

Using a Technology Based Diabetes Prevention Program to Improve Patient Activation and Reduce Body Mass Index in African American Adolescents/Young Adults



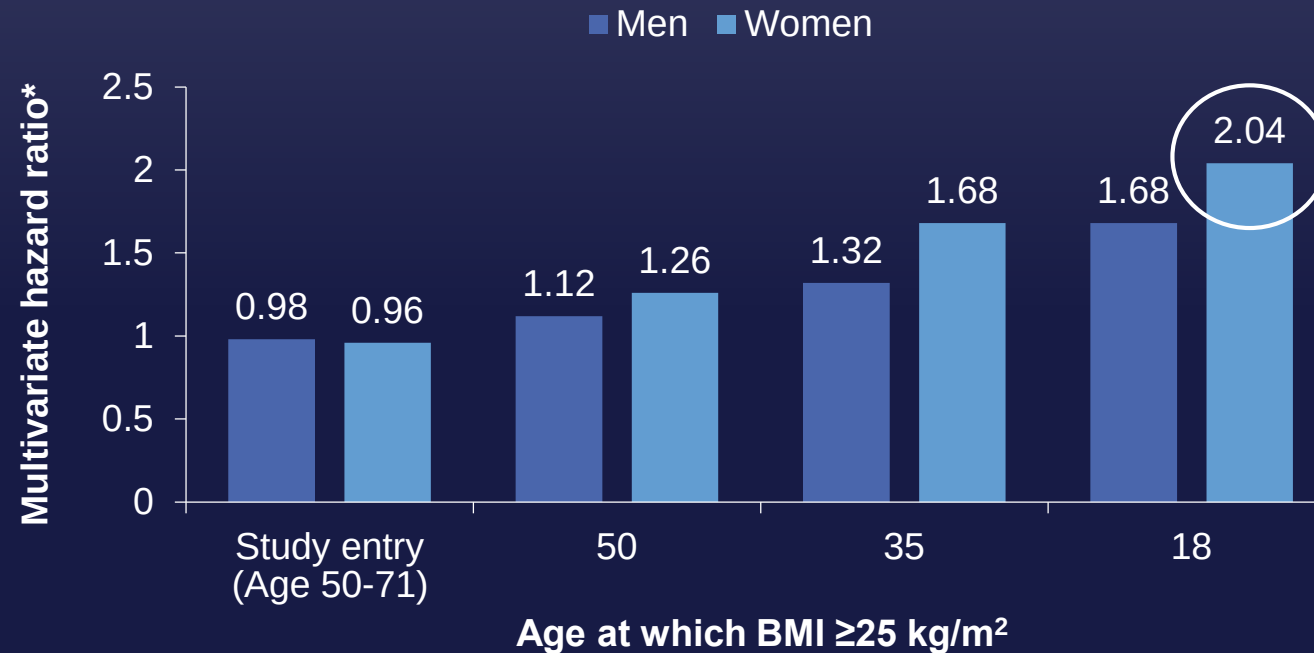
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Disclosures

"This project has been funded in whole or in part with Federal funds (P20MD000198) from the National Institute of Minority Health & Health Disparities. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health."

Earlier Weight Gain Increases Total Mortality Risk

**National Institutes of Health AARP Cohort
Study, 1996-2009
(N=109,947 Never-Smokers)**



*Regression analyses adjusted for age, race/ethnicity, education, leisure-time physical activity, and alcohol consumption.

Adams KF, et al. *Am J Epidemiol.* 2014;179:135-144.

NIH diabetes prevention program

High risk for development of type 2 diabetes mellitus
FPG ≤ 126 mg/dL
2-hour post-OGTT glucose 140–199 mg/dL

Aim: Prevent or delay progression to type 2 diabetes mellitus

Intensive lifestyle changes
Dietary advice
Exercise advice ($\uparrow$ Activity
700 kcal/wk or by 150 min/wk)
 $\downarrow$ weight $\sim 7\%$ and maintain
weight loss through study end

Pharmacologic treatment
Standard lifestyle advice
Placebo
Metformin 850 mg BID

Follow-up every 6 months
for 3–6 years

End point: Development of type 2 diabetes mellitus
FPG ≥ 126 mg/dL or 2-hour OGTT glucose ≥ 200 mg/dL

Diabetes Prevention Program

- Average follow-up 2.8 years
- Incidence of diabetes
 - Placebo 11%
 - Metformin 7.8%
 - Life-style 4.8%
- Conclusions
 - Lifestyle intervention most effective



