

Icahn School of Medicine at Mount Sinai

DENNIS S. CHARNEY, M.D.
Dean

September 7, 2017

Research Accomplishments

AAMC Rank

U.S. Medical Schools (AAMC) 2016 #2 Research Dollars/Principal Investigator

U.S. Medical Schools (AAMC) 2016 #3 Research Expenditures/sf

Research Quality

ISMMS is #10 in Nature Innovation Index amongst 200 global research institutions

The index measures the impact of science on new therapies.

Innovation

- Mount Sinai Innovation Partners has been active in identifying opportunities for tech transfer as well as creating the ecosystem for incubators and spin-offs.

ISMMS Growth in Faculty

The full-time faculty has grown by 70% since creation of the Mount Sinai Health System in 2013:

Full Time Faculty Counts						
Year	2013	2014	2015	2016	2017	Increase 2013-2017
Count	2,042	2,753	3,178	3,415	3,471	+1,429

Continued growth is expected as ISMMS and MSHS implement new strategic initiatives

New Appointments

Deans:

Steven Burakoff, MD

Dean for Cancer Innovation

I. Michael Leitman, MD

Dean for Graduate Medical Education

Eric Schadt, PhD

Dean for Precision Medicine

System Chairs:

Eric Barton, MD, MBA

Emergency Medicine

Rolfe Sean Morrison, MD

Geriatrics

Research Institute Directors:

Yasmin Hurd

Addiction Institute of Mount Sinai

Robert O Wright, MD, MPH

Exposomic Research Institute

Douglas A. Jabs, MD, MBA

Eye and Vision Research Institute

Elizabeth A. Howell, MD, MPP

Women's Health Research Institute

Ramon Parsons, MD,

Tisch Cancer Institute

Mirian Merad, MD, PhD

Mount Sinai Immunology

TBH

Adolescent Research Institute

Annetine Gelijns, PhD

Innovation in Clinical Trials

Jonathan A. Cohen, DVM, MS, DACLAM

Center for Comparative Medicine and Surgery

New Appointments

Senior Associate Deans:

Eric M. Genden, MD, MHCA, FACS

Paul Lawrence, MFA

Brian T. Smith

Brian J. Nickerson, JD, PhD, MPA

Matthew J. O'Connell, PhD

Eric A. Sobie, PhD

Clinical Affairs, MSHS

Academic and Research Informatics

Clinical Affairs, MSDFP

Master's Programs

Curriculum, Accreditation and Outreach

Programmatic Development

MD Students-Matriculating Class of 2017

- Number of Complete Applications 5,188
- Number of Interviews 755
- Size of Class 140
- MD/PhD 12
- Early Assurance 36
- Women 50%
- Under-represented in Medicine 19%
- Median MCAT 36
- Median GPA 3.83
- Number of Undergraduate Schools 71

MD/PhD Students-Matriculating Class of 2017

- Number of Complete Applications 349
- Number of Interviews 112 (including 2 Flex Med)
- Size of Class 12
- Women 42%
- URM 25%
- Median MCAT 517
- Median GPA 3.9
- Number of Undergraduate Schools 12

Medical Education Notable Accomplishments

Full-time faculty has grown by 78 percent since the MSHS inception in 2013

Inaugural FlexMed class matriculated with the entering Class of 2020

Department of Medical Education in collaboration with the student body launched the IcahnBeWell program to improve student well-being

Announcement of the Strategic Plan launch for 2017 with the goal of increasing scholarship and learning spaces

Medical Education Notable Accomplishments

Creation of the Practice Enhancement, Engagement, Resilience and Support (PEERS) curriculum

Creation of a training program for all first year students to become trained in behavioral health first aid in addition to physical health first aid

Expansion of the faculty advisory from 7 to 10

Initiated the preparation for the next LCME re-accreditation process

Medical Education-IcahnBeWell Program

Distress and burnout are common in health-professions learning communities (students and trainees)

Emerging threats to wellness have been on the rise.

Medical & Graduate School collaborated on Dean's Task Force on the Learning Environment: Enhancing Well-Being and Changing Culture.

As a result several new, school-wide initiatives have been implemented

Some of these programs are student-led and others are structural and programmatic enhancements that have been integrated into the curriculum and learning environment.

Graduate Medical Education

Largest GME Program in the United States

- 150 ACGME Programs and 2,193 Residents and Fellows
- Institutional Accreditation with commendation (ACGME)

List of Sponsoring Institutions, by Resident Count Academic Year 2016-2017 United States



Sponsor Number / Name	Institution City	Institution State	Number of Programs	Number of Residents
[359503] Icahn School of Medicine at Mount Sinai	New York	NY	150	2,193
[358051] New York Presbyterian Hospital	New York	NY	142	1,747
[418024] UPMC Medical Education	Pittsburgh	PA	124	1,517
[358024] Hofstra Northwell School of Medicine	Great Neck	NY	111	1,506
[260173] Mayo Clinic College of Medicine and Science	Rochester	MN	163	1,415
[480211] Baylor College of Medicine	Houston	TX	98	1,378
[480316] University of Texas Southwestern Medical School	Dallas	TX	103	1,286
[540502] University of Washington School of Medicine	Seattle	WA	110	1,280
[359649] Montefiore Medical Center/Albert Einstein College of Medicine	Bronx	NY	96	1,244
[050737] University of California (San Francisco) School of Medicine	San Francisco	CA	90	1,203
[350450] New York University School of Medicine	New York	NY	87	1,201
[120490] Emory University School of Medicine	Atlanta	GA	104	1,175

Graduate Medical Education

Residency Ranking 2017 (Doximity)

8 programs among top 25 in US:

- Dermatology | MSH # 11
- Psychiatry | MSH # 17
- Physical Medicine and Rehabilitation | MSH # 18
- Internal Medicine | MSH # 19
- Ophthalmology | NYEEI #19
- Emergency Medicine | MSH # 20
- Anesthesia | MSH #24
- Nuclear Medicine | MSH #25

First ACGME accredited fellowships in Clinical Informatics started

Goals for next year:

- Continued health system integration
- Improved Doximity rankings, resident match
- Increased scholarly activity from residents and fellows
- Strengthen resident wellness program

PhD Students-Matriculating Class of 2017

- Number of Complete Applications 459
- Number of Interviews 144
- Size of Class 39
- Women 56%
- URM 18%
- Median GPA 3.7
- Number of Undergraduate Schools 37

Master's Students-Matriculating Class of 2017

- Master of Science in Biostatistics 5
- Master of Science in Genetics Counseling 12
- Master of Science in Clinical Research 22
(plus 4 PhD and 5 Cert)
- Master of Science in Healthcare Delivery Leadership 25
- Master of Science in Biomedical Sciences 41
- Master of Science in Public Health 75 (plus 4 Cert)

Graduate School Notable Accomplishments

- Established Exchange Programs with the *Graduate Center of the City University of New York* and the *Grove School of Engineering at the City College of NY* to enable graduate students at each institution to take courses at the other's.
- Designed and launched an accelerated admission process into PhD and MD/PhD programs also known as “*FlexGrad*” program.
- Renewed Medical Scientist Training Program (MSTP) grant (40 years of continuous funding).
- Doubled number of F30/31/32 fellowships as a result of a formalized process that provides instruction and review feedback for fellowship applications.
- Introduced a personalized first-year PhD research rotation process to reduce time to degree (now 4.8 years) without compromising quality of training.

Graduate School Notable Accomplishments

- Redesigned Biostatistics training, including elements of basic coding, and program-specific lab applications.
- Continued to expand entrepreneurship training opportunities by developing a new course in *Commercialization of Biomedical Innovation: Entrepreneurship and Business Fundamentals*.
- Created a new Translational Oncology Track in the Clinical Research Program
- Revamped training in Responsible Conduct in Research for all research students and postdocs.
- Formalized near-peer and peer-to-peer mentorship programs.
- Expanded the portfolio of career advising and job readiness programs.

Expanded CUNY Affiliation

Graduate Center at CUNY:

- Graduate Student Exchange Program:
 - Gives ISMMS graduate students access to courses in mathematics, engineering, computer science, chemistry and physics.
- Inter-Institutional Glial Biology Initiative
 - NYC's first program to catalyze and strengthen scientific interactions in glial biology through collaborative research, educational symposia, joint recruitment and shared core resources.

Grove School of Engineering at CUNY:

- Graduate Student Exchange Program
 - Gives ISMMS graduate students access to CUNY Engineering School courses in Biomedical Engineering, Chemical Engineering, Computer Engineering, Computer Science, Electrical Engineering and Mechanical Engineering

RPI Affiliation Update

- Total Joint Funding > \$ 14 million
 - Ongoing joint CHEAR Center grant for Data Science
 - RPI participation in Mount Sinai CTSA award
- Collaborations in clinical data computing, digital health, biomedical engineering
- Joint Workshop “New Connections in Cancer Research: Bridging Basic Science, Clinical Science, Engineering and New Technologies” 2016
- Joint Courses: Intellectual Property, Medical Devices
- Ongoing internally funded seed joint project “Optical and laminar coherence tomography and wide-field optical image-guided surgery for head and neck cancer”
- RPI students will participate in upcoming SINAIInnovations health hackathon, October 13-15, 2017

Stoney Brook Affiliation Update

- Established pilot grant program for joint conferences and research projects
 - Several brainstorming conferences held.
 - First pilot grants underway.
- Major areas of collaboration include:
 - Cancer
 - Imaging
 - Neuroscience
- Proteomic and metabolomic resources at SBU now available to ISMMS
 - Greatly augmenting our capacity for research
- October 30 conference (held at ISMMS) with SBU to review progress

