

Reference Range Number Line Format Preferred by African American Adults for Display of Asthma Control Status

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Disclosure

The authors have no conflicts of interest to disclose.

Introduction

- African Americans have disproportionate asthma burden
- Comprehension of asthma status needed for self-management
- Low health literacy possible barrier to comprehension
- Tailored information visualizations promising for patient-facing displays (e.g., portals)
- Best practices still emerging for optimal formats
- Does acceptability and appeal vary by demographic groups?

Objectives

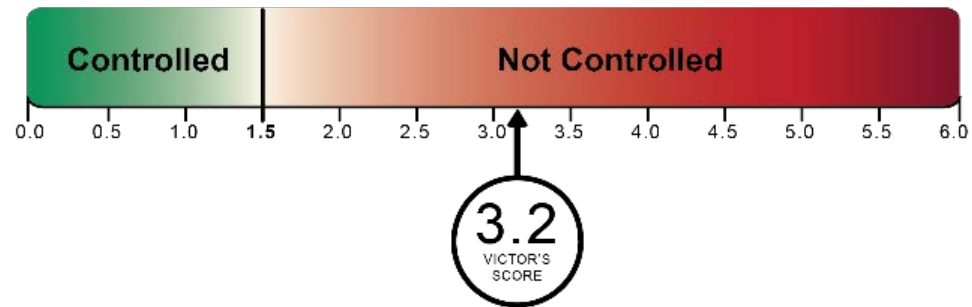
Overall: Develop asthma control report as provider-client communication tool

This study: Evaluate acceptability and appeal of a reference range number line (RRNL) and a stoplight graphic to display asthma control status
Population – African American adults w/ persistent asthma & loved ones

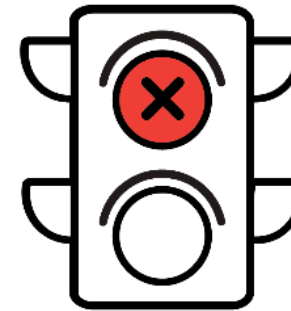


Reference Range Number Line (RRNL)

Level of Asthma Control



Stoplight Graphic



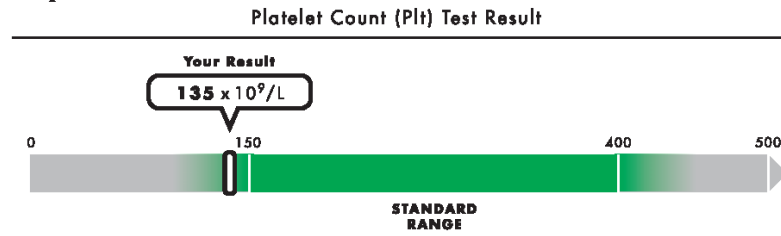
Victor's asthma is:
NOT CONTROLLED

Control Score: **3.2**

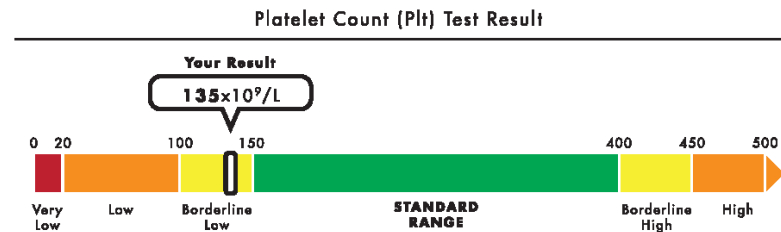
0 = totally controlled
6 = extremely poorly controlled

