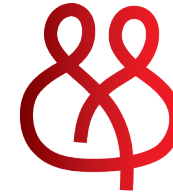




**Department  
of Health**



HRSA Ryan White HIV/AIDS Program

**CENTER FOR QUALITY  
IMPROVEMENT & INNOVATION**

# Using Quality Improvement to Assess & Address Low Health Numeracy

**Adam Thompson, MPH**

**CQII Consultant**

March 12, 2026, at 2:30 pm EST



# Learning Objectives

- Define health numeracy and its impact on patient outcomes.
- Explain how numeracy influences health-related skills.
- Apply a quality improvement (QI) lens to how patients use quantitative information.
- Identify ways to assess patient health numeracy.
- Implement QI strategies to support patients with low numeracy.

# Agenda

13

3

1. Health Numeracy
2. Methods to Assess and Address Patient Health Numeracy
3. Using Quality Improvement to Assess and Address Low Health Numeracy
4. Summary

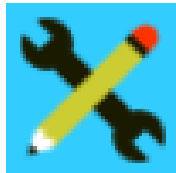
35

10

FIXES

# A Better Way to Teach Math

BY DAVID BORNSTEIN APRIL 18, 2011 8:30 PM 298



Fixes looks at solutions to social

Is it possible to eliminate the bell curve in math class?

Imagine if someone at a dinner party casually announced, “I’m illiterate.” It would never happen, of course; the shame would be too great. But it’s not unusual to hear a successful adult say, “I can’t

That’s because we think of math as something you’re born with, as if there’s a “math gene” that

I can’t read.

I can’t do math.

# HEALTH NUMERACY



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# Literacy and Numeracy

- **Literacy** is understanding, evaluating, using, and engaging with written text to participate in society, to achieve one's goals and to develop one's knowledge and potential.
- **Numeracy** is the ability to access, use, interpret, and communicate mathematical information and ideas, to engage in and manage mathematical demands of a range of situations in adult life.

CDC. (2024, October 10). *Numeracy*. Health Literacy. <https://www.cdc.gov/health-literacy/php/research-summaries/numeracy.html>

# Numeracy

- There are two types of numeracy: subjective and objective.
  - **Subjective numeracy** is a person's reported confidence in understanding mathematical data.
  - **Objective numeracy** measures a person's actual math skills.

**“I can just remember having a really hard time in high school with doing wonderfully well in algebra, straight A’s. The next year in geometry, the direct opposite. I think I never really got over getting those grades.”**

