

Numeracy and health

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2009 federal mandate (“Meaningful Use Program”) to provide electronic copies of data to patients upon request

Home / Weill Cornell Connect Home / Health Summary

▶ My Medical Record
▶ Communication Center
▶ Appointments
▶ My Family's Records
▶ Preference

Search Health Information on
Healthwise® Knowledgebase:

Search

Health Summary

 Print

The Health Summary provides you with a convenient summary of important information in your health record. Your summary includes up-to-date information concerning your current health issues, medications, allergies, immunizations, and preventive care.

Current Health Issues

[Back to Top](#)

You have no health issues on file.

Medications

[Back to Top](#)

AMLODIPINE BESYLATE 10 MG TAB
[About This Medication](#)

Instructions: 1 tablet daily

Prescribed by [James P Hollenberg](#) on 11/16/2010

[Request a refill](#)

AMLODIPINE BESYLATE 10 MG TAB
[About This Medication](#)

Instructions: 1 tablet daily

Prescribed by [James P Hollenberg](#) on 11/16/2010

[Request a refill](#)

Y Ztest

[Logout](#)

Read your new message from Weill Cornell CONNECT Admin.
Subject: Welcome To Weill Cornell CONNECT!!

Review the preventive care services we recommend you schedule soon.

Your Providers



Adam David Cheriff
Weill Cornell Connect Participant



James P Hollenberg
Weill Cornell Connect Participant



Sameer Malhotra



B Robert Meyer

ABC WITH DIFF

Date	Test	Result	Deviation
Jan 29, 2009 : 06:30 AM	WBC	12.5 10 ⁹ /l	
	RBC	4.69 10 ¹² /l	
	HGB	10.8 g/dl	
	HCT	32.0 %	L
	MCV	68.2 fl	
	MCH	23.0 pg	L
	MCHC	33.8 g/dl	
	RDW	18.6 %	H
	PLT	168 10 ⁹ /l	
	MPV	10.4 fl	
	NRBC	0.0 /100 WBC	
	ABSOLUTE NRBC COUNT	0.00 10 ⁹ /L	
	% NEUTROPHILS	85 %	
	% LYMPHS	8 %	L
	% MONOS	6 %	
% EOS	0 %		
% BASOS	0 %		

[Back to top ^](#)

PT/INR

Date	Test	Result	Deviation
Jan 29, 2009 : 06:30 AM	PT	18.7 sec	
	INR	1.48	H

[Back to top ^](#)

APTT

Date	Test	Result	Deviation
Jan 29, 2009 : 06:30 AM	APTT	33.1 sec	

[Back to top ^](#)

BASIC METABOLIC PANEL

Date	Test	Result	Deviation
Jan 29, 2009 : 06:30 AM	SODIUM	137 mM/l	
	POTASSIUM	5.8 mM/l	H
	CHLORIDE	113 mM/l	
	CO2	22 mM/l	L
	BUN	21 mg/dl	
	GLUCOSE	163 mg/dl	H
	CREATININE	1.0 mg/dl	
	CALCIUM	7.3 mg/dl	L



“BP = 140/90”

*“Your blood pressure
is high”*
(comparison)

*“High blood pressure
puts you at risk of having
a stroke”*
(consequences)

*“Here are some
very effective ways
to help you lower
your blood
pressure”*
(developing and
applying
generalizable rules
and theories)

Increasing expectations for health literacy and numeracy

- Health literacy: Ability to comprehend and make use of written and oral information for one's own health
 - Low/marginal health literacy estimated in nearly half of US population
Paasche-Orlow 2005
- Health numeracy: Ability to comprehend and make use of quantitative information for one's own health
 - Poor numeracy even more prevalent Ancker, Kaufman *JAMIA* 2007

Numeracy

Questionnaire about bladder infection administered to 600 women -- “Please circle which rate is higher.”

1. 2.6 per 1000 women, or 8.9 per 1000 women

- 73% of respondents got it right
- ≤ 9 years of education: 50%

2. 1 in 384 women, or 1 in 112 women

- 56% of respondents got it right
- ≤ 9 years of education: 30%

Evidence about importance of numeracy

- Poor numeracy skills associated with poorer medical decisions (Peters et al, 2006)
- Poor numeracy skills associated with worse health:
 - asthma (Apter 2006)
 - anticoagulation (Estrada 2004)
 - diabetes (Osborn 2009)

