

# Diabetes- A framework for Interprofessional Education, Collaborative Practice, and Team Science

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# Objectives

- Articulate the need for interprofessional education and collaborative practice in diabetes.
- Describe the rationale and relevance for team science in advancing diabetes research.
- Illustrate examples of interprofessional education, practice, and research.



# Paradigm Shift

- The health care delivery system does not provide consistent, high-quality medical care; A fundamental paradigm shift is required to foster innovation and improve outcomes.

Physician Centered practice	....	Patient Centered practice
Practitioner autonomy	....	Team collaboration
Focus on illness & cure	....	Focus on health promotion
Passive patient role	....	Involved patients & families
Acute, episodic care	....	Care for chronic conditions

Institute of Medicine, Crossing the Quality Chasm (2001)



Morrison, G. Goldfarb, S, Lancken, PN. (2010 ) *Team Training of Medical Students in the 21<sup>st</sup> Century: Would Flexner Approve?* Academic Medicine 85 (2), 254-259.

- In the 20<sup>th</sup> Century, team members were resources for the physician as the decision maker.
- In the 21<sup>st</sup> Century - team members are responsible for key decisions in the patient's care together with the physician.
- Health professionals must realize that the collective knowledge of the group far exceeds that of an individual.
- This shift demands a change in how all health care providers be educated.



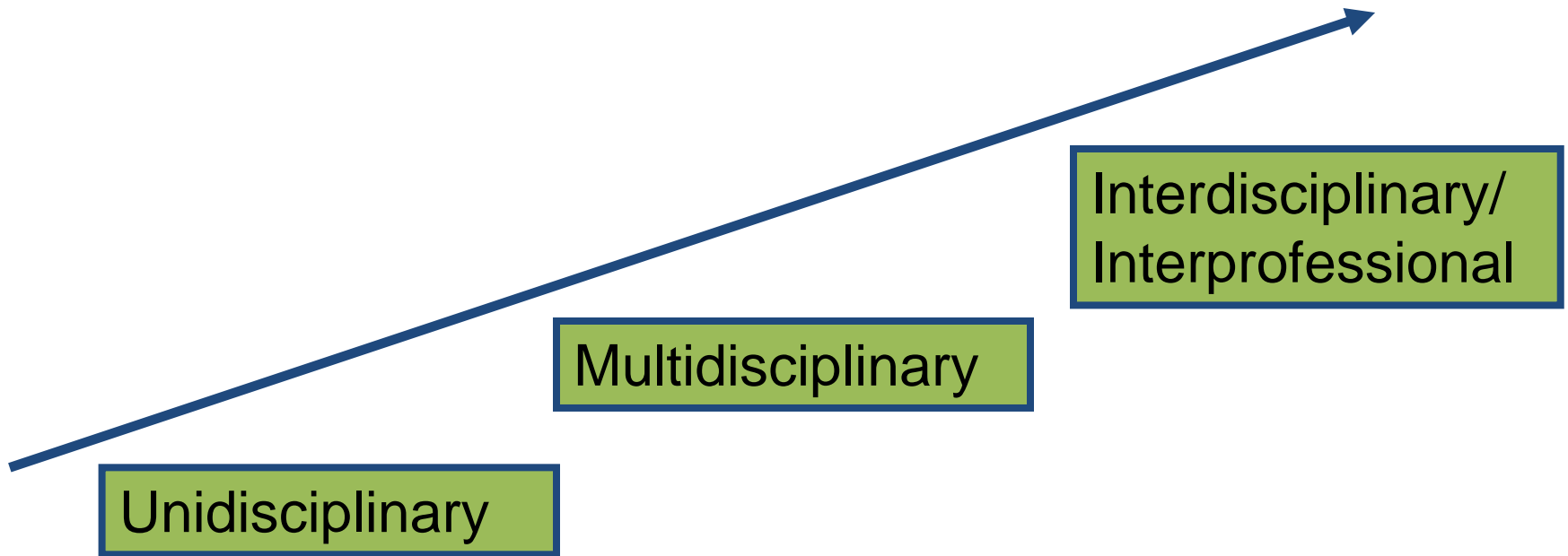
# Interprofessional Education and Practice Definitions

- **Interprofessional education** occurs when two or more professions learn with, about, and from each other to enable effective collaboration and **improve health outcomes**.
- **Interprofessional collaborative practice** “occurs when multiple health workers from different professional backgrounds provide **comprehensive** health services by working with **patients, their families, caregivers, and communities** to deliver the highest quality of care across settings.”

