DSME/S for Older Adults with Cognitive Decline

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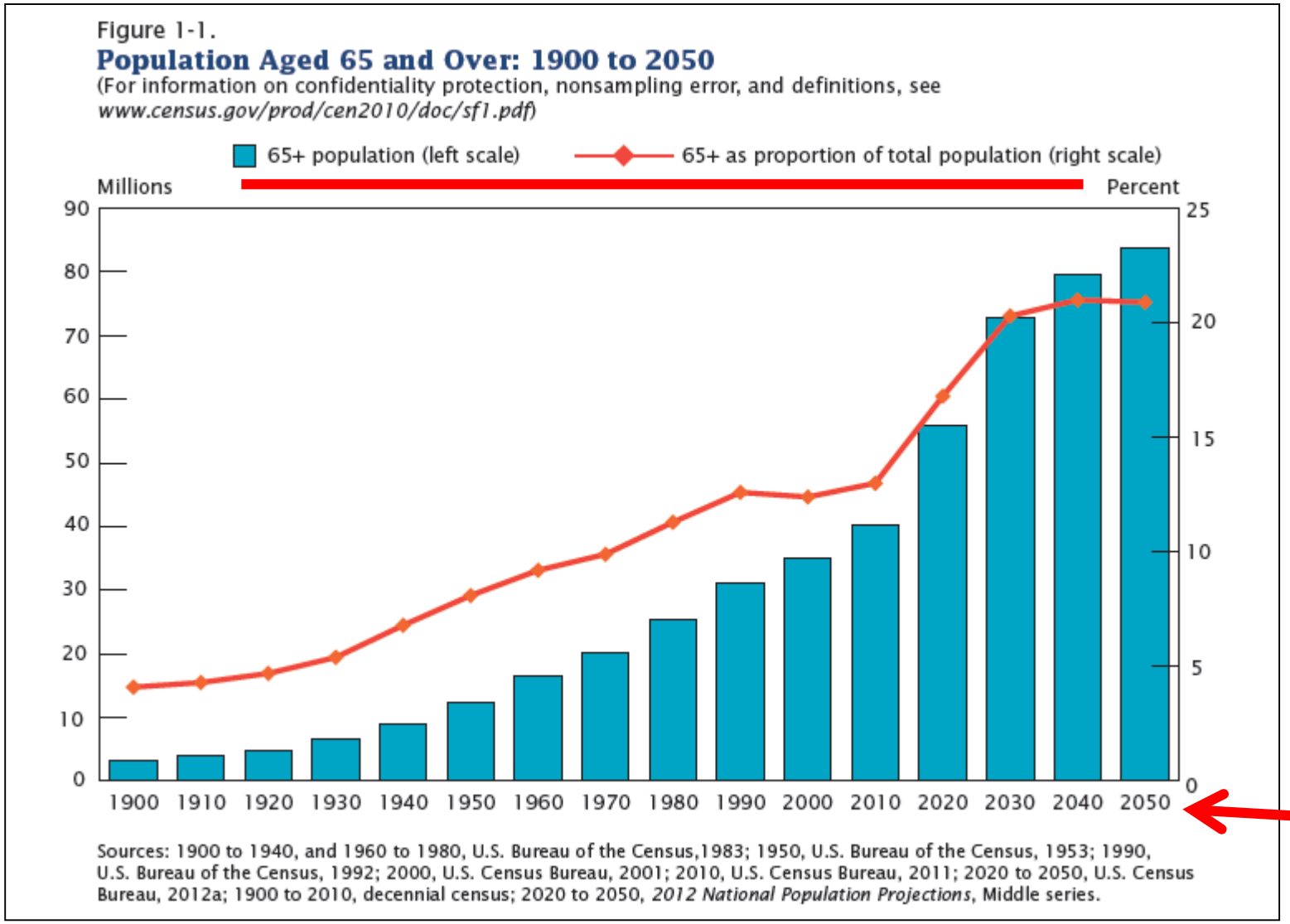
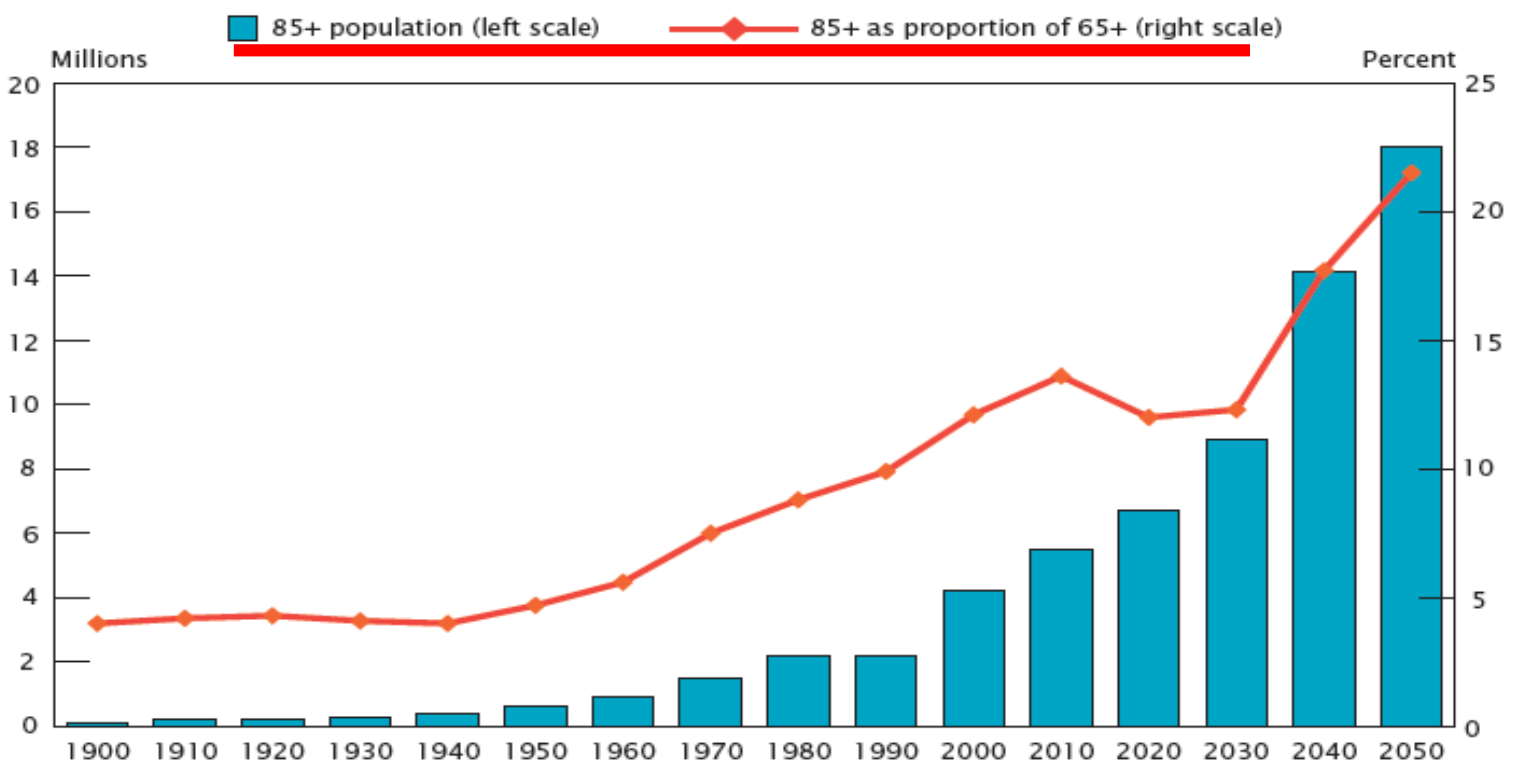
The U.S. population is getting older…..