Reference Range Number Lines for Lab Values

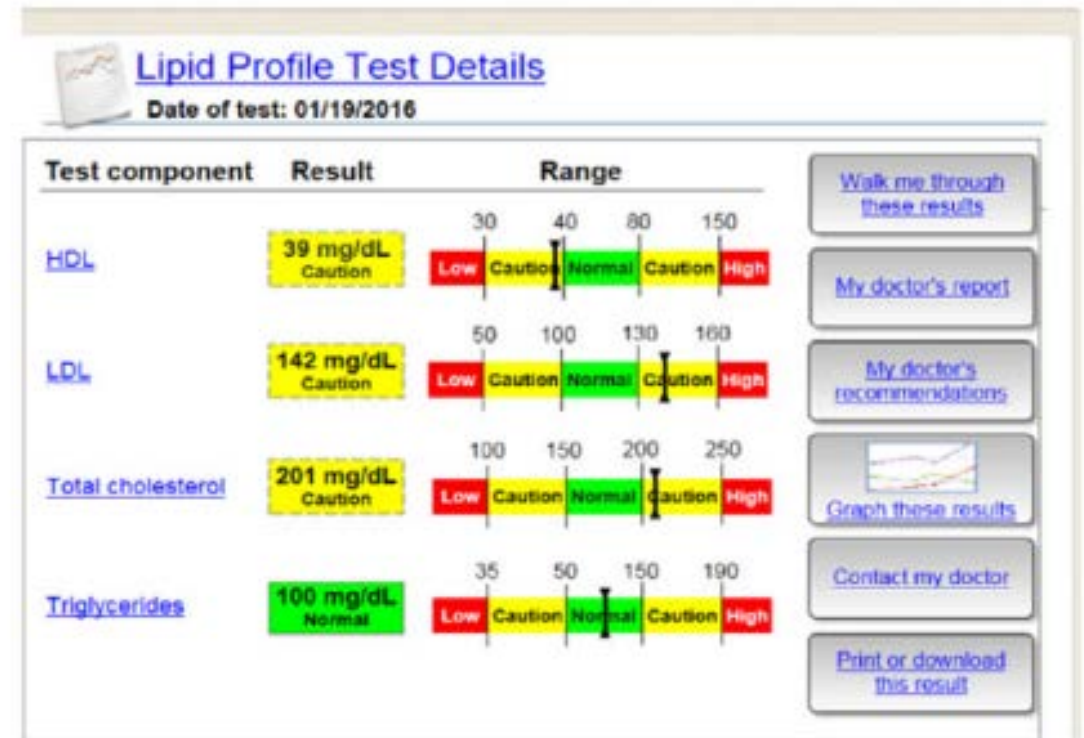
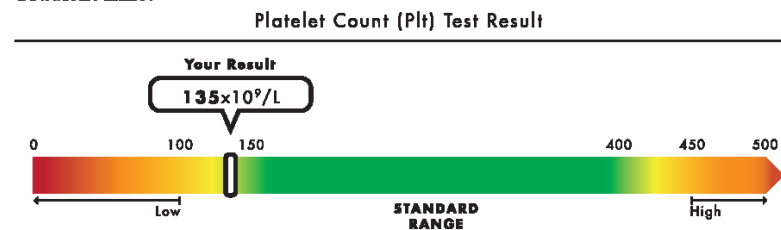
Simple Line:



Block Line:



Gradient Line:



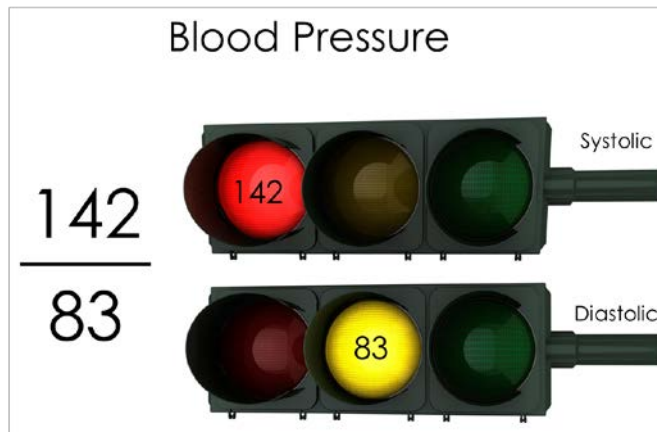
From: Graphics help patients distinguish between urgent and non-urgent deviations in laboratory test results
 J Am Med Inform Assoc. 2016;24(3):520-528. doi:10.1093/jamia/ocw169
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Nystrom DT, Singh H, Baldwin J, Sittig DF, Giardina TD. Methods for patient-centered interface design of test result display in online portals. EGEMS (Wash DC). 2018;6(1):15.

