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# **Web Design and Implementation for the Family Health Center of Worcester**

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## **Abstract**

The Family Health Center of Worcester (FHCW), a non-profit federally funded health center, sponsored this project with the goal of redesigning its website to accommodate more effectively the growing and diverse needs of its patients. FHCW was in need of a website that reflects its mission and provides the necessary tools and resources for patients, including non-English speakers, with few computer skills. This report presents the methodology for designing such a website, the prototypes developed during the project, and the new FHCW website.

## Executive Summary

Today, websites are efficient tool of communication within society. For example, when people need information about a company or an organization, most of them will almost instantaneously think of its website. To provide patients electronic access to information about its services, Family Health Center of Worcester (FHCW) was in need of a more updated, user-friendly and informative website. This was necessary because FHCW's former website contained outdated information that could mislead patients. Its unorganized structure made it difficult for patients to find information on the website. In addition, without any multilingual aspects, it did not meet the needs of people who speak different languages. FHCW was therefore, in need of a new website serving as a better communication tool for FHCW and its patients. To achieve this goal, the project team started by conducting a literature review and continued by following the four stages of the system development life cycle, namely planning, analysis, design and implementation. These stages were cycled within a feedback system, in which we developed one prototype based on the feedback from the previous one. We developed two prototypes and improved upon them before producing the final website that successfully met the project objectives.

During the planning phase, we defined the scope of the project and came up with a list of prioritized project objectives: (1) highlighting each department and its service; (2) highlighting staff; (3) using rich media content; (4) using multilingual content; and (5) being easy to use and update. All these objectives were included within the scope of our project. However, we were not responsible for the design of the homepage and style of the website. Once the objectives and scope of the project were finalized, we were able to create a tentative 7-month schedule for the completion of the project. Next, during the analysis phase, through diligent research on web

design techniques, requirements gathering through 24 staff interviews and benchmarking of other websites, we were able to develop a list of requirements as well as identify the audiences of the website. We determined that the patients were the most important and central audience of website, reflecting the mission of FHCW. Therefore the website had to cater to their diverse backgrounds and varied medical needs. Peripherally, the website would also focus on providers, donors, potential employees, and the public. As a result of a complete analysis of the FHCW website and analysis of the website of other health centers who we believed to feature good website design techniques, we identified the organization and presentation of content, the out-of-date information and the lack of multilingual and multimedia content as areas that needed improvements. Additionally, we obtained information about services and programs of each department during this phase through staff interviews and document analysis.

During the design phase, we first determined the navigation tabs which reflected the most appropriate structure in which to organize the web content and to include all the information that users need. We also determined that to meet part of the goal of catering to all patients, we had to meet the sub-goal of being multilingual and including multi-media. We therefore, included welcome videos in five different languages (Spanish, Portuguese, Vietnamese, Twi, and Haitian Creole) on the homepage and decided to include the English version of the welcome video on the About Us page. We also developed the sub-structures under each main navigation tab to effectively organize our web content. During the last phase, the implementation phase, we installed the website on Sitefinity, the content management system that was selected because it is a lot easier to use than software such as Dreamweaver since it does not require any computer programming skills.

Although the new website caters more effectively to the FHCW patients, there is still future work to be done. There were features of the project that were beyond the scope and schedule of our project, such as developing an intranet or an internal database for employees and patients of FHCW. Additionally, to improve the multilingual aspect of FHCW website, the content should be translated to different languages in the future. Links to reliable online healthcare resources should also be provided on FHCW website for patients wanting to learn more about their health. Furthermore, to successfully collect feedback from patients, a pop-up survey should be placed on homepage.

Although future work is needed, FHCW will surely benefit from the new website. Its patients will now be able to obtain relevant information about the health center; as well as recognize that they are indeed the central focus of the center. We hope that this newly created line of communication will be continued via frequent updating of the website. We are confident that it will be successful in catering to patients of all backgrounds, providers, donors, future employees and other audiences.

## **Acknowledgements**

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## **Statement of Authorship**

This two-member project team decided to evenly distribute the work load in terms of writing as well as balance the load in regards to building the prototypes. The work was distributed based on the strengths of each member. Majoring in Biomedical Engineering and Professional writing, Funmi Adebayo was mainly in charge of investigating healthcare related website models and organizing web content. Being a Computer Science major, Joanne Zhang was mainly responsible for understanding how Content Management System (CMS) works, researching web design techniques, loading and formatting content on the CMS. Since there were only two of us, the work was relatively easy to distribute with one member writing a section while the other edited and vice versa. We affirm that this is the way things worked out not only with the designing of each prototype but also with the writing of this report.

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## 1 Introduction

Virtually all businesses, corporations, and organizations today utilize the internet and websites as means to communicate, broadcast and interact with their broad spectrum of users. As computer and internet resources grow larger and larger, the opportunities and possibilities a website brings can prove invaluable. The Family Health Center of Worcester (FHCW), a non-profit community health center in Worcester, recognizes these values and wants to design a website that not only acknowledges and accommodates its users, but also effectively communicates with all of them. When designing such a website, we consider a wide realm of concerns. Like any other health and medical facility, privacy issues and cost concerns are important, but issues such as how to cater to a large and diverse group of users also take precedence.

The FHCW is a family health center established in 1970 in Worcester, MA (Family Health Center of Worcester, 1994). It is committed to providing medical service to the underserved communities of the Worcester area regardless of age, background, and financial and insurance status. It is made up of a diverse group of staff focused on providing medical services to everyone that they can. FHCW's primary and most important concern is its patients. From departments such as its dental unit, to its Women, Infants and Children (WIC) program, FHCW strives to offer the best healthcare to all of its patients. It was therefore not surprising that, fitting with its mission, FHCW strives to also strengthen its communication and interactions with its patients through the use of a website.

## 1.1 Project Objectives

The FHCW's former website, although useful in many ways, did not really accommodate its needs, or the diverse needs of its patients. It was a dated website and had an unorganized hierarchical system of content and data management. The website did not meet FHCW's ambition to strengthen communication ties with its patients, nor did it reflect technological advances in internet and website design. Therefore, the main objective of this project was to design a new website for FHCW that not only reflected today's effective web design techniques, but also communicated successfully with its diverse audience.

Though a seemingly straightforward main objective, there were many sub-objectives to consider when designing the new FHCW website. For instance, one of the most important sub-objectives was to cater to FHCW patient diversity. Even under this sub-objective, there were multiple other sub-objectives, including:

- Accommodating the variety of languages spoken: The center serves more than 22 thousand patients who speak 24 different languages ranging from Swahili to Vietnamese (Johnson Smith, 2009). Creating a website to cater to such a wide variety of patients' languages was one of the major sub-goals.
- Accommodating the varying levels of literacy in English and other spoken languages in the FHCW.

These particular sub-objectives called for the use of rich media content, namely the use of video and audio content, through which patients would be able to listen or watch as an employee of FHCW provided important health information in a language and format that they can comprehend. Additionally and equally important, the website had to provide the

necessary urgent information as well as maintain up-to-date health content. These were only a few of the considerations and goals among a myriad of sub-objectives.

## **1.2 Benefits of This Project**

Despite the challenges and multi-faceted objectives of building such a website, the benefits far exceed the extensive work needed to produce one. The website opens a new and unique line of communication between FHCW and its patients. It allows members of medically underserved communities of Worcester to have access to timely health information and information about the health center. Not only will the health services continue to be given regardless of economical background, but also and perhaps often overlooked, information and access to health content is now available to these patients. Such a website even alleviates some of the daily doctor-to-patient concerns and frequently asked questions. For instance, topics such as the FHCW policy about people without insurance is addressed on the website instead of taking up valuable doctor-to-patient time.

As FHCW is a non-profit, government-funded organization, designing and implementing a new website would have proven to be a financial difficulty, had it tried to solicit paid professional help. The employees of FHCW do so much good in the Worcester community; so not only is it important that this work is exemplified in the website, but also that it is highlighted for everyone to see. A good website is extremely beneficial for such an organization, not only for its main priority – its patients, but also to highlight and appreciate the members of FHCW.

### 1.3 Layout of This Report

The following sections of this report highlight information about the Family Health Center of Worcester, web design, the design process and methodology, as well as our results, discussion and future recommendations. There are eight main sections, namely the background section, the methodology section, the planning and analysis sections, the design and implementation sections, future recommendations and a conclusion section.

In the background section, this IQP team provides the history of family health centers in the United States, and then focuses specifically on the FHCW. The current FHCW website is then closely examined and described, and effective web design techniques are addressed. Following this, in the methodology section, this team explains its approach to developing a website for FHCW. In the following four chapters after the methodology – the planning, analysis, design and implementation chapters, the team details the four phases of its methodology. Included in the planning chapter are a project schedule and an overview of the data acquisition process. In the analysis chapter, the current FHCW is dissected and analyzed, and current healthcare website models are compared for effectiveness. In addition, a detailed explanation, and the advantages of the Content Management System (CMS), the web technology to which FHCW is switching, is provided. The design and implementation chapters provide the results of the project as well as a detailed explanation of the staff and patient feedback on the final prototype. In the future recommendation section of this chapter, this IQP team provides a discussion on the future work that can be continued on this web design project to optimize the website's effectiveness in achieving the goals of Family Health Center of Worcester. The report concludes with a conclusion section, where the project and its results are summarized and the team reflects upon the project.

## 2 Background

The following sections provide the history of federally funded community health centers, and a description of the Family Health Center of Worcester.

### 2.1 History of Federally Qualified Health Centers in the United States

The history of federally qualified health centers (also known as community health centers) is accurately depicted on the website of Klamath Health Partnership, a community health center in Oregon, which is where the following information was obtained (Klamath Health Partnership Inc., Unknown). This information was also validated by other sources, such as the National Association of Community Health Centers, and the Coastal Health Alliance Community Health Centers websites.

With the goal of providing attainable and affordable healthcare, including physical and mental care, to low-income communities in medical need, federally qualified health centers were first established during the 1960s. The idea of creating such centers was originally introduced during President Johnson's "war on poverty." During this "war", it was proposed to the Office of Economic Opportunity that people in low-income communities should also have equal rights to healthcare. Among such activists was young doctor, H. Jack Geiger, who had travelled to South Africa and witnessed how a health center could help mitigate the large differences in healthcare services between high and low income communities. Through his actions and the help of countless others, the *Economic Opportunity Act of 1964* was passed. It reinforced community health resources with federal funds, and was monumental in founding community clinics around



the United States. In 1965, Boston City Hospital received its funding and became the first family health center in the US.

Today, family health centers are a key part of the healthcare system in the United States. They are located in high-need areas and provide healthcare to more than 20 million people (National Association of Community Health Centers, 2009). They are open to all residents of the US including those without health insurance and those who do not speak English. Family health centers have been serving low income communities for more than 40 years now, and they have undoubtedly improved the healthcare system and delivery in this country (National Association of Community Health Centers, 2009). As the National Association of Community Health Centers further states, community health centers have dramatically increased awareness of preventative medicine (2009). Economically, they have been shown to reduce mortality rates in high-need neighborhoods and increase the overall health of their members. Furthermore, they have created jobs and thus “stimulated economic growth” (National Association of Community Health Centers, 2009).

## **2.2 Family Health Center of Worcester**

Following the trend of utilizing community health centers to meet the medical needs of underserved communities, the FHCW was established in 1970. It is located on 26 Queen Street, Worcester, Massachusetts and is one of 1200 health centers in the country (National Association of Community Health Centers, 2009). Much like other community health centers, it treats patients from a large variety of backgrounds regardless of their ability to pay, or insurance status.

It serves as a local medical service provider in the greater Worcester area. The following sections will elaborate on its mission, history, patients, departments, and finances.

### **2.2.1 Mission**

The mission of the Family Health Center of Worcester is to “improve the health and well-being of underserved and culturally diverse Worcester area residents through the provision of high quality, comprehensive, and continuous healthcare” in various medical fields (Family Health Center of Worcester, 1994). Its medical departments include Primary care, Urgent care, Dental care, Social services and Pharmacy. FHCW’s commitment to community is apparent in its countless programs including Women, Infants and Children (WIC) as well as its participation at school-based sites.

### **2.2.2 History**

The history of FHCW was obtained from interviews with Noreen Johnson Smith, who is the Vice President of Development at FHCW, documents obtained from the employees at FHCW, and information from its current website.

When the FHCW was founded in 1970, it was a part of Model Cities Program, a component of Lyndon Johnson’s “war on poverty” (Johnson Smith, 2009). As stated on the website, two years later in 1972, FHCW was incorporated as the Family Health and Social Service Center. In 1974, it made a commitment to the University of Massachusetts Medical School to participate in its Family Practice Residency Program. Since then, FHCW has offered training to more than 130 physicians through this program. In 1991, the Family Health Center of

Worcester built a satellite health center on the former site of the Worcester City Hospital (WCH), which had closed because of insolvency (FHCW, Unknown). It seamlessly continued the work of WCH health service delivery to over 20,000 patients per year. Today, as a non-profit medical care provider to “the whole family,” FHCW is ensuring the continuity of full range healthcare to 33,000 residents with or without insurance (Johnson Smith, 2009).

### **2.2.3 Community & Patients**

The FHCW is located in the high-need urban area of Worcester, Massachusetts, home to 175,500 people from very diverse backgrounds (City of Worcester, 2009). Reflective of the Worcester community, FHCW serves a wide variety of patients including low-income families, minorities, refugees, and homeless people, most of whom do not have insurance prior to visiting FHCW. Approximately 95% of these patients live at or below 200% of the poverty limit (Johnson Smith, 2009). This means that for an average family of four, the total annual income is at or below \$44,000 (Foundation for Health Coverage Education, 2009). In addition, these patients come from extremely diverse backgrounds. They speak twenty-four different languages including Spanish, Vietnamese, Albanian, Portuguese, Twi, and Swahili. Countless others are refugees, currently from countries such as Bhutan, Iraq and Burma (Johnson Smith, 2009). The literacy level of these patients varies significantly as well, ranging from illiterate in all languages to proficient in reading and writing English. Many patients only have spoken literacy in their native language, and do not know how to read and write (Johnson Smith, 2009).

## 2.2.4 Operation and Departments

Targeting patients' involvement, FHCW provides high-quality primary care, diagnostic and special service to people facing language, financial or other problems. As a Federally Qualified Health Center, it is governed by a patient-majority board of directors, ensuring patients' decision-making on how their health service is delivered (Johnson Smith, 2009). They oversee the entire health center and make strides in improving health delivery for FHCW patients. They also, along with the administration, supervise the center's many departments. Below are the departments of FHCW; this information was obtained from the FHCW website (Family Health Center of Worcester, 1994):

- **Dental Care:** With the knowledge that dental care is often critical to and reflective of overall physical health, the dental care department at FHCW has the resources to serve many patients. It has five examination rooms, the fifth being a pediatric examination room. It offers a variety of dental services ranging from cleanings to emergency services.
- **Health Benefit Advisors:** Although not an explicit department at FHCW, the Health Benefit Advisors play an extremely important role in all the departments of the health center. They are multilingual staff members who work with uninsured patients and help them apply for public insurance. This is extremely important for the health center to be able to provide the necessary medical attention to these patients.
- **Laboratory, Radiology & Pharmacy:** As part of the 340B Drug Pricing Program, the pharmacy provides prescription drugs to FHCW patients at a lower cost. The laboratory and radiology services also provide diagnostic tests and X-

rays including mammographic X-rays, HIV testing, and ultrasound exams, for the primary and urgent care departments. They, like all other departments at FHCW, work with patients who cannot afford to pay for any of these services thus reflecting the mission to provide medical service regardless of financial standing.

- **Maternal and Child Health Program:** As part of the Worcester Infant Mortality Reduction Task Force, this program is focused on creating an opportunity for pregnant women to have early and consistent prenatal care. Equipped with five bilingual case managers, FHCW is able to provide care from the prenatal stages until age 2, through this program. The staff of this program also provides labor and delivery support, and are on-call 24 hours a day, 7 days a week. Also offered as social services programs to the expecting mother are depression screenings throughout the pregnancy, immunizations for the infant as well as a smoking cessation program if needed.
- **Primary Care:** The Family Health Center of Worcester currently has three medical teams that make up the primary care department, with one more in development. Each team consists of primary care providers who administer the medical service; clinical social service workers who provide mental support if needed; and care coordination staff whose primary concerns are the welfare of the patient, financially and mentally, and making sure that each patient receives the best medical service FHCW can provide. Again, reflective of its mission to better serve its patients, most FHCW employees are bi- or trilingual.
- **Reception and Call Center:** It is at the entrance of the building. Bilingual or trilingual employees inform visitors about how to navigate the health center if

there are any questions, make appointments and help uninsured patients apply for public insurance. They are essentially the greeting face of the health center and reflect FHCW's mission to help as many people in need of medical attention as they can. In the Call Center, patients can make appointments and also speak with a triage nurse to determine the severity of their illness. These employees are well-trained and most often bilingual.

