms. Both use color to help people navigate through the spaces, by color-coding floors, collaborative areas, or even the facade. The enriching and educational opportunities offered by these design decisions are highly applicable and informative within the scope of this thesis project.
More directly linked to the field of healthcare settings and architecture, academic clinics extend education and training opportunities to care providers as well as patients. According to one source, “academic clinics are teaching clinics, they serve the dual purpose of patient care and student education. Exam rooms must consider patient privacy while still providing a centrally located teaching zone and faculty zone” (Vickery, “Clinic Design: The Clinic Module”, 2012). Architecturally, a new typology known as the academic clinic module is beginning to be developed that supports an education-based approach to healthcare.

These settings are typically affiliated with medical schools and teaching hospitals; they provide space on-site that supports medical faculty and medical students in their residency program. The Whittier Clinic is an example of an academic clinic that is owned by the large Hennepin County Medical Center. It hosts up to thirty residents in rotational training, as well as medical faculty. Specific areas are dedicated to these users, including a flexible residency classroom and faculty work stations. One clinical pod is dedicated to the residency program and contains a precepting area for faculty and residents to interact and collaborate. (Molly Jacques, 16 Oct. 2012)
At the right are two examples of academic clinic modules developed by HGA Architects. Both feature an open, collaborative core with surrounding exam rooms. In the first module, this core has work stations for all members of the care team, which can include residents. This is the basic design of the Whittier Clinic, which increases the size of this hub for its residency pod and incorporates an additional ‘precepting’ space. This module focuses on education among providers, allowing them to work side by side in a team-based setting, yet its design limits opportunities for patients, such as group education rooms.

Figure 141: Academic Clinic Module B (Source: HGA, “Trends in the Clinic”, 2012; diagram created by Judith Crews)
The second module dedicates its core as a ‘teaching zone’ for professors and residents yet creates dispersed stations for other providers. It includes remote physician offices, rather than creating an open collaborative space for all.

Both modules remain limited in the educational spaces they provide and the collaboration that can take place among these internal settings. Another step needs to be taken to further the developments made by these facility types so that architecture and practice are jointly addressed in an innovative setting both in the care it provides and the education it bestows.

Figure 142: Academic Clinic Module B (Source: HGA, “Trends in the Clinic”, 2012; diagram created by Judith Crews)
Forming a Healthcare Innovation Zone: The Next Step in Design

The next step is the unique focus of this thesis project, which seeks to define and complete a Healthcare Innovation Zone in response to the primary care crisis and the evolutions in primary care settings. Within this setting, new philosophies on and approaches to education will encourage greater participation and active involvement among all users. It will be grounded on the principle of reciprocity, aligning with the idea that “good teachers do more than pass on facts: they help students learn how to learn” (Dubberly et al., 2010). This approach assumes that patients and providers all learn from each other, as teachers also learn from their students.

This new architectural typology will be a space to educate, learn, and design. Integrating the goals previously outlined will result in a flexible, adaptable space that promotes transparency among users. This type of openness and flexibility in design will help with “creating conditions in which users become designers - creating spaces in which people can learn and grow” (Dubberly et al., 2010). Allowing users to engage in the architecture and the process of care delivery will yield a higher level of personalized support. In the following chapters, the physical design of such a setting will be detailed through general recommendations and specific solutions.
Each of the guidelines relates back to multiple goals that communicate the vision of a new primary care model: one that supports an integrative approach to healthcare, enhances patient and staff experience, and achieves operational excellence. The architectural design of the facility should channel these concepts in an innovative building type that successfully supports the new model of a clinical entity within a Healthcare Innovation Zone. It should be seen as a facility of both public and medical use, and the following guidelines demonstrate how physical design should support the intended program, users, and operations of the primary care center.

These design principles attempt to resolve existing issues and present new strategies that should improve the healthcare experience through the built environment. Overall, the guidelines work together as a cohesive set of strategies that will allow designers to produce an integrated setting for primary care that can benefit a range of settings. The mission is to fulfill what one sources describes as “the outpatient environment [becoming] a health and wellness destination as opposed to a place for people to go only when they are sick” (Sweetland et al., 2012).
GUIDELINE 1: GRADIENT ZONES

GUIDELINE 2: TRANSPARENCY

GUIDELINE 3: SIMPLIFIED CIRCULATION

GUIDELINE 4: MODULAR PLANNING

GUIDELINE 5: POD GROUPINGS

GUIDELINE 6: OPEN TEAM HUBS

GUIDELINE 7: STANDARDIZED CARE ROOMS

GUIDELINE 8: TRANSFORMABLE SPACE

Figure 145: Design Guidelines and Associated Goals (Crews)
Guideline 1 - Gradient Zones

Creating gradual transitions between public and clinical realms improves the integration of the primary health center into everyday life and use. Promoting the concept and image of an “open door” policy invites more visitors to use the site and can help reduce some of the existing mystery of healthcare activities.

The overall appearance and image of the facility can begin to communicate this policy, particularly in the way its immediate surroundings, footprint, and facade are designed. Christine Vickery of HGA stresses the importance that entry design has on inspiring confidence in the facility’s commitment to quality care as visitors approach. She writes that a well-designed entrance should “include distinctive architectural elements to create a visible entrance and reinforce a sense of community” (“The Next Wave”, 2012). The Arizona State University Health Services Building uses prominent forms by designing a transparent Entry Pavilion to establish a strong pedestrian connection and connect to the historic Palm Walk on campus. This pavilion and garden courts become the “front door” of the facility along the high traffic volume promenade (Orcutt/Winslow, 2012). Inside, open public space reflects the exterior circulation and provides access to other public-use programs like a pharmacy.
According to one source, “exterior access areas now take into consideration public transportation, walking or bike access, no longer assuming that every patient will arrive by automobile” (Sweetland et al., 2012). Primary care center designs that fully achieve fluidity and permeability with the public must consider both pedestrian and vehicular approaches. For all entrants, establishing an entry sequence that involves a gradual transition from open public to private clinical zones allows visitors to filter through the site according to their needs and helps reduce cross-circulation of clinical and non-clinical users. Example options for this transition of zones include connecting to adjacent public plazas, mirroring an exterior public promenade inside the building (like the ASU Health Services Building), or wrapping the facility with transparent open circulation space.

The Waldron Health Centre by Henley Halebrown Rorrison in South London uses the first approach of connecting to a public plaza to set up an entry series of five spaces that gradually lead to a clinical room. The “narrative journey” begins in the public square around which the center is designed, and takes a visitor into an open foyer, followed by a more intimate cloister, waiting room, and finally clinical room.
Overall, the clinic reaches out to its surroundings by connecting to public plazas and introducing public amenities into its program that include retail spaces and a community cafe. (Saieh, 2011)

In order to function as a place that serves as a lifestyle amenity, rather than an institutional setting, the new model for a primary care center can further reach out to the community by creating public and semi-public spaces throughout the building. While traditional primary care sites may load clinical spaces immediately at the entry, transition spaces should be created that allow the public to use the site for non-medical related activities.
More innovative architectural clinics like the North Portland Clinic invite the public into the facility by featuring a prominent art gallery as a fluid transition space between the exterior sidewalk and the interior medical functions. This gallery features local artwork and establishes a strong connection to the community, which can inspire greater feelings of loyalty and trust in the visitors.

Figure 153: Upfront Public Gallery Space at the North Portland Clinic (Source: “Mahlum”, 2009; diagram created by Judith Crews)

Figure 154: Example of Local Artwork at the North Portland Clinic (“Mahlum”, 2009)
The upfront area should also be heavily programmed with public amenities to bring a more diverse clientele to the site and allow those who come to use it as a convenient “one stop shop” for achieving many of their everyday needs. At Adelante Healthcare Mesa, the entry area is supported by spaces that focus on wellness and nutrition and include a healthy cafe, pharmacy, and multipurpose community room; patients can access these spaces freely during their wait through the use of patient pagers (Wingler et al., 2012). Programs offered at the clinic reach out to and bring in the community by tying in to the local farmer’s market, a container gardening project, and cooking education classes (2012 Facility Tours).

Public program spaces should also be designed so that they can be accessed after clinical hours to allow the facility to function more fully as a non-institutional, lifestyle-integrated setting. Throughout the entire facility, smaller zones of public activity should be dispersed to lessen the boundaries between upfront and clinical zones and may include locating program spaces like retail or community use deeper into the building.
Guideline 2 - Transparency

Infusing the primary health center with transparency will remove alienating internal boundaries in public areas and place appropriate health activities and education on display. Transparency should be integrated carefully into the facility with respect to the programming of clinical areas where patient privacy must be maintained. It is beneficial in public areas intended to engage the general population with the activities taking place within, such as community rooms or the demonstration kitchen. The same amount of visibility can compromise patient and even staff privacy in other areas though, like the care rooms; therefore, transparency should reflect a gradient concept by being incorporated more in open, public programming but not in protected clinical areas.

A sense of transparency can be employed in the exterior design. Large amounts of glazing in public areas create open connections between exterior and interior and allow visitors to begin to interact with the facility before they even enter. This openness creates a sense of welcome that is important in gaining patient trust and allowing individuals to use the site in a fluid, personalized way. According to one source, “a welcoming, familiar, and unintimidating environment that alleviates
patient anxiety and stress is essential for delivering quality care" (Keller, et al, 2011). Exterior glazing is also beneficial for bringing more daylight to the interior that can make the facility feel less institutional and become more therapeutic. At night, the effect can be reversed so that light radiates from the facility and transforms it into a beacon within the city, giving it a stronger physical presence and iconic branding to which the community can relate. The Whittier Clinic uses extensive glazing in its entry and waiting areas, both along the façade and with colored partition walls that incorporate the facility’s wayfinding motifs. This glazing system sends a message not only of physical transparency but also reminds visitors of the color branding of the larger Hennepin County Medical Center, which inspires confidence and loyalty.

As one source suggests, “the open concept allows for a more personal face-to-face experience as well as promoting visual control of the environment” (Sweetland, et al., 2012). In the design response, internal boundaries inside the new primary care center should be minimized, and an open layout should be established that communicates collaboration, honesty, and trust. Such a message will encourage patients to enter into valuable partnerships with their care providers if they are more
accessible and visible. A sense of transparency will also allow other visitors to the site to engage in the health-related communal activities taking place throughout the facility. These key spaces include the community room, education room, innovation zone, and research room. Putting these collaborative, educational health spaces on display removes some of the perceived ‘mystery’ behind clinical functions and celebrates wellness rather than exploiting sickness. Such spaces should be designed with extensive glazing and may differ somewhat in the type of glass or opacity level to suggest varied levels of transparency and accessibility.

At the Edmonton Clinic Health Academy, incubator research areas are located in a part of the building known as “Discovery Mall” that is placed right along the building’s main circulation promenade, allowing for more dynamic collaboration between researchers and the public. The entire building is designed for transparent connection to the surroundings; according to the vice provost Dr. Jane Drummond, “We wanted to have transparency and we wanted to demystify health research, and one way to do so was to make this an open and eye-catching building... We wanted people to be aware of what’s going on in here” (Shelow, 2012).
Not all spaces in the clinic are appropriate for such high levels of transparency. In the clinical zone, care rooms should have a low degree of transparency while in use to protect the patient’s privacy. Other design features such as transom or clerestory windows in both interior and exterior walls of the care rooms can be used instead to allow light to filter into the room and communicate a sense of connection to the rest of the facility. The Mill City Clinic, for example, places clerestory windows in its exam rooms that line the light-filled waiting area for this reason. Additionally, the overall layout of the clinical zone and within the proposed pods should maintain an openness that reduces the institutionalism and sense of enclosure or isolation that traditional practices tend to channel. The open staff hub and generous circulation space, complemented by wider corridors and transition zones, will reinforce transparency and fluid interaction throughout the new primary care model.
Guideline 3 - Simplified Circulation

Creating direct pathways and reducing disparate stops help users to circulate easily and efficiently through the site. Movement throughout the new primary care model should enhance the visitor’s experience by reducing stress and ensuring comfort. According to one source, “crowding, congestion, and difficulty in wayfinding in health care settings can cause patient stress, wasted time, and missed appointments” (Quan et al., 2011). A simple design for circulation is an important factor in enhancing movement throughout the facility. At the Edmonton Clinic Health Academy in Alberta, Canada, an indoor “main street” runs along every floor and overlooks the parallel vehicular street outside. A clear network of perpendicular secondary “streets” lead off this circulation spine to various departmental spaces while smaller, open gatherings spaces are also dispersed adjacent to the main street, much like sidewalk cafes. (Shelow, 2012)

One source suggests to “define movement through the facility using flow patterns reminiscent of significant cultural events and local natural space” (Capital Link, 2011). Circulation space within the new model should respond to the contextual surroundings by creating an environment that is similar to heavily-used pedestrian
spaces in the city. It should also consider the urban pattern of open spaces or street-abutted building facades and present either a natural extension of open spaces or an interesting contrast to fill such voids. Spatial hierarchies can also be used to distinguish key destinations, like check-in and registration, or intersections of circulations paths, including areas of vertical circulation. Christine Vickery suggests using architectural forms, changes in ceiling heights, dropped soffits, lighting, and contrasting finishes to create these visual hierarchies (“The Next Wave in Clinic Design”, 2011).

