Addressing Health Literacy and Health Communication in Population Health

Russell L. Rothman MD MPP
Professor, Internal Medicine, Pediatrics and Health Policy
Vice President, Population Health Research
Director, Center for Health Services Research
Chief, Internal Medicine/Pediatrics Section
Vanderbilt University Medical Center
Disclosures

• **Previous Funding Support:** RWJ Clinic Scholars Program, UNC Department of Medicine, Vanderbilt Diabetes Center, Vanderbilt DRTC, Vanderbilt Center for Health Services Research, Pfizer Clear Health Communication Initiative, ADA (Novo Nordisk), K23/R03, AADE, National Academy of Medicine, NIDDK (R18)

• **Current Funding Support:** NICHD (R01), NCATS (VICTR), NIDDK (P30), PCORI, CMS

• **Disclosures:** EdLogics (Advisory Board), Abbott Diabetes Care
Outline

• Status of Healthcare in the US
• Definition of population health
• Health Reform Driving Population Health
• Addressing Health Literacy and Health Communication in Population Health
From: Inequalities in Life Expectancy Among US Counties, 1980 to 2014 Temporal Trends and Key Drivers


Life Expectancy at Birth by County, 2014.
Health Challenges

• Over 50% of recommended care is not achieved.
  – Significant disparities in health outcomes
  – Overuse, underuse and misuse of health services
• Up to 50% of patients do not comply with care recommendations.
  – 20% of patients do not fill initial prescriptions
  – 50% of patients do not take prescriptions as recommended
  – Lifestyle changes can be more challenging
• Navigation of our complex health system is challenging:
  – Patients asked to perform more complex self-care
  – Clinic visit times and hospitalizations are shorter
  – Patients only recall 20% of what is told to them in the doctor’s office.
  – Less than 50% of patients know their discharge medications or plan.
• Disparities in health care delivery
• Costs are high for results achieved at population level
Why inadequate care?

Community
- Cultural beliefs
- Access to Care
- Access to Diet
- Access to Exercise
- Environmental Factors

Patient
- Physiology/genetics
- SES factors
- Knowledge/Attitudes/Beliefs
- Behaviors/Adherence
- Health Literacy

System
- Insurance/Financing
- Focus on Acute Care
- Delivery structure
- EHR systems

Provider
- Knowledge
- Attitudes/Beliefs
- Behaviors
- Incentives
- Health Communication Skills

Quality
Population Health

• Population health is defined as the health outcomes of a group of individuals, including the distribution of such outcomes within the group.
• Population health is not just the overall health of a population but also includes the distribution of health, and the health of individuals.

http://www.improvingpopulationhealth.org/blog/what-is-population-health.html
Population Health Paradigm

http://www.improvingpopulationhealth.org/blog/what-is-population-health.html
Population Health Management

Approaches to Population Health

• Health System
  – Accountable Care Organizations
  – Clinically Integrated Networks
  – Health Maintenance Organizations
  – Population Health Offices
  – Patient Experience Offices
  – Capitated and Value-Based Reimbursement

• Leveraging Big Data
  – Identify Gaps in Care
  – Predictive Analytics; Geocoding analyses
  – Collection of social and behavioral determinants
  – Collection of Patient Reported Outcomes

• Targeted Programs
  – Focus on chronic disease management and prevention
  – Focus on high utilizers
  – Patient Centered Medical Homes
  – Address social and behavioral determinants
  – Community efforts
Medicare Access and CHIP Reauthorization Act of 2015

- Overwhelming bipartisan support.
- Provides new tools in implementing the payment reforms.
- Applies to expanded group of clinicians
- Creates clear timetable and benchmarks.

On 3/26, the House passed H.R. 2 by 392-37 vote.

