

**MD Anderson's Moon Shots Program:
Transforming Cancer Prevention and Care**

THE UNIVERSITY OF TEXAS
**MD Anderson
Cancer Center**
Making Cancer History®

Ronald A. DePinho, M.D.
President

Our Mission

To eliminate cancer in Texas, the nation and the world through outstanding programs that integrate patient care, research and prevention, and through education for undergraduate and graduate students, trainees, professionals, employees and the public.

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21,000 People, One Goal

Our singular focus: Making Cancer History

Our organizing principle: Serve the patient

Our culture: Collaboration

Our strategy: Research-driven patient care

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Serve the Patient

MD Anderson team

- 21,000 employees, including nearly 1,000 physicians and 3,000 nurses
- More than 1,000 volunteers
- 1,700 faculty across 66 departments

Our size and volume:

- Enables multidisciplinary care
- Builds experience in common and rare cancers
- Provides unique options for our patients: technology and trials

Total patients served

- 127,000 (Houston)
- 114,000 (Network)

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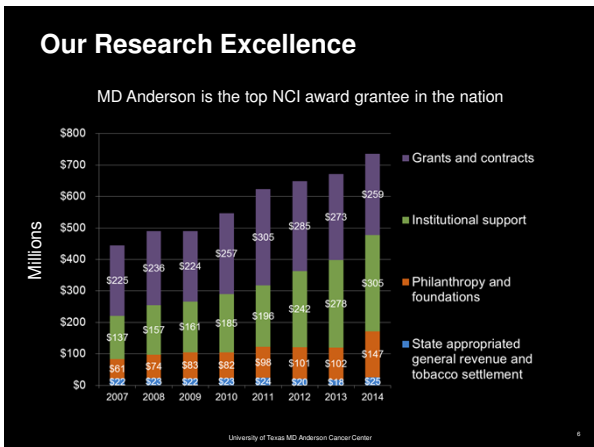
Patient-Focused Growth

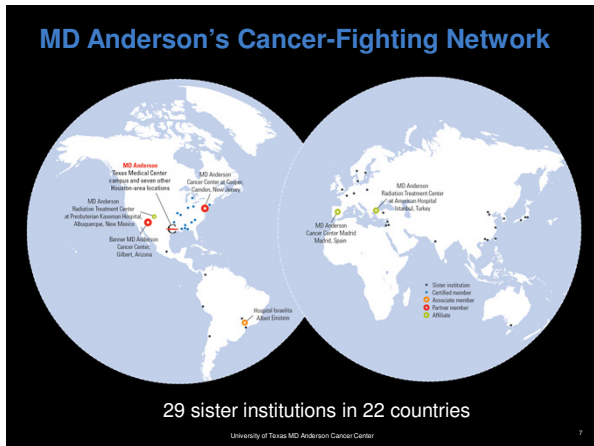
Clinical and Translational Investments

- Alkek Hospital Expansion: 24 floors, 645 inpatient beds
- 16 million gross square feet in the Texas Medical Center
- Major new buildings
 - Pavilion for state-of-the-art surgery and interventional radiology
 - Zayed Building for Personalized Cancer Care



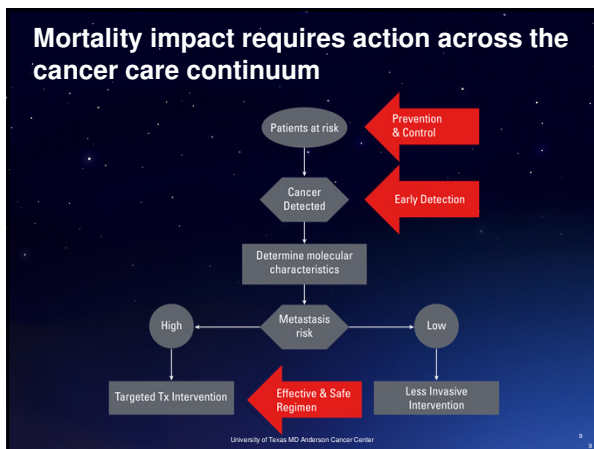
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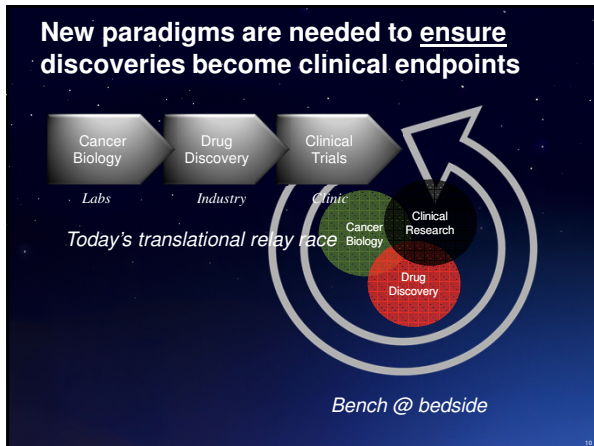