Providing key views out to the city should be incorporated into the design by using glazing along circulation spaces. This allows visitors to see prominent landmarks that can act as orientation devices as they make their way throughout the facility. The Shapiro Ambulatory Care Center incorporates floor to floor glazing along circulation and gathering spaces to create views out to recognizable features in its historic surroundings. A project designer describes how “the patient corridors run the length of the building, immediately accessible from the waiting area... so patients are oriented toward natural light and views of their neighborhood” (Silvis, 2012).
The Whittier Clinic places a fully glazed staff corridor along an exterior wall and allows views to outside across this space from within the clinical pod by creating an open line of sight between exam rooms. Natural daylighting also acts as an intuitive wayfinding cue and can work in tandem with the concept of views; however, glazing that allows daylight to enter without providing views is also useful as it does not obscure a patient’s line of sight while they are in motion. Recessed glazing that perpendicular to circulation allows daylight to enter from the side, rather than a harsh direct angle.
Simplified circulation can also be achieved by reducing the number of disparate stops patients must make during their visit. Clinical care rooms should be designed to allow more activities to take place within that space, such as checking vital signs or weight, entering electronic medical record data, and even checking out. This model of “one-stop” care involves providers moving to the patient rather than making the patient move to different locations in the clinic, enhancing the concept of patient-centeredness and personalized support (Keller et al., 2011). Integrating technology into the design can help advance this concept allowing space for point-of-care testing and portable diagnostic equipment within each larger care room or in a closely located storage room (Keller et al., 2011). The principle of simplifying patient movement also reduces the amount of travel for staff as well; colocation of services creates a more efficient workflow with minimized disruptions.
Guideline 4 - Modular Planning

A regulated system of grids and room sizes or configurations creates adaptability for change and future growth. The entire facility should be designed for flexibility and adaptability from the start, in anticipation of changes within the clinic or increasing volumes of patients and staff. This can be achieved through a regulated grid system and standardized modules that provide options for combining into larger units or dividing into smaller units (Keller et al., 2011).

As one source explains, “module and room design standardization allows clinics to grow in place without renovations and allows space to be used by different programs on different days, enhancing space utilization efficiency” (Stavins et al., 2011). This concept is particularly important in the clinical zone as different clinics may have varying patient needs or facility resources that demand alternative uses of spaces. Creating a regulated grid system that accommodates the exam room as a base unit allows greater flexibility and adaptability by the clinic. For example, examination and consultation rooms should be designed to be the same size, like those used at Adelante Healthcare Mesa. This way, their function can flex in the future if necessary without requiring renovations that would disrupt the clinical operations.
One source indicates that “the adaptation of the universal patient room — which has been a steady trend in inpatient environments — now is moving into ambulatory facilities as well. These rooms incorporate flexibility and adaptability for different patient types and different levels of outpatient acuity” (Sweetland et al., 2012). It is recommended that the exam/consult room base unit be designed at 120 nsf minimum so that they can flex in acuity level. According to the FGI Guidelines, rooms with 120 nsf and three feet of clearance around the exam table can be used as treatment rooms, as compared to smaller 80 nsf general examination rooms (FGI, 2010, p. 218-219). Accommodating the space for this alternative usage prior to construction can save important resources in time, energy, and cost in the future.
Other rooms within the clinical zone should also respond to this base unit and the overall structural grid at incremental sizes. Group consult rooms should be designed so that they could also flex in function in the future, either by being combined with surrounding rooms into a larger support space or being divided into smaller exam/consult units. This flexibility is a key component to ensuring certain goals within the context of this thesis project; it allows more opportunities for comprehensive care and personalized support of both patients and staff. It is suggested that “a flexible health center facility enhanced by a variety of technologies and spaces allows the patient, family, and interdisciplinary care team to choose the most effective methods for ... a coordinated plan of care” (Capital Link, 2011).

The use of a regulated grid system and modular configurations of rooms can also occur outside the clinical zone. Even in the upfront zone, spaces can be designed to reinforce the structural system and prepare for adaptability in the future. For example, the retail spaces and research support areas should be designed as modules that allow for “plug and play” programming, like the clinical zone, as the needs of the facility and the users change over time.
Team pods help organize and regulate room groupings within the clinical zone. These modules are a useful means of ensuring easier wayfinding and flow within the facility, as well as adaptability to growth and change, all of which are key goals for designing better primary care settings for the future. A number of clinics have begun to use pods as an organizational unit within the overall building layout. They can be arranged in several different ways to fit to the desired facility footprint. For example, the North Portland Clinic has three adjacent pods that are linked by the main patient circulation space as well as a more back of house staff corridor. At the Open Door Community Health Center in Eureka, five pods are laid out around a central courtyard and are similarly linked by both patient and staff circulation paths.

Each pod becomes a consistent base from which one or multiple clinical care teams can operate. They should contain private care and procedure rooms as well as shared support spaces for staff and clinical functions. Pods should be designed so that they have the potential to function as an independent unit, although it is also important to design complementary spaces like a staff break room to enhance the experience of the facility’s users. Even though pods may have the capability of functioning
independently, they should be arranged so that collaboration and interaction among patients and providers is not hampered and care teams can connect across pods.

Figure 181: Layout of Six Pods at the Whittier Clinic (Source: HGA Architects; diagram created by Judith Crews)

Figure 182: Detail of Pod at the Whittier Clinic (Crews)
In effect, the pods become a template for the layout of clinical rooms and spaces. Creating these repeated groups of rooms within the clinical zone helps patients with navigating their way to a care room. They eliminate the complex mazes that characterize some older clinical layouts.

Similar to helping patient navigation, creating standardized elements within healthcare settings also improves staff efficiency. Particularly in settings with fluid or rotational staffing approaches, this regulation provides consistency that all providers understand and are familiar with. Such a replicated pattern of care can
Figure 184: Opportunities for Horizontal and Vertical Expansion with Pods (Crews)

help reduce unnecessary steps and wasted time. Additionally, the clustering of care rooms creates a design opportunity for shared staff space and open workflow at the pod’s core. This layout better supports the operational model of multi-provider care teams than the traditional method of clustering a small number of exam rooms around a physician’s private office.

Pods are an effective way to accommodate for potential changes in staff and patient volumes as they can be easily repeated for future expansion. Depending on site and surroundings, this expansion can occur horizontally or vertically. Additional pods can be stacked on top of each other as more floors are added vertically, or side by side along a circulation route for horizontal expansion. Room for potential growth in either direction should be considered before the pods are laid out. Transition space should also be incorporated between or around pods to better allow for flexibility in adding additional pods during a time of growth. During slower times, the use of a particular pod can also be suspended if lower volumes no longer demand its need; because of the relative independence of each pod, the rest of the facility can operate as normal even if one is not being used.
Guideline 6 - Open Team Hubs

Open team hubs promote collaboration among staff and encourage better interaction between providers and patients. In traditional primary care models, a significant amount of space is designated to personal physician offices and separate nurse stations that reinforce isolation and solo work. The space would be better allocated to creating larger team hubs at the center of each clinical pod in place of private offices.

According to one source, “team communication is enhanced through direct communication that the open team center can facilitate. Open team centers cluster and centralize the physicians, staff, and the support personnel who care for the patient, allowing better access and communications” (Sweetland et al., 2012). Personal interviews with staff at the Ambulatory Practice of the Future, Whittier Clinic, and Dartmouth Health Connect, which all employ centralized open team hubs, reveal high staff satisfaction with the shared work space. These spaces support the evolving team operational approach and have been found to improve outcomes and work efficiency with more opportunities for discussions amongst all types of team members on shared patients.
These open team hubs should be designed with partial height partition walls to promote views across the clinical pod and allow providers and patients to maintain visual connections. The use of half walls “enables staff to monitor patient activity while out of the room, and also gives the patient a visual connection to staff and allows access to them for any questions they may have;” glass separations can be used to achieve a similar degree of visibility but with a greater degree of privacy for the staff (Sweetland et al., 2012).

The team core should also be designed with modular open work stations that can be used interchangeably by staff members, like at the Whittier Clinic, and may feature adjustable-height furniture that promotes personalization by individual users. These core work stations should be arranged to enhance collaborative work and educational opportunities by allowing team members to work side by side with open communication within the team and to other teams that share the open hub. They could further supported by low work tables at the center of the hub that bring teams together in a shared location and allow space for specialists or faculty mentors to participate in the teams’ interaction.
The concept of open team hubs can be repeated throughout the clinic at smaller scales as well to complement to main core space. These more intimate open pockets or niche spaces reinforce the goal of collaborative care by allowing providers or providers and patients to congregate within the clinical space for impromptu interactions; one source recommends designing these spaces along primary circulation routes with space for up to three or four people (Capital Link, 2011). These spaces also support the goal of personalized support by allowing patient-provider relationships to develop outside the clinical care rooms.

The open team concept can be incorporated into other staff areas like the break room and resident room to further promote opportunities for collaboration and peer education. Integrating larger staff support spaces with open layouts allows “increased communication between staff during break time or downtime. This encourages a private discussion of patient care or the latest health care research article” (Sweetland et al., 2012).

Figure 189: Dispersed Pocket Meeting Areas (www.steelcase.com)
Guideline 7 - Standardized Care Rooms

Creating a care suite of one exam room shared by two consult rooms provides a setting that better accommodates comprehensive patient support. This type of module within the clinical pod particularly promotes the goal of personalized support to enhance the patient experience by providing them with a choice of care setting. It prioritizes patient comfort and reduces stress by addressing a greater range of personal needs. Patients who feel more relaxed and comfortable in a clinical environment are more likely to reveal information to care providers and improve their interaction, factors that are essential to ensuring a comprehensive, collaborative care approach is taking place within the new primary care center (Capital Link, 2011).

The care suite presents a key opportunity to improve personalized experiences for patients and encourage them to identify the facility as a resource beyond the clinical visit. According to one source, “a carefully designed, patient-centered environment can improve patient satisfaction. Designs of outpatient environments are changing to accommodate the patient experience for the different populations they serve” (Sweetland et al., 2012).

The care suite creates an easily shared environment that reflects the various needs
Figure 194: “Talking” Room at Adelante Healthcare Mesa (Wingler et al., 2012)

of patients coming to the primary care center. It provides an examination space for
more clinical processes to take place but is conveniently supported by a more inviting,
conversational consultation room in which discussion can take place following an
exam. A number of primary care patients never need a physical examination; the
care suite provides a more flexible option for patients to come to simply discuss their
condition or become better trained in prevention and management techniques by
their care team in a less institutional setting.

The suite should be designed so that one has direct access into all of the rooms,
with additional doors leading directly from the central exam room to the flanking
consult rooms. Adelante Healthcare Mesa incorporates this design into their internal
medicine department as an adaptation of a Mayo demonstration project. Their use
of an exam room with two connecting “talking” rooms also increases throughput
by allowing staff the exam rooms to be cleaned and turned over to the next patient
while discussion and wrap-up is conducted in the “talking” room (Wingler et al.,
2012).
Both types of rooms within the suite should accommodate extra space for teaching and demonstration activities. Integrated technology including a computer monitor on a wall-mounted swivel arm should allow all occupants of the room to see the screen. This type of technology is used or recommended by the Ambulatory Practice of the Future, Dartmouth Health Connect, Mill City Clinic, Whittier Clinic, and a number of other primary care sites evidenced in both literature review case studies and site visits.

Extra space should also be allowed for family members to be involved in the exam or
consult, as well as additional members of the patient’s care team. In order to enhance patient-centeredness and comfort, space and furniture should be provided for extra family members who want to participate in developing the patient’s care plan or making decisions with the patient and provider (Sweetland et al., 2012; Keller et al., 2011). At Village Family Medicine, both greater patient comfort and more family space is provided on a couch that accommodates the patient as well in place of the typical exam table.

Figure 198: Care Suites of Exam and Consult Rooms Support Collaboration Among Patients, Providers, and Families (Crews)

Figure 199: Shared Patient and Family Space at Village Family Medicine (http://www.healthdesign.org/clinic-design/clinic-examples/village-family-medicine)
Guideline 8 - Transformable Space

Transformable spaces support flexible programming and can be easily adapted to accommodate current and future conditions. Transformable space is another way to accommodate flexibility and adaptability for changes over time. However, this one is more internally focused within each room or space, rather than a holistic recommendation on how spaces should be arranged to fit within a larger system.

Designing spaces so that they can be reconfigured in the future with minimal disruption to the rest of the clinic is an important aspect of flexibility, one of the primary goals of this thesis project (Capital Link, 2011). Because the primary care center is meant to operate as a constant support to patients, it is essential for the facility to be able to adapt to changes efficiently while not disrupting services to the patient base. These changes might occur based on the number of facility users, activities, furnishings, or even time of day, to name a few influences.

Key public spaces like the community room or education room should be designed so that they can be transformed to accommodate different usages that may include community programs, full staff meetings, or health education and training. Research
support areas should likewise be able to fulfill a range of needs and functions that may vary from staff-only research to clinical trials involving patients and volunteers. In addition to the upfront zone, clinical areas should also be designed with transformability in mind. The group consult rooms should allow for different types of educational sessions while the staff hub and other support areas should accommodate rotating specialists and other non-permanent staff.

