

UNIVERSITY OF HOUSTON
College of Medicine Report

January 2018

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University of Houston College of Medicine Report

INTRODUCTION

In Fall 2014, Chancellor Renu Khator announced that the University of Houston (UH) would explore pursuit of a medical school adding to established UH healthcare-related programs already serving the Houston region and the state of Texas. Dr. Khator stated in that address to the UH community her vision to establish “...down the road, a primary care, community-based medical school.” In concurrence with a recommendation by the UH Health Workgroup, she further vowed to “...not duplicate anything currently available in Houston, but to build upon it and focus entirely on community-based research and training.”

In January 2015, the University of Houston retained Tripp Umbach¹, in association with Dr. Jack Brose and Sharon B. Zimmerman to determine the feasibility of various options for establishing a medical school and impact of such a program on the community.

The Tripp Umbach consulting firm study was designed to allow the University of Houston to better understand the need, the benefits and the economic impact of a four-year college of medicine. The study highlighted how the health care industry is undergoing transformative change due to many factors and highlighted the current healthcare environment.

These factors include unsustainable increases in costs, an aging patient and physician population, a primary care provider shortage, and the need to shift from a medical education and health care delivery system focused on providing episodic care to one designed to prevent and manage disease. The future of health care requires that patients, providers, academic institutions, community organizations, and industry work together in innovative ways to provide high-quality care with better outcomes at lower costs.

The study noted the shortage of physicians across the country. This problem is particularly acute in Texas, as it lags well behind all but a handful of states in terms of physicians per capita and most critically, primary care physicians. The state of Texas has 190.8 active patient care physicians per 100,000 population, compared to the U.S. national average of 234.7, ranking 42nd out of 50 states on this ratio; Texas would need 11,838 additional active patient care physicians to achieve the national average active patient care physician to population ratio today. The state of Texas has 65.1 active patient care primary care physicians per 100,000 population, compared to the U.S. national average of 82.5, ranking 47th out of 50 states on this ratio; Texas would need 4,686 additional active patient care primary care physicians to achieve the national average active patient care primary care physician to population ratio today.²

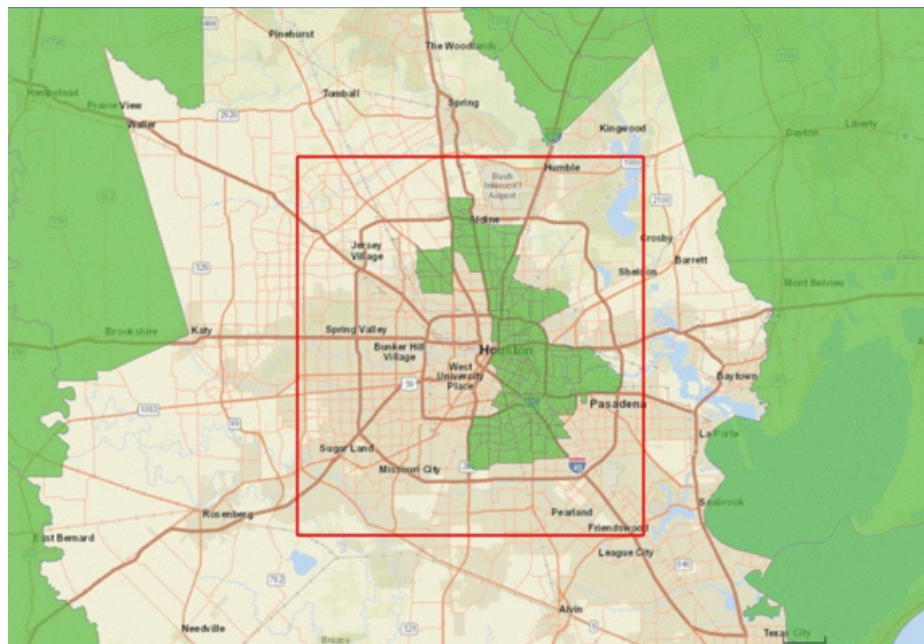
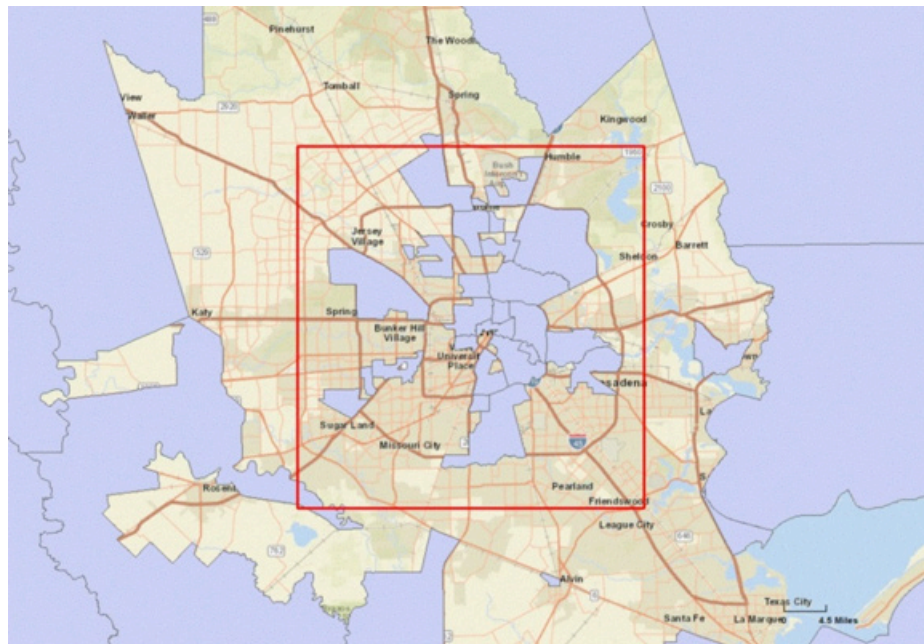
¹Tripp Umbach is the national leader in conducting feasibility analysis and economic impact studies for existing academic medical campuses as well as new or expanded medical schools.