On 4/14, the Senate passed the House bill by a vote of 92-8, and the President signed the bill.
Transforming to Value Based Healthcare

- **All Medicare FFS (Categories 1-4)**
- **FFS linked to quality (Categories 2-4)**
- **Alternative payment models (Categories 3-4)**

**2016**
- 85%
- 30%

**2018**
- 90%
- 50%
Quality Payment Program

Eligible Clinicians

Merit-Based Incentive Payment System (MIPS)

Alternative Payment Models (ACOs)
Medicare Shared Savings Program ACO and Pioneer ACO Assigned Beneficiary Population by ACO by County
(counties with more than 1 percent of an ACO’s assigned beneficiaries)

Source: CMS
## MIPS Scoring

<table>
<thead>
<tr>
<th>Performance Category</th>
<th>Maximum Possible Points per Performance Category</th>
<th>Percentage of Overall MIPS Score (Performance Year 1 - 2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quality:</strong> Clinicians choose six measures to report to CMS that best reflect their practice. One of these measures must be an outcome measure or a high-value measure and one must be a crosscutting measure. Clinicians also can choose to report a specialty measure set.</td>
<td>80 to 90 points depending on group size</td>
<td>50 percent</td>
</tr>
<tr>
<td><strong>Advancing Care Information:</strong> Clinicians will report key measures of patient engagement and information exchange. Clinicians are rewarded for their performance on measures that matter most to them.</td>
<td>100 points</td>
<td>25 percent</td>
</tr>
<tr>
<td><strong>Clinical Practice Improvement Activities:</strong> Clinicians can choose the activities best suited for their practice; the rule proposes over 90 activities from which to choose. Clinicians participating in medical homes earn “full credit” in this category, and those participating in Advanced APMs will earn at least half credit.</td>
<td>60 points</td>
<td>15 percent</td>
</tr>
<tr>
<td><strong>Cost:</strong> CMS will calculate these measures based on claims and availability of sufficient volume. Clinicians do not need to report anything.</td>
<td>Average score of all cost measures that can be attributed</td>
<td>10 percent</td>
</tr>
</tbody>
</table>

Source: CMS
Other Drivers Towards Population Health

• Private Insurance Contracts
  – Pay for Performance
  – Risk-Based Contracting
  – Total Cost of Care Contracts

• Medicaid Payment Report
  – State Innovation Models
  – Bundled Payments

• IRS Requirements for Non-Profit Hospitals
  – Community Health Needs Assessment
Approaches to Population Health

• **Health System**
  – Accountable Care Organizations
  – Clinically Integrated Networks
  – Health Maintenance Organizations
  – Population Health Offices
  – Patient Experience Offices
  – Capitated and Value-Based Reimbursement

• **Leveraging Big Data**
  – Identify Gaps in Care
  – Predictive Analytics; Geocoding analyses
  – Collection of social and behavioral determinants
  – Collection of Patient Reported Outcomes

• **Targeted Programs**
  – Focus on chronic disease management and prevention
  – Focus on high utilizers
  – Patient Centered Medical Homes
  – Address social and behavioral determinants
  – Community efforts
Literacy is a Complex Skill

- Cultural and Conceptual Knowledge
- Listening
- Speaking
- Writing
- Reading
- Numeracy

Literacy

- Oral Literacy
- Print Literacy

IOM, Health Literacy, 2004
Who Has Poor Literacy/Numeracy?

- NALS (1992) and NAAL (2003)
  - 40-44 million Americas are functionally illiterate
  - 50 million have marginal literacy & numeracy skills
- Average American reads at 8th-9th grade level
- Quantitative skills are often worse
Numeracy

• A component of overall literacy
• “The ability to understand and use numbers and math skills in daily life”
• Calculations, deduction/logic, interpretation of graphs/labels, time, probability, etc.

Rothman et al, J Health Comm, 2009
Numeracy vs Literacy

• Highly correlated with literacy, but not perfect

Calvin and Hobbs, Bill Watterson, Universal Press Syndicate, Released on: Friday, Oct 10th 1986.
## Many Outcomes Associated with Literacy