Transformability can be achieved within a space in a number of ways. The use of movable building and furniture systems are key design concepts, as well as integrating modular elements within a room. For example, adjustable walls can help divide a space into smaller units or, if collapsed, create a larger space for bigger user groups. The Whittier Clinic uses this approach in their community support space with folding partition walls that can split the room into different sizes, such as when smaller staff meetings take place or when larger community programs like Girl Scout meetings take place. Other facilities like Al!ve use a glass-enclosed multipurpose space as both a gymnasium and a community support area.
Using modular furniture means spaces can be easily rearranged, combined, or broken apart to form various configurations. The Whittier Clinic uses this approach with modular workstations in the clinical staff team hubs; these partial-height stations can be adjusted to fit the needs of each user, who may change work location at the facility from one day to the next because of their fluid team approach. They also support rotating specialists who come to the clinic certain days of the week. Flexible adjustable-height stations at the center of each pod allow staff members to sit or stand while working and, following an interview at the Whittier Clinic, creates greater staff satisfaction through the personalized support (Molly Jacques, 16 Oct. 2012). Furniture companies in healthcare are responding to this trend as well by designing more flexible, modular furniture that can transform a space and better accommodates the needs of the time.
Conclusions

Altogether, the proposed guidelines help inform how a primary care clinical entity should be designed to fulfill its role as an integrative support center to patients, staff, and public users. The guidelines address previously identified problems in many existing clinical facilities and in combination provide an environment that offers greater personalized support in a less institutional setting. They bring together the project goals at a range of scales, from the building level to the room level, so that they permeate throughout the facility. An individual experiences the physical effects of these guidelines from their initial approach to the facility and throughout their time within the space, whether they are there for a clinical visit or for another lifestyle support program. The guidelines reflect the medical home model in that they focus on user comfort and control by offering a choice of settings, like the care suites or transformable spaces, that range from public to private at varying levels of transparency. Openness and collaboration are supported by the design strategies as ways to reduce clinical ‘mystery’ and make the facility more accessible to the public and patients. Consideration of the future is also incorporated through guidelines that encourage flexibility and adaptability to help the building respond easily to potential changes in users and needs within the greater Healthcare Innovation Zone.
Development of the program for this thesis project came following research on and visits to existing primary care facilities. Perspectives from both designers and medical staff were taken into consideration as well, through literature review as well as personal interviews. Other contextual factors addressed earlier like the Affordable Care Act and the American College of Physician’s Advanced Medical Home concept influenced the selection of particular programmatic and operational elements.

Overall, the facility incorporates more than primary care program areas. In order to address a larger context that comes from being a component of a greater Healthcare Innovation Zone, the proposed ‘clinical entity’ integrates flexible commercial lease space and open public space into the building program to supplement the clinical care spaces. Four floors of commercial shell space create the opportunity for a variety of tenants to lease program area that could help anchor the new model as a community-use facility. This space can easily accommodate medical researchers, for example, who would help bring a heightened sense of innovation and progress to the site. It can also accommodate more health and wellness focused programs that may have higher demands in the future, such as a fitness facility, rehabilitation
equipment, or even more specialized primary care services such as a women’s center. The other key non-clinical component of the building program is the public space, which is expanded so that the facility becomes a true ‘one-stop-shop’ that can meet a range of needs. These public spaces promote a holistic view of wellness by making healthy amenities more convenient and accessible; their offered services make the facility more conducive to being a lifestyle-integrated destination for the average individual. The supplemental amenities and services convert the center from being purely institutional to being more of a public-use facility that can be appreciated by patients, family, staff, and the community alike even after typical clinic hours. Like the Healthcare Innovation Zone itself, these public spaces create a greater network of services that can reach out comprehensively to the public.

The clinical services relate to the three main areas of treatment, prevention, and education. In some cases, these primary areas overlap as certain services can relate to two or more concepts, and they work together to provide a holistic approach to healthcare. When combined, they become a comprehensive packaged delivery of care and support the ultimate vision and goals of the thesis proposal.
Treatment. The increasing occurrence of chronic disease necessitates spaces that are efficient and functional while avoiding a feeling of institutionalism. Exam rooms that can accommodate varying levels of patient acuity and needs should be supported with minor procedure rooms to provide a range of treatment settings. Treatment areas should also consider the patient’s experience by colocating more services into a single space so that the “one stop shop” allows them to receive comprehensive care that may include treatment of multiple conditions.

Prevention. A greater number of preventive services are being covered through the Affordable Care Act, which will raise their demand. These include a range of screenings, immunizations, and counseling; annual wellness visits will also be covered for Medicare recipients to establish and maintain their personalized prevention plans (HealthCare.gov). Because of these factors, spaces will need to be developed that better accommodate higher volumes of users, as well as users who may not be coming for a traditional “sick visit.” Nontraditional clinical spaces should consider the expectations and satisfaction of those who visit for consultation purposes.
Education. The creation and development of personalized care plans will be a foundation for helping patients learn to manage their health. Education and training programs will help ‘apprentice’ patients toward being trained in a set of skills that allows them to control existing episodic or chronic health conditions and/or prevent new ones from occurring. Flexible spaces that support an educational program and learning experiences are vital to begin to redress the impending crisis in primary care and help both patients and staff understand the importance of primary care.

The proposed program is based around the concept of expanded holistic services that will require greater reliance on integrated technology throughout the space. It assumes that technological support will be offered through 24/7 virtual access, online pre-visit registration, and electronic medical record data entry that will improve overall access, patient flow, and care coordination at the center. The expansion of traditional medical services to accommodate overall wellness and better lifestyle decisions will make the new primary care model a “one-stop-shop” environment that benefits the entire surrounding community.
For the purposes of this thesis project, the proposed primary care clinical model caters to the working population of approximately twenty-five to sixty-five years of age, particularly the younger half of that demographic. This assumption is based on the idea that this population is less accustomed to a stagnant, episodic model of care and more willing to adopt a new model that is lifestyle integrated and based on education and coaching. Additionally, the younger demographic is a more reasonable target for preventive programs. Because there is a high number of community health centers and safety-net clinics already funded through the Affordable Care Act, this primary care center is meant to be more widely used by middle-income families with private insurance, or those with Medicare or Medicaid, rather than the uninsured or underinsured. It is also assumed that the average patient will be somewhat comfortable using and integrating technology in their lifestyle.

**Users**

For the purposes of this thesis project, the proposed primary care clinical model caters to the working population of approximately twenty-five to sixty-five years of age, particularly the younger half of that demographic. This assumption is based on the idea that this population is less accustomed to a stagnant, episodic model of care and more willing to adopt a new model that is lifestyle integrated and based on education and coaching. Additionally, the younger demographic is a more reasonable target for preventive programs. Because there is a high number of community health centers and safety-net clinics already funded through the Affordable Care Act, this primary care center is meant to be more widely used by middle-income families with private insurance, or those with Medicare or Medicaid, rather than the uninsured or underinsured. It is also assumed that the average patient will be somewhat comfortable using and integrating technology in their lifestyle.

**Patient Needs.** The intended users of the clinic are expected to come with a wide range of needs; as such, it will be important to supply a variety of lifestyle and amenity settings that fall within the guiding principle of gradient zoning. For those seeking treatment services, supportive clinical spaces will need to be provided
that are integrated with technology to ensure greater efficiency, better outcomes, and higher satisfaction. Those interested in health management and prevention or general care will need educational settings that are frequently not provided in many current primary care settings. In all cases, they will also need easy access to the facility’s expanded services.

Consideration of the staff is an essential aspect of this thesis project. In order to help remedy the primary care crisis, which stems from clinician dissatisfaction and growing shortage, it will be key to improve the experience of the staff working within the center. It is assumed that the center will operate with eight care teams of four to six members, with each team including a physician, nurse, and two health coaches. Residents will also be an important component of the staffing model; their presence will infuse the center with an educational purpose as these future professionals gain a firsthand connection to primary care and are encouraged to continue their careers in the field. Health coaches who may come from non-medical backgrounds will likewise bring a sense of innovation to the primary care centers as they act as the primary patient advocates and trainers. The interactions between physicians,
nurses, health coaches, and residents will layer experience and education in a new approach to healthcare delivery that yields greater satisfaction and outcomes for both staff and patients.

**Staff Needs.** A collaborative, non-hierarchical environment supported by open staff hubs with dedicated work spaces for all team members will help foster communication and teamwork. These “on-stage” staff areas should also be supplemented with “off-stage” areas that incorporate lifestyle amenities to enhance the work setting. Flexible spaces for a fluid team approach should also provide space for rotating 

![Team-Based Staffing Model](image-url)

Figure 214: Team-Based Staffing Model for the Proposed Primary Care Clinic (Crews)
specialists. Overall, simplicity and efficiency in both processes and physical design will help boost clinical operations and enhance the performance and experience of the staff.

Patients and staff overlap as users of the facility as well as in certain needs. Both groups would profit from a higher degree of personalized attention, which reflects one of the primary goals of this thesis project. The project is also grounded on the concept of patient-provider partnerships that require a high degree of collaboration and interaction among care teams and visitors. Another project goal of education is meant to be encouraged in both patients and staff alike through enriching, innovative spaces for training and research. Technology is a continuously evolving tool that can support the thesis goals and should be conscientiously integrated into the program and design of the new primary care center.
# Program Summary

<table>
<thead>
<tr>
<th>SPACES</th>
<th>TOTAL NSF</th>
<th>Multiplier</th>
<th>TOTAL DGSF</th>
</tr>
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<tr>
<td><strong>UPFRONT</strong></td>
<td>13,970</td>
<td>1.4</td>
<td>19,558</td>
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<tr>
<td>Reception and Waiting</td>
<td>2,280</td>
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<td>3,192</td>
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<tr>
<td>Patient/Visitor Amenities</td>
<td>8,800</td>
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<td>12,320</td>
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<tr>
<td>Health Research</td>
<td>800</td>
<td></td>
<td>1120</td>
</tr>
<tr>
<td>Administration</td>
<td>780</td>
<td></td>
<td>1092</td>
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<tr>
<td>Upfront Support</td>
<td>1,310</td>
<td></td>
<td>1834</td>
</tr>
<tr>
<td><strong>CLINICAL</strong></td>
<td>16,700</td>
<td>1.4</td>
<td>23,380</td>
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<tr>
<td>Pod 1</td>
<td>3,120</td>
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<td>4,368</td>
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<tr>
<td>Pod 2</td>
<td>3,120</td>
<td></td>
<td>4,368</td>
</tr>
<tr>
<td>Pod 3</td>
<td>3,120</td>
<td></td>
<td>4,368</td>
</tr>
<tr>
<td>Pod 4</td>
<td>3,120</td>
<td></td>
<td>4,368</td>
</tr>
<tr>
<td>Clinical Pod Support</td>
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<td></td>
<td>5,908</td>
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<tr>
<td><strong>SUPPORT</strong></td>
<td>37,340</td>
<td>1.25</td>
<td>46,675</td>
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<td>Commercial Space</td>
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<td>45,000</td>
</tr>
<tr>
<td>Building Support</td>
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<td>1,675</td>
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<td>89,613</td>
</tr>
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<tr>
<td><strong>TOTAL BGSF</strong></td>
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Figure 216: Summary of Proposed Program (Crews)
## Project Program