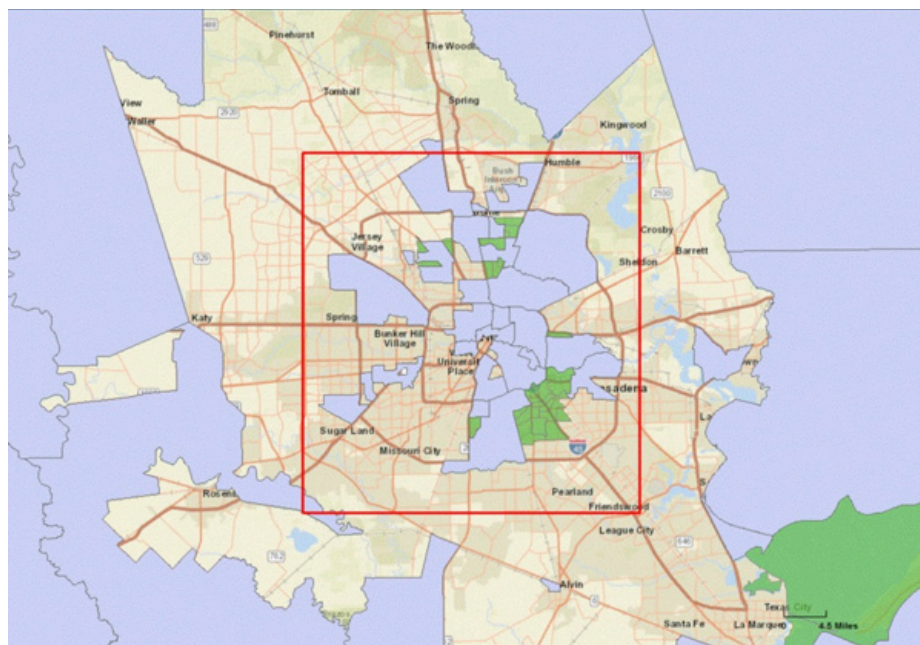
² 2015 State Physician Workforce Data Book. AAMC Center for Workforce Studies. <https://www.aamc.org/data/workforce/reports/442830/statedataandreports.html>. Accessed 1/5/17

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This specific need for primary care physicians permeates both rural and urban areas of Texas, including the underserved areas of the Houston metro. A significant number of Texas counties continue to be classified as Medically Underserved Areas (MUAs)/Populations (MUPs) and Primary Care Health Professional Shortage Areas (HPSAs). Even large urban counties like Harris County, which is home to the Texas Medical Center, the largest medical center in the world, continue to have geographic communities that are classified as medically underserved and suffering from a shortage of primary care health professionals in their communities.

The following figures illustrate the geographical location of Medically Underserved Areas (MUAs) (top panel, purple), Primary Care Health Professional Shortage Areas (HPSAs) (bottom panel, green) and their co-localization (next page) in the Houston Metro area.





Source: Health Resources & Services Administration (HRSA) Data Warehouse and Mapping Tool

This figure illustrates that the Health Resources & Services Administration (HRSA) has classified a large portion of the Houston Metro within Beltway 8 as Medically Underserved Areas (MUAs). Virtually all of this area geographically coincides with Primary Care Health Professional Shortage Areas (HPSAs). For example, there are a total of 19 medically underserved areas (MUAs) located within the geographical area bounded by the red box (above), with 5 distinct medically underserved populations (MUAs) being identified within the same geographical region. In addition, the same geographical area currently has a total of 68 HPSAs, 39 of which have been classified as High Needs areas.

Analysis of publicly available 2016 National Resident Matching Program (NRMP) data indicates that the shortage of primary care residents currently practicing in Texas may only get worse, especially if the majority of future Texas primary care physicians are expected to be graduates of Texas medical schools. For example, in 2016 only 20% approximately of all Texas medical school graduates selected residencies in primary care specialties.

Notably, there have been no new medical schools in Houston since 1972 despite significant population growth. This need for primary care physicians permeates both rural and urban areas of Texas, including the underserved areas of the Houston metropolis. The deficit is fueled by a growing and aging population, an aging physician workforce, as well as increased access to healthcare as a result of the Affordable Care Act. For a variety of reasons, the trend among medical students (both nationally and in Texas) is to pursue more lucrative specialties than a primary care practice, thus exacerbating this shortage. The consulting firm study found that in part because of its long history of involvement with programs related to health professions and health sciences, UH recognizes this critical unmet need, and could address it through the creation of the new College of Medicine embracing a community-based model and a primary care focus. The community-based College of Medicine would feature an innovative curriculum focused on primary care, community and population health, behavioral and mental health and the care of communities with significant health and healthcare disparities.

The study recognized that the Houston region is unique in its ability to address these challenges. The University of Houston is a Carnegie-designated Tier One research institution, centered just a few miles from the Texas Medical Center, the largest and most advanced health care system in the world. In addition, there are two

other medical schools in the city and more throughout the state where collaboration and partnerships could be established to meet the health care demands of the region and beyond. The University of Houston has an enormous opportunity and potential to leverage these advantages, shaping the future of health care through the development of a unique medical education enterprise.

The Chancellor accepted this study, to further explore the possibility of creating a new College of Medicine, and UH hired Dr. Steve Spann as Planning Dean in September, 2015. In the fall of 2015, the Chancellor also established a cross disciplinary Internal Advisory Committee (“Committee”) (Appendix A) to provide advice and to serve as an institutional audience for the planning process. Dr. Spann’s role has been to work on a case document and develop a business and finance plan, as well as a broad curricular framework for the College of Medicine. This working group studied and visited multiple exemplary newly-formed College of Medicines across the country so they could bring back knowledge and ideas for what could be the best design for a College of Medicine at UH. In addition, this working group engaged the team of MGT of America Consulting, LLC (national higher education consultants) and NBBJ (architects and planners) to assist them in developing the Business Plan (“Plan”) in June 2016. This Plan was a step in the process to develop a pro forma budget for the first 10 years of operation of the school as required by the Liaison Committee on Medical Education (LCME) for preliminary accreditation.

In 2017, the Texas legislature asked the University of Houston to “conduct a study on the need for an additional medical school in Houston that prepares students for primary care in urban and rural communities.” This action has provided UH the opportunity to bring together all the work and studies to present what it believes is a solid report on how a UH College of Medicine could provide needed primary care physicians to fill a real gap for the State of Texas.

In evaluating the tremendous work of the Committee and Planning Dean, it is clear that they have provided a proposal for a UH College of Medicine that would stay true to the UH mission.

The following summarizes a proposal for the UH College of Medicine.

MISSION

The UH College of Medicine will be accountable for improving the overall health and healthcare of the population of not only Greater Houston but also other urban and rural areas of Texas that face significant doctor shortages by:

- ▶ Educating a diverse group of physicians who will provide compassionate, high-value (high quality at reasonable cost) care to patients, families and communities, with a focus on primary care and other needed physician specialties, such as psychiatry and general surgery.
- ▶ Conducting interdisciplinary research to find innovative solutions to problems in health and healthcare.
- ▶ Providing integrated, evidence-based, high-value care delivered to patients by inter-professional teams.
- ▶ Engaging, collaborating with, and empowering patient populations and community partners to improve their health and healthcare.