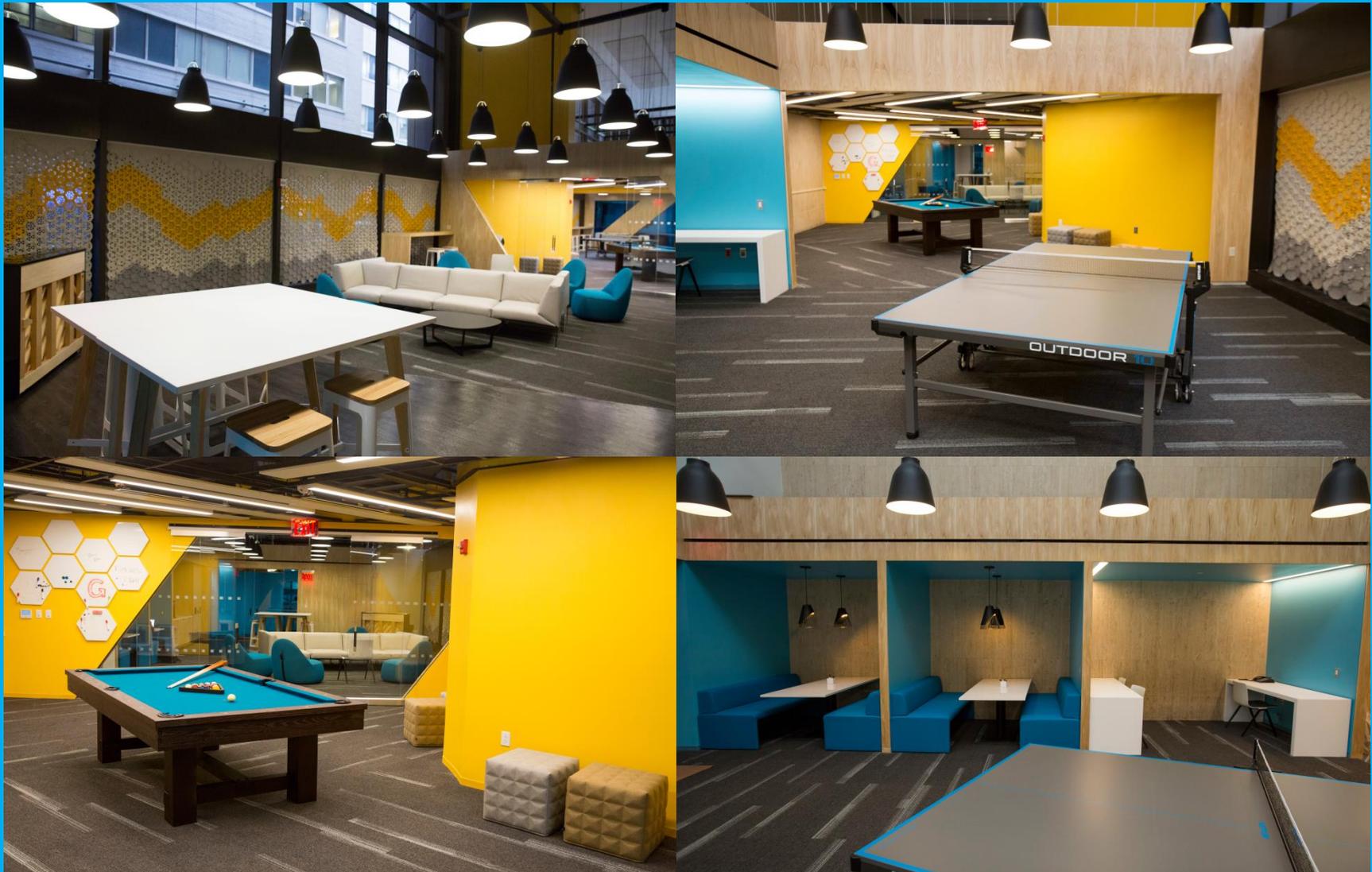
New Affiliation – Institut Pasteur (FR)

- Mount Sinai will become Pasteur's first US partner on Sept. 12, 2017.
- The goals of this partnership are 3 fold:
 - Create a program to increase our understanding of viruses
 - Identify and develop new antiviral strategies based on these new discoveries.
 - Develop an international training program between the scientific communities at Mount Sinai and those at the Pasteur Institute.
- This partnership has already resulted in >5 million dollars in support from the Defense Advanced Research Projects Agency (DARPA). Further fundraising continues.
- This partnership will enable student, postdoc, and faculty exchanges between schools and mutually enhance our scientific understanding.

New Classrooms & Multipurpose Space



The Patricia and Robert Levinson Student Center



Alumni Engagement

Alumni community includes ISMMS graduates of the MD, PhD, and Master's programs, former house staff, postdoctoral fellows and faculty.

The Office of Alumni Relations (OAR) is enhancing alumni engagement by fostering a life-long sense of community.

Ongoing initiatives include:

- Launching a dynamic alumni website including a member directory (September 2017)
- Offering all alumni with an ISMMS Gmail account (alumni.mssm.edu)
- Integrating alumni of Health System hospitals into all alumni events, mailings and activities (e.g., Reunion, Jacobi Medallion Awards, Mentoring)
- Establishing more opportunities for trainees to interact with alumni through mentorship opportunities, lectures, and meet-and-greet events
- Engaging current students by sponsoring study breaks, socials and other on-campus programming throughout the year

2017 Faculty Development Initiatives

BUILDING NEW LEADERS

- Professional development workshop initiatives: “Mentoring and Team Building,” “Effective Negotiations,” “Communication and Conflict Resolution in Research Management”
- Faculty Development Symposium: A&P committee panel discussion about promotion of clinical and research faculty
- Mount Sinai Faculty Resource Fair: face-to-face information sessions with faculty

FOSTERING MENTORING

- Mentoring Junior Faculty throughout the Sinai Health System: focus groups and interviews with junior and senior clinical faculty to assess strengths and weaknesses of mentorship programs
- Networking opportunities for site based physicians /OADE events

PROMOTING COLLABORATION

- Faculty Idea Prize for Innovative Collaborations – applications increased four fold and winners will be announced at *SinaInnovations*.
- “Coffee Talk” and “Faculty First” events promote networking of faculty from across the System
- Co-sponsor departmental grand rounds to promote mentorship and leadership

Lakshmi Devi, PhD – Dean, **Elizabeth Howell, MD, MPP** – Associate Dean, **Elizabeth Urbanski, MPA**- Program Manager, **Ramaa Chitale, MPH** – Program Coordinator

Diversity Initiatives

ISMMS was acknowledged for the 3rd consecutive year by **HEED** (Higher Education Excellence in Diversity) for outstanding diversity programs and outcomes.

MSHS, including the school was ranked **#1** by **DiversityInc in 2017** (3rd consecutive year for ranking in Top 10 hospitals and health systems).

All MSHS hospitals were acknowledged by **HEI** (Health Equity Index) for excellence in LGBT patient care.

Over 500 participants from across MSHS participated in Unconscious Bias Training in 2016-2017

Office for Diversity and Inclusion (ODI) and CHECER (Center for Health Equity and Community Engaged Research) are leading an effort to design a Health Disparities Dashboard.

CHECER efforts to date include:

- Developing new partnerships to affect system change
- Addressing social determinants in Medicaid populations
- Educating the next generation of disparities researchers and advocates
- Assuming leadership roles in national associations working on disparities

ISMMS will host a National Symposium on Health Disparities and Healthcare Access in Fall 2018

Diversity Initiatives

Ann-Gel Palermo, DrPH, MPH was appointed as the first Associate Dean for Diversity & Inclusion in Biomedical Education in ISMMS

CMCA has partnered with the Office for Academic Enhancement and Development to examine recruitment and retention strategies for Basic Science Faculty of Color

CMCA in partnership with MedEd is co-developing a longitudinal anti-racist based curriculum to teach mitigating bias as a clinical skill.

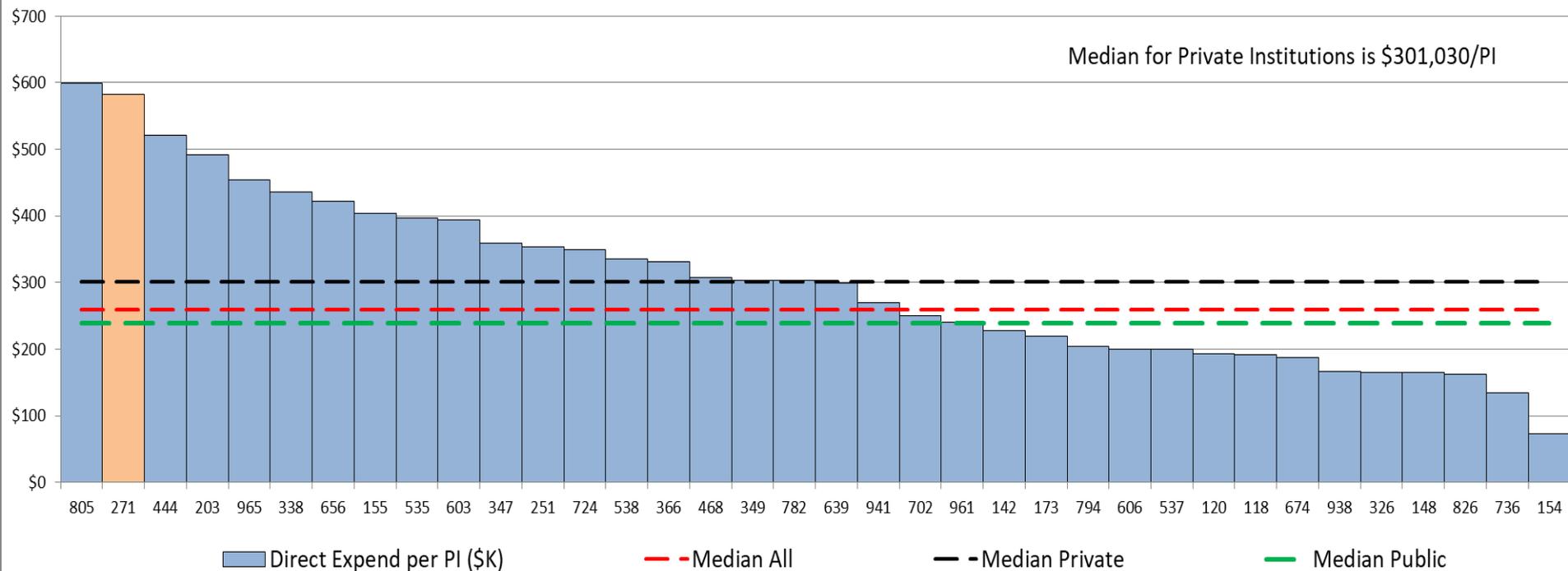
Center for Excellence in Youth Education (CEYE), housed in CMCA, continues to provide innovative science enrichment programming to J/HS and college students and has added college readiness and intensive academic counseling program to their services.

The Faculty Diversity Council and GME Diversity Council continue to focus on recruitment, retention and advancement of women and URIM faculty and house-staff.