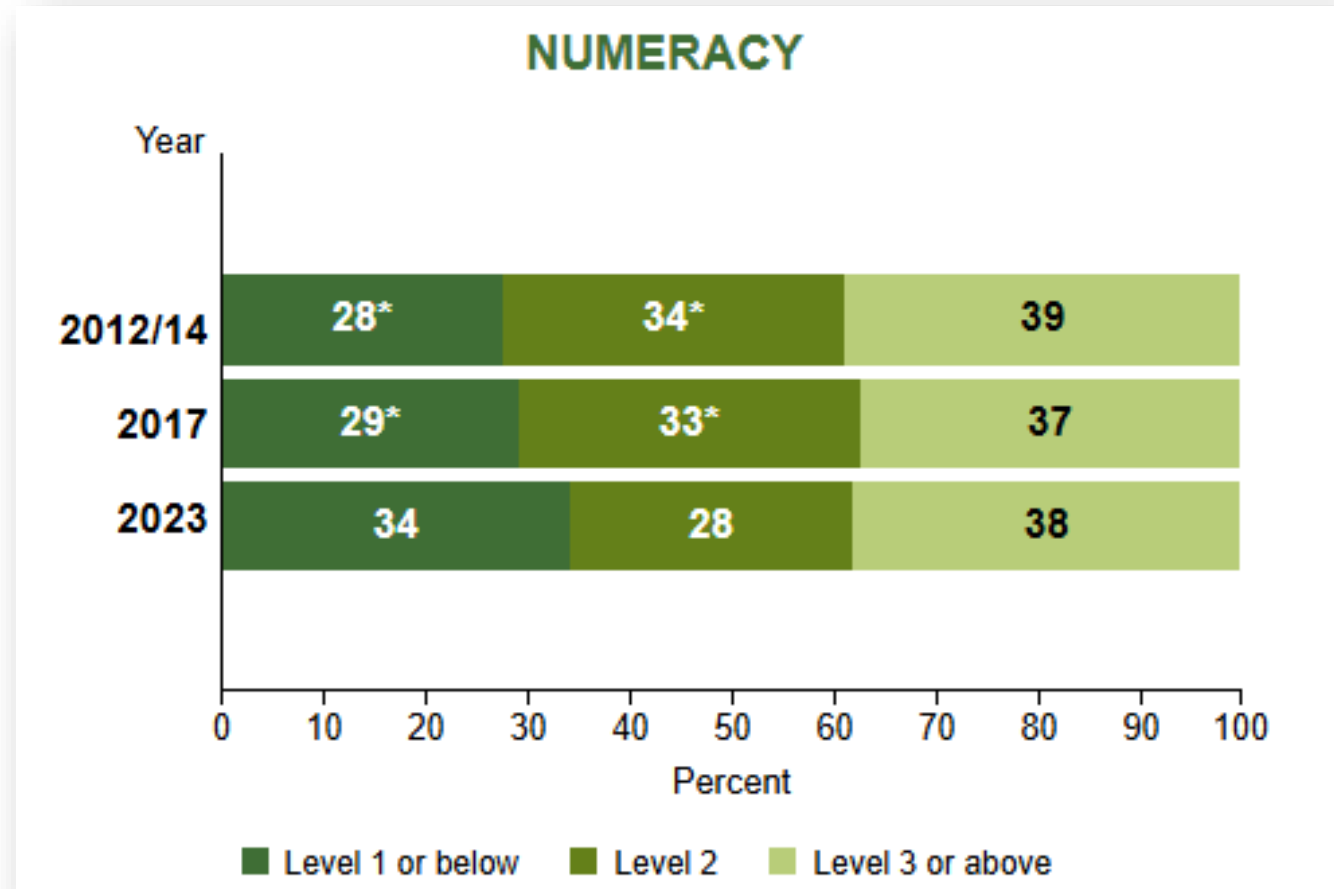
*~ College Graduate, Female Group*

CDC. (2024, October 10). *Numeracy*. Health Literacy. <https://www.cdc.gov/health-literacy/php/research-summaries/numeracy.html>

Schapira, M. M., Fletcher, K. E., Gilligan, M. A., King, T. K., Laud, P. W., Matthews, B. A., Neuner, J. M., & Hayes, E. (2008). A framework for health numeracy: how patients use quantitative skills in health care. *Journal of health communication*, 13(5), 501–517.

<https://doi.org/10.1080/10810730802202169>

# Numeracy proficiency among US adults, age 16-65.



U.S. Department of Education, National Center for Education Statistics. (2024). Highlights of the 2023 U.S. PIAAC Results Web Report (NCES 2024-202). Washington, DC. Retrieved February 24, 2026, from [https://nces.ed.gov/surveys/piaac/2023/national\\_results.asp](https://nces.ed.gov/surveys/piaac/2023/national_results.asp)

# Numeracy proficiency by self-reported health status.



U.S. Department of Education, National Center for Education Statistics. (2024). Highlights of the 2023 U.S. PIAAC Results Web Report (NCES 2024-202). Washington, DC. Retrieved February 24, 2026, from [https://nces.ed.gov/surveys/piaac/2023/national\\_results.asp](https://nces.ed.gov/surveys/piaac/2023/national_results.asp)

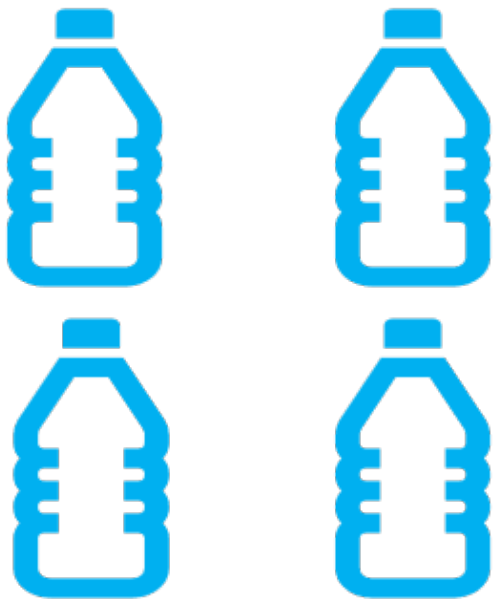
# Numeracy and Health

Numeracy is important because it enables people to make sense of health information that uses numbers. Health-related tasks that involve numeracy skills include:

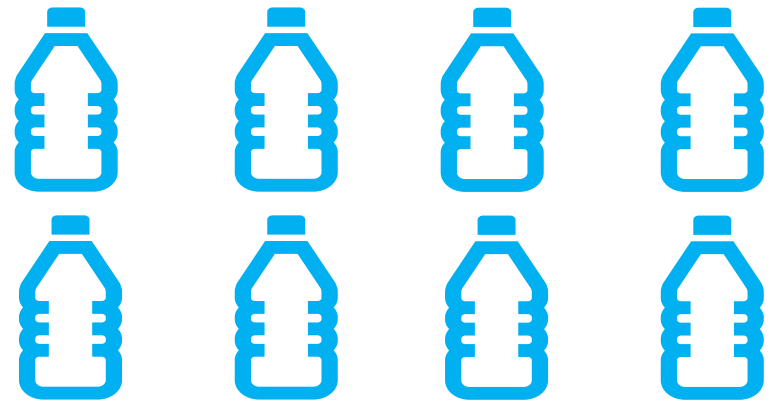
- Understanding nutrition information.
- Interpreting blood sugar and blood pressure readings.
- Recording numeric readings or results.
- Measuring or adjusting medications.
- Making and keeping appointments.
- Reading graphs and tables.
- Understanding information about risk, e.g., probability.

Health Care Consumers. (2021, June 29). Health Numeracy. Canberra Health Literacy Hub. <https://cbrhl.org.au/what-is-health-literacy/health-numeracy/>

# How many cups of water did Adam's mom drink per day?



The oncologist recommended 4 glasses of water per day.



