Numeracy Best Practices:

When, How, and Why to Use (or Lose) Numbers in Health Materials

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About CommunicateHealth

Our mission:

To improve lives by designing health information, products, and digital tools that are easy to understand and use

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Agenda

Today we'll discuss:

- Low health literacy skills and numeracy
- Examples of numeracy guidance
- Numeracy research
- The next steps

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Health Literacy and Numeracy

- What is numeracy?
- How does it affect understanding?

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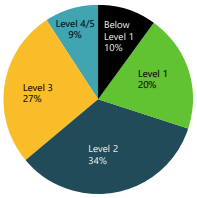
What is numeracy?

Numeracy is the ability to understand and use numbers.

Percentage of U.S. residents ages 16 to 65 at each level of proficiency on the PIAAC numeracy scale



Source: Centers for Disease Control and Prevention

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How does numeracy affect understanding?

- Numeracy is directly related to health literacy
- Sometimes we need numbers in health materials

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Numbers in health materials

The term FASD is not intended for use as a clinical diagnosis. It includes conditions such as fetal alcohol syndrome (FAS), alcohol-related neurodevelopmental disorder (ARND), and alcohol-related birth defects (ARBD). Each year, at least 40,000 babies are born with an FASD,[9] costing the Nation up to $6 billion.[10]

In the United States:
- 2 in 5 women drink alcohol.[8]
- 4 million women are heavy drinkers.[1]
- 2.5 million women are alcohol-dependent.[11]
- 1 in 10 pregnant women drinks alcohol.[12]

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Examples of Numeracy Guidance

The Patient Education Materials Assessment Tool (PEMAT) and User's Guide

PEMAT for Printable Materials (PEMAT-P)

SAM
Suitability Assessment of Materials
for evaluation of health-related information for adults

CDC Clear Communication Index
A Tool for Developing and Assessing CDC Public Communication Products
User Guide

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CDC Clear Communication Index

Does the material always present numbers the primary audience uses?

- Use only necessary numbers
- Use common numbers

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CDC Clear Communication Index

Does the material always explain what the numbers mean?

- Say why the numbers are important
- Provide context
- Avoid qualitative descriptors by themselves

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CDC Clear Communication Index

Does the audience have to conduct mathematical calculations?

- Do the math
- Use the same denominator

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PEMAT-P

Numbers appearing in the material are clear and easy to understand

- Use numbers only as needed
- In general, use frequencies instead of percentages
- It may be helpful to explain numbers qualitatively

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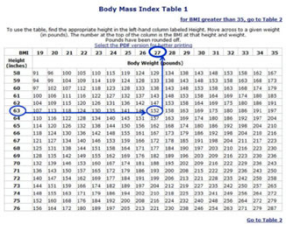
PEMAT-P

The material does not expect the user to perform calculations



Body Mass Index Table 1

For BMI greater than 35, go to Table 2

To use the table, find the appropriate height in the left-hand column labeled Height. Move across to a given weight (in pounds). The number at the top of the column is the BMI at that height and weight. Pounds have been rounded off.

Select the PDF version for printing

BMI	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Height (inches)	Body Weight (pounds)																
58	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167
59	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173
60	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179
61	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185
62	104	109	115	120	126	131	136	142	147	153	158	164	169	173	180	186	191
63	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197
64	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204
65	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210
66	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216
67	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223
68	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230
69	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236
70	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243
71	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250
72	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258
73	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265
74	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272
75	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279
76	156	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287

Go to Table 2

Source: National Heart, Lung, and Blood Institute, Body Mass Index Table 1

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SAM+CAM

- Use numbers other than fractions, percents, or probabilities
- Use helper words, like “less than” and “more than”
- Don’t make the reader do calculations

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Goal

Work with NLM to develop more nuanced and specific guidance to help people decide **when** and **how** to use numbers in health materials.

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Research

- Questions
- Methods
- Findings

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Guiding questions

- What are best practices for communicating numbers in health materials?
- What aspects of health numeracy contribute the most to people's understanding of health materials?

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Methods

- Brief literature and guidance scan
- 18 in-depth interviews with consumers

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Testing stimuli

We explored 4 numerical health communication concepts:

- Risk
- Quantity
- Level/amount
- Prevalence

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Testing stimuli

We also explored 2 numeracy format/form concepts:

- Ordinals in word or numeric form (**second** vs. **2nd**)
- Frequencies vs. percentages (**3 in 10** vs. **30 percent**)

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Findings

The communication goal matters.

Number only

Cystic fibrosis is a disease that causes serious damage to the lungs and other organs. While there's no cure for cystic fibrosis, better treatments are helping people live longer, healthier lives. About 30,000 people in the United States have cystic fibrosis.

Number with context

Cystic fibrosis is a disease that causes serious damage to the lungs and other organs. While there's no cure for cystic fibrosis, better treatments are helping people live longer, healthier lives. But cystic fibrosis is rare — about 30,000 people in the United States have it.

