7th Annual Health Literacy Research Conference (HARC)
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Assessing Health Literacy and Preconception Healthcare (PCH) Risk amongst Black/African-American Women via web-based Conversational Agent Technology

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EXCEPTIONAL CARE. WITHOUT EXCEPTION.

Topics to be discussed

- Background information on:
  - Health Disparities in Birth Outcomes
  - Preconception Care
  - The Gabby Preconception Care System
- Results
- Future directions

“HEALTH LITERACY” is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.

Women with poor health literacy are more likely to:

- Have an unplanned pregnancy
- Less likely to take folic acid prior to becoming pregnant
- Less to have discussed pregnancy with their physician prior to becoming pregnant

Infant Mortality Rates, by race and ethnicity, United States, 2005 and 2013

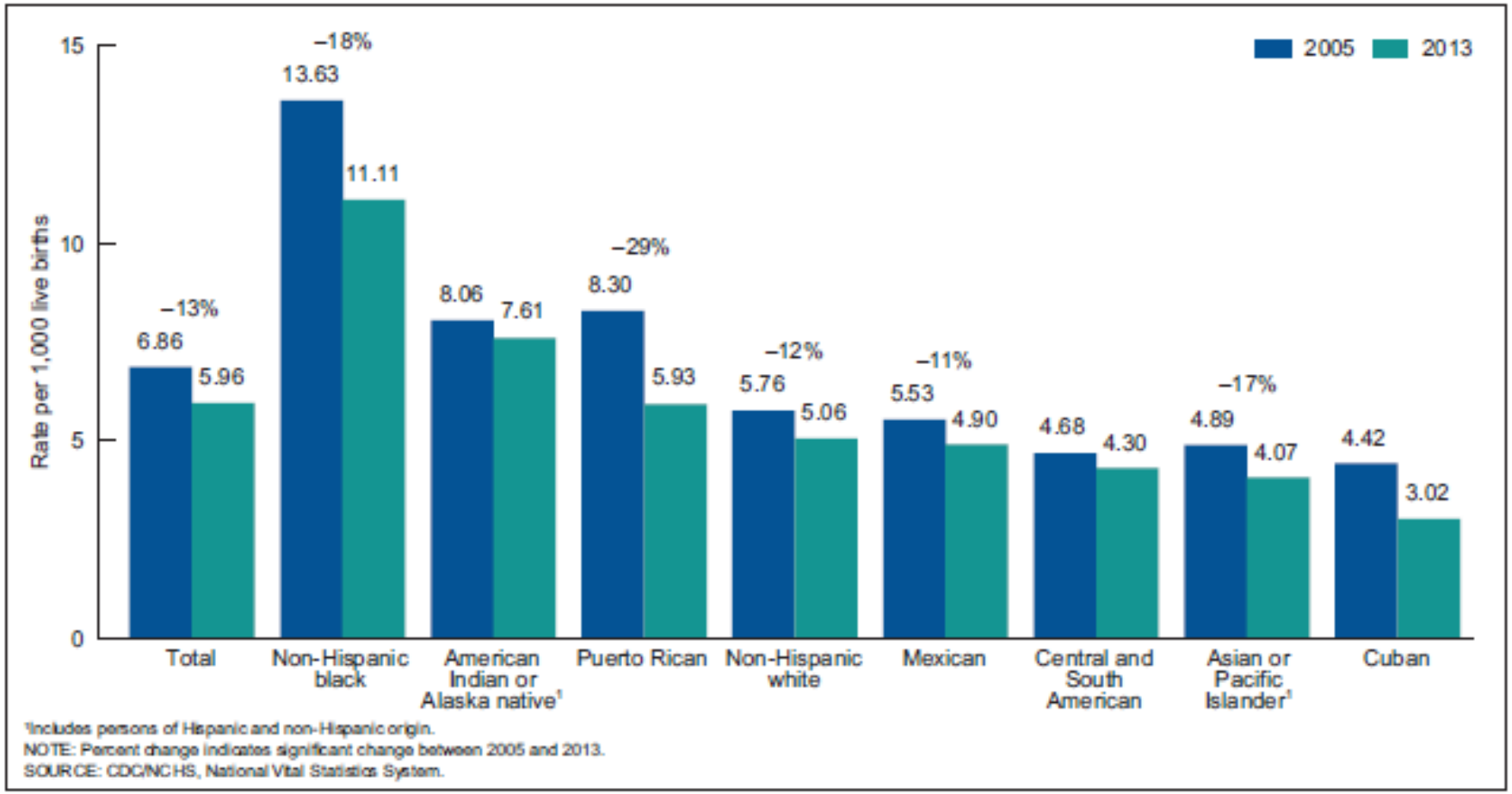


Figure 2. Infant mortality rates, by race and Hispanic origin of mother: United States, 2005 and 2013

Source: National Vital Statistics Reports Aug 6, 2015

Preconception care is:

"a set of interventions that aim to identify and modify biomedical, behavioral and social risks to a woman's health or pregnancy outcome through prevention and management"