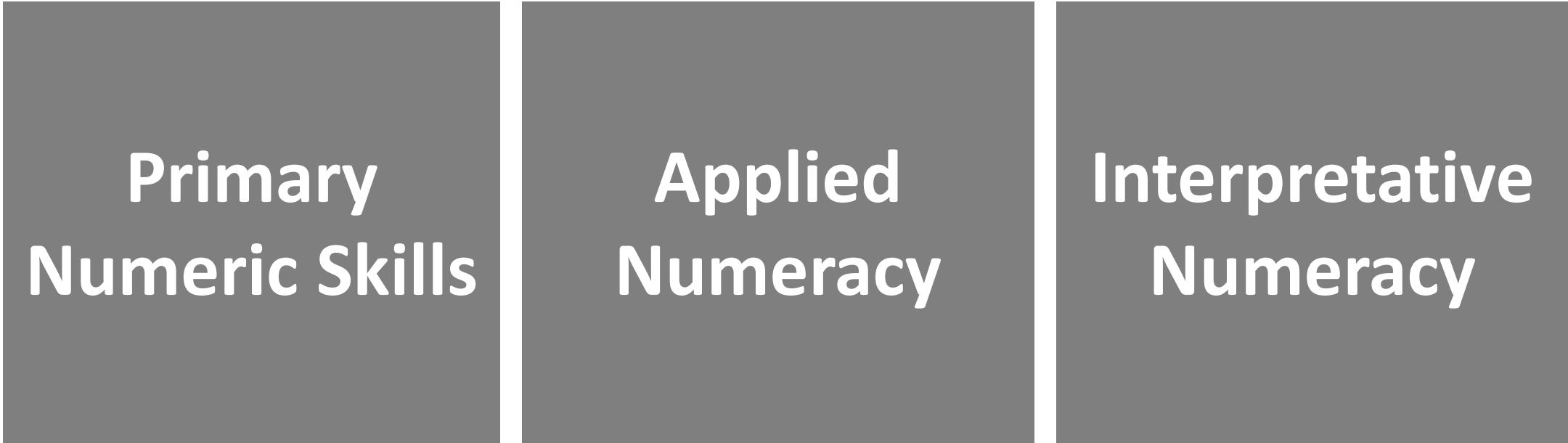
The endocrinologist recommended 8 glasses of water per day.

# Health Numeracy

- Health numeracy is the *“degree to which individuals have the capacity to access, process, interpret, communicate, and act on numerical, quantitative, graphical, statistical, and probability information needed to make effective health decisions.”*

Golbeck AL, Ahlers-Schmidt CR, Paschal AM, Dismuke SE. A definition and operational framework for health numeracy, *American Journal of Preventive Medicine*, 2005 : 29: 375-376

# Health Numeracy Framework



Schapira, M. M., Fletcher, K. E., Gilligan, M. A., King, T. K., Laud, P. W., Matthews, B. A., Neuner, J. M., & Hayes, E. (2008). A framework for health numeracy: how patients use quantitative skills in health care. *Journal of health communication*, 13(5), 501–517.

<https://doi.org/10.1080/10810730802202169>

# Primary Numeric Skills

Ability to use basic arithmetic functions and graphs as well as apply numbers to concept of dates and time.

## Examples

- Counting
- Basic math functions
- Estimating and projecting
- Dates and times
- Scales and graphs

Schapira, M. M., Fletcher, K. E., Gilligan, M. A., King, T. K., Laud, P. W., Matthews, B. A., Neuner, J. M., & Hayes, E. (2008). A framework for health numeracy: how patients use quantitative skills in health care. *Journal of health communication*, 13(5), 501–517. <https://doi.org/10.1080/10810730802202169>

# Applied Numeracy

## Basic Tasks

The use of numbers in day-to-day health care tasks such as taking your medications as prescribed.

## Examples

- Interpretation of lab values.
- Medication adherence.
- Symptom scale (pain).
- Scheduling appointments.
- Paying bills.

## Risk Communication Tools

The use of numbers to communicate probabilistic information about health outcomes including risk, severity, and outcomes of disease.

## Examples

- Modification of incidence by risk factors or health behaviors.
- Prognosis and survival.
- Adverse outcome of intervention.
- Efficacy of intervention.
- Results of diagnostic tests.

## Decision-Making Tools

The use of numbers to help consider the risks and benefits of a given medical decision.

## Examples

- Information seeking.
- Balancing risks and benefits.
- Assessment of evidence.

Schapira, M. M., Fletcher, K. E., Gilligan, M. A., King, T. K., Laud, P. W., Matthews, B. A., Neuner, J. M., & Hayes, E. (2008). A framework for health numeracy: how patients use quantitative skills in health care. *Journal of health communication*, 13(5), 501–517.

<https://doi.org/10.1080/10810730802202169>

# Interpretative Numeracy

The ability to understand the strengths and limitations of numbers to represent health or disease states, the efficacy of an intervention, or other expected health outcomes.