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<thead>
<tr>
<th>Space</th>
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<th>NSF</th>
<th>Total NSF</th>
<th>Comments</th>
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<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reception</td>
<td>1</td>
<td>80</td>
<td>80</td>
<td>Reception/greeter desk for 1 staff</td>
</tr>
<tr>
<td>Check-In</td>
<td>1</td>
<td>400</td>
<td>400</td>
<td>Check-in desk for 2-3 staff (50sf per person) with pager counter and multiple self check-in kiosks (30sf each)</td>
</tr>
<tr>
<td>Waiting Lobby</td>
<td>1</td>
<td>1800</td>
<td>1800</td>
<td>welcoming, group-oriented with clusters of seating, artwork and educational resources scattered throughout</td>
</tr>
<tr>
<td>Café Area</td>
<td>1</td>
<td>450</td>
<td>450</td>
<td>kitchen space with bar and tables; adjacent to healthy food mart and proximate to demonstration kitchen; seating for up to 30 people; includes grab and go counter area (15 sf per person)</td>
</tr>
<tr>
<td>Kitchen</td>
<td>1</td>
<td>300</td>
<td>300</td>
<td>adjacent to café area; includes storage; service door to exterior</td>
</tr>
<tr>
<td>Healthy Food Market</td>
<td>1</td>
<td>2000</td>
<td>2000</td>
<td>grocery store with focus on healthy local &amp; organic products; 2-3 cash registers near entry; proximate to loading dock and service area</td>
</tr>
<tr>
<td>Juice Bar</td>
<td>1</td>
<td>300</td>
<td>300</td>
<td>flexible program space; could be located closer to clinical area</td>
</tr>
<tr>
<td>Storage</td>
<td>1</td>
<td>200</td>
<td>200</td>
<td>close to service drop-off and building support area</td>
</tr>
<tr>
<td>Public Toilet</td>
<td>1</td>
<td>60</td>
<td>60</td>
<td>adjacent to café; single-use</td>
</tr>
<tr>
<td>IT/Library Resource Area</td>
<td></td>
<td>400</td>
<td>400</td>
<td>computer area and bookshelves with literature on health, wellness, common conditions, etc.; high visibility</td>
</tr>
<tr>
<td>Demonstration Kitchen</td>
<td>1</td>
<td>600</td>
<td>600</td>
<td>Regular-size kitchen area with large demonstration island; seating around bar for smaller groups or rows of seating for larger demonstrations; space for up to 20; available for use after normal office hours</td>
</tr>
<tr>
<td>Storage</td>
<td>1</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Figure 217: Project Program_Ufront Spaces (Crews)
<table>
<thead>
<tr>
<th>Space</th>
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<th>NSF</th>
<th>Total NSF</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td><strong>Upfront</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education Room</td>
<td>1</td>
<td>250</td>
<td>250</td>
<td>For lectures, health or fitness classes, training &amp; demonstrations;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>available for use after normal office hours</td>
</tr>
<tr>
<td>Storage</td>
<td>1</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Community Room</td>
<td>1</td>
<td>800</td>
<td>800</td>
<td>Flex space for community meetings, gatherings, exhibits, etc.; also</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>used for full staff meetings</td>
</tr>
<tr>
<td>Storage</td>
<td>1</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Innovation Zone</td>
<td>1</td>
<td>500</td>
<td>500</td>
<td>Space for research, training, &amp; testing by clinical staff and Piedmont</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Triad Research Park staff</td>
</tr>
<tr>
<td>Research Room</td>
<td>1</td>
<td>300</td>
<td>300</td>
<td>Staff and patient use; could function as demonstration area for</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>using fitness equipment or conducting clinical trials</td>
</tr>
<tr>
<td>Storage</td>
<td>1</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Pharmacy</td>
<td>1</td>
<td>1000</td>
<td>1000</td>
<td>Pharmacists' workspace and waiting area for picking up common prescriptions; high visibility and access</td>
</tr>
<tr>
<td>Retail Spaces</td>
<td>3</td>
<td>1000</td>
<td>3000</td>
<td>Health-related (i.e. vitamin or organic product store)</td>
</tr>
<tr>
<td>Administration Offices</td>
<td>4</td>
<td>100</td>
<td>400</td>
<td>Private offices for medical facility director, program coordinator, &amp;</td>
</tr>
<tr>
<td>Administratve Support</td>
<td>1</td>
<td>300</td>
<td>300</td>
<td>Educators</td>
</tr>
<tr>
<td>Office Support</td>
<td>1</td>
<td>80</td>
<td>80</td>
<td>8’x8’ cubicles for 4 billing, insurance, &amp; scheduling clerks</td>
</tr>
<tr>
<td>Public Toilets</td>
<td>2</td>
<td>200</td>
<td>400</td>
<td>Central area for files and equipment - copier, fax machine</td>
</tr>
<tr>
<td><strong>Total NSF</strong></td>
<td></td>
<td></td>
<td><strong>13970</strong></td>
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</tr>
<tr>
<td><strong>Multiplier</strong></td>
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<td></td>
<td><strong>1.4</strong></td>
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</tr>
<tr>
<td><strong>DGSF</strong></td>
<td></td>
<td></td>
<td><strong>19558</strong></td>
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Figure 218: Project Program_Upfront Spaces (Crews)
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<tr>
<th>Space</th>
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<th>NSF</th>
<th>Total NSF</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>POD MODULE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exam Room</td>
<td>4</td>
<td>120</td>
<td>480</td>
<td>includes exam chair and side discussion table; has two doors that connect to adjacent consultation rooms</td>
</tr>
<tr>
<td>Consultation Room</td>
<td>8</td>
<td>120</td>
<td>960</td>
<td>flexible for patient-team-(family) discussions; can be used alternatively as telemedicine room</td>
</tr>
<tr>
<td>Group Consult Room</td>
<td>1</td>
<td>360</td>
<td>360</td>
<td>space for 6 to 10 people, technology support, mainly discussion area with single patient recliner on side behind draw curtain</td>
</tr>
<tr>
<td>Minor Procedure Room</td>
<td>2</td>
<td>180</td>
<td>360</td>
<td>contains more equipment for light procedures; one per physician team; has patient toilets nearby</td>
</tr>
<tr>
<td>Staff Team Hub</td>
<td>1</td>
<td>480</td>
<td>480</td>
<td>space for 8 to 10 providers in central open core; enclosed with movable partitions of partial height</td>
</tr>
<tr>
<td>Patient Toilets</td>
<td>2</td>
<td>60</td>
<td>120</td>
<td>Adjacent to or very near minor procedure rooms</td>
</tr>
<tr>
<td>Clean Utility</td>
<td>1</td>
<td>120</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Soiled Utility</td>
<td>1</td>
<td>120</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Supply/Equipment Storage</td>
<td>1</td>
<td>120</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td><strong>Total NSF:</strong></td>
<td></td>
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<td>3120</td>
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<td><strong>Multiplier</strong></td>
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</tr>
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<td><strong>DGSF</strong></td>
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<tr>
<td><strong>4-POD CLINIC X 4</strong></td>
<td></td>
<td></td>
<td>17472</td>
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</table>

Figure 219: Project Program_Clinical Spaces (Crews)
### Clinical

**SHARED POD SUPPORT**

<table>
<thead>
<tr>
<th>Space</th>
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<tbody>
<tr>
<td>Greeter and Sub-Wait Area</td>
<td>2</td>
<td>400</td>
<td>800</td>
<td>one per floor level or per pairing of pods</td>
</tr>
<tr>
<td>Lab</td>
<td>1</td>
<td>480</td>
<td>480</td>
<td>shared by all provider teams</td>
</tr>
<tr>
<td>Imaging</td>
<td>1</td>
<td>900</td>
<td>900</td>
<td>shared by all provider teams</td>
</tr>
<tr>
<td>Staff Break Room</td>
<td>1</td>
<td>720</td>
<td>720</td>
<td>Kitchen area w/ refrigerator, sink, coffee, microwave; table &amp; chairs for up to 16</td>
</tr>
<tr>
<td>Staff Lockers</td>
<td>1</td>
<td>120</td>
<td>120</td>
<td>half-height lockers for personal storage</td>
</tr>
<tr>
<td>Residency Work &amp; Classroom</td>
<td>1</td>
<td>720</td>
<td>720</td>
<td>flexible space with computer stations and classroom-style lectures for 10 to 15 residents</td>
</tr>
<tr>
<td>Precepting Room</td>
<td>1</td>
<td>240</td>
<td>240</td>
<td>space for mentors to work and meet with residents</td>
</tr>
<tr>
<td>Staff Toilets</td>
<td>4</td>
<td>60</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td><strong>Total NSF:</strong></td>
<td></td>
<td></td>
<td><strong>4220</strong></td>
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<tr>
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Figure 220: Project Program _Clinical Spaces (Crews)
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<th># of Spaces</th>
<th>NSF</th>
<th>Total NSF</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Commercial Lease Space</td>
<td>4</td>
<td>8500</td>
<td>34000</td>
<td>flexible program space for researchers or rotating tenants to support health innovation and advancement; has its own vertical circulation and support services within programmed space</td>
</tr>
<tr>
<td>Shared Commercial Space</td>
<td>1</td>
<td>2000</td>
<td>2000</td>
<td>open space for large group gatherings or cross-over functions between commercial research and clinical programs; also for civic use; could incorporate upfront community room</td>
</tr>
<tr>
<td>Data and Electrical Equipment Storage</td>
<td>2</td>
<td>200</td>
<td>400</td>
<td>houses local server and storage for computer/IT equipment lockable central room that contains supplemental Information Technology equipment for educational sessions, demonstrations, virtual meetings, etc.</td>
</tr>
<tr>
<td>Janitors Closet</td>
<td>4</td>
<td>60</td>
<td>240</td>
<td>one per floor</td>
</tr>
<tr>
<td>Building Support</td>
<td>1</td>
<td>500</td>
<td>500</td>
<td>adjacent to loading deck for unloading, sorting, storing supplies</td>
</tr>
<tr>
<td>Trash &amp; Linen Storage</td>
<td>1</td>
<td>100</td>
<td>100</td>
<td>secure area for storing soiled linen and trash before pick-up</td>
</tr>
<tr>
<td>NSF</td>
<td></td>
<td></td>
<td>37340</td>
<td>NSF</td>
</tr>
<tr>
<td>Multiplier</td>
<td></td>
<td></td>
<td>1.25</td>
<td>Multiplier</td>
</tr>
<tr>
<td>DGSF</td>
<td></td>
<td></td>
<td>46675</td>
<td>DGSF</td>
</tr>
</tbody>
</table>

| Facility Totals       |             |      |           |                                                                                                                                         |
| TOTAL NSF             |             |      | 68010     |                                                                                                                                         |
| TOTAL DGSF            |             |      | 89613     |                                                                                                                                         |
| Multiplier            |             |      | 1.35      |                                                                                                                                         |
| TOTAL BGSF            |             |      | 120,978   |                                                                                                                                         |

Figure 221: Project Program _ Support Spaces and Facility Totals (Crews)
Primary Space Categories and Drivers

The major components of the program can be grouped into the following space categories: the public zone, clinical care space, and staff support areas. Distinguishing these zones relates back to primary visions of the project to enhance the experience of patients and staff alike and to support an integrative approach to primary care that encourages greater use of the facility by the surrounding community.

Programmatic strategies incorporate the overarching thesis goals into more specific principles for the new operational model and approach to primary care. They are:

1. Promote a comprehensive approach to health and wellness.
2. Foster collaboration among providers, patients, and all users of the space.
3. Create a setting for enriching educational experiences.
4. Provide personalized attention within a non-institutional environment.
5. Improve access through physical and operational strategies.
6. Optimize wayfinding for traveling within the facility.
7. Enhance flow patterns with efficient design and operation.
8. Accommodate future changes through flexibility and adaptability of space.
9. Integrate technology and innovation into design.
1 - PUBLIC SPACES
- RECEPTION
- CHECK-IN
- CAFE
- JUICE BAR
- WAITING LOBBY
- HEALTHY FOOD MARKET
- DEMONSTRATION KITCHEN
- IT/LIBRARY RESOURCE AREA
- EDUCATION ROOM
- COMMUNITY ROOM
- PHARMACY
- RETAIL

15,512 DGSF
17% OF TOTAL DGSF

2 - CLINICAL CARE SPACES
- EXAMINATION ROOMS
- CONSULTATION ROOMS
- GROUP CONSULT ROOMS
- PROCEDURE ROOMS
- IMAGING
- LAB

14,028 DGSF
16% OF TOTAL DGSF

3 - CLINICAL STAFF SUPPORT SPACES
- ADMINISTRATION
- INNOVATION ZONE
- RESEARCH ROOM
- STAFF BREAK ROOM & LOCKERS
- RESIDENCY WORK ROOM
- PRECEPTING ROOM
- TEAM HUBS

7,308 DGSF
8% OF TOTAL DGSF

Figure 222: Program Space Categories and Related Areas (Crews)
PUBLIC SPACES:

Features **public use areas** like retail and **amenities** that support the primary care center’s integration into the everyday lifestyle and ‘one-stop-shop’ environment. Educational and innovative resources promote productive waiting, as well as better health and wellness understanding.

**Check-In.** The check-in area should be located close to the building’s reception desk that acts as a transition between the public surroundings and the facility. It functions as a welcoming gateway, storefront and key information node for the clinical services and should be both highly visible and accessible from the entry. To accommodate different types of users and visitors to the facility, the check-in area should contain kiosks for self-registration and counters with two to three staff members at which patients can check in and provide electronically entered data to shorten their visit. Part of the counter should be dedicated as a pager pick-up point so that patients can move freely while waiting for their exam or consultation. The area should provide easy wayfinding with views to the facility’s supplemental spaces and amenities.

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 @ 400 nsf</td>
<td>4 to 8</td>
<td>Patients Staff</td>
<td>Check-In Registration Data Entry</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT/ FURNISHINGS</th>
<th>FUNCTIONAL RELATIONSHIPS</th>
<th>SPACE ATTRIBUTES</th>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main reception desk for 2-3 staff members; patient pager counter; bay with up to 5 self check-in kiosks</td>
<td>Near front reception desk and adjacent to waiting lobby</td>
<td>Visible from main entry and easy to access; welcoming</td>
<td>Assumes technology-supported check-in with pre-visit data entry</td>
</tr>
</tbody>
</table>

**Figure 223: Diagram of Registration Flow (Crews)**

**Figure 224: Summary of Check-In Space (Crews)**
Waiting. The waiting area can be reduced in size because of more efficient scheduling and pre-visit electronic data entry. It should be an open, inviting area that is adjacent to the reception desk and check-in and provides access to the clinical pods through a highly visible means of vertical circulation. The waiting area should be furnished with various choices of seating areas and is supported by dispersed smaller sub-waiting areas directly adjacent to the clinical pods. Views to the outside and natural daylight should be provided to enhance the waiting experience and provide navigation cues. Reading materials or televisions may be included to provide positive distractions to visitors who would also have easy access to a range of supplemental amenities in the immediate vicinaty.