VISION

By 2030, the UH College of Medicine will be recognized nationally for:

- ▶ Educating physicians who have a deep understanding of the social determinants of health, health disparities, and how to work with communities to improve their health and healthcare.
- ▶ Educating physicians who are experts in providing high-value healthcare, managing the health of patient populations, and continuously improving healthcare delivery.
- ▶ Graduating physicians who choose to practice primary care and other needed physician specialties in underserved (urban or rural) communities.
- ▶ Educating physicians who are underrepresented minorities in medicine, beginning with K-12 and college pre-medical ethnically and socioeconomically diverse “pipeline” programs.
- ▶ Conducting high impact, interdisciplinary research that contributes to improving health and healthcare, capitalizing on the breadth of talent and expertise present across our Tier One research university.
- ▶ Providing inter-professional team-based care to patients in surrounding underserved communities and beyond that is integrated, evidence-based, safe, and of measurable high value.
- ▶ Engaging, collaborating with, and empowering patient populations and community partners to achieve measurable improvements in health and healthcare.
- ▶ Contributing to measurable improvements in the health of the underserved populations in surrounding geographic communities that are currently socioeconomically disadvantaged and have significant health disparities.

GUIDING PRINCIPLES

Through the work of the Planning Dean and the Internal Advisory Committee, a value proposition for the new UH College of Medicine emerged around three key guiding principles:

- ▶ The college will educate physicians who will deliver high-value (high quality at reasonable cost) healthcare.
- ▶ The college will strive to educate physicians who will choose to practice primary care medicine, and other needed medical specialties, such as psychiatry and general surgery.
- ▶ The college will educate physicians who will be experts in working with communities with significant health disparities to improve the health of their populations.

COMMUNITY-BASED MODEL

The trend in medical education over the past several decades has been to train students in community settings rather than university teaching hospitals. This approach exposes students to the full spectrum of health issues, and is proving to be significantly more flexible and responsive than the traditional model focused entirely on a single, insular academic medical center. A central premise is that new physicians should be trained in the types of

environments in which they will practice. In addition to a superior learning environment, this emerging model for medical education is much more efficient in terms of both capital and operating costs.

In response to the changes in healthcare delivery over the last few decades, innovative approaches to medical education have been developed that are:

- ▶ Community-based – where the medical school uses existing community hospitals and clinics for clinical training. The medical school’s clinical faculty are typically located there, along with community faculty. The ownership of the hospital is not under the control of the school. Increasingly, community-based medical education programs are using community physicians as faculty.
- ▶ Ambulatory – where the medical student and their mentors work in an outpatient environment. This can include but is not limited to patients in the hospital who do not stay overnight, ambulatory clinics, and doctor’s offices.

Today, new medical schools are successfully training students in diverse community settings, where most of the patients reside. The students see patients all along the continuum of health to disease in doctors’ offices, clinics, hospitals, and in all the settings where healthcare takes place. Research has shown that these students are much more likely to practice in settings outside of academic health centers than students trained in the high-tech settings of tertiary and quaternary care.

This new model, like the traditional model for delivery of undergraduate medical education (UME), must pass through the rigorous five-step accreditation process established by the Liaison Committee on Medical Education (LCME).

New Model of Medical Education

- ▶ New curriculum incorporating community based healthcare
- ▶ Patient-centered care teams involving first-year students
- ▶ Managing patient populations that are considered at risk

Key Outcomes:

- ▶ Higher quality care
- ▶ Personalized medicine
- ▶ Better care decisions
- ▶ Patient-empowered care
- ▶ More efficient health care delivery
- ▶ A pipeline of primary care physicians serving the rural and urban underserved of Texas

Throughout its 90 year history, the University of Houston has not only remained true to its mission, but also expanded its mission over the years. The new College of Medicine would further the University of Houston System’s mission of serving people through access, high-quality care, medical research and education. The College of Medicine will also provide the University of Houston with the opportunity to be a leader in

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transforming medical education through a primary care curriculum that will provide inter-professional team-based clinical education, while also leveraging research opportunities for faculty and medical students at a Carnegie-named Tier One, world-class research institution. The new College of Medicine will strengthen the University of Houston's ability to broaden its partnerships and advance the health of the population in the region, the state and beyond.

It is anticipated that opportunities for interdisciplinary collaboration for existing UH faculty and staff and those of the new College of Medicine will be available and encouraged. As noted in other medical schools, such collaborations might include:

- ▶ Existing UH faculty participating in some teaching assignments within the College of Medicine, and College of Medicine faculty who might have joint appointments within other University departments.
- ▶ College of Medicine faculty serving on graduate committees in other disciplines.
- ▶ Attracting new high-performing research faculty.
- ▶ Attracting interdisciplinary research contract and grant dollars, which may involve sharing of specialized research facilities and equipment.
- ▶ Participating in interdisciplinary innovative activities which could benefit the University community, the greater Houston region and the state of Texas.

Clinical partners are an essential component of a community-based model. The Greater Houston Area enjoys the presence of several large and excellent health systems. Despite the current existence of two medical schools in Houston, there is ample clinical teaching capacity within the current healthcare systems to accommodate additional medical students and residents from a third medical school. A number of healthcare systems have capacity and have expressed an openness to developing clinical affiliation agreements, including teaching students at a new UH College of Medicine. (See also the discussion of Residency Partners.)

Through its partnerships, the University of Houston will follow national best practices in access to care, clinical services for the underserved, and in the development of better preventive medicine protocols and population health management capabilities.

The University of Houston will develop teaching methods based on a team-based fully integrated community health care model with a medical school, community health clinics, and inter-disciplinary fully integrated hospitals in a comprehensive university setting.

The UH College of Medicine along with its research partners, will be the springboard for future economic development and research in the Houston area and the State of Texas.

As a major employer in the Houston community, it is critical that the University of Houston maintains its ability to be a national leader in research, provide expanding opportunities to change lives while being a catalyst within its own community.

The new College of Medicine is seen as important to the University's ability to contribute to the economic development of the region and state. The new College of Medicine will enhance the University's ability to attract and retain faculty, to secure and increase research funding and to conduct translational research that transforms knowledge and creativity into economic growth for the state.

The well-being and quality-of-life of the University will be improved through the development of the new College of Medicine. A wider array of health services and future cutting-edge clinical trials will improve the health care options of the University's employees and the larger community.

Ultimately the new College of Medicine will allow the University of Houston to strengthen its competitive position among its aspirational peers. In addition, the new College of Medicine will allow the University of Houston to continue its commitment to diversity, to embracing change, and to being a strong community partner in serving the region and impacting the world.

Increased partnership and collaborative opportunities will also allow for additional National Institutes of Health funding potential for the University and the state overall. Ultimately, the new College of Medicine will provide an opportunity to transform the state's medical education system with its own unique focus and purpose.

CURRICULUM DEVELOPMENT

A broad curriculum framework for the UH College of Medicine was developed by the Internal Advisory Committee with the Planning Dean. A set of differentiating features have been identified to guide that effort:

- ▶ Curriculum emphasis on community and population health, primary care, behavioral and mental health, and preventive medicine.
- ▶ Highly integrated teaching of biomedical, clinical, behavioral and social, and health system and population health sciences throughout the four-year curriculum.
- ▶ Emphasis on inter-professional education and training.
- ▶ Adaptive education approach.
- ▶ Longitudinal primary care experience across the four-year curriculum.
- ▶ Longitudinal integrated core clinical clerkship.
- ▶ Emphasis on learning about social determinants of health and health disparities.
- ▶ Participation in an inter-professional student team providing household-centered care to a family living in an underserved community throughout the four years of the curriculum.
- ▶ Learning about engagement and partnership with communities to improve their health and healthcare through service learning.
- ▶ Emphasis on learning the health system and population health sciences.

