

The State of the Department of Quantitative Health Sciences (QHS) at 8 years of age

Catarina Kiefe, PhD, MD

October 17, 2017



State of QHS 2017: Overview

- Brief history and department overview
 - Vision, values and organizational structure: request for input regarding our future
- Research Funding Highlights
- Human capital
 - Highlight of newest QHS people
 - 5 QHS faculty talk about their work
- Highlights from educational programs
- Challenges for FY 18 and beyond

QHS History

- Founded in June 2009
- Moved into ~24,000 sq. ft. across 5 floors in new Sherman building, May 2013
- “Five-year” review report November 2015
“QHS has been extraordinarily successful by any metric for success”

QHS Vision

We will be leaders in the science of moving from discovery to improving individual and population health:

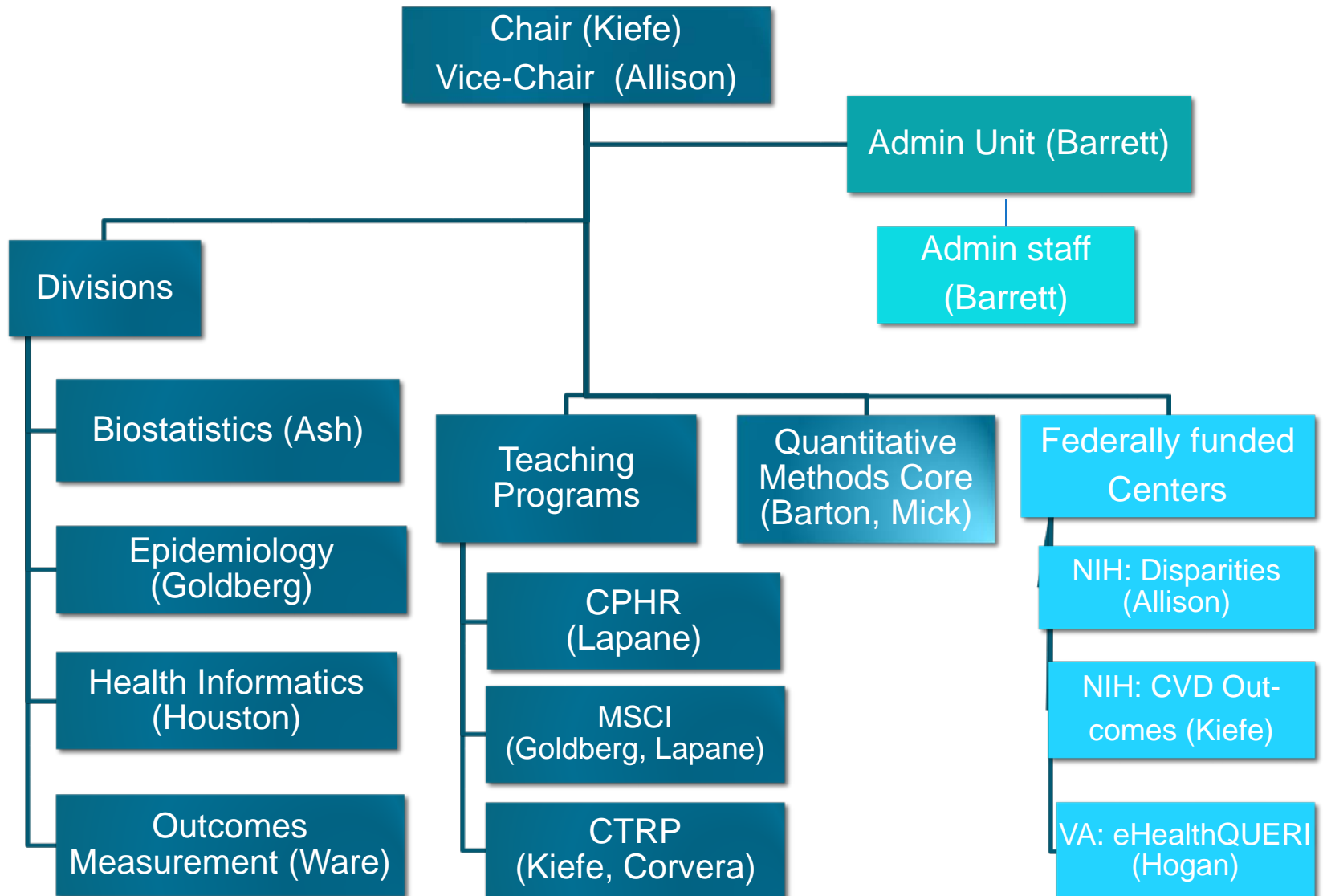
- by transforming healthcare delivery through methodological innovation
- by becoming a nationally and internationally recognized resource for translational research

QHS Values

- Social justice through improved health
- Collective creativity
- Integrity and excellence
- Diversity and mutual respect
- Science that makes a difference



Dept. of Quantitative Health Sciences Organizational Chart



Time to reassess?

- Strategic plan in 2010, updated 2014
- Have our mission, vision, or values changed?
- Does our organizational structure continue to support our goals?