Numeracy: How people think it works

healthcare
provider



“Take 50 mg 3 times
a day”

numerate
patient



comprehends,
takes appropriate
action

Numeracy: How people think it works

healthcare
provider



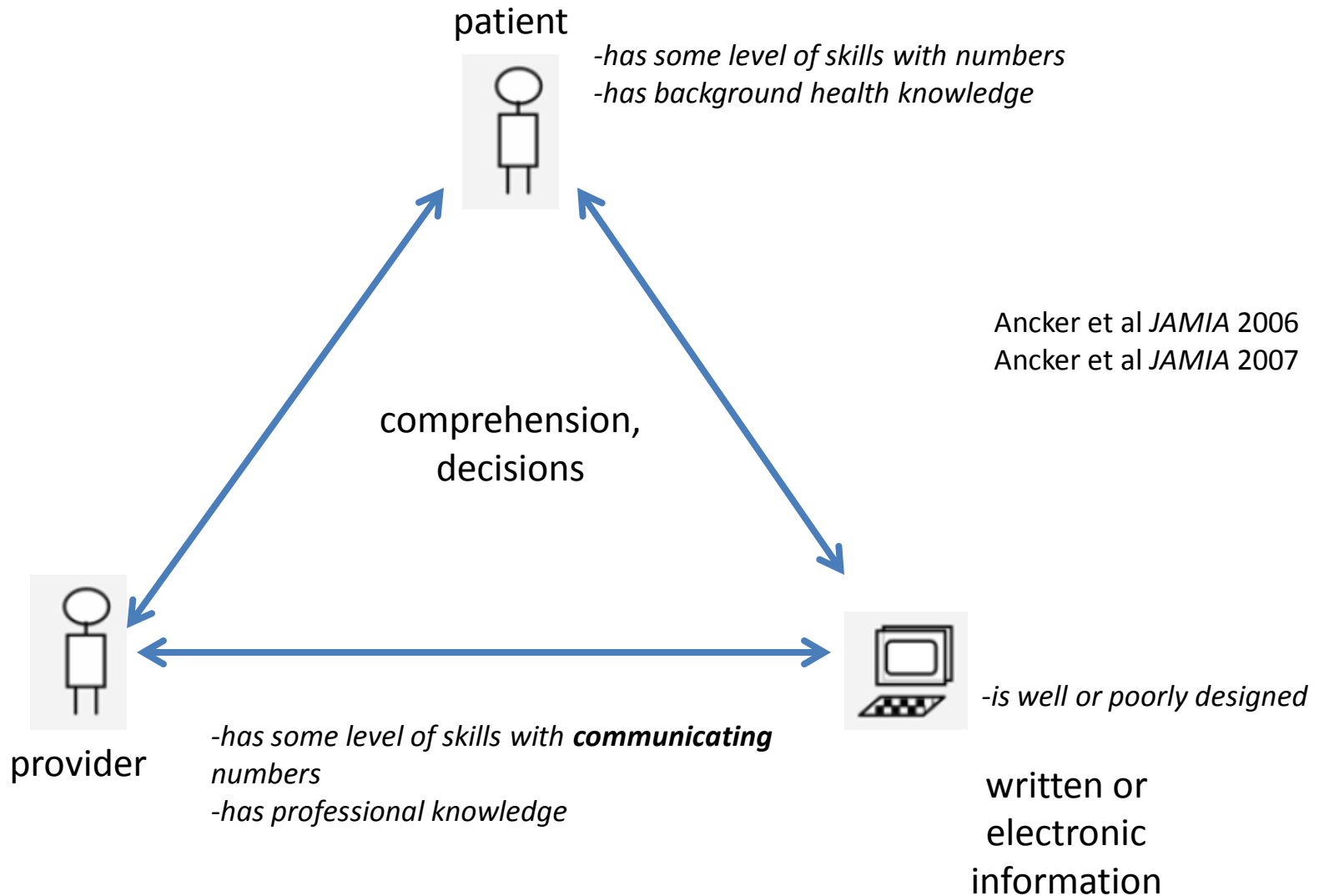
“Take 50 mg 3 times
a day”