<table>
<thead>
<tr>
<th>Behaviors</th>
<th>Health Outcomes/Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastfeeding</td>
<td>General health status</td>
</tr>
<tr>
<td>Behavioral problems</td>
<td>Hospitalization</td>
</tr>
<tr>
<td>Adherence to medication</td>
<td>Mortality</td>
</tr>
<tr>
<td>Smoking, Substance abuse</td>
<td>Emergency department use</td>
</tr>
<tr>
<td></td>
<td>Depression</td>
</tr>
<tr>
<td></td>
<td>Diabetes control</td>
</tr>
<tr>
<td></td>
<td>HIV control</td>
</tr>
<tr>
<td></td>
<td>Prostate Cancer Stage</td>
</tr>
<tr>
<td></td>
<td>BMI</td>
</tr>
<tr>
<td></td>
<td>Mammography</td>
</tr>
<tr>
<td></td>
<td>Pap smear, STD Screening</td>
</tr>
<tr>
<td></td>
<td>Immunizations</td>
</tr>
<tr>
<td></td>
<td>Cost</td>
</tr>
</tbody>
</table>

### Knowledge
- Food label and portion size understanding
- Birth control knowledge
- Emergency department instructions
- Asthma knowledge
- Hypertension knowledge

DeWalt, JGIM 2004
McCormack, Annals of Internal Medicine 2011
Low Literacy and Numeracy Linked to Worse Knowledge of Child Healthcare Issues

Kumar, Academic Pediatrics, 2011
Health Literacy/Numeracy Linked to Poor Understanding of Nutrition

- Over 90% of patients struggle to understand food labels
- Over 2/3 of patients have poor estimation of portion sizes
- Subjects with lower Literacy/Numeracy had more difficult time understanding health information.

Health Numeracy Linked to Worse Diabetes Knowledge and Control

• Difficulties performing many literacy and numeracy related diabetes tasks:
  – Over 25% of patients could not interpret glucose meter
  – Over 40% could not calculate carbohydrate intake
  – Over 30% could not dose insulin correctly

• Self-care skills linked to underlying numeracy.

• Diabetes numeracy skills associated with self-management, self-efficacy, and A1C.

Huizinga et al, BMC Health Services Res, 2008
Cavanaugh et al, Annals of Internal Medicine, 2008
Assessing Literacy Status

• Not Reliable
  – Asking directly
  – Asking educational status

• Quick Techniques
  – Pill bottle
  – Signing name
  – Red Flags (Missed Appts, noncompliance, etc)

• Validated Techniques
  – REALM
  – TOFHLA
  – The Newest Vital Sign
  – WRAT, SORT, PIAT
Communicating: What can you do?

• Use low literacy and picture based materials
• Individualize education
• Teach concepts in a simplified manner
• Use teach back technique
• Address cultural issues
• Shared goal setting
Low literacy Information

• Most patient information is written at or above the 10th grade levels
• Low literacy materials can improve patient knowledge and outcomes.
• When making materials:
  – Avoid pathophysiology and jargon and focus on key concepts/actions.
  – Use figures to simplify text
  – Increase white space
  – Try to write for the 4th-6th grade level
  – Use SMOG, FRY, Flesh-Kincaid Methods to assess your materials
Resources for Low Literacy Material

• Writing your own:
  – [https://www.cdc.gov/healthliteracy/learn/Resources.html](https://www.cdc.gov/healthliteracy/learn/Resources.html)
  – [https://www.ahrq.gov/topics/health-literacy.html](https://www.ahrq.gov/topics/health-literacy.html)

• Available Materials:
  – [www.niddk.nih.gov/health/eztoread.htm#dia](www.niddk.nih.gov/health/eztoread.htm#dia)
Sample Materials
Teaching Concepts

• Limit advice to key concepts. Focus on behaviors and actions
• Simplify concepts
• Focus on one concept at a time; partition information
• Use concrete terms and examples
• Make info culturally relevant and personal
• Avoid Jargon!
Teachback Technique

New Concept: Health Information, Advice, or Change in Management

Clinician Explains New Concept
Patient Recalls and Comprehends

Clinician Assesses Patient recall and Comprehension

Clinician Clarifies and Tailors Explanation

Clinician Reassesses Patient Recall and Comprehension

Adherence

Schillinger, Arch Int Med, 2003
Shared Goal Setting

• Let patient or family initiate
  – Practice “reflective” listening”
  – Provide affirmation of positive behaviors
  – Show empathy for challenges

• Choose goal that is realistic and attainable
  – Can offer a few choices and settle on goals together
  – Roll with resistance (don’t challenge patients who resist change; instead ask them to come up with solutions)