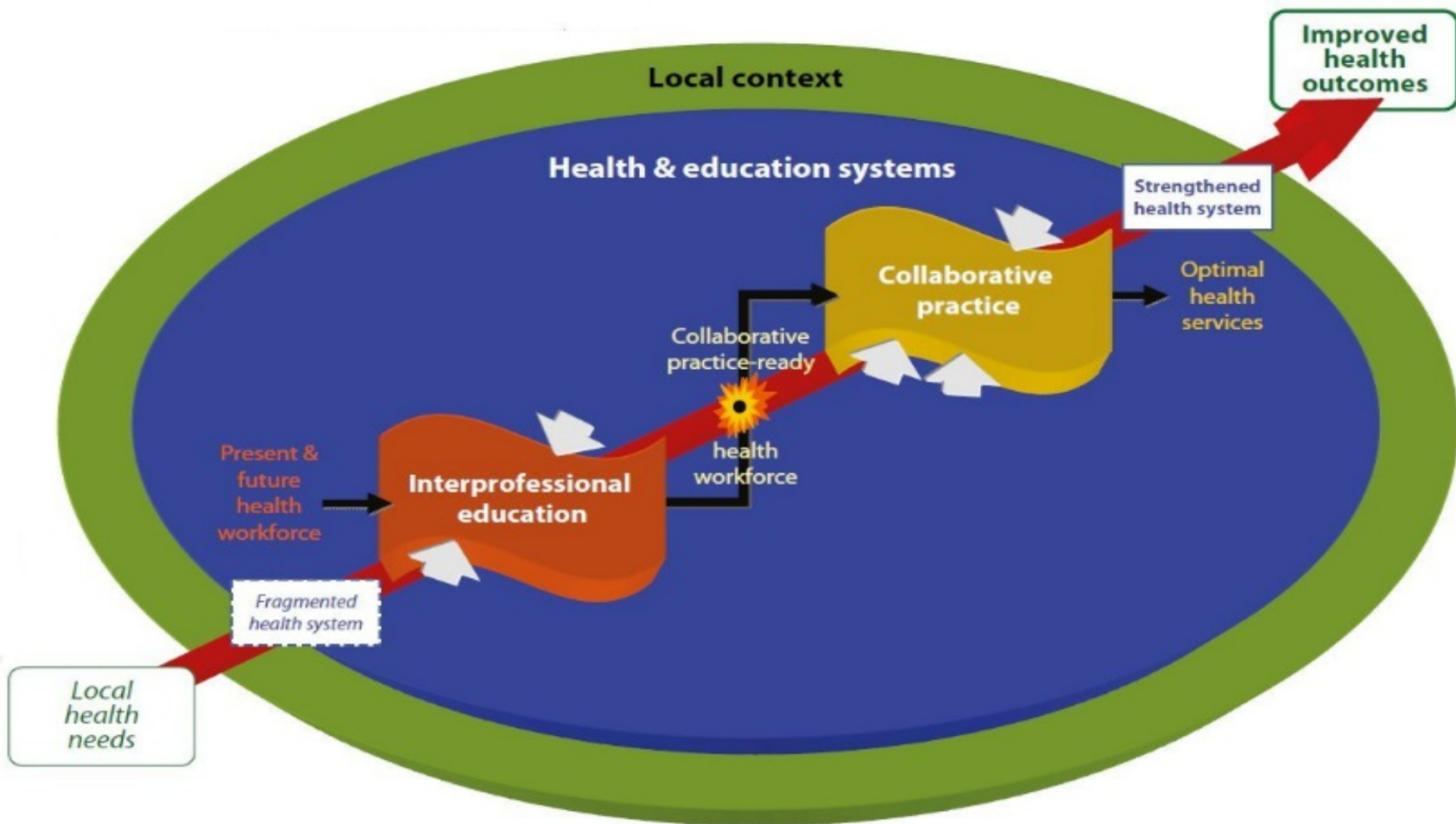
Sources: *Framework for Action on Interprofessional Education and Collaborative Practice*, 2010, World Health Organization, Geneva, Switzerland.



# A Hierarchy of Collaboration



# Interprofessional Education & Collaborative Practice



Framework for Action on Interprofessional Education and Collaborative Practice, 2010, World Health Organization, Geneva, Switzerland.



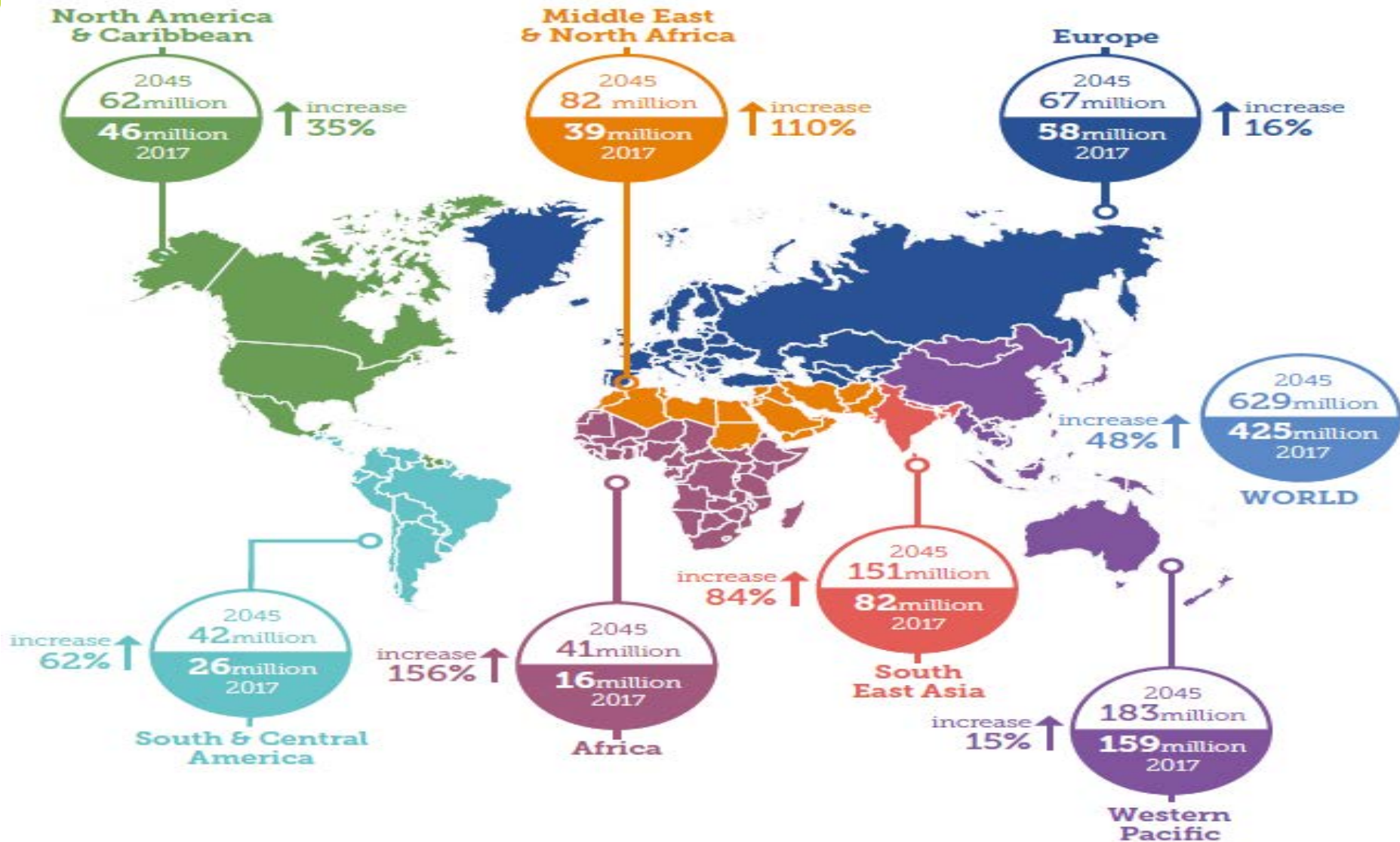
# Diabetes....