CDC, Johnson K, Posner SF, Biermann J, Cordero JF, et al. (2006) CDC/ATSDR Preconception Care Work Group; Select Panel on Preconception Care. Recommendations to improve preconception health and health care: A report of the CDC/ATSDR Preconception Care Work Group and the Select Panel on Preconception Care. MMWR Recomm Rep 55: 23

50% of all pregnancies are unplanned, hence important to address preconception healthcare (PCH) risk factors in healthy young women before they become pregnant, such as:

- Folic Acid supplementation
- Vaccinations
- Intimate Partner Violence (IPV)
- Smoking
- Obesity
- Opioid use and/or abuse

Preconception Health & Health Care

Although most women understand optimizing health before pregnancy is important & most physicians think preconception care is important, few obstetricians/gynecologist or family physicians provide comprehensive PCH care to their patients…

Hence we need to create tools to assist busy clinicians in providing this care

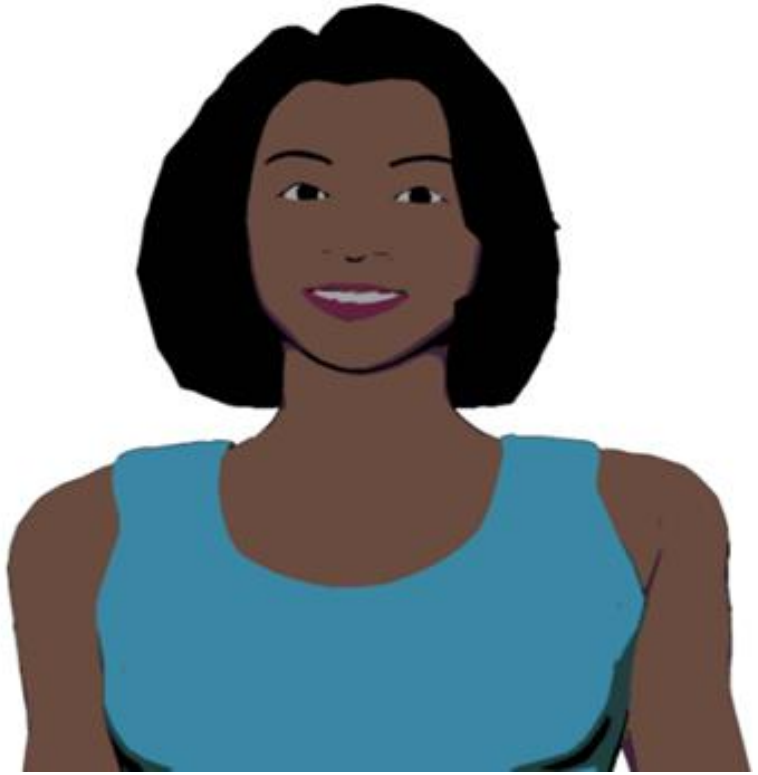
Preconception
Health+Health Care Initiative
A National Public-Private Partnership

Using Health IT to improve Preconception Health:

Gabby is a "Conversational Agent", which is a computerized, animated character designed to integrate best practices from provider-patient communication theory

Gabby may be ideal for delivering PCH because:

- can reach large number of patients
- Alleviate clinician time restraints
- Can control costs
- High patient acceptability:
  - Culturally appropriate
  - Provide understandable info for those with low Health literacy



Gabby

The Gabby Preconception Care System..

