American Association of Diabetes Educators

Beyond Health Literacy:
Cognitive demands of diabetes self-management

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2

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3

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Over 100 scientific publications and 120 national/international presentations, most on how differences in reasoning, learning ability, and functional literacy affect performance in education, training, jobs, and health self-management.

President of International Society for Intelligence Research and on editorial board of *Intelligence*.

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4

CDEs and the challenge of patient self-management

- DSME/T outcomes are vital in the emerging healthcare landscape
- DSM is a complex job
- Literacy is a general cognitive ability
- Disabilities and aging can affect literacy
- DSM must be cognitively accessible
  - Identify the most critical tasks
  - Identify cognitive barriers in tasks
  - Deliver instruction based on cognitive difficulty (Bloom's taxonomy)
  - Select Bloom-referenced educational materials

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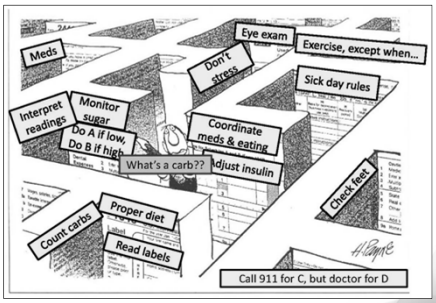

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Effective patient education

and self-management

are part

of the healthcare landscape.

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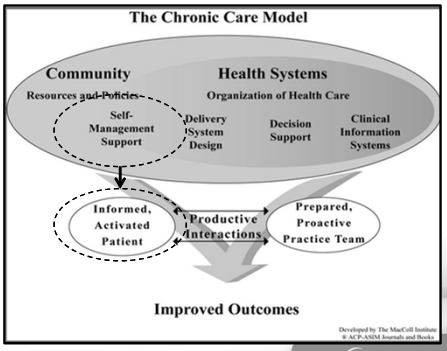

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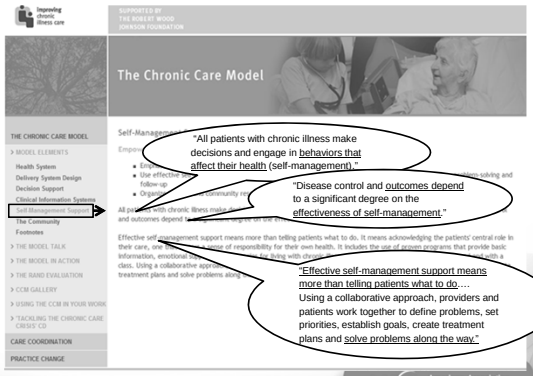

"All patients with chronic illness make decisions and engage in behaviors that affect their health (self-management)."

"Disease control and outcomes depend to a significant degree on the effectiveness of self-management."

"Effective self-management support means more than telling patients what to do… Using a collaborative approach, providers and patients work together to define problems, set priorities, establish goals, create treatment plans and solve problems along the way."

9

"No hospital got top scores for readmissions or communication"

10

11

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13

Revised PCMH Standards

PCMH Recognition is based on meeting specific elements included in six standard categories.

1. Enhance Access and Continuity: Accommodate patients' needs with access and advice during and after hours, give patients and their families information about their medical home and provide patients with team-based care
2. Identify and Manage Patient Populations: Collect and use data for population management
3. Plan and Manage Care: Use evidence-based guidelines for preventive, acute and chronic care management, including medication management
4. Provide Self-Care Support and Community Resources: Assist patients and their families in self-care management with information, tools and resources
5. Track and Coordinate Care: Track and coordinate tests, referrals and transitions of care
6. Measure and Improve Performance: Use performance and patient experience data for continuous quality improvement

Practices must successfully meet the following "must-

14

Stage 1 Meaningful Use Criteria

Physicians must meet all 15 "Core Set" objectives and measures and five of the 10 "Menu Set" objectives and measures. They also must report clinical quality measures (see separate document).

Provide patients with timely electronic access to their health information (including lab results, problem list, medication lists, allergies) within 4 business days of the information being available to the EP	More than 10 percent of all unique patients seen by the EP are provided timely (available to the patient within four business days of being updated in the certified EHR technology) electronic access to their health information subject to the EP's discretion to withhold certain information **Exclusion:** Any EP that neither orders nor creates any of the information listed at 45 CFR 170.304(g) (e.g., lab test results, problem list, medication list, medication allergy list, immunizations, and procedures) during the EHR reporting period qualifies for an exclusion from this objective/measure	EHR must have ability to tabulate patient's records stored in the EHR, however, if thresholds are not met through these patient records stored in the EHR, physician would need to manually count paper records in order to meet the threshold
Use certified EHR technology to identify patient-specific education resources and provide those resources to the patient if appropriate	More than 10 percent of all unique patients seen by the EP are provided patient specific education resources **Exclusion:** None	EHR must have ability to tabulate patient's records stored in the EHR, however, if thresholds are not met through these patient records stored in the EHR, physician would need to manually count paper records in order to meet the threshold

15

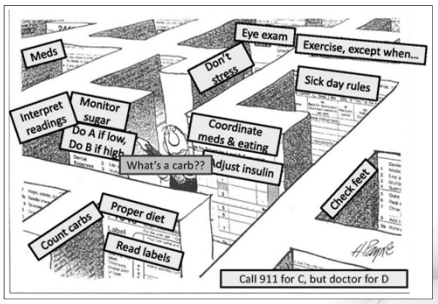
www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/6_Patient-Specific_Education_

Additional Information

- Certified EHR technology is certified to use either the patient's problem list, medication list, or laboratory test results to identify the patient-specific educational resources. These or additional elements can be used in the identification of educational resources that are specific to the patients needs.
- Education resources or materials do not have to be stored within or generated by the certified EHR. However, the provider should utilize certified EHR technology in a manner where the technology suggests patient-specific educational resources based on the information stored in the certified EHR technology. The provider can make a final decision on whether the education resource is useful and relevant to a specific patient.