Please let us know your opinion:

- By email
- Verbally
- By anonymous comments in suggestion box on 7th floor

Research Portfolio

- Since its inception, QHS faculty have been PIs on 117 extramurally funded projects worth \$94 million
 - 43 currently active (~\$46 million)
 - Plus active VA grants and contracts (~\$10 million)
- QHS faculty have been key on many others: CTSA, FORCE-TJR, PRISM, Hepatitis-C, ...
 - Grant funding impact of QHS on UMMS ~\$150+ million
 - FY17 non-QHS PI 29 active projects with QHS investigators, *annual* budgets \$15+ million
- QMC has collaborated with *all* UMMS departments
 - 1600+ initial consults with 650+ investigators
 - 450+ grant applications (80% NIH)

New R01s awarded in FY 2017

- **NIMHD: A System of Safety (SOS): Preventing Suicide through Healthcare System Transformation:** 9/5/2016 – 6/30/2021; Kiefe/Boudreaux, MPIs
- **NHLBI : Community Surveillance of Coronary Heart Disease:** 12/15/2016 – 11/30/2020; Goldberg/Yu, MPIs
- **NIMHHD: COmuNity-engaged SimULation Training for Blood Pressure Control (CONSULT- BP)** 5/19/2017-1/31/2022 Tjia, PI
- **NIH Fogarty: Quit-Smoking Vietnam! (mHealth motivational intervention):** 7/1/2017- 6/30/2022; Houston, PI
- **Non-malignant Pain in Nursing Home Residents** 9/25/2017-6/30/2022; Lapane, PI

Other major new grants in **FY 2017**

- **VA IIR: Improving Diabetes Care through Effective Personalized Patient Portal Interactions: 02/01/2017-01/31/2020; Shimada, PI**
- **NHLBI U01: Đương đầu với bệnh Tăng huyết áp ở Việt Nam: Giải pháp từ Y tế cơ sở (Conquering Hypertension in Vietnam: Solutions at Grassroots level) 09/01/2017 – 05/31/2022; Allison, UMMS PI**
- **NCATS U01: Strengthening Translational Research in Diverse Enrollment (STRIDE): 9/8/2016 – 6/30/2021; Allison/Lemon, MPIs**
- **PCORI: Smoker-to-Smoker Peer Marketing and Messaging to Disseminate Tobacco; 3/2017 – 2/2020; Sadasivam, PI**
- **NHLBI K12: Cardiopulmonary implementation science scholars program; 8/1/2017 – 7/30-2022; Houston/Lemon MPIs**

First-time PIs in FY 2017

- Christine Ulbricht - NIA R21: **Variations in nursing home residents' depression by level of cognitive impairment** 9/1/2017-5/31/2019
- Jake Hunnicutt - NIA F31: **Opioid Use and Safety in US Nursing Homes** 9/22/2017-9/21/2020
- Apurv Soni - **Trends, Predictors, and Consequences of Child Undernutrition** 9/22/2017-9/21/2021
- Jomol Mathew – **UMMS Presidents Award: Center for Data Driven Discovery and HealthCare (D3 Health)** 5/1/2017-4/30/2019
Mathew, McManus, Corvera, MPis



QHS: Our People

- 36 primary faculty
- 28 secondary faculty
- 20 voluntary or adjunct faculty
- 20 doctoral students, 7 post-docs
- 39 staff
 - 11 administrative
 - 28 research

QHS Staff: the glue that holds us together

- 10 administrative staff under Barrett:
 - 4 financial: O'Reilly, Thompson, Wiggin, Yeboah
 - 6 other: Baron, **Falla, Manning**, McDonald, Saber, Stankus
- 28 research staff
 - Quantitative Methods Core technical staff
 - Statistical computing: Flahive, Kroll-Desrosiers, Lessard, Williams, **Ayturk, Baek** (just accepted)
 - Data architecture and management: Lazar, Netherton, Orvek, Rosenberg
 - 18 project managers, research associates and assistants
 - New since last year: **Aboujaoude, Beckman, Nagawa, Seward**
 - Current program managers: Chiriboga, Gigliello, Yarzebski

New Primary Faculty in 2017

- Bo Wang, PhD
 - Associate Professor, Biostatistics and HSR since June 2017
 - Joint recruitment with Emergency Medicine
- Bo Zhang, PhD
 - Assistant Professor, Biostatistics and HSR since June 2017
- Jonggyu Baek, PhD
 - Assistant Professor, Biostatistics and HSR starting November 2017
- Feifan Liu, PhD
 - Assistant Professor, Health Informatics and Implementation Science
 - Joint recruitment with Department of Radiology since January 2017
- Shao-Hsien Liu, PhD
 - Instructor, Epidemiology, since June 2017
- Dan Amante, PhD
 - Instructor, Health informatics and Implementation Science, since August, 2017

QHS also grows in other ways....

Vivian May Tran,
born 9/27/2016



Adelaide June and
Isabelle Cerise
Desrosiers, born
1/31/2017



Prince Freddie
Yeboah, born
3/26/2017



Darren Vincent
Gigliello, born
8/15/2017



State of QHS 2017: Overview

- ✓ Brief history and department overview
- ✓ Research Funding Highlights
- ✓ Human capital
 - ✓ Highlight of newest QHS people
 - **5 QHS faculty talk about their work: Bo Zhang, Hong Yu, Arlene Ash, Melissa Clark, Kristin Mattocks**
 - Range from newest to most senior
 - Work illustrates diversity of our scientific contributions
- Highlights from educational programs
- Challenges for FY 18 and beyond

BO ZHANG, PHD

State-of-the-art *statistics can make a big difference*
in health policy and health services research.

Division of Biostatistics and Health Services Research
Department of Quantitative Health Sciences

Career Trajectory

- B.S. and M.S. in China
- Ph.D. in statistics (biostat minor) from U of Minnesota
- 2 years of post-doctoral training in NIH/NICHD
- 2.5 years at Oregon State
- 3 years at FDA
- From July 2017, tenure-track Assistant Professor

Mission Statement

Mission #1

Develop extramurally-funded research program on statistical methodologies to advance *health policy and health services research*.

Mission #2

Conduct collaborative research with our PIs, and provide high-level statistical support to maintain their success.

Research Interests & Current Projects

Research Interests:

Statistical methodologies in *interrupted time-series study design and analysis*, healthcare costs and utilization, risk adjustment, hospital readmission rate.