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Uses of Stoplight Graphics

- Asthma action plans
- Avoidance of sugary drinks
- Level of caregiver burden
- Blood pressure
- Breath alcohol self-rating



ASTHMA ACTION PLAN

aaifa Asthma and Allergy Foundation of America aaifa.org

The colors of a traffic light will help you use your asthma medicines.

GREEN means Go Zone!
Use preventive medicine.

YELLOW means Caution Zone!
Add quick-relief medicine.

RED means Danger Zone!
Get help from a doctor.

Name: _____ Date: _____
 Doctor: _____ Medical Record #: _____
 Doctor's Phone #: Day _____ Night/Weekend _____
 Emergency Contact: _____
 Doctor's Signature: _____

Personal Best Peak Flow: _____

GO	Use these daily controller medicines:		
	MEDICINE	HOW MUCH	HOW OFTEN/WHEN
You have all of these: • Breathing is good • No cough or wheeze • Sleep through the night • Can work & play Peak flow: from _____ to _____			
For asthma with exercise, take:			
CAUTION You have any of these: • First signs of a cold • Exposure to known trigger • Cough • Mild wheeze • Tight chest • Coughing at night Peak flow: from _____ to _____	Continue with green zone medicine and add:		
CALL YOUR ASTHMA CARE PROVIDER.			
DANGER Your asthma is getting worse fast: • Medicine is not helping • Breathing is hard & fast • Nose opens wide • Trouble speaking • Ribs show (in children) Peak flow: reading below _____	Take these medicines and call your doctor now.		

GET HELP FROM A DOCTOR NOW! Your doctor will want to see you right away. It's important! If you cannot contact your doctor, go directly to the emergency room. **DO NOT WAIT.** Make an appointment with your asthma care provider within two days of an ER visit or hospitalization.

STOP. RETHINK YOUR DRINK. GO ON GREEN.

RED: Stop! Drink rarely, if at all.

- Regular sodas
- Energy and sports drinks
- Fruit drinks
- 100% juice (over 4 ounces)

YELLOW: Caution! Drink occasionally.

- Diet soda
- Low-calorie, low-sugar drinks
- 100% juice (4 ounces or less)

GREEN: Go! Drink plenty.

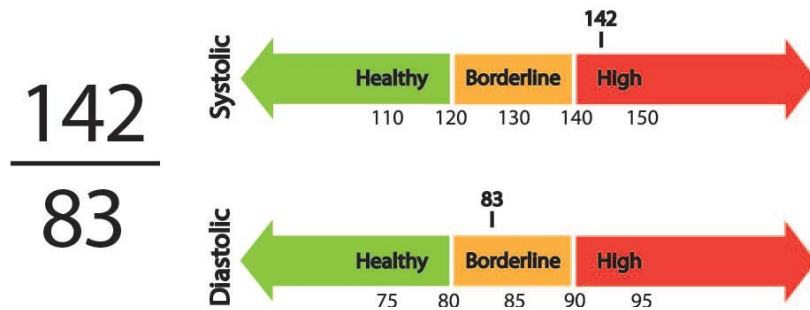
- Water
- Seltzer water
- Skim or 1% milk (unflavored)
- Unsweetened herbal tea