2016 Research Funding

2: Sponsored Programs Direct Expenditures/PI

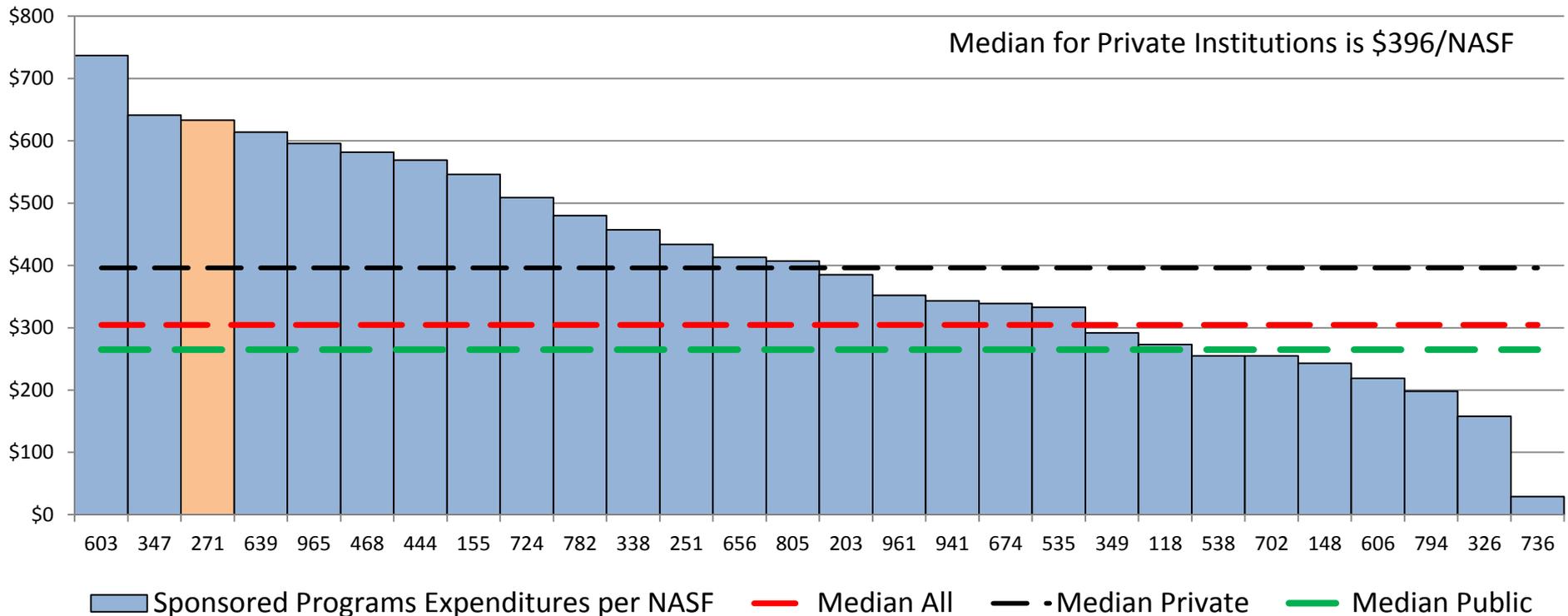
Sponsored Programs: Direct Expenditures per Principal Investigator
Private Schools



2016 Research Funding

3: Sponsored Programs Expenditures/Net Assignable Square Feet

Sponsored Programs: Expenditures per Net Assignable Square Foot (NASF) Private Schools

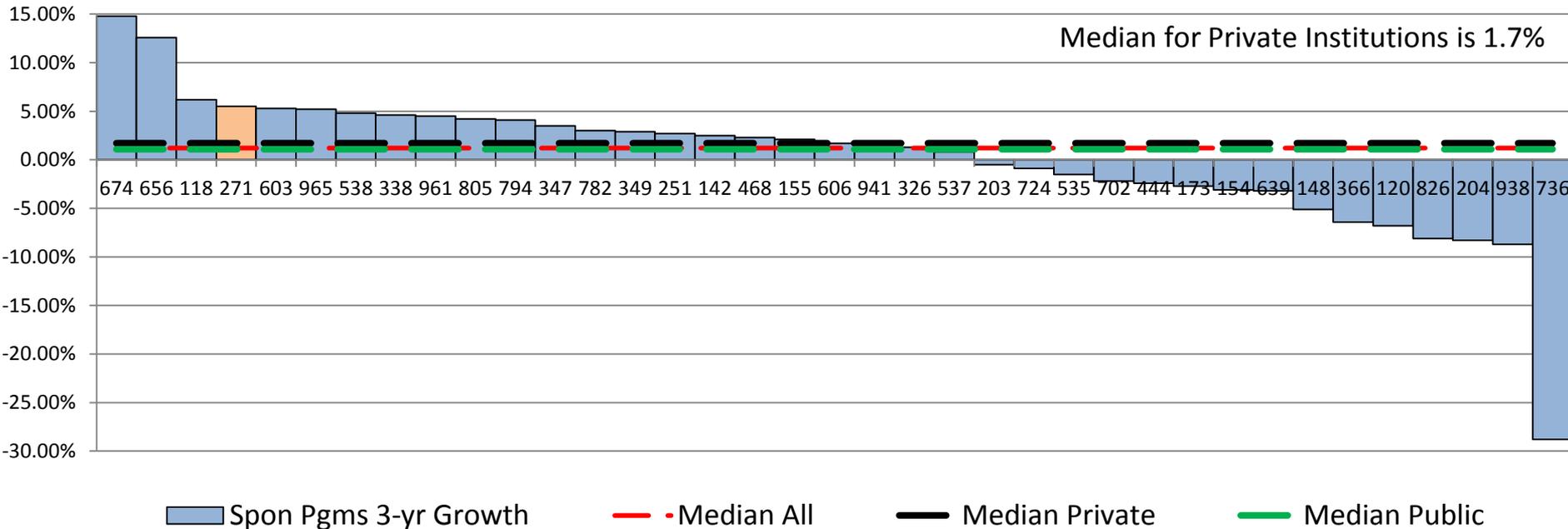


2016 Research Funding

#4 – Robust growth of Sponsored Programs from all sources

Sponsored Programs: 3-Year Growth in Expenditures Private Schools

Median for Private Institutions is 1.7%



Mount Sinai Innovation Partner (MSIP)

	2013	2014	2015	2016
• Performance Metrics				
• Faculty, Staff and Trainees Engaged:	394	519	549	685
• Gross Licensing Proceeds in \$millions:	41	47	57.9	46.1
• Revenue Generating License Agreements:	72	97	93	100
• Industry Research Funding in \$millions:	38.5	20.1	21.5	24.7
• New Inventions (IP Disclosures):	104	121	117	133
• New Patents Filed:	147	155	205	218
• New Licenses & Options:	45	50	57	60
• Collaborative & Sponsored Research Agreements:	79	99	119	147
• Enabling Agreements (MTAs, CDAs, IIAs):	1101	1224	1231	1271
• Active Equity Holdings in Spinouts:	9	6	5	8

Mount Sinai Innovation Partner (MSIP) Initiatives

Mount Sinai I³ Asset Accelerator:

Fund to advance commercially relevant Mount Sinai assets
Supported by broad group of commercial advisors and entrepreneurs-in-residence

Mount Sinai Startups:

Partnering with top-tier venture funds and Mount Sinai investigators to launch startups
Launched well funded orphan disease-focused startup in December 2016

Alliance Management:

New Alliance Management team supporting complex industry collaborations

Graduate Courses on Commercialization and Entrepreneurship:

Partnering with Graduate School to launch 3 new courses on intellectual property and commercialization

Mount Sinai Innovation Partner (MSIP) Initiatives

Commercialization Internship Program:

- Expanding highly regarded internship program
- Partnering with consulting firms and others to create career opportunities

Mount Sinai Innovation Group (MSIG):

- Created the MSIG to engage, support and expand the Mount Sinai innovation and entrepreneurial ecosystem for faculty, trainees and staff

Mount Sinai Innovation Exchange:

- Educational video forum on commercialization and entrepreneurship featuring Mount Sinai innovators

MSIP Quarterly:

- E-Newsletter sharing updates and opportunities on commercialization

MSIP is contributing to:

- Mount Sinai Biomedical Design Center
- Mount Sinai Medical Device Innovation Center @ Mount Sinai West

Sema 4 –a wholly owned ISMMS company

A Next Generation Health Information Company

The Company



Launched on June 1st, **Sema4** is a **venture of Mount Sinai** providing advanced genomic testing and merging big data analytics with clinical diagnostics

Dr. Eric Schadt is Sema4's CEO, and also serves as Dean for Precision Medicine

The Mission



Sema4's mission: to **revolutionize clinical diagnostics** by generating more personalized, precise, and real-time insights for patients

The Present



Sema4 has **~350 employees** with HQ in CT, next gen genomic labs and product R&D in NY and CT, and a nationwide sales team

The Future



Current genetic testing business is a "**growth hack engine**" to quickly scale nationwide and create deep digital engagement with data-sharing consumers

Mount Sinai Doctors Faculty Practice Accomplishments 2017

	Growth	Operating Margin	Contribution Margin
2016	2.4%	2.3%	84.8%
YTD 2017	-3.4%	3.1%	85.9%

- **Central Billing Office/IT**
 - Integrated remaining 100+ faculty, bringing total under CBO to 2,200+ physicians
 - Led implementation of Epic Practice Management system at MSH campus practices
 - Completed Epic EMR Wave 4 Implementation at BISLW sites
- **“Welcome” Self-Registration Module**
 - Implemented patient self check-in module with ENT and Medicine. 50% of registrations using module
 - Remainder of uptown practices go live in late September
- **New Sites**
 - **East 85th Street** opened Cardiac Rehab, Facial Plastics, Pediatric ENT, OMS and Rhinology practices

Mount Sinai Doctors Faculty Practice Accomplishments 2017, continued

- **Access Center**

- Implemented use of home agents
- Developed robust Quality Assurance program, including monthly agent quality scorecards

Access Center Growth	As of 1/1/17	Projected 12/31/17	% Increase
# of Agents	187	236	26%
Inbound Calls/Month	188,000	250,000	33%
Outbound Calls/Month	21,000	35,000	67%

- **Online Scheduling**

- Added 200+ physicians to Zocdoc’s functionality on Mount Sinai “Find-a-Doc,” bringing total to ~600 physicians (~8,000 appts/month)
- Experienced growth in Make an Appointment Online and MyChart scheduling (4-5000 appts/month)

