

# Creating Visual Context for Hard-to-Evaluate Data

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# **Evaluability** of Risk Information

# Imagine Robert



Your 10-year risk of  
cardiovascular disease is:

**11.22%**

*“Am I at high risk,  
or not?”*

# **Evaluability** of Laboratory Test Results


# Can Patients Use This?

## Component Results

Component	Your Value	Standard Range	Units
WBC Count	5.2	4.0 - 10.0	K/MM3
Hemoglobin	15.8	13.5 - 17.0	g/dl
Hematocrit	44.7	40.0 - 50.0	%
Platelet Count	145	150 - 400	K/MM3
RBC Count	4.71	4.40 - 5.70	M/MM3
Mean Corpuscular Volume	94.9	79.0 - 99.0	fl
Mean Corpuscular Hgb	33.5	27.0 - 32.0	pg
Mean Corpuscular Hgb Conc.	35.3	32.0 - 35.0	G/DL
Red Cell Distribution Width	11.7	11.5 - 15.0	%
Mean Platelet Volume	11.1	9.0 - 12.2	fl

# What Is Out of Range?

## Component Results

Component	Your Value	Standard Range	Units
WBC Count	5.2	4.0 - 10.0	K/MM3
Hemoglobin	15.8	13.5 - 17.0	g/dl
Hematocrit	44.7	40.0 - 50.0	%
Platelet Count	145	150 - 400	K/MM3
RBC Count	 4.71	4.40 - 5.70	M/MM3
Mean Corpuscular Volume	94.9	79.0 - 99.0	fl
Mean Corpuscular Hgb	33.5	27.0 - 32.0	pg
Mean Corpuscular Hgb Conc.	 35.3	32.0 - 35.0	G/DL
Red Cell Distribution Width	 11.7	11.5 - 15.0	%
Mean Platelet Volume	11.1	9.0 - 12.2	fl