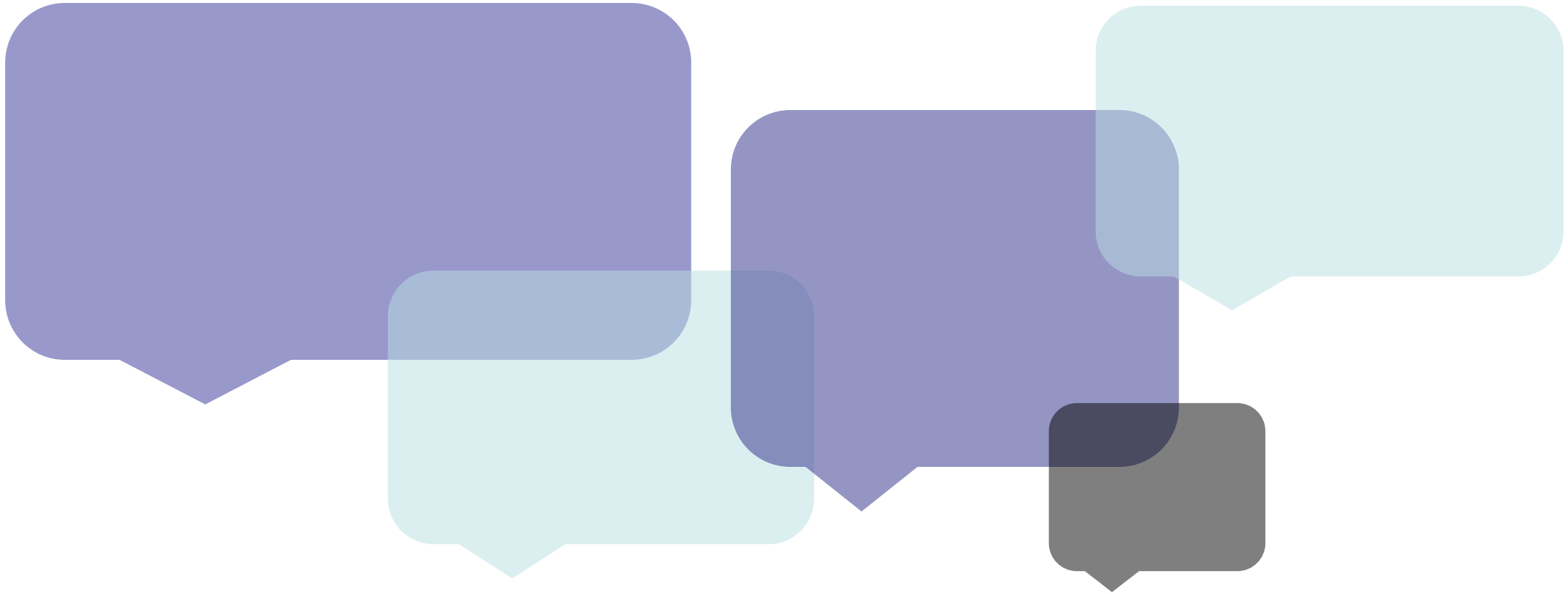
## Examples

- Probability and chance.
- Principles of scientific method.
- Concept of uncertainty.
- Representative nature of numbers.
- Graphic and verbal formats.
- Individual and biologic variation in expected outcomes.

Schapira, M. M., Fletcher, K. E., Gilligan, M. A., King, T. K., Laud, P. W., Matthews, B. A., Neuner, J. M., & Hayes, E. (2008). A framework for health numeracy: how patients use quantitative skills in health care. *Journal of health communication*, 13(5), 501–517.

<https://doi.org/10.1080/10810730802202169>

# Questions or Comments



# **METHODS TO ASSESS AND STRATEGIES TO ADDRESS LOW HEALTH NUMERACY**



# Addressing Low Numeracy

You can support the information needs of people with low numeracy by:

- 1. Assessing perceived confidence and actual ability to understand risk data.**
2. Tailoring communication using a combination of text and visual formats that address perceived and actual risk.

CDC. (2024, October 10). *Numeracy*. Health Literacy. <https://www.cdc.gov/health-literacy/php/research-summaries/numeracy.html>

# Brief Numeracy Assessments

- Brief Medical Numbers Test (BMNT)
- 6-item General Health Numeracy Test (GHNT)

Dykhuis, K. E., Slowik, L., Bryce, K., Hyde-Nolan, M. E., Eshelman, A., & Miller-Matero, L. R. (2019). A New Measure of Health Numeracy: Brief Medical Numbers Test (BMNT). *Psychosomatics*, 60(3), 271–277. <https://doi.org/10.1016/j.psym.2018.07.004>

Osborn, C. Y., Wallston, K. A., Shpigel, A., Cavanaugh, K., Kripalani, S., & Rothman, R. L. (2013). Development and validation of the General Health Numeracy Test (GHNT). *Patient education and counseling*, 91(3), 350–356. <https://doi.org/10.1016/j.pec.2013.01.001>

# Brief Medical Numbers Test – Check for Understanding

1. Your doctor says you need 64 oz of water each day. A cup is 8 oz. How many cups do you have to drink each day?
2. You need 30mg of your medication every day. Each pill is 5mg. How many pills should you take each day?
3. Your doctor tells you that you need 80g of protein each day. If you have 15g of protein at breakfast and 25g of protein for lunch, how much more protein do you need for the day?
4. You need 40mg of medication every day. Each pill is 20mg. If you have 12 pills left in the bottle, how many days of medication do you have left?

Dykhuis, K. E., Slowik, L., Bryce, K., Hyde-Nolan, M. E., Eshelman, A., & Miller-Matero, L. R. (2019). A New Measure of Health Numeracy: Brief Medical Numbers Test (BMNT). *Psychosomatics*, 60(3), 271–277. <https://doi.org/10.1016/j.psym.2018.07.004>

# Your Turn

6-item General Health Numeracy Test (GHNT)

**Participants will need a piece of paper, a pencil (or pen), and a calculator.**

## General Health Numeracy Test (GHNT-6)

Call your doctor if you have a temperature of 100.4°F or greater. The thermometer looks like the following:

100.2F

Do you call the doctor?

Yes

No

Osborn, C. Y., Wallston, K. A., Shpigel, A., Cavanaugh, K., Kripalani, S., & Rothman, R. L. (2013). Development and validation of the General Health Numeracy Test (GHNT). *Patient education and counseling*, 91(3), 350–356. <https://doi.org/10.1016/j.pec.2013.01.001>

## General Health Numeracy Test (GHNT-6)

If four people out of 20 have a chance of getting a cold, what would be the risk of getting a cold?