Mount Sinai Doctors Faculty Practice

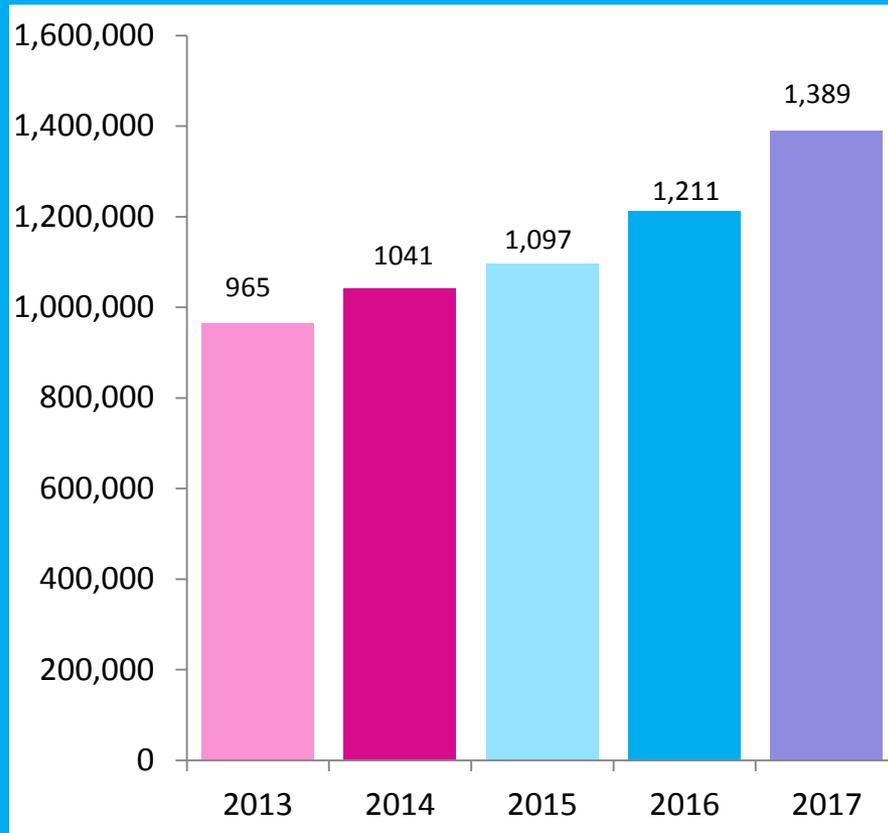
Ongoing Initiatives

- **Central Billing Office/IT**
 - Epic Wave 5 Practice Management implementation to be completed by Q4 2017
- **Access**
 - **Access Center**
 - Expanding use of home agents to 40 in 2017
 - **Zocdoc**
 - Implementing Find-a-Doc scheduling functionality to additional 500+ employed physicians, for total of 1,100+ physicians
- **Patient Satisfaction**
 - Enrolling more physicians in the Physician Communication Ambassador program
 - Rolling out star rating and patient comments to Mount Sinai “Find a Doctor” pages
- **Clinical Program Development and Oversight**
 - Urgent Care Site in DUMBO opening Fall 2017

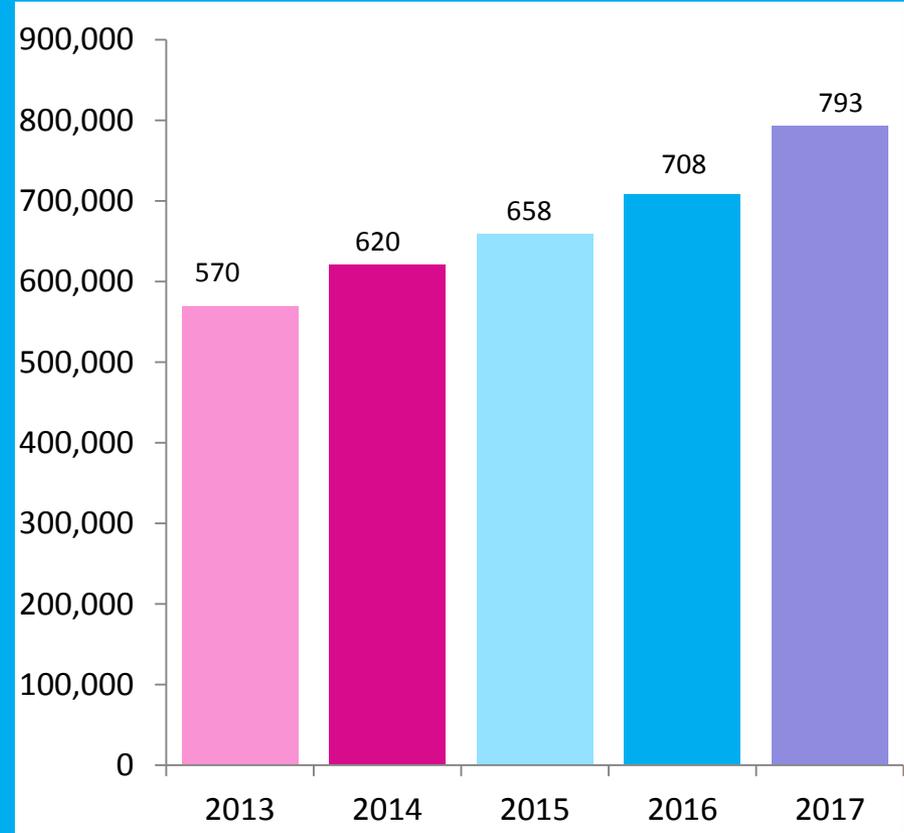
Mount Sinai Doctors Faculty Practice

Current Positioning: Clinical Activity

Ambulatory Encounters 2013 – 2017



Outpatient Visits 2013 – 2017



*2017 Annualized based on June YTD

Mount Sinai Doctors Faculty Practice

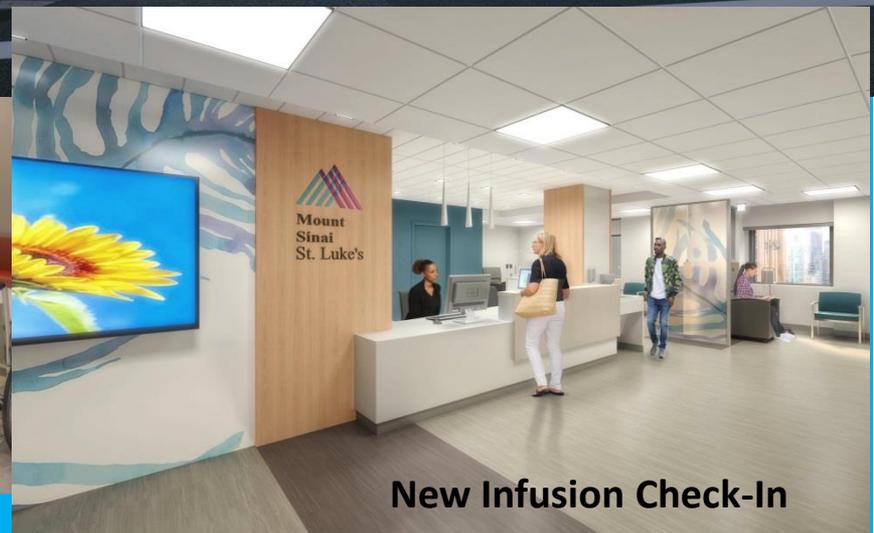
Ongoing Initiatives at MSSL

- **Central Billing Office/IT**
 - Epic Wave 5 Practice Management implementation to be completed by Q1 2018
- **Access**
 - **Par80 Referral Module**
 - Expanded use of Par80 amongst the various practices and clinics at MSSL as a means to continue to grow volume on campus
 - Regularly monitor each practice's ability to service new patients
 - **ZocDoc**
 - Expanding ZocDoc among new recruits
- **Performance Improvement**
 - Monthly meeting with departmental clinical and administrative leadership to review revenue cycle, clinical operations, KPIs, recruitment plans, and general departmental growth in effort to reduce high CARTS support
- **Network Development**
 - MSSL physicians to start working in Westchester partnering with new DOCs and WestMed practices

Mount Sinai Doctors Faculty Practice Space Projects at MSSL

Target Timeline	Project
Mar – May 2017	Clinic Consolidations and closures on MSSL campus
Apr – May 2017	Urology practice temporary renovation & expansion. Completed May 2017.
May – Dec 2017	New Cardiovascular Institute. Target completion Dec 2017. <ul style="list-style-type: none"> • 19 exam rooms, 26 physicians • Full Epic IT platform
Jun 2017	Lease signed for 124 th Street site. New location for IAM and Behavioral Health.
Jul 2017 – Dec 2017	Renovate Ambulatory Pavilion Lobby (Clark Building). Target completion Dec 2017. <ul style="list-style-type: none"> • New exterior canopy, reception desk, waiting area, coffee kiosk • Elevator upgrades
Dec 2017 – Apr 2018	New Imaging Center Waiting Area. Target completion Apr 2018.
Dec 2017 – May 2018	New 7 bay Infusion Suite. Target completion May 2018. <ul style="list-style-type: none"> • Future goal to grow to 15 bays • 2 Medical Oncologists
Dec 2017 – Jan 2019	Construction slated to start on new areas identified for FPA practice expansion.

Mount Sinai Doctors Faculty Practice Space Projects at MSSL



Mount Sinai Doctors Faculty Practice 2017 Accomplishments at MSW

- **Actors Fund Practice**
 - Opened the Samuel J. Friedman Health Center at 48th and 7th Avenue
 - Partnership between Mount Sinai Doctors and the Actors Fund to provide primary and specialty care to the performing arts community

- **425 West 59th Street Practice Openings**
 - Gastroenterology and Liver Associates
 - Health System destination for GI Motility Diagnosis and Treatment
 - Radiology
 - Provides mammography, ultrasound, x-ray and bone densitometry
 - MRI to open in November of 2017
 - Orthopedics
 - Provides all Ortho specialties and Rheumatology.