16

Patient's everyday reality



17

The patient's job description

Objective: Keep blood glucose within safe limits

- **Learn about diabetes in general (At "entry')** — Training
  - Physiological process
  - Interdependence of diet, exercise, meds
  - Symptoms & corrective action
  - Consequences of poor control
- **Apply knowledge to own case (Daily, Hourly)** — Self-management
  - Implement appropriate regimen
  - Continuously monitor physical signs
  - Diagnose problems in timely manner
  - Adjust food, exercise, meds in timely and appropriate manner
- **Coordinate with relevant parties (Frequently)** — Self-management
  - Negotiate changes in activities with family, friends, job
  - Enlist/capitalize on social support
  - Communicate status and needs to practitioners
- **Update knowledge & adjust regimen (Occasionally)** — Self-management
  - When other chronic conditions or disabilities develop
  - When new treatments are ordered
  - When life circumstances change
- **Conditions of work—24/7, no days off, no retirement**

18

Good glucose control requires good judgment

- **IT IS NOT** mechanically following a recipe
- **IT IS** keeping a complex metabolic system under control in often unpredictable circumstances (like accident prevention process)
  - Coordinate a regimen having multiple interacting elements
  - Adjust parts as needed to maintain good control of system buffeted by many other factors
  - Anticipate lag time between (in)action and system response
  - Monitor advance "hidden" indicators (blood glucose) to prevent system veering badly out of control
  - Decide appropriate type and timing of corrective action if system veering off-track
  - Monitor/control other shocks to system (infection, emotional stress)
  - Coordinate regimen with other daily activities
  - Plan ahead (meals, meds, etc.)
    - For the expected
    - For the unexpected and unpredictable
  - Prioritize conflicting demands on time and behavior

The challenge in DM self-management

19

Diabetes self-management is inherently complex

↓

Relentless, evolving cognitive demands

↓

Frequent cognitive overload

↓

High-risk errors = noncompliance

Must recognize cognitive burdens of DSM

AND how to reduce those burdens

Cognitive demands of DSM are like all complex jobs

20

- Elementary teacher
- Nurse
- Nuclear power plant operator

Heavy cognitive burdens

- Learn and recall relevant information
- Reason and make judgments
- Deal with unexpected situations
- Identify problem situations quickly
- React swiftly when unexpected problems occur
- Apply common sense to solve problems
- Learn new procedures quickly
- Be alert & quick to understand things

*Job analysis by Arvey (1986)

Cognitive demands of DSM are like all complex jobs

21

- Elementary teacher
- Nurse
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Heavy cognitive burdens that pile up

- Learn and recall relevant information
- Reason and make judgments
- Deal with unexpected situations
- Identify problem situations quickly
- React swiftly when unexpected problems occur
- Apply common sense to solve problems
- Learn new procedures quickly
- Be alert & quick to understand things

*Job analysis by Arvey (1986)

Disasters waiting to happen

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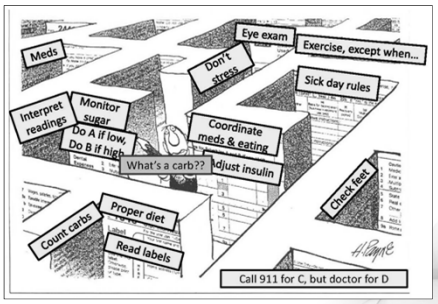
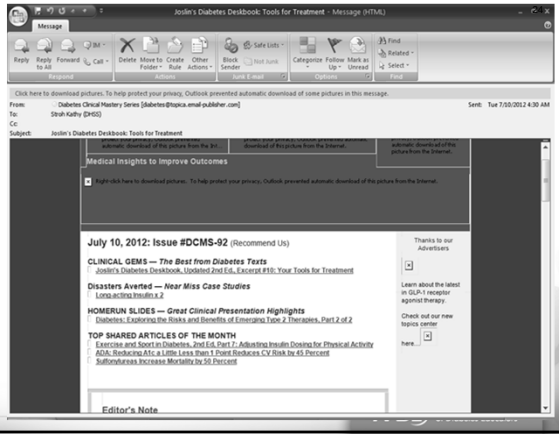


23

DIABETES IN CONTROL.COM
News and Information for Medical Professionals

Diabetes Disaster Averted series:

http://www.diabetesincontrol.com/articles/practicum



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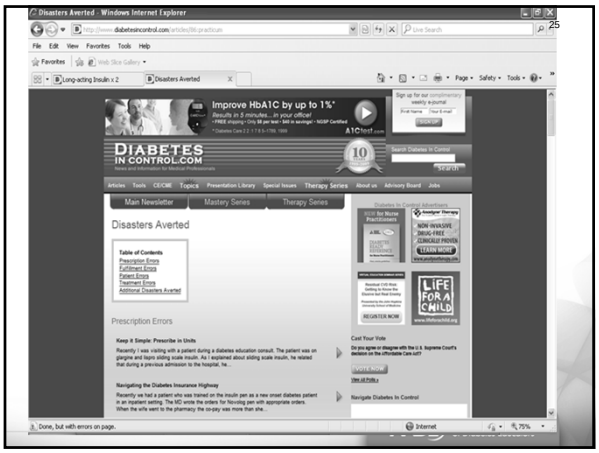
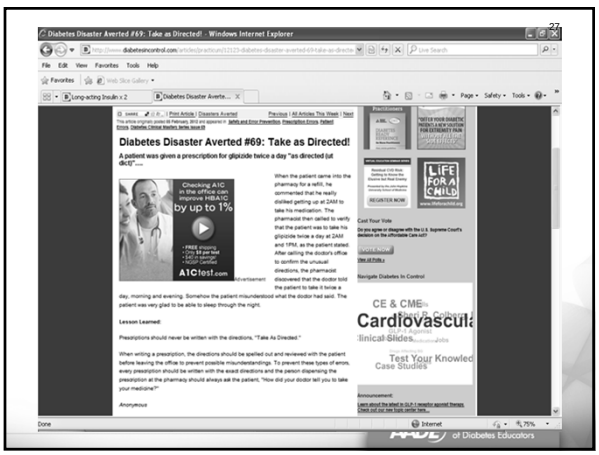

Disasters Averted - Windows Internet Explorer
Improve HbA1C by up to 1%*
DIABETES IN CONTROL.COM
Disasters Averted
Prescription Errors


Long-acting Insulin x 2 - Windows Internet Explorer
Improve HbA1C by up to 1%*
DIABETES IN CONTROL.COM
Long-acting Insulin x 2
At a recent support group meeting, the topic was long-acting insulin glargine. During the discussion, a patient raised his hand to tell me that he had been prescribed both Lantus and Levemir, and was taking them both at night. I advised the patient that...
I advised the patient that he would not be ordered both since they were both long acting insulin. However, he

27


Diabetes Disaster Averted #69: Take as Directed! - Windows Internet Explorer
Diabetes Disaster Averted #69: Take as Directed!
A patient was given a prescription for glipizide twice a day "as directed [at dict]" ....
Lesson Learned:
Prescriptions should never be written with the directions, "Take As Directed."
Anonymous