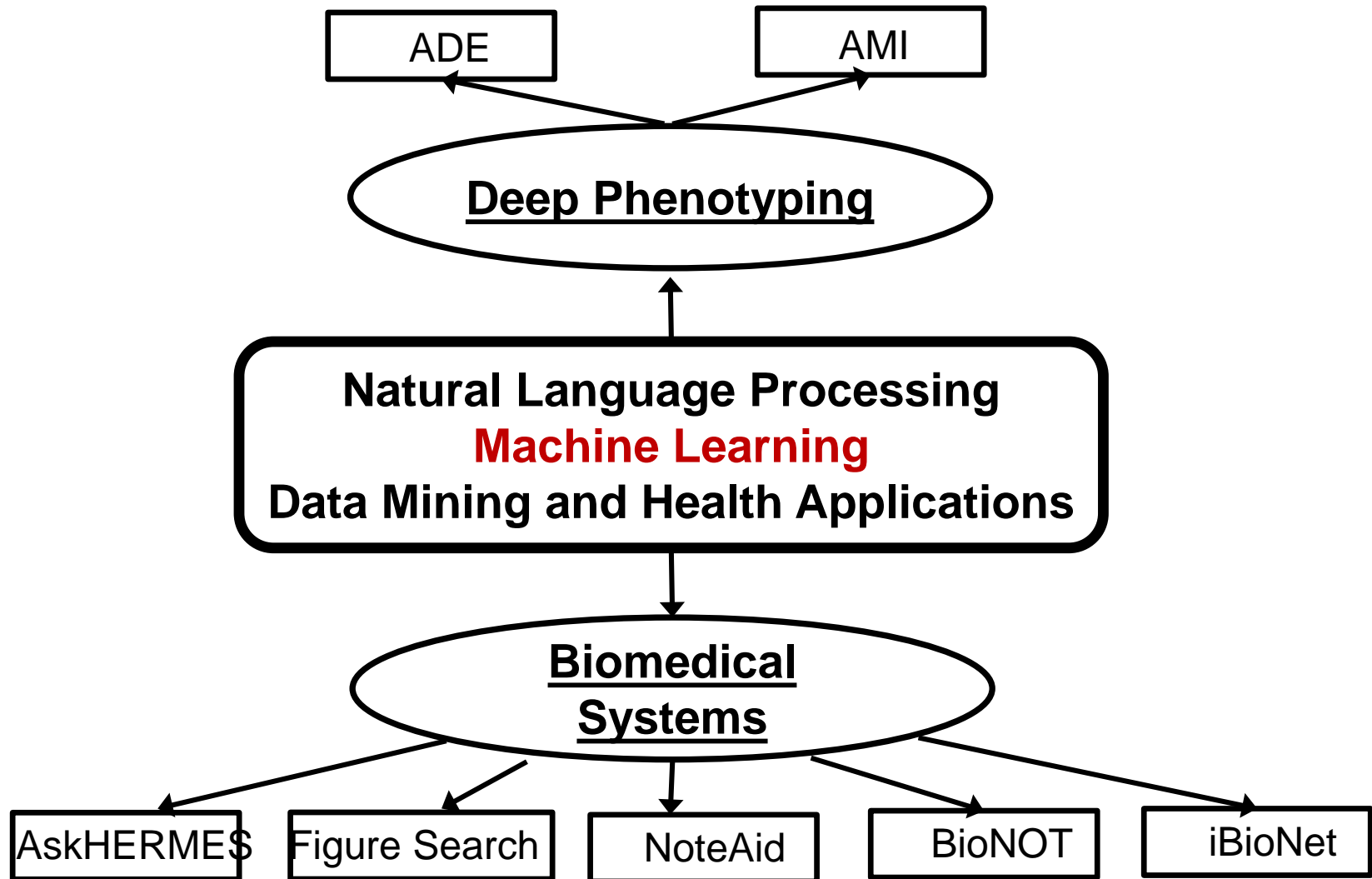
Current projects:

- Biostatistician in U01 “Strengthening Translational Research in Diverse Enrollment” (STRIDE), PIs: Allison/Lemon. – Interrupted time-series analysis.
- Biostatistician in a resubmission of P01 proposal, led by Jennifer Tjia and Arlene Ash.