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 @ 1800 nsf</td>
<td>Up to 80</td>
<td>Patients, Family, Visitors</td>
<td>Education - reading, Entertainment, Waiting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT/FURNISHINGS</th>
<th>FUNCTIONAL RELATIONSHIPS</th>
<th>SPACE ATTRIBUTES</th>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clusters of open seating and tables with educational resources</td>
<td>Adjacent to entry vestibule and check-in</td>
<td>Inviting, comfortable, choice of seating area, open, natural light, views to outside; acts as transition and circulation zone</td>
<td>Assumes 2.5 seats per care room, 20 sf per person; supplemented with sub-waiting areas in clinical zone</td>
</tr>
</tbody>
</table>

Figure 225: Shapiro Ambulatory Care Center Lobby (Silvis, 2012)

Figure 226: Waiting Atrium Space at Encircle Health Ambulatory Care Center (hga.com)

Figure 227: Summary of Waiting Space (Crews)
Education Area. Education area is designed for multifunctional programming that includes anything from seminars on health-related topics to instructional yoga sessions. Consequently, it is intended to be a transformable space with modular, mobile furnishings. It should be part of the public realm for after-hours use with easy access from the main public circulation space. Educational areas may also be dispersed throughout the facility to support the concept of placing education on display and encourage opportunities for collaboration.

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 @ 250 nsf</td>
<td>10 to 12</td>
<td>Patients, Family Visitors</td>
<td>Demonstrations, Training &amp; Lectures, Special Programs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT/FURNISHINGS</th>
<th>FUNCTIONAL RELATIONSHIPS</th>
<th>SPACE ATTRIBUTES</th>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile tables and chairs; technology support with projector and display wall</td>
<td>Close to waiting, with storage for equipment and furnishings nearby</td>
<td>Visible from waiting; flexible programming;</td>
<td>Should be able to be isolated from rest of clinic for evening programs and may have access directly from the exterior</td>
</tr>
</tbody>
</table>
**Demonstration Kitchen.** This space should be near to public eating areas if possible to ease the transfer of food prepped in the demonstration kitchen to be taken to this complementary space. It should also be highly visible to promote its message of healthy living. It contains a regular-size kitchen area with a large demonstration island at the middle. Chairs around this bar can seat smaller groups while a more open adjacent area can be set up with rows of chairs or small tables and chairs for larger groups of up to twenty ‘students.’ As a specific type of education room, it should likewise act as a semi-transformable space with some mobile furnishings and provide after-hours access to the public.

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 @ 600 nsf</td>
<td>Up to 20</td>
<td>Patients, Family, Visitors</td>
<td>Cooking Demonstrations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT/FURNISHINGS</th>
<th>FUNCTIONAL RELATIONSHIPS</th>
<th>SPACE ATTRIBUTES</th>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard kitchen equipment with large demonstration island; seating around bar; extra chairs for rows of seating</td>
<td>Close to waiting and public dining/seating</td>
<td>Visible from waiting; can support café with prepared food</td>
<td>Should be able to be isolated from rest of clinic for evening programs and may have doorways directly to the exterior</td>
</tr>
</tbody>
</table>

Figure 231: Alive Demonstration Kitchen (Johnson & Speck, 2012)

Figure 232: Demonstration Kitchen at MCC Culinary Arts Building (http://www.mccneb.edu/businessandcommunity/focconstruction.asp)

Figure 233: Summary of Demonstration Kitchen (Crews)
The Innovation Zone is a unique support space to the primary care center. It is intended to be used by the clinical staff and visitors from the nearby Piedmont Triad Research Park. This area infuses the spirit of research and education into the clinic and allows guest experts to bring their knowledge of medical advances to the clinical staff. It provides spaces for the clinical staff to work with researchers at modular computer workstations. The room also provides advanced technological support for videoconferences and virtual communication. Because it is intended more for staff use, it should be less directly accessed by the public; however, it should also be highly visible to allow the excitement of health research and progress to be put on display. Glass curtain walls achieve this design goal by providing a transparent barrier to the public as well as an adaptable surface for writing.

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 @ 500 nsf</td>
<td>Up to 12</td>
<td>Clinical Staff PT Research Park Staff</td>
<td>Research Training</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT/FURNISHINGS</th>
<th>FUNCTIONAL RELATIONSHIPS</th>
<th>SPACE ATTRIBUTES</th>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 12 computer workstations; glass walls for display &amp; writing; technology support</td>
<td>Adjacent to Research Room; along exterior wall</td>
<td>Visible from waiting area but with more restricted access; open to non-clinical staff</td>
<td>May have extra staff-only entrance from exterior</td>
</tr>
</tbody>
</table>
Research Room. The research room should be adjacent to the Innovation Zone to supplement the work taking place there. It is a highly transformable, flexible space that allows the researchers to present findings to the public and the clinical staff. Its activities may also include different types of research on clinical concerns, gathered through patient surveys taken in smaller, protected stations within the room. Mobile partition walls allow the space to be subdivided for this purpose, or for other programs scheduled for the room. This room should be visible from the waiting lobby to encourage the public to participate in the researchers’ presentations on their findings and may be visible from outside the facility to promote interest and engagement from the public.

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 @ 300 nsf</td>
<td>4 to 8</td>
<td>Patients Staff</td>
<td>Demonstrations Presentations Surveys</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT/FURNISHINGS</th>
<th>FUNCTIONAL RELATIONSHIPS</th>
<th>SPACE ATTRIBUTES</th>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible furnishings &amp; mobile equipment, technology support for presentations; mobile partitions</td>
<td>Adjacent to Innovation Zone</td>
<td>Partial visibility from waiting area; flexible programming and furnishings</td>
<td>Adaptable degrees of visibility/transparency during patient surveys</td>
</tr>
</tbody>
</table>

Figure 237: Diagram of Research Room Used for Conducting Research and Presenting Findings (Crews)

Figure 238: Summary of Research Room (Crews)
Community Room. The community room should be easily visible to those arriving at the site. It should be located to provide access to the public after standard clinical hours. In addition to supporting community functions like social events and gatherings, meetings, or special programs, this area can also provide clinical support by acting as an additional meeting room for the full clinical staff. The space should allow for flexibility and adaptability; movable partition walls can permit the larger open space to be subdivided into smaller rooms if necessary. To accommodate the multifunctional programming, it should be equipped with modular furniture including mobile tables and chairs, as well as ample technological support for projecting presentations or holding teleconferences.

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 @ 800 nsf</td>
<td>Up to 40</td>
<td>Patients, Family, Visitors, Staff</td>
<td>Education, Special Programs, Meetings, Event Gatherings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT/ FURNISHINGS</th>
<th>FUNCTIONAL RELATIONSHIPS</th>
<th>SPACE ATTRIBUTES</th>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modular tables &amp; chairs; partition walls; technology support; projector; display wall</td>
<td>Adjacent to waiting lobby or entry area</td>
<td>Flexible; able to be used for full staff meetings; also able to be set up for transitory community events</td>
<td>Should be able to be isolated from rest of clinic for evening programs; may have direct exterior access</td>
</tr>
</tbody>
</table>
The clinical space is organized into four pods in accordance with Guideline Five for Pod Groupings. Each features repeated groupings of clinical spaces like the care suites, procedure rooms, and group consult rooms, as well as support spaces. Together the four pods provide the clinical care area for the facility in a layout that supports comprehensive, collaborative care through the incorporation of extra space for family participation and team discussion, both within the rooms and the larger clinical pod.

**Exam Room.** The exam room forms part of the care suite that is a modular, repetitive element within the clinical pods. The exam room is directly accessible from the clinical pod and is flanked by two consultation rooms with doors leading directly to each. Of the two parts of the care suite, the exam room is the more efficient, clinical-oriented space; however, it also should be designed with features in mind to build patient satisfaction and allow for personalized patient support. It is loosely divided into three zones, which can be distinguished through material changes or distinct architectural forms; these are the patient zone, the provider zone, and the family zone. Medical equipment should be built into casework to reduce institutional clutter. The
The exam room supports collaboration and education through the dedicated family space and the small discussion area. The discussion area should be arranged so that everyone in the room has equal views to the digital information on display and can take part in discussing the patient’s health. In order to accommodate the extra space provided for family and technology support, this room is designed to be 120 nsf; while the FGI Guidelines permit standard exam rooms to be 80 nsf, the larger size is more flexible for providing advanced care, which allowing for future adaptation without renovation. The larger square footage allows the room to be treated like an acuity-adaptable room, similar to those designed in hospitals, for when patients arrive who need a higher level of care. The larger space also means more activities can take place in this room that traditionally has required space in the surrounding clinical area, such as checking vitals. According to one source, “the exam room is the focus of any clinic because all roads lead to the exam room. The most successful exam rooms streamline work processes” (Vickery, 2012, Clinic Design: The Exam Room). Using a standardized template for the exam room promotes more efficient staff work flow and can lead to higher patient outcomes.
Consultation Room. The other component of the clinical care suite is the consultation room, which can be entered either from the surrounding pod or from the adjacent exam room. This room complements the exam room by providing space for lengthier discussions within a less sterile environment. Patients may use this room for routine visits that require no physical exam; they may choose to visit the facility to check in with their health coach or care team to track the progress of their health plan.

### Table: Users and Activities

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 per pod @ 120 nsf each</td>
<td>3 to 6</td>
<td>Patients, Staff, Family</td>
<td>Examination, Education, EMR Data Entry</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT/FURNISHINGS</th>
<th>FUNCTIONAL RELATIONSHIPS</th>
<th>SPACE ATTRIBUTES</th>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam chair, visitor seating, stool, side table and chairs, wall-mounted monitor, computer terminal, printer, curtain &amp; track, mirror, sink, counter with base &amp; wall storage cabinets, medical equipment, exam light</td>
<td>Located between two consultation rooms with connecting doors to each; across from staff hub</td>
<td>Comfortable and noninstitutional but hygienic; integrated technology; medical equipment built into casework; preferably has windows or clerestory daylight</td>
<td>120 nsf with 3' clearance around patient bed allows use as general or special purpose examination room or treatment room</td>
</tr>
</tbody>
</table>

Figure 244: Summary of Exam Room (Crews)

Figure 245: Diagram of Consultation Room Users and Activities (Crews)
or to learn more about better management techniques. Overall, the space acts as a supportive, personalized setting for meaningful collaboration between patients and providers. As an ancillary function, the consult room can also be used by the provider team as a quieter, acoustically-protected space for carrying out virtual visits or making telephone calls. While the staff hub is an effective space for collaboration, it can present challenges for activities that require greater privacy. The consult room helps solve this problem by offering a flexible space that is not necessarily in constant use, allowing staff to use the technology support tools for virtual visits.

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 per pod @ 120 nsf each</td>
<td>3 to 6</td>
<td>Patients, Staff, Family</td>
<td>Discussion, Education, Demonstration, Some examination, Check-Out, Virtual Visits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT/FURNISHINGS</th>
<th>FUNCTIONAL RELATIONSHIPS</th>
<th>SPACE ATTRIBUTES</th>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient recliner, table with four to six chairs, mobile computer, technology support, printer, storage cabinets</td>
<td>Located next to an exam room with a connecting door; across from staff hub</td>
<td>More comfortable aesthetic; mostly used for more intimate or group discussions and post-exam follow-up; natural daylight</td>
<td>Can be used by staff for telephone conversations or conducting virtual visits if not being used by patients</td>
</tr>
</tbody>
</table>

Figure 246: Diagram of Consultation Room Use for Virtual Visits between On-Site Clinician and Off-Site Patient (Crews)

Figure 247: Summary of Consultation Room (Crews)
Group Consult Room. The group consult rooms are located within the clinical pod modules and support the care suites. According to Nyberg and Vickery, “group exams in flexibly designed spaces often supplement private exams with educational programming and group support as preventive measures” (2012). They are more accessible to the public and can be used without staff supervision for support group meetings. Staff-led consultations for a group of up to fifteen are also supported by this space who share similar health conditions or want to learn about management or prevention. These spaces support patients as well as staff; at the Clinica Compesina Thornton Clinic, 85% of patients who had a group visit elected to continue in such a group while provider productivity increased by 32% during these group visit activities (Bentley, 2011, p. 47).

The room should be equipped with modular, flexible furnishings that allow various activities and programs to take place; a hand-washing station should also be included to improve sanitation. Technology is another important element to integrate into the rooms to support educational demonstrations and teleconferences with remote participants. The group consult rooms should be highly visible from the staff team
hub and easily accessible to accommodate smaller staff meetings during times of non-patient use. The rooms should also be easily visible to patients coming to the clinical pods to encourage the rooms’ use. Equipping them with adjustable privacy panels along glazed walls or openings allows for visual protection during certain types of consultations while also allowing for greater visibility during public-oriented group sessions, such as demonstrations on using home-monitoring health equipment.

