



Community Preservation and Development Corporation

Community-Based Clinical eStorefront @ Edgewood Terrace

Project Purpose

Community Preservation and Development Corporation (CPDC), in partnership with The Catholic University of America, seeks to develop and implement a comprehensive in-home biomedical technologies program to provide medical services to 300 seniors living at Edgewood Terrace and to train 40 home health aides. Providing health care services, recreation, and other social activities for seniors are priorities for Edgewood Terrace. CPDC established a partnership with the National Council on the Aging (NCOA), a TOP grantee, to provide seniors with access to NCOA's online benefits prescreening tool at www.benefitscheckuprx.org for information on a variety of medical benefits. *Clinical eStorefront* is CPDC's effort to expand health services by implementing an in-home biomedical and telemedicine program to link seniors with area hospitals to create a "successful aging-in-place" program.

Since 1998, CPDC has been operating full-scale office technology and IT training to at-risk youth and adults (low literacy, un-employed, welfare-to-work) through the Career and Skill Enhancement Department (CSE). We have developed a unique expertise for integrating literacy and supportive services in occupational skills training programs. CPDC will use TOP funding to introduce telehealth training to entry-level healthcare support staff. The project will focus on training incumbent workers by offering skill upgrade classes during the day, evening and weekends. Currently 65% of all individuals served in CSE employment programs are employed and seeking to upgrade their skills for job security, wage increases, or promotion. By using a combination of classroom

and hands on approaches, CPDC will assist 40 entry-level healthcare employed workers to upgrade their skills to the level of healthcare technician.

Demand for Direct Care Workers

According to a report by The US Department of Health and Human Services, February 2004, the US is experiencing a critical shortage of direct care workers. This shortage is expected to have a significant impact on the availability and quality of health care for the elderly and chronically ill. The US will need between 5.7 and 6.8 million long-term care workers by 2050 to address the growing direct care needs of the nation. These workers include home health, nursing, and personal care aides that provide care in residential and nursing facilities. Because of the growing numbers of aging baby boomers, the supply of workers has not been able to keep pace with the current demand. Additionally, the direct care field experiences significant turnover due to job demands (physically and emotionally draining), low wages, and little opportunity for advancement. According to the Bureau of Labor Statistics, the average hourly wage for direct care workers is \$9.00 per hour. Given that most of the workers in this field are single women with children, this is hardly enough to make ends meet. Many healthcare paraprofessionals live in poverty and receive public assistance.

U.S. Demographics Generate Demand for an Expanded Healthcare Workforce

The elderly population (age 65 years and older) currently approximates 33+ million representing 13% of the population. Increased longevity and the aging of the baby boom generation is contributing to a substantial increase in the elderly population, expected to increase to 53 million by 2020 and 77 million by 2040. The rapid growth in the size of an aging population is projected to substantially increase overall demand for health care services. Physicians spend an estimated 32 percent of patient care hours providing services to seniors and are projected to spend an increasing proportion of their time treating the elderly. Yet, the aging of the health workforce indicates that many health professionals will retire about the same time that demands for their services increases.

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The Workforce Analysis Branch of the Bureau of Health Professions (BHPr), Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) commissioned an analysis of the changing demographics and the implications for the future health workforce.¹ The report indicates an increasing elderly population and the consequent demand for health workers and the demand for nurses and nurses aides.

Forecasted FTE Nurse Requirements	2000	2020	Increased Demand	Percent Increase
Registered nurses	2,001,198	2,822,388	821,190	41.0%
Licensed practical nurses	617,945	905,159	287,214	46.5%
Nurses aides and home health aides	1,545,722	2,323,518	777,796	50.3%

[Source: Adapted from Changing Demographics: Implications for Physicians, Nurses, and Other Health Workers, Spring 2003.]