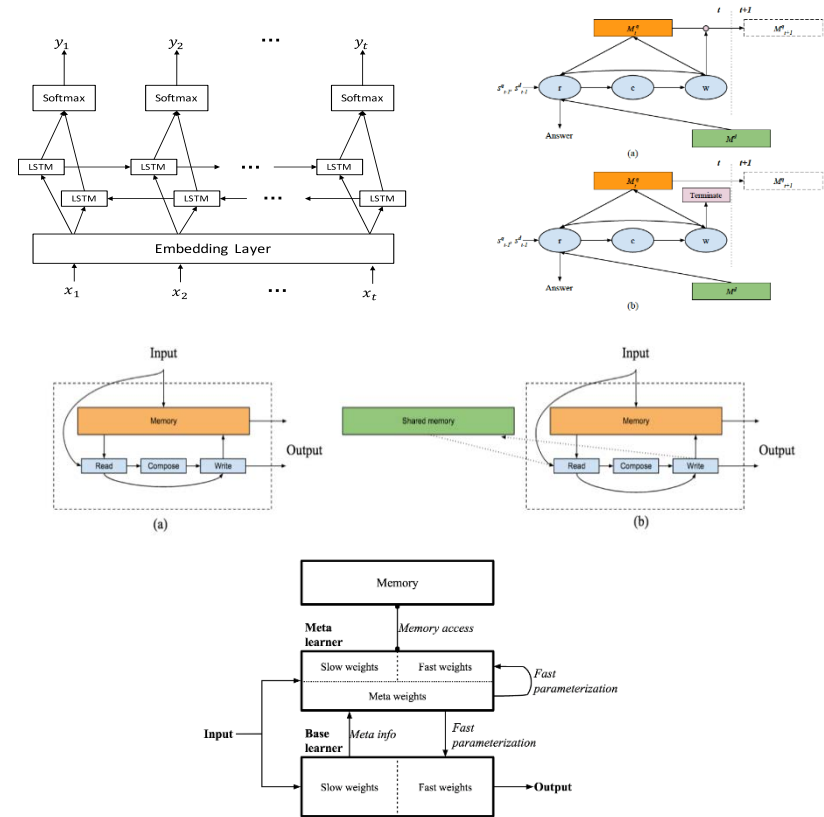
Hong Yu, PhD

Extracting and Mining Knowledge from Health Data





We Develop Innovative Deep Learning Models

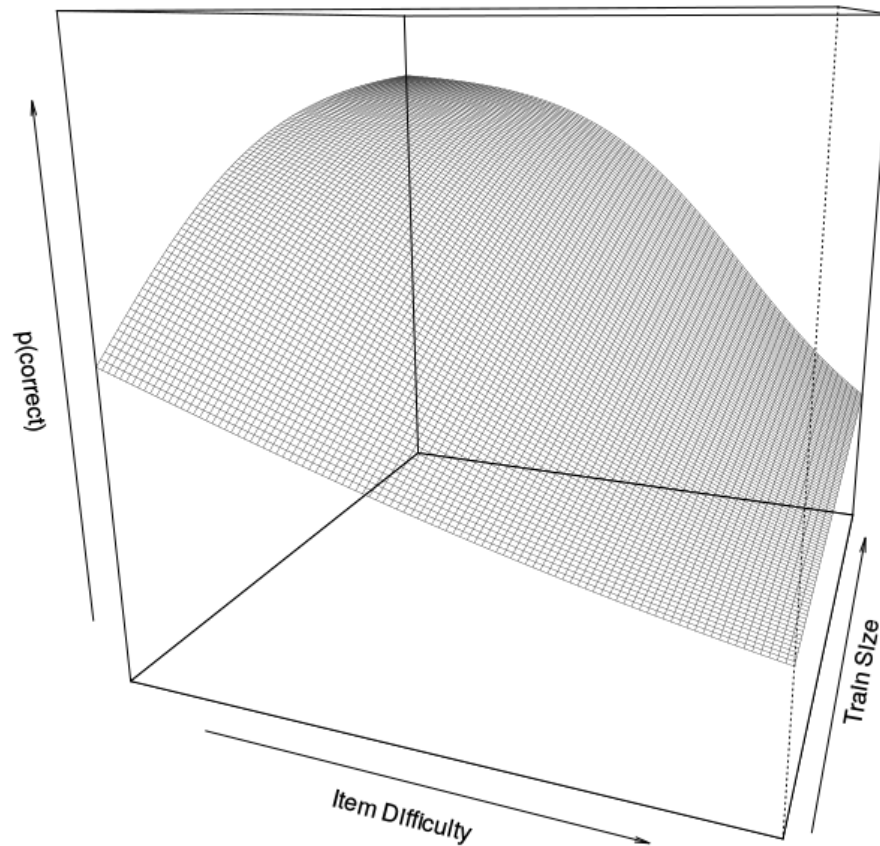


Evaluating the Intelligence of Artificial Neural Network



- Define a task
 - Semantic entailment
- Identify the **difficulty** of each task
 - Apply item response theory
- Study how artificial neural network learns

Artificial Neural Network Learns Easy Items First!



Arlene Ash, PhD

Supporting MassHealth in 2017

Working with MassHealth to:

- Implement a \$1.8 billion, 5-year Massachusetts Health Care Delivery and Payment Reform
- Conduct an independent evaluation:
 - What changes?
 - What happens to costs and patient outcomes?
 - Did any specific changes especially help?

QHS/CWM personnel:

- Arlene Ash
- Deborah Gurewich
- Jay Himmelstein
- Eric Mick
- Melissa Clark
- Jeff Williams

MassHealth (Massachusetts Medicaid)

- The Affordable Care Act (ACA) was modeled after Massachusetts legislation, which uses MassHealth to achieve near universal coverage
- MassHealth now serves ~1.9 million people (state pop. ~6.8 million)
 - Children's Health Insurance Plan (1997)
 - Commonwealth Care (subsidized private insurance offered via Health Connector, 2006)
 - Expanded eligibility for working poor (2006)
- MassHealth pays for health care for:
 - ~40% of all children
 - ~25% of all non-elderly adults
 - ~60% of all nursing home residents
- Idea: restrain costs and improve quality through accountable care organizations (ACOs) and community partners (CPs)

Massachusetts' Delivery System Reform Incentive Program (DSRIP)

5-year funding allocation:

Objective	Funding (% of DSRIP \$s)
ACO Development	\$1,065M (60%)
Community Partners (CPs)	\$546M (30%)
Statewide Investments	\$115M (6%)
State Operations & Implementation	\$73M (4%)
TOTAL	\$1.8 Billion

Funding phases down (more in year 1 than in year 5)

Our role(s): to help MassHealth

- **Risk Adjusted Payment:** Pay ACOs more when they care for people with greater medical and “social” risks
 - E.g., Mean cost of “homeless” people is about 9 times average!
- **Risk Adjusted Quality Assessment:** Judge “quality” fairly when ACOs take on people with different risks
 - E.g., Hospitalization rate is expected to be higher for sicker people
- **Program Evaluation:**
 - Understand how delivery system reform money is being spent
 - Identify barriers (and potential solutions) to effective reform
 - Learn which programs “are worth it”

Melissa Clark, PhD

Collaboration with the Massachusetts Coalition for Serious Illness Care

- More than 80 Massachusetts-based organizations
- Mission: To ensure that health care for everyone in Massachusetts is in accordance with their goals, values and preferences at all stages of life and in all steps of their care.