numerate
patient

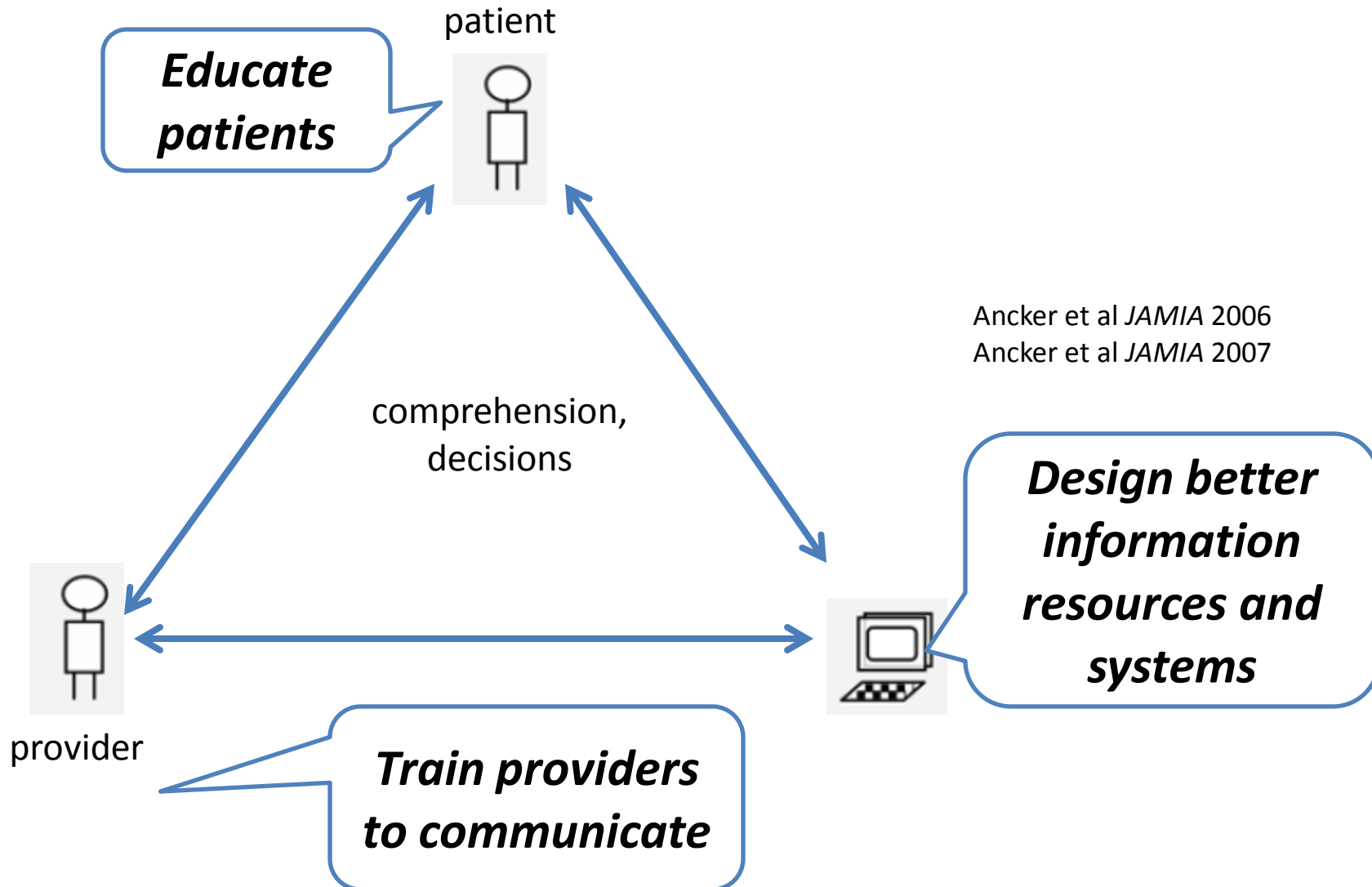


↓
doesn't
understand,
takes no action –
or wrong action!