Mount Sinai Doctors Faculty Practice Space Projects at MSW & MSD



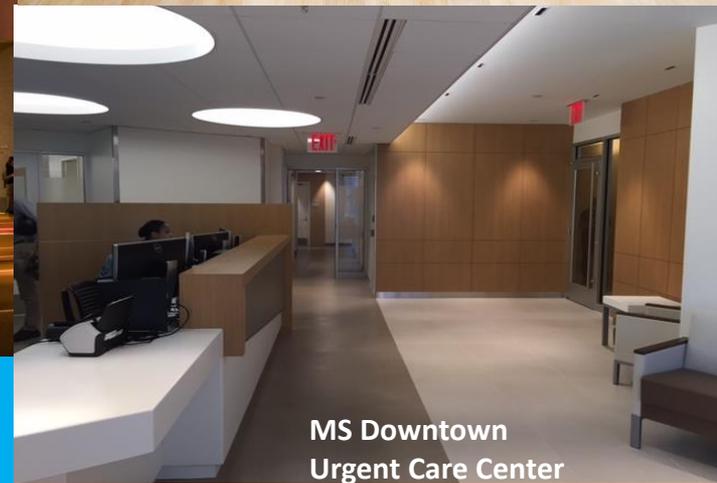
Brodsky 6-Ortho



**MS Downtown
PACC**



**MS Downtown
PACC**

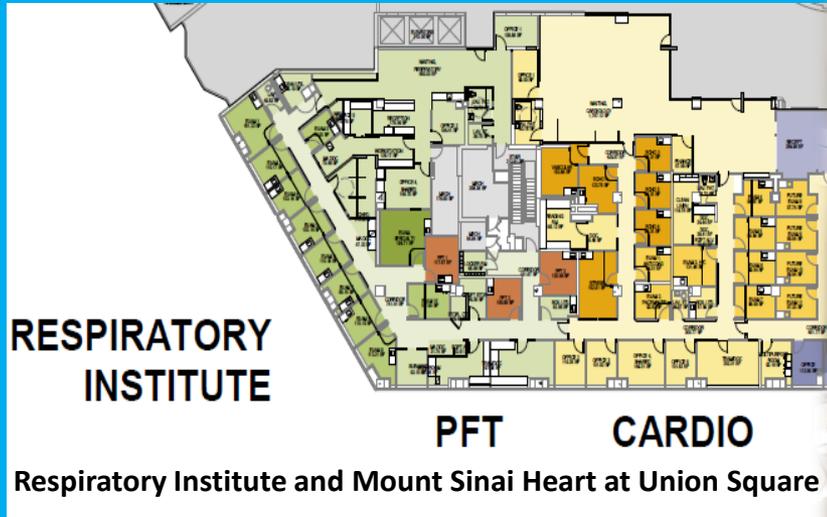


**MS Downtown
Urgent Care Center**

Mount Sinai Doctors Faculty Practice 2018 Space Projects at MSW

Target Timeline	Project
Jan 2018	New space for Internal Medicine and Dermatology at the Ansonia Building on 73 rd and Broadway
Feb 2018	New space for the Department of Surgery Clinical Practices and Administration at 425 W 59 th Street
Aug 2018	New space for Fetal Evaluation Unit and Maternal Fetal Medicine practice at 425 W. 59 th
Q4 2018	Development of Neuroscience Center, which will integrate Neurosurgery and Neurology with the addition of Stroke and Movement Disorders
Q4 2018	Infusion Center expansion and relocation to 425 West 59 th Street

Mount Sinai Doctors Faculty Practice Space Projects at MS Downtown



Financial Results

The School's goal for 2017 is at least breakeven or positive financial operating results.

Financial Operating Results:

	<u>Results</u>
2017	Plan is at least breakeven results
2016	\$ (14,062)
2015	\$ (12,894)
2014	\$ 85
2013	\$ 77
2012	\$ 7,481*

* Includes benefit from one time licensing settlement

Research and FPA growth are major contributors to the School's financial success

Financial Challenges to Continued Success

- School unrestricted operating losses in 2015 and 2016 were (\$12.4) million and (\$14.1) million respectively.
- Liquidity constraints from rapid growth
- Member Hospital faculty practice finances .
- Clinical space constraints.
- One time items included in 2017 break-even budget.
- Capital Project Funding for existing school buildings.
- Investment returns necessary to meet endowment income spending budget.
- Loss of Fabrazyme and Medimmune Royalty Income (over \$24 million).
- Philanthropy support for new Strategic Plan.
- Revenue Diversification.

Action Plan to Meet Financial Challenges

- Continue successful Financial Policies and Goals:
 - School's financial operating results must be positive using only the 4.5% endowment spending rate investment income.
 - Department's must consistently achieve positive financial results.
 - Clinical Departments minimum 2.5% margin.
 - Basic Sciences, Research Institutes achieve budget targets.
 - Incentive plans encourage revenue and margin growth.
- Principles of Department Compensation Models consistently followed:
 - 100% of compensation tied to performance
 - Compensation must be covered by Teaching, Research and Clinical Revenue
 - Quality, productivity and outcomes goals integrated
 - Performance goals for each physician with regular reviews of actual results
 - Productivity Standards.
- Business plans for all clinical and research initiatives.
- Continuous monitoring of financial results with timely corrective actions, if necessary

Action Plan to Meet Financial Challenges

CHALLENGE	ACTIONS
<ul style="list-style-type: none"> 2018 Breakeven Operating Results 	<ul style="list-style-type: none"> Basic science / clinical financial improvement Continued research growth <ul style="list-style-type: none"> – Grow FPA margin Participation with Hospitals in 340B initiatives Strategic Plan Philanthropy MSIP initiatives: <ul style="list-style-type: none"> – SEMA 4 Genomics – Precise MD – Accelerator Fund – Other Licensing and Royalty opportunities
<ul style="list-style-type: none"> Member Hospital Faculty Practice Finances 	<ul style="list-style-type: none"> Improved financial reporting Metrics driven financial management Improved physician productivity Improved revenue cycle management
<ul style="list-style-type: none"> Space Constraints 	<ul style="list-style-type: none"> 85th Street 50,000 sq. ft. – majority occupied Effective use of member hospital FPA space Saint Luke’s FPA space renovations New space leases <ul style="list-style-type: none"> – 1399 Park – 1770 Madison

Action Plan to Meet Financial Challenges

CHALLENGE	ACTIONS
<ul style="list-style-type: none"> Capital Project Funding 	<ul style="list-style-type: none"> Bond refinancing provides project funding FPA Growth and Renovation Reserve Funds
<ul style="list-style-type: none"> Philanthropy to Support Strategic Initiatives 	<ul style="list-style-type: none"> New Capital Campaign underway
<ul style="list-style-type: none"> Investment Returns to support endowment spending rate 	<ul style="list-style-type: none"> Endowment spending rate increase to 4.5%
<ul style="list-style-type: none"> Liquidity 	<ul style="list-style-type: none"> Clinical revenue cycle initiatives Action items above

Strategic Plan 2006 –7: A Spectacular Success

How Did We Achieve Success?

1. Established world-class interdepartmental, multi-disciplinary research teams
2. Developed a new model of research structure by creating 19 Research Institutes:
 - Arnhold Global Health Institute
 - Black Family Stem Cell Institute
 - Charles Bronfman Institute for Personalized Medicine
 - Conduits – Institutes for Translational Sciences
 - Friedman Brain Institute
 - Icahn Institute for Genomics and Multiscale Biology
 - Institute for Health Care Delivery Science
 - Institute for Medical Education
 - Institute for Next Generation Health Care
 - Mindich Child Health and Development Institute
 - Mount Sinai Diabetes, Obesity, and Metabolism Institute
 - Mount Sinai Drug Discovery Institute
 - Mount Sinai Global Health and Emerging Pathogens Institute
 - Mount Sinai Immunology Institute
 - Mount Sinai Institute for Systems Biomedicine
 - Mount Sinai Institute for Translational Epidemiology
 - Mount Sinai Translational and Molecular Imaging Institute
 - Tisch Cancer Institute
 - Zena and Michael A. Wiener Cardiovascular Institute

Strategic Plan 2006 - 7

How Did We Achieve Success?

3. Built Hess Center for Science & Medicine
4. Renovated existing buildings to modernize outdated spaces



Strategic Plan 2006 - 7

How Did We Achieve Success?

5. Invested heavily in Tisch Cancer Institute
Result: - 2015 NCI Designation

6. Invested heavily in High Performance Computing and Genomics and Multi-Scale Biology – the largest high performance computing cluster in Academic Medicine
Result: - Genetics NIH Funding Rank increased from #32 to #4
- Creation of new companies, eg Sema4



Strategic Plan 2006 - 7

How Did We Achieve Success?

7. Created a culture of innovation and entrepreneurship from training to start-up:

Result: - More Patents & Start-Ups

- 685 inventors and 218 patents in 2016

- \$300M deal between Mount Sinai (and three other NCI-designated Cancer Centers) and Celgene to advance novel therapies for cancer

SINA*Innovations*

Strategic Plan 2006 - 7

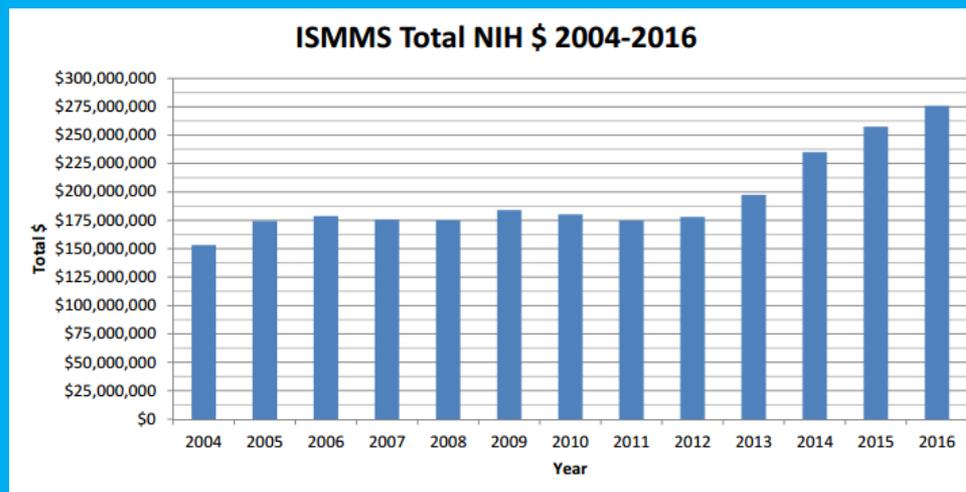
How Did We Achieve Success?

8. Examples of top discoveries that make a difference for our patients:
- Development of ketamine as a novel, rapidly acting antidepressant (Charney)
 - Identification of the first genetic risk factors for neuropsychiatric disorders (schizophrenia, bipolar disorder, autism, Alzheimer's, and Parkinson's) (Buxbaum, Sklar, Goate, Roussos)
 - Combination therapy for multiple myeloma (Jaganath, Barlogie)
 - New immunotherapy for malignant melanoma (Bhardwaj)
 - Launch of first Human artificial pancreas in NYC (Stewart)
 - Identification of de novo mutations that cause congenital heart abnormalities and development of treatments to counteract those abnormalities (Gelb)
 - Characterization of the human gut microbiome and its influence on ulcerative colitis and Crohn's disease (Cho, Dubinsky, Schadt)
 - First time reconstruction of an extinct organism: the 1918 pandemic influenza virus (Palese, Garcia-Sastre)
 - Vaccine against avian influenza (bird flu) (Palese, Garcia-Sastre)

Objective Metrics-2004 vs 2006 vs 2016:

NIH Funding: from \$153M to \$178M to \$290M

NIH Ranking: from #25 to #18 to #13



Basic Science Department NIH Funding Rank-2006 vs 2016:

Genetics from #30 to #4

Microbiology from #14 to #4

Neurosciences from #16 to #2

Pharmacology from #27 to #3

Strategic Plan 2017 – Process – Phase 1

37 Work Groups involving >200 Mount Sinai Faculty

37 External Advisory Boards comprising 135 world experts

22 members of Mount Sinai Strategic Plan Council

Worked closely with Development from the beginning

Begin Phase 1: November 2015

End Phase 1: November 2016

12-month course resulted in a transparent process with bottom-up and top-down recommendations on which there was universal consensus.