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 per pod @ 360 nsf each</td>
<td>10 to 15</td>
<td>Patients Staff Family</td>
<td>Discussion Education Demonstration</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT/ FURNISHINGS</th>
<th>FUNCTIONAL RELATIONSHIPS</th>
<th>SPACE ATTRIBUTES</th>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible furnishings, including table(s) and chairs for ten to fifteen; technology support with display wall, projector, and mobile computer station; storage cabinets; sink and counter</td>
<td>On entry side of pod, closest to waiting; across from staff hub</td>
<td>Chairs can be set up around table(s) or arranged in rows for presentations; easily movable, modular furniture</td>
<td>Can be used for group meetings and support sessions that do not require staff presence; can also be used for staff team meetings before/after clinical hours</td>
</tr>
</tbody>
</table>

Figure 249: Diagrams of Group Consultation Room Users and Activities (Crews)

Figure 250: Summary of Group Consult Room (Crews)
The clinical staff support spaces are located both within each pod and in shared core support areas. Within each pod, the staff team hub acts as the central station for providers, in accordance with Guideline Six for Open Team Hubs. These more “on-stage”, patient-accessible staff areas are supported by shared “off-stage” staff areas located between the pods, including the staff break room and staff classroom.

Staff Team Hub. The staff team hub is located at the core of each clinical pod and is a collaborative space that bolsters efficiency, job satisfaction, and opportunities for teaching and learning among the staff. Open team hubs are linked to better outcomes because of the increased communication between team members and their patients (Sweetland et al., 2012). In order to improve collaboration within the hub, modular workstations should be provided for each team member. For the purposes of this thesis project, it is assumed that two teams of four to six people operate within each clinical pod; therefore, spaces for eight to twelve people would be included in each pod. Workstations should be kept flexible with adaptable furnishings that can be modified to provider preference, including adjustable-height desks and chairs, as well as tables that can be linked together or split into smaller units. Partial height
walls should help give definition to the space while allowing it to remain open to the surrounding clinical area. Good visibility and connections to the rest of the pod are also key to the open team core concept, as explained in the preceding Guidelines chapter. In order to further staff satisfaction and encourage providers to continue in primary care, other qualities like good lighting and comfortable materials should be brought into this area. Since the majority of the staff’s day can be spent in this hub, which functions as the “home base” for the care team and receives constant use, it is essential that the staff recognize it as a highly accessible and supportive center.

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 per pod @ 480 nsf each</td>
<td>8 to 12</td>
<td>Staff teams</td>
<td>Discussion Clinical work Education Training</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT/ FURNISHINGS</th>
<th>FUNCTIONAL RELATIONSHIPS</th>
<th>SPACE ATTRIBUTES</th>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 to 12 open work stations with phones and computers, split into two team areas with partial-height partition walls; storage cabinets (lockable), 2 printers, 2 copiers</td>
<td>Located at core of pod with clear line of vision to patient spaces; wrapped by circulation to care rooms</td>
<td>Flexible workstations that can be used by different providers each day; adjacent open computer stations; daylight and high visibility</td>
<td>Each hub provides stations for all members of two teams: physician, nurse, health coaches and/or residents</td>
</tr>
</tbody>
</table>

Figure 252: Options for Staff Team Hub Layouts (Crews)  
Figure 253: Summary of Staff Team Hub (Crews)
Precepting Space. The precepting space provides an area for faculty or mentors to give assistance and guidance to residents on a care team. It should be located in the clinical zone with easy access between the team pod as well as the staff’s “off-stage” areas. To improve access for the residents, the precepting space may not necessarily be an enclosed office but instead open to the flow of staff circulation or even located within the open team hub. It should contain space for faculty mentors to have desks with small discussion areas adjacent to their workstation to meet with residents and discuss diagnoses or other patient care topics. Like the staff hub area, the furnishings for this space should be flexible to accommodate changing numbers of staff and residents alike.

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 2 @ 240 nsf each</td>
<td>4 to 8</td>
<td>Residents, Staff mentors, Rotating specialists</td>
<td>Discussions/meetings, Research, Computer work</td>
</tr>
</tbody>
</table>

**EQUIPMENT/FURNISHINGS**
Open work stations with extra chairs for discussions with residents; computer terminals; phones; printer; storage

**FUNCTIONAL RELATIONSHIPS**
Can be divided and integrated into staff hub; otherwise easily shared location between two pods/staff hubs

**SPACE ATTRIBUTES**
Visibly connected to rest of space through use of glass or partial walls; space to have meetings between residents and mentors

**ADDITIONAL COMMENTS**
Potential half-day use by mentors; can also act as support space for visiting specialists when not in use by mentors.

Figure 254: Nurture by Steelcase Caregiver Station (www.nurture.com)
Figure 255: Options for Precepting Space within the Staff Team Hub (Crews)
Figure 256: Summary of Precepting Space (Crews)
Staff Classroom. The staff classroom is a combined area that supports the teaching model of the new primary health center. Located near the clinical pods, this room is multifunctional as it accommodates space for teaching residents as well as permanent staff, supported by an adaptable gathering area with mobile tables and chairs. These furnishings should be flexible so that the space can also be set up for scheduled lectures and other educational programs for at least twenty. One wall should be dedicated as a display wall for projecting presentations or displaying educational tools. This room should benefit from natural daylighting and good views to encourage residents and staff to continue in primary care. It should foster a collaborative, enriching environment by offering personalized support to rotating residents within the larger facility context.

<table>
<thead>
<tr>
<th>NUMBER &amp; AVG. S.F.</th>
<th>USER NUMBER</th>
<th>USERS</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 @ 720 nsf</td>
<td>20 to 30</td>
<td>Residents Staff mentors</td>
<td>Education Training Computer work</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EQUIPMENT/FURNISHINGS</th>
<th>FUNCTIONAL RELATIONSHIPS</th>
<th>SPACE ATTRIBUTES</th>
<th>ADDITIONAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC workstations, modular tables &amp; chairs; writing &amp; display surfaces</td>
<td>Between two pods; close to precepting room and staff break room</td>
<td>Can be set up for individual work or studying or for group lectures</td>
<td>Should provide technology support with projector</td>
</tr>
</tbody>
</table>

Figure 257: Steelcase MediaScape Classroom (www.steelcase.com)

Figure 258: Classroom Options for Staff Education Seminars or Resident Study (Crews)

Figure 259: Summary of Staff Classroom (Crews)
Three proposed site selection criteria are intended to be generally applicable for the new type of primary care setting developed in this thesis project. They respond to current problems in the healthcare and architectural contexts by making the facility location more user-friendly and community-oriented. The criteria support a facility that can be easily integrated into the average individual's everyday lifestyle to encourage its use as a support center. The site selection criteria are also supportive of a specific type of clinical entity within the Healthcare Innovation Zone that is associated with an urban location to help extend and complete the greater network.

The specific site for this thesis proposal illustrates the proposed site selection criteria within an actual context, in this case Winston-Salem, North Carolina. The chosen site allows the project to be developed to a higher level of detail with consideration to existing site and design influences. In the following chapter, both the general criteria and the chosen site will be analyzed and described to demonstrate their relevance to the evolving primary care model of the Healthcare Innovation Zone.
In order to successfully complete a Healthcare Innovation Zone, the following site selection criteria will ensure the new primary care clinical entity’s integration into the intended users’ lifestyles, whether they are part of the public, members of the on-site clinical staff, or affiliated providers from other healthcare settings.

1- Downtown Core: the site should be embedded within environments of daily use and with convenience to other related services.
2- Easy Access: the site should maximize use through a location along circulation routes already in frequent use.
3- Community Connection: the facility in its site should create a distinct physical presence within the surrounding context.

Downtown Core. Convenience is a key component in selecting a site for the new model of primary care. Today’s fast-paced society is naturally more accustomed to multitasking and being able to accomplish several items at one time or place. The concept of the “one-stop-shop” has grown exponentially through superstores like Wal-Mart and Target. The new primary care center should respond in a similar way by positioning itself close to other sites of daily destinations and colocating services. “Primary care clinics are located in a variety of convenient sites, from
office buildings to mixed-use developments, strip malls, shopping centers, and community crossroads” (Vickery, Clinic Design: Determining Location Factors of a New Clinic). Locating in the downtown core inherently creates proximity to mixed-use developments and particularly work sites, which provide the vital clientele base for this new primary care model. Choosing a location with close proximity to work, live, and play environments increases the opportunity for potential clients to make use of the center commuting to and from work, during the work day, running errands, or going to cultural and social destinations downtown, all in one trip.

In order to provide greater convenience for potential users, the new primary care model should also be located close to related services that can act as programmatic support and bring a higher degree of comprehensiveness to the center, even through off-site services and specialties. These include the other components of the Healthcare Innovation Zone, like the teaching hospital or affiliated physicians, who can help provide patients with additional medical attention. For example, Dartmouth Health Connect is located less than ten minutes away from the larger Dartmouth Hitchcock Medical Center, allowing for providers to rotate easily between

Figure 261: Closely Located Services between Dartmouth Health Connect and Dartmouth Hitchcock Medical Center (Crews)
the two sites and for patients to gain the full spectrum of health services they may require within a short distance. Additionally, locating close to related services like pharmacies or even fitness centers can reduce the programmatic load of the clinical model to provide these types of services if they are available nearby for client use.

_Easy Access._ In addition to locating close to daily lifestyle services, the site should be located along primary routes to such destinations. Following the concept that people “get care where they can access it and when they want it,” easy access should be provided by locating along primary vehicular and pedestrian routes (Sarasohn-Kahn). It is important to position a primary health center so that it acts as a bridge between work and live environments. This way, it can serve a more concentrated population within the business district while still providing easy access from the suburbs or en route to the suburbs; neither realm is isolated. Situating “along regularly traveled routes [means] patients can schedule appointments on their way to and from work or in conjunction with other activities, such as completing errands” (Nyberg & Vickery, 2011). Additionally, locating at key nodes within the target population’s routine circulation patterns improves access to the site and captures...
cliente traveling in multiple directions. These nodes become natural transition spaces that would help encourage people already in the process of changing their route to stop and utilize the center.

*Community Connection.* In addition to convenience, locating a primary health center should take into consideration the contextual environment by promoting itself as a visibly user-friendly setting that encourages visitors and patients alike. Vickery recommends that “clinics can heighten awareness about their location and services by creatively connecting with their community” (Clinic Design: Determining Location Factors of a New Clinic). Creating opportunities for community programs, like farmer’s markets or walking trails for example, loosens the transition between public and private settings. Locating on a highly visible site allows the center to create an iconic image within the city and can promote loyalty and support from the surrounding community. At the same time, it can connect to the community by respecting the urban fabric and act as an extension to the downtown core if necessary, by filling in a missing streetfront or creating a needed open space. This can be achieved by looking at the rhythm of building footprints and heights in relation to open public spaces,
whether plazas or green spaces. For example, the Waldron Health Centre integrates into the community by following a pattern of repeated public courtyards along one of the city’s main streets and creating one on its site that blends into the facility itself. In contrast, other facilities like the Centra Care Health Plaza create an iconic landmark that stands out against the existing urban fabric to call greater attention to its services; in this case, it establishes a massive tower to act as a beacon that is visible miles away at night (Nyberg & Vickery, 2011). The location of the primary care center should be one that allows it to create a distinct physical presence within the surrounding context. The site should encourage fluidity between public and medical realms so that the center becomes a destination in and of itself.

Figure 264: Centra Care Health Plaza’s Iconic Light Tower as a Beacon (http://wikimapia.org/43716/CentraCare-Health-Plaza)
Site Selection and Analysis

This thesis project is sited in Winston-Salem, North Carolina, a city of approximately 230,000 in 2011 (City Data). Demographically, Winston-Salem provides a client base that fits the proposed services and program, as well as the overall vision of the new primary care model. As mentioned in the previous chapter, the center is designed to be used more by the working population of twenty-five to forty-five year old adults who are comfortable using technology and responsive to the idea of being educated on health.

Winston-Salem supports this thesis assumption in a number of ways. The median age in Winston-Salem is 34.6 years old. In terms of education, 80.2% of the population has a high school diploma, 30.3% has a bachelor’s degree, and 11% has a graduate or professional degree. The average commute is 19.7 minutes, and over 75% of the population drives a car alone. The second most common mode of transportation is carpool, with very small percentages using the bus, walking, or working from home. Overall, Winston-Salem residents are a personal vehicle-reliant, commuting population that causes the city’s daytime population to increase 25.8% (City Data). Placing the new primary care center within the downtown core of Winston-Salem is
reasonable due to the high numbers of commuters coming to the central business district area daily for work.

Given its size, Winston-Salem is home to a high number of institutes of higher education, including a medical school that is part of Wake Forest University. Other examples include the University of North Carolina School of the Arts and a number of community colleges. This spirit of education and intellectual pursuits is diffused throughout the city and supports the concept of an innovative, educationally-focused primary care center.

The city’s population is rising, with a 23.6% increase since 2000 (City Data). The demand for healthcare services will likewise rise with the population growth, and a new primary care center within the downtown core would help alleviate this stress on the existing healthcare structure. Currently, there is only one hospital-affiliated primary care center within a mile of downtown Winston-Salem, so introducing a new primary care center that is associated with the medical university residency program is reasonable.
The lack of hospital-affiliated primary care centers in the downtown core makes a strong case for locating the proposed clinical entity within this area to extend the network of the Healthcare Innovation Zone to this part of Winston-Salem. The proximity of the Wake Forest Baptist Health teaching hospital, another critical component within the Healthcare Innovation Zone, further solidifies this site decision. The central downtown site also improves access for supportive physicians who may be coming from other clinical entities or specialist physicians who may be rotating among multiple clinical entities.