20%

Osborn, C. Y., Wallston, K. A., Shpigel, A., Cavanaugh, K., Kripalani, S., & Rothman, R. L. (2013). Development and validation of the General Health Numeracy Test (GHNT). *Patient education and counseling*, 91(3), 350–356. <https://doi.org/10.1016/j.pec.2013.01.001>

## General Health Numeracy Test (GHNT-6)

Suppose the maximum heart rate for a 60-year-old woman is 160 beats per minute and she is told to exercise at 80% of her maximum heart rate. What is 80% of that woman's maximum heart rate?

**128 beats per minute**

Osborn, C. Y., Wallston, K. A., Shpigel, A., Cavanaugh, K., Kripalani, S., & Rothman, R. L. (2013). Development and validation of the General Health Numeracy Test (GHNT). *Patient education and counseling*, 91(3), 350–356. <https://doi.org/10.1016/j.pec.2013.01.001>

# General Health Numeracy Test (GHNT-6)

You ate half the container of carrots.  
How many grams of carbohydrates  
did you eat?

**12.5 grams**

Nutrition Facts	
Serving Size: 1 cup (85g) (3 oz.)	
Servings Per Container: 2.5	
Amount Per Serving	
Calories 45	Calories from Fat 0
<b>% Daily Value*</b>	
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 55 mg	2%
Total Carbohydrate 10g	3%
Dietary Fiber 3g	12%
Sugars 5g	
Protein 1g	

Osborn, C. Y., Wallston, K. A., Shpigel, A., Cavanaugh, K., Kripalani, S., & Rothman, R. L. (2013). Development and validation of the General Health Numeracy Test (GHNT). *Patient education and counseling*, 91(3), 350–356. <https://doi.org/10.1016/j.pec.2013.01.001>

## General Health Numeracy Test (GHNT-6)

Your doctor tells you that you have high cholesterol. He informs you that you have a 10% risk of having a heart attack in the next five years. If you start on a cholesterol-lowering drug, you can reduce your risk by 30%.

What is your five-year risk if you take the drug?

7%

Osborn, C. Y., Wallston, K. A., Shpigel, A., Cavanaugh, K., Kripalani, S., & Rothman, R. L. (2013). Development and validation of the General Health Numeracy Test (GHNT). *Patient education and counseling*, 91(3), 350–356. <https://doi.org/10.1016/j.pec.2013.01.001>

## General Health Numeracy Test (GHNT-6)

A mammogram is used to screen women for breast cancer. False positives are tests that incorrectly show a positive result. 85% of positive mammograms are false positives. If 1,000 women receive mammograms, and 200 are told there is an abnormal finding, how many women are likely to have breast cancer?

**30 women**

Osborn, C. Y., Wallston, K. A., Shpigel, A., Cavanaugh, K., Kripalani, S., & Rothman, R. L. (2013). Development and validation of the General Health Numeracy Test (GHNT). *Patient education and counseling*, 91(3), 350–356. <https://doi.org/10.1016/j.pec.2013.01.001>



# Your Turn

6-item General Health Numeracy Test (GHNT)

How did  
we do?

# Addressing Low Numeracy

You can support the information needs of people with low numeracy by:

1. Assessing perceived confidence and actual ability to understand risk data.
2. **Tailoring communication using a combination of text and visual formats that address perceived and actual risk.**

CDC. (2024, October 10). *Numeracy*. Health Literacy. <https://www.cdc.gov/health-literacy/php/research-summaries/numeracy.html>

# Strategies to Enhance Numeracy Skills

- **Marry words and numbers to provide a complete understanding** (e.g., emphasize numbers rather than words such as low-risk or common).
- **Do the math** (e.g., give patients a specific goal; use examples to illustrate the math).
- **Be consistent** (e.g., present numbers in consistent and expected formats; use same denominators).
- **Present only the most necessary information, but enough to be fully understood** (e.g., only the most important information needed to achieve the goal; eliminate background information).

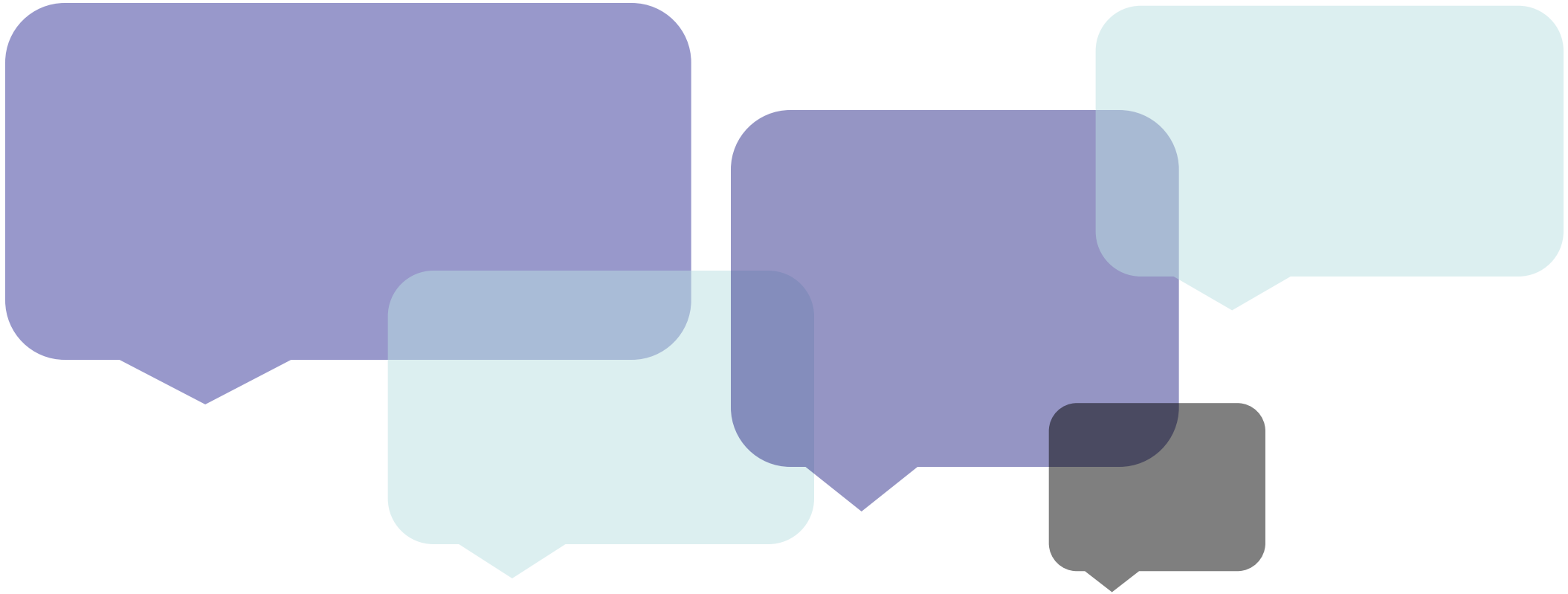
Pleasant, A., M. Rooney, C. O’Leary, L. Myers, and R. Rudd. 2016. Strategies to Enhance Numeracy Skills. *NAM Perspectives*. Discussion Paper, National Academy of Medicine, Washington, DC. <https://doi.org/10.31478/201605b>