……..and older

Figure 1-3.
Population Aged 85 and Over: 1900 to 2050
(For information on confidentiality protection, nonsampling error, and definitions, see *www.census.gov/prod/cen2010/doc/sf1.pdf*)



Sources: 1900 to 1940, and 1960 to 1980, U.S. Bureau of the Census, 1983; 1950, U.S. Bureau of the Census, 1953; 1990, U.S. Bureau of the Census, 1992; 2000, U.S. Census Bureau, 2001; 2010, U.S. Census Bureau, 2011; 2020 to 2050, U.S. Census Bureau, 2012a; 1900 to 2010, decennial census; 2020 to 2050, *2012 National Population Projections*, Middle series.

Older adults are more likely to have diabetes

2 out of 5 adults with diabetes are =>65 years of age

Diagnosed and undiagnosed diabetes among people aged 20 years or older, United States, 2012

	Number with diabetes (millions)	Percentage with diabetes (unadjusted)
Total		
20 years or older	28.9	12.3
By age		
20–44	4.3	4.1
45–64	13.4	16.2
65 years or older	11.2	25.9
By sex		
Men	15.5	13.6
Women	13.4	11.2

Source: 2009–2012 National Health and Nutrition Examination Survey estimates applied to 2012 U.S. Census data.

1 out of 4
people over the age of 65 has diabetes.[1]

Newly diagnosed cases of DM in persons =>65 years of age

New Cases of Diagnosed Diabetes

New cases of diagnosed diabetes among people aged 20 years or older, United States, 2012

	Number of new diabetes cases	Rate of new diabetes cases per 1,000 (unadjusted)
Total		
20 years or older	1.7 million	7.8
By age		
20–44	371,000	3.6
45–64	892,000	12.0
65 years or older	400,000	11.5

Source: 2010–2012 National Health Interview Survey, 2009–2012 National Health and Nutrition Examination Survey, and 2012 U.S. Census data.