- Diabetes is the ideal framework for interprofessional education/practice and for team science.





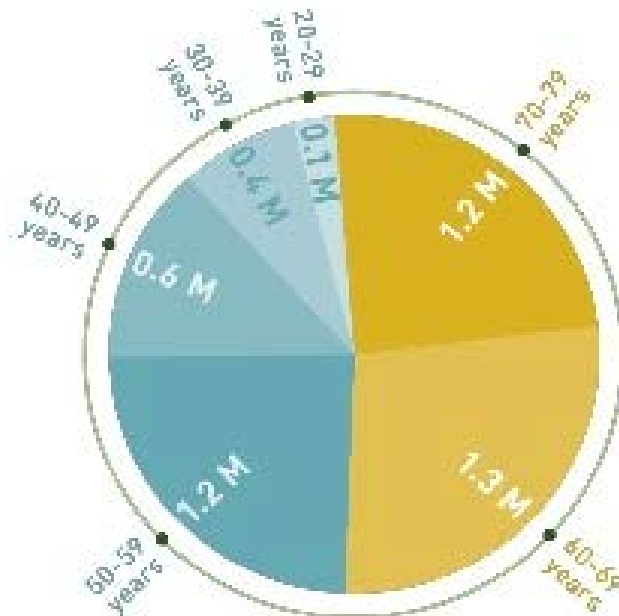
# Diabetes: A global emergency



# The Global Burden of Diabetes

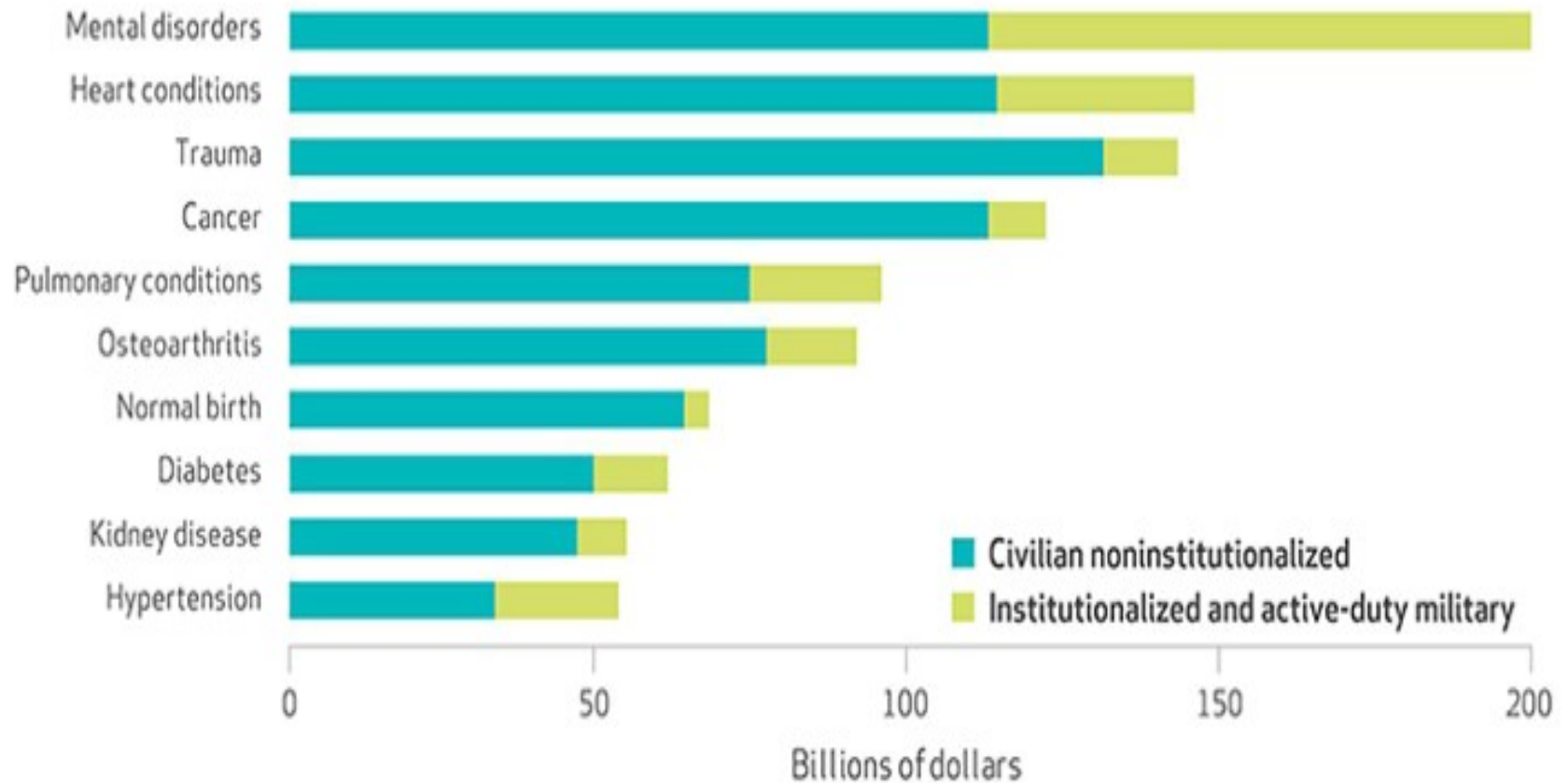
**Half of people** who die from diabetes are **under the age of 60.**