- **School-based Centers:** FHCW extends even more into the Worcester community through its six school-based centers around the city. This program offers medical services to students enrolled in Doherty High School, Elm Park Community School, Goddard School of Science and Technology, University Park Campus School, South High Community School, Sullivan Middle School, and Woodland and Claremont Academies. These centers work closely with students and their parents to provide primary health services, sports medicine, emergency services, immunization, dental services and wellness and exercise programs.
- **Social Services:** This department consists of a team of clinical social workers, dedicated to providing mental health services and counseling to patients who need it. In addition, they oversee the Homeless Families Program. This program works with homeless families to identify their health, mental and financial needs and equip them with the necessary tools, resources and support. Along with the Homeless Families Program, the social services department is involved with testing and counseling HIV and Hepatitis C patients, as well as a Smoking Cessation Program. It works very closely with the other FHCW departments to insure the patient's overall wellbeing.

- **Urgent Care:** Equipped with well-trained, multilingual staff, it provides treatment for non-emergency and unscheduled appointments. If the situation is deemed life-threatening to the patient, he or she will be promptly sent to an emergency room. In addition, patient navigators help patients to identify a primary care doctor for them and their families. This particular department is being merged with the primary care department. This merged department hopes to have a new same-day appointment feature to accommodate both the needs of patients in urgent care as well as those in the primary care department.
- **Women, Infant and Children (WIC):** FHCW serves as the main site for the Worcester WIC program, which has three additional sites in Worcester. This program provides healthy foods to pregnant women, new mothers and young children in need by giving them food checks. It also offers nutrition counseling and immunization tracking and provides these services to over 6400 people in the Worcester area.

These departments maintain very private and close communication to ensure the confidentiality and care of their patients. Other programs include the Maternal and Child program, Teen Health clinic and the Hepatitis, HIV and STI program (Family Health Center of Worcester, 1994). In addition to serving patients, FHCW, partnering with UMASS Medical School, hosts one of the few community-based residency programs in the country. It is a very extensive health center that not only provides quality care for its patients, but also helps nurture future health providers for the country.

### 2.2.5 Funding

To accommodate its very extensive healthcare program, the Family Health Center of Worcester spent about \$22.5 million last year (Family Health Center of Worcester, 2008). Of this amount, which varies from year to year, close to \$21 million was used to support FHCW's departments and program services, and about \$1.7 million was used for support services (Family Health Center of Worcester, 2008). The money for these services comes from a variety of sources. Approximately \$2 million of this money comes from the federal funds, namely the Public Health Service grant, section 330 (Johnson Smith, 2009). This grant helps fund community health centers as well as other nonprofit organizations that provide services and care to members of low-income neighborhoods. Additionally, \$4 million of the FHCW budget comes from fundraising and various other grants (Johnson Smith, 2009). The rest of the money comes from patient revenues such as reimbursements from Medicaid and Medicare. Despite efforts to stay within the budget, FHCW has had a deficit in the past few years due to its broad patient-oriented programs.

### 2.3 FHCW Former Website

Like many health facilities of its kind, the Family Health Center of Worcester had its own website, which could be found at [www.fhcw.org](http://www.fhcw.org) (also see Appendix I, Figures 3 & 4). This website served many purposes, including creating a means of communication to a variety of users. A large majority of these users were the actual or potential patients of FHCW. For them, the website essentially acted as an informative guide, where they could find information regarding the services and programs, relevant center news, history of the health center, and its mission. They could also glance through the names of the providers at FHCW as well as learn a



little bit about each of its departments. Information about hours of operation, directions to the health center, and the health center's brochure could also be obtained here. The website was very patient-orientated and attempted to create a one-way communication line directed to its extremely diverse patients. For those patients without insurance, the FHCW website offered information about who to talk to as well as what to do. It even acknowledged its large Spanish-speaking patient community by providing a link to a health-related question-answer website in Spanish as well as providing some links to additional news in Spanish; otherwise, the website was in English.

Catering to less numerous audiences, the website also included a link for donations as well as a page for job opportunities. These parts of the website were more administrative than the rest and were noticeably kept to a minimum, emphasizing FHCW's true commitment to its patients. Nevertheless, future financial donors and employees were able to find some information regarding donating and current job openings, respectively. In addition, current employees may have found some useful information on the website as well, including a link to important documents such as the "Notice of Privacy Practices" document. The website attempted to embody the true mission of the health center – to cater to its patients. It did so in certain ways and mainly focused on informing FHCW patients and providing the relevant resources they needed.

## **2.4 Website Design**

As the internet world grows ever greater, it is imperative for organizations and businesses to understand the benefits and resources the internet has to offer, and to know how to create a

“good” and effective website. Many organizations have already tapped into this enormous resource through the use of a website. Below is a literature review that has been validated by a variety of different sources (e.g., Thomas, 2002; Lewis, 2002; Kumar, 2005) about web design.

#### **2.4.1 Before Designing the Website**

With the goal of designing a website that simplifies users’ action and leads to high productivity, the first step is to determine the requirements and constraints on the project. The project team needs to conduct user analysis and task analysis, and create a design model based on its findings.

##### **2.4.1.1 User Analysis**

Users are always the center of interfaces or websites. Prior to drafting a user-friendly website, a design team needs to consider potential users as a part of the project, not just recipients. Human factors are the key criteria of creating a system that satisfies users’ need. The characteristics and experiences of various users are the main determinants of website interface design (Brown, 2006). The first thing we should identify is users’ knowledge and experience. How are their reading and typing skills? Are they familiar with using computers or internet? What are their native languages? Next, we should distinguish between users who give information and users who gain information from the website. We should also design a webpage or functionality based on the users’ age. We should notice the percentage of users who are color-blind or have any disabilities. Then we can decide what the system should look like and what functionalities it has based on our research to ensure effective use of the system.

### **2.4.1.2 Task Analysis**

The tasks and subtasks that the users perform when interacting with the website, such as searching or uploading a file, also have a profound influence on the design decisions. When investigating a series of users' actions by breaking them into tasks and steps, the following characteristics need to be considered (Brown, 2009):

- Task objectives: What are the goals of users as they perform their tasks?
- Basic actions: What actions do users need to perform to achieve this objective?
- Frequency of use: Are there tasks that are performed very often? Do we need shortcuts for them?
- Primary training: Will users get trained to perform those tasks? Do we need to provide help messages?
- Task importance: How important is each task? What if an error happens? What can we design to prevent errors?
- Alternative solutions: Are there other ways to achieve the same goals?
- Relationship between tasks: Are tasks related to each other? Do we need links?

### **2.4.1.3 Four Level Model**

A web design model is based on identified needs of users and established requirements of the system. Via a conceptual simulation of users navigating through the website, a designer formulates a model to outline the structure of the website in detail and illuminate how it will be implemented (Thomas, 2002). The model represents the overall arrangement and functional components of the system. The mental and physical models of design can be grouped into four levels (Foley & van Dam, 1990). Each level goes into more detail:

- Conceptual level – Thorough understanding of goals and intended model, such as the overall structure and functionality of the website
- Semantic level – Identify users' input and what the system will output
- Syntactic level – Placement of components on the webpage, arrangement of content
- Lexical level – Primitive ingredients such as icons, links, messages, and search boxes

To build the four-level approach, two different versions of prototypes can be utilized. A paper prototype is a simplified sketch of the web pages and their relationship. A designer can brainstorm and draft easily on paper. A computer prototype requires more skill to accomplish, but it is a dynamic blueprint of the real version.

Evaluation should be conducted during the process of model design, not after it. Evaluation can be in the form of comparing metrics, questionnaires or surveys, interviews, etc.

## 2.4.2 Principles

In addition to the analysis and fulfillment of the websites' pre-requirements, applying appropriate design principles and guidelines are also necessary to ensure a user-centered website. Today, one of the most widely adapted sets of interface design evaluation rules is the Usability Heuristics developed by Jakob Nielsen in his book *Usability Engineering* (2005). Built on those rules, four principles of a well-structured, efficient and virtually engaging website are as follows:

### 1) **Functionality**

Identify who the functions are designed to serve and what their special needs are.

Operations should be accessible and easy to perform without assumed knowledge,

catering to both experienced and inexperienced users. Provide shortcuts to frequent functions if needed.

## **2) Content**

All of the content should be logically organized and expressed in natural phrases and concepts familiar to the users. Instructions should be provided when necessary. The designer must focus on the needs and interests of users by highlighting content on the page, and ensuring that the content is reliable and updated. Users should not be required to remember any information. A good design should also include correct grammar and spelling.

## **3) Consistency**

To design a consistent and predictable website, the designer can use a template. The “look and feel” of every page should be similar, so that a user does not need to wonder whether different situations mean the same.

## **4) Aesthetics**

A disorganized layout can lead to error, and a bad-looking homepage can turn users away. Designers should focus their efforts on fonts, colors and images. The overall design should not be too fancy. White space is necessary for good page layout (Lewis, 2000).

### 3 Methodology

Designing a website of this caliber took a fair amount of planning and organization. Of the available system development methods, we chose the prototyping-based methodology, which is illustrated in Figure 1 (Dennis, et al., 2006):

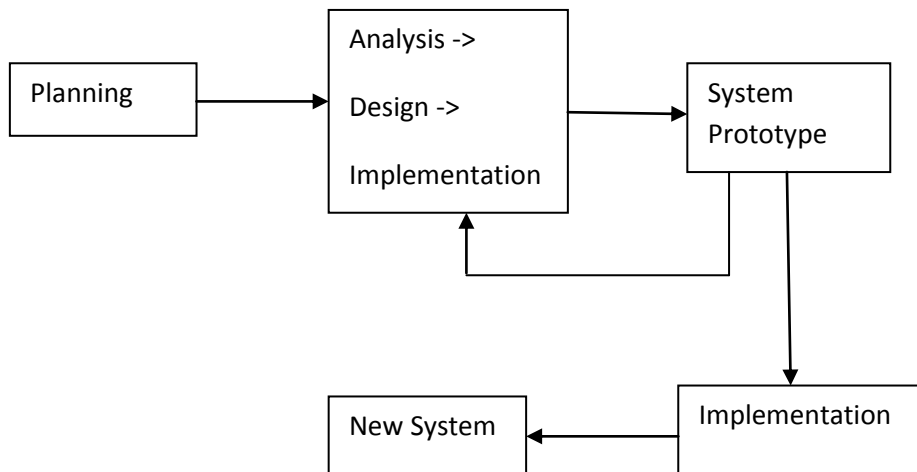


Figure 1 - Prototyping-based Methodology

According to the concept of the “System Development Life Cycle” (SDLC) illustrated in Figure 1, the project team decided to break the whole design project into four phases:

“Planning”, “Analysis”, “Design” and “Implementation”. When we were first presented with the project to create a website for FHCW, we determined the users of the website and sponsor’s needs and objectives for the project. After this, we communicated with the sponsor to prioritize these objectives. Extensive research was then conducted to determine how to design an effective website, as well as to review current healthcare websites. We used this information as well as information from preliminary interviews to form initial ideas on how to approach this design project. Then, the design team provided the sponsor and users with an initial prototype of the system, and then refined it based on their suggestions. Phases of analysis, design and implementation were performed iteratively until users and designers agreed on a final system specification. At this point, the project could move to the final implementation phase.

The advantage of this approach was that a draft system could be provided to users to interact with quickly (Centers for Medicare and Medicaid Services, 2008). Although the initial system showed limited functionality, the sponsor and users could still get a sense of the new design theme, and provide their comments and additional requirements at an early stage. It also ensured that the project was going in a correct direction from the beginning. The users were highly involved in every phase of the project. Their feedback during the process furthered our understanding of the system requirements and objectives and helped us avoid potential problems. Since they participated in the process of analysis, design and implementation, the users were more likely to be satisfied with the final system.

The following four chapters, Planning, Analysis, Design and Implementation, describe in detail our methods and results for each phase of SDLC for the project.

## 4 Planning

Before designing the website, our project team drew an overall blueprint for the new system. The first step was “Project Initiation” (Dennis, Wixom, & Roth, 2006). The team members clearly understood that the objective of this project was to develop a website that will “create value” for FHCW (Dennis, et al., 2006). We also determined what features the system needed to become such a website, and in which way it can create value. To achieve this goal, we had a number of meetings with Noreen Johnson Smith, the Vice President of Development at FHCW, our project sponsor, and identified initial objectives and requirements, which included:

- **Showing Alerts:** The website should have up-to-date information about relevant health news such as the swine flu.
- **Highlighting Staff:** The website should highlight and introduce the doctors and staff. It not only connects the doctors and their patients but also shows the staff at FHCW that they are appreciated.
- **Being Informative:** It should include relevant health information about FHCW, its departments, other sites around Worcester and its history and mission.
- **Patient Feedback:** The website should also allow patients to give their feedback online.
- **Rich Media/Multilingual:** It should include the use of audio and visual media content to cater to people who speak different languages such as Spanish, Vietnamese, Albanian, Portuguese, Twi, and Swahili, as well as accommodate different literacy levels among the patients.
- **Targeting Funders:** Although not a priority audience of FHCW, the website should also acknowledge the funders and provide information on the health center, its mission and history and how to donate.



- **User-friendliness:** The website should allow for easy patient interaction and use of the website. It should have an organized hierarchical structure, and accommodate a diverse group of patients.

We prioritized these objectives from most important to least important to determine where to place our focus, what decision to make when we had to make a trade-off, and what objectives were most critical to the success of this project. To do this, we asked our sponsor to fill in a pair-wise comparison chart, which can be found in Table 1.

Table 1 - Prioritizing Objectives: Pair-wise Comparison Chart

<b>Objectives</b>	Show alerts	User friendly	Informative	Rich media content/multilingual	Target funders	Highlight staff	Social Networking	Patient feedback	<b>SCORE</b>
Show alerts	<b>X</b>	0	0	0	0	0	1	0	1
User friendly	1	<b>X</b>	1	0.5	1	0.5	1	0.5	5.5
Informative	1	0	<b>X</b>	0.5	1	0.5	1	1	5
Rich media content/multilingual	1	0.5	0.5	<b>X</b>	1	1	1	1	6
Target funders	1	0	0	0	<b>X</b>	0	1	0	2
Highlight staff	1	0.5	0.5	0	1	<b>X</b>	1	1	5
Social Networking	0	0	0	0	0	0	<b>X</b>	0	0
Patient feedback	1	0.5	0	0	1	0	1	<b>X</b>	3.5

As a result, the priority of these objectives from most important to least important was as follows:

1. Rich media/multilingual
2. User-friendliness
3. Being Informative
4. Highlighting staff
5. Patient's feedback
6. Targeting funders
7. Showing Alerts

Based on this prioritized list, the key objectives for us were creating a website that effectively uses rich media content to cater to oral communicators and those using other languages; creating a website that is user-friendly and informative, and one that shows the most up-to-date and recent health alerts. Through this exercise, it was determined that patient feedback, although ranked in the middle, was beyond the scope of the project.

To manage our tasks well, we determined a work plan during the planning phase. We used a Gantt chart, as shown in Appendix II, as a way to view and organize the schedule and scope of the project. It illustrated the work breakdown of our project and the relationship between time and each phase of the design process.

## 5 Analysis

### 5.1 User Analysis

To build a user-centered system, the first thing we determined in the analysis phase was who the audience was. After a comprehensive user analysis, the potential users were listed as follows:

- Patients
  - Age
    - Patients range from prenatal to the elderly
  - Language
    - Different literacy levels
    - English, Spanish, Vietnamese, Albanian, Portuguese, Twi (Ghana), Swahili
    - Refugees from Bhutan, Burma, Iraq
  - Departments of interest
    - Dental care
    - Medical Care
      - Urgent care
      - Primary care
      - HIV services
      - Maternal and Child Health Programs
    - Laboratory/Pharmacy/Radiology
    - Women Infant and Children Program
    - Social services

- Mental health
  - Homeless families program
  - Smoking cessation
- Different sites
  - Main site (Queen street)
  - School-based sites
  - Webster Square
- Funders
  - Individuals
  - Foundations
  - Event attendees
  - Government
- Staff
  - Healthcare providers
  - Administration
    - Insurance
    - Operations
- Public
  - Non-patient viewers
  - Other clinics
- Future employees
  - Doctors/nurses
  - Administrative people

- Residency candidates

## **5.2 Website Analysis**

Once we knew the audience of the website, we then examined FHCW's former website, and compared it to model websites which we identified based on our literature review of effective web design techniques. Based on these comparisons, we were able to determine the areas that needed improvement in the current website. In addition, after a critical investigation of the former website, we were able to determine the user requirements and develop the overall concept of the new website.

### **5.2.1 As-Is System Analysis: FHCW's Former Website**

While the FHCW's former website may have embodied the mission of the health center, it did not effectively cater to all the needs of its audiences. As stated previously, its main audience was the FHCW's actual and potential patients, and they come from a variety of backgrounds. They vary in age, ranging from infants to the elderly. More importantly, they are extremely diverse in the languages they speak. As stated earlier, there are many different languages spoken by FHCW's patients, most of which the website provides no accommodation. The former website also failed to meet the individual needs of each patient for information about a department of interest. For instance, if one wanted to find out more information about dental care, general information was provided, but it was not enough for any patient worried about their dental health. Each departmental webpage was also unfortunately lacking specific information for its patients. It merely gave the essential information of hours of operation and a brief description, but nothing beyond that. There were no links to further resources for a patient with

questions about their health. In addition, there were no answers to pertinent frequently asked questions that a patient might be interested in knowing.