# Strategies to Enhance Numeracy Skills

- **Be visual** (e.g., use images and shapes to reflect the meaning of the numbers)
- **Be aware of how you present or describe risk** (e.g., change in risk from “1 in 100” to “2 in 100” is a 100 percent change but using only that percent change is misleading and may not lead to informed decision making).
- **Check in early and often** (e.g., test your communication and use teach-backs).

Pleasant, A., M. Rooney, C. O’Leary, L. Myers, and R. Rudd. 2016. Strategies to Enhance Numeracy Skills. *NAM Perspectives*. Discussion Paper, National Academy of Medicine, Washington, DC. <https://doi.org/10.31478/201605b>

# Questions or Comments



# USING QUALITY IMPROVEMENT TO ASSESS AND ADDRESS LOW HEALTH NUMERACY

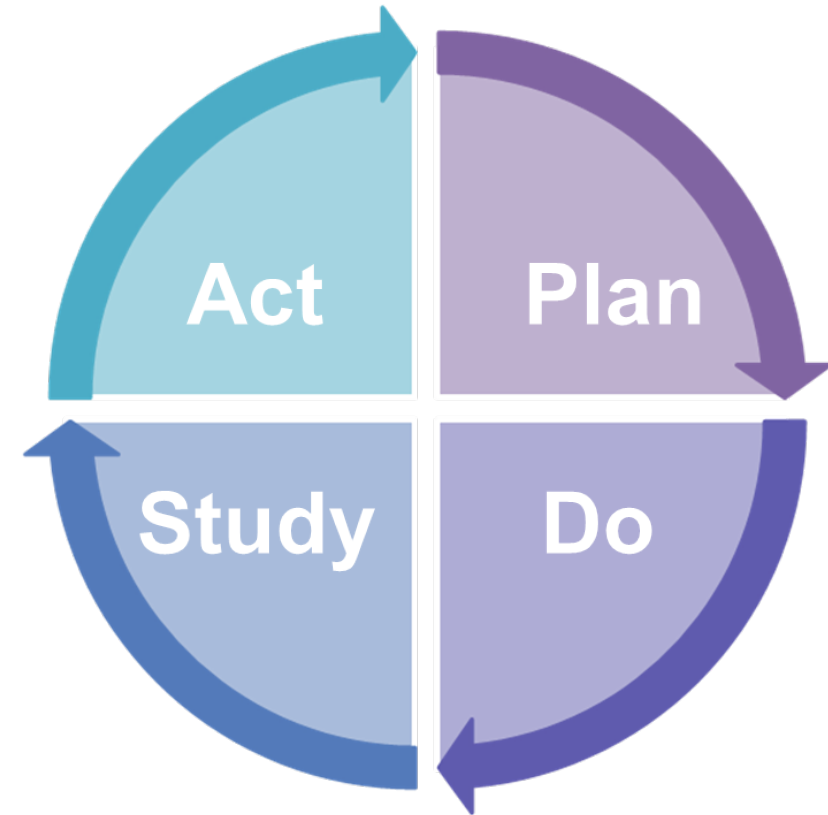


# The Model for Improvement

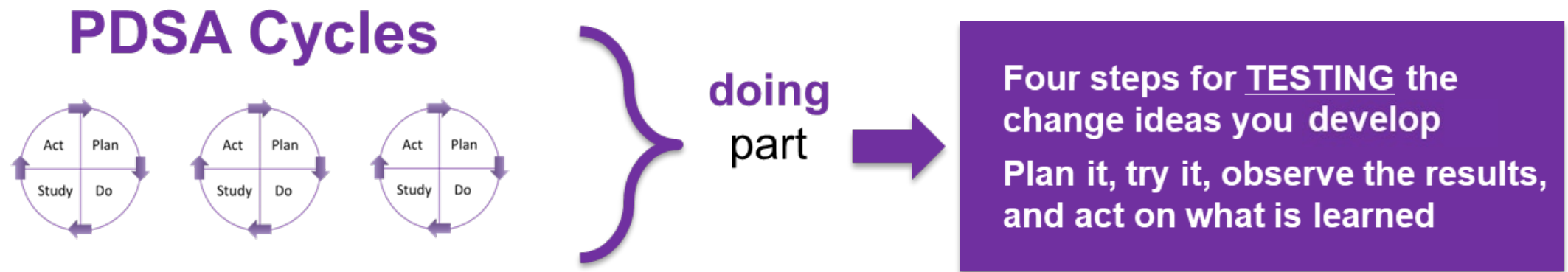
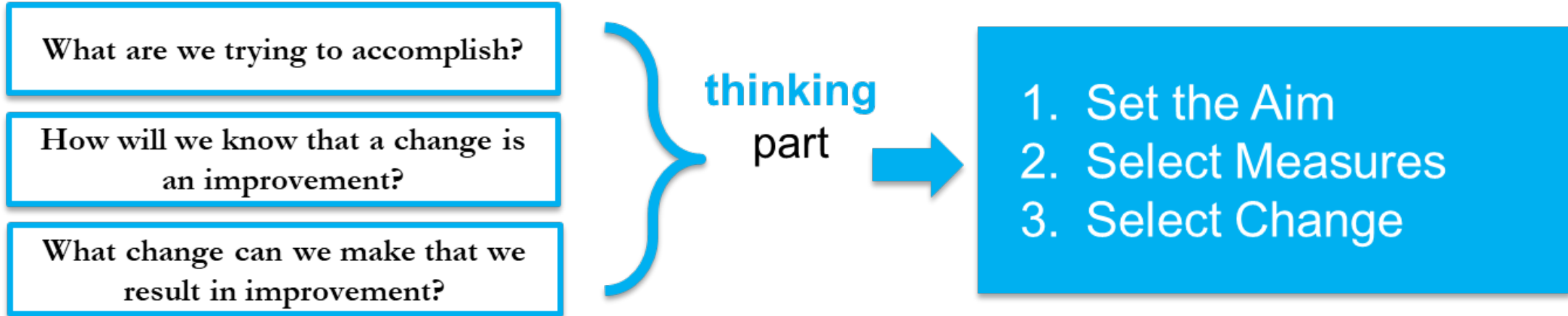
## Three Questions

1. What are we trying to accomplish?
2. How will we know that change is an improvement?
3. What change can we make that will result in an improvement?

## Plan-Do-Study-Act (PDSA) Cycles



# The Model for Improvement



# What are you trying to accomplish?

## Assessing for Low Health Numeracy

- A QI project focused on assessing for low health numeracy is likely looking at **adopting an evidence-based tool or practice** to better inform clinicians and care teams of the health numeracy skills of patients; perhaps even **focusing on a specific population** of patients where these skills are most important.

## Addressing Low Health Numeracy

- A QI project focused on addressing low health numeracy is likely looking at **conducting training among providers** to better communicate numeric information, **adopting interventions for provider and/or patient skills building** (such as a teach-back), or **changing clinic materials** to be more “numbers-friendly.”

# Sample Aim Statements for Health Numeracy QI Projects

## Assessing for Low Health Numeracy

- The ABC Clinic will assess the health numeracy skills of **90% patients with HIV and co-occurring diabetes** by June 30, 2026.

## Addressing Low Health Numeracy

- The ABC Clinic will increase health numeracy skills among **90% of patients with an HIV diagnosis and co-occurring diabetes reporting low health numeracy** by June 30, 2026.

