
Excellence in Research and Education at the John A. Burns School of Medicine: A Tribute to Edwin Cadman's Vision

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Introduction

When Edwin Cadman came to the University of Hawaii (UH) in 1999 to serve as dean of the John A. Burns School of Medicine (JABSOM), he articulated a clear vision for its future. Dr. Cadman saw tremendous potential in our students, staff, faculty, and community. He envisioned JABSOM setting the standard for medical schools with an Asian-Pacific focus, and in doing so he inspired a collaborative approach to reaching new heights of accomplishment and productivity. Dr. Cadman wanted to build upon JABSOM's earned reputation for excellence in education and expand opportunities for biomedical research. He wanted to bring new advances in medicine and technology to Hawaii and the Pacific Basin, transforming JABSOM into a premiere research institution that could address the healthcare needs of the State's diverse communities not only by training primary care physicians but also by conducting culturally competent state-of-the-art research. Dr. Cadman encouraged community participation in numerous arenas, embracing the biotechnology industry and welcoming community engagement in research and education programs, never losing sight of his vision of improved healthcare for Hawaii's people. As soon as he arrived, Dr. Cadman designed a strategic plan for JABSOM and set out to achieve its objectives.

During the last several years, the medical school has experienced unprecedented growth in biomedical research programs while continuing to uphold standards of excellence in education and training. The recently completed \$150 million Biosciences Complex and medical school campus in Kaka'ako is merely one of the tangible achievements arising from Dr. Cadman's tenure as dean. Its offices, laboratories and space for biotechnology companies create an environment where world-class scientists and care givers can work together, integrating research, education, and community-based programs that directly benefit Hawaii's people. In addition to envisioning and working to see the new Kaka'ako campus built,

Dr. Cadman led the JABSOM faculty to new heights of productivity. Research grants and contracts increased 522% from 1999 through 2004. Annual dollars received increased from \$3.2 million to \$19.8 million (Figure 1). In 2003 and 2004, researchers obtained long-term grants totaling \$62 million. Moreover, the number of faculty at JABSOM has increased by 24% in the past five years (Table 1). Fifteen renowned scientists have joined JABSOM's faculty, bringing their established research programs, independent funding and stellar expertise, which has, in turn, attracted other distinguished faculty and promising students to the University. Several new academic departments have emerged, including the departments of Native Hawaiian Health, Complementary and Alternative Medicine, and Geriatric Medicine. Most importantly, Dr. Cadman invigorated JABSOM's research and educational activities, capitalizing on our strengths and enhancing our capacity to forge links in local communities and in the broader Asia-Pacific region. This paper seeks to provide a brief description of some of the areas of excellence in research and education that have continued to flourish under Dr. Cadman's tenure as JABSOM's dean.

Core Areas of Research Excellence

Part of JABSOM's strategic plan is to become one of the top 75 medical schools in the nation. Dr. Cadman recognized that in order to compete with other medical schools for this status, JABSOM needed to identify specific areas of research in which to excel. Working closely with leaders in research and education at JABSOM, Dr. Cadman prioritized target areas according to Hawaii's unique factors and community needs. JABSOM is the most ethnically diverse and geographically isolated medical school in the country. This factor alone gives rise to exciting opportunities for exploration of biomedical questions of immediate relevance to the Asia-Pacific region and its ethnically diverse populations.

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Given these factors and the needs of our communities, we have chosen to focus upon specific areas of excellence in order to distinguish JABSOM from other medical schools. Under Dr. Cadman's leadership, JABSOM has experienced dynamic, exponential growth within core research areas. These include health disparities, early human development and reproductive biology, tropical medicine and infectious diseases, neuroscience and behavior, geriatric medicine, mental health, genomics and proteomics, and biotechnology. Dr. Cadman also infused JABSOM's medical education and training programs with a renewed sense of vigor, integrating them with research activities and creating new possibilities for career development. The National Institutes of Health (NIH)-funded Research Centers in Minority Institutions (RCMI) Program and the Clinical Research Center (CRC), led by Drs. Richard Yanagihara and David Easa, respectively, provide vital infrastructure support for biomedical research activities throughout the university. By offering mentoring and career development guidance, salary support, laboratory space and research staff, assistance with protocol development and translational research design, the RCMI Program and CRC promote independent and collaborative research projects and foster advances that lead to improved patient care in specific areas. With Dr. Cadman's guidance and the fundamental support of the RCMI Program and the CRC, the following areas of emphasis have grown significantly at JABSOM over the last five years.