In addition to the partial fulfillment of patients' needs, the FHCW website did not do justice to some of its other users. Notably, one of the major website's audiences that the current website barely acknowledged was the providers at FHCW. While they may not be primarily targeted users, the providers at FHCW are extremely important. Not only do they provide the health information and most of the content of the website, but also they are a key part of the health center. Therefore, the new website should provide more information about the providers including, their position at FHCW, the department or program in which they are involved, and the languages they speak.

Furthermore, the FHCW's former website could have been more up to date. Patients are constantly looking for new and updated health information but the website was still displaying the version developed in 1994. This was because the website was built using Dreamweaver, difficult software for non-computer programmers to update. Additionally, the organization of the website was not efficient, thus making it less user-friendly. With the large amounts of text and the placement of certain links, but with no logical and obvious hierarchy, some information was also hard to find. It was a black and white flat-page website and did not provide enough to draw in the user. Additionally, there was no search box, which can help retrieve information faster.

While the website served as a communication tool mainly between the FHCW and its patients; it did so in an ineffective way, due to the lack of updated content, as well as structural inefficiencies in the website. These were problems that needed to be resolved so that the FHCW website successfully achieved its purpose. While designing such a website, it was imperative for

us to consider several factors including that the website had to cater to the needs of FHCW patients who vary in languages spoken, literacy level, age, and health concerns. The website also had to effectively broadcast information to all audiences of the website. Furthermore, user-friendliness was a very important objective. Not only did patients and other users of the website need to obtain relevant information quickly and effortlessly, but FHCW employees also had to find it useful as well, because they were the people who would update the information as needed.

Illustrated in Table 2, is a summary of this section. It presents the ideal purposes of the FHCW website, based on the objectives we developed during the planning phase of the project, on the left column and determines if the former FHCW website met each criterion.

**Table 2 - Analysis of Areas for Improvements**

Ideal Purpose of FHCW Website	Did Former Website meet criteria
Diverse patient accommodation – language, literacy, computer background, social background, medical needs	No
Presentation of clear, concise and organized data for easy data acquisition	No
Presentation of up-to-date information	No
Highlight Staff	No
User-friendly	No

### **5.2.2 Benchmarking: Analysis of Current Website Models**

To successfully design an effective website, detailed research and analysis of current website models was conducted to determine how other health centers had attempted to create an effective user-friendly means of communication with their patients through the use of a website.



Below is a look at six health-related organizations and their approaches in establishing this type of communication. They were selected from a myriad of other websites, because they best exemplified good web design techniques as detailed in our literature review. Many of these centers share similarities with FHCW in terms of the diversity of their patients, and thus we decided it would be worthwhile to analyze each of their approaches on the design of their website. Screen shots of each of these websites can also be seen in Appendix II, Figures 5-10.

- **Community Health Connections Family Health Centers (CHCFHC):** This website, which can be found at [www.chcfhc.org](http://www.chcfhc.org), brings together three connected health centers, Fitchburg Community Health Center, Leominster Community Health Center, and Greater Gardner Community Health Center, under one website. Its use of pictures on the front page of the website gives an immediate sense of connection and personal touch to the site. Also eye-catching is its use of a scrolling news link bar. There is the option of clicking to any of the health centers, and also a menu tab about CHCFHC in general. It also includes a 10-minute video that features the history of community health centers in general, an overview of the three health centers specifically, as well as a look at their wide variety of patients. The video is designed to draw in its diverse audience, through the use of personal narratives as well as the use of different languages. The menu tabs highlight its services, an overview of the organization as well as pages for volunteering and donating. Again, the use of pictures on all these pages provides a greater sense of connection between doctor and patient. The website overall is very well organized. An overview of each individual health center is also provided, with each mission, and location using the Google Map tool. Although under construction, the website also provides an alternate site in Spanish and Hmong.

- **Fallon Clinic:** This website can be found at [www.fallonclinic.org](http://www.fallonclinic.org). Perhaps one of the most striking things about this website is the organization of the website. On the front pages, patients can click to access their own medical records online and have the ability to email their doctor, request to renew a prescription and view their upcoming clinic visit under the Mychart feature. In addition, the front page contains current information about H1N1<sup>1</sup>, the clinic's locations and its policy on insurance policies as well as links to brochures about a variety of topics. There are menu tabs at the top of the page, which are very user-friendly because as a patient scrolls the mouse cursor on them, a menu appears under each tab. This eliminates wasting time due to not knowing where something is. Included under this menu is an encyclopedia about health as well as a physician search. Patients can search to find doctors and are provided with a picture of the doctor and the department for which each doctor works. Clicking on the name of each doctor leads to a synopsis of the doctor's credentials and background, thus creating a sense of connection between the patient and the doctor. In addition there is also a separate database for employees. This website is very user-friendly for its patients and most things are no more than two clicks away. It is very well organized and contains effective and reliable content.
- **Great Brook Valley Health Center in Worcester:** This website can be found at [www.gbvhc.org](http://www.gbvhc.org). The most attracting feature of this website is its use of pictures. It creates a very connected feeling between the center and its patients because patients can see the faces of other patients that also use the center. The center's mission is immediately highlighted on the front page. This is very effective because patients and other users immediately know what the health center's goals and objectives are.

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<sup>1</sup> H1N1 was a flu epidemic that was taking place during the course of this project (2009-2010).

Operation hours are also listed on the side bar as well as a link to its different sites in Massachusetts. Each site has an alternative page in Spanish and Portuguese, catering to those patients. Like most websites, there is a menu at the top of the front page. Once the mouse cursor is placed on these tabs, there is a drop-down menu, again leading to faster retrieval of information. There is also a search box, allowing for ease in navigating the website. Under each site, there is side menu about each department, and like other websites, the mouse cursor just needs to be placed on each tab and information about the different departments will be provided. This is extremely useful for user interface as it eliminates the click of the mouse. The website is very patient-oriented, and does a great job in website layout and connecting the patient to the health center.

- **Health Foundation of Central Massachusetts:** This website, found at [www.hfcm.org](http://www.hfcm.org), is a unique one. The front page only highlights its mission. This is reflective of the rest of the website, where the information is extremely stream-lined and straightforward. Users do not have many options on one single page. This is very useful for those people who are not used to navigating a website. It is not a health center website and so, does not have much information about doctors and patients. Its pages are very short and directly to the point, although some may argue that there is not enough information provided. There is also a search feature for users who cannot find what they need in a timely manner. Information about what it is, its mission and history, and its grants can all be retrieved here. Its noticeable lack of pictures does not provide a face or “feel” for the organization.
- **Kaiser Permanente:** This website can be found at [www.kaiserpermanente.org](http://www.kaiserpermanente.org). Kaiser Permanente has health centers around the country and uses this website to unite them

under one umbrella. The website is immediately attracting with the use of a slide show of pictures on the front page. Patients also have the option of navigating the website in English or in Spanish. Furthermore, there is updated information about H1N1 and other health-related news. Kaiser Permanente also makes use of Electronic Medical Records, and its patients can email their doctors, manage their health record and view appointments via the “My health manager” feature. Prospective members are taken to a page where they decide what type of information they would like as well as what region of the country in which they live. This takes them directly to the relevant website. The content of the website is up-to-date and relevant. There is also a search box to expedite information retrieval. Since Kaiser Permanente also sells health plans, the website also caters to this group of users. It has a menu and an informative page dedicated to employers and others who want to buy health plans. It is an interactive and organized website.

- **UMASS Memorial Medical Health Center:** This website can be found at [www.umassmemorial.org](http://www.umassmemorial.org). It brings five different hospitals under one website. Looking specifically at the UMASS Memorial Medical Center, there are many great features of the website. First and foremost, the very dynamic slideshow of pictures creates a sense of community between the medical center and its patients. Instead of a top menu, the website has a side menu, through which patients can view information about the center, find a physician, or ways they can help. There is a tab specifically for patients and visitors where directions, patient privacy policy and other relevant information are provided. There is also a link for financial counseling which includes a video of the center’s president and CEO. Accommodating a diverse group of users, this website also

provides information for physicians, medical school students, vendors and volunteers.

One of the interesting features of the website is its links. Rather than have each link as a separate feature from the text, the links are embedded in the text. Some of the text essentially hyperlinks to other pages. While this is useful in many ways, it may make finding information cumbersome. To mitigate this, there is also a search box on the website. It is an overall user-friendly website.

Based on the above websites, in addition to passively exploring other websites such as the Worcester Polytechnic Institute website, there were many effective features to incorporate when designing a website. For instance, proper and effective use of pictures and patients' quotations could be very appealing and eye-catching. Furthermore, the use of a search box would expedite the information retrieval process. Having video content was also one way to accommodate and draw in a variety of users. Also an important task of this project was the use of different languages. Incorporating different languages was definitely a major challenge of the new FHCW website. Essentially, the most important design concern was putting the user first. Integrating effective design features played a major role in implementing a new website for FHCW.

### **5.2.3 Comparison of Website Models and FHCW's Former Website**

Based on the information provided in the previous sections about some current website models and the literature review about key components of an effective website, Table 3 is a comparison of these sites based on functionality, content consistency and aesthetics. Each website was analyzed and its good features and poor features were determined. The good features were to be integrated and incorporated in the design of the FHCW website.

Table 3 - Comparing websites based on four design principles

Websites	Good features	Poor features
<p>Community Health Connections Family Health Centers <a href="http://www.chcfhc.org">www.chcfhc.org</a></p>	<p><b>Functionality</b></p> <ul style="list-style-type: none"> <li>○ Serves the purpose of informing the users of different kinds of information</li> <li>○ Assumes no prior knowledge</li> <li>○ Caters to people who speak Spanish, and Hmong (still in development)</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>○ Content is extremely well-organized</li> </ul> <p><b>Consistency</b></p> <ul style="list-style-type: none"> <li>○ The template is very consistent</li> </ul> <p><b>Aesthetics</b></p> <ul style="list-style-type: none"> <li>○ The use of pictures is very eye-catching and very well organized</li> </ul>	<p><b>Functionality</b></p> <ul style="list-style-type: none"> <li>○ No search box</li> <li>○ No drop-down menus</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>○ Content may be hard to find</li> </ul> <p><b>Consistency</b></p> <ul style="list-style-type: none"> <li>○ No noticeable poor feature</li> </ul> <p><b>Aesthetics</b></p> <ul style="list-style-type: none"> <li>○ No noticeable poor feature</li> </ul>
<p>Fallon Clinic <a href="http://www.fallonclinic.org">www.fallonclinic.org</a></p>	<p><b>Functionality</b></p> <ul style="list-style-type: none"> <li>○ Accommodates the different users</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>○ Content is available, it is just a matter of finding it</li> </ul> <p><b>Consistency</b></p> <ul style="list-style-type: none"> <li>○ The template is consistent</li> </ul> <p><b>Aesthetics</b></p> <ul style="list-style-type: none"> <li>○ The use of pictures is eye-catching</li> <li>○ The use of members' quotations adds a feeling of community</li> </ul>	<p><b>Functionality</b></p> <ul style="list-style-type: none"> <li>○ Does not cater to people who speak different languages</li> <li>○ No search box</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>○ Content could be better organized</li> </ul> <p><b>Consistency</b></p> <ul style="list-style-type: none"> <li>○ No noticeable poor feature</li> </ul> <p><b>Aesthetics</b></p> <ul style="list-style-type: none"> <li>○ Could be organized better</li> </ul>
<p>Great Brook Valley Health Center in Worcester <a href="http://www.gbvhc.org">www.gbvhc.org</a></p>	<p><b>Functionality</b></p> <ul style="list-style-type: none"> <li>○ Spanish, Portuguese and English users</li> <li>○ Acknowledges most users</li> <li>○ Use of search box</li> <li>○ Use of drop-down menu</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>○ Relevant, up-to-date content</li> </ul> <p><b>Consistency</b></p> <ul style="list-style-type: none"> <li>○ Template is consistent</li> </ul>	<p><b>Functionality</b></p> <ul style="list-style-type: none"> <li>○ No noticeable poor feature</li> </ul> <p><b>Content</b></p> <ul style="list-style-type: none"> <li>○ Does not really highlight the staff of the health center</li> </ul> <p><b>Consistency</b></p> <ul style="list-style-type: none"> <li>○ No noticeable poor feature</li> </ul> <p><b>Aesthetics</b></p> <ul style="list-style-type: none"> <li>○ No noticeable poor feature</li> </ul>

Websites	Good features	Poor features
Great Brook Valley Health Center in Worcester <a href="http://www.gbvhc.org">www.gbvhc.org</a>	<b>Aesthetics</b> <ul style="list-style-type: none"> <li>○ Great use of color pallet</li> <li>○ Great use of quotations</li> </ul>	
Health Foundation of Central Massachusetts <a href="http://www.hfcm.org">www.hfcm.org</a>	<b>Functionality</b> <ul style="list-style-type: none"> <li>○ Caters to some of its users</li> <li>○ Drop-down menu</li> <li>○ Search feature</li> <li>○ Good way to get directions</li> </ul> <b>Content</b> <ul style="list-style-type: none"> <li>○ Relevant content</li> </ul> <b>Consistency</b> <ul style="list-style-type: none"> <li>○ Consistent template</li> </ul> <b>Aesthetics</b> <ul style="list-style-type: none"> <li>○ Needs improvement</li> </ul>	<b>Functionality</b> <ul style="list-style-type: none"> <li>○ Either too few or too many words</li> </ul> <b>Content</b> <ul style="list-style-type: none"> <li>○ Not a lot of relevant information</li> <li>○ Not very well-organized</li> </ul> <b>Consistency</b> <ul style="list-style-type: none"> <li>○ Page length and information were different</li> </ul> <b>Aesthetics</b> <ul style="list-style-type: none"> <li>○ Minimal use of pictures or eye-catching text</li> </ul>
Kaiser Permanente <a href="http://www.kaiserpermanente.org">www.kaiserpermanente.org</a>	<b>Functionality</b> <ul style="list-style-type: none"> <li>○ Spanish-speaking users</li> <li>○ Very well-organized</li> <li>○ Acknowledges most users</li> <li>○ Search box and drop-down menus</li> </ul> <b>Content</b> <ul style="list-style-type: none"> <li>○ Information is clear, up-to-date and relevant</li> </ul> <b>Consistency</b> <ul style="list-style-type: none"> <li>○ Template is consistent</li> </ul> <b>Aesthetics</b> <ul style="list-style-type: none"> <li>○ Great use of pictures</li> </ul>	<b>Functionality</b> <ul style="list-style-type: none"> <li>○ No noticeable poor feature</li> </ul> <b>Content</b> <ul style="list-style-type: none"> <li>○ No noticeable poor feature</li> </ul> <b>Consistency</b> <ul style="list-style-type: none"> <li>○ No noticeable poor feature</li> </ul> <b>Aesthetics</b> <ul style="list-style-type: none"> <li>○ Information on the front page could be more organized</li> </ul>
UMASS Memorial Medical Center <a href="http://www.umassmemorial.org">www.umassmemorial.org</a>	<b>Functionality</b> <ul style="list-style-type: none"> <li>○ Acknowledges most users</li> </ul> <b>Content</b> <ul style="list-style-type: none"> <li>○ Up-to-date, relevant content</li> </ul> <b>Consistency</b> <ul style="list-style-type: none"> <li>○ Template is consistent</li> </ul> <b>Aesthetics</b> <ul style="list-style-type: none"> <li>○ Great use pictures</li> </ul>	<b>Functionality</b> <ul style="list-style-type: none"> <li>○ Does not accommodate other languages</li> </ul> <b>Content</b> <ul style="list-style-type: none"> <li>○ No noticeable poor feature</li> </ul> <b>Consistency</b> <ul style="list-style-type: none"> <li>○ No noticeable poor feature</li> </ul> <b>Aesthetics</b> <ul style="list-style-type: none"> <li>○ Too much going on, on the front page</li> </ul>

### **5.3 Requirements Gathering**

To successfully finish the analysis phase, we gathered information about users' requirements and content of the website. In addition, we determined how to get these data. We conducted interviews with our sponsor, staff from each department, and the information system consultant. The following sections present the data collection methods and data analysis used to determine requirements.

#### **5.3.1 What data does the project need?**

We determined that there needed to be a welcome video, instructions on how to access FHCW, how to make or cancel an appointment, how to get assistance on applying for insurance, how each department operates and a list of providers.

To facilitate communication between FHCW and its patients through the website, we needed information from the staff in different departments. We needed to know how a website could solve the problems they encountered in their daily work. We discovered effective ways to communicate with their patients via the website. To meet the needs of users, basic information of each department contained the operation time, contact information, staff, and work scope. The project team also collected additional content that different departments needed to publish on the website.

#### **5.3.2 Obtaining Information via interviews**

One of the best methods by which we obtained information, specifically about the content and requirements of the website, was through the use of interviews. An interview is a “person-



to-person interaction between two or more individuals with a specific purpose in mind” (Kumar, 2005). In this case, the “specific purpose” was to collect in-depth and well-explained information about FHCW and their requirements from staff.