• Be concrete

• Set a time for accomplishing goal
  – Let them know it is up to them to make change!
  – Promote a “you can do it” approach!
Cultural Challenges

• Language
  – Limited English proficiency

• Family Structure
  – Multiple caregivers

• Health Beliefs
  – Dissonance from the “biomedical model”

Campinha-Bacote, 2003
Addressing Language Barriers

• Improve your language proficiency

• Use language-appropriate handouts

• Use a language interpreter ...
  – If you are not “natively fluent”
  – If you cannot “tell a joke” in that language
“Health care organizations that make it easier for people to navigate, understand, and use information and services to take care of their health.”
Patient Interactions

- Patient and Family
- Provider
- Administrative Staff
- Support Services
- Information
- Organizational leadership and policies
- Appointments, Insurance, billing, regulatory
- Health care team (MD, NP, RN, RD, LPN, etc)
- Translators, patient navigators
- Educational materials, patient portal, medication lists, discharge instructions
Measuring Organizational Health Literacy

Health Literacy
Universal Precautions Toolkit

C-CAT
Communication Climate Assessment Toolkit

THE HEALTH LITERACY ENVIRONMENT OF HOSPITALS AND HEALTH CENTERS
Berna E. Balda - Jennifer E. Anderson

enliven
ENHANCING SOCIAL HEALTH
ENLIVEN ORGANISATIONAL HEALTH LITERACY
Self-assessment Resource
Literacy Interventions
Initial Diabetes Intervention

- 217 Patients with T2DM
- Initial Pharmacist Session
- 112 Interv.
- 105 Control
- 99 Control
- 95 Control
- 6 Month Follow-Up
- 1 Year Follow-Up
Intervention

- Diabetes Education
- Evidence-based medication algorithms
- Database to track and manage patient outcomes
- Diabetes Care Coordinator

- Addressed literacy by using:
  - Individualized verbal education
  - Low literacy material
  - Teaching concepts in a simplified manner
  - “Teach back” techniques to confirm learning
Significant Clinical Improvements at 12 months

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control (n=95)</th>
<th>Intervention (n=98)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1C (%)</td>
<td>-1.2%</td>
<td>-2.1%</td>
<td>0.9% (0.8,1.0)</td>
</tr>
<tr>
<td>SBP (mmHg)</td>
<td>+2.3</td>
<td>-6.9</td>
<td>9.2 (2.3,16.1)</td>
</tr>
<tr>
<td>DBP (mmHg)</td>
<td>+1.2</td>
<td>-3.6</td>
<td>4.8 (1.1,8.6)</td>
</tr>
<tr>
<td>ASA (mmHg)</td>
<td>+6%</td>
<td>+47%</td>
<td>41% (25-55)</td>
</tr>
<tr>
<td>T. Chol. (mg/dL)</td>
<td>-12</td>
<td>-27</td>
<td>15 (-4, 35)</td>
</tr>
</tbody>
</table>

Rothman AM J Med, 2005
Literacy was an Important Factor

**Influence of Patient Literacy on the Effectiveness of a Primary Care-Based Diabetes Disease Management Program**

**High Literacy Patients**
- Control High
- Intervention High

**Low Literacy Patients**
- Control Low
- Intervention Low

- *Difference (Adjusted)*
  - Control High vs. Intervention High: -0.6, 95% CI (-1.2, 0.1)
  - Control Low vs. Intervention Low: -1.2, 95% CI (-1.9, -0.6)
Diabetes and Numeracy RCT

**THE ABC's & 123's OF DIABETES CARE**

- Check your blood sugar every day.
- Be aware of how much starch and sugar (carbohydrates) you eat at every meal.
- Be active every day!
- Take your diabetes medicines every day.
- Clean and look at your feet every day.
- Go to your doctor's office for regular check ups.