HRSA projections are supported by recent US Department of Labor (DOL) occupational employment projections. DOL projects fast-growing industries include healthcare and social assistance and professional, scientific and technical services. Healthcare practitioners and technical occupations are projected to add 1.7 million jobs, as the demand for healthcare services continues to grow rapidly. Fifteen of the 30 fastest growing occupations are health related with health care support occupations projected to add 1.1 million jobs, growing the fastest of the services subgroups. "Rapid growth among health-related occupations reflects an aging population that requires more healthcare, a wealthier population that can afford better healthcares, and advances in medical technology to permit more health problems to be treated more aggressively."²

Nursing aides and home health aides are two of the paraprofessional direct healthcare support occupations responsible for providing patient services to the elderly. While these occupations are projected as the fastest growing, a parallel analysis of healthcare workforce trends indicates there is a considerable shortage of workers in these occupations caused by high turnover, and problems in recruiting and retaining workers due to low pay and the lack of a career ladder.³ Appendix A summarizes statistics from DOL occupational

employment projections, citing the education level and relative pay of the ten fastest growing occupations. Nurses aides and home health aides are in the lower wage quartile with a salary level consistent with the categorization of the "working poor."

Telehealth Technology Promotes Efficiency In Healthcare Delivery and Job Growth

Simultaneous to the aging phenomena in the United States and internationally, the world is witnessing a proliferation of technologies. These range from computing technologies to telecommunications technologies to health care technologies and others. There are tremendous opportunities for these technologies to benefit the elderly population and to assist them in their quest to "age-in-place." A recent study showed that ninety-five percent of older Americans would prefer to age in their own homes and to function independently. The growing trend in the elderly and the needs of this segment of the population paralleled by the explosion of recent technologies give momentum to the proposed telehealth training program. Telehealth is an emerging area in the medical profession that enables clinicians to deliver health services remotely using a combination of hardware and software tools. This project seeks specifically to deliver targeted technologies and services for the purposes of home health monitoring, health education and resident caregiver training for tenants in Edgewood's newly operating Senior Building.

Innovation

Clinical eStorefront involves several key components for the use of innovative technology-based service delivery. These components seek to take advantage of Edgewood Terrace's unique infrastructure, which provides broadband access to each residential unit within its community complex. Key components of the project include:

1. Biomedical Technology Demonstration Center for demonstration, education, and training regarding assistive and health monitoring

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technologies for promoting personal health, wellness, and independent living.

2. Physical and virtual Clinical eStorefront at Edgewood Terrace supported by CUA's nursing school and clinicians at the National Rehabilitation Hospital who will provide access to local and remote health professionals and support services.
3. In-home technologies for continuous and routine health and activity monitoring for support of those with chronic illness and acute medical conditions.
4. Train and certify 40 individuals to fulfill positions as "Bio-Med/Healthcare Technicians" that will substantially increase their current incomes.

Clinical eStorefront is designed to apply the most recent research on the innovative uses of technology for promoting successful aging in the elderly population funded by the MacArthur Foundation. According to the MacArthur Foundation study on aging, the environment is the single most important parameter affecting the individual's ability to age successfully. As such, this project's aim is to harness the recent advances in computing, information, sensing, and other technologies for creating an interactive living environment that enables the elderly inhabitants to live independently, learn user preferences and habits, and anticipates needs and suggests alternatives for the elderly. CUA has developed a model for success that requires three major thrusts for which technology can play a key role (see Appendix B):

- avoiding disease
- maintaining physical and cognitive function, and
- engagement in life

Development and utilization activities that include (1) creating affordable consumer toolkits for independent living based on existing or near-term technologies, (2) developing interactive "smart" home environments, and (3) creating health monitoring systems for sensitive screening and detection of disease. Training and dissemination activities relating to (1) education of the elderly on use of technology, (2) consumer education on available technologies for independent living, and (3) vocational training of nurses aides and home health aides to remote troubleshooting and monitoring systems. The approach

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relies heavily on the most recent technologies in sensors, computing, and wireless communications, as illustrated at Appendix C.1. An example of the conceptual model for this interactive living environment is shown in figure at Appendix C.2. The basic elements of the *Clinical eStorefront* proposal includes the following key activities:

- **Research activities**

- R1: Aging Successfully: Attitudes Toward and Role of Technology
Idea: Needs, gaps, and trends analysis of elderly
Partners: CUA (Social Work/BE) + Edgewood
- R2: TelePresence: Impact of "Virtual Communities" on Elderly
Idea: Communities will provide social support for elderly; engagement
Partners: CUA (Social Work/BE) + Edgewood