USING TECHNOLOGY TO PREVENT DIABETES

Primary Care-Based Counseling for T2D Prevention: ADAPT

ADAPT System for Behavior-Change Counseling

**Behavior-Change
Principles**

**Persuasive
Psychology**

Technology

- Website-based tailored reminders
- Frequent feedback about progress via email/text

Specific Aim

- To compare the effectiveness of a lifestyle change intervention delivered either using state-of-the-art communications and networking technologies or using lifestyle group visits

Study Design

- Non-masked randomized interventional parallel assignment trial
- Inclusion criteria
 - African American
 - 18-24 years
 - Impaired fasting blood glucose of 100-125 or HbA1c 5.7-6.4 or
 - + family history of type 2 diabetes mellitus
 - BMI $\geq$ 25
- Exclusion criteria
 - Pregnancy
 - Unwilling to participate
 - No web-enabled cell phone
 - Diagnosis of diabetes
 - Significant chronic illness

Measurements

- Demographics
- Patient Activation Measure (PAM)-10
- Patient Health Questionnaire (PHQ) 9
- Physical Activity- Godin Leisure Time (GLT)
- Motivation for Weight Loss
- Newest Vital Sign
- International Physical Activity Questionnaire (IPAQ)
- Height
- Weight
- Body Mass Index (BMI)
- Fasting Blood Glucose (FBG)
- HbA1c
- Urine pregnancy test

Study Outcomes

- Primary Outcome
 - Improved Patient Activation Measure
- Secondary Outcome
 - Decrease in BMI
 - Decrease in HbA1c

PAM-10

- PAM – developed by Judy Hibbard at University of Oregon is commercially available
- Assess how activated a patient is in managing his/her health
- Assess what to do with the information to improve outcomes
- 4 levels
 1. No active/important role in their health
 2. Lack confidence and knowledge to take action
 3. Beginning to take action
 4. Maintain behavior over time



GROUP LIFESTYLE BALANCE™

A Modification of the Diabetes Prevention Program's
Lifestyle Change Program

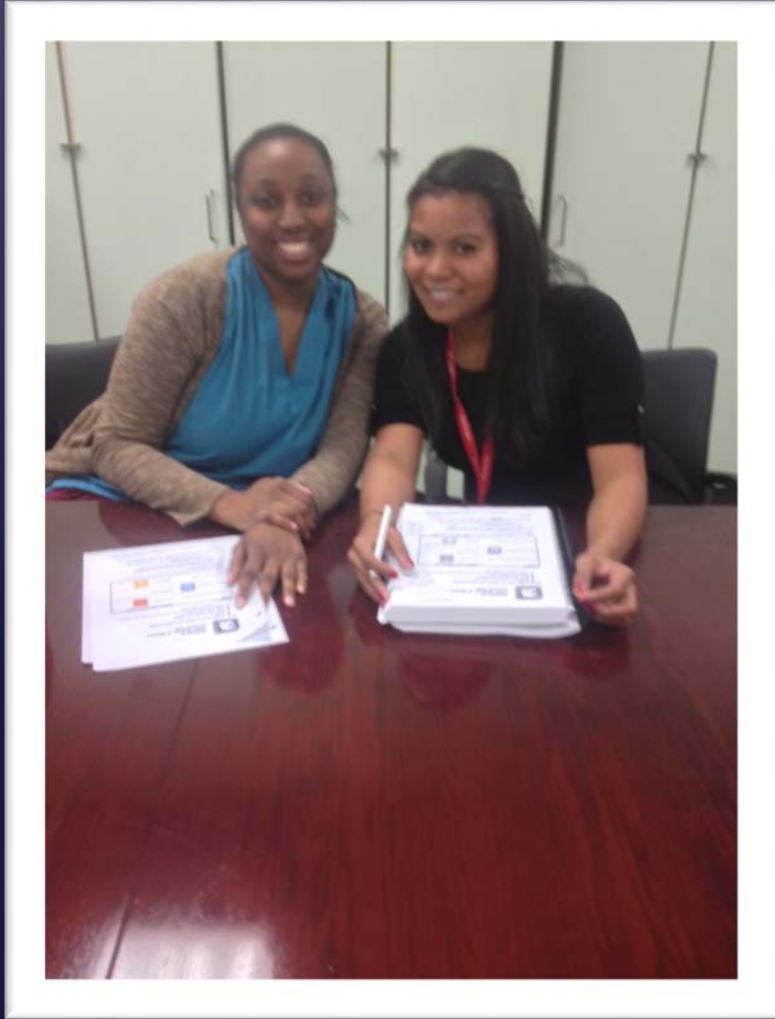
© 2004; 2008; 2010; 2011; by the University of Pittsburgh.*