Guiding Principles

1. Take advantage of the size and excellence of the Mount Sinai Health System
2. Establish unrivaled excellence in medical and graduate education
3. Anticipate and fund new areas of research that will result in discovery of novel approaches to disease diagnosis and treatment
4. Invest further in current areas of excellence
5. Power an “Engine of Discovery” to create more IP, more collaborations with Industry, and more Mount Sinai companies

“One of the primary goals I have is to get Google to be a big company that has the nimbleness and soul and passion and speed of a start-up.”

Larry Page

January 20, 2011

Upon taking over as Chief Executive

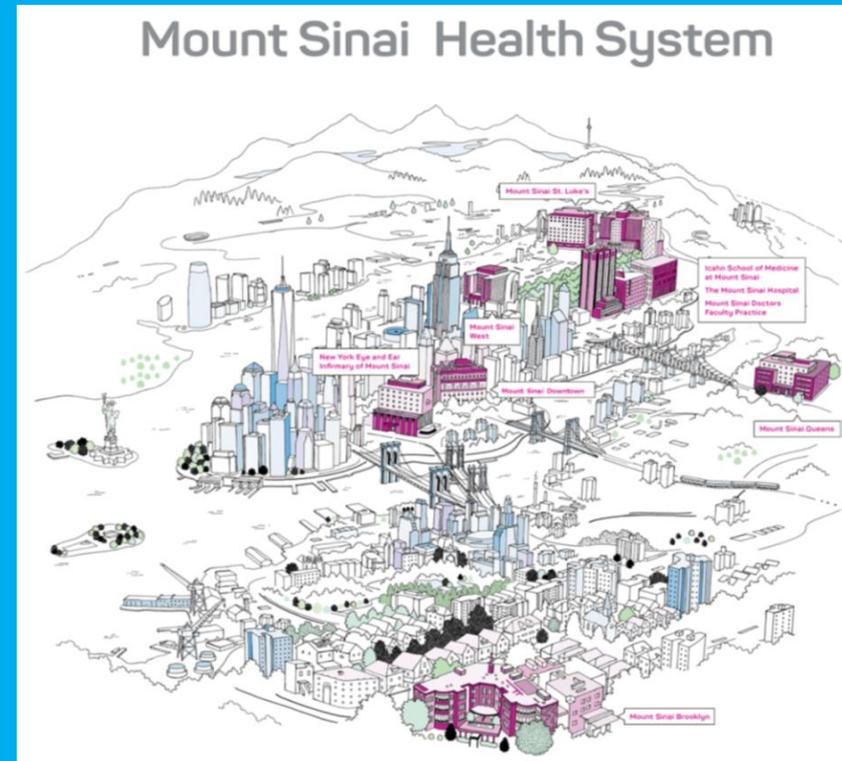
Taking Advantage of the Health System (MSHS)

1. Establish the following new Research Institutes:

- Addiction Institute at Mount Sinai
- Adolescent Health Research Institute
- Exposome Institute
- Institute for Transformative Clinical Trials
- Women's Health Research Institute

2. Expand the scope of research to additional disease areas:

- Diabetes/Obesity
- GI
- Kidney
- Pulmonary
- Pediatrics
- Others



Taking Advantage of the Health System (MSHS)

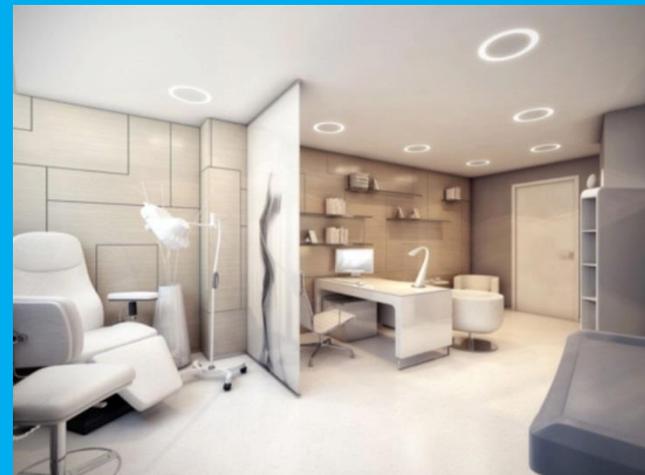
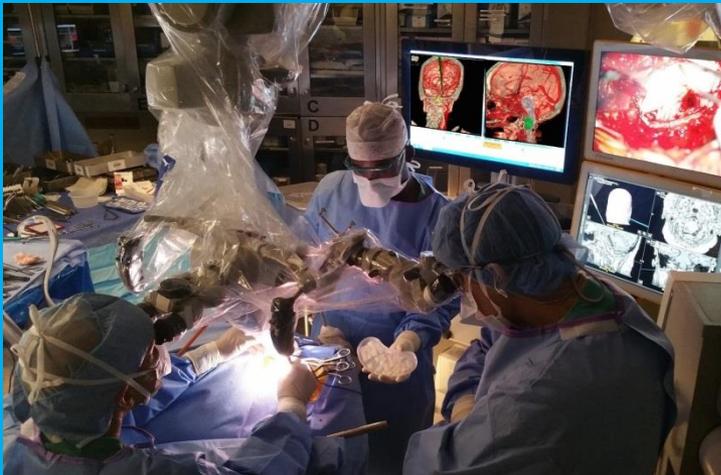
3. Invest in Surgical and Rehabilitation Innovations

- Simulations to guide surgeons
- Exoskeletons - helping people regain use of their limbs

4. New Academic Department: Health System Design & Global Health

- Transformation strategies for optimized healthcare in our local communities and globally
- Next generation care models to pioneer innovative approaches to healthcare

5. Institute for Next Generation Health Care



Unrivaled Excellence in Medical Education

Diversity of thought, experience and demographics is the key to progress and innovation in medical education, patient care, and biomedical research. It is critically important for creating an environment of learning and discovery that challenges convention and offers every student the opportunity to achieve their fullest potential to impact the health of the world.



Unrivaled Excellence in Medical Education

Center for Learning and Development

Creating an environment of learning and discovery that allows students from diverse cultural, socioeconomic, professional, and educational backgrounds to maximize their potential

The Institute for Medical Education

Recruiting, promoting, and retaining the best educators who are key drivers of institutional success. The IME allows our faculty to improve the quality of their teaching, disseminate their innovations, generate grant support for their research, and enhance the reputation of the Icahn School of Medicine

Unrivaled Excellence in Medical Education

Scholarship support.

Setting a new standard by providing more scholarship support to our students to reduce the profound impact that debt has had on healthcare in the United States.

Space:

Our goal is to double the footprint of Education at Icahn School of Medicine, creating a vertical campus that will bring the Medical and Graduate Schools together for the first time in our history, aligning our teaching, and enhancing the learning resources for our students. This expanded space will include new classrooms and lecture halls, a home for the Center for Learning and Development, and a state-of-the-art Simulation and Standardized Patient Training Center

Unparalleled Excellence in Graduate Education



- Spearhead a pedagogical shift to transform biomedical research and its translation into precision medicine.
- Reaffirm Mount Sinai as a leading choice for world-class graduate scientists who will innovate and make breakthrough discoveries that lead to better patient outcomes.
- Curriculum reform that will empower graduate and post-graduate trainees with the necessary skills to break down current barriers and achieve inter-disciplinary innovation.

Anticipate & Fund New Areas of Research

Major Investment in Precision Medicine

Precision Medicine is an innovative model of healthcare that customizes diagnosis and treatment for individual patients, based not only on our DNA, but also on everything else in our medical history, lifestyle, and environment.

Precision Medicine promises to yield dramatic advances in diagnosis, treatment, and prevention.

Precision Medicine is a major initiative of the National Institutes of Health and Mount Sinai will lead the way.

Anticipate & Fund New Areas of Research

Major Investment in Precision Medicine

Mount Sinai is uniquely poised to lead Precision Medicine efforts nationally:

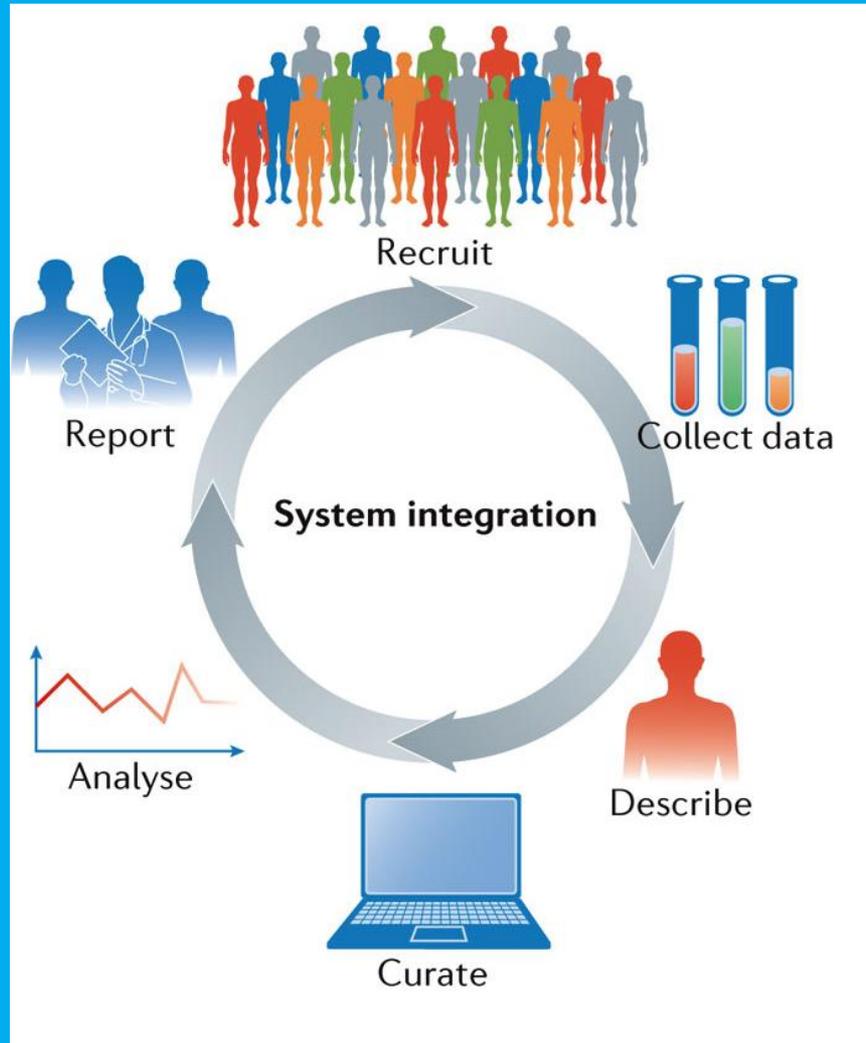
- Large and diverse patient population
- World class interdisciplinary expertise in genomics, big data, supercomputing, and bioinformatics
- Ability to translate from lab directly to the clinic

Precision medicine will transform healthcare delivery:

- Patients are more in control and have better outcomes
- Reduced costs and side effects with more accurate treatments
- Mount Sinai will be the leading institution in promoting wellness.