- **Development & Implementation activities**

- D1: Biomedical Technology Demonstration Center @ Edgewood (PIs: Tran)
Idea: Demonstration center of current and near-future health care technologies and devices appropriate for promotion of health and function. Technologies include health care devices, assistive technologies, wearable sensors, etc. This Demonstration Center will be staffed by CUA engineering, nursing, and social work students who will work with consumers and residents to train and educate consumers on best practices and appropriate use of these technologies.
Partners: CUA (BE/Nursing) + Edgewood
- D2: Virtual Clinical eStorefront (PIs: Tran, Rosen, Buckley, Bertera)
Idea: Technology-based "virtual" access *from* the Edgewood Terrace Campus to NRH's clinicians and CUA's nursing & social work personnel will be provided to Edgewood residents via the Biomedical Technology Demonstration Center. Through the use of videotelephony, haptics, rehabilitation robotics, as well as other

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technologies, clinicians from nearby NRH will be able to *remotely* communicate with, assess, treat, and manage health related activities.

Partners: CUA (BE/Nursing/Social Work) + NRH + Edgewood

- o D3: Independent Living Toolkit: Tech-Sizing the Home Environment (PIs: Tran, Rosen)

Idea: Toolkit of sensors, home automation, monitoring, environmental control, etc. for promoting independent living in the home. Probably low-cost, readily available, currently existing systems. Desirable: commercial product available to consumers

Partners: CUA (BE) + NRH + Edgewood

- o D4: Interactive "Smart Environments" for Independent Living (PIs: Tran, Rosen)

Idea: Truly *interactive* living environments that sense and respond to the user, predicts needs, and assist with consumer ADLs and IADLs.

Partners: CUA (BE) + NRH + Edgewood

- o D5: Unobtrusive and Obtrusive Monitoring for Health and Safety (PIs: Tran, Buckley)

Idea: Monitoring activity and physiologic parameters on a routine basis may enable early prediction of disease formation or emotional/psychological changes in the elderly

Partners: CUA (BE/Nursing) + Edgewood

The project will make use of the existing infrastructure at Edgewood Terrace to provide local area network connectivity between the residents. This system also provides connections for the residents to communicate to the outside world through the Internet.

In partnership with CPDC's Career and Skills Enhancement Program, CUA will provide training to healthcare paraprofessionals to help facilitate outside monitoring of individuals when needed. A sample training curriculum is referenced in Appendix D. A program that integrates the use of technology in the delivery of healthcare services will help address employment turnover problems at the Kennedy Institute while also serving to enhance the skill level

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of nurses aides and home health aides serving the seniors at Edgewood Terrace. Nurses aides and home health aides will be trained to use at-home health monitoring systems relevant to checking blood pressure, pulse, ECG, pulse, and weight.

Comparison to other TOP funded projects: TOP has funded a number of telehealth (11) and telemedicine (48) projects designed to offer telehealth training to nurses, to bring medical services to underserved rural communities, and/or to use the Internet to provide health information. The FY2003 "Certified Nursing Assistant Training Program" proposed training unemployed residents of the Cheyenne River Sioux Tribe as certified nursing assistants. By contrast, *Clinical eStorefront* is a skills training program for paraprofessional healthcare workers. According to a report by the US Department of Health and Human Services, 2004, 90% of all healthcare paraprofessionals are female. Many of these women live in poverty and 30-35% of the single headed households receive public assistance. In focusing on this segment of the workforce, *Clinical eStorefront* addresses TOP's FY2004 program priorities by focusing on a training program for low-income healthcare workers to "increase worker skills, enhance productivity, and expand economic opportunity."

Community Involvement

Each household at Edgewood Terrace is wired and connected to a computer residential network and each resident has access to a computer and the network, much the same way they have access to a refrigerator and stove. CPDC recently completed the build-out of approximately 15,000 sq. ft. of space in the complex that will house several partners who will provide health, medical and other amenities for seniors to support their interest. [See Appendix E.] **The Edgewood Technology Advisory Board** is a resident member organization that advises CPDC on the use and growth of the EdgeNet Network and has indicated their support for advancing the telehealth project.

Catholic University - The Catholic University of America (CUA) is a preeminent four-year University located just .25 miles from Edgewood Terrace. Since the

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beginning of the re-development of Edgewood, CUA has been intimately involved. CUA currently provides the English Skills instructor for CPDC's Computer Office Skills Employment Program and awards 3 college credits for individuals who receive the Gateway Certification. The partnership broadened to include @Home.On .Campus, a one year Professional Certificate Program. CPDC and Catholic University have worked in partnership over the past five years sharing a commitment to improving the standard of living for seniors at Edgewood Terrace through the use of cutting edge technology.