Health Disparities

For Dr. Cadman, reducing racial and ethnic health disparities, particularly among Native Hawaiians and other Pacific peoples, was fundamental to his vision of JABSOM's success. With the support of the Native Hawaiian community, Dr. Cadman established the Department of Native Hawaiian Health (DNHH), the first department in a U.S.-accredited medical school dedicated to the health of an indigenous people. JABSOM has since obtained substantial funding for research programs geared toward reducing health disparities related to diabetes, cardiovascular disease, oral health and cancer.

Dr. Marjorie Mau, professor and chair of the DNHH, heads the Hawaii EXPORT (EXcellence in Partnerships for Community Outreach, Research on Health Disparities and Training) Center, which seeks to eliminate health disparities in Native Hawaiians and other Pacific peoples. The center is currently funded to focus on diabetes-related disparities. It supports efforts to increase the number of qualified investigators and hypothesis-driven studies and improve dissemination of study data to communities. In addition, Dr. Mau and the Queen's Medical Center (QMC) have been awarded a \$6-million cardiovascular disparities partnership grant by the NIH's National Heart Lung

and Blood Institute (NHLBI). Through four research studies and two educational activities that will focus on heart failure disparities in Native Hawaiians and other Pacific peoples, Dr. Mau and her colleagues will increase JABSOM's capacity to conduct high quality cardiovascular research.

Complementing this partnership grant, JABSOM also recently obtained an NHLBI award (Principal Investigator (PI) – Easa) to recruit an experienced, independently-funded researcher in molecular cardiology. The magnet investigator will establish a cardiovascular health disparities research program and design and implement collaborative studies with researchers at community health centers. He or she will also assist with the creation of a cardiology fellowship program that will offer intensive laboratory research training for fellows and junior faculty.

JABSOM has also begun to focus upon reducing oral health disparities. Unfortunately, children in Hawaii suffer higher rates of dental caries than children on the mainland. Throughout the state, Asian and Pacific Islander children have poorer oral health than African-American, White, or Hispanic children. Indeed, most health indicators show a significant variance between regional and ethnic groups in Hawaii. In spite of the need for more data regarding the oral health status of Hawaii's communities, very few clinical faculty members at JABSOM possess the appropriate research experience and expertise. As a result, almost no oral health studies have been conducted. In 2001, with Dr. Cadman's encouragement and support, JABSOM faculty obtained a grant to build a research network by collaborating with the University of North Carolina at Chapel Hill School of Dentistry (UNC), one of the top dental schools in the country and a premiere oral health research institution. By offering expert guidance, UNC has trained JABSOM investigators to design and implement protocols and monitor field research in Hawaii. UNC investigators are working with JABSOM faculty to complete two research studies (PI – Easa, PI – Lynnae Millar) and have collaborated in the preparation of a substantial NIH proposal (PI – Harrigan), significantly enhancing our capacity to address the relatively poor oral health status of children and adults in Hawaii.

JABSOM is also extending its efforts to improve medical education, research, and capacity throughout the U.S. Associated Pacific Island Nations (USAPIN). These efforts stem from the Department of Family Medicine and Community Health, chaired by Dr. Neal Palafox. The department recently secured funding to improve the health care of uninsured and homeless patients on the island of Oahu. More broadly, a cooperative agreement with the Federal Health Resources and Services Administration (HRSA) supports a major four-year program to expand distance education in the Pacific. The NIH and U.S. Centers for Disease Control

and Prevention (CDC) currently funds the Pacific Cancer Initiative (Cancer Council of the Pacific) to prepare comprehensive cancer control plans for the USAPIN. In the Marshall Islands, the Department of Family Medicine and Community Health conducts diabetes research and helps obtain assistance from the U.S. Department of Energy for radiation-related illnesses resulting from nuclear testing.

In addition, Dr. Cadman appointed Dr. Kelly Withy to lead the Area Health Education Center (AHEC) in the conduct of research related to rural health disparities. AHEC seeks to increase recruitment of healthcare profession students from rural areas and send trained healthcare professionals to areas of need. Dr. Withy coordinates with the Hawaii Rural Health Association and Office of Rural Health to assess health needs in rural areas by using surveys, insurance data analysis and community meeting responses. Similarly, AHEC collaborates with several partners, including Papa Ola Lokahi, the Office of Rural Health, the Hawaii Medical Education Council, Center on Nursing, and State Health Planning and Development Association to form a Hawaii Health Workforce Collaborative that evaluates the demand for healthcare providers in Hawaii and proposes plans for meeting workforce needs across the state.