Rady Children's **Healthy Connections**
Mind Body Spirit

For more information, visit: www.rchsd.org/ryd

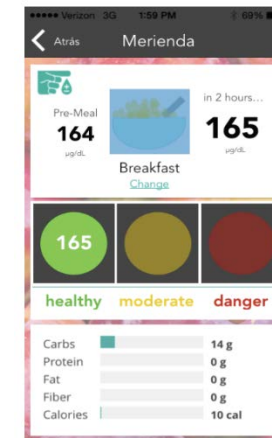
RRNL vs. Stoplight

RRNL Preferred for Blood Pressure



Context

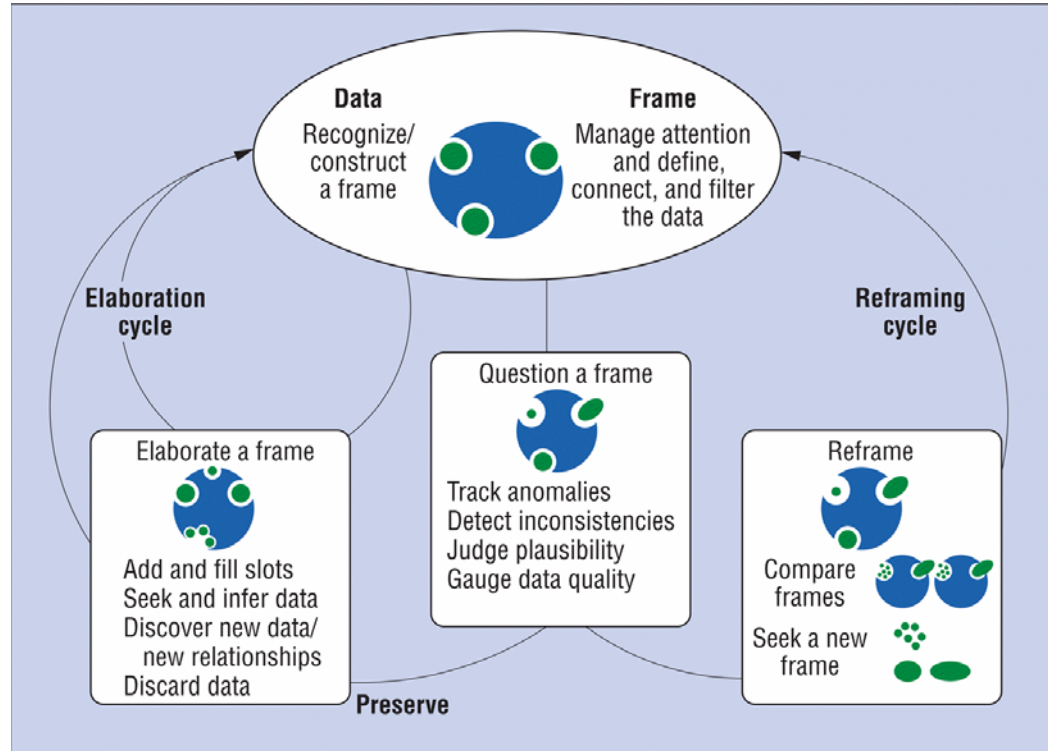
Stoplight Preferred for Blood Sugar Forecast