DEATHS ATTRIBUTABLE TO DIABETES BY AGE (20-79 YEARS)



# Ten Health Conditions with the Highest Spending

Ten medical conditions with the highest estimated spending in 2013



# The Burden of Diabetes- Arab World

Country	Prevalence
Saudi Arabia	17.72%
Egypt	17.31%
UAE	17.26%
Qatar	16.52%
Bahrain	16.52%
Kuwait	15.84%
Sudan	15.67%
Lebanon	14.6%
Oman	12.61%

# Diabetes is a Complex Condition

A “Cluster” -- Multiple Metrics on a Single Condition



# Challenges in Diabetes Care

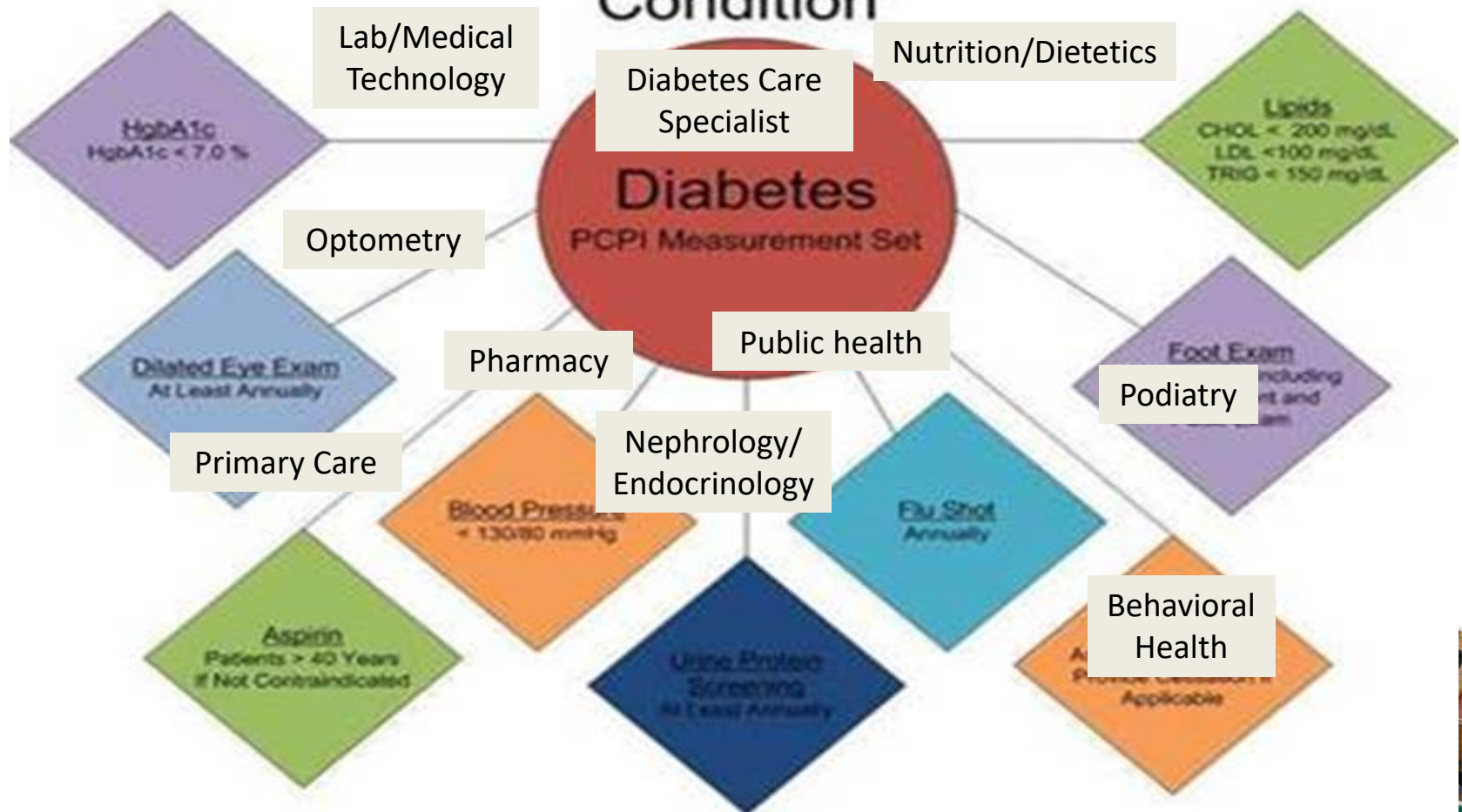
- To anticipate and recognize the onset of complications through comprehensive diabetes care.
- To forestall the development of complications through effective diabetes care.
- **Comprehensive and effective diabetes** care requires:
  - Multiple process-of-care measures at each visit
    - Time issues
  - Multiple skills in a variety of fields to achieve goals





# An Illustration from Diabetes

A “Cluster” -- Multiple Metrics on a Single Condition



For Patients with Diabetes:  
Navigation through healthcare systems and health  
professionals is very challenging



Could there  
ever be real  
“one stop  
shopping” in  
diabetes  
healthcare?





# Barriers to Diabetes Care

- Patients and/or their family members can't figure out who to talk to or where to go for specific services
- Siloed health professionals don't know what other services are available to patients or where these services are available
- Health professionals may not know how to communicate with other professionals using language others can understand



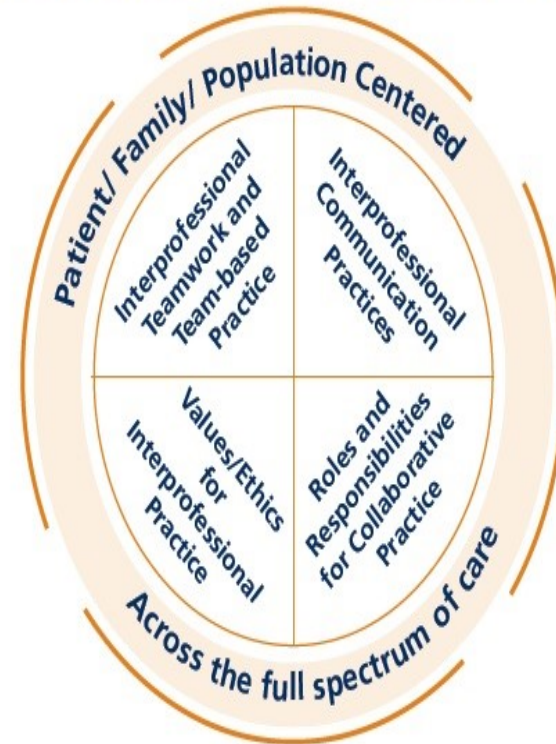
Interprofessional Education and Collaborative Practice are innovative approaches to improve health outcomes in patients with diabetes