The *Clinical eStorefront* project will involve a collaborative, interdisciplinary group affiliated with the CUA comprised of faculty from the departments of biomedical engineering, electrical engineering, mechanical engineering, computer science, and the schools of nursing. For this effort, CUA has the resources of The HomeCare & Telerehabilitation (HCTR) Technology Center within the Department of Biomedical Engineering (BE) and two other laboratories in which the proposed research and development projects will be conducted (Appendix F).

The George Washington University (GWU) - CPDC has had a long-standing relationship with the Graduate School of Education and Human Development (GSEHD) at GWU. The GSEHD is ranked number 25 in the nation and has trained a number of leaders and professionals in Vocational Evaluation and Special Education. GSEHD has worked with CPDC to develop and operate the Academic and Vocational Assessment Center at Edgewood Terrace. Interns and staff have participated in interdisciplinary reviews that tailor instruction to the needs of individuals with low skills and limited employment experience. CPDC is a partner with GSEHD on a grant to bring the HEALTH National Clearinghouse on Post-secondary Education for Persons with Disabilities and has worked closely with the GWU Collaborative Vocational Evaluation Training program to develop and enhance the Edgewood Terrace career/vocational evaluation center. Dr. Pamela Leconte, Assistant Research Professor, will work closely with Leicester Johnson, Deputy Director of Programs, to develop a curriculum for a certification program to enhance the skill level of the paraprofessionals that comprise the entry-level healthcare support occupations.

Microsoft – Microsoft Corporation has been supporting CPDC since 1997 with initial funding for an employment training program to teach basic computer and Microsoft Office skills to help tenants gain employable skills. CPDC became a certified Microsoft Testing center in 1998 and revamped its training program to include a comprehensive assessment module. Today CPDC teaches MS 2003, Help Desk and Customer Service for IT support, Web Design, and Database Administration and Administrative Office Skills.

Clinical & Field Partners will include the Kennedy Institute and the National Rehabilitation Hospital (NRH). The Kennedy Institute has experienced considerable staff turnover and staff recruitment problems with its staff of nursing and home health aides and will be a key source of referrals of health care workers for upgrading their skills with telehealth training. NRH currently hosts a center on telerehabilitation in partnership with CUA to deliver clinical services to rural and urban communities (Appendix G).

Evaluation

CPDC's goal in offering office technology and IT training is to provide existing low-income residents with opportunities to increase their incomes. The average income of the 125 adult residents who have taken the 18-week career-training program at Edgewood Terrace was \$9,400, prior to enrollment. After completion, the average income almost tripled to \$26,800 at time of graduation. CPDC anticipates that participants in the telehealth training program will have similar results: job and income mobility.

The broader focus of the evaluation will be to document income gains, program completion, and job retention, and job satisfaction. CPDC will conduct pre- and-post surveys and analysis of participants' attitudes about their job. The Health Resources and Services Administration direct care field reviews indicate significant turnover due to job demands (physically and emotionally draining), low wages and little opportunity for advancement. CPDC will measure job satisfaction prior to training and conduct three post-training interviews

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(immediately after training, 6 months, and 1 year). In addition to job satisfaction, CPDC will measure job retention, wage increases, advancement on the job, and continued education and training. CPDC will use the following factors to measure the success of the project.

Activity	Measurable Performance Indicator
Enrollment in Training	Enrollment Applications Intake Records Enrollment in Class
Rate of Retention in training	Daily and Monthly Attendance Logs Number of students enrolled vs. number of students completed
Improved Employability	Number of Graduates that Enhance Competence in Telehealth Number of Graduates Retained in Employment beyond six months Number of Graduates Being Promoted/Finding Better Jobs Number of Graduates Receiving Raises Number of Graduates that Receiving Certification Number of Graduates that Enroll in Advanced Post-Secondary Training
Improved Self-Sufficiency	Number of Graduates Relinquishing Public Assistance Number of Graduates Receiving Unsubsidized Child and/or Health Care

CPDC views the evaluation component as important to the project development and planning phase and has outlined a tasking plan that includes an initial pilot program during year 1 of the grant that will be subject to an evaluation for purposes of making revisions to the training protocol and instruction based on surveys from the first training cohort. See Appendix H.