*“Am I at risk,  
or not?”*



# Problem #1: Numbers

# Problem #2: Lack of Meaning

**So now what?**

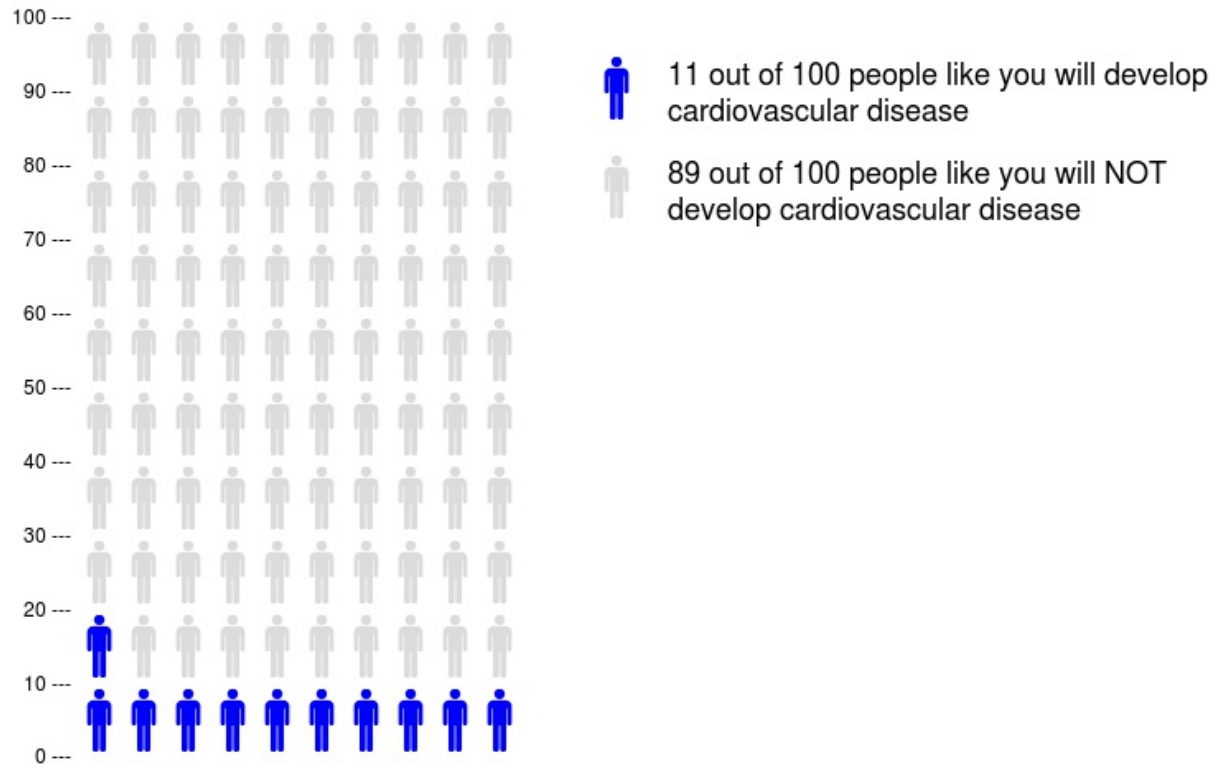
***What can we do to help?***

# **Step 1:**

# **Visual information**

# Robert's Risk

## Your 10-Year Risk of Cardiovascular Disease



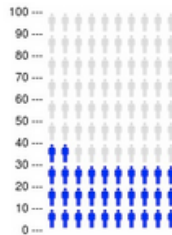
Created at  
*iconarray.com*

## Welcome to Clinician.IconArray.com

### 1 Risk/Benefit

Use one risk/benefit to show the effect one treatment option.

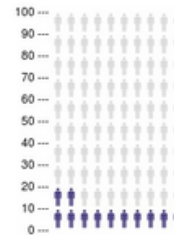
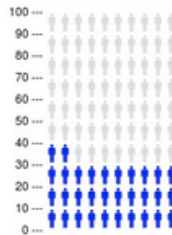
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### 2 Risks/Benefits

Use two risks/benefits to compare 2 treatment options side-by-side.

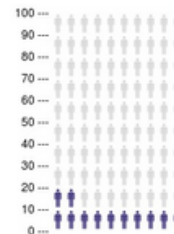
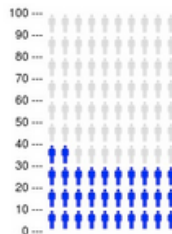
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### 3 Risks/Benefits

Use three risks/benefits to compare multiple treatment options.

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# Tables

**Table:**

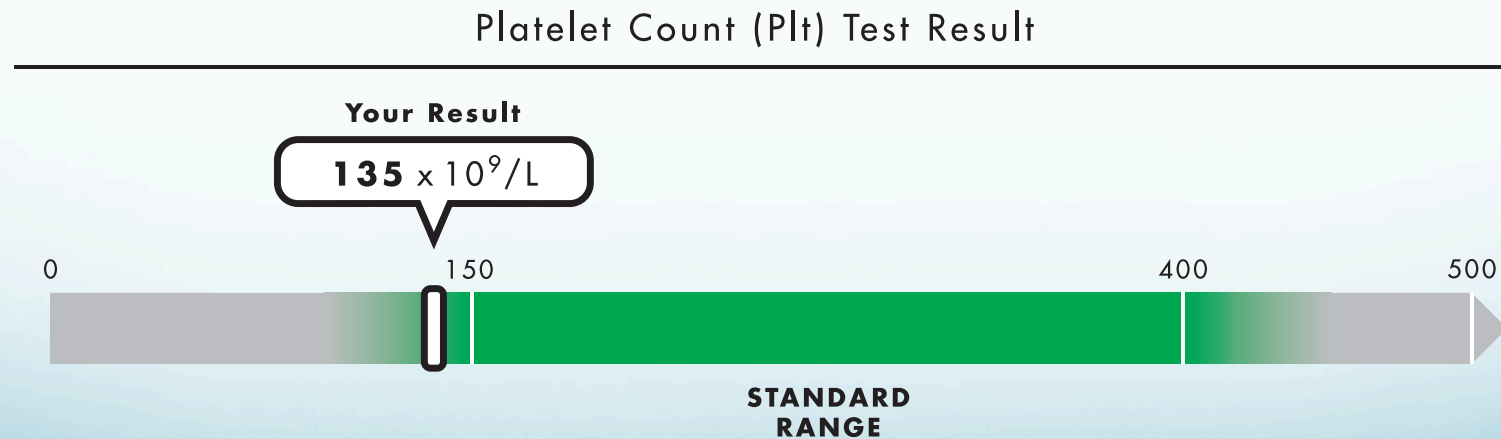
Test	Your Result	Standard Range	Units
Platelet Count (PLT)	135	150-400	$\times 10^9/L$

# Table vs. Number Line

**Table:**

Test	Your Result	Standard Range	Units
Platelet Count (PLT)	135	150-400	$\times 10^9/L$

**Simple Line:**



Zikmund-Fisher BJ, et al. Graphics help patients distinguish between urgent and non-urgent deviations in laboratory test results. *Journal of the American Medical Informatics Association* 2017;24(3):520-528.