The UH College of Medicine curriculum will focus on the areas of Biomedical Sciences, Clinical Sciences, Behavioral and Social Sciences, and Health System and Population Health Sciences, and the academic departmental structure will reflect this, containing four departments with these respective names.

Because of the high prevalence of behavioral and mental health issues in the population and in patients cared for by physicians in all specialties, there will be a strong curricular emphasis on behavioral and mental health. And because of the significant need to increase the number of physicians practicing in rural Texas, the curriculum will require every medical student to participate in a four week clinical learning experience in rural Texas.

CURRICULUM LENGTH, TERMINAL DEGREE, AND EDUCATIONAL APPROACH

- ▶ A four-year, broad-based curriculum integrating the biomedical, clinical, behavioral and social, and health system and population health sciences, emphasizing community and population health, primary care, behavioral and mental health, and preventive medicine, leading to a Doctor of Medicine (M.D.) degree.
- ▶ Students will have opportunities to gain additional expertise through concentrated study in a number of areas such as primary care, community health, population health, global health, health informatics, healthcare administration, health policy, and biomedical ethics; or obtain an additional master's degree in business, health informatics, public health or public policy, during a fifth year of education in conjunction with other UH colleges or other institutions of higher learning in the Greater Houston area.
- ▶ Students will be encouraged to participate in research and scientific discovery, and opportunities will be available within the medical school and across the broader university community.
- ▶ "Pipeline" programs will be developed with area middle schools, high schools, and colleges in order to attract and admit minority students who are under-represented in medicine. A post-baccalaureate program leading to a master's degree in biomedical sciences will be developed on the foundation of the UH Honors pre-medical program to assist students who may need additional academic preparation in order to gain acceptance into medical school.
- ▶ The medical school's educational approach will be adaptive to learner needs and learning styles, and the curriculum will be adaptive to changes in the healthcare system and the medical profession.
- ▶ There will be a strong emphasis on inter-professional education and training, with the goal of educating healthcare professionals who will be adept at working together in inter-professional teams. This will include students from UH colleges of medicine, nursing, pharmacy, optometry, social work, education, liberal arts and social sciences, and law. Joint educational activities will include didactic courses, simulations, patient care in clinical settings and service learning opportunities involving community engagement and partnership to improve the health of communities.
- ▶ Innovative and best practice teaching methods will be utilized, including problem-based, case-based, and team-based learning, "flipped classroom," clinical simulation including the use of standardized patients, virtual reality, telemedicine, and service learning.

BIOMEDICAL SCIENCES CURRICULUM

- ▶ The teaching of the biomedical sciences will be concentrated in the first 19 months of the curriculum, but biomedical sciences concepts will be reinforced and amplified during the remaining months of the curriculum that are more clinically focused.
- ▶ The biomedical sciences will be taught within the context of their relevance to clinical practice; utilizing clinical correlations and clinical problem solving through problem-, case-, and team-based learning exercises. Clinician faculty will join biomedical sciences faculty as co-teachers in this part of curriculum.
- ▶ The biomedical sciences will be taught using an integrated body system approach, as opposed to a discipline-based approach. An initial Scientific Foundations of Medicine course (molecular and cell

biology, metabolic pathways, genomics, pharmacokinetics, and pathobiology) will be followed by an Integrated Medical Sciences course with system-specific blocks (musculoskeletal/skin, hematopoietic, cardiovascular, pulmonary, renal/genitourinary, gastrointestinal and nutrition, endocrine/metabolic/reproductive, and brain and behavior). The timing of clinical skills teaching will be coordinated with the body systems teaching in the biomedical sciences curriculum.

CLINICAL SCIENCES CURRICULUM

- ▶ The teaching of clinical sciences will begin on “day one” of the curriculum; students will be exposed to the care of patients in the community-based primary care setting as part of the clinical skills course and longitudinal primary care clerkship experience.
- ▶ The clinical sciences curriculum will utilize clinical simulation and standardized patients to teach fundamental principles of clinical care.
- ▶ The biomedical sciences will be taught within the context of their application to clinical medicine, with significant utilization of clinical correlations and clinical problem solving exercises, including a review of the scientific evidence in current biomedical literature.
- ▶ In lieu of a traditional block core clinical clerkship approach to teaching the clinical sciences, the curriculum will combine a longitudinal integrated core clinical clerkship with short hospital-based clinical rotations in internal medicine, surgery, obstetrics, and neonatology, and a required 4-week clerkship in rural health. The longitudinal integrated clinical clerkship will involve spending time each week with an internist, pediatrician, gynecologist, surgeon, psychiatrist, and family physician over a prolonged period of time (six months), mostly in outpatient settings.
- ▶ Each student will be assigned to a primary care practice throughout the four-year curriculum in order to gain longitudinal primary care experiences involving continuity of care of a panel of patients. In traditional medical schools, exposure to primary care settings is limited to a more condensed period that tends to result in fewer students choosing to practice in primary care.
- ▶ The final year of the curriculum will include some required inpatient clinical rotations (critical care, acting internship) along with clinical electives across a broad range of specialties/subspecialties.

Behavioral and Social Sciences Curriculum

- ▶ The teaching of the behavioral and social sciences will happen across all four years of the curriculum, and will be integrated with the teaching of the other sciences.
- ▶ Teaching methods will include didactic lectures; problem-, case-, and team-based learning exercises; case studies; team-based projects; and cooperative service learning opportunities. Some of the learning will occur in inter-professional education settings.
- ▶ Students will learn about the social determinants of health and health disparities in multiple settings.
- ▶ Students will participate in an inter-professional team providing family care an underserved community throughout the four years of the curriculum.

- ▶ Students will learn about engaging and partnering with communities to improve their health and healthcare through inter-professional service learning experiences.
- ▶ Curricular content will include physician-patient communication, relationship-based care, the art of healing, cross-cultural care and cultural fluency, motivational interviewing, behavioral treatments for lifestyle modification, and the management of patients with addictions.

HEALTH SYSTEM AND POPULATION HEALTH SCIENCES CURRICULUM

- ▶ The health system and population health sciences (epidemiology, biostatistics, research design including clinical trials, evidence-based medicine, clinical decision-making, health informatics, population health, quality improvement and patient-safety, health economics, health systems and policy, biomedical ethics, team-based care, and leadership) will be fundamental components of the curriculum and will be taught across the four years in an integrated fashion with other sciences.
- ▶ Teaching methods will include didactic lectures; problem-, case-, and team-based learning exercises; case studies; team-based projects; and cooperative service learning opportunities. Some of the learning will occur in inter-professional education settings.