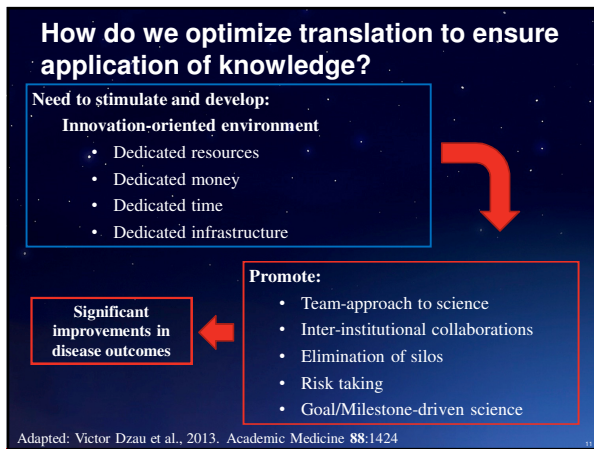


Unprecedented Opportunity in Cancer Medicine

- Deep knowledge of biology
- Disruptive technologies
- Critical mass & global reach







The Moon Shots Program

Goal-oriented multi-disciplinary effort harnessing available knowledge and new disruptive technologies to dramatically reduce cancer mortality through prevention, early detection and curative treatments

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The Moon Shots Program

- Flagship projects underway designed to impact cancer mortality
- Projects span prevention, early detection and treatment areas
- Platforms enable execution through expert professionals
- Collaborations expanding and funding growing: ~\$223M

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The Moon Shots Program

Currently funded moon shots	Pilot moon shots
<ul style="list-style-type: none">• Leukemia – MDS/AML• Leukemia – CLL• Prostate cancer• Melanoma• Lung cancer• Breast and Ovarian cancer	<ul style="list-style-type: none">• Glioblastoma• Pancreatic cancer• HPV-associated cancers• Colorectal cancer• B-cell Lymphoma• Multiple Myeloma

Collectively ~50% of cancer deaths

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Moon Shot Platforms

<ul style="list-style-type: none">• Cancer Prevention and Control• APOLLO & Big Data• Clinical Genomics• Research Genomics• Proteomics• Immunotherapy• Institute for Personalized Cancer Therapy	<ul style="list-style-type: none">• Institute of Applied Cancer Sciences• Oncology Research for Biologics & Immunotherapy Translation (ORBIT)• Applied Cellular Therapy• Center for Co-Clinical Trials
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Cancer Prevention and Control Platform

Up to 50% of cancers can be prevented

EVIDENCE-BASED INTERVENTIONS

Policy Education Community Services

Policy, education and evidence-based service delivery can make a measurable and lasting difference in the community, especially among the underserved

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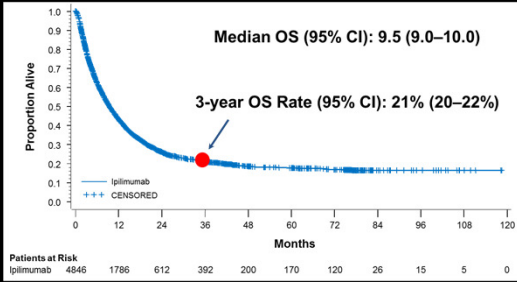
Melanoma Moon Shot Team and Cancer Control Platform