# Lines with More Meaning

## Block Line:

Platelet Count (Plt) Test Result



## Gradient Line:

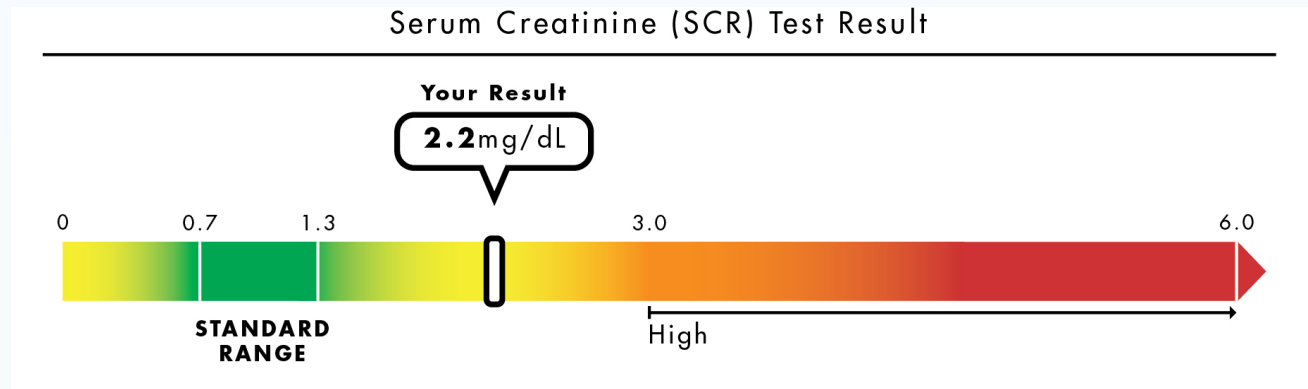
Platelet Count (Plt) Test Result



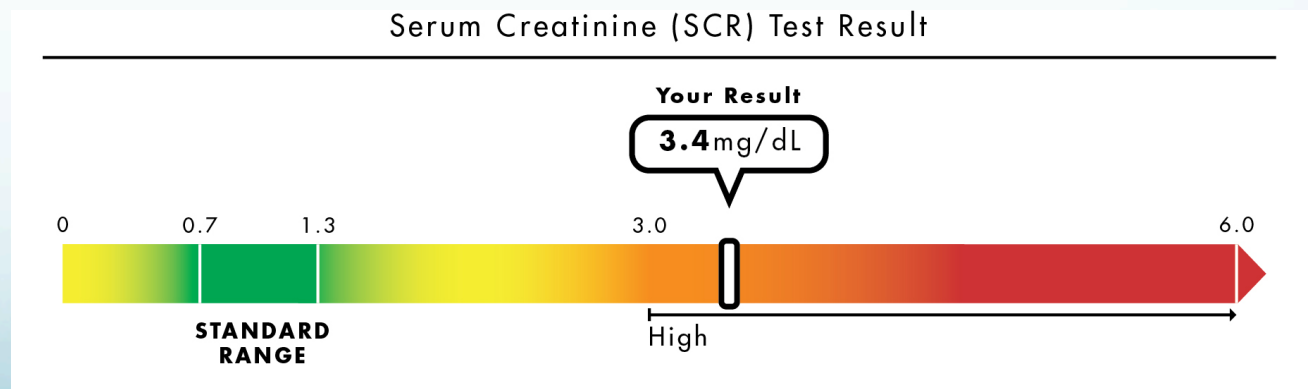
Zikmund-Fisher BJ, et al. Graphics help patients distinguish between urgent and non-urgent deviations in laboratory test results. *Journal of the American Medical Informatics Association* 2017;24(3):520-528.