Our Role as Research Partner

Conduct state-wide surveys

March-April 2016:

RDD sample of 1,851 residents \geq
18 years

February-March 2017:

Follow-back sample of 346
respondents

March-April 2018:

RDD sample of residents \geq 18
years



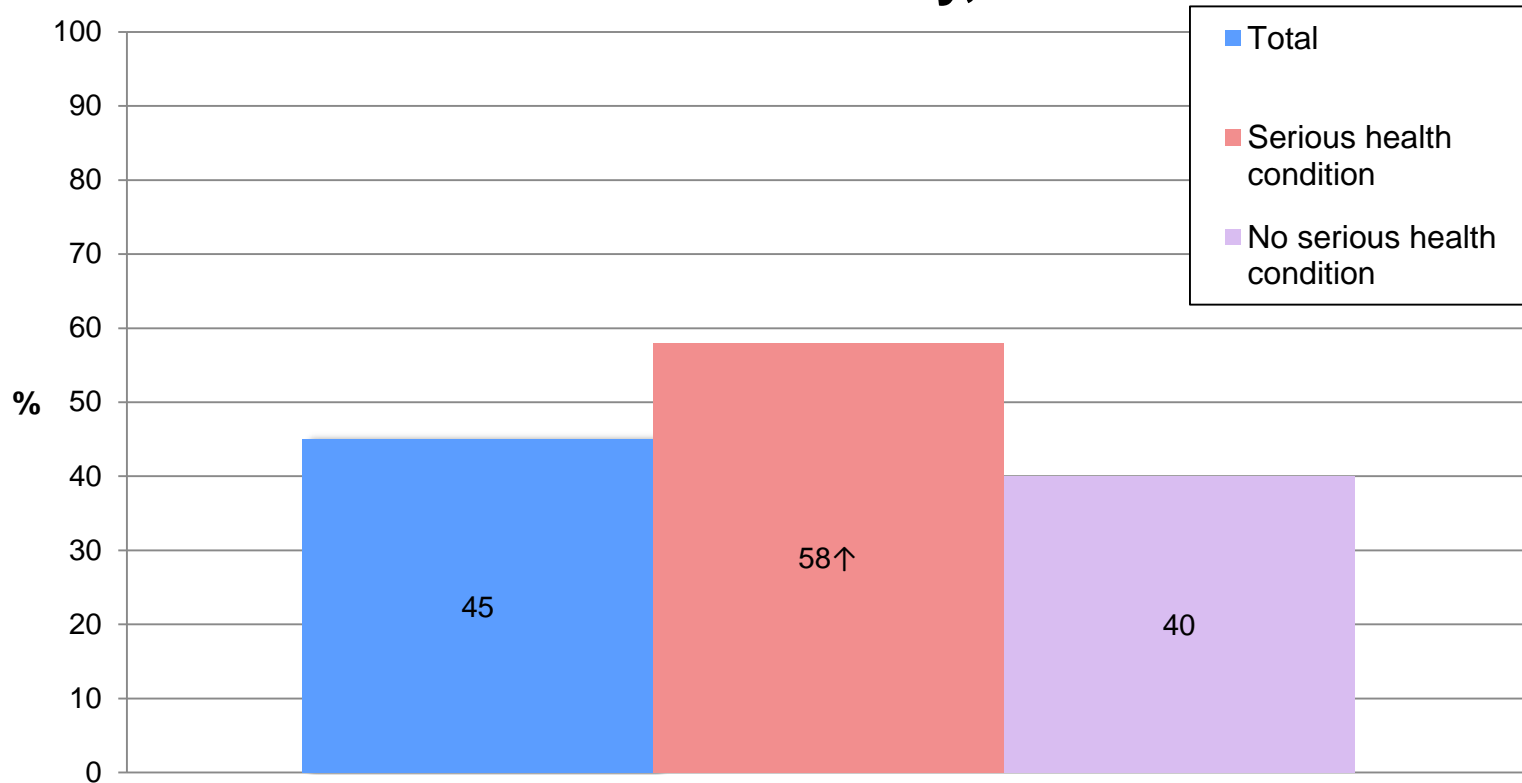
Melissa Clark
Julie Flahive
Stephen Kurtz
Sharina Person



Clay Daniel
David Dutwin
Tim Pokalsky
Susan Sherr

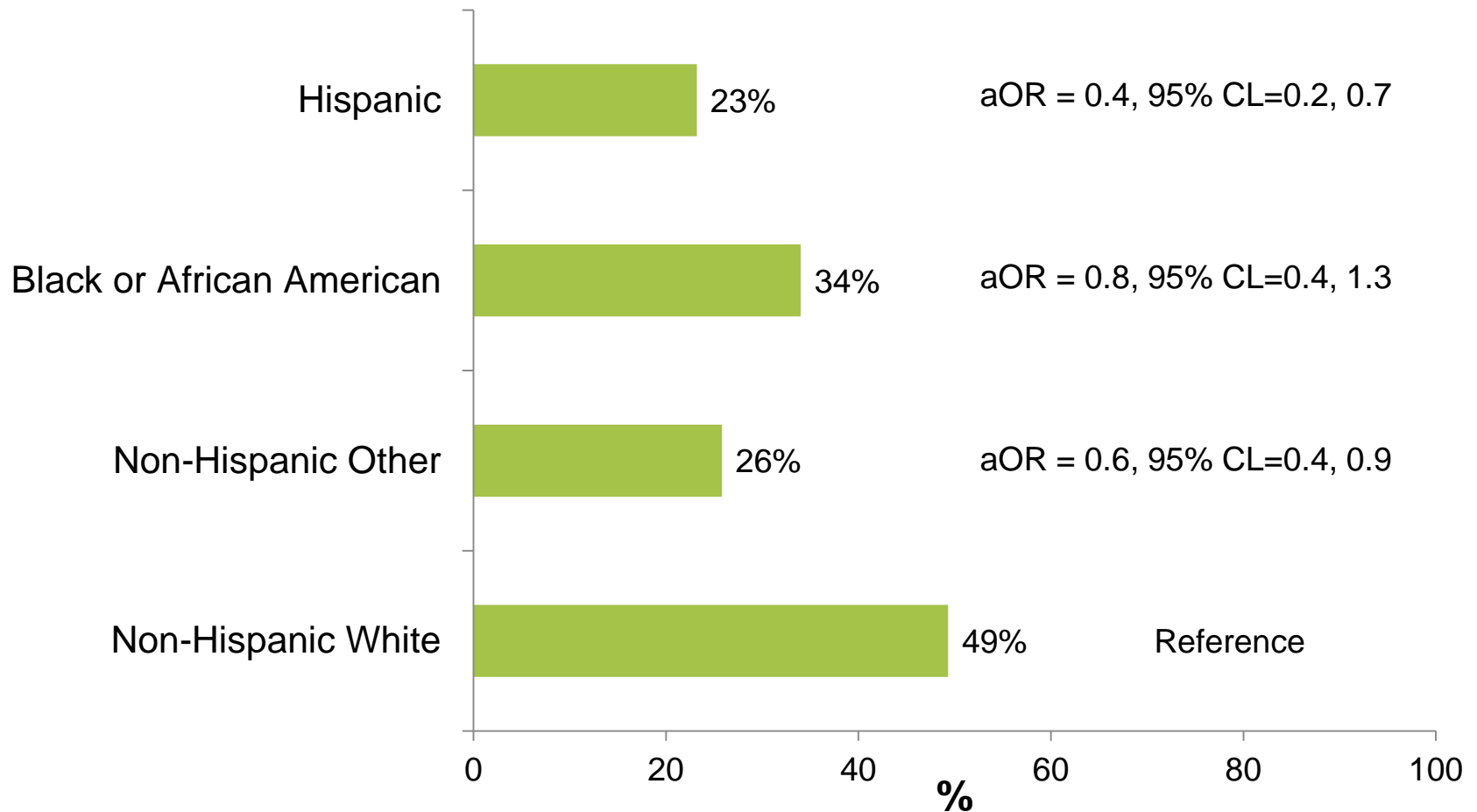
Goal: Everyone in Massachusetts, 18 or older, has designated a health care decision-maker (health care proxy).