Given Hawaii's ethnically diverse population and the geographic isolation of the state, collaborative affiliations are vital to addressing health disparities. Dr. Cadman insisted upon expanding research partnerships with community health centers and research clinics, the Hawaii State Department of Health, and research institutes within and outside the university. This expansion involves strengthening ties between patient communities, community-based physicians, and academic researchers as well as promoting integration of existing research networks. It also includes efforts to harmonize clinical research regulatory processes and enhance clinical research workforce training. Meaningful community participation and cultural competency is integral to the success of our health disparities research efforts. To continue to build upon these partnerships, and to ensure that research efforts benefit the community, we will continue to invite broad community participation in JABSOM-affiliated research programs.

Early Human Development and Reproductive Biology

Unfortunately, Native Hawaiian and other Pacific-based Peoples also experience significant disparities in early development and reproductive health. To reduce these disparities, JABSOM has obtained an \$11 million NIH award to establish the Pacific Research Center in Early Human Development (PRCEHD). The center is built upon a partnership between JABSOM-affiliated entities, community education and health centers, and

the University of Utah Department of Obstetrics and Gynecology. The principal investigator, Dr. Kenneth Ward, is a nationally recognized perinatologist and geneticist who was recruited to JABSOM from the University of Utah, one of the top maternal and fetal research institutions in the country. By supporting junior investigators' projects and recruiting additional junior faculty, the center will increase the cadre of well-trained clinicians with skills in early human development research. In addition to establishing a database and specimen bank, the center will provide basic histology, immunohistochemistry, and pathology, as well as laser capture micro-dissection technology and advanced imaging techniques.

The PRCEHD involves collaboration with Kapiolani Medical Center for Women and Children as well as JABSOM's Institute for Biogenesis Research (IBR) and Laboratory of Molecular Endocrinology. IBR, presently under the leadership of Dr. Steven Ward, was founded on the research success of Dr. Ryuzo Yanagimachi, full professor and former director of the IBR. Dr. Yanagimachi has been a leader in the field of reproductive biology for over 40 years. He developed the biological principles of mammalian fertilization including sperm capacitation, the acrosome reaction, and the novel idea that mammalian spermatozoa and oocytes could fertilize *in vitro*. These discoveries led to his development of the techniques of mammalian *in vitro* fertilization and intracytoplasmic sperm injection. More recently, Dr. Yanagimachi developed the first replicable technique for mammalian cloning. The Laboratory of Molecular Endocrinology, led by Dr. Gillian Bryant-Greenwood, emphasizes molecular and cellular biology of preterm birth, particularly preterm premature rupture of the fetal membranes. Both IBR and the Laboratory of Molecular Endocrinology will contribute their unique expertise in the process of designing and implementing collaborative studies with the PRCEHD.

Tropical Medicine and Infectious Diseases

Infectious diseases and their economic repercussions are currently one of the gravest problems facing Asia and the Pacific. In particular, "old diseases," such as dengue and dengue hemorrhagic fever, epidemic polyarthritis, Japanese encephalitis, malaria, cholera, tuberculosis, plague and influenza, have repeatedly wreaked havoc in the region, severely taxing the public health infrastructure and weakening the economy. Moreover, the emergence of newly recognized pathogens such as human immunodeficiency virus, Nipah virus, Hendra virus, SARS corona virus and avian influenza virus, all of which are zoonotic viruses that have "jumped species," have caused major epidemics in recent years, resulting in significant loss of human life and devastating economic consequences worldwide.