# Interprofessional Collaborative Practice- U.S.

**In the U.S.,  
interprofessional  
collaborative practice is  
being spurred by  
mandates in the  
Affordable Care Act-but  
there are still  
roadblocks to effective  
collaborative practice.**

Interprofessional Collaborative Practice Core Competency Domains



The Learning Continuum



# Interprofessional Education Accreditation Standards in the U.S.

- Team training requirements in almost all health professional accreditation standards
- Accreditation Council Pharmacy Education 2016 Standards
  - Pharmacy curricula MUST prepare all students with the skills to provide patient-centered care in a variety of settings as contributing members of interprofessional teams



# Interprofessional Education- Wayne State University

- Diabetes elective course designed to provide students with in-depth knowledge of diabetes through active, hand-on learning including living with diabetes (simulated insulin injections, insulin pump, glucose monitoring). The course is facilitated by faculty from pharmacy, physical therapy, occupational therapy, and nutrition.
- Experiential IPE activities:
  - Interprofessional Team Visits- WSU Students from 7 professions make team visits of older adults.
  - Diabetes Education and Wellness (DEW) clinic is an IP, student-run, free clinic providing care to uninsured patients and represents a close collaboration among medical, pharmacy, OT, PT, dietetics, social work, and lab sciences.

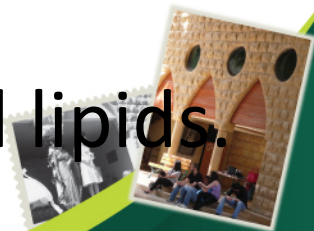


# Interprofessional Collaborative Practice- Illustrations



# Interprofessional Collaborative Practice- WSU Diabetes Clinic

- This clinic was established within a primary care clinic in the Metro Detroit area caring for primarily African Americans with diabetes.
- Patients are referred to clinic by PCP's.
- Team included: physician and pharmacist; Later behavioral health psychologist included.
- The clinic is used for training of medical and pharmacy students
- Management targets glycemia, BP, and lipids.



# Physician-Pharmacist Collaborative Practice in Diabetes: Randomized controlled study

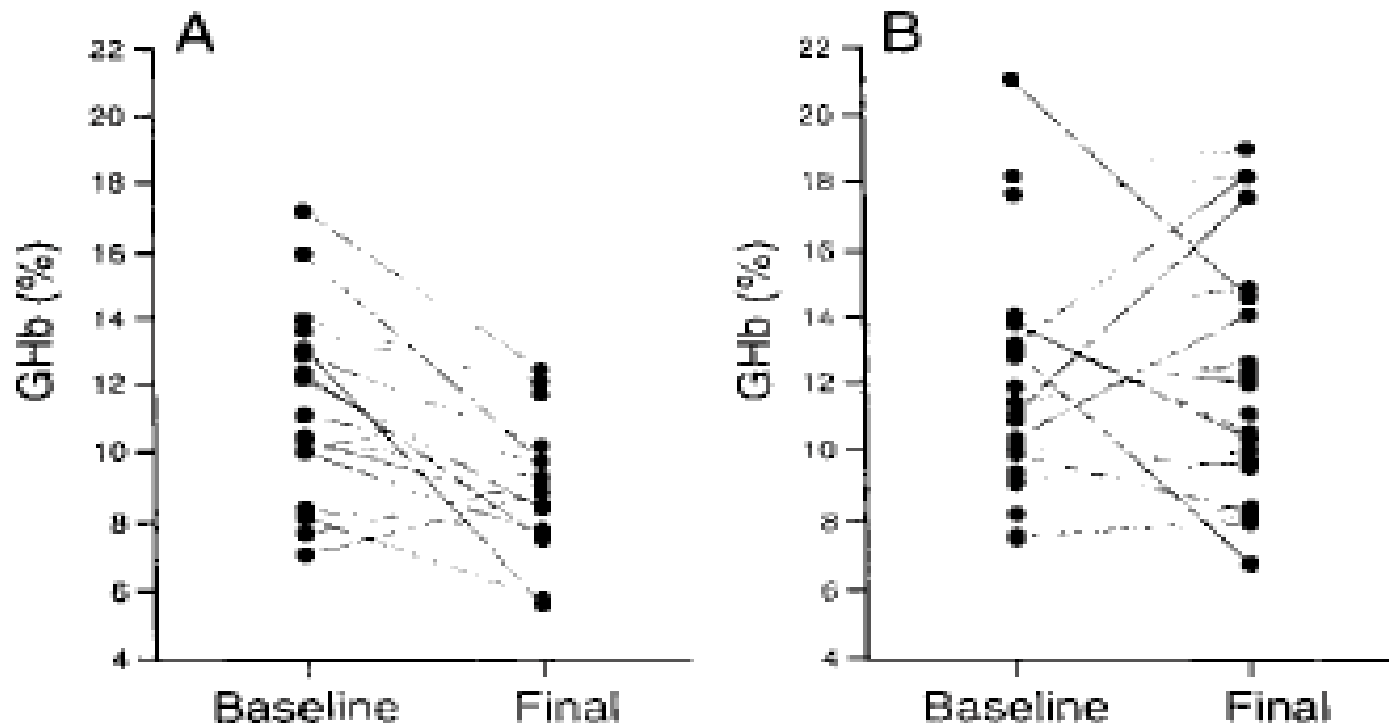
- Adherence to ADA standards of care was significantly greater in physician-pharmacist managed clinic vs. usual care.