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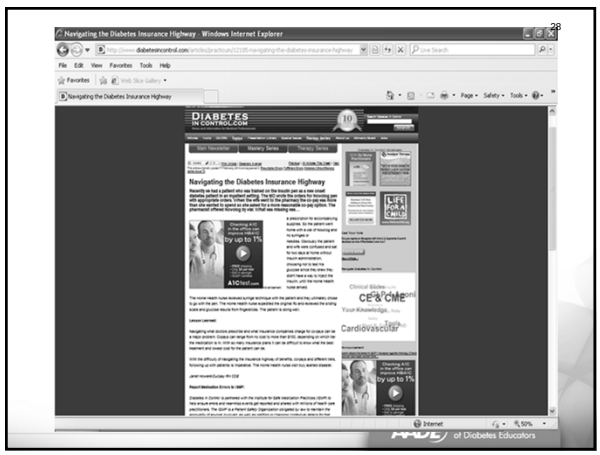
Navigating the Diabetes Insurance Highway - Windows Internet Explorer
Navigating the Diabetes Insurance Highway

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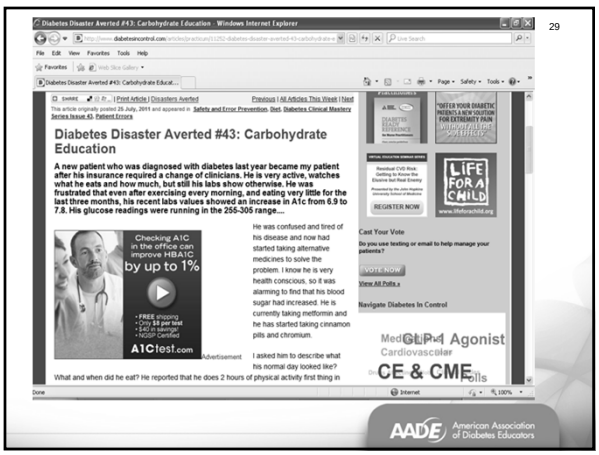
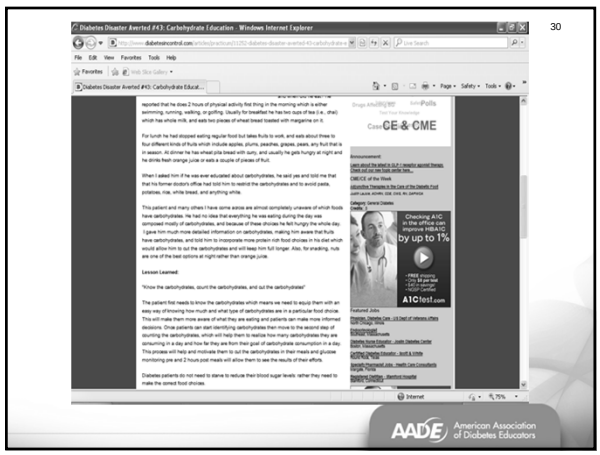

Diabetes Disaster Averted #43: Carbohydrate Education - Windows Internet Explorer
Diabetes Disaster Averted #43: Carbohydrate Education
A new patient who was diagnosed with diabetes last year became my patient after his insurance required a change of clinicians. He is very active, watches what he eats and how much, but still his labs show otherwise. He was frustrated that even after exercising every morning, and eating very little for the last three months, his recent labs values showed an increase in A1c from 6.9 to 7.8. His glucose readings were running in the 255-305 range....
He was confused and tired of his disease and now had started taking alternative medicines to solve the problem. I know he is very health conscious, so it was alarming to find that his blood sugar had increased. He is currently taking metformin and he has started taking cinnamon pills and chromium.
I asked him to describe what his normal day looked like?
What and when did he eat? He reported that he does 2 hours of physical activity first thing in
CE & CME

30


Diabetes Disaster Averted #43: Carbohydrate Education - Windows Internet Explorer
CE & CME

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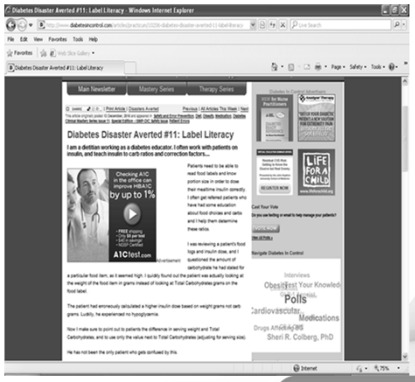

32

Label literacy

- A diabetic educator taught a patient insulin-to-carbohydrate (I:C) ratios so he could match insulin doses to the amounts of carbohydrates he consumed. (The I:C ratio specifies how many grams of carbohydrates are covered by each unit of insulin.) Patients need to read food labels and understand portion size to dose their mealtime insulin correctly.
- When reviewing the patient's food and insulin dose log, the educator questioned the carbohydrate content for a food item that seemed high.
- As the patient answered, the educator realized that the patient had been looking at the total weight in grams of the food item/serving size instead of the total carbohydrates grams in the item/serving size.
- This resulted in calculating a higher insulin dose than needed. Fortunately, the patient did not experience significant hypoglycemia.
- Some patients have also mistaken the percent of daily allowance of carbohydrates in each serving as the weight of carbohydrates in grams.

33

Improving the Literacy Level (Readability)

of educational materials

does not guarantee

comprehension & compliance

because it does not reduce

***cognitive demands*.**

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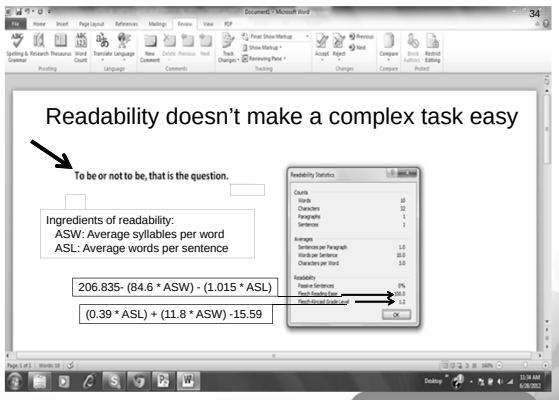
34



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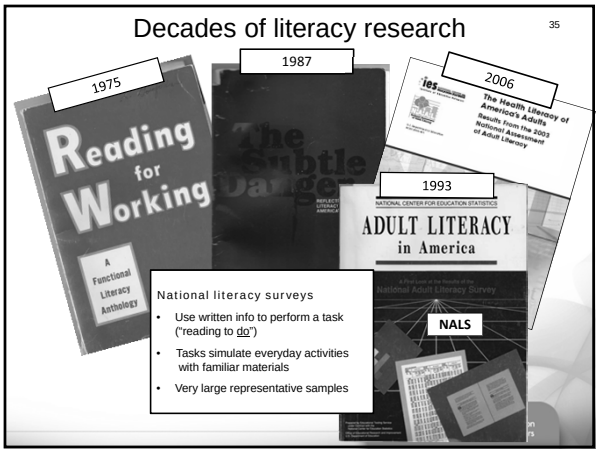