Figure 268: Hospitals, Clinics, and Higher Education in Winston-Salem, as Components of the Healthcare Innovation Zone or Potential Support (Crews)
The Piedmont Triad Research Park is another key developing component in the city, “emerging as a synergistic and innovative community supporting life science and information technology research and development.” The Research Park “stimulates intellectual curiosity and connects ideas with resources... against an urban backdrop of a well-educated, culturally varied and creatively rich community.” (Piedmont Triad Research Park - official website)

Site analysis of Winston-Salem further demonstrates how a downtown site fulfills the selection criteria at a range of scales.

Figure 269: Location of Site (the corner of First Street and Liberty Street) within the Greater Area of Winston-Salem (Crews)
**Criteria 1_Downtown Core.** The selected site is located within the area referred to as the walkable district surrounding the downtown core district. It falls within an important triangle that includes the city’s main commercial district, residential areas, and research district.

The core district of the city is within a five minute walk of the site, and the corporate and government districts are within a similar range. The site itself is located near the edge of the financial district, close to more residential districts that include Holly Avenue and Old Salem.
Within a ten minute walking radius from the site, one can find a range of work, live, and play environments in an area of town that is widely diversified in building uses and services.

Figure 271: City Hall, 2 Blocks from Site (Crews)

Figure 272: Milton Rhodes Center for the Arts, 3 Blocks from Site (Crews)

Figure 273: Functional Uses of Buildings (Crews)
The primary civic buildings in the city are within a five minute walk of the site; these include City Hall, the Hall of Justice, and the courthouse. Other higher-density downtown businesses like GMAC Insurance and Wachovia are within an eight minute walk north of the site and provide a substantial clientele base for a downtown primary care center. More residential areas are located to the east and south of the site; the cross flow of commuting traffic between work and live areas conveniently passes by the chosen site. It is also close to several high-density residential buildings on Fourth Street that cater to a similar demographic as the project.
Along Fourth Street or “Restaurant Row” are a number of retail and dining sites that people would be likely to visit on a daily basis. These and other cultural or arts destinations are within an easy walking distance, such as Hanesbrands Theatre and the Milton Rhodes Center for the Arts and that attract the public with exhibits, classes, and performances.

Figure 277: 4th Street “Restaurant Row” (Crews)

Figure 278: Milton Rhodes Center for the Arts (Crews)

Figure 279: Downtown “Play” Areas (Crews)
In addition to work, live, and play areas, the site is conveniently close to other important related services. The Piedmont Triad Research Park is a five minute walk from the site down First Street; being close to this complex allows researchers to move easily back and forth between the primary care center and their base location.

The Wake Forest Baptist Medical Center is a five to ten minute drive taking either Highway 40 Business or First Street, which run parallel with the site directly between them. This is an essential connection with the new center; the teaching hospital not only provides a

Figure 280: Connections to Related Services (Crews)
greater range of services including higher acuity and specialty services, but it also incorporates staffing components that can be utilized by the primary care center. Residents and rotating specialists who use the medical center would be able to travel easily to and from the new downtown clinical entity. Patients likewise would not be inconvenienced by a long drive to the greater medical center should they need referral medical attention and services.

Other related services include those contributing to improved health and wellness. Two fitness centers are within a few blocks of the site, and their close proximity reduces the need for one on-site. Only one pharmacy can be found downtown, a CVS on Fourth Street. Because of its small size and location, a new pharmacy space is part of the proposed program in order to contribute to the new center’s comprehensive services and reinforce its function as a “one stop shop.” No healthy food stores exist in the downtown core, and this need is also addressed by the choice to program in grocery space. To truly act as a convenient lifestyle-integrated center for patient treatment, prevention, and education, consideration of related services through off-site connections or on-site programming is essential.
Criteria 2 _Easy Access_. The selected site is surrounded on three sides by streets that the city designates as ‘primary.’ Its fourth side, First Street, is a secondary street that nonetheless is an important one-way street to connect to the west side of the city. All one-way primary streets running north-south are within a block or two of the site. These primary streets tend to have heavier flows of vehicular traffic. The heaviest traffic flow is along Highway 40 Business. Key intersections of both primary and secondary streets occur near the site. One of these nodes is the transition of traffic onto and off of Highway 40 Business via ramps to the west of the

![Figure 284: Primary and Secondary Streets (Crews)](image)
site. The other is immediately adjacent and is created by traffic changing one-way directions and getting onto Hwy 40 Business. The site has easy access from traffic along these key routes, particularly in relation to the nodes, and also has a number of conveniently close parking garages or surface lots.

Figure 285: Vehicular Circulation around Site (Crews)

Figure 286: Vehicular Circulation (Crews)
Pedestrian access is also easy in relation to the choice of site. The highest volume of pedestrian traffic is along Fourth Street “Restaurant Row,” and a number of nodes are created by people intersecting at corners on this street. Another main pedestrian route is down Liberty Street, where many high-density businesses and work sites are located.

The Strollway is a defining element of Winston-Salem pedestrian flow. It begins at Fourth Street as a raised bridge before dropping to street level as a sidewalk along Town Run Lane. Once it crosses First Street, the Strollway takes on a park-like condition as it becomes a

Figure 287: Pedestrian Circulation (Crews)
semi-paved surface disconnected from any vehicular roads and surrounded by more vegetation. This transition occurs right at the northeast corner of the site. Pedestrians use this key artery throughout the day to move between business and historic districts. Access to the site would be very easy from the Strollway for those using it during lunch break, before, or after work.
Criteria 3. Community Connection. The chosen site has great potential to act as an extension of the downtown environment. It lies on the fringe of the walkable downtown districts and the surrounding historic and residential neighborhoods. Because of its location in this transition area, adding more services to the primary care center like those along Fourth Street would increase the likelihood of people expanding their migration from the core. Limited retail and dining options within and below the financial district suggest that offering these programs in the larger facility is a way to reach out and invite the community to use the site.

Figure 290: Fringe Area between Downtown Districts (Crews)
The site falls along a pattern of open public plazas or green spaces along the Strollway. It has the opportunity to extend the public space of Corpening Plaza across the street to a new public area on the site, similar to the connecting plazas at the start of the Strollway.

A number of influences come together at the site that could allow it to become a strong physical presence within the surrounding context. Traffic from Liberty Street, pedestrians along the Strollway, and researchers coming from the Research Park are all strong community relations that intersect at the site.
To further connect to the surroundings, the site profits from a range of views from multiple directions that would allow it to become an iconic image in the city. Its northwest corner is more visibly prominent because the building on the block to the east is pushed back from the road. Raised plazas connected to the BB&T and Wells Fargo buildings to the north help create these wider vistas that are not blocked by hard edges. The site is also highly visibly from cars driving in both directions along the elevated Highway 40 Business, as long as the building reaches a height of at least three stories to be seen over the surrounding foliage and grade change. From a pedestrian perspective, the site is highly visible for those walking along the Strollway, from either the north or south directions, as well as from those walking down Liberty Street from the corporate district. The views directly from the west are more limited because the buildings are built right up to the sidewalk and create a narrow view corridor for pedestrians walking toward the site.
Views from the site are best to the north direction. These include several landmark buildings within the Winston-Salem skyline, including the BB&T and Wells Fargo buildings across the street that are two of the five tallest buildings in the city. In order to maximize wayfinding within the new center, views should be created toward these landmarks to help patients orient themselves. Views to the south are less distinctive and include pockets of thick vegetation, the elevated Highway 40 Business, and surface parking lots. These elements have less visual impact and would not make valuable wayfinding cues like those to the north of the site.
Overall, the chosen site on the corner of First Street and Liberty Street in Winston-Salem meets the proposed site selection criteria and is in a location that would benefit from completing the Healthcare Innovation Zone. Creating a new clinical entity for primary care on this downtown site would allow a greater network of comprehensive care services to be extended to an area that currently lacks a hospital-affiliated primary care center. The chosen site offers the benefits of easy access for both vehicular and pedestrian traffic with its location along heavily-used routes like Liberty Street and the Strollway. It also offers improved convenience for the dense working population in the downtown core, as well as those living in nearby residential areas, to use the facility as a “one stop shop” destination in the midst of their typical daily routine. Its ability to integrate with the community is enhanced by being located at a key fringe area between the downtown to the north and more historic and residential areas to the south. Locating the proposed entity on this site creates an opportunity to begin to mirror the activity and thriving streetlife of Fourth Street “Restaurant Row” to the north along First Street to the south. Its proximity to greater network components like the teaching hospital and Research Park make forming a Healthcare Innovation Zone in downtown Winston-Salem more feasible.
The proposal for a new clinical model to complete a Healthcare Innovation Zone for Winston-Salem acts as an accessible, lifestyle-integrated support center at every level of design. It avoids the institutionalism of many existing clinics by reaching out and embracing the public, as well as by focusing on user comfort and personalized support. At the site level, it invites the community to enter from all sides of the facility and creates a permeable, fluid series of public spaces that link indoor and outdoor environments. Programmatically, the design supports the needs of patients, staff, and public alike through a range of public and clinical amenities that focus on health and wellness, with the added convenience of locating all of these within a “one-stop-shop” destination. These program areas are distinguished spatially through large public volumes featuring exposed structure and transparent materiality in contrast to the more private or intimate clinical areas that act as smaller, identifiable elements within the larger facility. The holistic and comprehensive vision of the project reinforces its mission to act as a currently missing component of a Healthcare Innovation Zone. Designing around the project goals, such as collaboration and education, allows the facility to form integrative relationships with the other network components, including the teaching hospital, physicians, and other clinical entities.
The new clinical model for the chosen site in Winston-Salem is designed to connect fluidly to its surrounding context in the city so that it can fulfill its function as a convenient lifestyle-integrated setting that can easily reach out to and be accessed by as many people as possible within the Healthcare Innovation Zone, including residents and specialty physicians. One of the first design decisions was to bring the building footprint up close to First Street to create a strong streetfront presence and activate the sidewalk with easy access to program amenities found in the building. Multiple entry points wrap the ground level to allow the facility to integrate with its surroundings and improve access by users coming from different directions: the Strollway to the south, the Research Park to the east, and the downtown core to the north. The First Street streetfront creates a contrast to the open Corporate Plaza across the street and fills a void along the street by establishing a new destination zone. The facility connects gently to the more naturalized south side which is connected to the pedestrian Strollway. A series of open corridors promote movement through the building so that it supports both those coming to the site as a destination point as well as those using it as a pass-through. Indoor green space reinforces the concept of permeability and allows the facility to blend in to its surroundings.
A series of terraces and stairs on the south side create a smooth connection to the Strollway [A]. They encourage a healthy lifestyle by offering spaces for outdoor activities such as kick-offs for 5k runs [B] as well as small community gardens [C].

While pedestrians can enter the site from either one of the entrances on First Street [D] or from the Strollway and balcony on the south [E], people arriving by vehicle can park in the garage below the facility that is open to the southern green space [F].
Massing Overview

The building is organized into three main masses that relate to the programs housed within: the commercial anchor, the public atrium, and the clinical zone, which incorporates both clinical care and clinical staff support. The commercial tower acts as a prominent volume to anchor the Liberty Street end of the facility and contributes to its ability to be perceived as an iconic and identifiable silhouette within the city skyline. The public atrium acts as a bridge between the commercial and clinical zones while also creating the opportunity to connect thoroughly to the immediate surroundings. The clinical areas are pushed back toward the south for greater privacy while preserving connection to both the north and the south.
The first four guidelines proposed for creating this new clinical entity model generally apply more at the overall building scale level. The latter four guidelines are more specific to the clinical levels and a smaller scale of application. Together, they guide the design decisions made to create this new typology within the Healthcare Innovation Zone. The guidelines additionally tend to correspond to a person’s experience of the facility, from an individual’s approach to the site, through building circulation, and finally to a specific room within the facility.

Guideline Application and Analysis

**BUILDING SCALE**

- **G1** Gradient Zones
- **G2** Transparency
- **G3** Simplified Circulation
- **G4** Modular Planning

**CLINICAL SCALE**

- **G5** Pod Groupings
- **G6** Open Team Hubs
- **G7** Standardized Care Rooms
- **G8** Transformable Space

Figure 305: Guideline Application (Crews)
G1 Gradient Zones.

Overall, the division of the facility into different programmatic masses supports the concept of gradient zones. The building is organized so that public areas tend to be located on the ground floor or on the more urban north side. The upper floors become progressively more private and include the commercial and clinical care zones. The clinical staff support area is the furthest removed from the public access to give providers more of an “off-stage” break area with views out to the south of the naturalized Strollway and residential areas. Pockets of public space are dispersed throughout the building so that the public can utilize the full extent of the space. Internal boundaries are reduced to improve the fluidity between different zones and allow the facility to function as a cohesive support center.
The ground floor minimizes the distinction between public and private by setting up a gradual transition from the public sidewalk outside to a large public space inside with semi-public amenity spaces that can be used after traditional clinic hours. These spaces include an open market or gallery space for local farmers and artists, an organic grocery store, a healthy cafe and juice bar, and a demonstration kitchen, in addition to retail and pharmacy spaces.