- Excessive UV exposure during childhood drives a significant increase in melanoma
- Collaborative efforts have led to positive outcomes via education and policy
 - Early childhood education (K-12) programming
 - Preschool sun protection curriculum
 - Tanning bed legislation passed in Texas and nine other states
 - Currently proposed in 15 other states

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Immunotherapy: Paradigm Shift

Ipilimumab in Metastatic Melanoma: Pooled OS Analysis (4846 Patients)

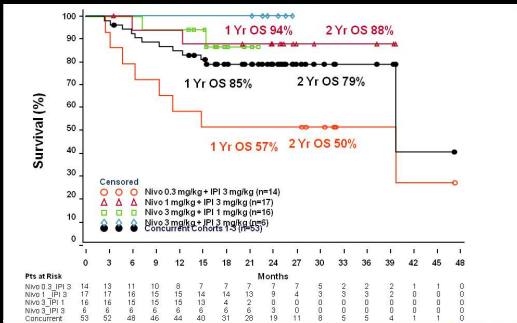


Hodi, ECCO 2014

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Immunotherapy combos: Game-changer

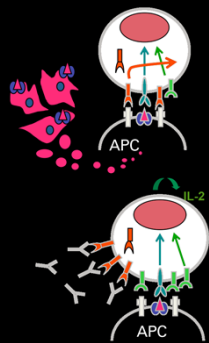


Presented By Mario Sznol at 2014 ASCO Annual Meeting



Immunotherapy Platform

- Director, James Allison
- Blends world-class expertise and leading technology
- Enables researchers to take the newest immune-modifying drugs, test them in both preclinical and clinical settings, and apply deep analyses for mechanistic insight
- Facilitates clinical trials across diverse tumor types
- Aggregates clinical and research data (APOLLO & Big Data)



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Ovarian Cancer Moon Shot

- No improvement in survival for decades
- Survival correlates with complete surgical resection of disease
- Pioneered the Anderson algorithm for personalized surgery
 - Less-invasive laparoscopy: two oncologists independently assess and objectively score extent of disease
 - Proceed to surgery or chemotherapy to reduce tumor burden before surgery
 - Result: complete removal in ~90%, compared to 20%
 - Focus: dissemination of practice-changing approach

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Ovarian Cancer Moon Shot

Anderson algorithm for personalized surgery in ovarian cancer

Nature Reviews | Clinical Oncology

Nek, A. M. et al. (2015) A framework for a personalized surgical approach to ovarian cancer
Nat. Rev. Clin. Oncol. doi:10.1038/nrclinonc.2015.26

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Ovarian Cancer Moon Shot

Novel clinical trial design for patients treated on the Anderson Algorithm

Nature Reviews | Clinical Oncology

Nek, A. M. et al. (2015) A framework for a personalized surgical approach to ovarian cancer
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Lung Cancer Moon Shot

Integrated plan to significantly advance prevention, early detection, and molecularly-guided treatment of lung cancer

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Lung Cancer Moon Shot Overview

PROJECT 1: SMOKING PREVENTION AND CESSATION

- Youth prevention: ASPIRE program**
 - Web-based
 - HCP training: In-Sina clinics
- Adult cessation:**
 - Community intervention
 - Personalized clinical trials for cessation
 - Biomarker development to optimize cessation: Project Switch
 - Neural predictive biomarker of cessation: Project Reward
 - Enhance existing TTP: EMR-based triggers, Project Echo, Telemedicine/Web-based

PROJECT 2: EARLY DETECTION

- MD Anderson lung cancer screening trial**
 - CT Screening
 - Biomarker collection, advanced imaging
- MD Anderson screening network**
 - U.S. partners
 - GAP partners (China, Brazil, Germany, etc)
 - Smoking prevention module
- Biomarker Groups**
 - Genomic profiling and risk stratification
 - Blood-based
 - Airway changes
 - Advanced Imaging

PROJECT 3: GEMINI PROGRAM (GEnomic Marker-guided Therapy Initiative)