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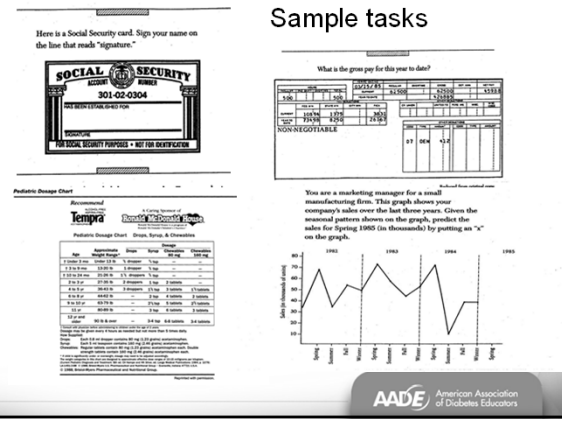
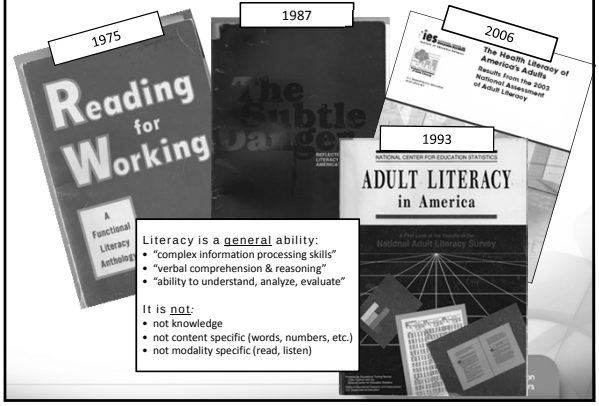


Surprising, common conclusion

37



Literacy is a general ability:
- "complex information processing skills"
- "verbal comprehension & reasoning"
- "ability to understand, analyze, evaluate"

It is not:
- not knowledge
- not content specific (words, numbers, etc.)
- not modality specific (read, listen)

Screening for literacy level

38

Short, simple, and non-threatening

Single Item Literacy Screen (SILS)

"How often do you need to have someone help you when you read instructions, pamphlets, or other written material from your doctor or pharmacy?"

The Single Item Literacy Screener: Evaluation of a brief instrument to identify limited reading ability
Nancy S Morris[1,2], Charles D MacLean[2], Lisa D Chew[2] and Benjamin Littenberg[2,3]

[1]College of Nursing and Health Sciences, University of Vermont, Burlington, Vermont, USA
[2]College of Medicine, University of Vermont, Burlington, Vermont, USA
[3]Harborview Medical Center, University of Washington, Seattle, Washington, USA
BMC Family Practice 2006, 7:21 doi:10.1186/1471-2296-7-21

Typical literacy items, by difficulty level

National Adult Literacy Survey (NALS), 1993

NALS difficulty level (& scores)	% US adults peaking at this level	Simulated everyday tasks
		Daily self-maintenance in modern literate societies
5 (375-500)	3%	▪ Use calculator to determine cost of carpet for a room ▪ Use table of information to compare 2 credit cards
4 (325-375)	15%	▪ Use eligibility pamphlet to calculate SSI benefits ▪ Explain difference between 2 types of employee benefits
3 (275-325)	31%	▪ Calculate miles per gallon from mileage record chart ▪ Write brief letter explaining error on credit card bill
2 (225-275)	28%	▪ Determine difference in price between 2 show tickets ▪ Locate intersection on street map
1 (0-225)	23%	▪ Total bank deposit entry ▪ Locate expiration date on driver's license

39

What makes some items more difficult? "Information processing complexity"

NALS difficulty level (& scores)	% US adults peaking at this level	Si… National…
5 (375-500)	3%	▪ Use calculato… ▪ Use table of i…
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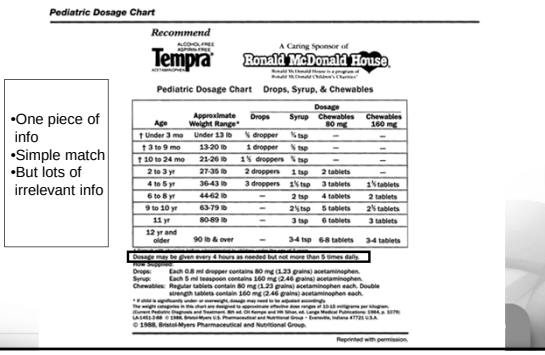
Not reading per se, but "problem solving"
- number of features to match
- level of inference ("connecting the dots")
- abstractness of info
- distracting information

41

42

Task #1—Underline sentence saying how often to give the medicine

- One piece of info
- Simple match
- But lots of irrelevant info


Pediatric Dosage Chart

Recommend Tempra — A Caring Sponsor of Ronald McDonald House

Pediatric Dosage Chart Drops, Syrup, & Chewables

Age	Approximate Weight Range*	Dosage: Drops	Syrup	Chewables 80 mg	Chewables 160 mg
† Under 3 mo	Under 13 lb	¾ dropper	¼ tsp	—	—
† 3 to 9 mo	13-20 lb	1 dropper	½ tsp	—	—
† 10 to 24 mo	21-26 lb	1¼ droppers	¾ tsp	—	—
2 to 3 yr	27-35 lb	2 droppers	1 tsp	2 tablets	—
4 to 5 yr	36-43 lb	3 droppers	1¼ tsp	3 tablets	1¼ tablets
6 to 8 yr	44-62 lb	—	2 tsp	4 tablets	2 tablets
9 to 10 yr	63-79 lb	—	2½ tsp	5 tablets	2½ tablets
11 yr	80-89 lb	—	3 tsp	6 tablets	3 tablets
12 yr and older	90 lb & over	—	3-4 tsp	6-8 tablets	3-4 tablets

Dosage may be given every 4 hours as needed but not more than 5 times daily.

How Supplied:
Drops: Each 0.8 ml dropper contains 80 mg (1.23 grains) acetaminophen.
Syrup: Each 5 ml teaspoon contains 160 mg (2.46 grains) acetaminophen.
Chewables: Regular tablets contain 80 mg (1.23 grains) acetaminophen each. Double strength tablets contain 160 mg (2.46 grains) acetaminophen each.

* If child is significantly under- or overweight, dosage may need to be adjusted accordingly.
The weight categories in this chart are designed to approximate effective dose ranges of 10-15 milligrams per kilogram. (Current Pediatric Diagnosis and Treatment, 8th ed. CH Kempe and HK Silver, ed. Lange Medical Publications: 1984, p. 1079) LA-1451-1148 © 1988, Bristol-Myers U.S. Pharmaceutical and Nutritional Group – Evansville, Indiana 47721 U.S.A.

How difficult is this item?

NALS difficulty level (& scores)	% US adults peaking at this level	Simulated everyday tasks National Adult Literacy Survey (NALS), 1993)
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43

Literacy levels require different amounts of cognitive support

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44

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Complexity & aging

"Okay your father managed to get a mouse. Now how do we use it?"