Major global public health emergencies in the past ten years have originated in Asia; these include plague in India in 1994, Hong Kong flu in 1997, Nipah encephalitis in 1999, SARS in 2003, and avian influenza in 2004. This disturbing trend necessitates the establishment of programs to monitor and treat infectious diseases using the most modern laboratory, epidemiologic and information technology. Given its strategic location as the gateway to Asia and the Pacific Islands and its strong ties to countries in the region, the University of Hawaii is uniquely poised to develop such programs. Collectively, research and training programs in tropical medicine, public health, microbiology and immunology provide a platform on which to build a world-class institute for tropical medicine and infectious diseases. Dr. Cadman recently recruited Dr. Duane Gubler, an infectious disease specialist, to work with Dr. Yanagihara and other colleagues in this area. The overall plan is to build a balanced, transdisciplinary research program that emphasizes basic, translational, and field research on microbial diseases of public health importance in the Asia-Pacific region. The new Asia-Pacific Institute of Tropical Medicine and Infectious Diseases (APITMID or Institute) at the Kaka'ako campus will serve as a catalyst to development of new strategies to combat infectious disease throughout the region.

By encouraging collaboration between the faculties of JABSOM, the Cancer Research Center of Hawaii, the Pacific Biosciences Research Center, the College of Natural Sciences, the College of Engineering, the College of Social Sciences, and the School of Earth Science and Technology, the APITMID will represent a university-wide initiative. The Institute will also conduct research projects in partnership with the Hawaii State Department of Health, Department of Defense, and the biotech industry in Hawaii, ensuring that local communities derive direct benefit from scientific advances. Extending beyond Hawaii, the Institute's projects will involve collaboration with institutions from throughout Asia and the Pacific. Building capacity to monitor disease with the latest technology and developing early warning systems to prevent transmission is one of the primary goals of the Institute, particularly in countries where diseases commonly occur. Syndromic surveillance and pathogen discovery programs, for example, will be set up to monitor both old and new diseases in the Asia-Pacific region. Data collected will then be used to develop effective prevention and control strategies. With strong institutional commitment, the convergence of interdisciplinary expertise, and the involvement of established programs and funded investigators, the APITMID will be geared toward sustaining a high level of research funding. Ideally, the Institute will emerge as a world-renowned center of research excellence for the study of tropical medicine and infectious diseases in the Asia-Pacific region.

Neuroscience and Behavior

With rapid advances in imaging technology, neuroscience offers more and more sophisticated means of assessing the effects of aging, substance abuse, emotion, cognition, and behavior on human health and disease. This is particularly important in Hawaii given the typically long lifespan of our diverse population and an increasing rate of methamphetamine use affecting adults, adolescents, and newborns. Neuroscience has been a largely "hidden" discipline at the University of Hawaii, despite the gradual increase in research activity on behalf of individual faculty members in distinct departments within and outside the medical school. Dr. Cadman has been instrumental in bringing neuroscience to light at JABSOM, offering institutional support, recruiting new faculty, and coordinating neurosciences research efforts. Two grants recently awarded by the National Institute of Neurological Diseases and Stroke have moved neuroscience to the forefront of JABSOM's research agenda. The first, the Specialized Neuroscience Research Program (SNRP) award, was funded through the Pacific Biomedical Research Center in 1999 (PI – Martin Rayner) and renewed through JABSOM in 2004 (PI – Joachim Spiess). This award led to a second SNRP award in Neuro-AIDS research in 2001 (PI – Cecilia Shikuma) to complement the HIV clinical research network program also led by Dr. Cecilia Shikuma. Together these awards currently generate more than \$22 million for UH to develop capacity in neurosciences research. We hope to establish a Department of Neuroscience at JABSOM by 2010. The department will serve as a springboard for the next generation of promising graduates, and will propel efforts to recruit faculty with special expertise in areas such as the cellular and molecular basis of human behavior, epidemiology and pathophysiology of stroke, and advanced neuroimaging techniques to investigate the effects of HIV/AIDS and substance abuse on the brain. Esteemed scientists, including Dr. Joachim Spiess from the Max Planck Institute for Experimental Medicine, and Drs. Thomas Ernst and Linda Chang from Brookhaven National Labs, have recently joined JABSOM faculty, raising the level of specialized expertise in this burgeoning field.