Taking care of your diabetes

If you have diabetes, you need to:
DLNET Toolkit

Text at 5th grade reading level

Color coding

Pictures for key concepts

Step-by-step instructions

Simplified medication instructions

Practice skills worksheets

Wolff K et al. The Diab Educ 2009
Study Demonstrates Value of Addressing Health Literacy

*Adjusting for age, gender, race, type of diabetes, income level, site of intervention and baseline DNT score and Hba1c levels

Cavanaugh KL et al. Diabetes Care 2009
Diabetes Nutrition Education Study (DINES)

- **Arm 1**: Usual Care with PCP & 3 "Control" Contacts focusing on non-nutrition education. 3 month Outcomes, 6 month Outcomes
- **Arm 2**: Usual Care with PCP & 3 RD CDE Contacts focusing on Carbohydrate Counting. 3 month Outcomes, 6 month Outcomes
- **Arm 3**: Usual Care with PCP & 3 RD CDE Contacts focusing on Modified Plate Method. 3 month Outcomes, 6 month Outcomes

150 pts with T2DM
Carb Counting vs Plate Method

Practice One Serving Size

Use the label below:

What is the serving size?

How many carbohydrate grams are in each serving?

If you eat one serving, you will get grams of carb.

Nutrition Facts

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount Per Serving</th>
<th>% Daily Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Calories from Fat</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Total Fat</td>
<td>1.5g</td>
<td>2%</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>0g</td>
<td>0%</td>
</tr>
<tr>
<td>Trans Fat</td>
<td>0g</td>
<td>0%</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>0mg</td>
<td>0%</td>
</tr>
<tr>
<td>Sodium</td>
<td>150mg</td>
<td>6%</td>
</tr>
<tr>
<td>Total Carbohydrate</td>
<td>10g</td>
<td>3%</td>
</tr>
<tr>
<td>Dietary Fiber</td>
<td>Less than 1g</td>
<td></td>
</tr>
<tr>
<td>Sugar</td>
<td>0g</td>
<td></td>
</tr>
</tbody>
</table>

2 servings is crackers
Add grams of carb from 1 serving
grams of carb from 1 serving
grams of carb from 2 servings

1/2 serving is crackers
grams of carb from 1 serving
divided by 2
grams of carb from 1/2 serving

For Lunch and Dinner, You Should Divide Your Plate Into 3 Parts

1. Fill up this part of your plate with Free Foods
2. Use this part of your plate for Protein Foods
3. Protein should be about the size of your palm

For Carbs, you can have any from this list:

Vanderbilt University Medical Center
Results Demonstrate Value of Simpler Diabetes Education
New Standards for Diabetes Education

National Standards for Diabetes Self-Management Education and Support

LINDA HAAS, PHC, RN, CDE (CHAIR)¹
MELINDA MARYNIUK, MED, RD, CDE (CHAIR)²
JONI BECK, PHARM.D, CDE, BC-ADM³
CARLA E. COX, PHD, RD, CDE, CSSD⁴
PAULINA DUKER, MPH, RN, BC-ADM, CDE⁵
LAURA EDWARDS, RN, MPA⁶
EDWIN B. FISHER, PHD⁷
LENITA HANSON, MD, CDE, FACE, FACP⁸
DANIEL KENT, PHARM.D, BS, CDE⁹
LESLIE KOLB, RN, BSN, MBA¹⁰
SUE MCLAUGHLIN, BS, RD, CDE, CPT¹¹
ERIC ORZECK, MD, FACE, CDE¹²
JOHN D. PIETTE, PHD¹³
ANDREW S. RHINEHART, MD, FACP, CDE¹⁴
RUSSELL ROTHMAN, MD, MPP¹⁵
SARA SKLAROFF¹⁶
DONNA TOMKY, MSN, RN, C-NP, CDE, FFADE¹⁷
GRETCHE YOUSSEF, MS, RD, CDE¹⁸
ON BEHALF OF THE 2012 STANDARDS REVISION TASK FORCE

nonaccredited and nonrecognized providers and programs.