CURRICULUM

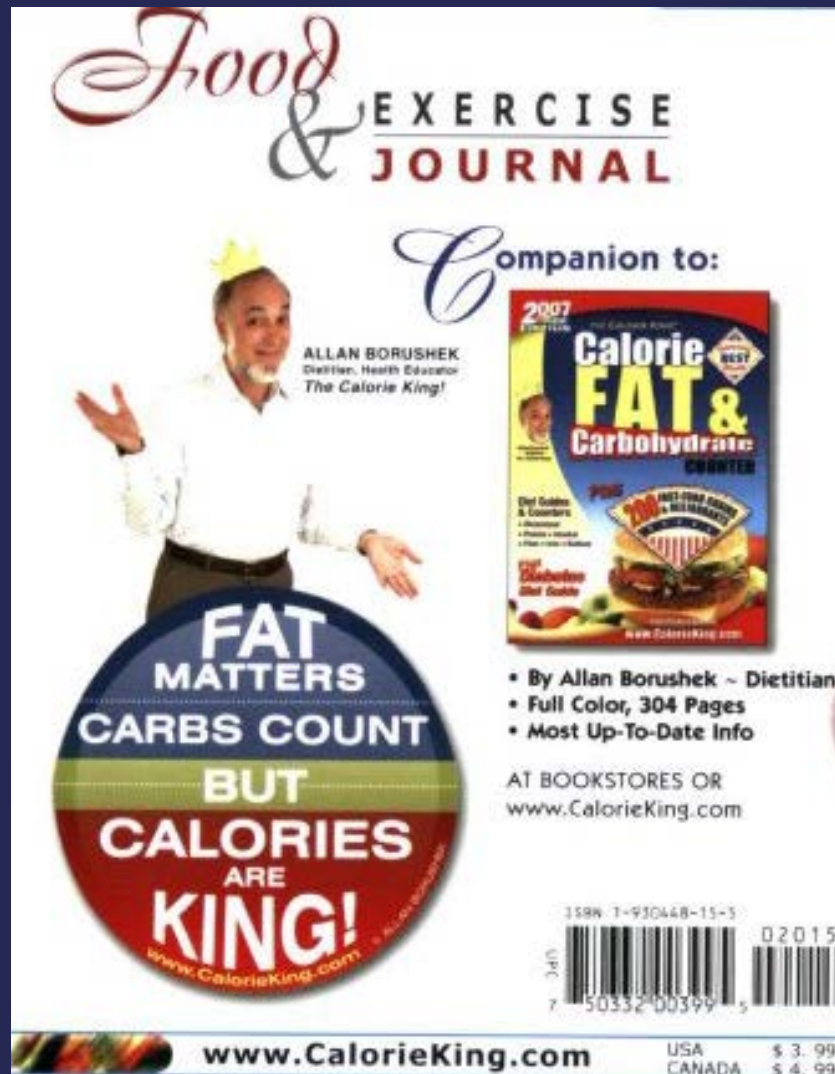
Participants randomly assigned to
in person group visits or online
curriculum

Supplies





Lifestyle Group Visits



WRITTEN
JOURNALS



TECH
GROUP

Compliance Text Reminders



MY FITNESS PAL AND FITBIT PHONE APPS



myfitnesspal
TUESDAY / Nov 17, 2009

Your Daily Summary

1569 CALORIES REMAINING

Goal	Food	Exercise	Net
2100	+1010	-479	531

Add to Diary

Nutrient Summary

	Total	Goal	Left
Total Fat (g)	20	104	84
Saturated (g)	1	34	33



HOWARD UNIVERSITY HOSPITAL DIABETES TREATMENT CENTER MOBILE UNIT

Howard University Hospital Diabetes Treatment Center



Account Summary



Member Summary



Mailbox : 57910



E-Clipboard Empty



Return to NMC-MD

Logged in as: gailbland Viewing Member: [REDACTED] Age:24, Sex: F



Member Access Center [Edit]



Edit Member Summary Layout

Change what sections appear on this members summary screen.



Member Review

Go through a step by step medical review for Naja.