### **Interview Protocol**

To obtain in-depth and first-hand sources, we conducted “structured interviews” (U.S. Environmental Protection Agency, 2007), which meant detailed questions and information to be gathered were written down before an interview. We received approval, from the IRB review board, as shown in Appendix III, and we were able to conduct the interview, as shown in Appendix IV. Interviewees were asked the same sequence of questions as follows:

- What do you think about the current website?
  - What do you like and what do you dislike about it?
  - Has it ever been involved in your work?
- How would you want the website to assist you with your work?
  - What types of information in general should be included?
  - What problems do you encounter in your work of assisting patients?
    - Which of these problems do you think the website could potentially help you with?
- What do you think of each department having its own webpage (tab on front page)?
- In general, what content do you think the staff in each department would want to put on their webpage?
  - Do you think they would update it frequently?
- How do think the employees of each department would feel about highlighting the providers on the website?

- How would you want to introduce the staff?
  - What types of information would you include?
- Do you think having rich media content on the website would help? Why?
  - In what ways would you like to utilize this method of communication?
- Are there any particular suggestions you have for us right now?
  - What user needs should we keep in mind as we move forward in the planning process?

### **Interviewee Selection**

Since the staff knows FHCW and their patients the best, our interviews focused on them. Based on the information we needed, our sponsor suggested one person from each department who would be able to provide us with the necessary information.

### **Conducting Interviews**

To conduct successful interviews, we first explained our project to the staff to make sure that they understood our purpose and how they could help us. Then we “established trust” and showed our respect for their volunteering. To make full use of the interviews, we prepared in advance, took good notes and kept contact with interviewees as needed (Kumar, 2005).

### **Interview Results**

From the interviews, we were able to obtain specific information about what content should be on each department’s page, we were also able to develop certain general requirements about the website overall. Appendix IV contains a summary of the results from the interviews,

from which we were able to deduce the following requirements (some of which, we had already developed from our literature review and web design analysis):

- Present up-to-date information
- Include more information about each department
- Highlight FHCW, its mission and all the good that it does
- Answer the most common patient questions
- Provide the basic information about what FHCW offers
- Provide hours of operations, directions and contact information
- Provide information and resources about general health information
- Design the website so that it is welcoming and user-friendly
- Highlight providers
- Incorporate multi-media and multilingual content
- Keep the website simple and easily updatable

While some requirements, such as including more information about each department and providing more patient resources, supported each other, others contradicted each other. An example of these contradicting requirements was the need to keep the website simple and easily updatable, and the requirement to highlight providers. Since the staff and employees at FHCW are constantly and frequently changing, this did not serve well to keep the website up-to-date. In addition, some of the staff did not want to highlight providers due to privacy issues. Therefore, although it was listed as a requirement, we placed less emphasis on it in relation to the other requirements.

## 6 Design

During our design phase, we focused on the operation of the system. As indicated by Dennis, et al (2006), in this phase we designed the architecture and interface of the website and decided where to store data and how it should flow. We thus started with the overall software system, and the hierarchical structure of the web content, and then dealt with the video content as described in the following sections.

### 6.1 Software Specification – Content Management System (CMS)

FHCW's former website was designed with Dreamweaver, which is a software for web developers and visual designers. Since the old system required a level of information technology expertise, the website had been managed by a dedicated person in the IT department. As a result, the content could not be managed and updated by staff from other departments.

Thus, FHCW decided to switch its Dreamweaver-designed website to a Content Management System (CMS) combined with a database. The CMS to be used was called Sitefinity ([www.sitefinity.com](http://www.sitefinity.com)), an ASP.NET based platform that provides users flexible and extendable modules and templates to support integration of webpages. This CMS software fulfilled the user-friendly requirement very well for both users and staff managing the website. It allowed non-technical staff without programming background to access, edit, store, publish and manage contents on the website or intranet (Sitefinity, 2002-2009).

## 6.2 Navigation Tabs

To determine the best way to organize the web content, we decided to examine the project objectives. Since the main objective of the project was to design a website that catered to the diverse audiences of FHCW, our first priority was accommodating each user. We determined that the key users were primarily the patients of FHCW, and secondly donors, medical students, potential employees, and the general public. We thus came up with the following hierarchical structure for the layout of the web content as follows:

### Primary Top Navigation Tabs

- About Us (targets all users but specifically donors, potential employees and general public)
  - What is an academic community Health Center
  - Our History
  - Locations
  - Our patients
  - Annual Report
  - Board of Directors
  - News
- Health Services (target audience is patients)
  - Find a Health Care Professional
  - Primary Care
    - Getting Started
    - Feeling Sick?
    - Health Resources
  - Same Day Appointment
  - Dental Care
  - Behavioral Health
  - Social Services
  - Pharmacy
  - Lab
  - Radiology
  - WIC
  - School based
  - Maternal and Child Care Program
- Patient Support Services (target audience is patients)
  - Call center

- Health Benefits Advising
- New Patient Enrollment
- Medical Translation
- Patient Advocates
- Care Coordination
- Medical Record
- Academics or Residencies (target audience is residents)
  - Family Medicine
  - Dental
  - Behavioral Health
  - Family Nurse Practitioner
  - Research
- Join Our team (target audience is future employees)
  - How to Apply
  - Current Job Openings
- News (target audience is the public)
- Donate (target audience is donors)
  - Special Campaigns
  - Friends of Family Health

### 6.3 Video Content

After organizing the overall structure of the website, we determined that the homepage and the “look and feel” of the website would be left up to the sponsor. We thus focused on the structures and layout of the welcome videos. To effectively gear our videos towards the most appropriate patient audience, we first determined the top seven languages spoken through the phone language translator. The top seven languages were:

1. Spanish
2. Portuguese
3. Albanian
4. Vietnamese
5. Ki-Swahili

6. Twi
7. Haitian Creole

Following the selection of the top seven languages spoken, we then focused on choosing the staff, with the help of our sponsor, who would be most appropriate to speak the particular language. Once these staff members were chosen, they were suggested to the human resources department to be in the video and then invited to the videotaping session. To provide a complete layout of the video content, the script (as seen below) was created and translated in six different languages (Spanish, Portuguese, Vietnamese, Twi, and Haitian Creole and English).

### **Family Health Center of Worcester**

#### **Script for the Welcome Video**

*Please translate the following passage. Practice reading it slowly.*

Welcome to Family Health Center of Worcester – where you and your family can come for some of the best quality health care in Massachusetts. You can visit us to see your primary care doctor or specialist, nurse practitioner, dentist, social worker, nutritionist or mental health clinician. Our patients can pick-up their medications right from our pharmacy, have their tests done in our lab, get a mammogram or x-ray, and sign up for WIC and many other services here. We have three convenient locations on Queen Street, in Webster Square, and at the Elm Park Community School.

My name is \_\_\_\_\_, and I work in the \_\_\_\_\_ Department at Family Health Center as a \_\_\_\_\_. At Family Health Center, we give our patients the best quality care regardless of your income level or insurance. If you need help applying for health insurance, we have staff to help you with the paperwork.

When you come to our health center, we can assist you in the language that you speak. If you would like to receive services in \_\_\_\_\_, please let us know when you call to schedule an appointment. A medical interpreter will help you during your visit. If our interpreter is not available, we can use a telephone service to translate too.

If you would like to register as a patient at Family Health Center, call today to make an appointment as a new patient. Or come and visit us in person and ask for patient registration at

the front desk. If you are already a patient, call 508-860-7800 to schedule your next appointment.

I look forward to seeing you at our health center soon. Thank you for visiting Family Health Center of Worcester's website!



## **7 Implementation**

In this phase, the project team actually “constructed” and “installed” the website (Dennis, et al., 2006) based on users’ feedback. The team planned for training and testing in advance. Sitefinity provides a user manual so that users can easily learn how to manage information with this platform. In addition, a help session was provided to related staff at FHCW by the sponsor’s IT consultant. Basic instruction on using Sitefinity can be found in the user manual in Appendix V. Following the website structure we finalized in the design phase, we made our first prototype which was a rough draft without colors or pictures. After this, we showed it to our sponsor and asked her feedback on the content arrangement. The next step was to put everything onto Sitefinity and make changes to meet the sponsor’s requirements. After we finished our second prototype with Sitefinity, we got more detailed feedback on content from sponsor and completed the welcome videos. With edited content and video, we showed our third prototype to staff and patients. After analyzing their suggestions, we improved our prototype and did final implementation. The following sections will explain the details of our implementation phase. Sample screenshots from each prototype can be found in Appendices VI-VIII.

### **7.1 First Prototype**

With the content hierarchy, navigation tabs and data we received from the design phase, we started to build our first website prototype with Dreamweaver as shown in Appendix VI. Since this prototype was mainly intended to give the users an overall feeling of navigating through the website, it was a black-and-white website mock-up and did not contain any pictures or video. Sitefinity does not allow creation of web pages without a template in place. Since the

template for the new website was still in progress, we decided to use a simple technique for the first prototype. This first prototype included main menu, submenus, content we gathered from last phases and valid links between web pages. It was an initial form of the website for users to provide feedback about whether the way we arranged content was easy to follow. Since this prototype was high-level rather than detail-oriented, we asked for feedback from the sponsor only. Our sponsor pointed out that a few programs were not mentioned. Other than that, she was satisfied with the structure. She thought it was clear, logical and easy to follow. Based on her feedback, we interviewed staff from those programs that we missed and collected information.

## **7.2 Second Prototype**

During the transition from first to second prototype, the SiteFinity template had been built by the IT consultant and the navigation tabs and overall structure were confirmed. We started to work on the second prototype with SiteFinity. Firstly, we analyzed sponsor's comments and made respective modifications. Since the purpose of this prototype was to give the users a chance to evaluate the content and check how well it fits with the template design, we focused more on editing the data to make it easy for patients to read and understand and to make sure it contained enough information to meet patients' various need. Thus, it was more laborious than the previous prototype, as shown in Appendix VII. At this point, there was not a finished homepage on SiteFinity because content on it was yet to be determined. Since the whole prototype was online, the sponsor had access to it at any time. Therefore, she was able to do a complete review of the content and perform edits to the web pages by herself.

Due to time constraints, we decided to obtain patient feedback on our second prototype. Although designs for the third prototype were already underway, we decided to obtain patient feedback on our second prototype since it was already on SiteFinity and easy to view.

### 7.3 Testing and Evaluation

To obtain patient feedback, we had a kiosk in the main lobby of FHCW with a computer. We had received IRB approval (as seen in Appendix III) prior to this set-up and so we were able to conduct the survey. Uploaded on this computer was our third prototype of the website. We had a sign that stated “Check out our new website”. We randomly selected walk-in patients who went through the lobby and explained to them that we were in the process of making a new FHCW website and we needed their feedback, as followed:

“Good morning, would you be interested in checking out our new website? We are a project group for Worcester Polytechnic Institute, and we are working on a project to develop a new Family Health website. We would like to find out what you think of it. All you have to do is to see the webpage, and answer a few questions (see below) for us. Thank you for your help.”

The questions were as follows:

- What do you think of the website?
  - \*Did you find it easy to use?
- Was the information on the website useful to you?
  - \*Is there any other information you would like to see on the website?
- What did you like the most about the website?
- What didn't you like about the website?
- Do you have a computer at home? Do you use the internet very often?
- \*These were follow-up questions, in case the patient did not provide a detailed answer to the original question.

There were some issues with collecting patient feedback. We were not able to get any patients to test our website for a few reasons. First, we noticed that some patients did not understand us, because they do not speak English. Second, some of them indicated that they do not use computers. Others were simply in a rush and not interested in the website. Future teams will need to determine a better way to obtain patient feedback.

Despite the failed attempt at obtaining patient feedback, we managed to obtain feedback from 4 staff members who were walking by the kiosk. The biggest feedback was that some of the information was already outdated. Their biggest concern was about who would be updating the website in the future, since the information becomes outdated very often.

Based on the staff feedback and our experience of trying to gather patient feedback, we concluded that there was a major need for multi-media and multilingual content to accommodate those who are illiterate and those who do not speak English. Furthermore based on our sponsor's feedback as well as knowing that the content had to be able to be updated fairly easily, we had to present the content in a clear and concise manner.

#### **7.4 Third Prototype**

Based on the feedback from the previous prototype, we completed certain design aspects and included them in the third prototype, which can be found in Appendix VIII. First, we discussed homepage content with our sponsor based on the prior analysis. The IT consultant was responsible for creating the homepage template and our sponsor was in charge of gathering pictures and getting release from people in the pictures. Making welcome videos in different languages was within our work scope. We taped those videos with the help of WPI Academic

Technology Department. The videos were then placed on the homepage as multilingual welcome messages. We also clarified the content on our previous prototype, making it more user-friendly in terms of reading levels. The content was presented at a fourth-grade reading level; it was much clearer and more succinct than in the previous prototype.

## 8 Conclusions and Recommendations

The original objective of this project was to design a new website for FHCW that not only reflected today's effective web design techniques, but also communicated successfully with its diverse audience. The website was to accommodate the needs of patients that spoke languages other than English, patients without any real computer background as well as patients' diverse medical needs. In addition, such a website was to reflect the mission and goal of the Family Health Center of Worcester. Using prototyping methodology in Systems Analysis and Design, we were able to create a new website for FHCW.

We found that the most important feature of our web design is the utmost attention to the FHCW patients. The website is geared and centered towards them, thus emphasizing and reflecting FHCW's mission. In addition, the use of multi-lingual video content further accomplished our goal to accommodate the needs of the diverse patients of FHCW. We were able to reach most of the project objective, by creating a partial multi-lingual website, providing more detailed information about each department as well as presenting the content in a simple and easily-understandable way.

This website will benefit FHCW in many ways. First, it provides an effective communication link between FHCW and its patients. It showcases the health center in a new light and embodies its mission and goals publicly. By using it, patients can obtain information about the health center even if they do not want to call or visit. By providing a list of the medical providers at FHCW, the patients can now have a better connection to their doctors. It opens up a sense of community in FHCW. It also highlights the staff and members and essentially caters to all the different audiences that would use the website. It is easy to use and update and we hope that the staff and patients of FHCW will find the website useful.

## 8.1 Future Recommendations

Based on our final prototype, there are certain improvements that can be done in the future. For the future website design teams for Family Health Center of Worcester, we make the following recommendations. These recommendations are derived from each project phase, namely planning, analysis, design and implementation.

First of all, since the system development life cycle led to successful completion of our web design project, we recommend that future teams should also divide their project into those four phases; even though they would simply be modifying or making improvements to our project. By doing this, we believe that they will be able to better and thoroughly investigate users' needs, examine and use available resources, and complete the project in a organized and professional way.

Secondly, there is still a lot that can be done for the multi-lingual aspect of the website. For now, we have welcome videos in six different languages on the website. Based on patients' need and resources at FHCW, future teams can produce welcome videos in more languages and on other content, such as directions, instructions on making an appointment, and introduction to services at FHCW. Moreover, important components of the FHCW website can be translated into other languages to accommodate the needs of patients who have difficulty in reading and understanding English. Future design teams would need to conduct extensive research on what languages would be best suited for the patients of FHCW and whether FHCW staff can translate them, as we did for the six videos.

Thirdly, a more detailed list of frequently asked questions (FAQ) should be collected from all departments and even patients. When people search for information on a website, they refer to the FAQ page a lot, so we think a FAQ page can also be a helpful online tool for FHCW

patients. It could also help answer some questions before the actual patient visit, so as to maximize effective patient-doctor time. During our staff interviews, we were able to gather a general list of frequently asked questions. We recommend that future teams also interview patients or organize some focus groups to determine what patients usually ask. It is crucial that these teams then go back to staff and acquire the answers to those questions. This FAQ page will further cater to the needs of FHCW patients.

Additionally, links to online health resources should be provided on FHCW website. Future teams can ask FHCW staff to recommend some online healthcare tutorials or brochures. For example, healthy diet instruction, mental health information, and infant health manual would all be useful information for patients looking for reliable online medical help without having to go to the health center.

Furthermore, a pop-up survey can be placed on the homepage to obtain more patient feedback on the final website. To cater to staff at FHCW, an intranet is also needed so that staff can share documents online and each department can update and modify their own pages.

Based on our time constraint and broad scope of our project, there is still work to be done in the design of the website. We make the preceding recommendations so that a more effective and interactive website can be designed to better fulfill patient and staff needs. Our website design is a stepping-stone or foundation on which others can make improvements.



## References

Brown, D. (2006). CS 3041 - User Analysis & Task Analysis Retrieved September 27, 2009, from <http://web.cs.wpi.edu/~dcb/courses/CS3041/UAandTA.html>

Brown, D. (2009). The Story So Far...HCI Course Contents Retrieved September 27, 2009, from <http://web.cs.wpi.edu/~dcb/courses/CS3041/the-story.html>

Centers for Medicare and Medicaid Services. (2008). *Selecting a Development Approach*.

Retrieved from <http://www.cms.hhs.gov/systemlifecycleframework/downloads/selectingdevelopmentapproach.pdf>.