Development of the Gabby Preconception Care System

- **Version 1 (V1)** (2012)– 24 black/African American (AA) women enrolled, used Gabby system for 2 months (HRSA)

- **Version 2 (V2)** (2013-4)- 100 AA women enrolled and completed RCT to assess the effectiveness of the Gabby system to reduce PCH risk during 6 month period, completed 2014, published in JABFM July 2015. (HRSA)

- **Version 3 (V3)** (2015 to present) - 500 AA women currently being recruited for RCT of 1 year duration (NIMHD)

- **Version 4 (V4)-** refinement, update of Gabby System (Kellogg Foundation)

Gabby Version 2 and 3 (V2 and V3)

Research hypothesis

- Black/AfAm women with low health literacy will have increased PCH risks.
- Use of Gabby system did not vary with level of health literacy.
- Gabby system PCH risk mitigation was not associated with health literacy.

Gabby Version 2 (V2)

- Methods: 6 month RCT with 100 nongravid primarily college-attending AA women between 18-34 years of age, screened for PCH risks.

- Results:
  - Mean # of PCH risks: 23.7
  - At 6 months, the Gabby group had greater reduction in number of PHC risks compared to controls (8.3 vs 5.5 risks, $P<0.5$)
  - Women averaged 2.9 logins and 63.7 minutes of interaction time with Gabby
  - 78% reported it “was easy to talk to Gabby”
  - 64% reported they had used information from Gabby to improve their health

Rapid Estimate of Adult Literacy in Medicine (REALM)

Patient Name/ Subject # _____ Date of Birth _____ Reading Level _____

Date _____ Clinic _____ Examiner _____ Grade Completed _____

List 1	List 2	List 3
Fat	Fatigue	Allergic
Flu	Pelvic	Menstrual
Pill	Jaundice	Testicle
Dose	Infection	Colitis
Eye	Exercise	Emergency
Stress	Behavior	Medication
Smear	Prescription	Occupation
Nerves	Notify	Sexually
Germs	Gallbladder	Alcoholism
Meals	Calories	Irritation
Disease	Depression	Constipation
Cancer	Miscarriage	Gonorrhea
Caffeine	Pregnancy	Inflammatory
Attack	Arthritis	Diabetes
Kidney	Nutrition	Hepatitis
Hormones	Menopause	Antibiotics
Herpes	Appendix	Diagnosis
Seizure	Abnormal	Potassium
Bowel	Syphilis	Anemia
Asthma	Hemorrhoids	Obesity
Rectal	Nausea	Osteoporosis
Incest	Directed	Impetigo

SCORE

List 1 _____

List 2 _____

List 3 _____

Raw Score _____

REALM Score	REALM equivalent Education Level	Health Literacy
0-18	≤3rd grade	Low
19-44	4th-6th grade	
45-60	7th-8th grade	Marginal
61-66	≥9th grade	Adequate

PCH Risks and REALM Category

(Gabby Baseline Data, V2 & V3 to 9/2015):

REALM Category of Equivalent Educational Grade (n)	PCH Risks mean (sd)
≤3rd Grade (1)	24 (6.5)
4-6th Grade (4)	31.3 (3.2)
7-8th Grade (12)	27.3 (1.9)
≥9th Grade (156)	24.4 (0.5)

ANOVA p=0.09

REALM Score & Self-Reported Education Level

(Gabby Baseline Data, V2 & V3 to 9/2015):

Self-reported Education level (n)	Mean REALM score mean (sd)
Have not graduated High School (7)	59.8 (2.3)
Graduated High School (16)	50.0 (1.5)
At least 1 year of College (172)	63.6 (0.46)