ANNUAL BUDGET PROJECTIONS

The initial class of 30 students is projected to enter in Fall 2020, and the size of the entering class will increase to 60 students in Fall 2022. A full entering class of 120 students will start in Fall 2024, and the school will reach its full complement of 480 total students by Fall 2027 (Appendices D-1 and D-2).

The pro forma budget (Appendix B-1) is tailored to the stated vision and mission for a community-based medical school with a focus on primary care. Recently accredited medical schools with similar missions, as well as other UH professional schools, were used as benchmarks in the development of the pro forma budget. Benchmark data informed planning assumptions about required numbers of faculty and staff, competitive salary rates, and typical costs for fringe benefits and operating expenses.

Once the new College of Medicine reaches its planned enrollment of 480 students, it is expected to have 153 faculty and staff, and annual projected operating expenditures of approximately \$33.3 million (expressed in 2016 dollars). Total expenditures are projected to be much lower in early years, with \$23.1 million for the three years of planning and \$19.8 million for the first year of instruction.

The College of Medicine is expected to depend on multiple sources of revenue to fund its operations during its first 9 years of student enrollment. State appropriations are projected to cover about 55% of expected spending at full enrollment. Medical student tuition is projected to cover an additional 31% of costs. Additional sources of revenue include sponsored research grants, medical practice, patient income, and philanthropy. Our budgeting plan for the start-up years has approximately one third from legislative appropriations starting in FY 2020, one third from philanthropy, and one third from incremental increases to our intellectual property revenue over and above current levels. The College of Medicine will be on a separate cost center with its own transparent revenues and expenditures.

FACILITY NEEDS AND CAPITAL COST ESTIMATES

The new UH College of Medicine will require a significant amount of space in which to operate on the campus as it grows to full enrollment. Given the length of time it takes for capital budget requests, approvals, design and construction of a new facility, temporary space must be identified for the new college. University officials have identified space on several floors in the new Health and Biomedical Sciences Building Phase II (HBSB-2) currently nearing completion. After careful examination of College of Medicine interim space needs a “test fit” of the identified space (floors 8 and 9), the consulting architectural team concluded that the available space in HBSB-2 could meet the clinical instructional and administrative needs for a limited time period, with additional office space available on the 6th floor. HBSB-2 could serve as a temporary home to the College of Medicine for three planning years and the first two years of initial enrollment. Such an arrangement would provide the necessary facilities and resources for attaining preliminary LCME accreditation. The temporary facility would house a small number of students (anticipated maximum of 60), as well as administrators, faculty, and staff while the College of Medicine grows. Interim space needs to service the temporary College of Medicine facility are based on faculty, staff, and student projections. Assuming enrollment build out as outlined over a 10-year period beginning with the charter class of 30 students in Fall 2020, a new permanent facility would need to be available by Fall 2022.

The total project costs (current dollars) for developing College of Medicine space in HBSB-2 is dependent upon the end stage of build-out resulting from the current construction effort.

- ▶ An estimated project cost of \$13.1 million will be required to build out the two floors of HBSB-2 to meet the College of Medicine needs.
- ▶ The permanent College of Medicine facility will be built on campus, similar in scope/cost of HBSB-2, but adjusted to the smaller project size. An on-campus utilities facility with existing parking (no cost for added parking) is included in the Capital Cost Analysis. Total Project Costs are estimated to be \$80 million (current dollars).

RESIDENCY PARTNER

This last legislative session, the Texas Legislature passed SB 1066 which requires in part that an institution of higher education in their preliminary planning for a new doctor of medicine degree shall include a plan for an increase in first-year residency positions for the graduate medical education program to be offered in connection with the new degree program. The increase must be sufficient to reasonably accommodate the anticipated graduates with a doctor of medicine degree that will come from the new program so that there will be adequate opportunity for those graduates to remain in the state for the clinical portion of their education. This requirement has been part of the efforts of our Planning Dean who has negotiated an arrangement with Hospital Corporation of America (HCA) Gulf Coast Division. In this arrangement, UH will serve as the academic affiliate partner in the development of 8 new residency programs including 103 new first year residency positions to be in place by 2020, containing 309 total residents by 2024, with projections of further growth in the numbers of first year and total residency positions to follow in ensuing years. Our plan includes adding additional residencies as the opening of the College of Medicine draws nearer.

ECONOMIC IMPACT

As part of the feasibility study, the consulting team completed an analysis to estimate the projected economic impact of a new University of Houston College of Medicine. The analysis was conducted using a national database of the economic impact of all U.S. allopathic medical schools (2012), developed by Tripp Umbach on behalf of the Association of American Medical colleges (AAMC).

Based upon analysis of the impacts of established medical schools located in markets in which there is another larger medical school (Los Angeles, Washington D.C., Chicago, Boston, New York City, and Philadelphia), it is estimated that the total economic impact of the new College of Medicine enterprise will exceed \$1 billion annually by 2050 when the college is at full maturity (Appendix C-1). The new college is expected to sustain more than 6,410 jobs statewide by 2050 (Appendix C-2). This impact will stem from the spending by the College of Medicine and its partners on capital improvements, goods and services, the spending of staff and faculty, the spending of medical trainees, and the spending (external to the institution) of visitors to the proposed school. This impact is conservative in its projected spending related to capital expenditures needed to operate a medical school, such as equipment, clinical supplies, and non-salary related expenditures for the medical school. In addition, it is anticipated that the health research impact will increase from \$25 million in 2016, to \$125 million by 2050, a 400% increase. (Appendix C-3)

In addition, the economic benefits generated by the development of a new College of Medicine extend beyond the direct impact of its operations. The number of benefits generated in the region as a result of the College of Medicine will include newly constructed neighborhoods and schools to support the anticipated increase in families relocating to the region, and communities championing the expansion of dedicated education, and greater choices for entertainment. In addition to the construction of new homes and schools to support projected population increases, the need for new retail, banking, and commercial opportunities will serve as additional economic benefits for the region.

The new College of Medicine and its partnerships with other organizations throughout Texas will be the springboard for future economic development in Houston and the state. These partnerships have the opportunity to launch new industries and add value to existing industries, creating new high-paying jobs in health care, higher education, and related industries.

WORK PLAN

The current work plan outlines the activities that need to occur to begin the recruitment of inaugural class by 2019 and admit first class by 2020 (Appendix E-1).