City of Worcester. (2009). Worcester Retrieved September 20, 2009, from

<http://www.ci.worcester.ma.us/>

Coastal Health Alliance Community Health Centers. (Unknown). Community Health Centers

Retrieved September 24, 2009, from [http://www.coastalhealth.net/health\\_centers.html](http://www.coastalhealth.net/health_centers.html)

Community Health Connections Family Health Centers. (2009) Retrieved September 19, 2009,

from <http://www.chcfhc.org>

Contentmanager.eu.com. (2008). Enterprise Content Management Retrieved September 26, 2009,

from <http://www.contentmanager.eu.com/history.htm>

Dennis, A., Wixom, B., & Roth, R. (2006). *Systems Analysis and Design* (3rd ed.). Hoboken, NJ:

John Wiley & Sons.

Fallon Clinic. (2007). Fallon Clinic Retrieved September 19, 2009, from

<http://www.fallonclinic.org/>

Family Health Center of Worcester. (1994). Family Health Center of Worcester Retrieved

September 19, 2009, from <http://www.fhcw.org>

Family Health Center of Worcester. (2008). FHCW Financial Statements. Worcester: Family Health Center of Worcester.

Foley, J. D., van Damn, A., Feiner, S. K., & Hughes, J. F. (1990). *Computer Graphics: Principle and Practice* (Second ed.). Reading, MA: Addison-Wesley Professional.

Foundation for Health Coverage Education. (2009). *2009 Federal Poverty Level*. Federal

Register Retrieved from [http://www.coverageforall.org/pdf/FHCE\\_FedPovertyLevel.pdf](http://www.coverageforall.org/pdf/FHCE_FedPovertyLevel.pdf).

Great Brook Valley Health Center Inc. (2007-2008). Great Brook Valley Health Center

Retrieved September 19, 2009, from <http://www.gbvhc.org>

Johnson Smith, N. (2009). [Interviews].

Kaiser Permanente. (1995-2008). Kaiser Permanente Retrieved September 19, 2009, from

<http://www.kaiserpermanente.org>

Klamath Health Partnership Inc. (Unknown). A History of Community Health Centers Retrieved

September 19, 2009, from <http://www.klamathopendoor.org/downloads/History%20of%20Community%20Health%20Centers.pdf>

Kumar, R. (2005). *Research Methodology: A Step-by-Step Guide for Beginners*. Thousand Oaks, California: SAGE Publications.

Lewis, C. (2000). Prof. Lewis' Basic Web Design Principles Retrieved September 26, 2009, from <http://www.colorado.edu/AmStudies/lewis/Design/lewbasic.htm>

National Association of Community Health Centers. (2009). America's Health Centers Retrieved September 25, 2009, from <http://www.nachc.com/client/documents/America's%20Health%20Centers%20updated%208.09.pdf>

Nielsen, J. (2005). Ten Usability Heuristics. Retrieved September 24, 2009, from *Alerbox*, [http://www.useit.com/papers/heuristic/heuristic\\_list.html](http://www.useit.com/papers/heuristic/heuristic_list.html)

Sitefinity. (2002-2009). Sitefinity ASP.NET CMS Overview Retrieved September 26, 2009, from <http://www.sitefinity.com/asp-net-cms-features.aspx>

The Health Foundation of Central Massachusetts. (Unknown). The Health Foundation of Central Massachusetts Retrieved September 19, 2009, from <http://www.hfcm.org>

Thomas, C. (2002). Conceptual, Semantic, Syntactic, and Lexical Model. *Theories in Computer Human Interaction* Retrieved September 26, 2009, from <http://www.cs.umd.edu/class/fall2002/cmhc838s/tichi/CSSL.html>

U.S. Environmental Protection Agency. (2007). Evaluation Support Retrieved October 3, 2009, from <http://www.epa.gov/evaluate/glossary/s-esd.htm>

UMassMemorial Health Care. (2001). UMass Memorial Medical Center Retrieved September 19, 2009, from <http://www.umassmemorial.org/MedicalCenterHP.cfm?id=6>

# Appendix I - Websites Screen Shots

## Former FHCW Website

**Committed to Community**

Home Find a Medical Provider Mission & History Directions Donate

**Our Programs & Services**

**Recent News & Upcoming Events**

**Human Resources**

**Phone**  
(508) 860-7700  
TTY: (508) 860-7750

**Family Health Center of Worcester, Inc.**  
26 Queen Street  
Worcester, MA 01610

**Family Health Center at Webster Square**  
645 Park Ave.  
Worcester, MA 01603

**Helen A. Bowditch Health Center at Elm Park Community School**  
23 N. Ashland St.  
Worcester, MA 01609

**Hours**

**Primary Care**  
Monday Wednesday and Friday 8:00 am to 5:30 pm  
Tuesday and Thursday 8:00 am to 8:00 pm

**Urgent Care**  
Monday-Friday: 8:00am to 7:30pm  
Saturdays and Holidays: 9:00am to 4:30pm

**Dental**  
Monday-Thursday: 8:00am to 7:00pm; Friday: 8:00am to 6:00pm

**Pharmacy**  
Monday Wednesday Friday 8:30am to 6:00pm  
Tuesday and Thursday 8:30am to 8:00pm

Pharmacy Prescription Line: (508) 860-7730

**WIC**  
Monday and Wednesday 8:30am to 7:30pm  
Tuesday Thursday and Friday 8:30am to 5:00pm  
Closed the last Thursday of each month

Welcome to the Web site of Family Health Center of Worcester, Inc. We have a diverse staff and offer a broad range of health care services under one roof. As a federally-funded community health center, Family Health Center of Worcester (FHCW) provides these services to everyone, regardless of their ability to pay. [Click here to view our outreach brochure.](#)

[Click here to view the NECN Worcester News Tonight video of FHCW's 2009 Neighborhood Health Fair.](#)

**Health Care for All**  
Our benefits managers will be happy to meet with you to discuss how you can access services at Family Health Center of Worcester. [Click Here for more information.](#)

**Health Information**  
Looking for an answer to a health-related question from another organization? Try visiting [healthfinder.gov](#). Para informacion en espanol, visita [healthfinder.gov/espanol](#)

[Or click here for a full list of health info sites.](#)

**Applications to the Post-Graduate NP Residency Program in Community Health have been closed.**

Joint Commission Re-Accreditation - May 2008

All designs Copyright © 2002-2006 Andrew Chandler. All other content Copyright © 2002-2006 Family Health Center of Worcester, Inc.

06179

Free counters provided by Andale.

Figure 2 - Former FHCW Homepage



# Committed to Community

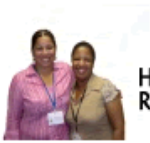
[Home](#) [Find a Medical Provider](#) [Mission & History](#) [Directions](#) [Donate](#)



**Our Programs & Services**



**Recent News & Upcoming Events**



**Human Resources**

## Phone

(508) 860-7700  
TTY: (508) 860-7750

Family Health Center  
of Worcester, Inc.  
26 Queen Street  
Worcester, MA 01610

## Our Programs & Services



### Medical

- [Primary Health Care](#)
- [Masshealth and Free Care](#)
- [Hepatitis C Services](#)
- [HIV/AIDS Services](#)
- [Immigration Physicals \(INS\)](#)
- [School-based Health Centers](#)
- [Tuberculosis Program](#)
- [Urgent Care](#)
- [Women's Health Network](#)
- [Disease Management](#)
- [Teen Health](#)

### Social Services

- [Advocacy/ Case Management](#)
- [Hepatitis C Services](#)
- [HIV/AIDS Services](#)
- [Homeless Families](#)
- [Mental Health](#)
- [Maternal and Child Health](#)
- [Prenatal Care](#)
- [Reach Out and Read](#)
- [Southeast Asian Health](#)

### Dental

- [Adult & Pediatric Dental Care](#)

### Other Programs & Services

- [Ancillary Services](#)
- [Family Medicine Residency](#)
- [Language Translation](#)
- [Masshealth and Free Care](#)
- [Pharmacy](#)
- [Radiology](#)
- [WIC Nutrition Program](#)

[Click here to view the MA patients and residents rights law.](#)

Figure 3 - A page from the former FHCW website

## Website Models

English - Spanish - Hmong

 *Community Health Connections*  
**Family Health Centers**

High quality health care  
for everyone under one roof.

[Home](#) [Services](#) [About Us](#) [Volunteer](#) [Giving](#) [Advocacy](#) [Newsroom](#)

[Make an online donation](#)

Watch a VIDEO introduction. ▶▶

**Haiti Earthquake Relief**      **CHC Awarded \$10.7 Million Federal Grant for Infrastructure Improv**

<b>Fitchburg Community Health Center</b> Bullock Building 275 Nichols Rd Fitchburg, MA 01420 978-878-8100	<b>Leominster Community Health Center</b> 14 Manning Ave Leominster, MA 01453 978-847-0110	<b>Greater Gardner Community Health Center</b> 175 Connors St Gardner, MA 01440 978-410-6100	<b>ACTION Health Services</b> 978-878-8110	<b>School Based Programs</b> <i>Caring for Kids</i>
--	--	--	---	--

275 Nichols Rd Fitchburg, MA 01420 Main Number: 978-878-8100 | [Site Map](#) | [Contact Us](#)  
Community Health Connections, Inc. is a federally qualified Section 330 Community Health Center.

Figure 4 - Community Health Connections Family Health Centers Homepage



- Renew prescriptions
- Email your doctor
- View recent visits

[Patients Click Here!](#)

**We Accept Most Health Insurances!**

- Aetna
  - Blue Cross
  - Blue Shield of MA
  - Cigna
  - Fallon Community Health Plan
  - Tufts Health Plan
- [Click here to learn more!](#)

## Welcome to Fallon Clinic

Welcome to Fallon Clinic, a large multi-specialty medical group practice located throughout Central Massachusetts. At Fallon Clinic we have more than 250 doctors providing healthcare services in more than 20 medical facilities throughout the greater Worcester community. In addition to family practice, internal medicine and pediatric doctors, we have pediatric and adult urgent care centers and over 30 specialty services, including OB-Gyn, Pulmonology, Orthopedics, Cardiology, Hematology and Oncology.

If you live in Central Massachusetts, chances are we have a location near you. And, our healthcare services are covered by most major insurances. At Fallon Clinic, we are dedicated to **Treating You Well.**

Call our toll free number to find a doctor, make an appointment or to learn more!  
**1-800-AT-FALLON.**

### Important Flu Information

- Fallon Clinic H1N1 flu information
- Preventing Flu Virus

[Click here for more information >](#)



### Specialty Care

**Our specialists have you covered head to toe.**

Fallon Clinic accepts most major insurances.

[Click here to learn more >](#)



### Locations

**Where are we located?**

Fallon Clinic has over 20 locations throughout Central Massachusetts.

[Click Here >](#)



### Meet Our Doctors <sup>SM</sup>

**Dr. Krissie Connor**

Want to get to know our doctors? Get to know them before you call for an appointment.

[Click Here >](#)



## Latest News

**Our Charlton site has closed, effective 1/15/10**  
[Click here](#) for information about service relocations.

**H1N1 Flu Vaccine Information**

[Click here to learn more.](#)

Last Updated: 2-11-10

**Massachusetts Health Quality Partners Issues 2010 Report on Quality of Care Performance data drives delivery system improvements**

Figure 5 - Fallon Clinic Homepage





HOME ABOUT US OUR SERVICES JOIN OUR TEAM SUPPORT US CONTACT US DIRECTIONS



"Working together for the health of our community"  
"Trabajando juntos por la salud de nuestra comunidad"  
"Trabalhando juntas para a saúde da nossa comunidade"

Great Brook Valley Health Center and Framingham Community Health Center are thriving community health centers providing comprehensive, culturally competent health

Search

Great Brook Valley Health Center, Inc.

19 Tacoma Street  
Worcester, MA 01605  
(508) 853-1805 or  
(800) 853-3288  
24 Hour Answering Service

TTY: (508) 854-3255  
Fax: (508) 853-6593

Framingham Community Health Center

19 Concord Street  
Framingham, MA 01702  
(508) 370-0113  
24 Hour Answering Service  
Fax: (508) 370-2637

72 Union Avenue  
Framingham, MA 01702  
(508) 370-5700  
24 Hour Answering Service  
Fax: (508) 875-6215

Our Mission:

LEARN MORE

We are committed to creating access to high quality, comprehensive health care for all people. Governed by our patients, we are dedicated to maintaining strong standards of excellence while respecting the diversity, dignity and confidentiality of our patients and staff.

Our Sites:



Great Brook Valley Health Center in Worcester

PROGRAMS & SERVICES  
English Spanish Portuguese

CONTACT/DIRECTIONS/HOURS  
English Spanish Portuguese



Framingham Community Health Center

PROGRAMS & SERVICES  
English Spanish Portuguese

CONTACT/DIRECTIONS/HOURS  
English Spanish Portuguese



Dental Sites

PROGRAMS & SERVICES  
English Spanish Portuguese

CONTACT/DIRECTIONS/HOURS  
English Spanish Portuguese

Quicklinks

Download Annual Report



We celebrate our patients - who have placed their trust in us to meet their health care needs and to help them lead healthier lives.



SOMWBA Certified

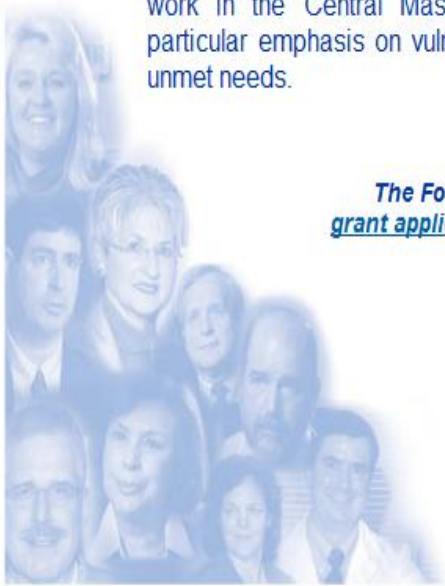
Copyright 2007-2008 Great Brook Valley Health Center, Inc.  
19 Tacoma Street Worcester, MA 01605 (508) 853-1805 or (800) 853-3288 Fax: (508) 853-6593 TTY: (508) 854-3255  
Framingham Community Health Center 19 Concord Street Framingham, MA 01702 (508) 370-0113 Fax: (508) 370-2637

Design by Creative Grids

Figure 6 - Great Brook Valley Health Center Homepage

## Welcome

The mission of The Health Foundation is to use its resources to improve the health of those who live or work in the Central Massachusetts region with particular emphasis on vulnerable populations and unmet needs.



*The Foundation has announced [grant application deadlines for 2010](#)*

[Oral Health Impact Report](#)



Download the  
2006 THFCM  
Report to the Region  
on the First 5 Years  
of Grantmaking

## Recent News

- February 23, 2010 - \$350,000 grant boosts nutrition programs
- February 17, 2010 - Health Foundation Names Officers
- January 25, 2010 - Visions: Jean G. McMurray honored with Public Service Award



Subscribe to our e-Newsletter

Figure 7 - The Health Foundation of Central Massachusetts Homepage

My health manager
Health & wellness
Health plans & services
Locate our services

[Online growth](#)

## Members sign on

User ID

Password

[Sign on](#)

[Forgot your user ID or password?](#)

[Register to get a user ID](#)

Experience My health manager

Our health plans

Member discount programs

Using our services

Are you an employer?



[Prospective Members](#)
[Employers/Administrators](#)
[Media Representatives](#)
[Brokers](#)
[Job Seekers](#)

### Important notices

Stay informed about [H1N1 flu \(swine flu\)](#) and [seasonal flu](#).

[Privacy notification: Northern California](#)



#### Health and wellness

Support and inspiration that works on your time—[digital health coaching](#).

Be sweet to your heart

5 things you can do to lower lipid levels and [reduce your risk for heart attack and stroke](#).

[Tap the power of your mind](#): Guided imagery can help with stress, anger, heart health, and more.

Video: a personal roadmap for [managing your diabetes](#)

- [Featured health topics](#)
- [Health topics A to Z](#)
- [Health classes](#)
- [Inquire on a referral](#)
- [Healthy lifestyle programs](#)
- [More...](#)



#### Health plans and services

A perfect match of choice and price: [Apply for coverage](#).

Plans for peace of mind

[Looking your coverage?](#) We can help.

3 easy steps: [individual and family plans](#)

Get covered: Check out our [plans for parent and retired federal employees](#).

[Get information on our Medicare plans](#).

Now that we've found each other

[New member, meet Kaiser Permanente](#).

At home, online, or on the road. [We've got you covered](#).



#### My health manager

Ready for a new you? Take a [total health assessment](#), get a custom action plan.

- [Email your doctor](#)
- [Self assessments](#)
- [My test results](#)
- [New providers](#)
- [Schedule appointments](#)
- [More...](#)

Enrich your care

Be ahead: [Select a personal physician](#).

Are you using our time-saving tools? [Experience My Health manager](#).



#### News Center

Study: [Excessive weight gain during pregnancy may increase diabetes risk](#).

Find out [what's up in your area](#).



#### Community

We invest in [violence prevention](#) to help young people like Neo. Watch his story.