# How will you know that a change is an improvement?

## Assessing for Low Health Numeracy

- How many patients were eligible for, offered, and accepted the health numeracy assessment?
- How long did the health numeracy assessments take to complete?
- What was the patient experience with the health numeracy assessment?
- What was the provider experience with the health numeracy assessment?

## Addressing Low Health Numeracy

- How many patients were eligible for, offered, and accepted the intervention?
- How many patients reported increased health numeracy skills?
- How long did the intervention take to complete?
- What was the patient experience with the intervention?
- What was the provider experience with the intervention?

# What change can you make that will result in improvement?

## Assessing for Low Health Numeracy

- There are several tools that can be used to assess the level of health numeracy amongst patients:
  - Brief Medical Numbers Test (BMNT).
  - Six-item General Health Numeracy Test (GHNT).
  - Newest Vital Sign (aka *the Ice Cream Assessment*).

Change Idea: BMNT Assessment

## Addressing Low Health Numeracy

- There are many ways to increase patient health numeracy skills including:
  - Individual-level interventions (e.g., teach-backs).
  - Group-level interventions (e.g., diabetes management group).
  - Peer-led interventions (individual or group).

Change Idea: Peer-led Teach-Back

# Sample Aim Statements for Health Numeracy QI Projects

## Assessing for Low Health Numeracy

- The ABC Clinic will assess the health numeracy skills of 90% patients with an HIV diagnosis and co-occurring diabetes by June 30, 2026.
- The ABC Clinic will assess 90% patients with an HIV diagnosis and co-occurring diabetes using the Brief Medical Numbers Test (BMNT) by June 30, 2026.

## Addressing Low Health Numeracy

- The ABC Clinic will increase health numeracy skills amongst 90% of patients with an HIV diagnosis and co-occurring diabetes reporting low health numeracy by June 30, 2026.
- The ABC Clinic will offer peer-led teach-back sessions to 90% of patients with an HIV diagnosis and co-occurring diabetes reporting low health numeracy by June 30, 2026.

# PLAN for the Test of the Change Idea

Note the small scale  
of the tests.