Department of Geriatric Medicine

As middle-aged and older people live healthier lives, the population is aging. The fastest growing segment of the population in the United States is over age 85. This demographic imperative is resulting in dramatic societal changes, including the practice of medicine. The American Association of Medical Colleges estimates that 75% of today's medical students will have a significant proportion of older people in their practices, regardless of specialty, and recommends strongly that medical schools have administrative units to provide leadership in geriatrics. In 1984, Dean

Terence A. Rogers was one of the first to recognize this need, and established the school's Geriatric Medicine Program in the dean's office to facilitate cross-departmental collaboration and to nurture the program's growth over time. By 2001, the program had grown substantially to include medical student education, a nationally-recognized Geriatric Medicine fellowship training program, significant extramurally funded research, interdisciplinary geriatric education and extensive community service. The program was also collaborating across departments, most notably with the department of Medicine, Family Medicine, Psychiatry and Obstetrics and Gynecology for their geriatrics training needs. At the beginning of his tenure, Dean Edwin Cadman reflected that the dean's office geriatrics program was one of the strongest in the school and needed to be graduated into full Board of Regents approved department status, which occurred officially in 2004. The Department became the fourth in the country among over 125 medical schools.

The dean's commitment to the Geriatrics Department caught the attention of several major national foundations. As a result, Dean Cadman helped obtain the required matching funds for a highly competitive grant initiative in geriatrics curriculum development, further propelling the department into the national spotlight. Moreover, Dean Cadman's directive to broaden the school's financial base by expanding the school's faculty practice plan was the prime motivation for the development or expansion of the new department's teaching clinical services. These well-received new services were designed to fill pressing community needs in geriatric care and consultation. They also expand the school's teaching sites for medical students, residents and fellows. In summary, Dean Cadman was quick to recognize excellence and the potential contribution of the Department of Geriatric Medicine under the competent leadership of Dr. Patricia Blanchette to JABSOM's future.

Mental Health

Mental health status affects nearly all areas of human functioning. Mental health research presents unique challenges given the stigma of mental illness, particularly in some Asian and Pacific Islander cultures. Epidemiologic studies have demonstrated that one in every two individuals in the United States will meet criteria for a psychiatric disorder within their lifetime, underscoring the importance of further research in this area. With the support of Dr. Cadman the Department of Psychiatry, under the leadership of Chair Dr. Naleen Andrade, has made significant progress in the past five years. Prominent researchers in the Department of Psychiatry include Drs. Earl Hishinuma, William Haning and Deborah Goebert. The department has established the National Center on Indigenous Hawaiian Behavioral Health, the Pacific

People's Mental Health Research Support Program, the Pacific Addiction Research Center, the Alcohol Research Center of Hawaii and Methamphetamine Clinical Trials Group, the Asian/Pacific Islander Youth Violence Prevention Center, and Hawaii AIDS Education and Training Center. These programs have led to research breakthroughs and scientific advancement, including first-ever psychiatric prevalence rates for Native Hawaiians and other ethnic groups in Hawaii, development of risk and protective models for mental health for Asians and Pacific Islanders, medication treatments for substance abuse and dependence, and culturally appropriate HIV/AIDS education and training for Pacific Islanders. More than \$13 million has been acquired from the CDC, National Institute of Mental Health, National Institute of Alcohol Abuse and Alcoholism, National Institute of Drug Abuse, and Health Resources and Services Administration. The Department of Psychiatry also collaborates with other investigators who have obtained over \$15 million in federal funds.

Genomics and Proteomics

The field of genomics, the determination of complete DNA sequences of genomes, has generated far more questions than answers. Scientists ponder, for example, how the complexity of biological systems such as the human organism can be determined by as few as 20,000 genes, how gene expression can be orchestrated to generate appropriate panels of proteins at the correct times and locations within an organism, and how proteins assemble into the complex machinery that forms the basis of life. The field of proteomics, or the analysis of the complete protein content of a given cell, tissue or organism, has emerged as the next great technical challenge in unraveling the mysteries of biology. Just as high-throughput DNA sequence determination was the basis for a revolution in genomics, automated protein fractionation and identification is providing insights into early diagnostic markers for diseases and individual responsiveness to potential therapeutics, offering the exciting promise of prevention and treatment regimes specifically tailored to individual patients.

It has become clear that state-of-the-art proteomics research capability is essential to the success of any aspiring biomedical research



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institute. Dr. Cadman contemplated development of a proteomics institute in the new Kaka'ako campus, and approximately 2000 sq. feet of laboratory space has been designated for this purpose. More space will be created in future buildings. Faculty recruitment designed to draw investigators with expertise in proteomics, genomics and bioinformatics is part of JABSOM's strategic plan to support genomic and proteomic advances at the institution. The open floor plan of the new campus was specifically designed to foster collaboration among research programs, and as new scientists join our faculty, they will be quickly integrated into existing study teams.