Context only

Cystic fibrosis is a disease that causes serious damage to the lungs and other organs. While there's no cure for cystic fibrosis, better treatments are helping people live longer, healthier lives. But cystic fibrosis is rare.

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Findings

Numbers lend credibility.

Numbers only

Quitting smoking is one of the best things you can do for your health. Smoking is the leading cause of preventable death and disease in the United States. If you smoke, you're 15 to 30 times more likely to get lung cancer.

Numbers with context

Quitting smoking is one of the best things you can do for your health. Smoking is the leading cause of preventable death and disease in the United States. If you smoke, you're 15 to 30 times more likely to get lung cancer. If you smoke, your risk of lung cancer is much higher than someone who doesn't smoke.

Context only

Quitting smoking is one of the best things you can do for your health. Smoking is the leading cause of preventable death and disease in the United States. If you smoke, your risk of lung cancer is much higher than someone who doesn't smoke.

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Findings

Numbers stand out.

Spelled out

Cancer treatments have improved dramatically in recent years. But cancer is still the second leading cause of death in the United States. Researchers are constantly working to develop better treatments that can save lives.

Numeral

Cancer treatments have improved dramatically in recent years. But cancer is still the 2nd leading cause of death in the United States. Researchers are constantly working to develop better treatments that can save lives.

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Findings

People make sense of numbers through visualization.

Number only

Eating healthy means eating a variety of nutritious foods and drinks. To eat healthy, it's important to think about serving sizes. For example, a healthy serving of meat is 4 ounces.

Number with context

Eating healthy means eating a variety of nutritious foods and drinks. To eat healthy, it's important to think about serving sizes. For example, a healthy portion of meat is 4 ounces — that looks about the same size as a deck of cards.

Context only

Eating healthy means eating a variety of nutritious foods and drinks. To eat healthy, it's important to think about serving sizes. For example, a healthy portion of meat looks about the same size as a deck of cards.

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Findings

To make sense of numbers, people convert to their preferred format.

Numbers only

Chickenpox spreads easily from person to person. That's why all kids need to get vaccinated against chickenpox. 9 out of 10 people who get the chickenpox vaccine never get chickenpox.

Numbers with context

Chickenpox spreads easily from person to person. That's why all kids need to get vaccinated against chickenpox. 9 out of 10 people who get the chickenpox vaccine never get chickenpox. That means the vaccine is very effective.

Context only

Chickenpox spreads easily from person to person. That's why all kids need to get vaccinated against chickenpox. Most people who get the chickenpox vaccine never get chickenpox.

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Findings

It's not clear whether people understand frequencies or percentages better. In fact, they may struggle to understand both.

Percentage

30 percent of Americans have high blood pressure.

Frequency

3 out of 10 Americans have high blood pressure.

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Findings

Numbers + context is best.

Number and context only

Breathing in too much air pollution can be especially dangerous for people with asthma. If you have asthma, the Air Quality Index (AQI) can help you stay safe by telling you when the air may be dangerous for you to breathe. Today, the AQI is at 25. That means the air is safe for you to breathe.

Number, context, range

Breathing in too much air pollution can be especially dangerous for people with asthma. If you have asthma, the Air Quality Index (AQI) can help you stay safe by telling you when the air may be dangerous for you to breathe. The AQI ranges from 0 (safest) to 500 (most dangerous). Today, the AQI is at 25.

Context only

Breathing in too much air pollution can be especially dangerous for people with asthma. If you have asthma, the Air Quality Index (AQI) can help you stay safe by telling you when the air may be dangerous for you to breathe. Today, the AQI shows that the air is safe for you to breathe.

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What Now?

- Key takeaways
- Future research

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Key takeaways

Before including numbers in a material, carefully consider whether they're useful.

Will numbers help support your main message or communication goal?

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Key takeaways

Use numerals rather than spelled-out numbers.

✓ **YES:** Call your doctor if you're still having pain in 6 weeks.	✓ **YES:** Your doctor will want to see you more often in the 3rd trimester of your pregnancy.
✗ **NO:** Call your doctor if you're still having pain in six weeks.	✗ **NO:** Your doctor will want to see you more often in the third trimester of your pregnancy.

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Key takeaways

When using numbers, provide context (with words **or additional numbers**) to help increase understanding.

Heart disease is the leading cause of death in the United States. Every year, more than 600,000 people die of heart disease.

Your triglyceride level was 350. Anything between 200 and 499 is considered unhealthy.

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Key takeaways

Consider using visual metaphors to help people understand numbers.

1 ounce of cheese is about the same size as 4 dice

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Future research

- What is the right quantity of numbers to use so that readers find health information credible and understandable?
- What are the most effective formats for presenting numerical health risk information?
- When are frequencies or percentages most effective for supporting communication goals?
- Which frequency units and which types of percentages are easiest to understand?

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Discussion
& Questions

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