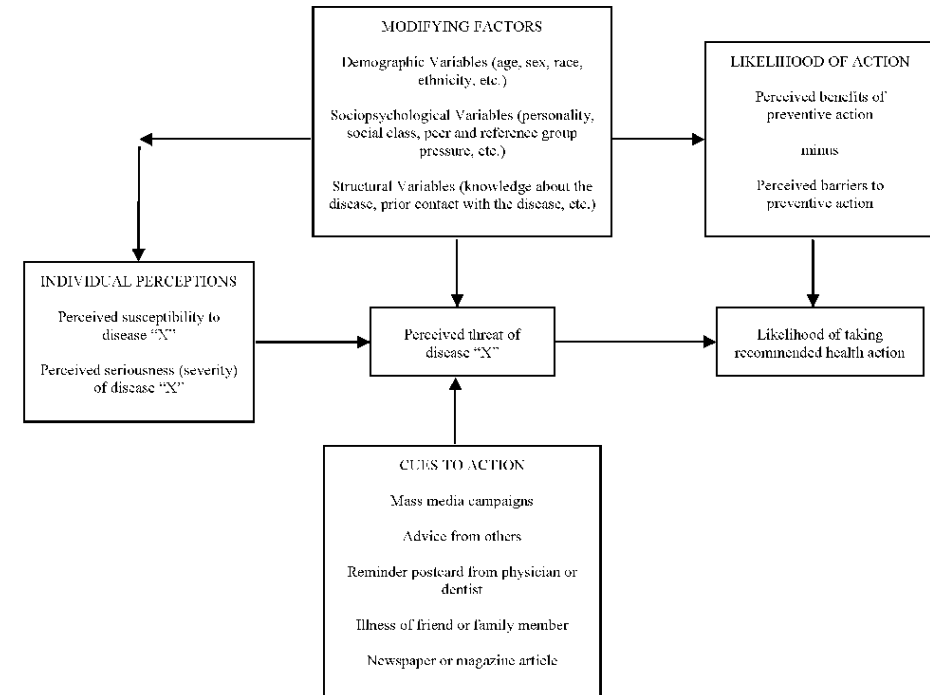
Urgency

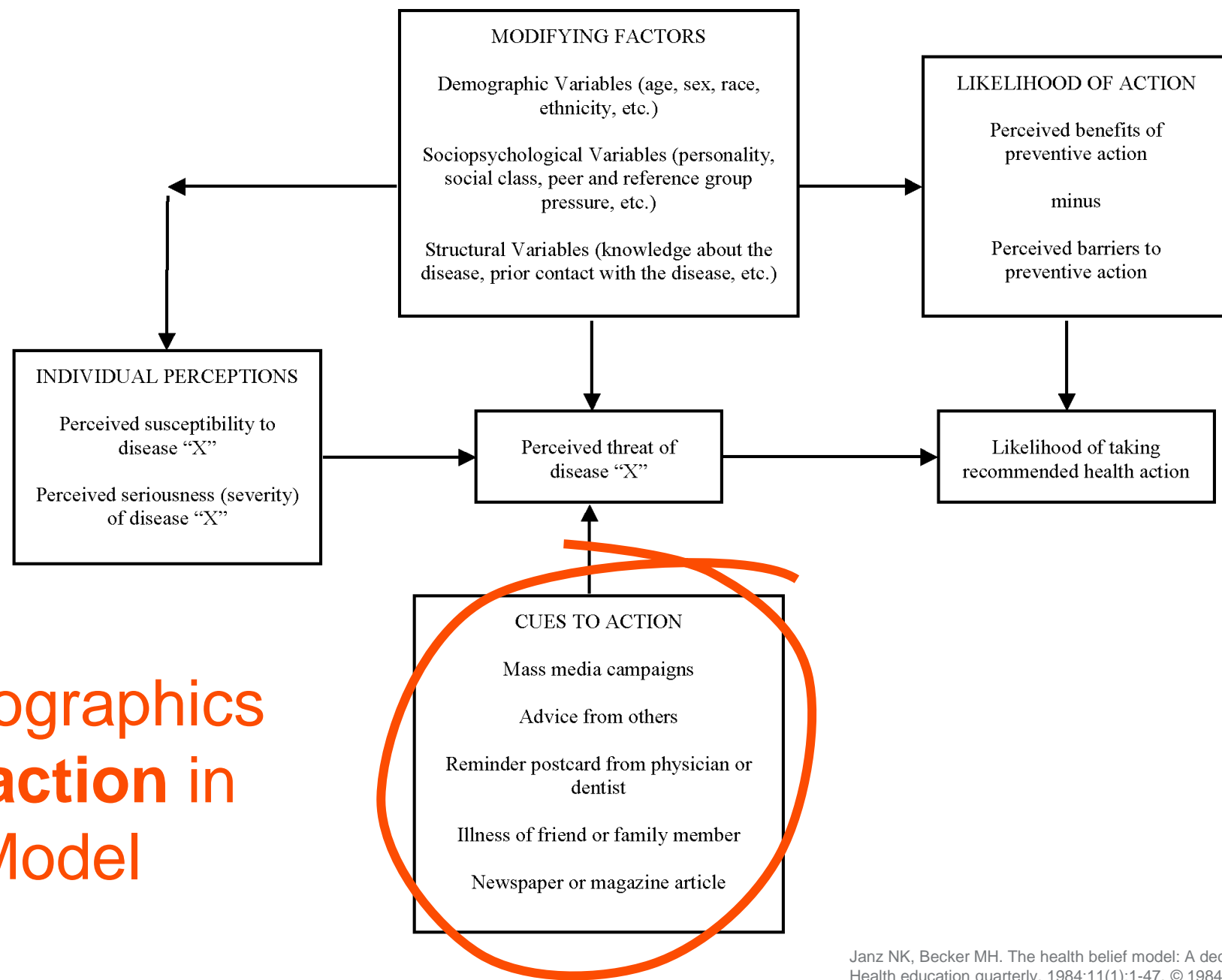
Theoretical Frameworks

Data-Frame Theory of Sensemaking



Health Belief Model





Tailored health infographics serve as **cues to action** in the Health Belief Model