APPENDICES

A — Internal Advisory Committee

B — Business Plan/Budget

C — Economic Impact

D — Timelines

E — Current Work Plan

F — Medical Education Committee

INTERNAL ADVISORY COMMITTEE

CHAIR:

Stephen J. Spann, M.D., M.B.A. - Planning Dean, University of Houston College of Medicine

MEMBERS:

Muayyad Al-Ubaidi, Ph.D. - Professor, Biomedical Engineering, Cullen College of Engineering

Stuart E. Dryer, Ph.D. - John and Rebecca Moores Professor, Department of Biology and Biochemistry, College of Natural Sciences and Mathematics

Jack M. Fletcher, Ph.D. - Hugh Roy and Lillie Cranz Cullen Distinguished Professor of Psychology and Chair, Department of Psychology

Lynn M. Maher, Ph.D., CCC-SLP - Professor and Chair, Department of Communication Sciences and Disorders

William Monroe, Ph.D. - Professor of English, O'Connor Abendshein Professor, and Dean, The Honors College

Dan O'Connor, Ph.D. - Associate Professor of Health and Human Performance

F. Lamar Pritchard, Ph.D. - Dean, College of Pharmacy

Jessica Roberts, J.D. - Director, Health Law and Policy Institute, and Associate Professor of Law

Earl L. Smith III, O.D., Ph.D. - Greeman-Petty Professor and Dean, College of Optometry

Nathan G. Smith, Ph.D. - Associate Professor of Psychological Health and Learning Sciences, Counseling Psychology Program, College of Education

Kathryn Tart, Ed.D., M.S.N., R.N. - Professor and Founding Dean, College of Nursing

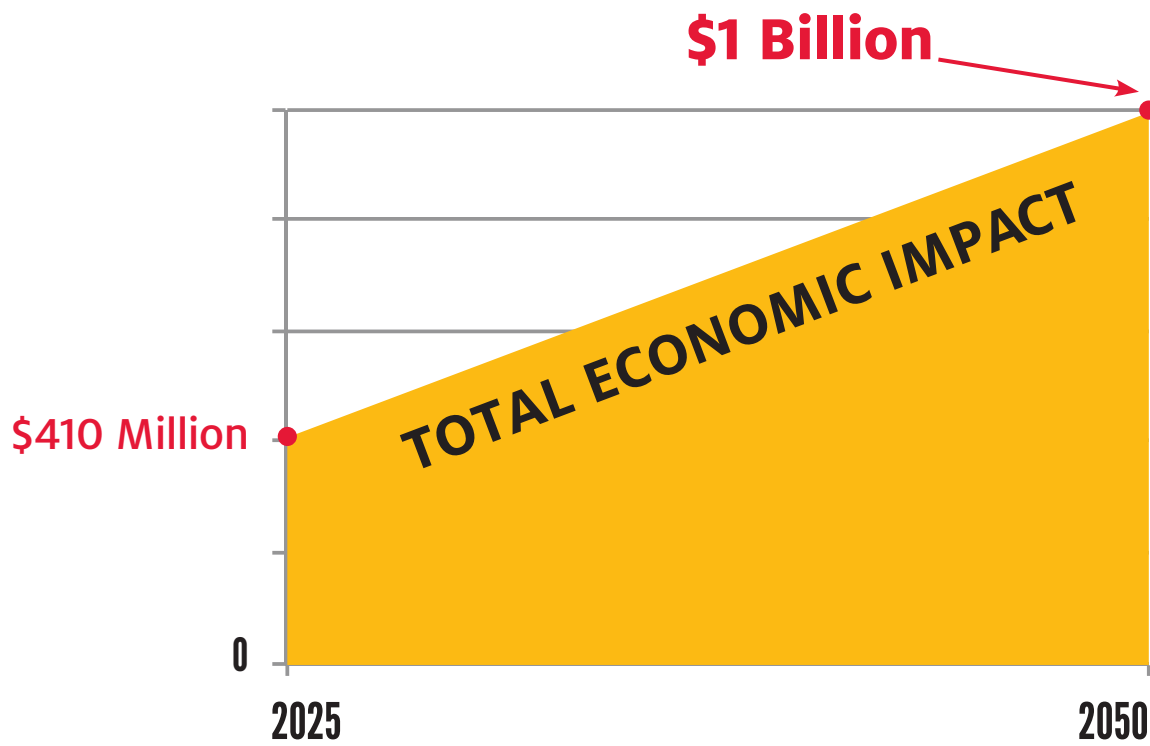
Luis Torres, Ph.D. - Associate Professor and Associate Dean for Research and Strategic Partnerships, Graduate College of Social Work

George Zouridakis, Ph.D. - Professor and Associate Dean for Research and Graduate Studies, College of Technology

BUSINESS PLAN/BUDGET

Organizational Unit	Year 1 2016-17	Year 2 2017-18	Year 3 2018-19	Year 4 2019-20	Year 5 2020-21	Year 6 2021-22	Year 7 2022-23	Year 8 2023-24	Year 9 2024-25	Year 10 2025-26	Year 11 2026-27	Year 12 2027-28	Year 13 2028-29	Total
Projected Expenditures	Fall 2016	Fall 2017	Fall 2018	Fall 2019	Fall 2020	Fall 2021	Fall 2022	Fall 2023	Fall 2024	Fall 2025	Fall 2026	Fall 2027	Fall 2028	
Biomedical Sciences	0	0	353,808	2,830,467	3,891,892	4,245,700	4,953,317	5,307,125	5,660,934	6,368,550	6,368,550	6,368,550	6,368,550	52,717,443
Clinical Sciences	0	0	626,970	3,761,821	4,388,792	5,015,762	6,269,702	7,523,643	8,777,583	10,658,494	11,912,434	13,166,375	13,166,375	85,267,950
Behavioral & Social Sciences	0	0	306,105	612,211	918,316	1,224,422	1,530,527	1,530,527	1,836,632	1,836,632	1,836,632	1,836,632	1,836,632	15,305,270
Health Systems & Populations Sciences	0	0	324,504	973,511	1,947,023	2,271,527	2,596,031	2,596,031	3,245,038	3,245,038	3,245,038	3,245,038	3,245,038	26,933,817
College Administration	300,000	1,192,750	5,035,750	7,073,000	8,703,000	8,703,000	8,703,000	8,703,000	8,703,000	8,703,000	8,703,000	8,703,000	8,703,000	91,928,500
Total, College of Medicine	300,000	1,192,750	6,647,138	15,251,010	19,849,022	21,460,410	24,052,577	25,660,325	28,223,187	30,811,715	32,065,655	33,319,595	33,319,595	272,152,980
Projected Staffing Levels														
Faculty, Executive & Professional FTE	0.00	2.50	11.17	29.33	38.67	40.67	47.33	50.33	56.00	61.00	63.00	65.00	65.00	
Support Staff FTE	0.00	2.50	16.00	41.75	54.00	57.75	65.25	69.00	76.50	82.75	85.25	87.75	87.75	
Total, Full-Time-Equivalent Positions	0.00	5.00	27.17	71.08	92.67	98.42	112.58	119.33	132.50	143.75	148.25	152.75	152.75	
Projected Revenue														
Student Tuition @ \$21,431 per student	0	0	0	0	642,930	1,285,860	2,571,720	3,857,580	5,786,370	7,715,160	9,001,020	10,286,880	10,286,880	51,434,400
Sponsored Research Salary Support	0	0	0	221,993	443,806	489,593	577,651	577,651	711,496	711,496	711,496	711,496	711,496	5,868,082
Practice Plan Salary Support	0	152,750	389,448	809,189	893,137	977,085	1,144,981	1,312,877	1,480,773	1,732,617	1,900,514	2,068,410	2,068,410	14,930,190
State Appropriations - Formula Funding @ \$38,276 per student	0	0	0	0	0	0	4,593,120	6,889,680	10,334,520	13,779,360	16,075,920	18,372,480	18,372,480	88,417,560
Philanthropy	0	0	3,636,364	3,636,364	3,636,364	3,636,364	3,636,364	3,636,364	3,636,364	3,636,364	3,636,364	3,636,364	3,636,364	40,000,000
State Appropriations - Start Up Funding	0	0	0	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	40,000,000
Required Additional Funding	300,000	1,040,000	2,621,326	6,583,555	10,232,787	11,071,509	7,528,741	5,386,174	2,273,664	-763,282	-3,259,658	-5,756,034	-5,756,034	31,502,748
														272,152,980