# Near-Normal Results vs. Extreme Results

Near-Normal



Extreme



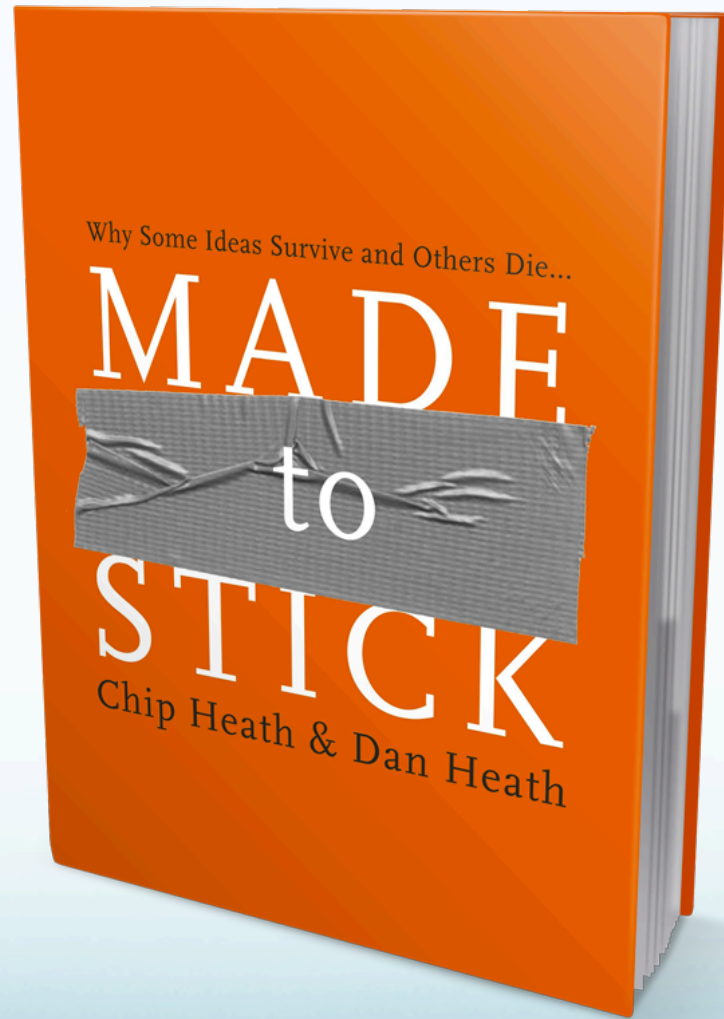
# **Step 2:** **Gist-full information**

# Fuzzy Trace Theory

(Brainerd and Reyna, 1995)

**Verbatim  
memory** vs **Gist**

***What the heck is “gist”?***



Why Some Ideas Survive and Others Die...