The CUA HCTR Technology Center has research activities relating to applications of advanced technologies for delivery of health care services for independent living by the elderly. Dr. James Zabora, Dean of the National Catholic School of Social Service and Associate Professor of social work, who is involved in that research will serve as the project Evaluator. See Appendix I.

Project Feasibility

Funds from the TOP program will enable CPDC's CSE program to expand its current offering to address the current shortage of paraprofessionals in the healthcare field and to improve the skill level and income growth potential of direct care staff. Consistent with other skill training programs, CPDC will offer a comprehensive evening and weekend telehealth training program for entry-level, direct care health professionals such as Home Health Aides and Nursing Assistants. During the period of the grant, CPDC will conduct pilot a 10-12 week telehealth training sessions involving two cohorts of participants. Training will include the following course sequences. As referenced above and in Appendix D, the sample training curriculum includes modules in:

- **Clinical Nursing Practice (CHATS): 6-week module**
- **Health Technology Training (THINK): 4-6 week module**
- **In-Service & Field Training: 2-4 week rotation**

CPDC will utilize a combination of theoretical and hands on training to help participants develop the skills needed to provide effective medical care using such devices. Participants will be able to apply and refine their skills in the Edgewood Terrace *Clinical eStorefront*. Additionally participants will gain the necessary competencies to become to advance along the healthcare career ladder and become health technicians. In cooperation with the George Washington University Collaborative Vocational Evaluation Training Program and the Catholic University of America Biomedical Engineering department CPDC will begin to identify skills standards and to develop initial certification for entry-level telehealth professionals and assist telehealth program graduates with achieving certification.

Organizational and management team – The Clinical eStorefront Project will be managed by CPDC and CUA with Albert Browne, CPDC Vice President, and Dr. Binh Tran, Associate Professor and Chair of the CUA Biomedical Engineering Department. Dr. Tran will serve as the project manager for the telehealth component of the project working with Mr. Browne in who will facilitate collaboration with seniors and staff at Edgewood Terrace. See Appendix J for a detail description of the management team and partners.

Project Dissemination - CPDC and CUA have actively published articles and participated in conferences and forums to highlight the success of the projects. CUA is a member of the Washington Academy of Biomedical Engineer (WABME), an organization actively in promoting research, technology transfer and education in biomedical engineering. Dr. Tran organized a forum held on April 26, 2004 for the WABME quarterly meeting, Technology for Promotion of Health and Independence Through the Lifespan (see Appendix K) with a presentation by Albert Browne of CPDC. Dr. Tran and Mr. Browne are expected to participate in other WABME meeting and conferences.

Project sustainability - CPDC has longstanding partnerships with CUA, Microsoft, and a number of organizations that have expressed an interest in supporting the telehealth training program. Similarly, CUA has received has received funding from multiple sources. For example, The Whitaker Foundation provided funding to establish the state-of-the-art HCTR Training Center and CUA has received a sequence of large center grants on assistive technology R&D from the US Army Medical Research and Material Command.

As a part of the project CPDC will also explore opportunities for generating fees from employers looking for training programs to upgrade skills of nurses aides and home health care aides and/or to reduce staff turnover. Additionally, CPDC will explore possibilities for components of the project being income-producing ventures. For example, Senior Employment Resources (SER), a nonprofit in Annandale, VA, helps seniors find employment (www.seniorjobs.org) and receives 80% of their operating revenue from employers for whom seniors are referred for jobs. With the dwindling asset base of foundations, there is an increasing emphasis on nonprofits becoming entrepreneurial by developing revenue-generating strategies. A telehealth training program that meets the needs of the 100+ hospitals, clinics, and medical centers within a mile of Edgewood Terrace offers that prospect. Appendix L includes a list of major hospital within a 1-mile radius.

Project Budget

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CPDC is pleased to submit a budget, as detailed in the budget narrative, that reflects the investment of CPDC, CUA, Microsoft, GWU, NRH to create a successful in place model program for seniors in Washington, DC to train low-income direct health care workers. CPDC has secured matching funds commitment from Microsoft of approximately 20% of this budget. CPDC/Edgewood Senior Limited Partnership has pledged a commitment of 20% and CUA and the other partners are contributing 10% of the match. Pledges by each CPDC partner are included in their respective Letter of Support.