Persons age 65+ are at much greater risk of low literacy

NALS difficulty level (& scores)	% US adults (seniors) peaking at this level	Simulated everyday tasks National Adult Literacy Survey (NALS), 1993)
5 **(375-500)**	3% ~0%	▪ Use calculator to determine cost of carpet for a room ▪ Use table of information to compare 2 credit cards
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46

47

Persons with disabilities

are also

at much greater risk

of low literacy

48

http://nces.ed.gov/pubs93/93275.pdf

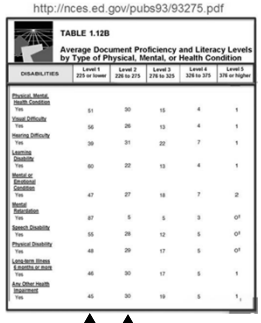

TABLE 1.12B

Average Document Proficiency and Literacy Levels by Type of Physical, Mental, or Health Condition

DISABILITIES	Level 1 225 or lower	Level 2 226 to 275	Level 3 276 to 325	Level 4 326 to 375	Level 5 376 or higher
Physical, Mental, Health Condition					
Yes	51	30	15	4	1
Visual Difficulty					
Yes	56	26	13	4	1
Hearing Difficulty					
Yes	39	31	22	7	1
Learning Disability					
Yes	60	22	13	4	1
Mental or Emotional Condition					
Yes	47	27	18	7	2
Mental Retardation					
Yes	87	5	5	3	0[3]
Speech Disability					
Yes	55	28	12	5	0[3]
Physical Disability					
Yes	48	29	17	5	0[3]
Long-term Illness 6 months or more					
Yes	46	30	17	5	1
Any Other Health Impairment					
Yes	45	30	19	5	1[3]

1993 NALS report

Persons with disabilities vs persons age 65+

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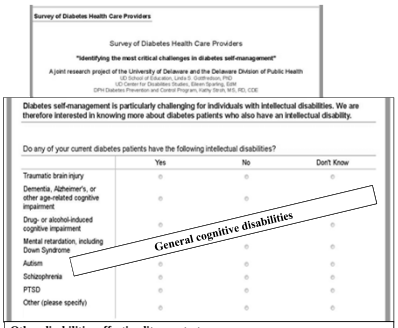

Survey of Diabetes Health Care Providers

Survey of Diabetes Health Care Providers

"Identifying the most critical challenges in diabetes self-management"

A joint research project of the University of Delaware and the Delaware Division of Public Health

Diabetes self-management is particularly challenging for individuals with intellectual disabilities. We are therefore interested in knowing more about diabetes patients who also have an intellectual disability.

Do any of your current diabetes patients have the following intellectual disabilities?

	Yes	No	Don't Know
Traumatic brain injury			
Dementia, Alzheimer's, or other age-related cognitive impairment			
Drug- or alcohol-induced cognitive impairment			
Mental retardation, including Down Syndrome			
Autism			
Schizophrenia			
PTSD			
Other (please specify)			

General cognitive disabilities

Other disabilities affecting literacy test scores
- Specific cognitive disabilities
- Perceptual disabilities
- Motor disabilities

Language

UD survey:
Diabetes patients with disabilities

Low "literacy" (lack of success in using materials in English) can result from :
- input problems (hearing, sight, language) ,
- weak processing (lower cognitive ability), or
- output limitations (motor, speech impediments, etc.)

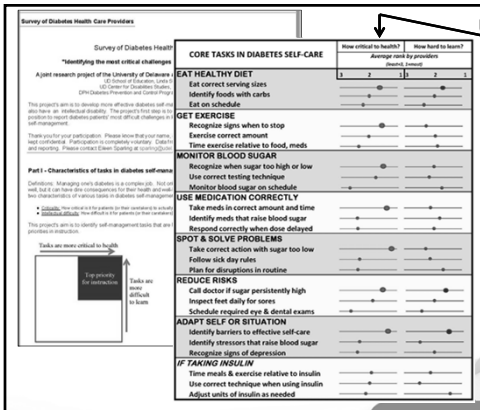
We are focusing on (b) but recognize that (a) and (c) are important too.

50

How to increase the cognitive accessibility of DSM…

1. Target the most critical tasks
2. Identify cognitive demands
3. Deliver instruction based on cognitive taxonomy (Bloom's)

51


Survey of Diabetes Health Care Providers

CORE TASKS IN DIABETES SELF-CARE	How critical to health? (Average rank by providers)	How hard to learn? (Average rank by providers)
EAT HEALTHY DIET	3 2 1	1 2 3
Eat correct serving sizes		
Identify foods with carbs		
Eat on schedule		
GET EXERCISE		
Recognize signs when to stop		
Exercise correct amount		
Time exercise relative to food, meds		
MONITOR BLOOD SUGAR		
Recognize when sugar too high or low		
Use correct testing technique		
Monitor blood sugar on schedule		
USE MEDICATION CORRECTLY		
Take meds in correct amount and time		
Identify meds that raise blood sugar		
Respond correctly when dose delayed		
SPOT & SOLVE PROBLEMS		
Take correct action with sugar too low		
Follow sick day rules		
Plan for disruptions in routine		
REDUCE RISKS		
Call doctor if sugar persistently high		
Inspect feet daily for sores		
Schedule required eye & dental exams		
ADAPT SELF OR SITUATION		
Identify barriers to effective self-care		
Identify stressors that raise blood sugar		
Recognize signs of depression		
IF TAKING INSULIN		
Time meals & exercise relative to insulin		
Use correct technique when using insulin		
Adjust units of insulin as needed		

Tasks are more critical to health

Top priority for instruction

Tasks are more difficult to learn

UD survey:
Criticality rankings

52

How to increase the cognitive accessibility of DSM…

1. Target the most critical tasks
2. Identify cognitive demands
3. Deliver instruction based on cognitive taxonomy (Bloom's)

53

Macaroni and Cheese

Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container 2

Amount Per Serving

Calories 250	Calories from Fat 110
	% Daily Value*
Total Fat 12g	18%
Saturated Fat 3g	15%
Cholesterol 30mg	10%
Sodium 470mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

54

Cookie Dough

Nutrition Facts Serv. Size: 1 33/100 oz (38g), Servings: 36, Amount Per Serving: **Calories** 170, Fat Cal. 80, **Total Fat** 9g (13%DV), Sat. Fat 3g (15%DV), *Trans* Fat 0g, **Cholest.** 15mg (5%DV), **Sodium** 135mg (6%DV), **Total carb.** 21g (7%DV), Fiber 1g (3%DV), Sugars 12g, **Protein** 3g, Vitamin A (0%DV), Vitamin C (0%DV), Calcium (0%DV), Iron (6%DV). Percent Daily Values (DV) are based on a 2,000 calorie diet.

granulated sugar, flour (wheat flour, malted barley flour, niacin, iron, thiamine mononitrate, riboflavin, folic acid), whole eggs, butter, vanilla, cinnamon, baking soda, salt. May contain traces of peanuts.