Figure 8 - Kaiser Permanente Homepage

UMass Memorial Health Care  
treating today's patients,  
training tomorrow's doctors  
and discovering future  
cures

- UMass Memorial Medical Center
- Clinton Hospital
- HealthAlliance Hospital
- Marlborough Hospital
- Wing Memorial Hospital and Medical Centers

Search



- About Our System
- Find a Physician
- Services
- Patients/Visitors
- News/Events
- Ways to Help
- Careers
- Quality, Patient Safety and Patient Experience
- For Providers
- Check Your Health
- UMass Medical School

**UMass Memorial Medical Center and Marlborough Hospital**  
*Recipients of 2009 Betsy Lehman Awards for Patient Safety*

**Responding to Community Needs**  
Supporting the overall health and well-being of communities in Central New England is an integral part of our work at UMass Memorial Health Care. Read about just a few of our Community Benefits Programs and the work of our dedicated employees in our latest report. ▶

Join Us on March 17

**Colon and Rectal Cancer Symposium**

Learn about colon and rectal cancer prevention and treatment at our free, day-long event. ▶

National Recognition

**Our Best Docs**

Plastic Surgeon Raymond Dunn, MD, is one of our 150 "Best Doctors." ▶

## Top Stories

More Than 10 Percent of Our Health Care System Physicians Named Best Doctors ▶

Local Doctors and Nurses Visit Haiti ▶

Dr. Glue Appointed Director of Cancer Center of Excellence ▶

Electronic Implants Give Relief to Haiti Tremors ▶

Dr. Harlan Named Director of the Diabetes Center of Excellence ▶

UMass Memorial Recognized for Smoking Cessation Program ▶

UMass Memorial Named Top 100 for Inpatient Cardiovascular Care ▶

*It's all right here.*

**Less invasive surgery.** ▶

**Our advanced cancer care.** ▶

**Region's leading orthopedic program.** ▶

**Come Learn... Come Play.**  
The 17th Annual Teddy Bear Clinic, a health and safety fair for kids, is Saturday, April 10, 10 am to 2 pm, Greendale Mall, Worcester. Families can enjoy 30 interactive booths, games and entertainment. Kids can dress up like a surgeon, have a stuffed toy examined, or hop aboard an ambulance. ▶

**New England's First Hospital-based Air Ambulance**  
The region's Trauma Center and specialty care are just minutes away by our air ambulance Life Flight. It is an important part of the UMass Memorial emergency services network, which provides responsive, high-quality care to patients throughout the region. ▶

**Check Your Health: Use Our e-Health Tools**  
Learn about the latest research, prescription medications, medical testing and more. Our online library offers a one-stop resource for the latest news on health and fitness topics. ▶

## Save these Dates

- Colon and Rectal Symposium
- Teddy Bear Clinic
- Heart Walk
- Frontiers in Critical Care Nursing
- Safe Summer Fun Day
- Walk to Cure Cancer

Figure 9 - UMass Memorial Health Care Homepage

## Appendix II – Project Gantt Chart

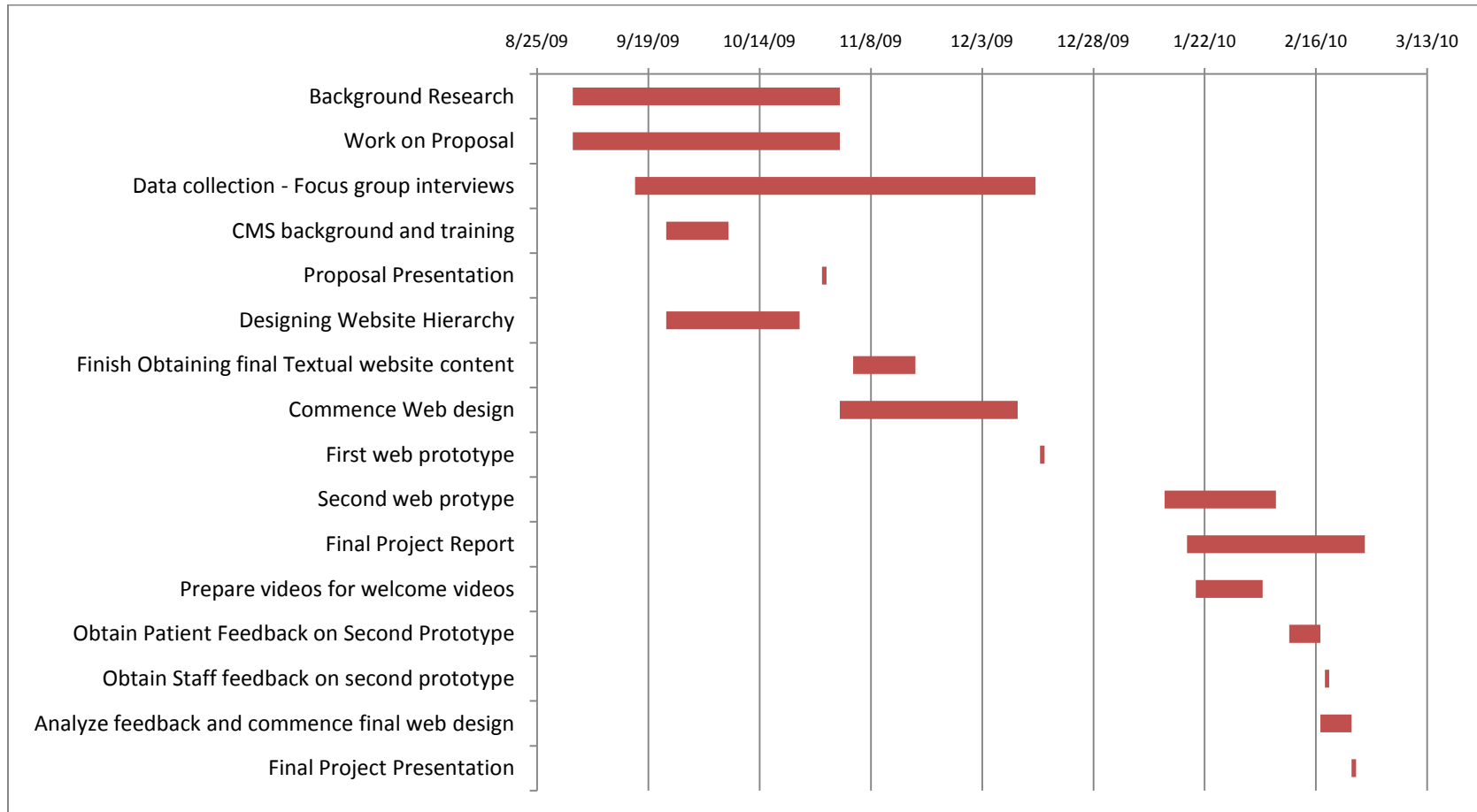


Figure 10 - Project Gantt Chart

## Appendix III - Institutional Review Board Approvals



Department of  
Social Science  
and Policy Studies

100 Institute Road  
Worcester, MA 01609-2280, USA  
508-831-5296, Fax 508-831-5896  
www.wpi.edu

29 September 2009  
File: 2009-EX--059

Worcester Polytechnic Institute  
100 Institute Road  
Worcester, MA 01609

**Re: IRB Application for Exemption 2009-EX-059 "Web-design and Implementation for the Family Health Center of Worcester"**

Dear Professor Tulu,

The WPI Institutional Review Committee (IRB) has reviewed the materials submitted in regards to the above mentioned study and has determined that this research is exempt from further IRB review and supervision under 45 CFR 46.101(b)(2): "Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation."

**This exemption covers any research and data collected under your protocol from 25 September 2009 until 24 March 2010**, unless terminated sooner (in writing) by yourself or the WPI IRB. This approval becomes immediately null and void if this project receives any federal sponsorship and work on this study must cease until review and approval by New England IRB. Amendments or changes to the research that might alter this specific exemption must be submitted to the WPI IRB for review and may require a full IRB application in order for the research to continue.

Please contact the undersigned if you have any questions about the terms of this exemption.

Thank you for your cooperation with the WPI IRB.

Sincerely,

Kent Rissmiller  
WPI IRB Chair

Worcester Polytechnic Institute



100 Institute Road  
Worcester, MA 01609-2280, USA  
508-831-5000, Fax: 508-831-6090  
www.wpi.edu

**Worcester Polytechnic Institute IRB #1  
IRB 00007374**

1 February 2010  
File: 09-059

Worcester Polytechnic Institute  
100 Institute Road  
Worcester, MA 01609

**Re: IRB Application for Exemption 09-059 "Web Design and Implementation for the Family Health Centre of Worcester"**

Dear Prof. Tulu,

The WPI Institutional Review Committee (IRB) has reviewed the materials submitted in regards to the above mentioned study and has determined that this research is exempt from further IRB review and supervision under 45 CFR 46.101(b)(2): "Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation."

**This exemption covers any research and data collected under your protocol from 1 February 2010 to 31 January 2011 unless terminated sooner (in writing) by yourself or the WPI IRB. Amendments or changes to the research that might alter this specific exemption must be submitted to the WPI IRB for review and may require a full IRB application in order for the research to continue.**

Please contact the undersigned if you have any questions about the terms of this exemption.

Thank you for your cooperation with the WPI IRB.

Sincerely,

Kent Rissmiller  
WPI IRB Chair

## Appendix IV – Summary of Staff Interviews

The following is the summary of the feedback obtained from staff interviews during the requirements gathering phase of the project.

- What do you think about the current website?
  - Most people haven't seen the website
  - It has not really been involved in their work
  - It is out-dated and does not have enough information about the departments
  
- How would you want the website to assist you with your work?
  - Post more information about each department
    - This is specific to each department
  - Show patients what FHCW is all about
    - What FHCW offers in different areas
  - Answer most-common patient questions such as:
    - Basic information about insurance
  
- What problems do you encounter in your work of assisting patients?
  - Which of these problems do you think the website could potentially help you with?
  - Patients come in not knowing really how the center works
    - Website could help sort out some of those assumptions
    - Website could answer some questions
    - Website could provide basic information on what FHCW does offer
    - Provide hours of operation, directions, and contact information
  - It could also provide information on how patients can be better health-care consumers
    - What information you need before going to see the doctor
    - When to make an appointment
    - When to go to the ER
    - Information on general health topics
  
- What do you think of each department having its own webpage (tab on front page)?
  - They think it is a great idea
  - Informs the patients about each department and what each department has to offer.
  
- In general, what content do you think, you and the staff in your department would want to put on your webpage?
  - Information about the department

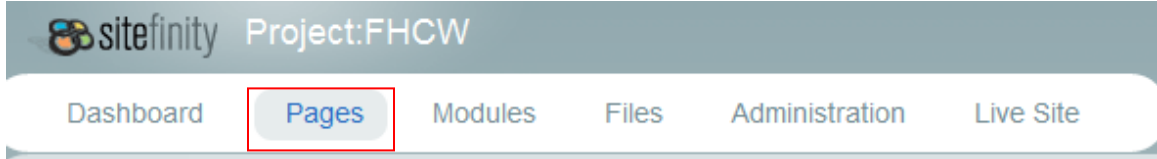


- Frequently asked questions
  - Hours of operation
  - Phone number of the department
  - Privacy policy
  - General providers page
  - Different languages spoken
- How would you like to be represented on the website?
    - They should be represented in a warm, welcoming way
    - Should cater to all patients
    - Not really fancy – something simple
- Do you think they would update it frequently?
    - Most will not have a very dynamic website, however, it will be updated as necessary
- How do you think your staff would feel about highlighting the providers in your department on the website?
    - How would you want to introduce the staff?
      - What types of information would you include?
    - Include the name, job title, and language they speak
      - Some don't want their staff listed
    - List only the department's phone number
    - About pictures of providers – most are hesitant, some want it maybe as a group picture
      - We need a release from each person in order to include their picture on the website – IRB
    - A couple of departments would like to include biographies of each provider

# Appendix V - Sitefinity User Guide

## 1. Create a new page

Once you login to new.fhcw.org/sitefinity, select “pages” on the top menu.



Press “Create a page” on the left hand side menu.

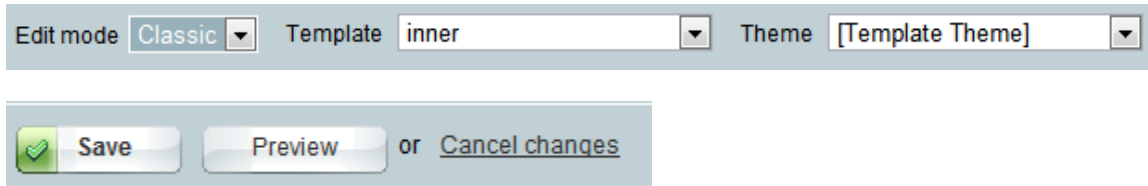


Then you are directed to a page creating form. Fill out the basic information and click “create this page at the bottom”.

A screenshot of the Sitefinity page creation form. The form contains the following fields and options:

- Page name \*** (For all languages) (?): A text input field containing "FAQ". Below the field is a note: "Cannot contain spaces or special characters. Example: AboutUs".
- Menu label (en) (?)**: An empty text input field. Below the field is a note: "Example: About Us".
- Show in navigation** (For all languages) (?): Two radio button options, "Yes" (which is selected) and "No".
- Page type** (For all languages) (?): Three radio button options: "Normal Page (displays its own content)" (which is selected), "Page group (redirects to its first sub-page)", and "External page (outside Sitefinity)".

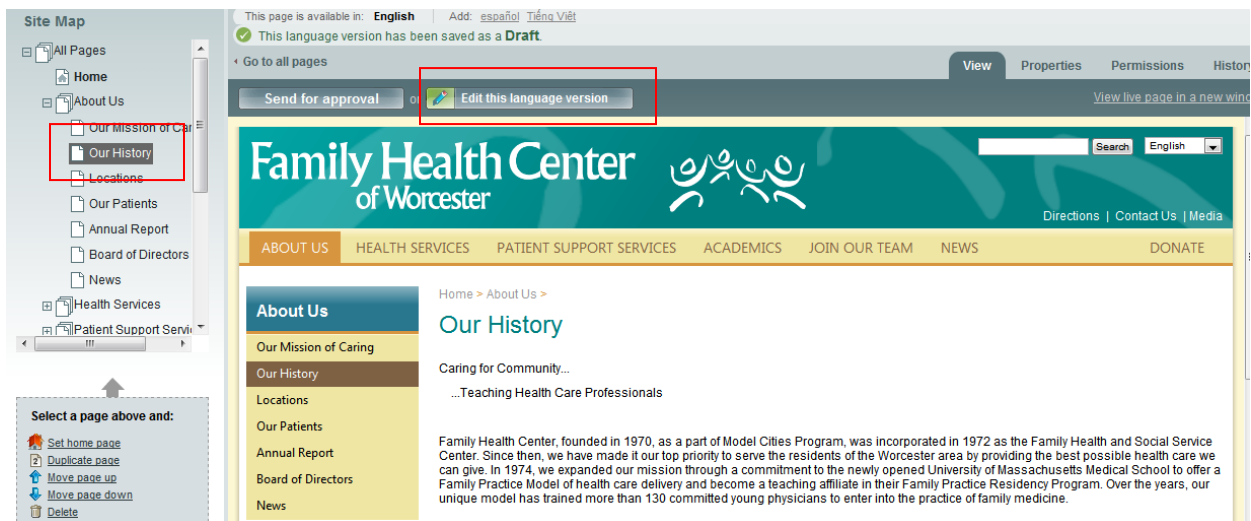
Select template “inner” and click “Save” on the top menu.



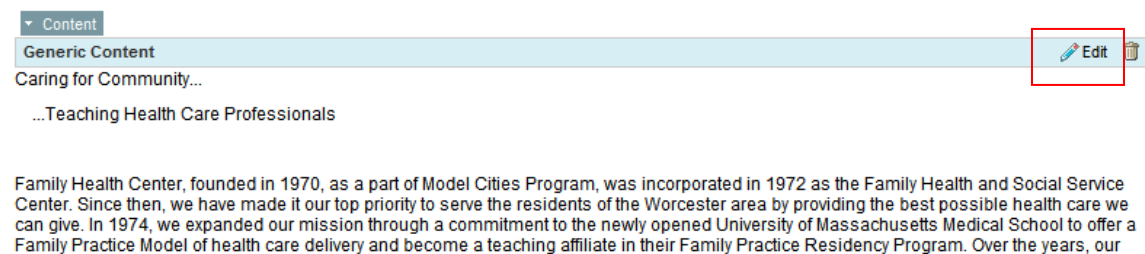
Now you have a new page.