Biotechnology

To support each of the above areas of research excellence, Dr. Cadman utilized an innovative approach to tapping into new advances in biotechnology. Dr. Cadman was convinced that a research-intensive medical school would attract the biotechnology industry, since technology and scientific discovery create vibrant synergy. He had the foresight to recognize that by expanding its faculty and research focus, the medical school could help diversify and strengthen Hawaii's economy. The new Kaka'ako campus would serve as a focal point, and together, the academy and the biotechnology industry would discover new pathways to research excellence. For example, Dr. Cadman envisaged that the Kaka'ako campus, with its laboratories, conference rooms, auditorium, and medical library could be made available to the broader biomedical community. Research space adjacent to the campus is currently available for lease, facilitating public-private sector partnerships and interdisciplinary collaborations. The estimated annual revenue from medical school research could reach \$80 million. Private sector research revenue could be as high as \$125 million. Indeed, it is likely that the Biosciences Complex at Kaka'ako will become self-sustaining, providing hundreds of jobs and generating significant income for the state.

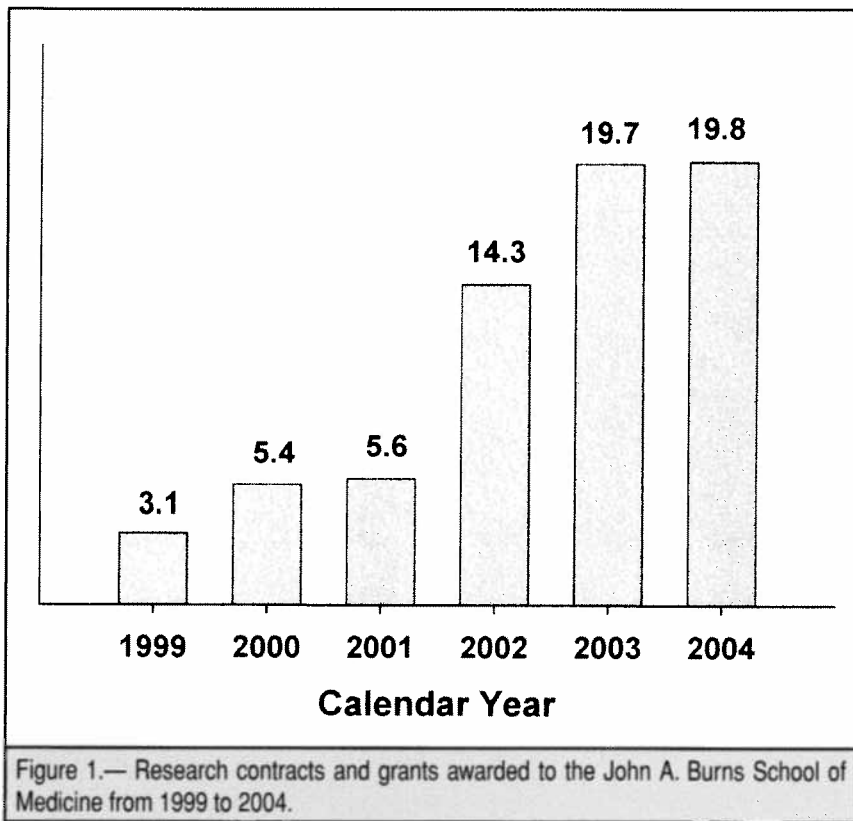
Medical Education and Training

JABSOM has earned an international reputation for offering innovative medical education. In 1989, the medical school implemented a problem-based learning curriculum based on the model developed at McMaster University in Canada. This was seen, and is perhaps still viewed, as a bold move away from the traditional passive, lecture-centered model for educating medical students. Problem-based learning emphasizes clinically-oriented, collaborative, student-centered, active learning methods, and is designed to help students acquire skills required for lifelong learning. The adoption of problem-based learning reflects more than just a change in curriculum structure. It also represents a genuinely progressive shift

in the educational philosophy of the medical school. In addition to problem-based learning, JABSOM also has successfully implemented a number of educational innovations including interdisciplinary community-based training, the use of role play for teaching and evaluation, the early introduction of students to clinical learning experiences to add meaning to their classroom studies, service-based learning activities designed to teach social responsibility and an awareness of community need, and a longitudinal clinical clerkship option that places students in various communities across the state. Based on its proven success, leaders from health professional schools around the world seek consultation with JABSOM representatives as they design their curricula.