Peanut Butter: Flour (wheat flour, malted barley flour, niacin, iron, thiamine mononitrate, riboflavin, folic acid), peanut butter, granulated sugar, margarine (palm oil, water, soybean oil, salt, vegetable mono & diglycerides, soy lecithin, sodium benzoate (a preservative), citric acid,

55

Amount *per* serving

Information is better because it's in chart form

But, it contains a confusing technical symbol.

Can you spot it?

"Amount/serving"

Nutrition Facts

Serv. Size 1 croissant (57g)
Serv. Per Cont. 144
Calories 190
Fat Cal. 70

Amount/serving	%DV*	Amount/serving	%DV
Total Fat 8g	12%	**Total Carb.** 24g	8%
Sat. Fat 3g	16%	Fiber 1g	3%
Trans Fat 1.5g		Sugars 3g	
Cholest. 10mg	4%	**Protein** 4g	
Sodium 290mg	12%		

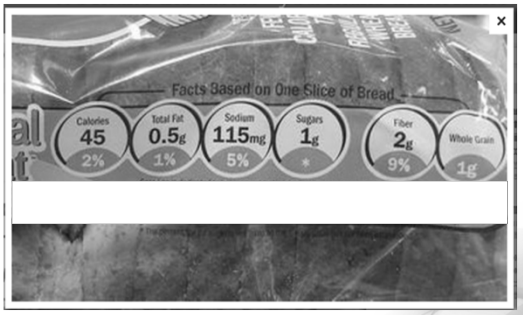
*Percent Daily Values (DV) are based on a 2,000 calorie diet.

Vitamin A 4% • Vitamin C 2% • Calcium 6% • Iron 8%

INGREDIENTS: Enriched Wheat Flour(Unbleached Wheat Flour, Malted Barley Flour, Niacin, Reduced Iron, Potassium Bromate, Thiamine Mononitrate, Riboflavin, Folic Acid), Water, Vegetable Shortening (Partially Hydrogenated Soybean and Cottonseed Oils,Soybean Oil, Soybean Lecithin with Mono- and Diglycerides, Vitamin A Palmitate), Butter, Sugar, Contains 2% or less of: Leavening(Yeast, Baking Powder [Sodium Bicarbonate, Cornstarch, Sodium Aluminum Phosphate, Calcium Sulfate, Monocalcium Phosphate]), Non-Fat Dry Milk, Salt, Dough Conditioner (Wheat Flour, DATEM, Dextrose, Soybean Oil, Ascorbic Acid, L-Cysteine, Azodicarbonamide(ADA), Calcium Stearoyl-2 Lactylate, Enzymes). Eggs, Artificial Flavor, Preservatives(Calcium Propionate, Potassium Sorbate, Citric Acid).

ALLERGY INFORMATION:
CONTAINS: Eggs, Milk, Soy, Wheat

56



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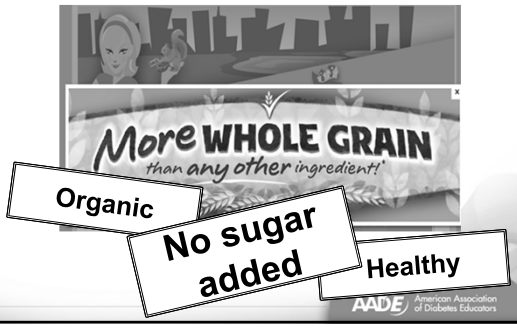
Attention-diverting labeling



58

Pros:
- Fewer items
- Single vertical list
- Major headings stand out

Cons:
- Lots of irrelevant info
- Seemingly inconsistent info

Macaroni and Cheese

Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container 2

Amount Per Serving

Calories 250 Calories from Fat 110

	% Daily Value*
Total Fat 12g	18%
Saturated Fat 3g	15%
Cholesterol 30mg	10%
Sodium 470mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
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Calcium	20%
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* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

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Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

59

Macaroni and Cheese

Nutrition Facts

Serving Size 1 cup
Servings Per Container 2

Amount Per Serving

%

Total Carbohydrate 31g
Dietary Fiber 0g

60

How to increase the cognitive accessibility of DSM…

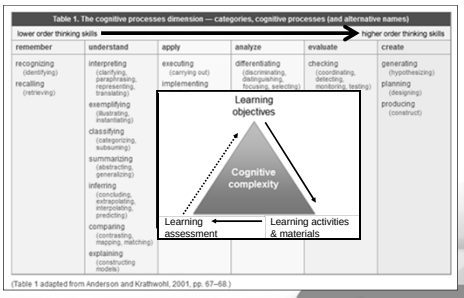
1. Target the most critical tasks
2. Identify cognitive demands
3. Deliver instruction based on cognitive taxonomy (Bloom's)