Named a Health Care Proxy, 2016



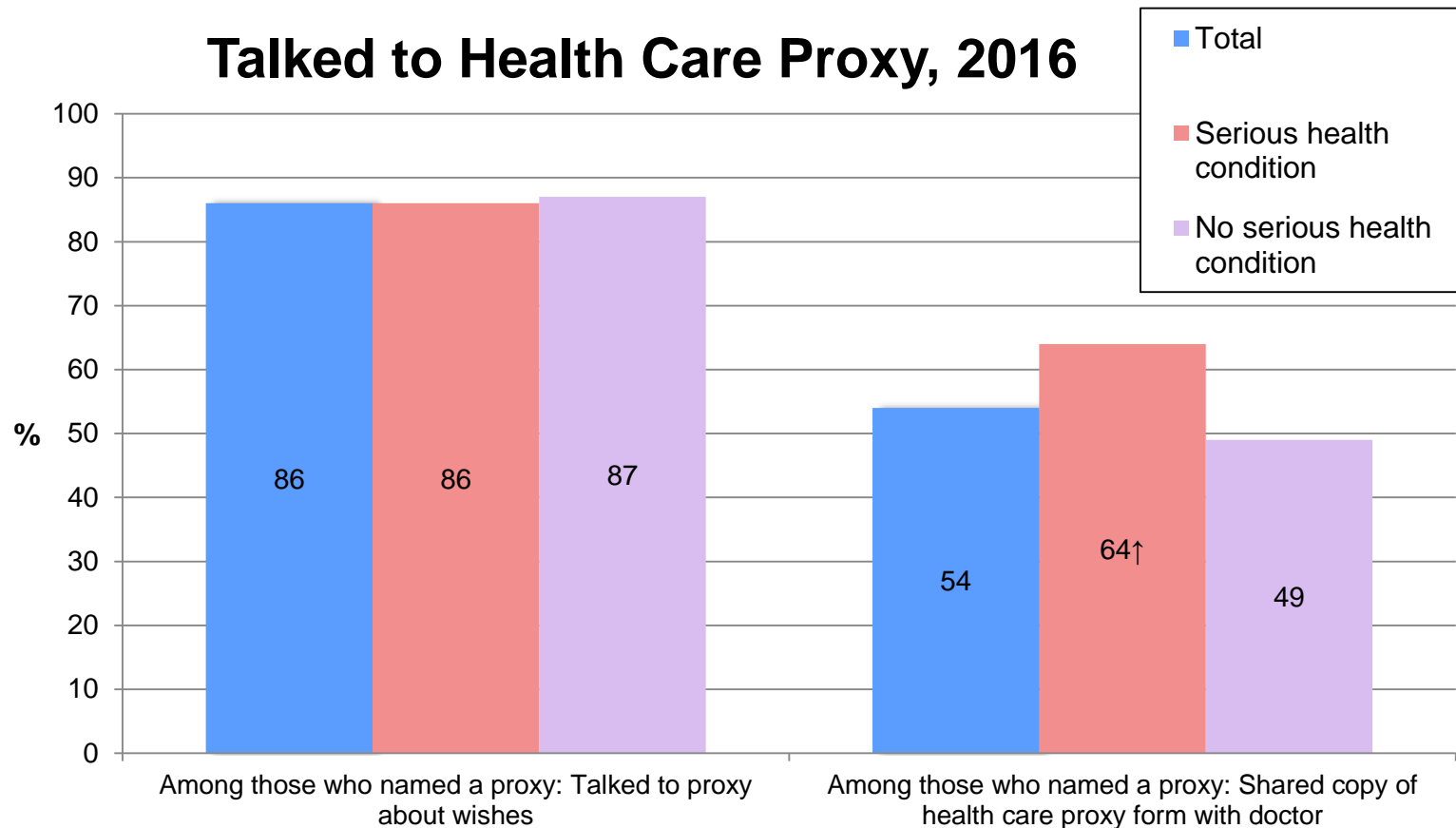
↑ Significantly higher than comparison group at 95% confidence level

Racial and Ethnic Disparities in Naming a Health Care Proxy, 2016



Model adjusted for: age, gender, marital status, education, household income, serious health condition