Anticipate & Fund New Areas of Research

Precision Medicine – The Future of Healthcare



Genetic Vulnerabilities
Medical History
Laboratory Tests
Life History &
Environmental Influences

↓

Data Science

↓

Assessment of Risk
More Accurate Diagnosis

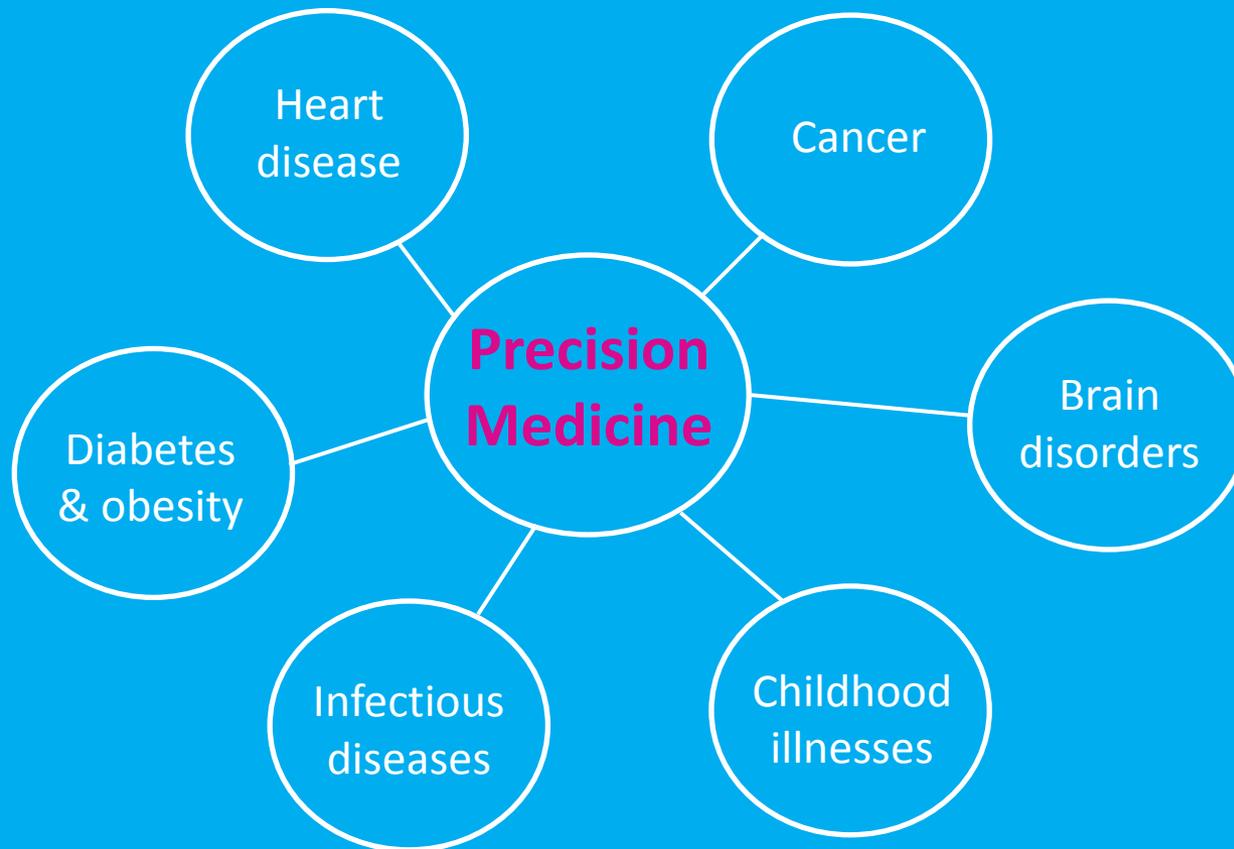
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Tailored Treatments
and Cures

Ultimately: Disease Prevention

Anticipate & Fund New Areas of Research

Precision Medicine – A New Model of Discovery to Transform Healthcare

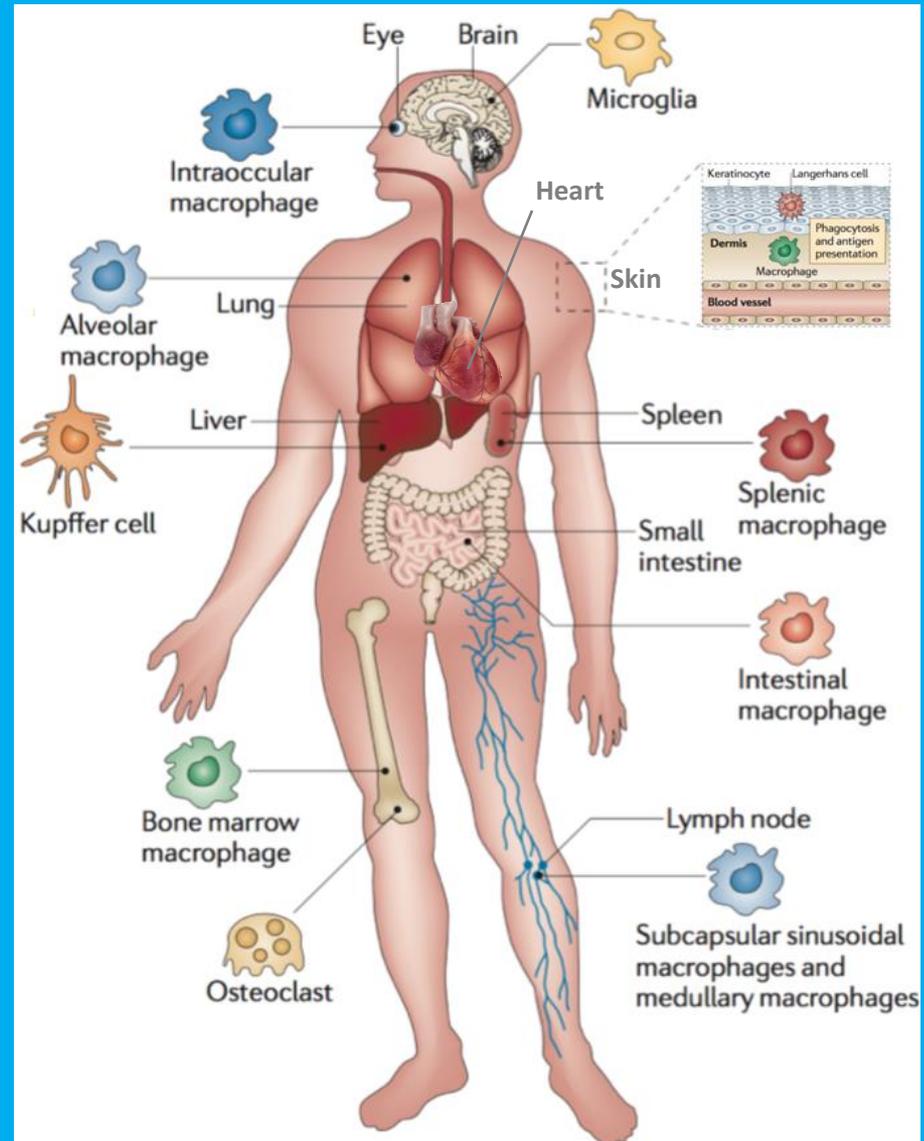


Driving advances in all areas of healthcare...

Anticipate & Fund New Areas of Research

Major Investment in Immunology

Cells of the immune system are present in every organ, influence all disease states, and represent a path toward unprecedented, targeted intervention to treat human illness.

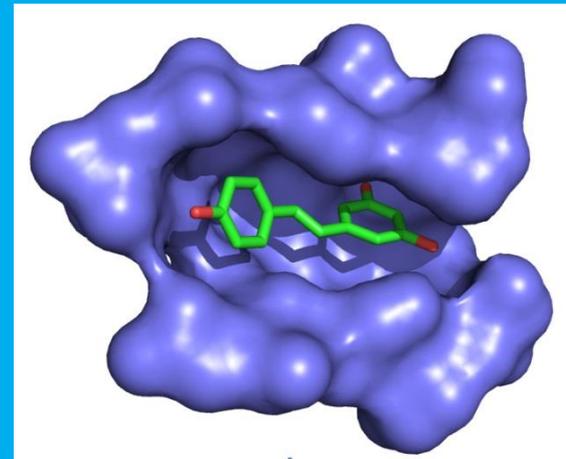


Powering the Engine of Discovery

Mount Sinai Drug Discovery Institute

Establish Centers of Excellence in areas of greatest potential:

1. Neuro-Therapeutics, focused on developing novel therapeutics for brain disorders
2. Discovery Medicine, which will leverage novel insights in human genetics and genomics to develop “precision medicines”
3. Immuno-Therapeutics, to develop human therapeutic antibodies and vaccines that target cancer, heart disease, diabetes, brain disorders, and others
4. Genome Editing, capturing the power of CRISPR-base high-throughput genomic screens to develop innovative therapeutics.