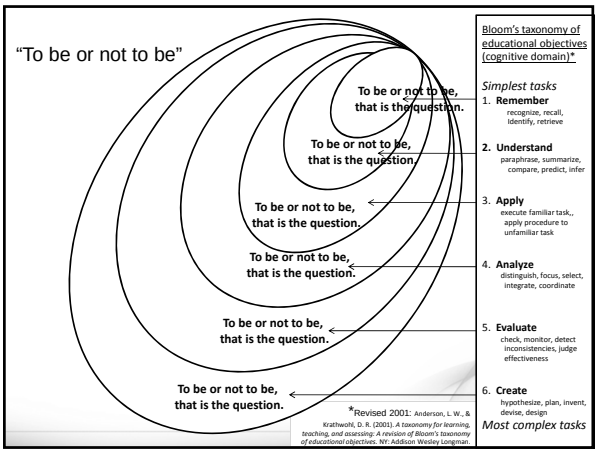
61

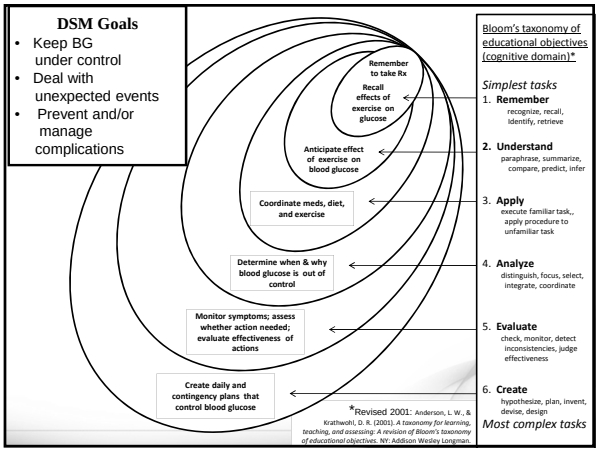
Bloom's Taxonomy of Learning Objectives

Latest (2001) revision

Bloom's levels = continuum of cognitive complexity







64

CORE TASKS IN DIABETES SELF-CARE	How critical to health? Average rank (mean) 3 2 1
EAT HEALTHY DIET	
Eat correct serving sizes	
Identify foods with carbs	
Eat on schedule	
GET EXERCISE	
Recognize signs when to stop	
Exercise correct amount	
Time exercise relative to food, meds	
MONITOR BLOOD SUGAR	
Recognize when sugar too high or low	
Use correct testing technique	
Monitor blood sugar on schedule	
USE MEDICATION CORRECTLY	
Take meds in correct amount and time	
Identify meds that raise blood sugar	
Respond correctly when dose delayed	
SPOT & SOLVE PROBLEMS	
Take correct action with sugar too low	
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Plan for disruptions in routine	
REDUCE RISKS	
Call doctor if sugar persistently high	
Inspect feet daily for sores	
Schedule required eye & dental exams	
ADAPT SELF OR SITUATION	
Identify barriers to effective self-care	
Identify stressors that raise blood sugar	
Recognize signs of depression	
IF TAKING INSULIN	
Time meals & exercise relative to insulin	
Use correct technique when using insulin	
Adjust units of insulin as needed	

65

Nutrition Facts

Serving Size 1 oz. (28g/About 21 pieces)
Servings Per Container About 2

Amount Per Serving	
Calories 170	Calories from Fat 110
	% Daily Value*
Total Fat 11g	17%
Saturated Fat 1.5g	8%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 250mg	10%
Total Carbohydrate 14g	5%
Dietary Fiber less than 1g	2%
Sugars 0g	
Protein 2g	
Vitamin A 2% •	Vitamin C 0%
Calcium 0% •	Iron 4%
Vitamin E 6% •	Thiamin 4%
Riboflavin 2% •	Niacin 4%
Vitamin B_6 2% •	Phosphorus 2%

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Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Bloom's taxonomy of educational objectives (cognitive domain)

Simplest tasks

1. **Remember** recognize, recall, Identify, retrieve
2. **Understand** paraphrase, summarize, compare, predict, infer,
3. **Apply** execute familiar task,, apply procedure to unfamiliar task
4. **Analyze** distinguish, focus, select, integrate, coordinate
5. **Evaluate** check, monitor, detect inconsistencies, judge effectiveness
6. **Create** hypothesize, plan, invent, devise, design

Most complex tasks

Location of relevant CHO gms

Carb vs non-carb ??
Sequence of label
Total CHOs = imp;
"Sugars" not = Total CHOs
Volume vs wt

How many CHO gms in 1 serving ?
Subtract fiber gms from CHO gms

Distractors
CHOs vs Fiber vs Fat

Part of meal vs OK snack ?
CHOs in intended serving ?
CHOs vs Fat/Chol vs Na

Plan a meal or snack

66

CORE TASKS IN DIABETES SELF-CARE	How critical to health? Average rank (mean) 3 2 1
EAT HEALTHY DIET	
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Adjust units of insulin as needed	

Bloom's taxonomy

Simplest tasks

1. **Remember** recognize, recall, Identify, retrieve
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5. **Evaluate** check, monitor, detect inconsistencies, judge effectiveness
6. **Create** hypothesize, plan, invent, devise, design

Most complex tasks

67

How to increase the cognitive accessibility of DSM…

1. Target the most critical tasks
2. Identify cognitive demands
3. Deliver instruction based on cognitive taxonomy (Bloom's) – materials

68

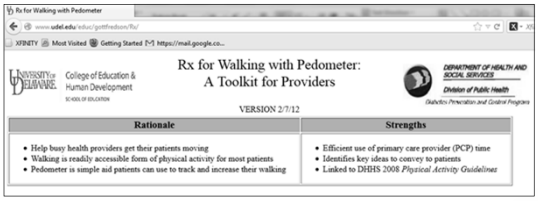
"Rx for Physical Activity" for a Rural Community Health Center

Linda S. Gottfredson, PhD
School of Education
University of Delaware

Kathy Stroh, MS, RD, CDE
Diabetes Prevention & Control Program
Delaware Division of Public Health

Presented at the 2009 Diabetes Translation Conference
Long Beach, CA, April 24, 2009

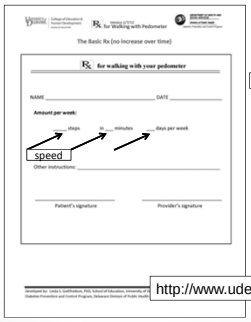
69

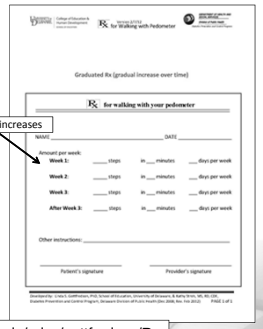


70

Graduated Rx

Basic Rx





http://www.udel.edu/educ/gottfredson/Rx

71

What can I give the patient?			Pages
Basic Rx - English			
• 1/page	Word	pdf	1
• 4/page	Word	pdf	1
Basic Rx - Spanish			
• 1/page	Word	pdf	1
	Word	pdf	1
Graduated Rx - English			
• 1/page	Word	pdf	1
• 4/page	Word	pdf	1
Graduated Rx - Spanish			
• 1/page	Word	pdf	1
• 4/page			
Steps-walked record			
• 1/page			
• 4/page			
Steps-walked record			
• 1/page			
• 4/page			
(Can be reproduced			

What dose and intensity do I prescribe?			Pages
Key facts from federal 2008 Physical Activity Guidelines	Word	pdf	1
Practical Rx suggestions for sedentary and unfit patients (to implement 2008 Guidelines)	Word	pdf	1
Sample Rx - Basic & graduated	Word	pdf	1
How do I explain the Rx - and why does that matter?			**Pages**
One-minute rationale for prescribing Rx for walking	Excel	pdf	1
Step-by-step guide for explaining Rx & pedometer	Excel	pdf	1
Are some pedometers easier to use? More reliable?			**Pages**
Guidance on selecting pedometers	Word	pdf	1
How do I assess compliance and barriers?			**Pages**
Questionnaire at follow-up	Word	pdf	1

72

Teaching the teacher: Script for CDE when prescribing "Rx for Walking"