Because of the dynamic nature of health care and diabetes-related research, the Standards are reviewed and revised approximately every 5 years by key stakeholders and experts within the diabetes education community. In the fall of 2011, a Task Force was jointly convened by the American Association of Diabetes

Diabetes Care, 2012
PRIDE Study

- **PaRtnering to Improve Diabetes Education**
- Goal to address health communication issues to improve diabetes care in middle TN
- Collaboration between TN Dept. of Health, Vanderbilt, and Meharry
- 5 year NIDDK R18 study
- Cluster RCT with 10 Clinics and 400 diabetes patients
# Pride Materials

<table>
<thead>
<tr>
<th>If Your Patient needs help with:</th>
<th>Consider these handouts:</th>
</tr>
</thead>
</table>
| 1 General Information For all Patients with Diabetes: | • What is Diabetes  
• Low Blood Sugar |
| 2 Glucose Monitoring | • Blood Sugar Checks  
• Blood Sugar Log Sheet - Simple  
• Blood Sugar Log Sheet - Advanced |
| 3 Nutrition Information | • Nutrition for Diabetes  
• Using your Plate to Manage your Carbs  
• Counting your Carb grams  
• What Can I Eat for a Snack?  
• What Should I Eat When I Eat Out? |
| 4 Oral Diabetes Medication | • Diabetes Pills  
• Taking Your Medicines |
| 5 Insulin and Byetta | • Drawing and Self-Injecting Insulin (BD)  
• Mixing Insulin for Self-Injecting (BD)  
• How To use an Insulin Pen  
• Set Dose Insulin  
• Insulin for Set Dose Plus Correction  
• Long Lasting Insulin Dose Chart  
• How To Take Byetta  
• Taking Your Medicines |
| 6 Lifestyle Management and Behavior Change | • Be Active  
• How Can Losing Weight Help Me?  
• Smoking and Diabetes |
| 7 Foot Care | • Foot Care Do’s and Don’ts (BD) |
| 8 Cardiovascular Risk Factors | • Blood Pressure Control  
• Cholesterol  
• Taking Your Medicines |
| 9 Coping with Stress and Depression | • Stress and Depression |
| 10 Oral Health | • Problems With Your Teeth and Mouth |
| 11 Women’s Health | • How Diabetes Can Affect Women |
Results: PRIDE Study Flow

Approached: 573  
Consented: 411

124 Declined  
38 Ineligible

Intervention
213 Participant's  
Enrolled

6 month  
139/213 (65%)

12 month  
125/213 (59%)

18 month  
118/213 (55%)

24 month  
125/213 (59%)

Control
198 Participant’s  
Enrolled

6 month  
140/198 (71%)

12 month  
127/198 (64%)

18 month  
113/198 (57%)

24 month  
116/198 (59%)
## Demographics

<table>
<thead>
<tr>
<th>Variable (n=410)</th>
<th>Mean(SD) or n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, yrs (SD)</td>
<td>51.0 (9.6)</td>
</tr>
<tr>
<td>Female, No. (%)</td>
<td>249 (61)</td>
</tr>
<tr>
<td>Hispanic, No. (%)</td>
<td>98 (24)</td>
</tr>
<tr>
<td>Race, No. (%)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>258 (63)</td>
</tr>
<tr>
<td>Black</td>
<td>72 (18)</td>
</tr>
<tr>
<td>Other</td>
<td>80 (20)</td>
</tr>
<tr>
<td>Without Health Insurance (%)</td>
<td>359 (88)</td>
</tr>
<tr>
<td>Annual Family Income ≤ 20,000 (%)</td>
<td>335 (83)</td>
</tr>
<tr>
<td>Education, yrs (SD)</td>
<td>11.1 (3.4)</td>
</tr>
<tr>
<td>Literacy Skills ( S-TOFHLA), No. (%)</td>
<td></td>
</tr>
<tr>
<td>Inadequate</td>
<td>59 (15)</td>
</tr>
<tr>
<td>Marginal</td>
<td>10 (2)</td>
</tr>
<tr>
<td>Adequate</td>
<td>333 (83)</td>
</tr>
<tr>
<td>Subjective Literacy Skills (SLS), mean total (SD)*</td>
<td>10.7 (3.3)</td>
</tr>
<tr>
<td>Subjective Numeracy Skills (SNS), mean (SD)*</td>
<td>3.3 (1.2)</td>
</tr>
<tr>
<td>Diabetic Numeracy Skills, DNT, mean (SD)*</td>
<td>46.1% (37.5)</td>
</tr>
</tbody>
</table>
### Clinical Characteristics