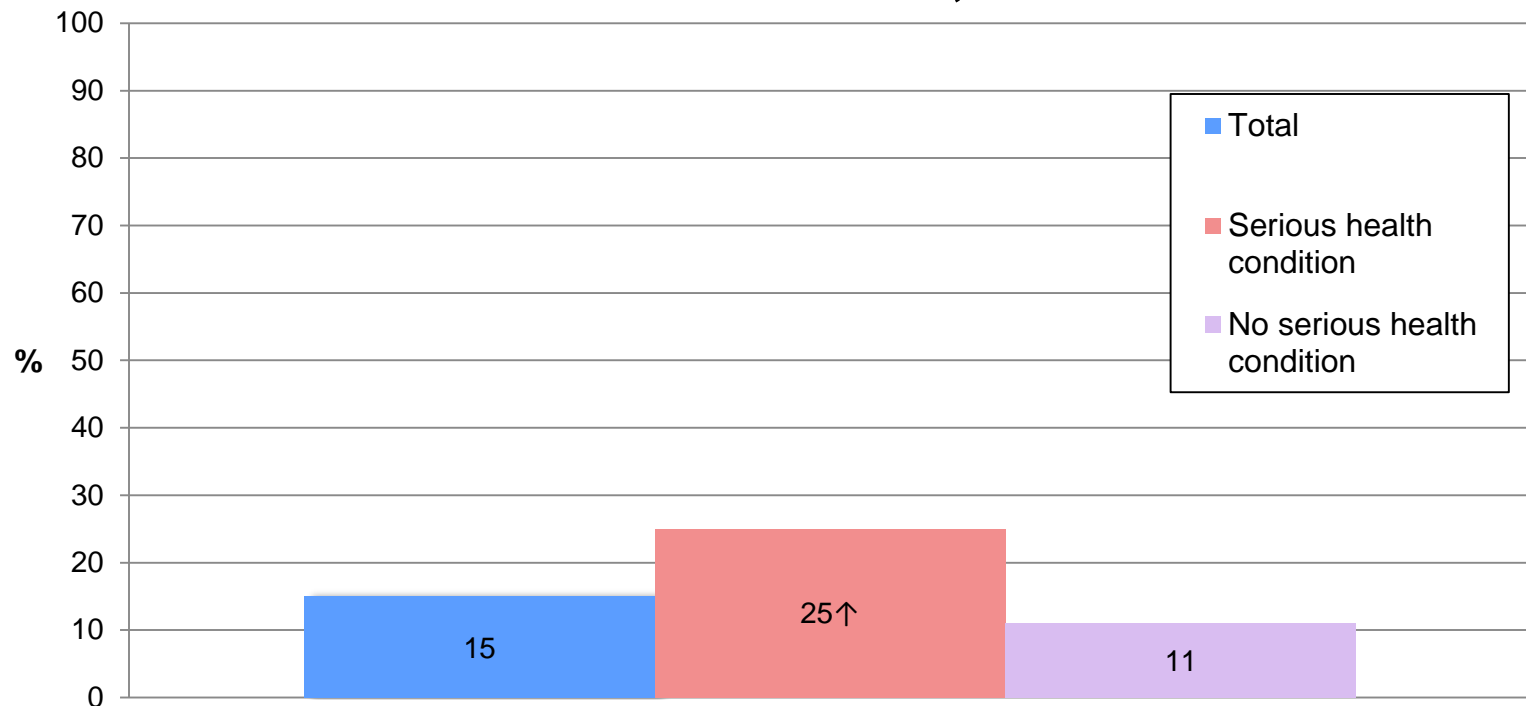
Goal: Everyone in Massachusetts, 18 or older, has had a conversation with their proxy to communicate their goals, values and preferences for care at the end of life.



↑ Significantly higher than comparison group at 95% confidence level

Goal: Everyone in Massachusetts facing a serious illness has had a high-quality, informed goals and values conversation with their care team.

Ever talked to healthcare provider about end-of-life care wishes, 2016



↑ Significantly higher than comparison group at 95% confidence level

Goal: All Massachusetts clinicians have appropriate training to facilitate high-quality communication with patients on advance care planning and serious illness.

Massachusetts Medical Schools initiative to teach medical students how to have goals of care conversations with patients

- Boston University
- Harvard University
- Tufts University
- University of Massachusetts

Our role: Assisting with curriculum development and the evaluation of the initiative



Examining Patterns of Mental Health Care Utilization among Pregnant and Postpartum Veterans: The COMFORT Study

Kristin M. Mattocks, Ph.D., M.P.H.

Rebecca Baldor, M.P.H.

On behalf the **COMFORT** study team

VA Central Western Massachusetts Healthcare System

Northampton, Massachusetts

COMFORT Study Sites



Maternity Care for Women Veterans

- Maternity benefits included in VHA medical benefits package since 1996.
 - However, benefit package didn't include coverage for newborns.
- **Public Law (PL) 111-163** amended VHA's medical benefits package to include up to 7 days of medical care for newborns delivered by eligible women Veterans (May 2010). (Current legislation proposing extending to 14 days)
- Note: All VA-paid prenatal care is provided by community-based providers, through the Veterans Choice Program (VCP) or fee care

Overall COMFORT Study Aims

- To examine pregnant and postpartum women Veterans experiences with pregnancy and community-based obstetrical care, and to begin to understand the degree to which this care is coordinated with ongoing VA care.
 - Sub-aim: To examine women's experiences with mental health care during pregnancy, and to understand how mental health care is coordinated during the pregnancy and postpartum periods.