Access Privileges

Manage access to your PHR information.



Import data from pickup code

Click here to use a pickup code from a provider or other institution to import



Print Summary

View and print a summary of this member.



Share my PHR information with others

Share your PHR information with your physicians and other providers.



Print NMC911 Card

View and print an NMC911.com card for this member.



Howard University Hospital [View]

Blood Pressure

Most Recent: No Data / No Data

[Take the questionnaire online](#)

[View questionnaire results](#)



FitBit - Connected!

Fitbit Display Name: [REDACTED]

[Click here to see your steps.](#)

POPULATED PHR



Howard University Hospital Diabetes Treatment Center

[Account Summary](#)[Member Summary](#)[Mailbox : 52251](#)[E-Clipboard Empty](#)[Return to NMC-MD](#)

Logged in as: gailbland Viewing Member: [redacted] Age:23, Sex: F

| [3 Months](#) | [6 Months](#) | [1 Year](#) | [All Time](#) | [Custom Dates](#) |

[Create Summary Report](#)

Click this button to create a report which you can add to your documents section and/or send to a medical professional.

[View/Edit Entries](#)[Graph Results](#)

Displaying Last 7 Dates Entered

Daily Steps

Observation date	Steps	Walking distance	Calories burned	Comments	Options
04-15-2014	12205	8.39	2705		Delete
04-14-2014	6720	4.58	2488		Delete
04-14-2014	0	0	2546		Delete
04-14-2014		6.17			Delete
04-14-2014	9036		2973		Delete
04-14-2014		7.35	2825		Delete
04-14-2014	10704				Delete

Observation date	Steps	Walking	Calories	Comments	Add
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HOWARD UNIVERSITY HOSPITAL
DIABETES TREATMENT CENTER

DIABETES PREVENTION SUPPORT PROGRAM

You are logged in as Gail L. Nunlee-Bland (Logout)

English (en)



Home > Site pages



HUH DIABETES TREATMENT CENTER

GROUP LIFESTYLE BALANCE PROGRAM PORTAL

Welcome to the Group LifeStyle Balance Program. This is Howard University Hospital's online educational program for diabetes prevention support. Use this tool to learn more about diabetes prevention, monitor your calorie intake, weight, and physical activity.



Settings

Front page settings

- Turn editing on
- Edit settings
- Users
- Filters
- Backup
- Restore
- Questions

My profile settings

Site administration

- Useful Links
- Chat Room

Courses

Start LifeStyle Balance Curriculum

- LifeStyle Balance 1
- LifeStyle Balance Program

Diabetes News

NAFLD is an independent cardiovascular risk factor...

Two new studies have provided more evidence to clarify the role of non-alcoholic fatty liver disease (NAFLD) as an independent risk factor for the development of cardiovascular disease. In the first long-term study, NAFLD was shown to contribute to the progression of early atherosclerosis independently of traditional (CV) risk factors. In a

Featured Links

- Howard University Hospital
- American Diabetes Association
- Weight Loss and Control
- Diabetes Treatment Center

Calendar

Find

Please fill out the following form.

Highlight Fields



Session 12:
Ways to Stay Motivated

Progress Review

Changes you've made to be more active:

Changes you've made to eat less fat (and fewer calories):





< PREV

NEXT >

Grade item	Grade	Range	Percentage	Letter grade	Feedback
 LifeStyle Balance Program					
 Assessment 1	75.00	0-100	75.00 %	C	
 Welcome to the Life Balance Program	1.00	0-1	100.00 %	A	
 Be a Fat and Calorie Detective	1.00	0-1	100.00 %	A	
 Assessment 2	100.00	0-100	100.00 %	A	
 Healthy Eating	0.00	0-100	0.00 %	F	
 Assessment 3	100.00	0-100	100.00 %	A	
 Move those Muscles	1.00	0-1	100.00 %	A	
 Assessment 4	100.00	0-100	100.00 %	A	
 Tip the Calorie Balance	0.00	0-1	0.00 %	F	
 Assessment 5	20.00	0-100	20.00 %	F	
 Take Charge	0.00	0-1	0.00 %	F	
 Assessment 6	80.00	0-100	80.00 %	B-	
 Problem Solving	0.00	0-1	0.00 %	F	
 Assessment 7	100.00	0-100	100.00 %	A	
 Four Keys to Health Eating Out	0.00	0-100	0.00 %	F	
 Assessment 8	100.00	0-100	100.00 %	A	
 The Slippery Slope of Lifestyle Change	0.00	0-1	0.00 %	F	
 Assessment 9	100.00	0-100	100.00 %	A	
 Jump Start Your Physical Activity Plan	0.00	0-1	0.00 %	F	
 Assessment 10	80.00	0-100	80.00 %	B-	