Measure	Physician/Pharmacist	Control Usual Care	P-value
A1C	85.7%	62.1%	0.04
Albumin-to-creatinine	89.3%	35.7%	0.0001
FLP	92.9%	65.5%	0.021
Foot exams	82.1%	6.9%	0.0001
Referrals	57.1%	10.3%	0.02



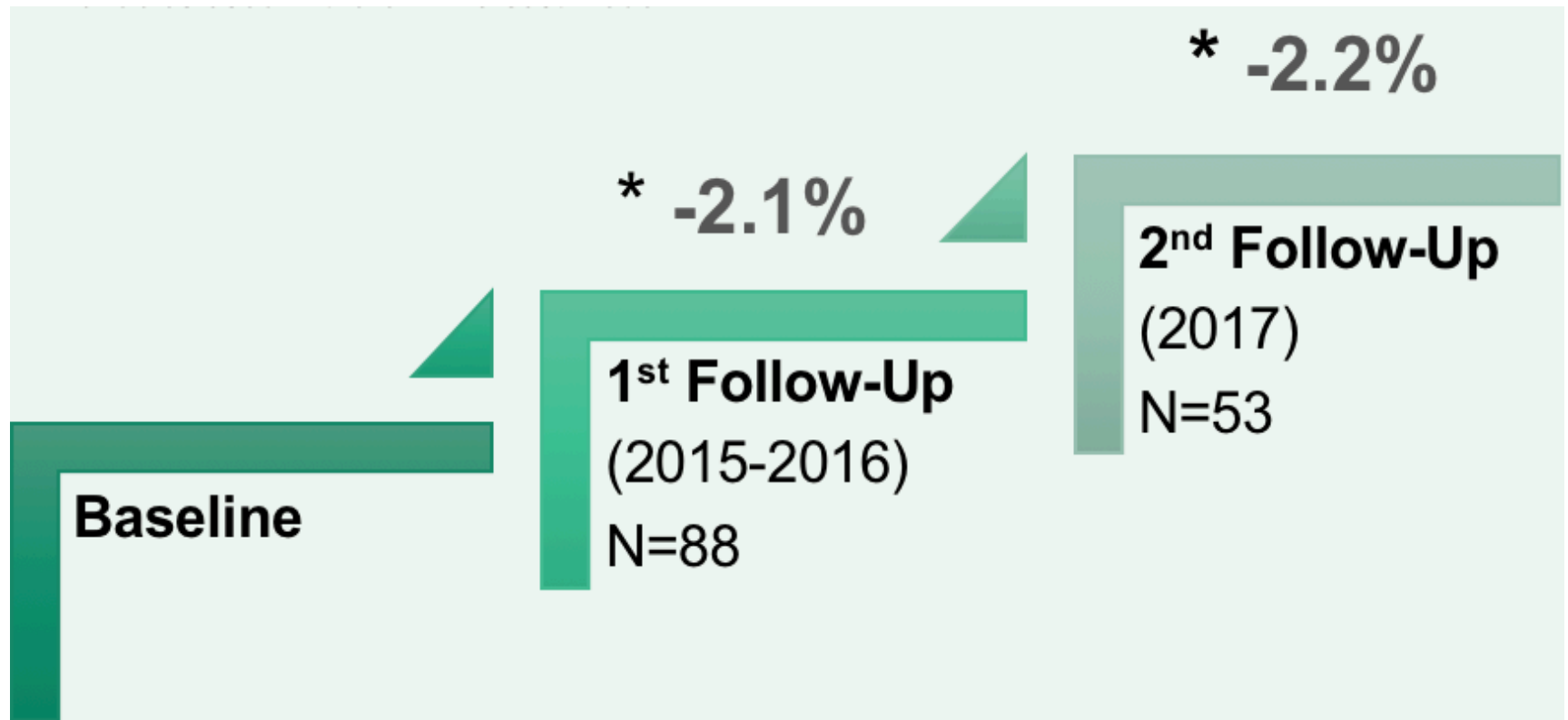


# Physician-Pharmacist Collaborative Practice in Diabetes: Randomized controlled study



**Figure 1.** Baseline and final glycosylated hemoglobin (GHb) concentrations in the intervention (A) and control (B) groups.