Mental health conditions of COMFORT participants (N=427)

Characteristic	%
Depression	55%
Anxiety Disorder	42%
PTSD	37%
Mood Disorder	13%
Bipolar Disorder	6%
Schizophrenia	0.2%

Mental Health Care Utilization During Pregnancy and Postpartum

Characteristic	%
Seeing a MH provider at time of pregnancy diagnosis	<u>36%</u>
• Provider was VA MH provider	90%
Currently taking medications for MH condition during pregnancy	10%
(Postpartum) Received mental healthcare during pregnancy	<u>21%</u>
• Received MH care from VA provider	74%
(Postpartum) Needed mental healthcare during pregnancy but could not get it	13%
Received ANY VA care during pregnancy (including primary, mental health, PT)	30%

The Babies

(n=285 and counting by the day)

Characteristic	%
Born at <37 weeks gestation	12%
Low birth weight (<5 lbs, 8 oz)	10%
Required NICU care at birth	17.8%
NICU hospitalization > 1 week	7.8%
Health insurance at 3 months of age	92%

“Education is the most powerful weapon which you can use to change the world” *Nelson Mandela*



New Faces in QHS Educational Programs

Master's in Clinical Investigation New Class:



Essa Hariri, MD
(TL1 Fellow)



Ryan Hendrix, MD

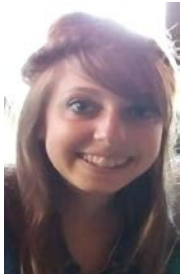


Patric Gibbons, MD student



Robert McLoughlin, MD

PhD in Clinical and Population Health Research First Year Class:



Ariel Becca, MS



Maira Casteñada, MS



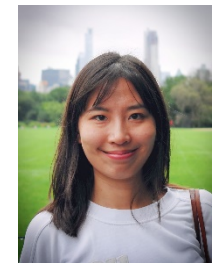
Eric Ding, MS
(MD/PhD)
T32 Fellow



Anny Li, MPH, MS



Grace Masters
(MD/PhD)
TL1 Fellow



Yiyang, Yuan, MPH

Institutional Training Grants



Funded:

- IMSD – Pre-doctoral diversity grant (Lewis / Lapane)
- NIH BEST – Pre-doctoral (Zamore / Fuhrman)
- MSTP – MD/PhD (Szabo)
- T32 CVD Clinical and Translational Science – Pre- and post-doctoral (Kiefe/Keaney)
- TL1 – Pre- and post-doctoral (Lapane / Corvera)
- NCI R25 Implementation Science – Post-doctoral (Lemon / Houston)
- KL2 – Post-doctoral and junior faculty (Keaney / Allison)
- NHLBI K12 Implementation Science (Houston / Lemon)
- INTPart (University of Oslo collaboration)

Pending:

- NIH PREP program – Pathway to graduate school (Lapane / Lewis); Score: 11

Post-doctoral Fellows Funded by Institutional Training Grants



Sarah Forrester,
PhD (TL1)



Essa Hariri, MD
(TL1)



Matt Alcusky,
PharmD, MS, PhD
candidate (TL1)



Lin Li, PhD
(T32)



Minjin Kim, PhD (R25)

Jinying Chen,
PhD (T32)



Amanda Blok, PhD, MSN
(R25, VA Special Scholar)



Theodore McDade,
MD, MPH (R25)



Vijaya Daniel, MD,
MPH (TL1)



Pre-doctoral Fellows Funded by Institutional Training Grants

PhD students



Karen Ashe, MS
(TL1)



Ganga Bey, MPH
(IMSD, T32)



Maira Casteñada,
MS (IMSD)



Jake Hunnicutt, MPH
(T32)



Andrea Lopez, MS
(IMSD, TL1)



Deb Mack, MPH
(TL1)

MD/PhD students



Eric Ding, MS (T32)



Nate Erskine (T32)



Grace Masters (TL1)



Meera Sreedhara, MPH
(TL1)

Our International Superstars



Hoang Tran, MD, MPH



Hawa Abu, MBBS, MPH, CPH

Funded Individual Training Grants



Apurv Soni – MD/PhD candidate (Former TL1 Fellow):
Understanding Trends, Predictors, and Consequences of Child
Undernutrition in India Using Geospatial and Multilevel Models

Mentor: Jeroan Allison



Jake Hunnicutt, MPH, PhD Candidate (Former TL1 Fellow):
Opioid Use and Safety in Nursing Homes

Mentor: Kate Lapane



Christina Haughton, MPH, PhD candidate (Former T32 Fellow):
Home and Environment Factors Influencing Teen Sweetened
Sugar Beverage Consumption

Mentor: Stephenie Lemon

Individual Training Grants Under Review



Karen Ashe, MS, PhD Candidate
Factors Affecting Weight Management Counseling during
Primary Care Clerkships

Mentor: Judy Ockene



Meera Sreedhara, MPH, PhD Candidate
Local health departments and inclusion of evidence-based
healthy eating and physical activity policies in their community
health improvement plans

Mentor: Stephenie Lemon



Hawa Abu, MD MPH
PCORI

Ariel Becca, MS
PCORI

recent PhD students, average
7 (range 2 to 11)

recent MD/PhD students,
average 7 (range 5 to 10)

Apurv Soni
Global Health
Award

Andrea Lopez
Outstanding
Young Scientist
Travel Award

Deb Mack
ICPE Travel
Award

Maira
Castenada
AACR Scholar-
in-Training
Award

QHS Faculty receive awards for teaching and mentoring

Catherine Dubé, EdD



2017 Graduate School of Biomedical Sciences faculty award for outstanding contributions in the lecture and classroom settings

A distant reminder.....



QHS Challenges/Opportunities for FY 18

- Maintain stability and some growth with constrained resources
- Improve communications and collaborations
 - Within QHS
 - With others
- Preserve and expand scientific vibrancy
 - Continue to produce “science that makes a difference”

Service Awards

20 Years

- Darleen Lessard

10 Years

- Robert Goldberg

5 Years

- Catherine Dubé
- Kate Lapane
- Peter Lazar
- Kayla McKay
- Sandra Stankus
- Deborah Wiggin
- Hong Yu

Thursday, November 16 at 12:00



QUESTIONS?