<table>
<thead>
<tr>
<th>Variable (n=410)</th>
<th>Mean(SD) or n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI (SD)</td>
<td>35.8 (9.0)</td>
</tr>
<tr>
<td>On Pills to Lower Blood Sugar (%)</td>
<td>364 (89)</td>
</tr>
<tr>
<td>A1C (SD)</td>
<td>9.6 (2.1)</td>
</tr>
<tr>
<td>Yrs of diabetes</td>
<td>9.0 (7.1)</td>
</tr>
<tr>
<td>On Insulin (%)</td>
<td>242 (59)</td>
</tr>
<tr>
<td>Takes insulin 1x per day</td>
<td>65 (27)</td>
</tr>
<tr>
<td>Takes insulin 2x per day</td>
<td>101 (42)</td>
</tr>
<tr>
<td>Takes Insulin 3-4x per day</td>
<td>77 (32)</td>
</tr>
<tr>
<td>Adjusts Insulin for Blood Glucose (%)</td>
<td>104 (42)</td>
</tr>
<tr>
<td>Adjusts Insulin for Carbohydrates (%)</td>
<td>33 (13)</td>
</tr>
<tr>
<td>Blood Glucose Monitoring, No. (%)</td>
<td></td>
</tr>
<tr>
<td>&lt; 1x per day</td>
<td>92 (23)</td>
</tr>
<tr>
<td>1x per day</td>
<td>87 (21)</td>
</tr>
<tr>
<td>≥ 2x per day</td>
<td>228 (56)</td>
</tr>
</tbody>
</table>
HIT approaches for Diabetes

• Web-based and mobile phone interventions to promote problem solving skills and self-care in adolescents with diabetes
• Use of electronic patient portal to address medication adherence
Childhood Obesity

• 1 in 4 preschoolers in the US are overweight/obese

• Overweight in infancy associated with increased risk for overweight in adulthood

• Weight gain in first few months of life associated with increased CV risks in adulthood

• “Obesogenic” behaviors start early in infancy and are very common!
Greenlight Study

• NIH (NICHD) Funded R01
• **Design:** Cluster Randomized Trial of Literacy Sensitive Obesity Prevention intervention vs Active Control (Injury Prevention)
• **Setting:** 4 academic primary care resident clinics (Vanderbilt, NYU, UNC, and U Miami)
• **Participants:**
  – Over 400 pediatric residents at the 4 sites
  – 865 English and Spanish speaking families with children enrolled at 2 months of age and followed until 2 years of age
  – Children with weight/length z score >3% (WHO Criteria) without significant chronic health issues or FTT or history of prematurity (<35 weeks)

Resident Training in Effective Health Communication

• Lectures, pre-clinic conference, role-playing
• Use effective health communication principles
  – Use plain language. Avoid jargon
  – Limit advice to 1-3 key concepts
  – Use “teach back” technique to confirm understanding
  – Address culture, language and family issues
  – Perform shared goal setting
• Perform in-room observations (“certifications”)
Greenlight Toolkit Materials

• 1-2 Booklets per Well Child Visit
  – 1 CORE booklet focused on key behaviors
  – 1-3 SUPPLEMENTAL booklets *(Provider Chooses)*
  – Booklets are 2-6 pages and end with goal setting

• Designed to be used interactively during the visit

• Available in English and Spanish
Sample Materials: 15 months

Keep Your Toddler Growing Healthy!

- Milk and water are best. Your toddler does not need juice or other sugary drinks. [pages 2-5]
- Choose healthy foods and offer the right amount. Teach your child to like healthy foods from the start! [pages 6-13]
- Be active with your toddler. TV time is not active time. [pages 14-15]

Plan The Dinner Plate – for your 15-18 month old
It's easy to do – just split the plate into 3 parts, the largest part for vegetables.

- ⅓ vegetable or fruit
- ⅔ protein
- ⅓ starch

This dinner plate has:
- 2 servings vegetables
- 1 serving rice & beans
- 1 serving fish

Start with 1 tablespoon of each food and let your toddler ask for more!