## 2. Edit a page

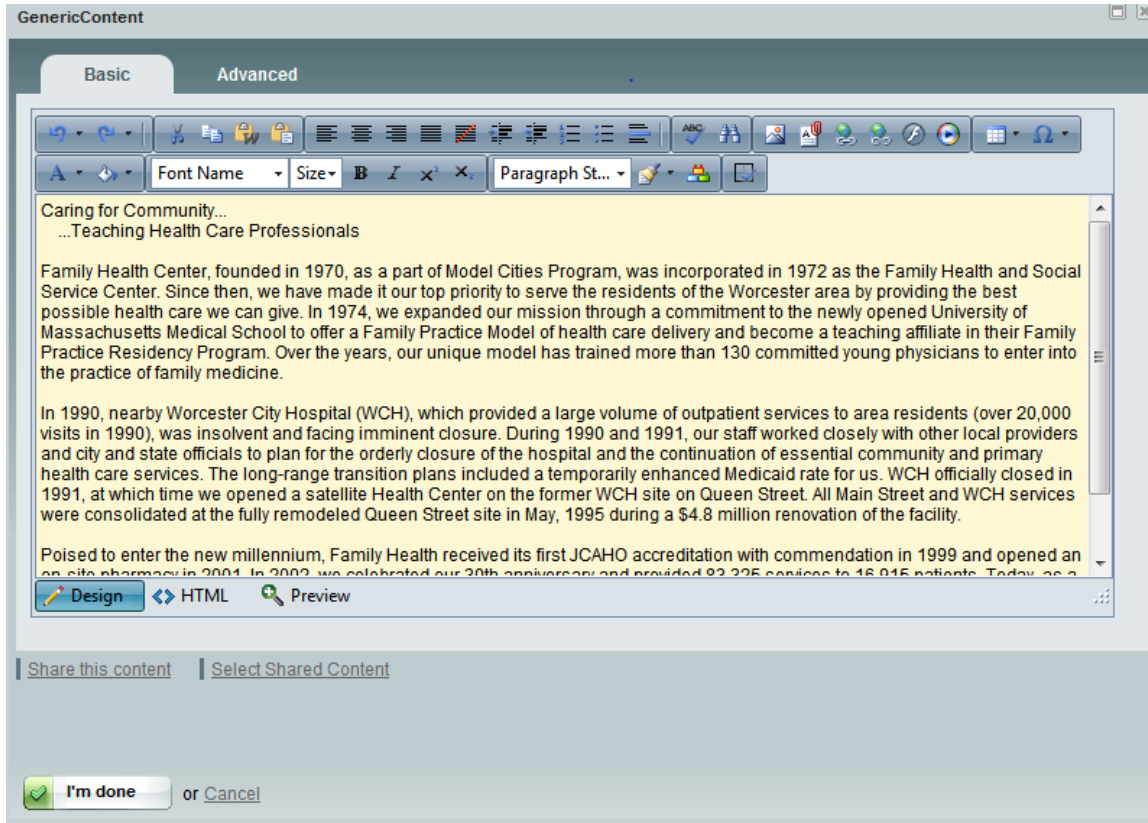
Select the page you want to edit on the left menu. The page will appear on the right. Then click “Edit this language version” above the page.



Click “Edit” button on the top left corner of the content window.

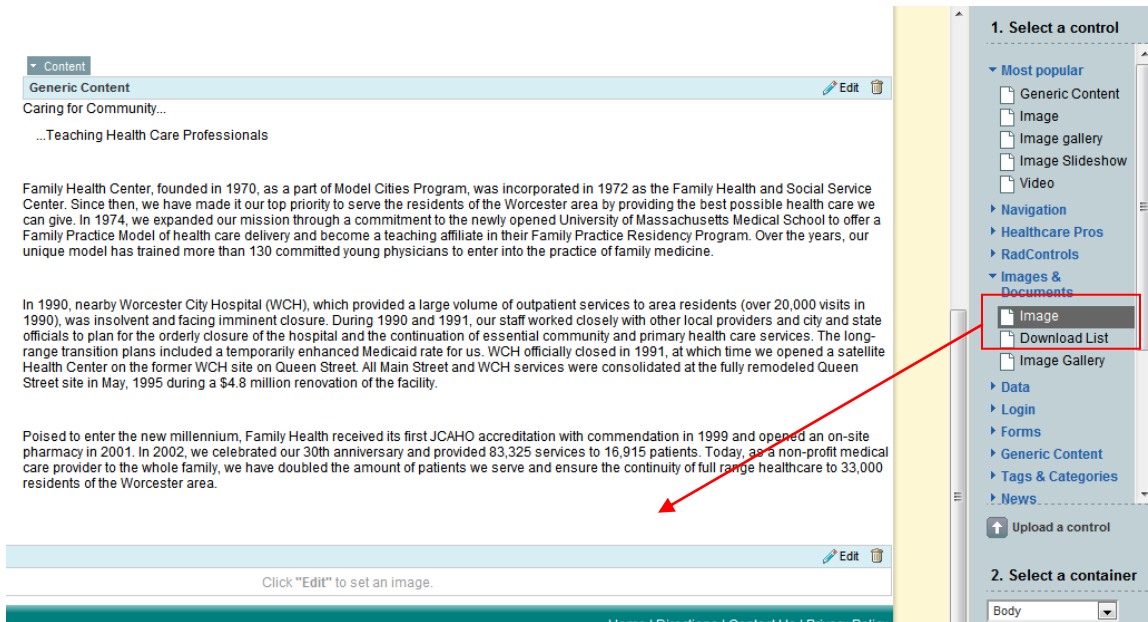


As you can see below, the editing window is like Microsoft Word. Remember to click “I’m done” when finishing editing.



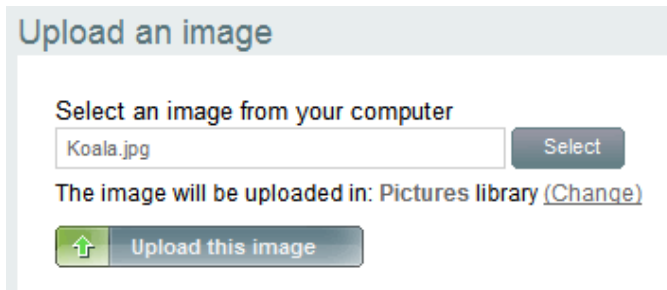
### 3. Add pictures or videos to a page

After you open a page, like what you do when editing a page, click “Image” or “video” on the right menu, and drag it into the page area.

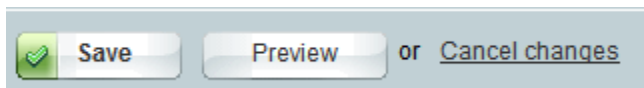


Click “Edit” button on the top right corner, like what you do when editing text content.

In the pop-up window, select a picture and upload or choose a video from previously prepared video libraries.



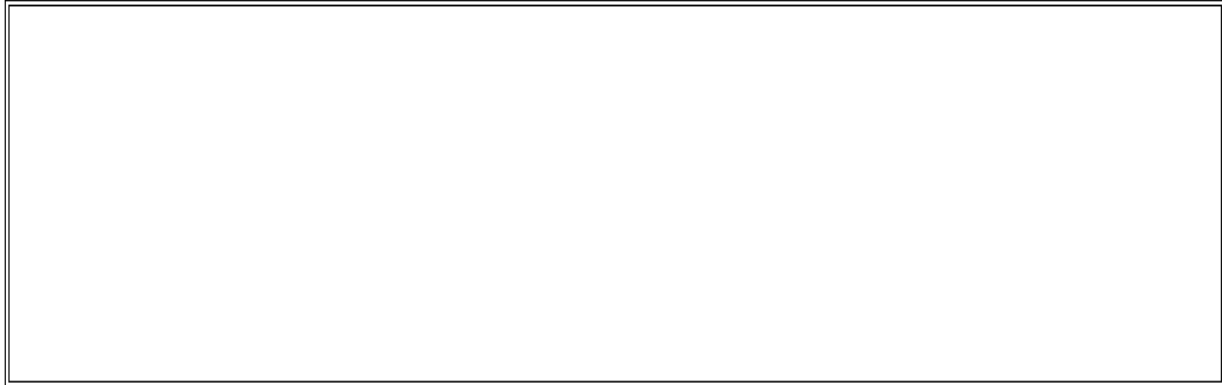
Click “Save” on the top menu like before.



## Appendix VI – First Prototype

# Family Health Center of Worcester

[About Us](#)   [Health Services](#)   [Support Services](#)   [Academics](#)   [Join Our Team](#)   [News](#)   [Media](#)   [Direction](#)   [Donate](#)



### About Us:

#### [Who We Are](#)

##### **We are an Academic Community Health Center**

Family Health Center of Worcester (FHCW) is a Federally Qualified Community Health Center, accredited by the Joint Commission. Its governing body is a 23-person Board of Directors of whom 51% receive their health care here at FHCW. We provide high quality comprehensive health care to every individual and family we serve. Our services include primary care, dental care, mental health care, social services, and an array of ancillary services, including pharmacy and radiology services, and also school-based programs.

#### [Our History](#)

#### [Locations](#)

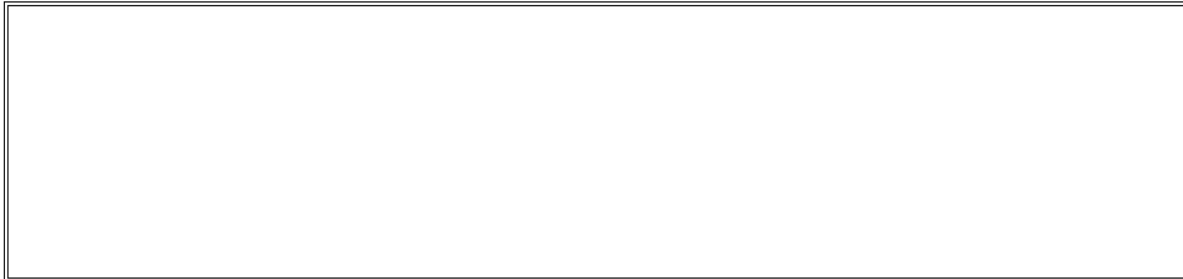
#### [Our Patients](#)

Our team is comprised of more than 300 medical, dental, social service and other clinical providers, pharmacists, nutritionists, interpreters, health benefits advisors and volunteers who serve our patients with respect and compassion.

Figure 11 - "About Us" page of first prototype

# Family Health Center of Worcester

[About Us](#)   [Health Services](#)   [Support Services](#)   [Academics](#)   [Join Our Team](#)   [News](#)   [Media](#)   [Direction](#)  
[Home](#) -> [Support Services](#) -> [Patient Advocates](#)   [Donate](#)



## Support Services:

[Call center](#)

[Health Benefits Advising](#)

Although not an explicit department at FHCW, the Health Benefit Advisors play an extremely important role in all the departments of the health center. They are multilingual staff members who work with uninsured patients and help them to apply for public insurance. This is extremely important for the health center to be able to provide the necessary medical attention to these patients.

[Medical Translation](#)

[Patient Advocates](#)

[Care Coordination](#)

26 Queen Street, Worcester MA 01609/508-860-7700/TTY508-860-7750

[Home](#)   [Direction](#)   [Contact Us](#)   [Privacy Policy](#)

copyright...

Figure 2 - "Support Services" page of first prototype

## Appendix VII – Second Prototype

The screenshot displays the website for the Family Health Center of Worcester. The header features the organization's name and logo, a search bar, and a language dropdown set to English. A navigation menu includes links for ABOUT US, HEALTH SERVICES (highlighted), PATIENT SUPPORT SERVICES, ACADEMICS, JOIN OUR TEAM, NEWS, and DONATE. The main content area is titled "Dental Care" and includes a breadcrumb trail: Home > Health Services > Dental Care. A left sidebar lists various health services, with "Dental Care" selected. The main text describes the dental services, mentions the staff's multilingual capabilities, and provides information on insurance, hours of operation, and location.

**Family Health Center of Worcester**

Search English

Directions | Contact Us | Media

ABOUT US HEALTH SERVICES PATIENT SUPPORT SERVICES ACADEMICS JOIN OUR TEAM NEWS DONATE

**Health Services**

- Primary Care
- Same-Day Appointment
- Dental Care**
- Social Services
- Behavioral Health
- Pharmacy
- Radiology
- Laboratory
- Maternal and Child Health Program
- School-based Sites
- WIC

Home > Health Services > **Dental Care**

We want you to know that your oral health is directly connected to your overall health. For example, gum diseases allow bacteria to enter your system and cause health problems in other parts of your body. Good oral health and preventive care can help you eliminate this risk, and we at Family Health, are here to help you do just that!

Our Dental Department has a team of dedicated and experienced dentists and dental hygienists who offer high quality preventative care, restorative services, and oral surgery for adults and children. We speak many different languages including Albanian, Chinese-Mandarin, Haitian Creole, Pashto, Portuguese, Spanish, Twi and Vietnamese. We also provide the same high quality services to students of [our school sites](#).

Our services are comparable to other area dental care providers while our prices are much lower. We accept payments from [most insurance carriers](#).

We are open from 7:00am to 6:30pm. Please call us at 508-860-7910 to schedule an appointment.

We also accept walk-ins for dental emergencies at our main office. We operate on different schedules at our school sites.

**Hours of operation**

Monday, Tuesday, Wednesday – 7 – 6:30PM  
Thursday – 7 – 7PM  
Friday – 7 – 6 PM  
Emergency Walk – in: Monday-Friday at 7am

**Location**

3rd floor

School Based sites

Figure 3 - "Dental" page of second prototype





## Health Services

- Primary Care
- Same-Day Appointment
- Dental Care
- Social Services
- Behavioral Health
- Pharmacy
- Radiology
- Laboratory
- Maternal and Child Health Program**
- School-based Sites
- WIC

[Home](#) > [Health Services](#) >

## Maternal and Child Health Program

At Family Health Center, we want to provide you with all the services you will need to have a successful pregnancy. Specialty services are available to all women who come to us for their prenatal, post-partum newborn and well-child care. Building healthy families is our goal.

As part of the Worcester Infant Mortality Reduction Task Force, we are focused on creating an opportunity for you to have early and consistent prenatal care. We have five bilingual case managers, who are happy to provide you with care from your child's prenatal stages until age 2.

Pregnancy testing is done by the perinatal nurse who will discuss with you information about your pregnancy. She will make sure that there is nothing urgent to be addressed, make sure you have a prescription for prenatal vitamins and she will schedule an appointment for you with the OB Nurse Practitioner. She will also talk to you about some of the other services (shown below) provided for our moms-to-be.

We also provide labor and delivery support, and are on-call 24 hours a day, 7 days a week. Also offered as social services programs to the expecting mother are depression screenings throughout the pregnancy, immunizations for the infant as well as a smoking cessation program if needed.

### Programs:

#### Healthy Start

Family Health Center is part of the Worcester healthy Start Initiative. As such, every woman has a designated perinatal advocate who will address any of her concerns on an individual basis. She will be available by phone or appointment and will provide labor and delivery support if it is requested. The perinatal advocates have a strong network among other service providers in Worcester and so provide a bridge to the greater Worcester community. The advocates are from many cultures and so provide culturally sensitive care. Individual advocates are bilingual in Spanish, Vietnamese, Portuguese, and Twi. Each advocate is a strong resource for information

Figure 4 - "Maternal Health" page of second prototype

## Appendix VIII – Third Prototype

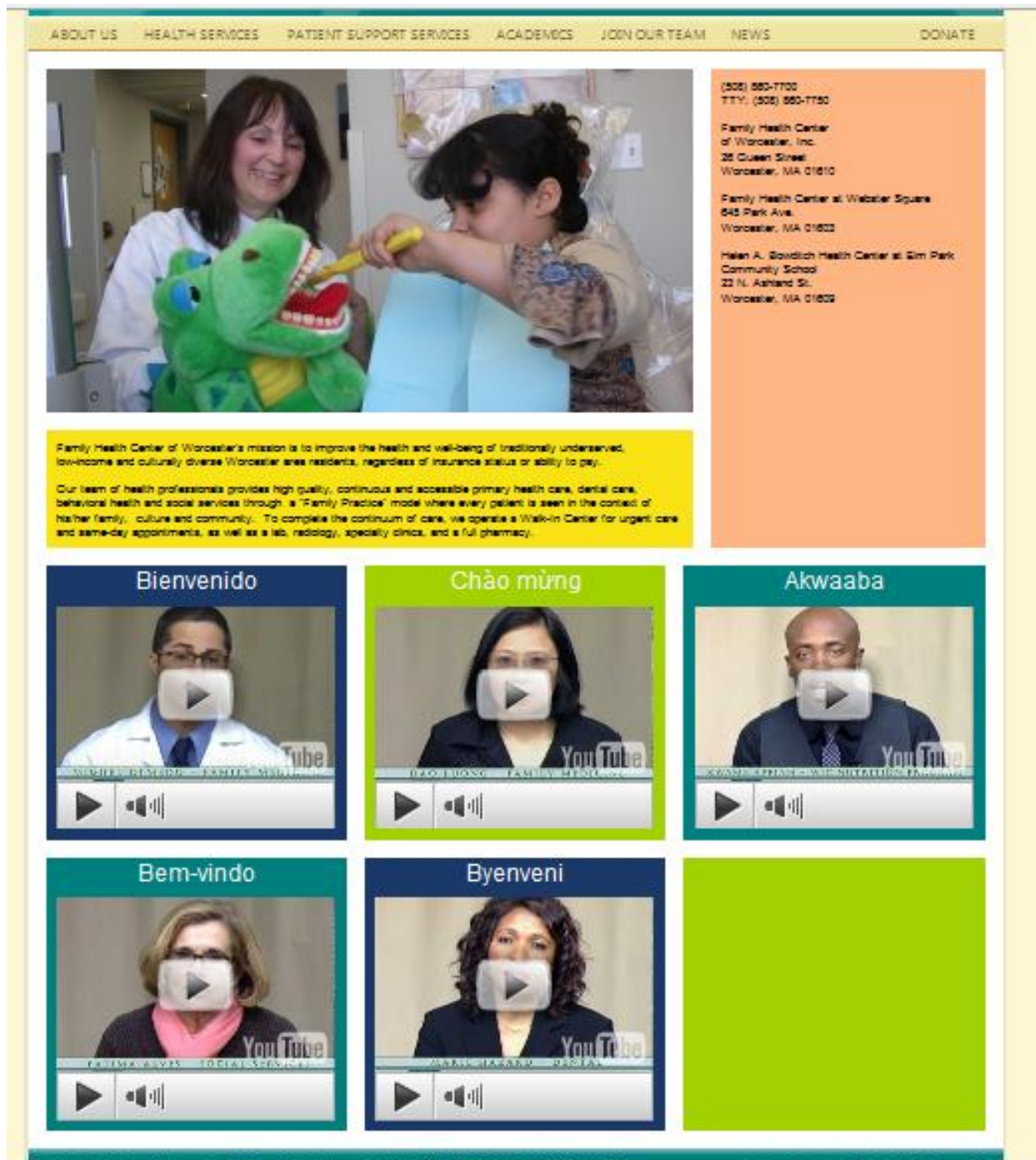


Figure 5 - Homepage of new FHCW website

## About Us

### Our Mission of Caring

### Our History

### Locations

### Our Patients

### Annual Report

### Board of Directors

### News

[Home](#) > [About Us](#) >

## Our Mission of Caring

Family Health Center of Worcester improves the health and well-being of traditionally underserved, low-income and culturally diverse residents living in the Greater Worcester area. We provide high quality, continuous and accessible primary health care, dental care, behavioral health and social services through a "Family Practice" model where every patient is seen in the context of his/her family, culture and community.