MADE

to

STICK

Chip Heath & Dan Heath

# **Know Your “Commander’s Intent”**

# Cancer Screening Test Decisions

# Colorectal Cancer Screening

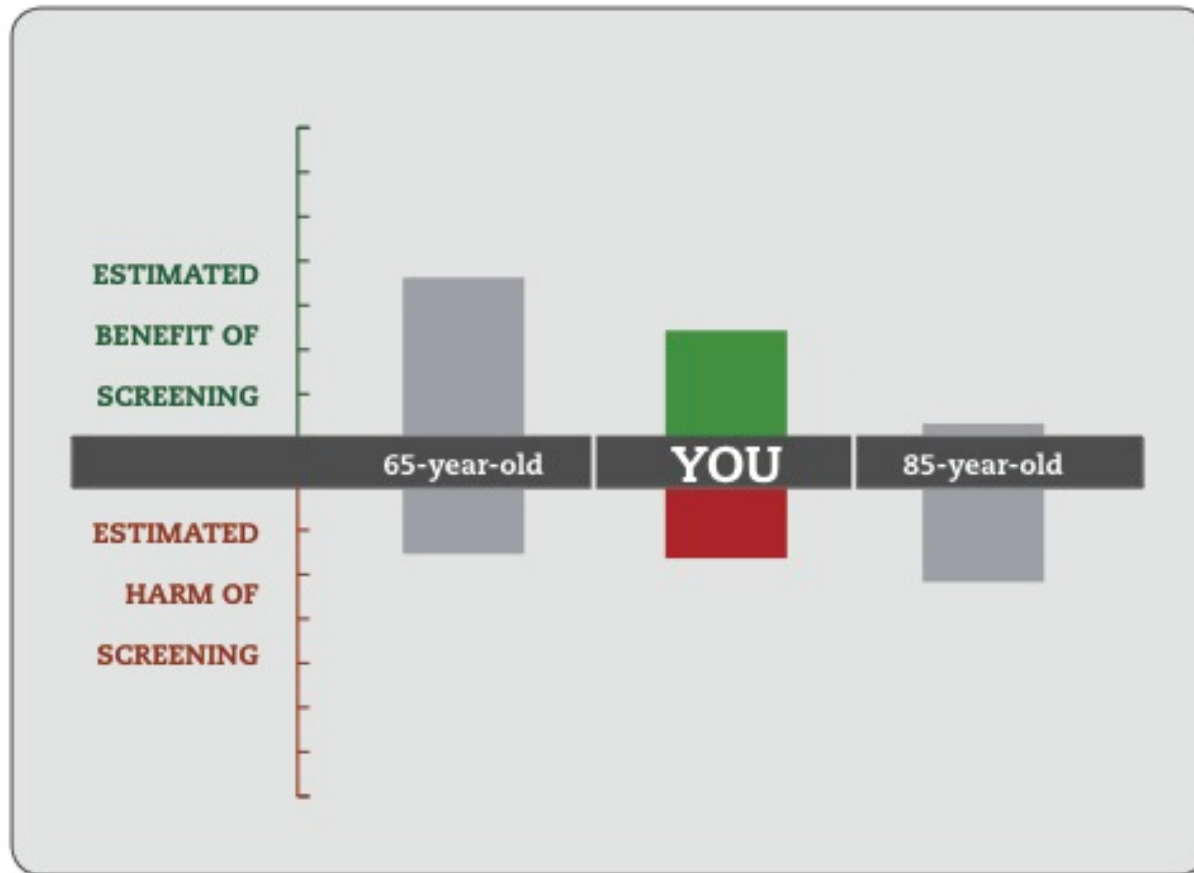
... at age 50

... vs. at age 75

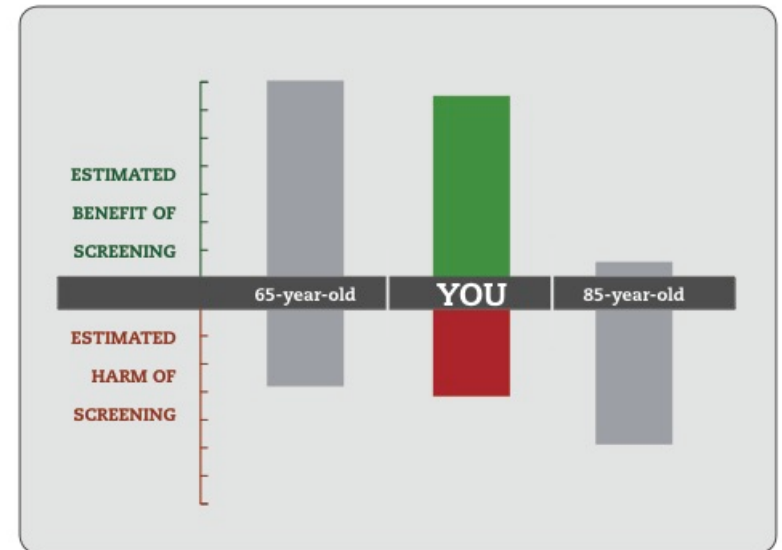
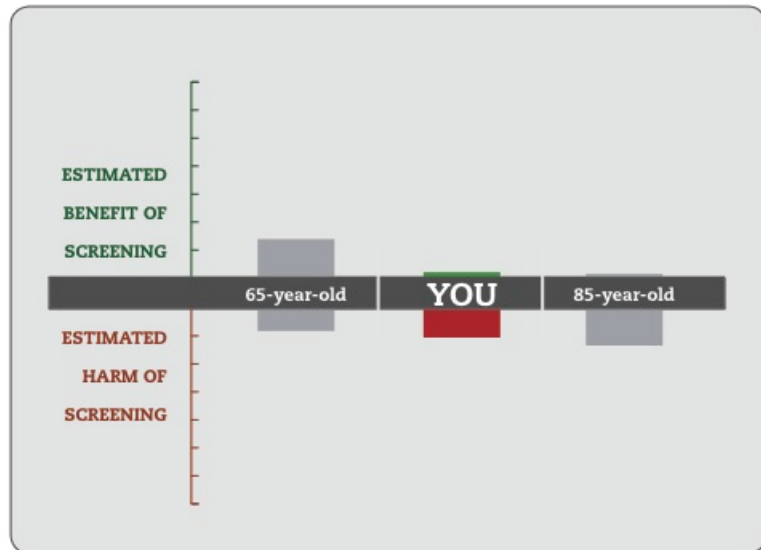
*(with multiple comorbidities)*