- ANOVA $p < 0.001$

PCH Risks & Self-Reported Educational Level

(Gabby Baseline Data, V2 & V3 to 9/2015):

Self-Reported Education level (n)	PCH Risks mean (sd)
Have not graduated High School (8)	30.25 (2.3)
Graduated High School (10)	27.4 (2.1)
At least 1 year of College (161)	24.2 (0.5)

ANOVA p <0.015

Adverse Health Conditions and Health Literacy Gabby V2 Baseline Assessment

- Lower Health Literacy more likely to be associated with:
  - Poor Birth Outcomes ($p<0.05$)
  - Preterm Baby ($p<0.001$)
  - Smoking ($p<0.001$)
  - No health insurance ($p<0.01$)
  - High blood pressure ($p<0.05$)
  - Missing Immunizations ($p<0.001$)
  - Disability ($p<0.001$)

- Higher Health Literacy is positively associated with:
  - Better Social Supports (per Multidimensional Scale of Social Support, $p=0.08$)
  - Better self-efficacy (per General Self-Efficacy Scale, $p<0.05$)

Gabby V2 Use & REALM Scores
6 month follow-up, Gabby V2

Number of times Gabby System Accessed (n)	REALM Score mean (sd)
None (4)	56.5 (6.4)
Once (7)	65.1 (4.8)
Two to Three times (7)	58 (4.8)
Four to Five times (10)	64.3 (4.1)
More than Five Times (7)	56.6 (4.9)

- ANOVA p=0.56, n=35

Number of PCH Risks Resolved and REALM Score 6 month follow-up, Gabby V2

PCH Risks Resolved (n)	REALM Score mean (sd)
0-4 (10)	65.1 (1.7)
5-8 (12)	53.6 (20.3)
9-20 (12)	64.0 (1.3)

- ANOVA, p=0.06

Computer Use Location and Health Literacy Gabby V2 & V3

Where Women Access Internet (n)	REALM Score mean (sd)
At friends (2)	59 (4.6)
Home (107)	62.5 (0.6)
Library (7)	47.1 (2.4)
Other (10)	59.9 (2.0)
Work (68)	63.9 (0.8)

- ANOVA $P<0.001$

Limitations

REALM Score

- REALM correlates with three standardized reading tests (PIAT-R, WRAT-R, SORT-R), but does not assess for comprehension of printed health materials, numeracy, and information seeking/navigation.. (Dumenci L et al, 2013)
- Does not consider cultural variation in pronunciation

Sample primarily college educated women

Gabby only assessable via computers, not mobile phones

Longer follow-up and larger sample needed to assess impact on reproductive outcomes.

In Summary

- Lower Health Literacy associated with more PCH Risks
- Women with lower Health Literacy attained similar benefits from the Gabby Preconception Care System as women with higher health literacy
- Women with lower health literacy may have issues related to accessing computers/tablets to utilize the Gabby System

Thank you

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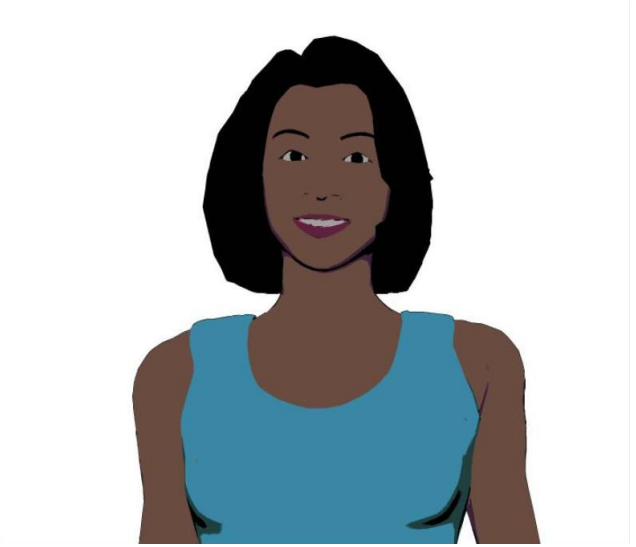

Funders:

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