ECONOMIC IMPACT



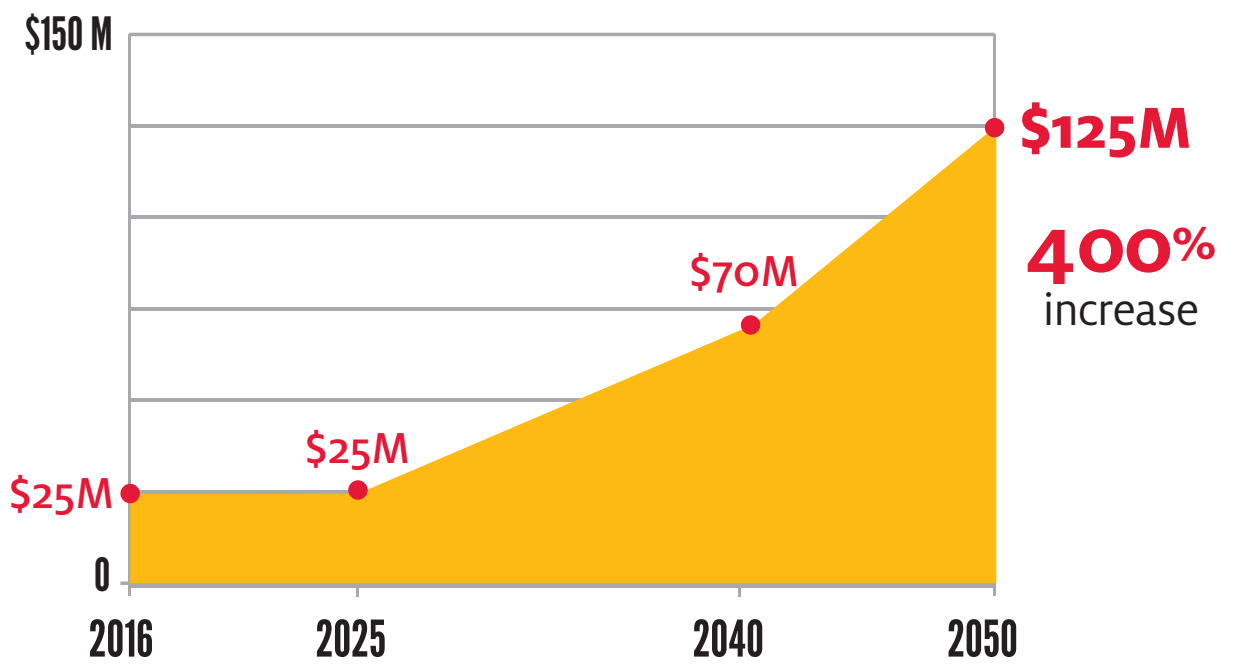
Impacts do not include significant economic and employment impacts that will result from the construction of facilities related to the new college of medicine.

Source: TrippUmbach: *Evaluating the feasibility of a new college of medicine at the University of Houston*

EMPLOYMENT IMPACT



UH HEALTH RESEARCH IMPACT



TIMELINE FOR DEVELOPMENT CURRENT UNTIL FIRST FULL CLASS GRADUATION

Major Milestones	2018-2019				2019-2020				2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	2029-2030	
	Quarter				Quarter														
	1	2	3	4	1	2	3	4											
Preliminary accreditation granted																			
Admissions activities																			
Enroll charter class of 30 students								30											
Enroll 2nd entering class									30										
Enroll 3rd entering class										60									
Enroll 4th entering class											60								
Enroll 5th entering class												120							
Enroll 6th entering class													120						
Enroll 1st complete class														120					
Graduate initial class of 30											30							120	
Graduate class of 60												30							120
Graduate class of 60													60						120
Graduate class of 60														60					120
Graduate 1st full class of 120															120				120

TIMELINE FOR PHASE-IN OF ENROLLMENT

Program Year	Year 1 2020-21	Year 2 2021-22	Year 3 2022-23	Year 4 2023-24	Year 5 2024-25	Year 6 2025-26	Year 7 2026-27	Year 8 2027-28	Year 9 2028-29	Year 10 2029-30
First Year Students	30	30	60	60	120	120	120	120	120	120
Second Year Students		30	30	60	60	120	120	120	120	120
Third Year Students			30	30	60	60	120	120	120	120
Fourth Year Students				30	30	60	60	120	120	120
Total	30	60	120	180	270	360	420	480	480	480

TIMELINE FOR DEVELOPMENT CURRENT UNTIL CHARTER CLASS GRADUATION

Major Milestones	ACADEMIC YEAR																											
	2017-2018				2018-2019				2019-2020				2020-2021				2021-2022				2022-2023				2023-2024			
	Quarter				Quarter				Quarter				Quarter				Quarter				Quarter							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
ACHIEVE APPLICANT STATUS																												
Obtain board/state approvals and funding commitments																												
Make initial contact with LCME																												
Submit LCME application letter; pay \$25K fee																												
ACHIEVE CANDIDATE STATUS																												
Prepare and submit Preliminary DCI and Self-Study																												
LCME staff determines readiness for site visit																												
Receive candidate status																												
ACHIEVE PRELIMINARY ACCREDITATION																												
Work with LCME to schedule site visit																												
Site visit conducted by LCME team																												
LCME reviews survey report																												
Receive preliminary accreditation																												
COMMENCE RECRUITMENT AND ADMISSION OF CHARTER CLASS																												
Register with AMCAS																												
Develop admissions procedures and descriptive materials																												
Begin to receive applications																												
Review applicants																												
Interview applicants																												
Admit charter class																												
Welcome charter class to 1st day of instruction (30 students)																												
COMMENCE INSTRUCTION WITH CHARTER CLASS																												
Implement 1st year of curriculum with charter class																												
Implement 2nd year of curriculum, welcome 2nd class																												
Receive provisional accreditation																												
Implement 3rd year of curriculum, welcome expanded 3rd class																												
Implement 4th year of curriculum, welcome 4th class																												
Receive full accreditation																												
Conduct graduation ceremony for charter class																												