- BATTLE clinical program**
 - Metastatic
 - Locally advanced
 - Early stage (ES)
 - FDC, rebiopsy program
- Target and drug discovery group**
 - Priority targets: Immunotherapy, KRAS/LKB1, Resistance
 - Drug repurposing pipeline
 - PDX, genotypically-defined cell lines
 - High throughput drug screening
- Integrated GEMINI database**
- Molecular Profiling (MDL, TMPL)**
- Bioinfo/Biostats**
- IACS, Immunotherapy Big Data, Proteomics, CGL, IPCT**

Legend: Clinical studies (Blue), Platform/Core (Grey), Preclinical studies (Green)

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Lung Cancer Moon Shot: Integration of Research and Platform Dissemination Efforts

Research and Discovery

- ADULT CESSATION PROJECT**
 - MDACC TTP/Adult Cessation**
 - Automated EHR
 - MDACC Algorithms
 - Counseling program
 - Project Reward
 - Telemedicine
- YOUTH PREVENTION PROJECT**
 - ASPIRE**
 - Houston based clinics (In Sina)
- REGULATIONS/LEGISLATION**

Dissemination

- CANCER CONTROL PLATFORM**
 - UT System TTP/Adult Cessation**
 - Automated EHR
 - MDACC Algorithms
 - Counseling program
 - Project Reward
 - Project Echo**
 - Mental health clinics
- CANCER CONTROL PLATFORM**
 - CATCH (Coordinated Approach To Child Health)**
 - UT System integration
 - Texas and US implementation
- TX LEGISLATION**
 - CDC recommended funding levels
 - Tobacco-free pharmacies (e.g. CVS)

Institute for Personalized Cancer Therapy

- Created to support preclinical research and clinical trials in which a patient's tumor biopsy is assayed for abnormal genes and gene products to select therapy with agents targeting the product of those particular abnormal genes
- This integrated research and clinical trials program is aimed at implementing personalized cancer therapy and improving patient outcomes

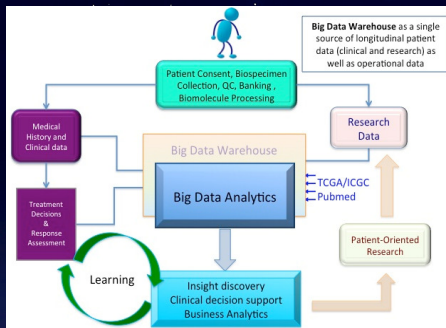
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Big Data Platform

- Integrates systems to improve patient outcomes, such that every patient contributes to and potentially benefits from research
- Dismantles silos that impede research-driven patient care, gathers data related to questions across tumor types, increases efficient use of data, focuses on a foundation built to secure and protect data and maintains historical accuracy of legacy data

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APOLLO Platform: Adaptive Patient-Oriented Longitudinal Learning and Optimization



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Delivering The Best Possible Care To More Patients

The MD Anderson Oncology Expert Advisor™
Powered by IBM Watson
More effective care for more patients

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How OEA™ System Is Trained

Training of EBA™

The MD Anderson Oncology Expert Advisor™
Powered by IBM Watson
More effective care for more patients

Continuous Training

Democratization

The MD Anderson Oncology Expert Advisor™
Powered by IBM Watson
More effective care for more patients

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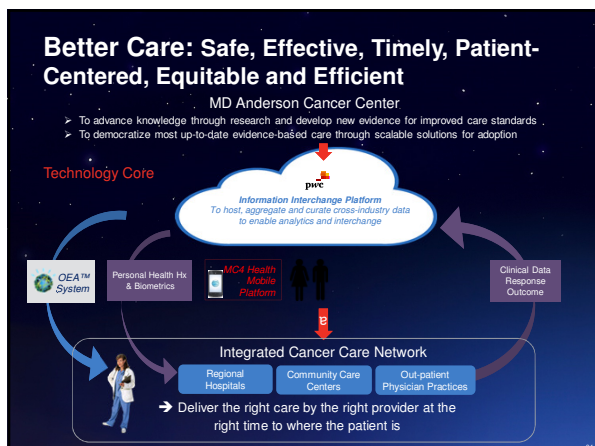
IOM Aim: Access to Equitable Care