# Benefits vs. Harms

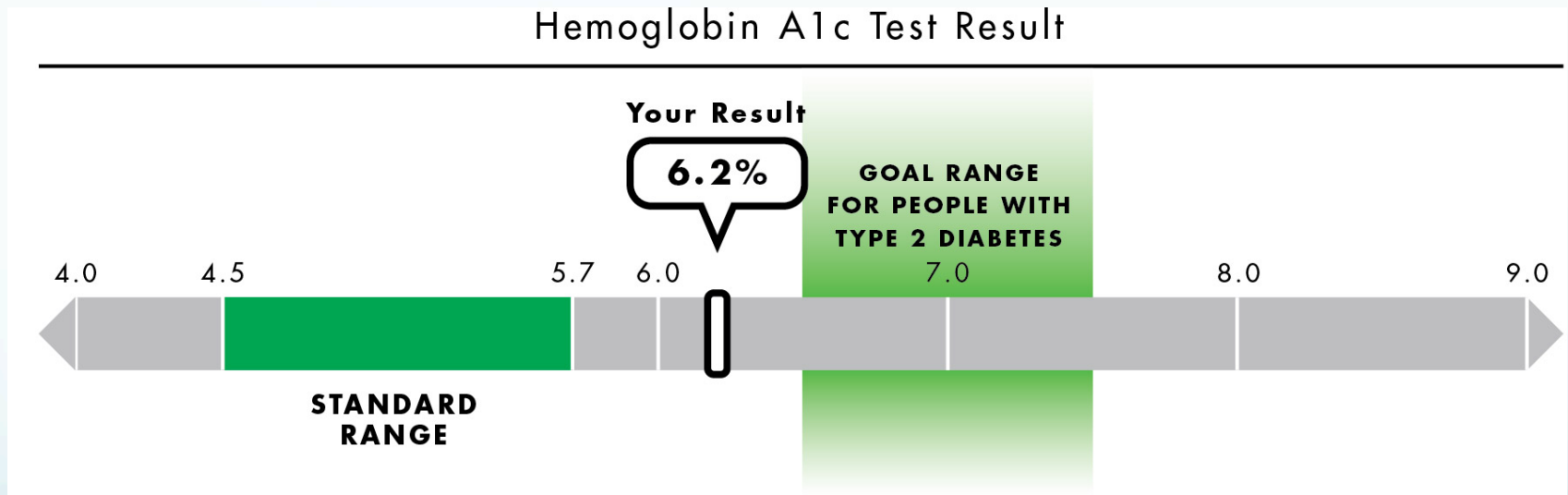


# Gist Processing

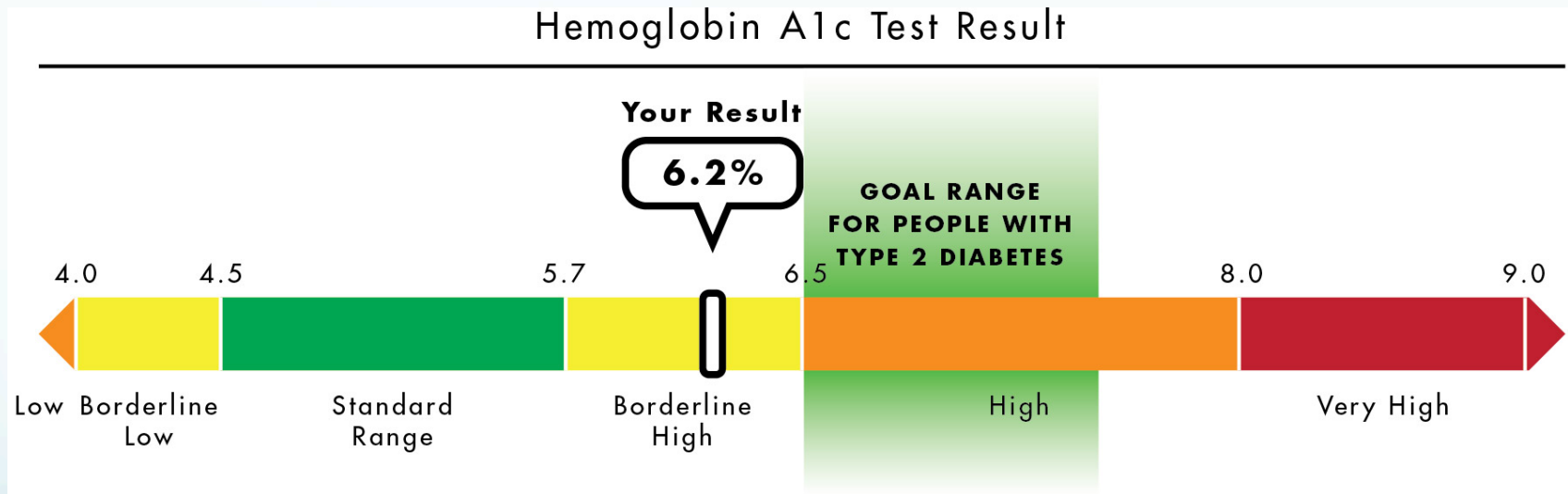


# Test Results for Diagnosed Patients

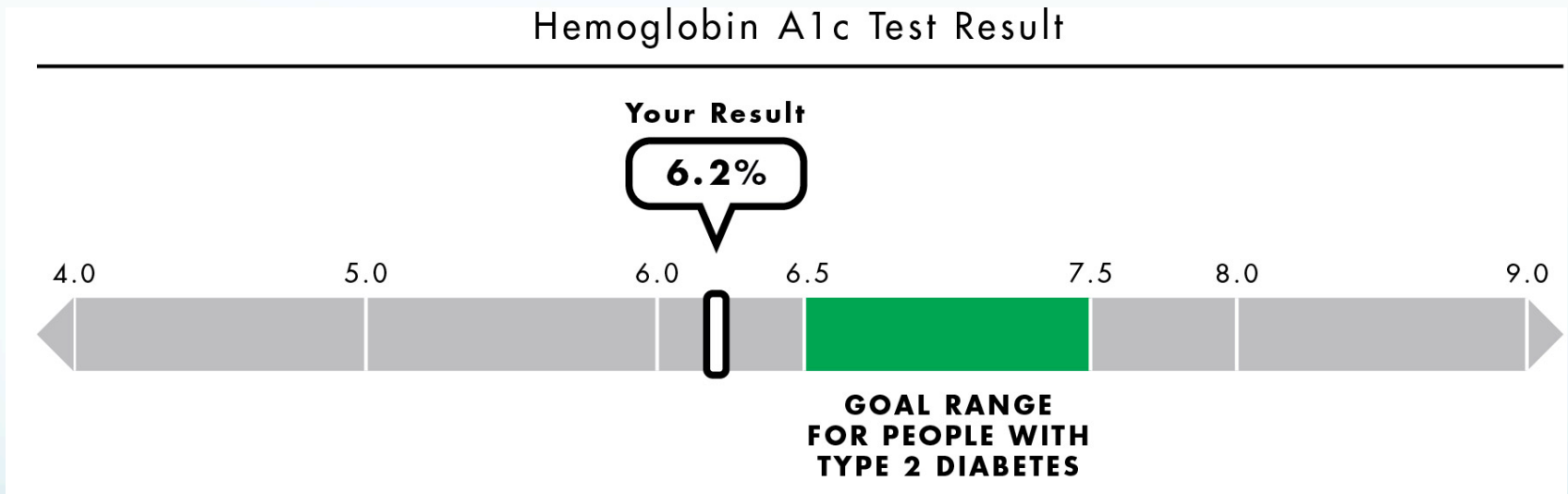