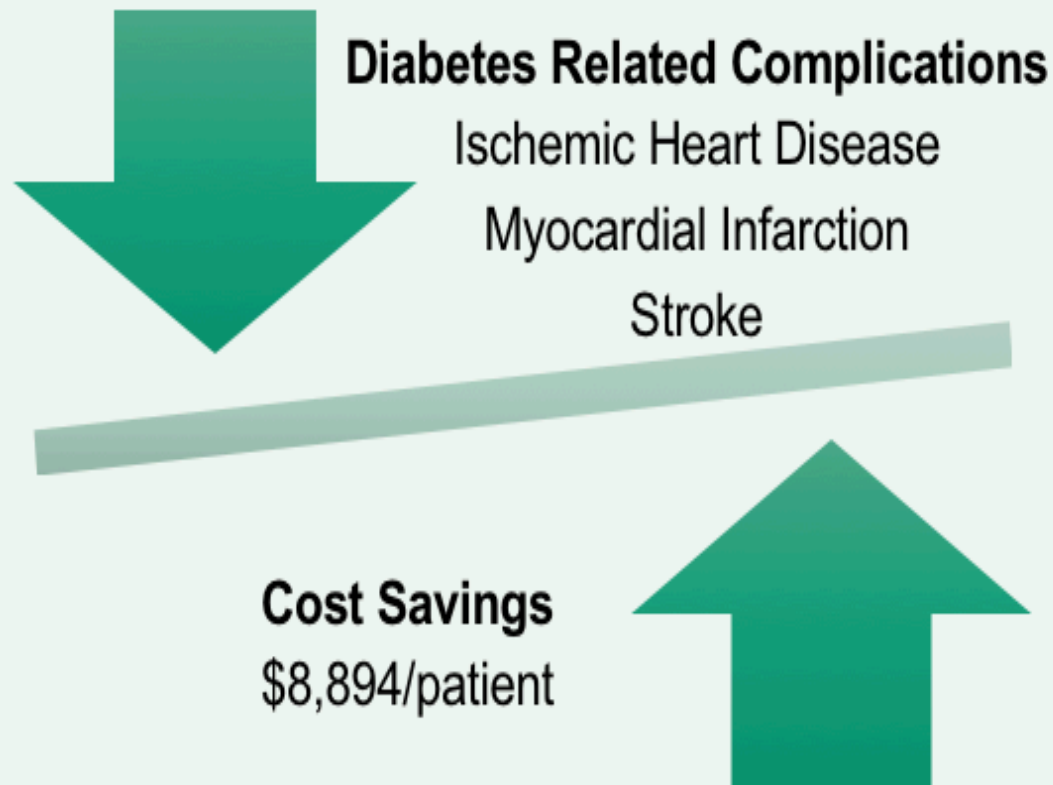
# Evaluation- Clinical Outcomes



**Figure 1:** Active Participants By Follow-Up Visit. Time of baseline visit was variable. There was a 2.1% decline in A1c between baseline and the 1<sup>st</sup> follow-up visit ( $p < 0.0001$ ). There was a 2.2% decline in A1c between baseline and the 2<sup>nd</sup> follow-up visit ( $p = 0.95$ ). This depicts a sustained A1C reduction between 1<sup>st</sup> and 2<sup>nd</sup> follow-up.

\*% Reduction in A1c

# Evaluation- Cost Savings

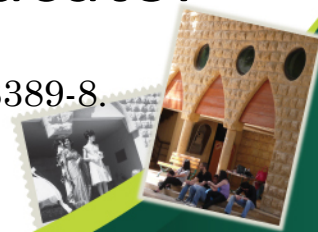


**Figure 3:** UKPDS estimated cost savings. Cost estimates were based on reductions in diabetes-related complications, associated with a decline in A1c between baseline and 1<sup>st</sup> follow-up.

# Individualized Interdisciplinary Team-Care Diabetes Model- Pittsburgh, U.S.

- Premise: To construct a chronic disease management model with an integrated interdisciplinary team that would deliver comprehensive and effective diabetes care while retaining the personalized (one-on-one) and continuing care.
- Team include: Endocrinologist/diabetologist, nurse practitioner, clinical pharmacist, nutritionist, certified diabetes nurse educator

Harsha Rao R, Perreiah P. Integrated Diabetes Care, DOI 10.1007/978-3-319-13389-8.



# Model Components

- Specifically designed for diabetes with goals of care set according to evidence-based practice guidelines.
- Collaborative care: ongoing and open communications among different providers to set, attain, and maintain individualized care and to improve delivery.
- Interventions match individual patient needs based on proactive risk stratification.
- Special emphasis on DSMES, MNT, BP, lipids.
- Meets all process and performance measures.
- Uses information technology that mandates documentation by each provider and creates a cohesive visit note.