7 inch plate
Goal Setting with the Toolkit

- Last page of each CORE booklet
  - Parent-centered
  - Do-able; “baby step”
  - Make goal with specific time frame
  - Can choose from examples or can WRITE ONE DOWN
Mid-South Practice Transformation Network

• CMS contract for $28 million over four years to help more than 4,000 clinicians transform their clinical practices to improve quality of care and reduce costs.

• Partnership between Vanderbilt, the Vanderbilt Health Affiliated Network (VHAN), the Mississippi Affiliated Health network, and the Safety Net Consortium of Middle Tennessee.

• Engaging 116 primary and specialty care practices across Tennessee, Arkansas, Mississippi, and Kentucky, representing over 4,200 clinicians.
Our Goal: Transformed, High Performing Practices

PHASE I
Detailed Transformation Planning
Developing Shared Vision of Transformed Practice
Creating Plan to Achieve Vision including Targeted Metrics

PHASE II
Reporting and Using Data To Generate Improvements
Monitoring Metrics
Training Staff on QI
Initiating Population Management & Care Coordination

PHASE III
Progressing Towards Success in Value-Based System
Improving Metrics
Incorporating QI Activities into Day-to-Day Operations
Implementing Multiple Care Coordination, Population Management

PHASE IV
Sustaining Progress Over Time
Meeting Metric Targets for One Year
Decreasing Utilization and Unnecessary Testing
Consistently Delivering Evidence-Based, Patient-Focused, Coordinated Care

PHASE V
Preparing to Thrive in Value-Based System
Sharing Financial Data within Practice To Optimize Success in APMs
Graduating to APM Prepared to Thrive Long-Term

Graduation to APM
Community-based Care Teams
Promoting quality and reduced cost by developing a collaborative of institutions that support practice transformation
Summary

• Population health is a growing field aimed at improving care for individuals and populations
• Heath Literacy/numeracy and health communication are important components to addressing population health
• Significant opportunities to advance the science of health literacy/health communication in population health
Acknowledgements

• Vanderbilt/ Meharry
  – Tom Elasy MD MPH, Robert Dittus MD MPH
  – Kerri Cavanaugh MD MPH, Mimi Huizinga MD MPH
  – Dianne Davis RD CDE, Becky Gregory RD CDE
  – Ken Wallston PhD, David Schlundt PhD, Phil Ciampa MD
  – Ayumi Shintani PhD, Tebeb Gebretsadik MPH
  – Andrea Bronaugh, Disha Kumar BS, Jessica Sparks BA, Ryan Housam BA, Hilary Weiss BS, Kirbee Bearden
  – Sunil Kripalani MD MSc, Bill Heerman MD MPH, Thomas Spain MD MPH
  – Kathleen Wolf MSN, FNP-BC, ADM-BC
  – Aileen Ciampa JD, Kerri Wolfe MA, Katie Worley MS, Lexie Lipham
  – Richard White MD, Vanessa Elliot PhD (Meharry)

• NYU
  – Shonna Yin MD MSc
  – Linda van Schaick PhD, MaryJo Messito MD
  – Elaine Galland RD, Benard Dreyer, MD
  – Alan Mendelsohn, MD

• Duke
  – Ian Sanderson MD, Ebony Boulware MD
  – Schulyer Jones MD, Gene Odddone MD

• UNC
  – Tim Carey MD MPH
  – Eliana Perrin MD MPH
  – Joanne Propst-Finkle JD
  – Alice Ammerman PhD RD
  – Michael Pignone MD MPH, Darren DeWalt MD MPH, Morris Weinberger PhD, John Buse MD PhD CDE
  – Robb Malone PharmD CDE, Betsy Bryant PharmD CDE, Victoria Hawke RD
  – Britton Crigler BS, James Joyner BA

• Health Sciences of South Carolina
  – Katrian Fryar
  – Les Lenert MD (MUSC)

• Miami/Stanford
  – Lee Sanders MD MPH, Alan Delamater PhD
  – Anna Maria Patino Fernandez, PhD
  – Daniela Quesada, MPH, Vivian Franco MPH, Sheah Rarback, RD, Sarah Messiah, PhD, Lourdes Forster, MD

• TDOH
  – Cathy Taylor RN PhD, Lori MacDonald MD MPH, Laura Harris RD CDE