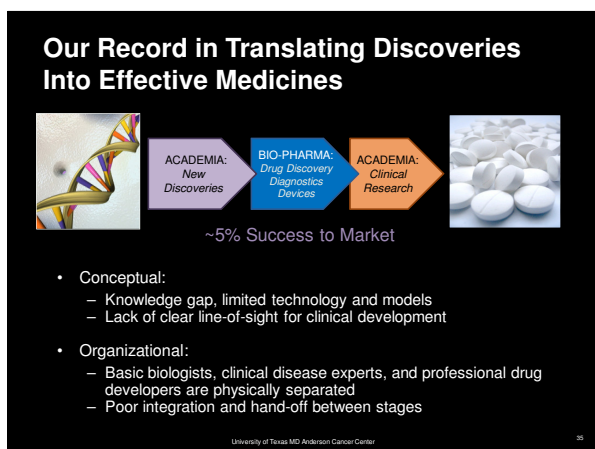
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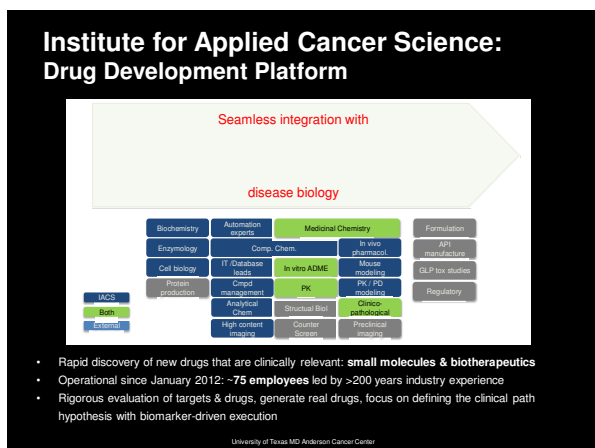
3 Core Functionalities of MD Anderson OEA™

- Dynamic patient summary that assimilates complete patient data
- Evidence-based treatment options with supporting evidence, including clinical trial options
- Care pathway advisory to better manage patient on therapy for optimal outcome

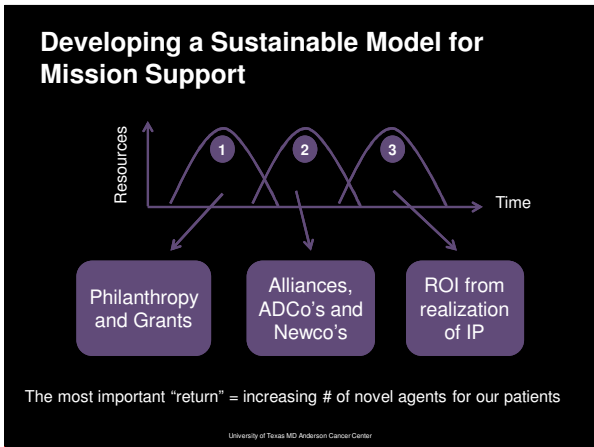
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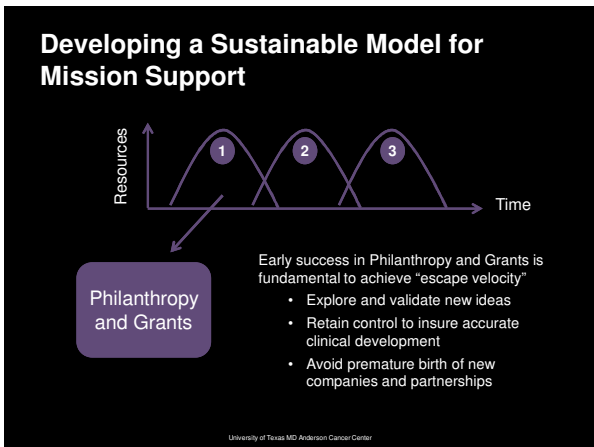












Developing a Sustainable Model for Mission Support

- Efficient translation requires productive collaboration with private sector.
- Achieved via Strategic Alliances with Big Pharma, risk-sharing agreements with smaller biotechs, Asset Development Corporations for individual drug candidates, or NewCo formation.
- All arrangements are guided by our conflict of interest rules to preserve research integrity and the safety of our patients.