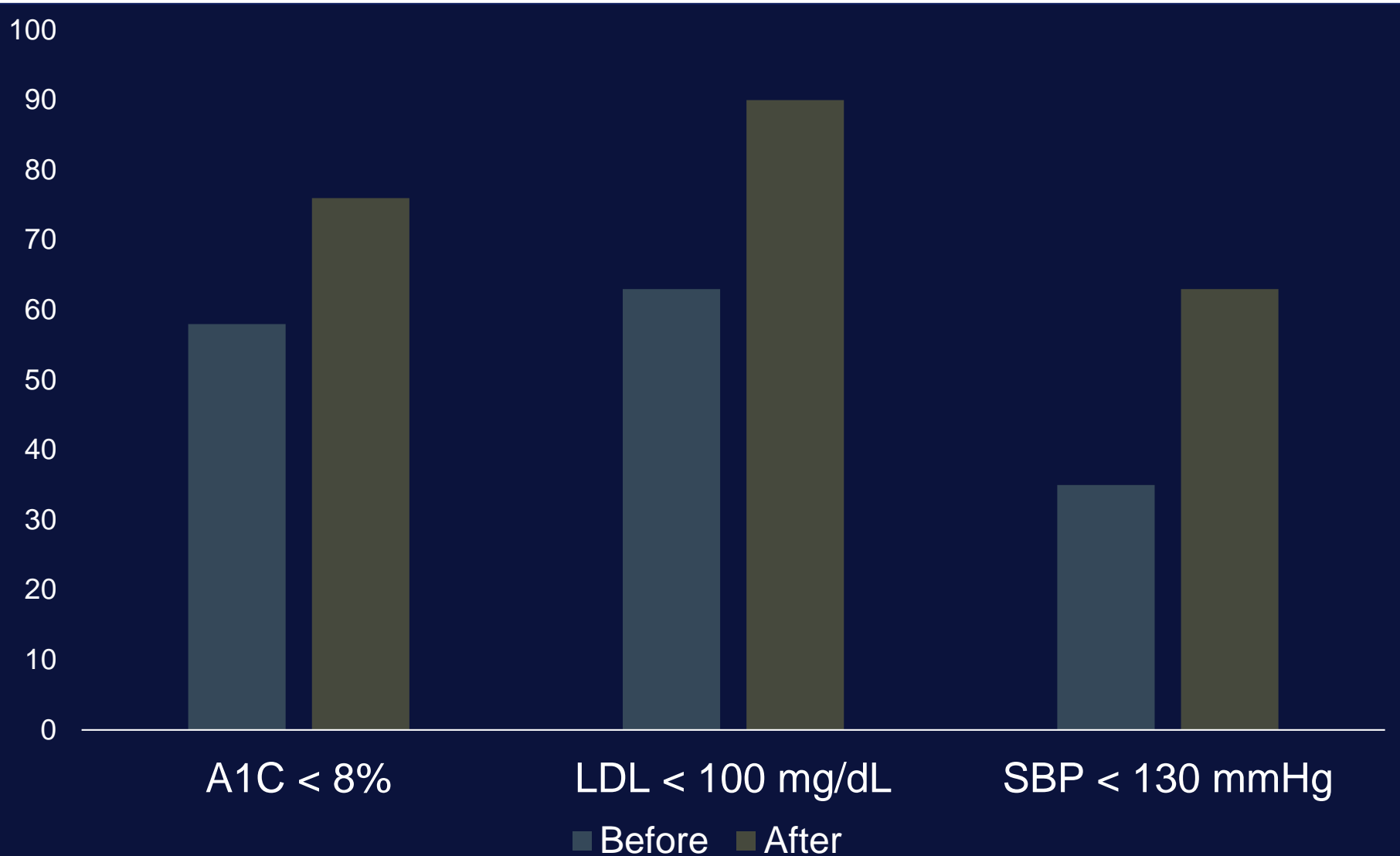
# Evaluation-

## Process-of-Care Measures & Clinical Inertia

- Annual performance reviews over 8 years showed 100% fulfilment of all ADA specified domains of diabetes care including:
  - A1C, LDL, BP, Annual creatinine and ACR, annual foot and eye exams, medication reconciliation, appropriate consideration of aspirin and statin use.
- Clinical Inertia “recognition of the problem but a failure to act” was eliminated.



# Evaluation- Clinical Outcomes



# Diabetes Interprofessional Collaborative Practice Program- Michigan, U.S.

- Online IPCP training program for all staff/students.
- Integration of interprofessional team of students (medical, pharmacy, physician assistant) with practice team (physicians, nurses, dieticians) in a family practice clinic.
- Student teams met with patients to capture health history, perform physical exam, and led group diabetes education classes.
- Teams of students and providers met daily to create integrated care plans.





# Evaluation

Indicators	Findings
<b>IPCP Knowledge</b>	Team Dynamics, Tips for Implementing Healthcare Behavioral Changes, and Patient Safety.
<b>Focus Group Data</b>	students benefits from hearing other professionals' questions to the patient. The focused patient visits created space for learners to experience other professionals' examination techniques, which changed their perspective of other professions.
<b>Provider Productivity</b>	Significant increase in the number of patients seen per staff provider per hour.
<b>Clinical Indicators</b>	Significant improvement in BMI, A1C, glucose, TG, Ratio of TC/HDL.
<b>Patient Satisfaction</b>	information about prescription medication was statistically significant: partly attributed to having a pharmacy student and the interprofessional student teams conducting medication reconciliations.

# Summary 1

- Interprofessional education and collaborative practice approach is an important strategy to tackle the challenges in diabetes care and to improve health outcomes.
- High quality (but still limited) evidence support positive diabetes outcomes for patients, providers, and systems with interprofessional collaboration.
- Concerted interprofessional research efforts across the globe are required to gather evidence on the implementation and effectiveness of diabetes interprofessional and collaborative practice models that are most applicable to local/regional needs and resources.



# TEAM SCIENCE

The Science of  
Team Science



Organize

Communicate

Conduct Research



# Research

- **Uni-disciplinary:** Research that uses theories and methods drawn from a single field.
- **Multi-disciplinary:** Collaborations involve researchers sharing their own disciplinary insights and perspectives with colleagues who are trained and work in fields different from their own.
- **Inter-disciplinary:** Research based upon a conceptual model that integrates theoretical frameworks from different disciplines, uses study design and methodology that is not limited to any one field, and requires the use of perspectives and skills of the involved disciplines throughout multiple phases of the research process.



# Research program-

## An illustration of unidisciplinary research

- Part of my research program focused on:
  - Determining response differences to chronic hypoglycemic agents in patients with type 2 diabetes.
  - The effects of chronic dosing, age, and obesity on the PK and PD of hypoglycemic agents.
  - The effects of SGLT2 and GLP-1 agonists on energy intake and appetite ratings.



# Research Program- Arab Americans

## Illustration of multi/interdisciplinary research

1

- Epidemiology of Diabetes and pre-diabetes
- Epidemiology of the metabolic syndrome
- Risk factors for these disorders

2

- Characterization of the metabolic defects underlying the progression to diabetes
- Association between Vitamin D and Insulin resistance and diabetes
- Racial differences in sensitivity and specificity of A1C in identifying diabetes and pre-diabetes

3

- Barriers and facilitators to adopting diabetes prevention activities
- Feasibility of culturally-specific lifestyle modification model in diabetes prevention
- Factors predicting response to diabetes prevention intervention

4

- The diagnostic utility/performance of A1C
- Genomic study to examine the association between HP gene and lipid and glucose measures
- Barriers and facilitators to diabetes self-management
- Diabetes knowledge, myths and perceptions

# Co-Investigators/Collaborators

## University of Michigan

William H. Herman, MD  
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Robert M. Anderson, EdD  
Martha Funnell, MS, RN  
Gretchen Piatt, PhD

## University of N Carolina

Stephen Sills, PhD

## ACCESS

Adnan Hammad, PhD

## Funding

American Diabetes Association  
National Institute of Diabetes  
and Digestive and Kidney  
Diseases (NIDDK)

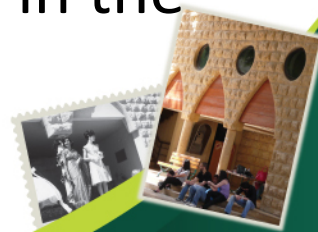
## Post Doctoral Fellows

Sandra Nowak, PharmD  
Helen Berlie, PharmD  
Nicole Pinelli, PharmD  
Elizabeth Bertran, PharmD



# Summary 2

- It's no longer sufficient to simply discover things. Funding agencies, especially NIH want to know how the work will improve lives.
- Deep strengths in single disciplines are insufficient to address basic questions.
- NIH report in April: on "[The Increasing Dominance of Team in Production of Knowledge](#)" and that scientific collaboration is truly beneficial to moving science forward
- The implications of this changing 21st century research paradigm for universities are transformational – business as usual will result in the decline of the university's research enterprise.





Thank you