Figure 308: Floor Plan // Level 1 (Crews)

Figure 309: Open Market & Public Space in the Atrium (Crews)
On the north side of the building, a multi-story atrium space creates a smooth transition between the exterior and interior amenities on the ground floor. This atrium becomes a public space that reflects the sidewalk activity along First Street and offers a protected sidewalk environment that can be used throughout the day and evening with access to lifestyle conveniences, as in the market, cafe, and organic grocery store. In effect, it is an indoor-outdoor space or garden that links between the north and south approaches.
The south side of the building contributes to the gradient zoning by providing supplemental public outdoor space that merges into the interior. The terraces create an opportunity for the indoor farmer’s market to expand visibly out from the building toward the Strollway with exterior market space and garden plots, all of which contribute to the ideas of health and wellness promotion.
G2 Transparency.
Varying levels of transparency reinforce the concept of gradient zones. An overall high level of transparency allows the interior programs to be placed on display to the public’s view and encourages interest and interaction from the surroundings, particularly at night. A highly transparent facade helps reduce the ‘mystery’ of medical activities and makes the facility more inviting and user-friendly. Less public spaces like the commercial tower and clinical levels retain a degree of privacy through protective screens or closely spaced mullions in the glazing systems, indicating the programs behind them.

Figure 315: First Street Facade (North Facade) (Crews)

Figure 316: Evening View of First Street Facade and After-Hours Amenities (Crews)
The multi-story atrium is the most transparent element of the facility, corresponding to its most public programming. It encourages engagement between the outdoor sidewalk environment and interior lobby space, allowing people to see easily through it to the other activities taking place. The exposed structural elements reinforce the project concepts of open, honest communication and expression, even education in an architectural or structural sense.
Inside, the use of glass walls reinforces the concept of transparency and also helps reduce the institutionalism and internal boundaries that plague many existing primary care settings. Instead, the transparency communicates a sense of openness that allows visitors to be more engaged in their health and minimizes operational hierarchies. Not all areas throughout the facility utilize this high degree of transparency; in the clinical care rooms, patient privacy should be maintained through both acoustic and visual protection. Some rooms like the group consultation room can be equipped with adjustable privacy screens that allow them to flex in visibility from the public.

In more public areas though, or spaces which are meant to be on display, high transparency allows their activities to be seen even by those merely passing by. This can also create a sense of preview to other spaces, contributing to the goals of comprehension and collaboration, as well as education. For example, locating glass walls in waiting areas allows people to see to other areas where the staff may be working, like the research room or staff classroom, and reinforces the idea of patient-provider partnerships in which the patient is actively involved.
G3 Simplified Circulation.

Like the programmatic zoning, the circulation is also organized along a gradient that acts as a natural filter, from public to clinic to staff circulation spaces. The concept of looking at the clinic as a city in itself creates an intuitive system of wayfinding that is based on the urban context. For example, circulation within the facility is arranged in a hierarchy from the largest boulevard in the public atrium to secondary streets leading to the clinical areas to the smallest back alleys for staff only. The program spaces are organized around these circulation corridors as smaller blocks within the larger city to help visitors identity with a more personalized, human-scale element. Creating a clear set of storefronts with multiple entries along the circulation spaces allows easier use and entry to the spaces behind.
Figure 324: Main "Boulevard" through the Public Atrium (Crews)
The main vertical circulation is located at the core of the public atrium and connects to upper-level balcony corridors that lead to the clinical floors. These elevated pathways are the secondary streets that run parallel to the main atrium “boulevard” and provide views back down to the lobby area as well as out to the surroundings. The BB&T building as well as the Wells Fargo building are key landmarks to the north which can be used as orientation cues. Intuitive wayfinding cues like daylighting are also supported through the exterior glazing along these circulation routes.
G4 Modular Planning.

In order to adapt to future changes, the overall building is designed on a regulated 21’ east-west grid system that can support additions or reconfigurations of space. The commercial core itself is an open shell space that can take on a range of programs, including modular workstations for researchers, rotating tenants, and even a gym on the two-story top level. The structural system is designed to accommodate both vertical and horizontal expansion, allowing the facility to grow as the demands grow or change. Providing multiple vertical circulation cores allows the various zones to function independently.

Figure 327: Regulated Structure to Accommodate Modular Planning and Future Growth (Crews)
Areas within the building are likewise designed according to regulated system that can accommodate future changes in a “plug and play” type of system. Within the clinical areas, for example, the care room acts as a base unit of 120 square feet. This size allows the exam rooms to flex in acuity level so that minor procedures can take place in these rooms as well. They can also be interchanged with the consultation rooms, depending on the facility’s needs, as both are the same square footage. Other rooms within the space are based on this unit size, allowing them to change as well if needed. For example, the group consult room can become a procedure room with adjacent support space or two care rooms.
G5 Pod Groupings.

The facility is currently designed with two floors of clinical care pods, with each floor accommodating two pods. Patient sub-waiting areas and other amenities like an IT resource library are shared between the pods on each floor. Common clinical staff support space is also shared between pods and vertically connects the two floors through its central, open mezzanine space. This balanced distribution of shared spaces between the pods supports the potential for future vertical expansion of the clinic, as more floors of two pods are stacked on top of each other.

The pods function as smaller “blocks” within the larger “city” as described earlier and become smaller element that patients can better identify with. The standard template of room arrangements simplifies navigation and reduces confusion if patients happen to enter a different pod.
The pod template is designed with two points of access for the patients, who can enter their pod directly from the atrium balcony walkways or from the shared sub-waiting area. This creates different options for more personalized support by improving access to the clinical pods and making them more permeable to the rest of the support center. The points of patient access also provide an open, wide view through the entire pod and reinforce the goals of collaboration and demystifying clinical activities. The staff are likewise connected to each other across the shared support core through a highly transparent circulation corridor.

The pod template also allows exam and consult rooms to be wrapped around its perimeter so that all of the rooms receive natural daylight, by being located either along an exterior wall or adjacent to a smaller internal atrium at the center of the shared pod core. The template also incorporates open niche spaces for impromptu staff or patient collaborations along an exterior wall. These help break up the rhythm of rooms to allow orienting views out to the surroundings as well as natural daylight to enter deeper into the pod through the full-height glazing.
G6 Open Team Hubs.

An open staff team hub anchors the core of each pod and allows for those expansive views across the clinical unit. From the hub, care providers can view all of their care rooms as well as patients entering into the pod. This openness creates more opportunities for collaboration and communication between patients and providers. The open hubs also promote interaction and collaboration among providers, including both permanent clinical staff members and rotating specialists. Additional workspace is provided in each team hub to accommodate supportive providers who may only come to the clinic one or two days a week. Supplemental touchdown space is also provided for residents and mentors to meet within the staff hub, rather than in a separate, isolated precepting room. Touchdown space is provided at the center of the hub in a more internally-focused environment less accessible to patients as well as at the periphery of the hub so that patients can engage more easily with their care providers.
Each staff hub accommodates two teams of at least four providers each. These providers include a physician, a nurse, and a combination of health coaches and residents. The use of modular workstations within the hub allows the team members to change desk locations in a more fluid, interactive approach. Each team is responsible for a total of two care suites, or a total of two exam rooms and four consult rooms, in addition to a procedure room.
G7 Standardized Care Rooms.

Each clinical pod contains four ‘care suites’ that contain the standardized care rooms in a 2:1 ratio of consultation rooms to exam rooms. This type of layout supports the goal of personalized support by offering patients an option for the setting in which they wish to receive care. Both types of rooms provide more space for collaboration and discussion, as well as participation among more team and family members. The exam room allows patients, providers, and family members to review medical information on a shared monitor next to the exam table. The consult room provides a larger, round-table discussion area with a large wall monitor to support education and demonstration activities. In both rooms, the built-in equipment and selection of finishes is meant to reduce institutionalism and improve patient comfort.
The standardized design of the care rooms within a suite contributes to one of the main project visions of achieving operational excellence. Rooms can be turned around more quickly once the team moves from the exam room to the consult room; another care team member like a health coach or resident can start prepping the exam room for the next patient and also begin the initial phases of the next patient exam while the first consult is concluding. These standardized care rooms support a range of uses and patient needs. For example, a patient may choose to have only a consult with care team members, or begin with a consultation prior to an exam. Additionally, virtual visits can be conducted in the consult rooms between a member of the clinical staff and an off-site patient, even while another consult or exam is taking place in the same suite.
G8 Transformable Space.
Throughout the facility, a number of spaces are designed to be transformable so that they can accommodate a range of activities and user groups without disturbing the surroundings. These include public spaces like community and education rooms or clinical spaces like group consult rooms and staff areas. Modular furnishings and adjustable room equipment or systems allow for these transformations to take place and promote flexible opportunities for education and collaboration, such as small group information sessions on diabetes in the group consult rooms. The education rooms are key transformable spaces within the circulation core that act as literal and figurative bridges of innovation in health and wellness.
Within the staff hubs and support areas, transformable spaces are an important feature that can support the young residents and encourage them to continue a career in primary care. These flexible work and learning settings can provide an enriching experience that focuses on collaboration, teamwork, and innovation and reduce the traditional image of the solo, overworked primary care physician. The staff classroom, for example, can provide modular technology stations that support either independent study or small group sessions that include residents and mentors. This space could alternatively be used for larger staff meetings that support continuing education opportunities for all levels of providers.
FORMING A HEALTHCARE INNOVATION ZONE

A NEW CLINICAL ENTITY

IN COLLABORATION WITH

PHYSICIANS AND FUTURE HEALTHCARE PROFESSIONALS

TO PROVIDE INTEGRATIVE PRIMARY CARE THROUGH SITE AND SERVICES

Figure 354: New Clinical Entity as One Component of a Healthcare Innovation Zone (Crews)
Conclusions

This proposal for a new primary care model is meant to be the missing ‘clinical entity’ component that completes the formation of a Healthcare Innovation Zone in downtown Winston-Salem. It functions as an important link between the teaching hospital, current and future care professionals, and the general public. It improves not only access to care but also access to other lifestyle amenities that contribute to overall health and wellness in a convenient, one-stop-shop environment. Within the facility, the experience of visitors is enhanced through its connection to the community and surrounding urban and natural contexts. Transparency and openness communicate its vision to integrate with the public realm and the average individual’s everyday lifestyle. Health and wellness areas are placed on display for greater enrichment and education of patients and staff alike. Personalized support can be found throughout the new model in transformable spaces and clinical care spaces that offer opportunities for patient preference and team interaction. Hierarchies are reduced within the collaborative setting that focuses on the education of patients, staff, and public to promote a continuous, preventive approach and to help curb the impending primary care crisis. In effect, the model becomes an empowering extension of the greater integrative network of the Healthcare Innovation Zone.
A new architectural model for primary care is needed that better supports a holistic approach to health and wellness. The proposed model will function as one key component within a greater Healthcare Innovation Zone and provide a lifestyle-integrated setting enriched with collaborative, educational spaces to enhance the experience of patients, visitors, and staff alike.

**GOALS**
- Comprehensive Care
- Collaboration
- Education
- Personalized Support
- Access
- Wayfinding
- Flow
- Flexibility
- Technology

**SITE SELECTION CRITERIA**
- Downtown Setting
- Easy Access
- Community Connection

**SITE RESPONSES**
- Activate the Streetfront

**SITE PLAN**

Figure 355: Board 1 (Crews)
A new architectural model for primary care is needed that better supports a holistic approach to health and wellness. The proposed model will function as one key component within a greater Healthcare Innovation Zone and provide a lifestyle-integrated setting enriched with collaborative, educational spaces to enhance the experience of patients, visitors, and staff alike.

**GOALS**

- **COMPREHENSIVE CARE**
- **COLLABORATION**
- **EDUCATION**
- **PERSONALIZED SUPPORT**
- **ACCESS**
- **WAYFINDING**
- **FLOW**
- **FLEXIBILITY**
- **TECHNOLOGY**

**Building in Context**

**SITE SELECTION CRITERIA**

- **DOWNTOWN SETTING**
- **EASY ACCESS**
- **COMMUNITY CONNECTION**

**Site Plan**

**Building Context**

**First Street**

**Freedom Street**

**The Strollway**

**HWY. 40 Business**

**Site Plan**

**FLOOR PLAN // LEVEL 0 PARKING**

**FLOOR PLAN // LEVEL 1**

1/16" = 1'

1/32" = 1'

**Figure 356: Board 2 (Crews)**
**GUIDELINES**

**BUILDING SCALE**
- 61: GRADIENT ZONES
- 62: TRANSPARENCY
- 63: SIMPLIFIED CIRCULATION
- 64: MODULAR PLANNING

**PROGRAMSCALE**
- 65: POD GROUPINGS
- 66: OPEN TEAM HUBS
- 67: STANDARDIZED CARE ROOMS
- 68: TRANSFORMABLE SPACE

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**FLUID TRANSITIONS FROM PUBLIC TO CLINIC**

*Programmatic Zoning of building*

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Figure 357: Board 3 (Crews)
Figure 358: Board 4 (Crews)
Figure 360: Board 6 (Crews)
Figure 361: Board 7 (Crews)
Figure 362: Board 8 (Crews)
Figure 363: Final Presentation Model (Crews)
APPENDIX
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