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Developing a Sustainable Model for Mission Support

UT MD Anderson, GlaxoSmithKline to collaborate on new approach to cancer immune therapy; success could earn cancer center \$335 million plus royalties

MD Anderson Asset Release (2012)

The University of Texas MD Anderson Cancer Center and GlaxoSmithKline (GSK) have entered into a strategic partnership to develop and commercialize a new approach to cancer immunotherapy. The partnership includes a license to GSK for the development and commercialization of a new class of cancer immunotherapies. The partnership also includes a license to MD Anderson for the development and commercialization of a new class of cancer immunotherapies.

Intrexon, ZIOPHARM, and MD Anderson Collaborate in CAR T Cells Immunotherapy

IP Commercialization

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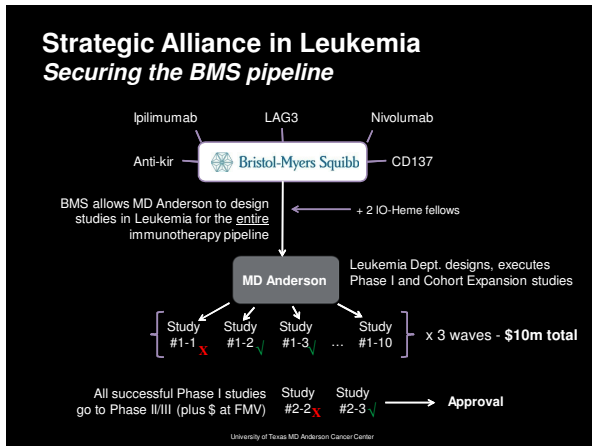
Optimize Strategic Alliances to 'Move the Clinical Needle'

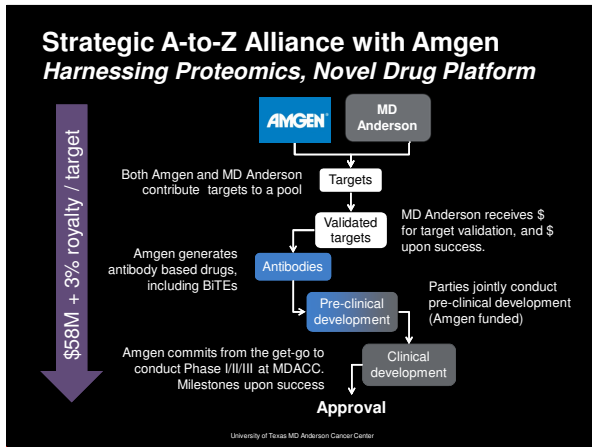
- Interactions with Industry have been limited to a specific field and heavily regulated by the sponsor
- Innovation alternative includes Investigator-Initiated Studies with limited (or zero) industry support; even in those cases, the key drugs are difficult to obtain, particularly if they are in pivotal clinical trials
- We can be far more successful if we work collaboratively, with meaningful input from both parties toward a common goal

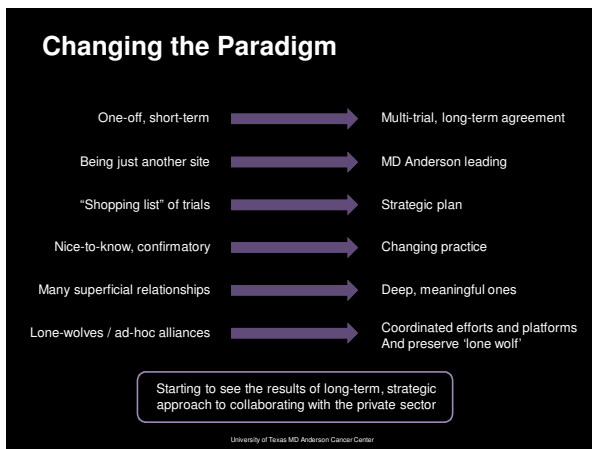
Solution: Pioneer novel interaction models where we:

- Gain access to all the truly impactful drugs, with few restrictions
- Are able to guide the course of collaboration, and stay involved throughout
- Enable all of that with substantial funding from the pharma partner

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**Fulfilling a Solemn Responsibility
To Our Patients, Future Generations**

*“Knowing is not enough;
we must apply.
Willing is not enough;
we must do.”*



Johann Wolfgang von Goethe

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