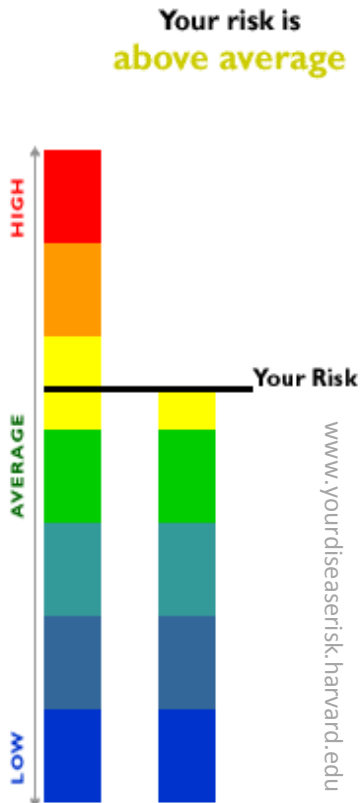
Numeracy: How it really works



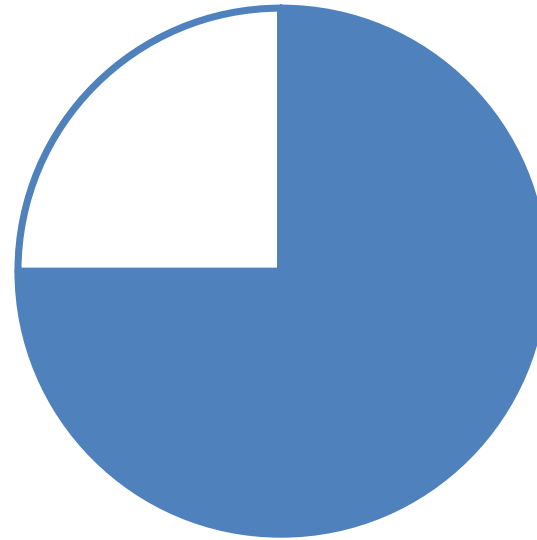
Improving patients' ability to use information



Good information design helps people use information



The chance that you have this mutation is 25%.
The chance that you do not have the mutation is 75%.

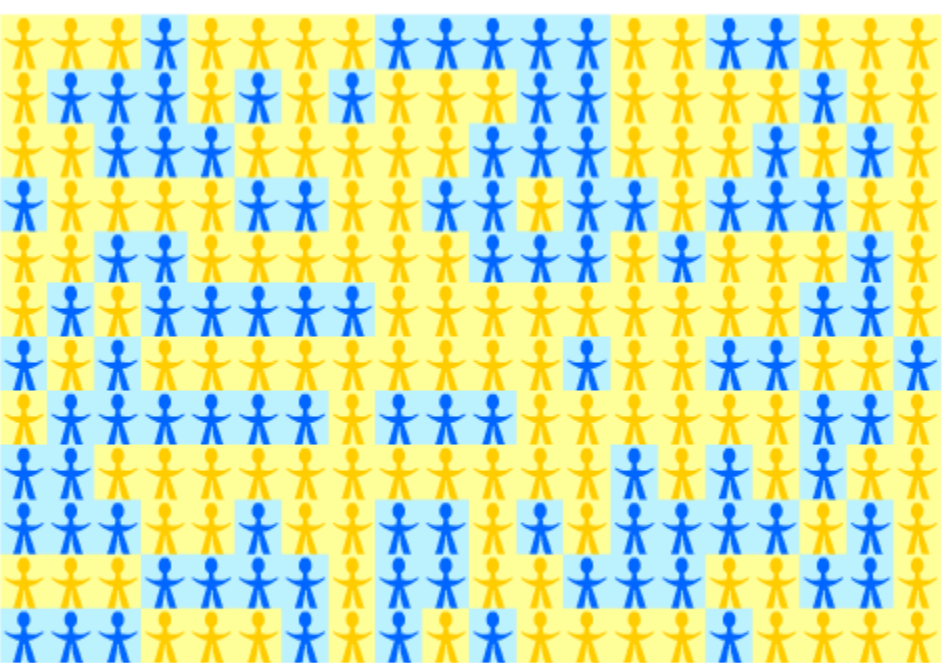


Rimer, Glassman, 1999

Opportunity for innovation

Adobe Flash Player 9

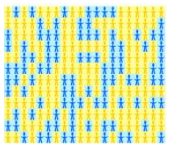
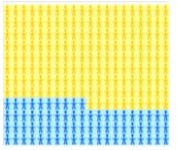
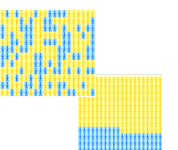
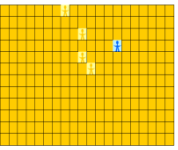
File View Control Help



- Click on any square to see the person underneath.
- Keep clicking on different squares until you find somebody who has the disease.

Ancker et al *Medical Decision Making*
2011

Participants (n = 160) liked interactive graphics

Strongly agreed that the graphic...					p
Helped me understand the risks	33%	41%	44%	60%	.08
all participants	46%	50%	46%	78%	.46
low numeracy only					

Graphics affected perceived risk and intention to take protective measures

- Searchers clicked 2-51 times before finding a blue person
- Number of clicks was
 - correlated with feeling vulnerable ($\rho = -0.52, p=.03$)
 - correlated with qualitative risk ($\rho = 0.67, p=.003$)
 - not correlated with numeric risk estimate ($\rho = 0.001, p>0.9$)
- Interactive graphic substantively *reduced* the difference between high-numeracy and low-numeracy patients
 - feelings of vulnerability
 - qualitative descriptions of risk

Summary

- Numeracy is associated with health outcomes
 - plausible causal relationship
- Patient understanding of quantitative information is strongly affected by information design as well as numeracy
- Opportunities for research and innovation into creative and effective ways of presenting medical data to patients
 - data -> information -> knowledge

Thank you!

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