Measures of Asthma Control

Based on self-report of symptoms

- Asthma Therapy Assessment Questionnaire (ATAQ)
- Asthma Control Test (ACT)
- Asthma Control Questionnaire (ACQ)

Research:	0 – 1.5	controlled	1.5 – 6.0	not controlled
Clinical:	0 – 0.75	controlled	0.75 – 6.0	not controlled

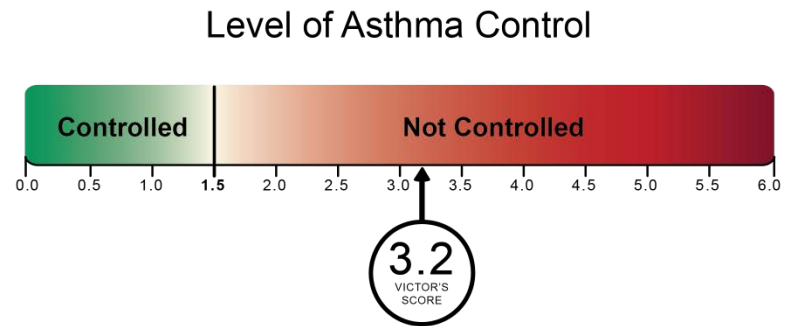
Methods

- IRB approved, Columbia University & University of Pennsylvania
- Two federally-qualified health centers
- 18+, Black/African American, w/ persistent asthma or loved one
- Control status: Asthma Control Questionnaire (ACQ)
- Health Literacy: Newest Vital Sign (NVS)
- Focus groups to inform brief motivational interviewing intervention on medication non-adherence
- ~ 15 min (range 10-22) spent on infographics

Stimuli

Asthma Control Report

Patient: *Victor Benson*
Date: *April 2, 2017*
Provider: *J. Gordon, FNP*



Asthma Control Report

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Victor's asthma is:
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Focus Group Prompts

1. “What information do you think we are trying to convey with this image? What does it mean to you?”
2. “Which of the images do you prefer and why?”
3. “How can the image be improved?”
4. “Would this image motivate you to address the health issue?”
5. “How much and what kind of information do you want?”

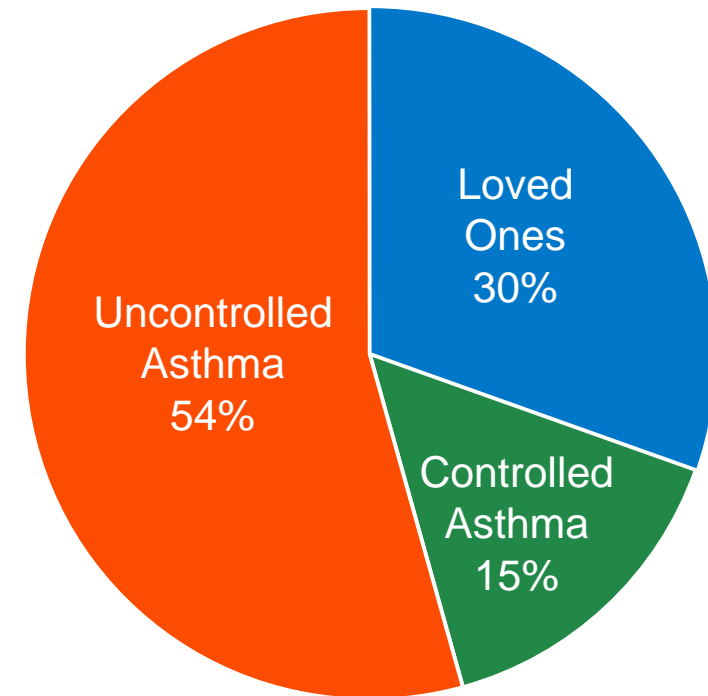
Analytic Focus

- Viewer perception of infographic **meaning**
- Statements of **preference**
- Suggestions for potential **design changes**
- Statements relating to (a)motivation or health **self-management**
- Sentiments about quantity, timing, and type of informational **reports**