Results

12 Weeks



1 Year



Baseline Characteristics

	Non-Tech	Tech	P value
Female gender	78 (88.6%)	77 (91.7%)	0.506
Age, mean (SD)	19.6 (1.68)	19.6 (1.89)	0.986
PAM-10 score, mean (SD)	65.2 (14.4)	66.8 (16.56)	0.508
PHQ9 score, mean (SD)	7.5 (5.77)	6.1 (4.60)	0.096
GLT Exercise, mean (SD)	39.2 (50.50)	31.4 (22.15)	0.189
Motivation for Weight loss			1
IPAQ			0.983

Baseline Characteristics (cont.)

	Non-Tech	Tech	P value
Newest vital sign			0.896
Height (in), mean (SD)	65.8 (3.75)	65.8 (2.78)	0.969
Weight (lbs.), mean (SD)	209.0 (43.58)	206.5 (40.94)	0.692
BMI, mean (SD)	34.3 (10.41)	33.4 (5.71)	0.473
HbA1c, mean (SD)	5.4 (0.32)	5.4 (0.33)	0.393

Follow up Assessments

3 Month Outcomes

- No significant differences

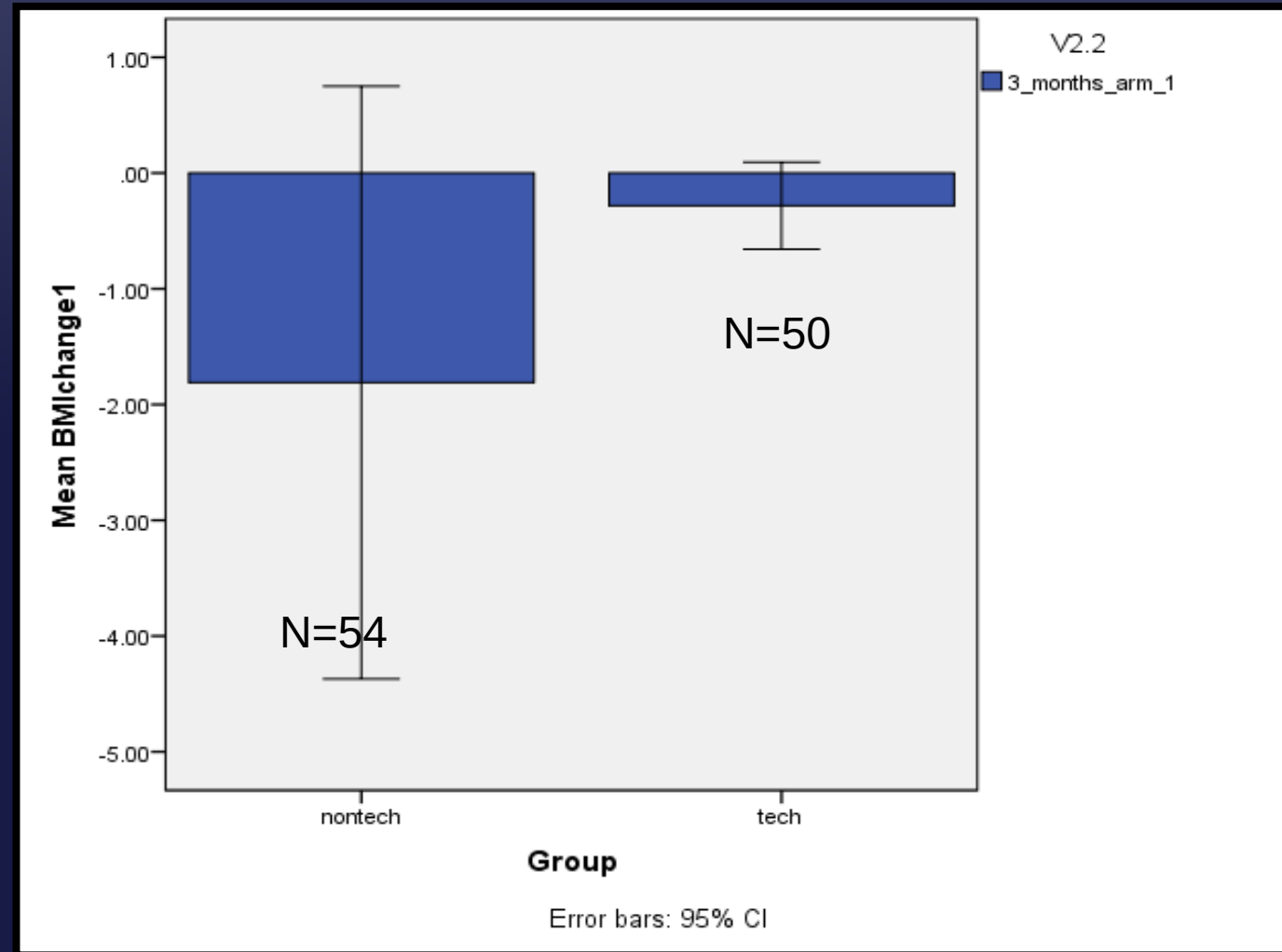
12 Month Outcomes

- Tech group had significantly lower PHQ9 score (p 0.014)
- Tech group were more physically active (p 0.027)

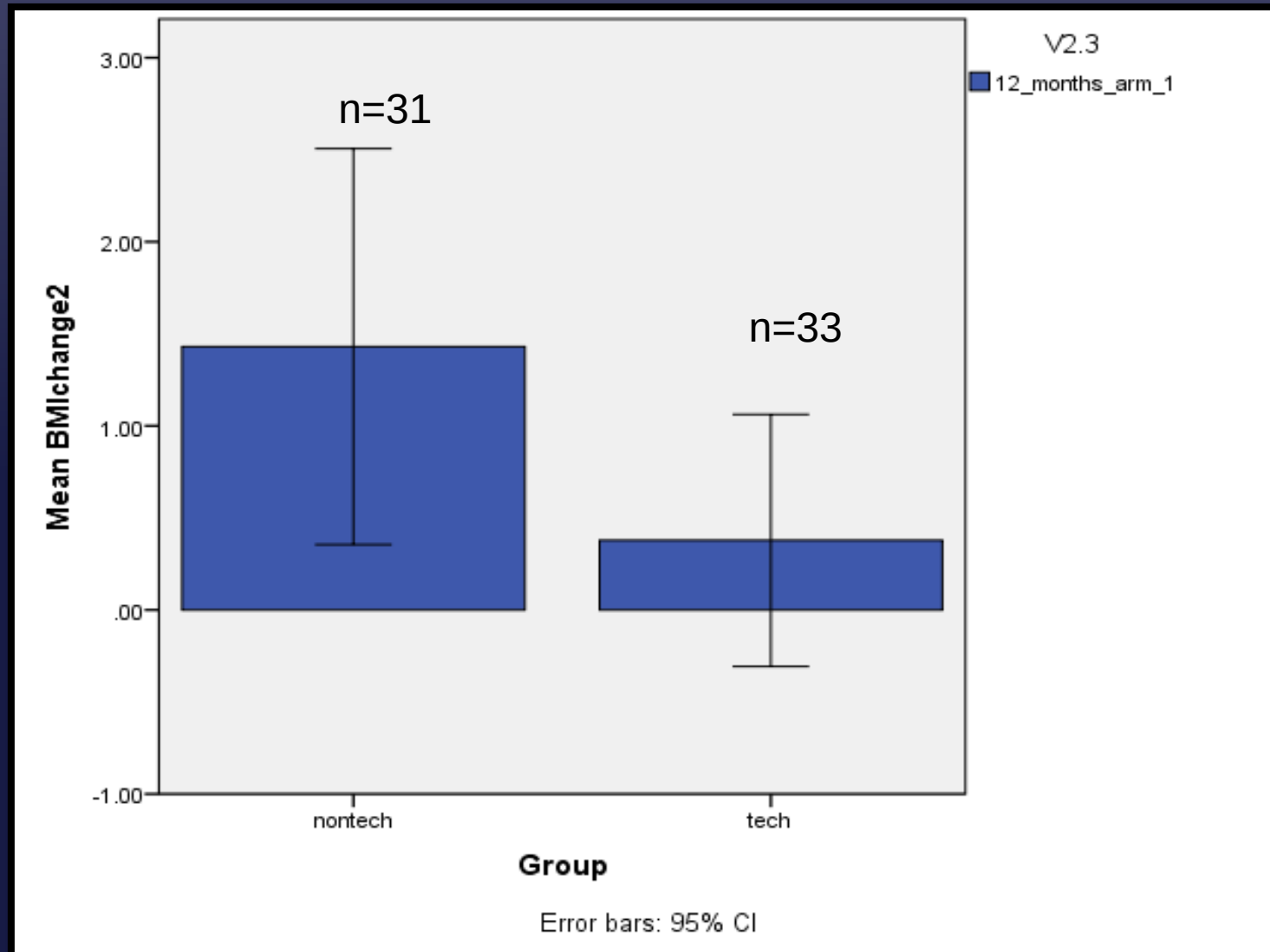
Linear Regression Analyses Change in Outcomes Over Time