# Goals for Test Results



# Goals for Test Results



# Goals for Test Results



# Test Results for Monitoring

# Harms

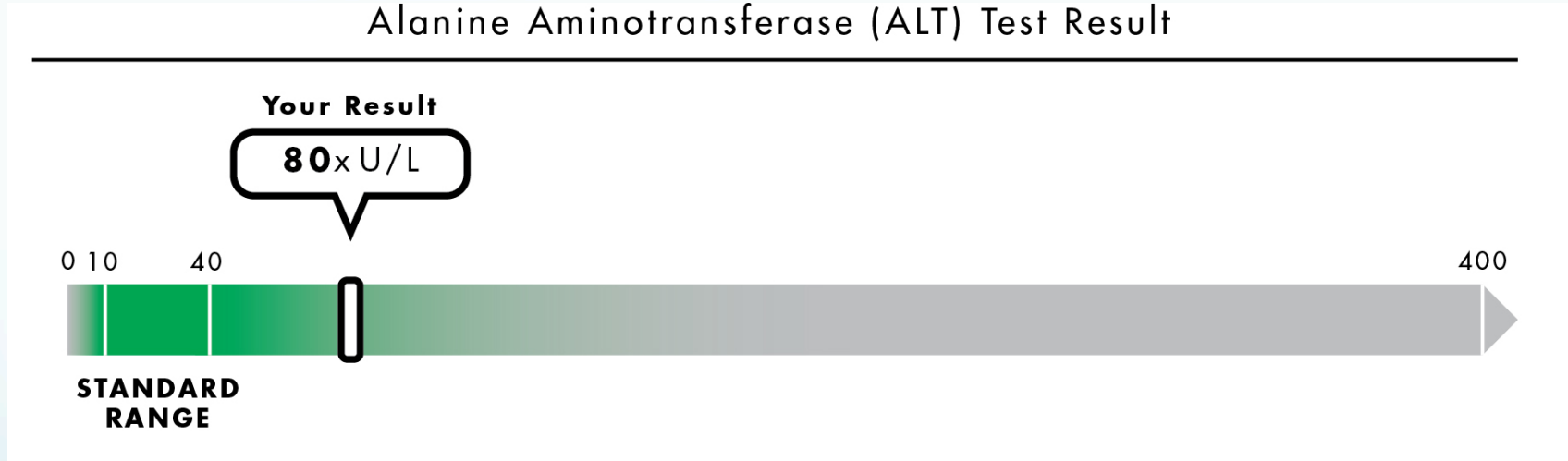
Alanine Aminotransferase (ALT):