Led by Mount Sinai Innovation Partners (MSIP), this investment will solidify Mount Sinai's position as a leading innovator in healthcare/life sciences on par with other elite institutions:

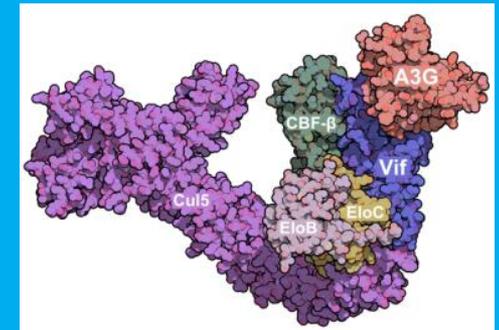
- Reinforces Mount Sinai's position as a leader in healthcare innovation
- Accelerates the development of commercially relevant Mount Sinai technologies
- Increases the number and value of *license-ready* Mount Sinai technologies
- Increases financial return from commercialization of Mount Sinai technologies
- Recruits and retains innovation-driven investigators
- Enhances Mount Sinai's reputation as a leader in "Bench-to-Bedside" translational research

The Accelerator Program will attract additional funding for translational research, new IP, and new company creation.

Invest Further in Current Areas of Excellence

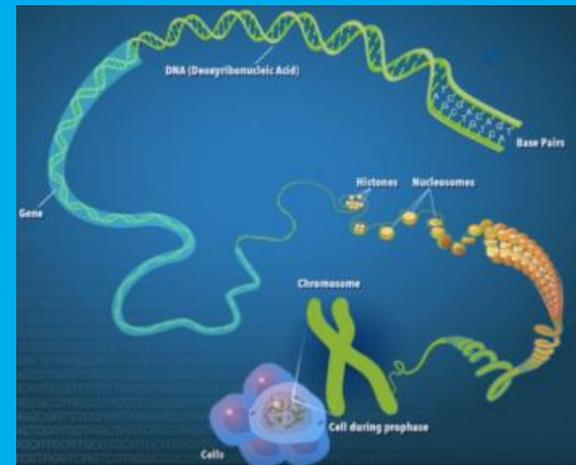
Clinical Sciences:

1. Brain
2. Cancer
3. Diabetes
4. Geriatrics
5. Heart
6. Infectious Disease
7. Others



And the Discovery & Translational Sciences that underpin them:

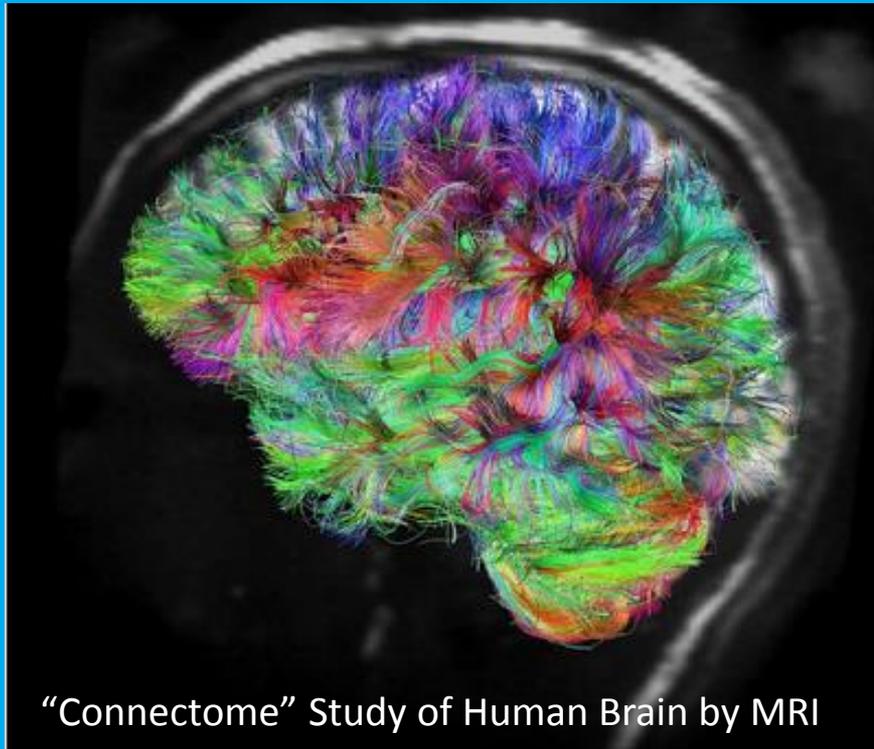
1. Cell & Developmental Biology (including Stem Cells)
2. Genetics and Genomic Sciences
3. Microbiology (including microbiome)
4. Neuroscience
5. Pharmacological Sciences
6. Others



Invest Further in Current Areas of Excellence

Transformational Exploration of the Brain

A single human brain is composed of 100 billion nerve cells which organize into 100 trillion connections (synapses). Plus 100 billion glial cells which control and modulate the nerve circuitry.



“Connectome” Study of Human Brain by MRI

We now have the power to define microcircuits in the brain and, in laboratory animals, establish the precise behavioral function served by each circuit.

These approaches immediately inform deep brain stimulation treatments for Parkinson’s disease and other disorders and dramatically advance our understanding of the brain—the last frontier of modern medicine.

Strategic Plan 2017 – Recruit New Faculty

The goals of the 2006 strategic plan were achieved through the recruitment of 150 faculty in targeted areas.

To achieve the goals of the 2017 Strategic Plan, we anticipate that we will need to recruit a similar number of Discovery, Translational, and Computational research faculty.

	<u>2017 Plan</u>
Discovery Science Lab-based research	90
Translational Science Patient-oriented research	50 (50% research effort)
Computational Science Big data integration (laboratory testing, electronic medical records, etc.)	35

Strategic Plan 2017 – Need for New Space

Mount Sinai is currently #3 in Research \$s/SF

Lack of space inhibits growth of programs and recruitment

Jeopardizes Mount Sinai's current upward trajectory

Strategic Plan 2017 – Space Needs

A new research building, comparable in size to the Hess Center, is needed to accomplish the Strategic Plan goals.

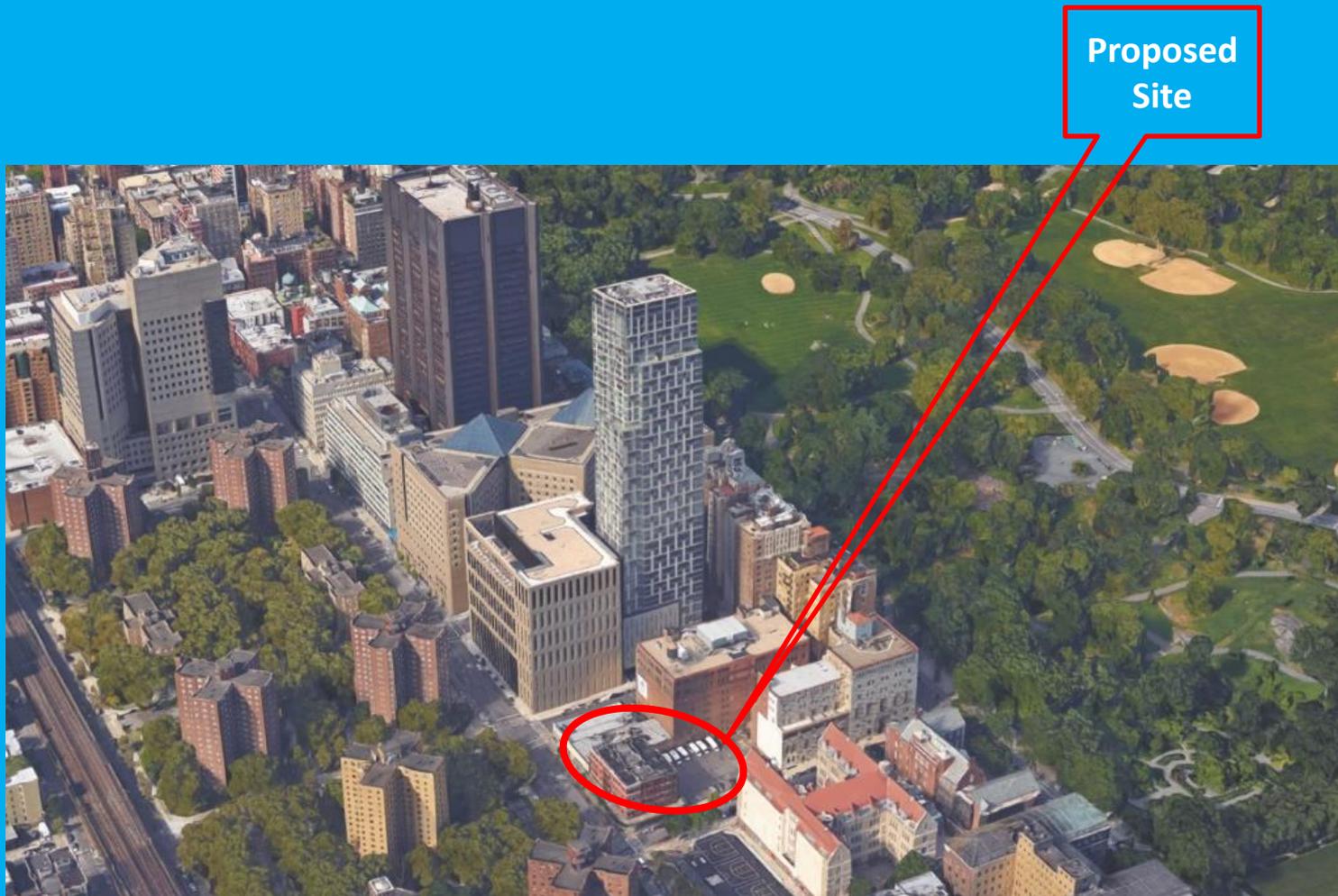
Discovery Science	180,000 nsf (includes vivarium)
Translational Science	20,000 nsf
Computational Science	20,000 nsf
Public & Meeting space	10,000 nsf
Clinical Space*	TBD
Incubator space**	TBD

* Clinical Space to be determined based on MSHS masterplan

** Incubator space to be determined in collaboration with venture partner

Strategic Plan 2017 - Proposal

New Life Science Center at 102-103 St and Madison Ave



Ultimate Outcomes

Measures of Success for the Strategic Plan:

1. Outstanding publications
2. Increased NIH funding / Higher NIH Ranking
3. More IP, more collaborations with industry, more Sinai companies formed
4. **MOST IMPORTANT:** Discoveries that make the Mount Sinai Health System the nation's best, and improve the lives of our patients, both locally and around the world

6th SINAIinnovations – Cancer



SINAInnovations
Leading a New Era of Discovery
Cancer
October 17-18, 2017
Stern Auditorium
1468 Madison Avenue



Mount Sinai Health Hackathon
Theme: Cancer
October 13-15, 2017
Davis Conference Center
1470 Madison Avenue, New York, NY 10029



5th Annual
Careers & Connections
October 17, 2017
Davis Conference Center
1470 Madison Avenue, New York, NY 10029



For you. For life.