	Unadjusted Regression, (95% C.I.)	Adjusted Regression*, (95% C.I.)
PAM-10 Score	5.20 (2.94, 7.47)	5.16 (2.91, 7.42)
BMI	-0.40 (-1.42,0.61)	-0.39 (-1.41, 0.62)
A1c	0.06 (0.01, 0.10)	-0.04 (-0.11, 0.04)
*Adjusted for non tech vs tech group		

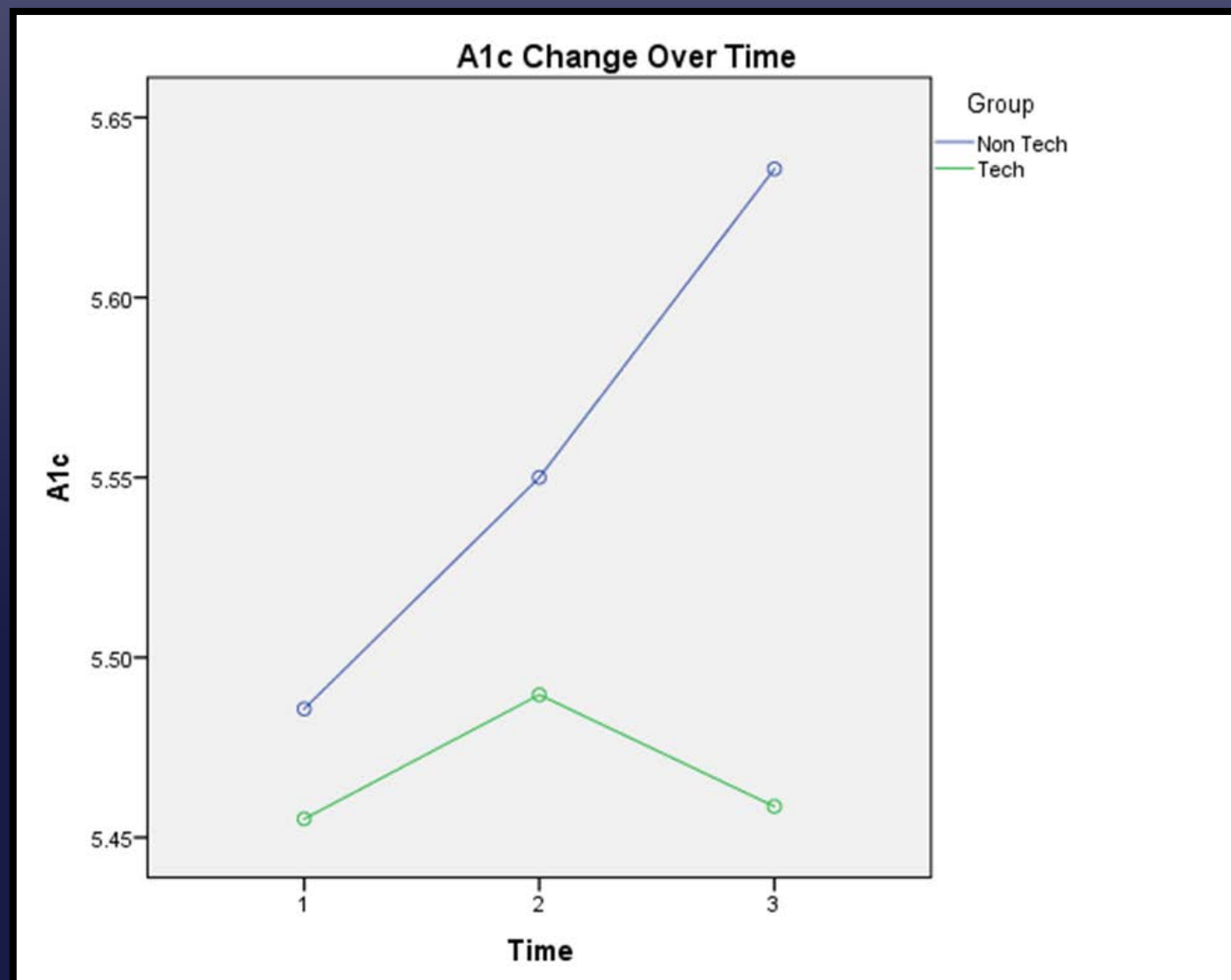
BMI Change – 3 months



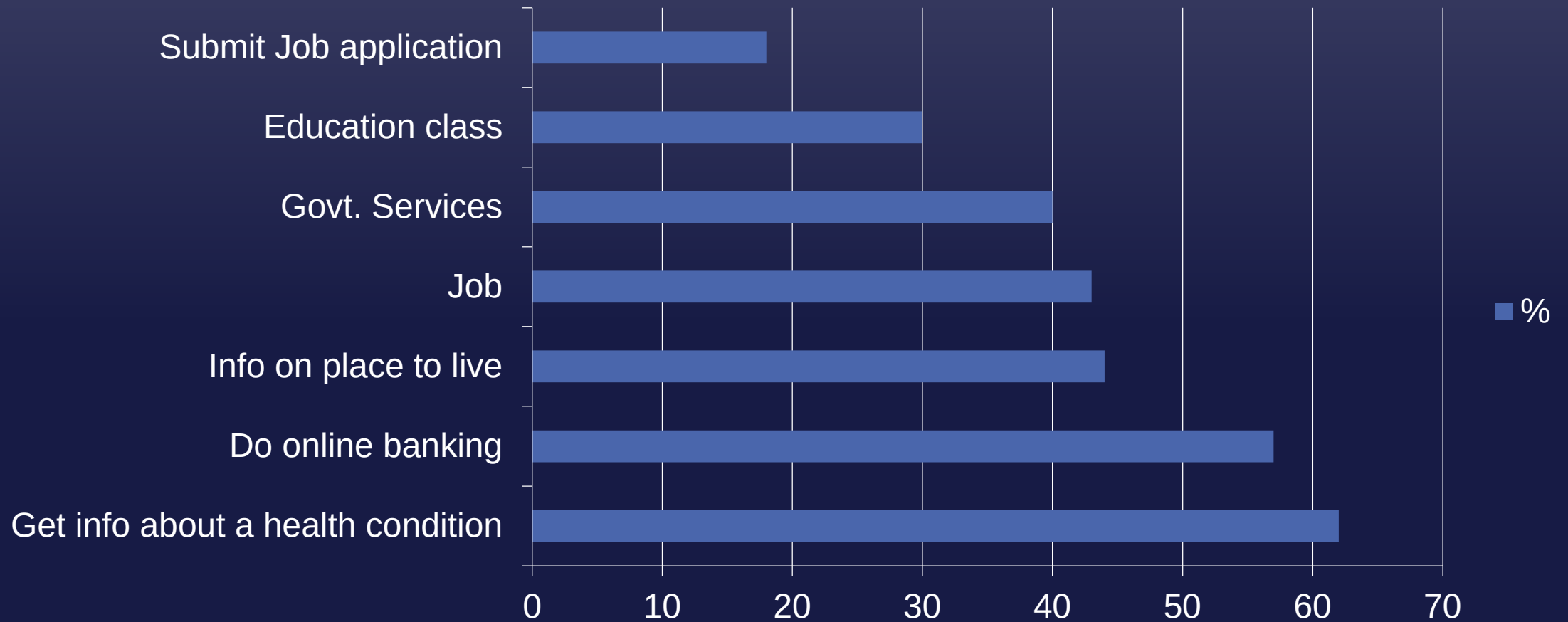
BMI Change – 12 months







Smartphone Use



Learning Retention

- After one hour, people retain less than half of the information presented
- After six days, people forget 75% of the information
- Give quizzes on key information to improve retention

Conclusion

- Both groups benefited from the intervention
- Improved patient activation was statistically significant in the Tech group
- Statistically significant reduction in BMI overall for both groups after 3 months
- The data suggests that BMI reduction may be more sustained with the use of technology in this young adult population
- No statistically significant reduction in HbA1c, but the Tech group did not have an increase in HbA1c

Thanks to My Collaborators

- Zane Networks
- No More Clipboards
- Numedics