## Assessing for Low Health Numeracy

### Plan

- Identify **one HIV primary care team** to test the assessment with three patients with scheduled visits in the next week.
- Identify **three patients with an HIV diagnosis** and co-occurring diabetes with medical visits in the next week.
- Develop draft protocol & prepare data collection tools and assessment materials.
- Schedule 15 minutes during care team meeting to review assessment protocol and data collection.

## Addressing Low Health Numeracy

### Plan

- Identify **one Peer** to test the teach-back intervention.
- Identify **three patients with an HIV diagnosis** and co-occurring diabetes with low health numeracy with medical visits in the next two weeks.
- Develop draft protocol & prepare data collection tools and intervention materials.
- Schedule one hour to train Peer in intervention protocol and data collection.

# DO

## Assessing for Low Health Numeracy

Do

## Addressing for Low Health Numeracy

Do

**Observe and monitor the test for early results and feedback.**

# STUDY the Results.

## Assessing for Low Health Numeracy

### Study

- Did the three patients get offered the assessment? If no, why?
- Did the three patients consent to the assessment? If no, why?
- What were the results of the assessments?
- How much time did the assessment take?
- What was the patient experience of the assessment?
- What was the care team experience of the assessment?

## Addressing Low Health Numeracy

### Study

- Did the three patients get offered the teach-back intervention? If no, why?
- Did the three patients consent to the teach-back intervention? If no, why?
- What were the results of the intervention?
- How much time did the intervention take?
- What was the patient experience of the teach-back intervention?
- What was the Peer experience of the teach-back intervention?

# ACT

Assessing for Low Health Numeracy

Act

Addressing Low Health Numeracy

Act

**Will you adopt, adapt, or  
abandon based on results?**

# Keep Testing until You Achieve Your Aim!

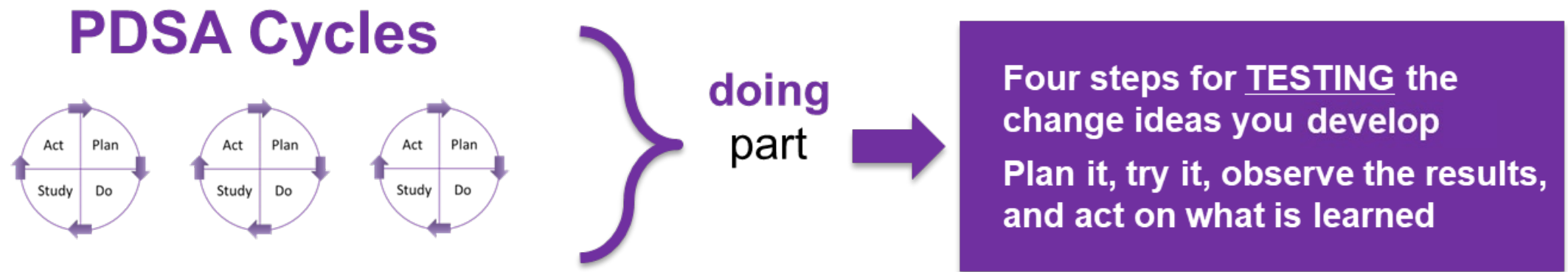
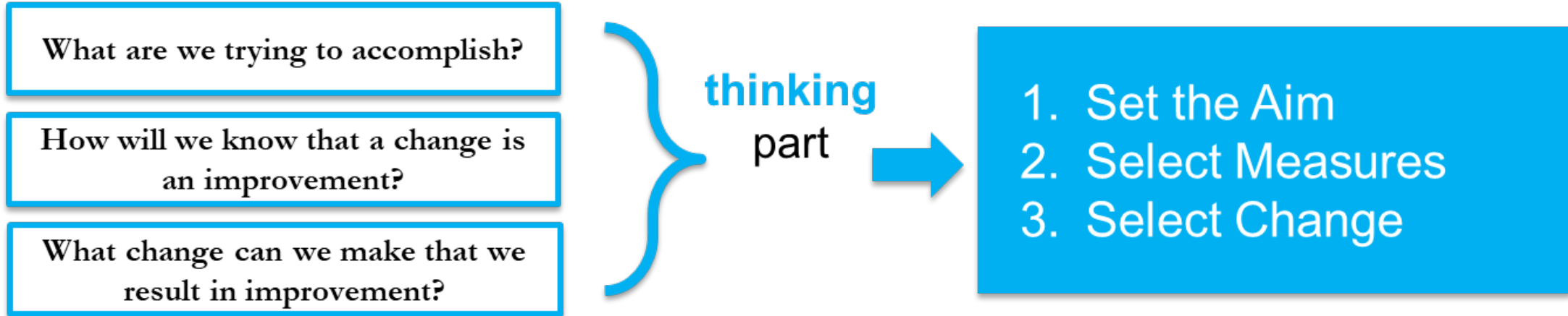
## Assessing for Low Health Numeracy

The ABC Clinic will assess **90% patients with an HIV diagnosis and co-occurring diabetes using the Brief Medical Numbers Test (BMNT) by June 30, 2026.**

## Addressing Low Health Numeracy

- The ABC Clinic will offer peer-led teach-back sessions to **90% of patients with an HIV diagnosis and co-occurring diabetes reporting low health numeracy** by June 30, 2026.

# The Model for Improvement



# Questions or Comments



# Summary

- Health numeracy is the **ability to access, use, interpret, and communicate** mathematical information and ideas, to **engage in and manage mathematical demands** of a range of situations in adult life.
- Agencies can improve quality of care by (1) **assessing patient health numeracy among people with HIV**, and (2) **addressing low health numeracy among people with HIV**.
- QI offers a **formal methodology** to structure a team's activities and increase their confidence that the **change is resulting in the desired improvement**.

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