Key idea	Sample statements
[general benefit]	"Exercise is important for staying healthy."
[concrete example]	"Walking helps keep your heart strong; it can help you lose weight; it also helps to relieve stress."
[personalize]	"Exercise is especially important for you because you have diabetes."
[meaningful metaphor]	"For people with diabetes, exercise is as important as the medicines they take to control their blood sugar."
What	
[pull out Rx for walking] [sign & enter patient's name]	"I am giving you a prescription for something that helps many people to start walking more."
[basics of a pedometer]	"It's for a pedometer. It's a little thing that you clip onto your belt/pants/skirt, and it counts many steps you take."
[most crucial point in prescription] [point to the contents of the Rx]	"This prescription tells you how many extra steps I want you to take."
[next most important point]	"The idea is to gradually increase how much walking you do each week, and how fast you do it."
[specific end-goal]	"That way you can work up to getting the amount of exercise you need to control your diabetes, and have more energy for the things you like to do."
[activate mindset that good health requires active self-care]	"The pedometer is a tool to help you do that in a way that works for you."
Where	
[Tell patient where to take the prescription to get the pedometer.]	
[preview of session—reassurance that all will be explained]	"The [nurse, physician assistant/etc.] will give you the pedometer and show you how to use it."
[reinforce active self-care mindset]	"[he will also help you think about different ways you might enjoy taking the extra steps I have prescribed for you."

NOTE: Record "prescribed pedometer" in the patient's chart

Provides the CDE with:

Educationally sound curriculum
- Key ideas
- Content, sequence, and pace of instruction, etc.

Implicit training
- Be concrete, personalize, use meaningful metaphors, etc.

73

Key idea	Sample statements
Why	
[general benefit]	"Exercise is important for staying healthy."
[concrete example]	"Walking helps keep your heart strong; it can help you lose weight; it also helps to relieve stress."
[personalize]	"Exercise is especially important for you because you have diabetes."
[meaningful metaphor]	"For people with diabetes, exercise is as important as the medicines they take to control their blood sugar."

74

Key idea	Sample statements
What	
[pull out Rx for walking] [sign & enter patient's name]	"I am giving you a prescription for something that helps many people to start walking more."
[basics of a pedometer]	"It's for a pedometer. It's a little thing that you clip onto your belt/pants/skirt, and it counts many steps you take."
[most crucial point in prescription] [point to the contents of the Rx]	"This prescription tells you how many extra steps I want you to take."
[next most important point]	"The idea is to gradually increase how much walking you do each week, and how fast you do it."
[specify end-goal]	"That way you can work up to getting the amount of exercise you need to control your diabetes, and have more energy for the things you like to do."
[activate mindset that good health requires active self-care]	"The pedometer is a tool to help you do that in a way that works for you."

NOTE: Record "prescribed pedometer" in the patient's chart

75

Key idea	Sample statements
Where	
[Tell patient where to take the prescription to get the pedometer.]	
[preview of session—reassurance that all will be explained]	"The [nurse, physician assistant/etc.] will give you the pedometer and show you how to use it."
[reinforce active self-care mindset]	"S/he will also help you think about different ways you might enjoy taking the extra steps I have prescribed for you."

76

Curriculum design: Don't assume they know what's obvious to you

Can't assume:

That patient will know:
- What a pedometer is
- How to wear it
- The exact regimen of the Rx
  - i.e., extra steps

That the educator will know ***specific*** learning steps for:
- Aim of script (e.g., extra steps)
- How to adjust regimen

77

Walking with Your Pedometer
Questions?

1. What should I wear?
- Comfortable shoes
- A watch
- Protection from weather (hat)

2. Where do I put the pedometer?
- On your hip
- Fasten securely to a belt or waistband

3. How do I use the pedometer?
- Set your walking goal – consult your prescription
  - How many steps?
  - In how many minutes?
- Reset pedometer to "0" by pressing the button *(on some models you need to press it for 2 seconds)*
- Calculate your "finish time"
  - Example: Your watch says it's now 2:00. You plan to walk 15 minutes, so your finish time will be 2:15.
- When you finish your walk, look at pedometer to see how many steps you walked
- Write down the number of steps and minutes you walked

Date: _____

4. What if the weather's bad?
- Consider walking indoors
  - In a mall
  - At a gym or YMCA

5. What if I'm sick?
- Wait until you are well again
- Start back gradually

6. What if I feel worse when walking?
- Stop walking when you feel
  - Pain
  - Very out of breath
  - Dizzy, faint, nauseous

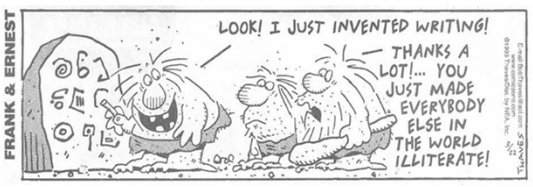
7. How do I know the walking is helping me?
- It gets easier
- You can walk more steps
- You can walk more minutes
- You have more energy

8. How can I make it a habit?
- Walk at same time every day
- Spot your barriers to walking
- Add fun or friends to walks!

Name _____

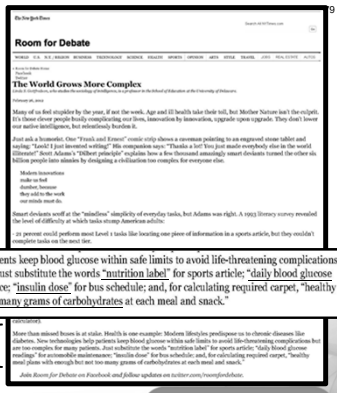
78

Smart people are busy making life more complex



79

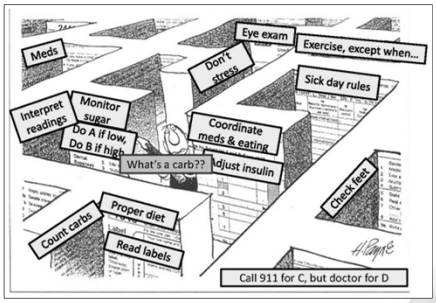
New York Times
February 26, 2012


Room for Debate

The World Grows More Complex

New technologies help patients keep blood glucose within safe limits to avoid life-threatening complications but are too complex for many patients. Just substitute the words "nutrition label" for sports article; "daily blood glucose readings" for automobile maintenance; "insulin dose" for bus schedule; and, for calculating required carpet, "healthy meal plans with enough but not too many grams of carbohydrates at each meal and snack."

80



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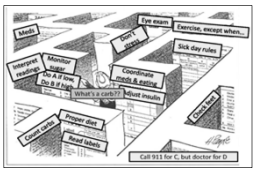

CDEs can simplify the maze….

- Recognize that "To be or not to be" is not easy to *do.*
- Know educational requirements in evolving healthcare.
- Assess and know implications of patient's literacy level.
- Recognize cognitive complexity of patient's DSM tasks (cf. Bloom's)
- Minimize the cognitive complexity of educational materials & programs.

82

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SCHOOL OF EDUCATION