In addition, we provide public health programs directed at early detection and prevent of disease. We carry out this mission in full compliance with all applicable federal, state and city laws and requirements.



Figure 6 - Mission Page of New FHCW website

**Family Health Center of Worcester**

Search English

Directions | Contact Us | Media

ABOUT US HEALTH SERVICES PATIENT SUPPORT SERVICES ACADEMICS JOIN OUR TEAM NEWS DONATE

Home > About Us >

## Our Patients

We are located in a large urban community in Worcester, Massachusetts. It is home to people from different backgrounds including minority and refugee populations, college students, low-income families, established residents, and homeless people living in temporary shelters.

Also, we offer services for mental illness, HIV, hepatitis B and C, tuberculosis, substance abuse, teen pregnancy and infant mortality prevention, and dental care. School-based health centers in four area schools and dental services in southern Worcester County provide further outreach. Insured, underinsured or uninsured – We welcome all!

In 2008, we helped 31,338 people with medical, dental, mental health and social services, nutrition counseling, health benefits advising and school-based health services through 108,212 clinical visits. We cater to a large and diverse patient population regardless of insurance, language, or ability to pay. We are committed to providing the best healthcare to each individual we serve.

We look forward to helping you during your visit!

Family Health Center of Worcester | 26 Queen Street, Worcester, MA 01610 | 508-860-7700 | TTY 508-860-7750 Home | Directions | Contact Us | Privacy Policy

©2002-2010 Family Health Center of Worcester, Inc.

Figure 7 - Our Patients Page of New FHCW website



## Health Services

Find a Healthcare

Professional

Primary Care

Getting Started

Feeling Sick?

Health Resources

Same-Day Appointment

Dental Care

Social Services

Behavioral Health

Pharmacy

Radiology

Laboratory

Maternal and Child

Health Program

School-based Sites

WIC

[Home](#) > [Health Services](#) >

## Primary Care

The doctor, nurse practitioner, or physician's assistant who cares for you and your family here at Family Health Center of Worcester is called a medical provider. They take care of many different families and individuals, from infants to senior citizens. Sometimes you might be seen by a nurse for a follow-up visit, or another medical provider may see if you are not feeling well when your provider is not available.

Your provider treats most of your medical problems. If you need extra medical help, they will arrange for you to see a specialist. Your provider will still stay involved with your care during the entire process.

Here at Family Health, we want to help you with your health and well-being. We have three medical teams in the primary care department, and one more will be added later. Each team has doctors and nurses, social service workers and other staff who makes sure that you receive the best medical service Family Health can provide. Most of our doctors and staff speak at least two languages, including Spanish, Portuguese, Albanian and Vietnamese, and there are interpreting service if you speak a different language.

### Hours of operation:

Mon, Wed, Friday – 8 – 5:30  
Tues, Thurs : 8 – 8PM

### Locations:

**Family Practice Team 1**  
1st Floor  
Fax: 508-860-7792

**Family Practice Team 2**  
2nd Floor  
Fax: 508-860-7855

**Family Practice Team 3**  
2nd Floor  
Fax: 508-860-7865

### Contact information

Phone: 508-860-7800

Do you still have questions? See our [Frequently Asked Questions](#)

Figure 8 - Primary Care Page of New FHCW website



## Health Services

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Professional

Primary Care

Same-Day Appointment

Dental Care

Social Services

Behavioral Health

Pharmacy

Radiology

Laboratory

Maternal and Child

Health Program

School-based Sites

WIC

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## Dental Care

Our Dental Department has a team of dedicated and experienced dentists and dental hygienists who offer different dental services for adults and children. We speak many different languages including Albanian, Chinese-Mandarin, Haitian Creole, Pashto, Portuguese, Spanish, Twi and Vietnamese. We also provide the same high quality services to students of our school sites.

Our services are similar to other area dental care providers but our prices are much lower. We accept payments from [most insurance carriers](#).

[Click here](#) for more information and resources on [Dental health](#)

### Hours of operation

Call: 508-860-7910  
Monday, Tuesday, Wednesday: 7 – 6:30PM  
Thursday: 7 – 7PM  
Friday: 7 -8 PM  
Emergency Walk-in: Monday-Friday at 7am

### Location

3rd floor  
School Based sites

Also see our [Frequently Asked Questions](#)

Figure 9 - Dental Care Page of New FHCW website

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## Social Services

We are dedicated to helping you achieve and maintain their goal of wellness. We are compassionate and highly trained professionals, including licensed Social Workers, Psychologists, and licensed Mental Health Clinicians. We provide individual and family health counseling services.

The staff in our department is fluent in English and Spanish; and interpretation in other languages is also available.

[Hours of Operation \(Call 508-880-7930\)](#)

Mondays through Fridays during the regular Family Health Center hours.

You can walk in or call to receive more information about how you can benefit from services.

[Case Management and Advocacy \(for Patients\)](#)

Here at Family Health, our multilingual advocates offer case management supportive services. There is a bilingual (Spanish-English) advocate on each of the primary care team. We also offer extra support for you and your family through many of our specialty care programs.

[Find out more](#)

[Homeless Families Program \(for Patients\)](#)

The Homeless Families program is open to patients who have children and are living in unstable housing situations. We understand that those experiencing homelessness have special needs during this time. Case managers work to ensure connections to medical, dental, and mental health services as well as referrals to other community agencies.

[Housing Resources](#)

[Food Stamp Services \(for Patients\)](#)

Patients may apply for food stamps at Family Health using a one-line application process. In addition, we provide information about food pantries in the area and other resources.

[Food Resources](#)

[HIV Testing and Counseling \(Open to everyone\)](#)

Family Health Center offers free HIV testing to those at risk. Patients of Family Health or others from the community may speak with a counselor and benefit from risk reduction activities. Services are available Mondays through Fridays 8:00am – 5:30pm.

Family Health Center of Worcester | 25 Queen Street, Worcester, MA 01610 | 508-860-7700 | TTY 508-860-7750 [Home](#) | [Directions](#) | [Contact Us](#) | [Privacy Policy](#)

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Figure 10 - Social Services Page of New FHCW website



## Health Services

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## Pharmacy

To better serve you, we operate a full-service pharmacy for Family Health and School-based patients only. Our pharmacy is a 340B contracted pharmacy, meaning that we are able to buy prescription drugs at a deep discount, so that we can sell them to you at a very low price.

We have pharmacists and staff who offer compassionate care and confidential, one-on-one counseling to patients. Our pharmacy staff is fluent in Albanian, English, Portuguese, Spanish and Vietnamese. We also offer interpretation services for patients who speak other languages. A pharmacist is always on duty to answer any questions you may have.

For more information, view our [Frequently Asked Questions](#):

[Automated Pharmacy Prescription Refill by Telephone](#)[Accepted Insurances](#)[Rules and Regulations](#)[Patient Privacy](#)

### Hours of operation:

Monday, Wed, Friday : 8:30 – 8PM

Tuesday, Thurs: 8:30 – 8PM

### Location:

Main Location, 1st floor

### Contact information:

Phone: 508-860-7730

Fax: 508-860-7737



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## Radiology

Our medical providers rely on radiology/imaging technologies to properly diagnose and treat our patients and detect and/or prevent certain diseases. Family health's mammography department undergoes yearly reviews by the Department of Public Health Radiation for State and MQSA license, and every three to four years by the American College of Radiology (ACR)

We have three licensed radiologists and six technologists who perform X-Rays, mammography and ultrasound. Please note that you need a doctor's referral to do all radiology tests, except for a mammography.

If you have any questions, please call our department at 508-860-7717, and we would be happy to help, or visit our [Frequently Asked Questions](#)

[Hours of operation \(508-860-7717\)](#)

**Radiology**  
Walk –in: M-F 8:30-4:30pm

**Mammography**  
M-Th by appointment

**Ultrasound**  
M, W, Th, by appointment

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Figure 12 - Radiology Page of New FHCW website



## Patient Support Services

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## Care Coordination

The Care Coordination Program is a free program for adults ages 40-64 who live in Massachusetts. While the program will focus on low income, uninsured and under-insured adults ages 40-64, both men and women under age 40 and over age 64 may be eligible for enrollment.

The Care Coordination model includes support services that help reduce barriers to healthcare. By being a part of our program, you will have a team of people to help you with your health needs, and get the information, tests and care you need to be healthy.

To learn more, call Family Health Center at (508) 860-7765 and ask to speak to a member of the Care Coordination Team.

Figure 13 - Care Coordination Page of New FHCW website



## Patient Support Services

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## New Patient Enrollment

Family Health Center of Worcester (Family Health) is open Monday through Friday, 8:00am to 5:30pm. Some evening hours are available by appointment only for Family Health patients. Call us at our main number (508-860-7800) 24 hours a day and 7 days a week. A medical provider is on call after hours. Please let us know if you would like help in a language other than English; our multilingual staff is ready to assist you.

### [Scheduling an Appointment \(508-860-7800\)](#)

To arrange for a medical, dental, or mental health appointment, please call 508-860-7800 or walk directly in to the reception area. Please let us know if you require interpretation services when you call. Canceling an appointment (508-860-7821). Please call 508-860-7821 as soon as possible if you need to cancel your health appointment, or walk directly in to the reception area. Please let us know if you require interpretation services when you call.

### [Arriving for an appointment](#)

Step 1: Please come 15 minutes before your scheduled appointment to allow time for check-in. Go to the Department or Team check-in desk.

Step 2: Please have the following information ready:

- Your name
- Your Medical Provider's Name
- Appointment Time
- Insurance card or appropriate income documentation
- Current address and telephone number
- Co-payment, which must be submitted at the time of the visit

Step 3: Bring a list of medication you are currently taking. Your provider will need that information to ensure your well-being

Step 4: Bring a list of any health concerns you want to discuss with your provider

Figure 14 - New Patient Enrollment Page of New FHCW website

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## Medical Record

### What's a Medical Record and What's in it?

Family Health Center creates a medical record for all of our patients. A medical record is a folder, set of folders, or electronic files that have information about illnesses you have or had, treatment you received from you medical provider(s), details about your lifestyle (such as whether you are a smoker, etc.), and information about your family medical history. Also, your medical record has laboratory and imaging test results, medication that were prescribed to you , and reports or surgeries and other medical procedures. Your records could also include information about your participation in research projects, if any, along with forms you have completed by.

Our medical record staff is fluent in English, Spanish and Albanian; interpretation service for other languages is available. The department is open Monday through Friday, 8:00am trough 5:30pm.

Still have questions? View our Frequently Asked Questions about:

- [Who has access to a patient's medical records?](#)
- [How to request a copy of your record.](#)
- [Patient privacy](#)

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Figure 15 - Medical Record Page of New FHCW website



## Academics

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## Academics

Become a part of the health care solution: train at Family Health!

For over 35 years, Family Health has been improving the care of Worcester's most vulnerable people and training future generations of family physicians in collaboration with the [University of Massachusetts Medical School](#). As a federally qualified community health center, Family Health is part of a national health care safety net that has been recognized for its high quality and cost effectiveness. This combination of health center and university training provides a learning environment that is truly unique.

Residents, faculty, and staff work in interdisciplinary teams of care providers. Patients receive comprehensive care from dentists, primary care and specialty physicians, nurses, case managers, nutritionists, and mental health providers – all under one roof. Patients also have access to lab, radiology, including mammography, and pharmacy services. Family Health truly is a model for the future of primary care delivery and residents learn how to practice in this cutting-edge model. We provide residency programs in:

[Family Medicine](#)[Family Nurse Practitioner](#)[Dental Health](#)[Behavioral Health](#)

For more information, please contact:

Cricket Haley  
Education Administrator  
Phone: 508-860-7898  
Fax: 508-860-7805

Figure 16 - Academics Page of New FHCW website

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**Join Our Team**

How to Apply

Current Job Openings

Family Health Center of Worcester, Inc. has been listed as one of Central Massachusetts' largest employers. Our staff includes dedicated and compassionate people with the latest training in health care and public service. We have many opportunities for our staff at Family Health Center and the area's highly successful WIC/Nutrition Program, to ensure the provision of high quality health care services to the Worcester community.

In existence for 35 years, we are proud of our mission to improve the health and well-being of under-served and culturally diverse Worcester area residents by providing high quality, comprehensive and continuous primary health care, dental, behavioral health and social services. We respectfully and compassionately care for patients in the context of their family, culture and community.

Many of our staff have been recognized throughout our 35-year history for their contributions to health care, through support and management of innovative programs for families and individuals of all ages. We provide a wonderful environment for practitioners and health care professionals to collaborate on patient care while continuously improving processes and expanding services.

Since its inception in 1972, Family Health Center of Worcester has been the primary employment for residents from the surrounding neighborhoods. our commitment to provide jobs and training has earned appreciation throughout Worcester County. We have an active volunteer and internship program for those just entering the health care/social service arena.

If you are a person who enjoys helping others, if you want to contribute to the creation of a "medical home" for our diverse patient population, if you thrive on working with a dedicated community service mission, if you want to give back to the community, or if you want to jump start your career in one of the most important industries in the country -- we are the employer for you!

[Current Job Openings](#)

[How to Apply](#)

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Figure 17 - Join Our Team Page of New FHCW website



## Donate

### Donate

### Special Campaigns

### Friends of Family Health

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## Donate

We at Family Health rely on the support of the local community to fund our medical services and other programs. We accept a variety of donations including:

- Basic hygiene supplies
- Baby blankets
- Bottles for newborns
- Mittens and hats in the winter
- Monetary donations to support operations through our special campaigns

### Family Health appreciates your support!

To donate or to be added to Family Health's mailing list, please contact the Development Office at 508-860-7996, or send a check to:

Administration, Development Office  
Family Health Center of Worcester, Inc.  
26 Queen Street  
Worcester, MA 01610

Also, see our [non-profit report from Guidestar](#)

Figure 18 - Donate Page of New FHCW website



## Directions

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## Directions

### Public Transportation

#### - WRTA Bus

Take route 6 or 7. Get off at Family Health Center.

[Click here for bus map.](#) [Click here for bus schedule.](#)

### How to Drive to FHCW?

#### From points east, Boston-Mass Pike I-90 west

- Take Exit 11A I-495 (N.H.-Maine/Cape Cod)--After the toll, bear left onto I-495 North
- Take exit 25B (I-290 West (Worcester))
- On I-290, take exit 13 (Kelly Square)
- At the stop sign at the end of the exit ramp, turn right

\*You have entered KELLY SQUARE ROTARY

-At the end of the intersection, take the street with the HESS gas station on the right and the Gulf station on the left.

-Go straight. At the third light, this street becomes Chandler Street. Continue straight.

-Pass Economy Paint (on left) and take a left onto Queen Street.

-Drive two blocks. Parking lot entrance is on the right.

[From points west, Springfield](#)

-Mass Pike I-90 east-Take exit 10 to I-290 east (Auburn)

-Take exit 13 (Kelly Square)

-At the end of the exit ramp, turn left

-Follow directions for KELLY SQUARE ROTARY listed above

[From points north or south](#)

-Take I-495 to exit 25B (I-290 west (Worcester))--Take exit 13 (Kelly Square)

-At the stop sign at the end of the exit ramp, turn right

-Follow directions for KELLY SQUARE ROTARY listed above

[From Providence, R.I.](#)

-Take Route 146 north--Routh 146 becomes Millbury Street

-Stay on Millbury Street to Kelly Square

-Follow directions for KELLY SQUARE ROTARY listed above

Figure 19 - Directions Page of New FHCW website