JABSOM is fully committed to continuing our tradition of educational innovation in the coming years. Applications for novel technologies such as mannequin-based simulations, three-dimensional virtual reality learning experiences, multimedia applications of problem-based learning, and web-based or distance education opportunities are currently in progress. JABSOM is also designing curricula in non-traditional disciplines such as behavioral and social sciences, bioterrorism, education, palliative and end-of-life care, complementary and alternative medicine, and cultural competency. To maintain our position as a leader in medical education, JABSOM also continues to explore new techniques in problem-based learning, case design, and applying problem-based learning to interdisciplinary and clinical learning contexts. For example, the newly funded Clinical Research Education and Career Development (CRECD) in Minority Institutions program has enabled us to establish a Master of Science in Clinical Research at JABSOM. The Master's program provides intensive training for doctoral and postdoctoral candidates in order to increase the number of clinical researchers. In addition to offering knowledge and skills needed to pursue careers in clinical research, the Master's program functions as a supportive mechanism for newly trained investigators, actively facilitating career development and encouraging collaborations, particularly those related to health disparities research. JABSOM has also obtained funding to offer an Interdisciplinary PhD in Clinical Research, providing Master's students and other candidates the opportunity to obtain a doctoral degree. JABSOM is also considering expansion of post-graduate training opportunities into rural areas and offering training alternatives in several additional clinical specialties.

To enhance educational offerings at JABSOM, Dr. Cadman encouraged the development of collaborative partnerships with outside institutions. The Pacific Health Research Institute, for example, directed by Dr. David Curb, offers significant expertise by partnering in both research and educational efforts at JABSOM.



Community hospitals, including The Queen's Medical Center, Tripler Army Medical Center and Honolulu Veterans Affairs Medical Center, Kuakini Medical Center, St. Francis Medical Center, Kaiser Permanente, Straub Clinic, and Kapiolani Medical Center for Women and Children each provide unique education and training opportunities for our medical students and faculty. The University of Utah, University of North Carolina at Chapel Hill School of Dentistry, University of California at San Francisco, Tuskegee Institute, and Medstar Research Institute are among the many renowned institutions engaged in active collaborations with JABSOM programs. In addition, external advisory committee members for

various grants and programs offer a diverse range of experience and expertise that contribute to higher standards of medical education and training as well as research activity. Distinguished external advisory committee members participating in JABSOM-affiliated programs hail from prominent universities across the country, sharing their skills and knowledge with our dedicated faculty and students.

Conclusion

As illustrated by advances in each of the above areas, Dr. Cadman built upon the foundation of strength offered by existing programs and sought creative, collaborative approaches to overcoming challenges in biomedical research and education. Dr. Cadman once expressed, "journeys are not straight lines; the road to success has many curves and stops . . . never be too stubborn to turn back and find another path." By forging a path sparked by his vision and inspired by his humble wit, we now have an undeniable sense of marching, step by step, down a path to unbridled success. Reflecting his sense of integrity and thoughtful planning, Dr. Cadman selected highly respected individuals to continue to lead the way. Interim Dean, Dr. Shomaker, for example, has played an integral role in the design and implementation of JABSOM's strategic plan over the last five years. He shares Dr. Cadman's wholehearted commitment to JABSOM's success. Dr. Shomaker is working closely with Dr. Cadman and our esteemed department chairs and faculty to continue to uphold standards of excellence in research and education as we transition to the next step on our journey. It is our hope that in so doing, we will contribute to fulfilling Dr. Cadman's clear vision of a healthy Hawaii.

Number of Faculty	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	Change Number	Percent
Full-time basic science	46	37	40	49	54	69	23	50%
Full-time clinical	135	107	128	155	167	156	21	16%
Total full time	181	144	168	204	221	225	44	24%
Part-time basic science	10	11	12	20	17	28	18	180%
Part-time clinical	126	152	158	197	206	207	81	64%
Total part-time	136	163	170	217	223	235	99	73%
Total compensated faculty	317	307	338	421	444	460	143	45%
Total volunteer clinical faculty	1,243	1,214	1,159	1,149	1,221	1,221	-22	-2%
Grand total	1,560	1,521	1,497	1,570	1,665	1,681	121	8%