Groups & Participants

- Six groups, April & May 2017
- Group size 2 – 10
- N = 46, African American adults
- 67% Female
- Age $M = 47$
- 72% marginal or inadequate health literacy

Participant Type



Results: Meaning

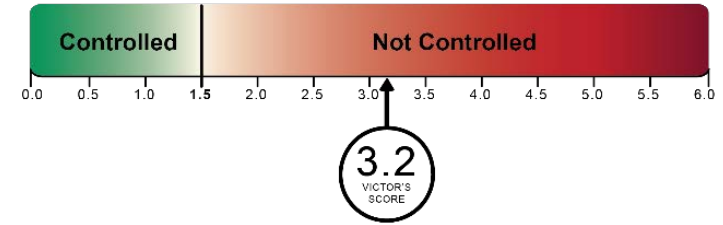


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Level of Asthma Control



“He’s not getting no (sic) oxygen in his lungs.”

“He’s in great danger.”

“With the X, it’s over. I’m checking out. It’s over!”

“It’s just like stage four cancer. There’s nothing else to do.”

“He can either continue his bad habits and probably make it worse or you know, he’s got to do what he’s got to do to fix it.”

“It looks sort of half and half.”

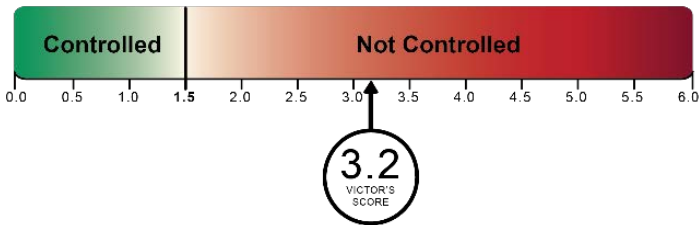
“2.0 and below would be good and everything above is a problem.”

Results: Preference

RRNL preferred for greater informativeness and motivational value.

It gives a visual representation of where a value falls within the context of possible values and the goal.

Level of Asthma Control



“It’s a scale. You can see where you are and where you need to get to.”

“...if you’re taking your medicine and doing what you’re supposed to do, then you’ll notice it start to get close to the green and it makes you feel more like ‘I’m doing my job,’ you would feel more... yes, it would motivate you better.”

Results: Self-Management

- Perception of threat: *“I’m in danger of losing my life”*
- Self-management intentions
 - Take medication
 - Avoid triggers
 - Follow up w/ healthcare provider

“I would be asking the doctor what other treatments are available—especially if I know that I’m taking it daily like I’m supposed to and they handed me something like this—it’s not working.”

Results: Design Changes

- Request for addition of tailored tips for improving asthma control.

“[It would be better] if they would’ve had something on there that tells you how you can control it.”



Results: Reports

- Amount of information: *“It’s just right, actually”*

- Prefer to see at the beginning of every visit:

“So that way we could discuss what we’re going to do to correct it”

- Consider putting a poster in consultation rooms:

“Stuff like this should be on the wall so that you can see and know so that you can ask.”

Discussion

- RRNL format overwhelmingly preferred to stoplight for asthma control status; easily adaptable to other instruments (e.g., ACT, ATAQ)
- Appealing/acceptable to African American adults
- Prior success among Hispanics for other data types
- Effectively cued self-management intentions as predicted by Health Belief Model
- Even with RRNL, threat perception still high
- Potential for undue alarm (e.g., unnecessary ED visits)
- We recommend that initial viewing be mediated by a clinician who can contextualize risk

Discussion

- RRNL format has undergone further refinement to support correct interpretation
 - Addition of interpretive statement (“Your asthma is not in control”)
 - Illustrations to anchor endpoints
 - Space for provider to write tailored plan of care
- Limitations: focus group setting; simulated data
- **Next step:** comprehension and acceptability of infographics tailored with participant’s own data

Acknowledgements

Self-Care Decision-Making: Feasibility of the BREATHE Asthma Intervention Trial (R21 NR016507).