CURRENT WORK PLAN

Year	Date	Event	Purpose/Notes
2017	September/October	Negotiate LOI with hospital partner, Hospital Corporation of America (HCA)	Establishment of multiple residency slots for potential medical students
2017	Fall	Consider relationship with FQHC for clinical care	Community health initiative, behavioral health, research and student opportunities
2017	September 28 th	Presentation to Faculty Senate	Information and status update
2017	October 2 nd	Presentation to Faculty Senate	Information and status update
2017	Fall	DCI committees formed	Initiation of LCME accreditation preliminary activities 4 Faculty Committees
2017	October 4 th Breakfast	Presentation to LCME DCI Committee	Information and status update
2017	October 4 th Lunch	Presentation to Faculty	Information and status update
2017	October 9 th Lunch	Presentation to Faculty	Information and status update
2017	November 7 th	Final Feasibility Report	For Board of Regents (BOR)
2017	November 7 th	Presentation to Graduate & Professional Studies Program Evaluation Committee	For approval of new M.D. degree (prior to Texas Higher Education Coordinating Board (THECB))
2017	November 16 th	Presentation to Board of Regents	Presentation of feasibility study report requested by legislature and approval sought for establishment of the College of Medicine (no other approval required from the state)
2017	November	Finalize agreement with hospital partner, HCA	Residency slots, etc.
2017	November	Search for leadership positions begins	Founding Dean Chief Business Officer Associate Dean for Medical Education Associate Dean of Student Affairs Associate Dean of Community Health Chair, Basic Sciences Chair, Clinical Sciences Chair, Health System and Population Health Sciences Chair, Behavioral and Social Sciences
2017	November-December	College of Medicine Strategic Planning Retreat	LCME accreditation planning processes
2018	January–September	Initiate LCME application	Accreditation process
2018	February 6 th	Graduate & Professional Studies (GPSC) Full Body Review	
2018	February	Presentation to Texas Higher Education Coordinating Board	Approval for new degree from THECB
2018	March 8 th	BOR meeting	Approval of M.D. degree
2018	March	THECB Committee on Academic and Workforce Success (CAWS) makes recommendation	
2018	May	Leadership team in place or about to be in place	
2018	June	Seek approval of M.D. degree from SACS	
2018	June/July	Consultative visit from LCME	
2018	Summer/Fall–December	Response from THECB regarding approval of M.D. degree	
2018	August	Search begins for additional positions	Associate Dean of Faculty Affairs Associate Dean of Research Assistant Dean for Curriculum Additional faculty
2018	December 1 st	Submit DCI/Self-Study	
2019	January	Legislative session begins	Support for College of Medicine initiative
2019	February/March 2019	LCME Preliminary Site visit	
2019	May	Legislative session ends	State Funding Approval
2019	June	LCME Reviews Site Team Report	Preliminary Accreditation Awarded
2019	October	LCME Awards Preliminary Accreditation	
2019	October–December	Recruitment of inaugural class	
2020	January–May	Recruitment of inaugural class	
2020	July–August	Admit first class	

MEDICAL EDUCATION COMMITTEE

CO-CHAIRS:

Paula Myrick Short, Senior Vice Chancellor for Academic Affairs, UH System, Senior Vice President for Academic Affairs and Provost, UH

Stephen J. Spann, Planning Dean, University of Houston College of Medicine

MEMBERS:

Muayyad Al-Ubaidi, Professor, Department of Biomedical Engineering, Cullen College of Engineering

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Mark Clarke, Associate Provost for Faculty Development and Faculty Affairs, Division of Academic Affairs

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Linda Davis, Director, Educational Technology, College of Liberal Arts and Social Sciences

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Jack M. Fletcher, Hugh Roy and Lillie Cranz Cullen Distinguished Professor, Chair, Department of Psychology, College of Liberal Arts and Social Sciences

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Chad Hansen, M.D., HCA Physician

Erika Henderson, Assistant Provost, Faculty Recruitment, Retention, Equity and Diversity, Division of Academic Affairs

Nick Holdeman, Professor and Associate Dean, Clinical Education, College of Optometry

Vikas Jogi, M.D., HCA Physician

Bruce Jones, Vice Provost for Academic Programs, Office of the Provost

Jami Kovach, Associate Professor, Department of Information and Logistics Technology, College of Technology

Joy LeBlanc, M.D., HCA Physician

Mimi Lee, Professor, Department of Curriculum and Instruction, College of Education

Sandra Lee, RN-BSN Track Manager and Assistant Clinical Professor, College of Nursing

MEDICAL EDUCATION COMMITTEE (CONTINUED)

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William Monroe, Dean, Honors College, Professor, Department of English, College of Liberal Arts and Social Sciences

Neelesh Mutyala, UHS Student Regent

Daniel O'Connor, Professor and Chair, Department of Health and Human Performance, College of Liberal Arts and Social Sciences

David Oliver, Associate Vice Chancellor and Associate Vice President, Facilities and Construction Management, Division of Administration and Finance

Daniel Price, Clinical Assistant Professor, Honors College

F. Lamar Pritchard, Dean, College of Pharmacy, Professor of Pharmaceutical Health Outcomes and Policy

Jose Quinones, M.D., HCA Physician

Miguel Ramos, Director, Institutional Effectiveness, Assessment and Accreditation, Institutional Planning and Analysis, Division of Academic Affairs

Kathleen Reeve, Associate Dean, Director, Master of Science in Nursing Program, Clinical Professor, College of Nursing

Jessica Roberts, Associate Professor, George Butler Research Professor of Law, Director, Health Law and Policy Institute, Law Center

Manish Rungta, M.D., HCA Physician

McClain Sampson, Assistant Professor, Graduate College of Social Work

Amy K. Sater, Professor and Chair, Department of Biology and Biochemistry, College of Natural Sciences and Mathematics

Jonathan P. Schwartz, Professor and Associate Dean of Graduate Studies, College of Education

Nathan Smith, Associate Professor, Department of Psychological Health and Learning Sciences, College of Education

Earl L Smith III, Greenman-Petty Professor and Dean, College of Optometry

Kathryn Tart, Professor and Dean, College of Nursing

Vanessa Tilney, Executive Director and Chief Physician, Student Health Center, Division of Student Affairs and Enrollment Services

Luis Torres, Associate Professor, Graduate College of Social Work, Associate Director, UH Center for Drug and Social Policy Research

Richard Walker, Vice Chancellor and Vice President for Student Affairs and Enrollment Services, Division of Student Affairs

Dan Wells, Professor and Dean, College of Natural Sciences and Mathematics

George Zouridakis, Professor and Associate Dean for Research and Graduate Studies, College of Technology