**80 IU/L**

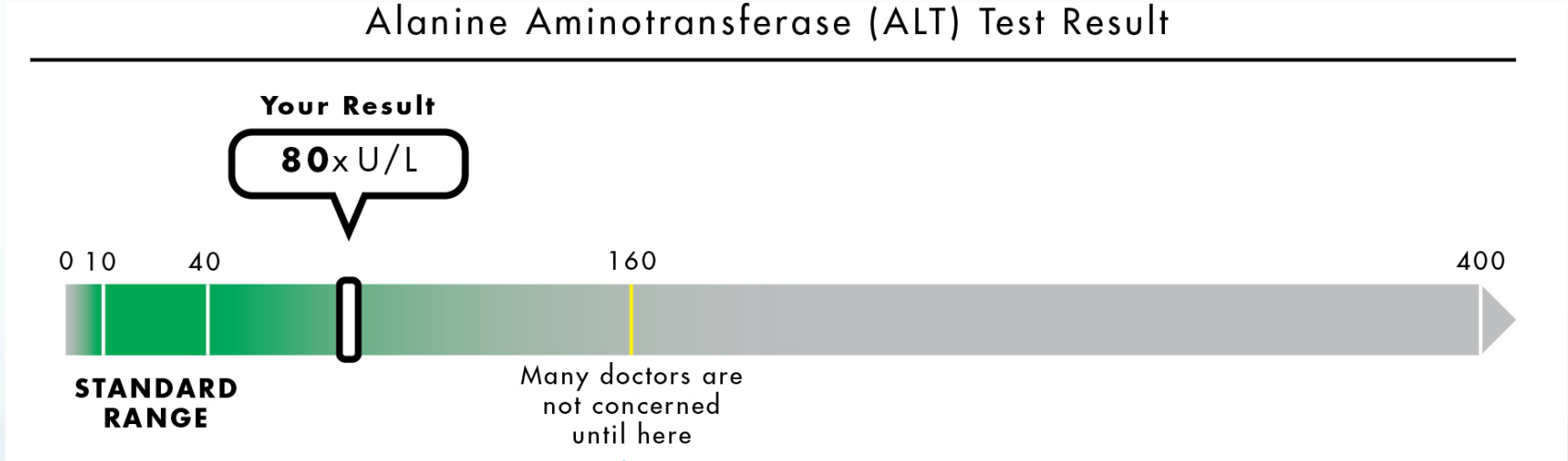
**Standard Range: 10-40**



# Showing the Possible Range

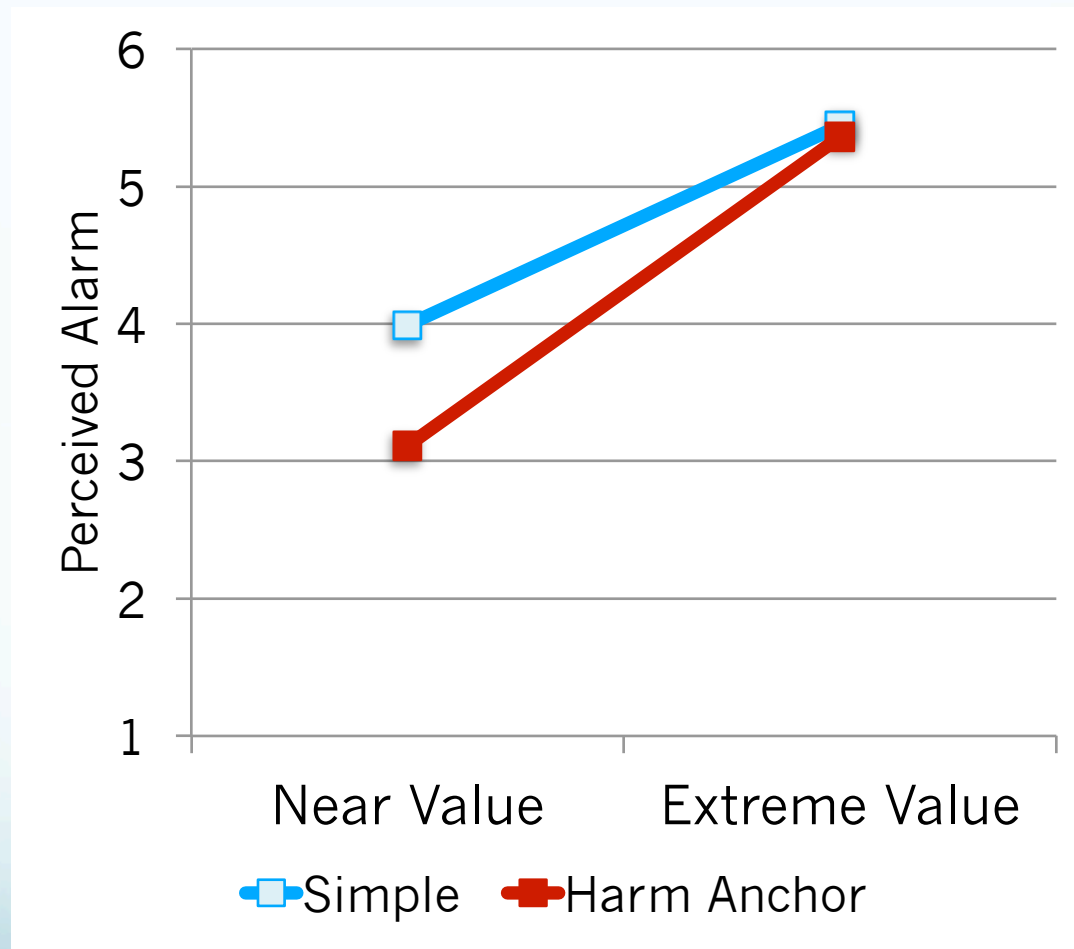


# Harm Anchors



“Many doctors are not concerned until here”

# Increased Sensitivity with Harm Anchors



**“We need to design  
for the way people ARE,  
not the way  
we wish they were”**

**- Holly O. Witteman**

**People only  
process or remember  
one thing**

Use **context** to create  
**ONE** message  
based on **THEIR** needs

# Thank You!

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