¼ of newly diagnosed

Forecast for 2025:
50% increase in diabetes prevalence and costs among seniors

Pre-Diabetes and Diabetes Trends[1] among Seniors in the United States

U.S. Seniors Diabetes Data and Forecasts	2010	2025
Population	40,229,000	63,907,000
Pre-diabetes	20,115,000	31,954,000
Diagnosed diabetes	7,901,000	12,551,300
Undiagnosed diabetes	2,920,600	4,639,700
Total with diabetes (diagnosed and undiagnosed)	10,821,600	17,191,000
Total with pre-diabetes or undiagnosed diabetes	23,035,600	36,593,700
Complications:		
Visual impairment	1,607,800	2,435,000
Renal failure	20,250	26,700
Leg amputations	27,180	31,400
Annual deaths attributable to diabetes	109,520	135,900
Total annual cost (2010 dollars)	$105.7 B	$168.0 B
Annual medical costs	$74.3 B	$118.1 B
Annual nonmedical costs	$31.4 B	$49.9 B

www.altfutures.org

HOW
DIABETES
AFFECTS OLDER ADULTS

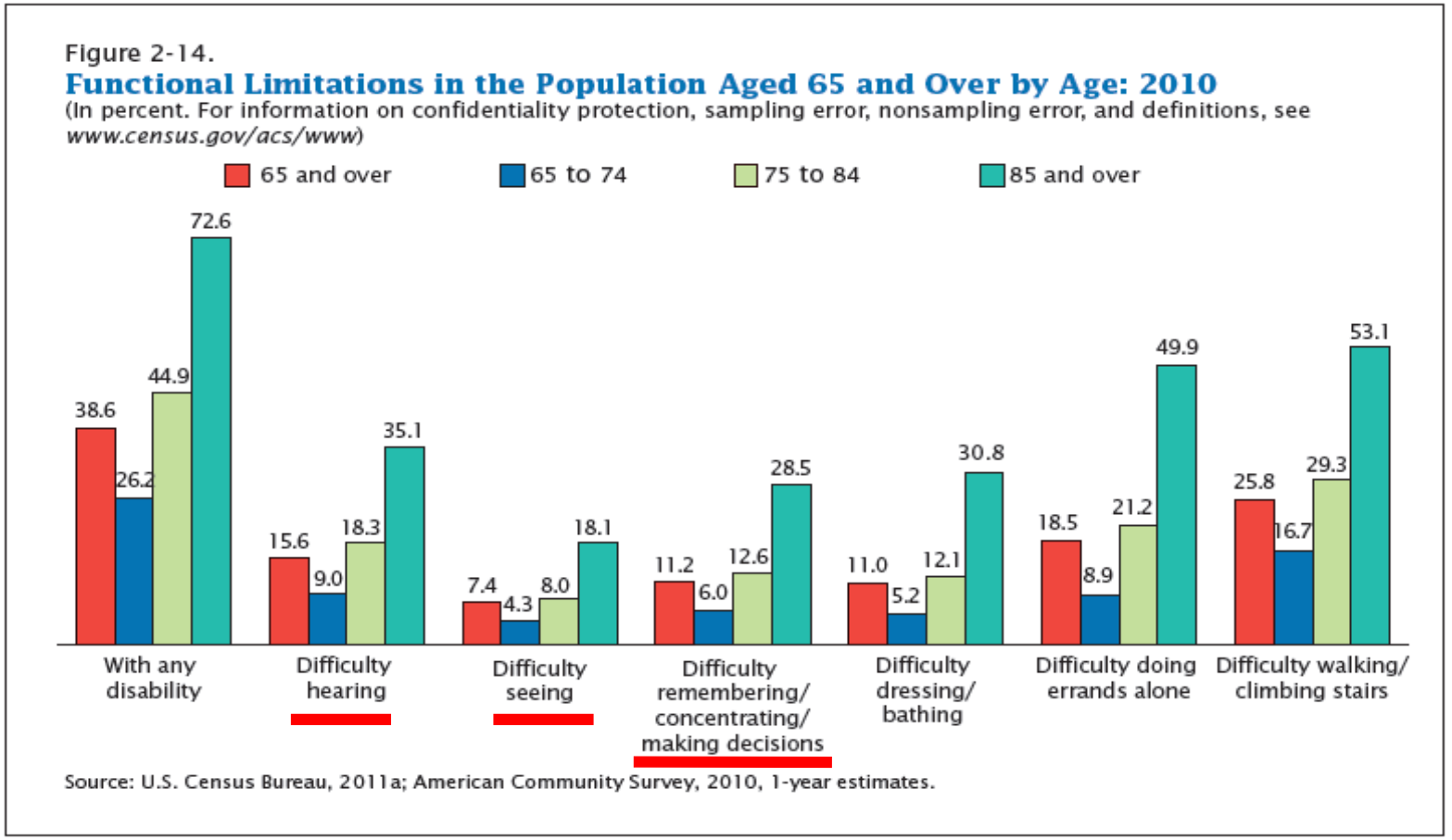
Older adults with diabetes:

Are **2 times** more likely to develop dementia than older adults without diabetes[2]

1 in 5 has vision problems[2]

2. Kirkman MS, Briscoe VJ, Clark N, et al. Diabetes in older adults. Diabetes Care. 2012;35(12):2650-64.

Persons aged 65-85+ with functional impairments (self-reported)



Types of Age-related Cognitive Impairment

Cognitive impairment is a continuum of changes:

normal

mild

major

Spectrum of Cognitive Changes

Asymptomatic

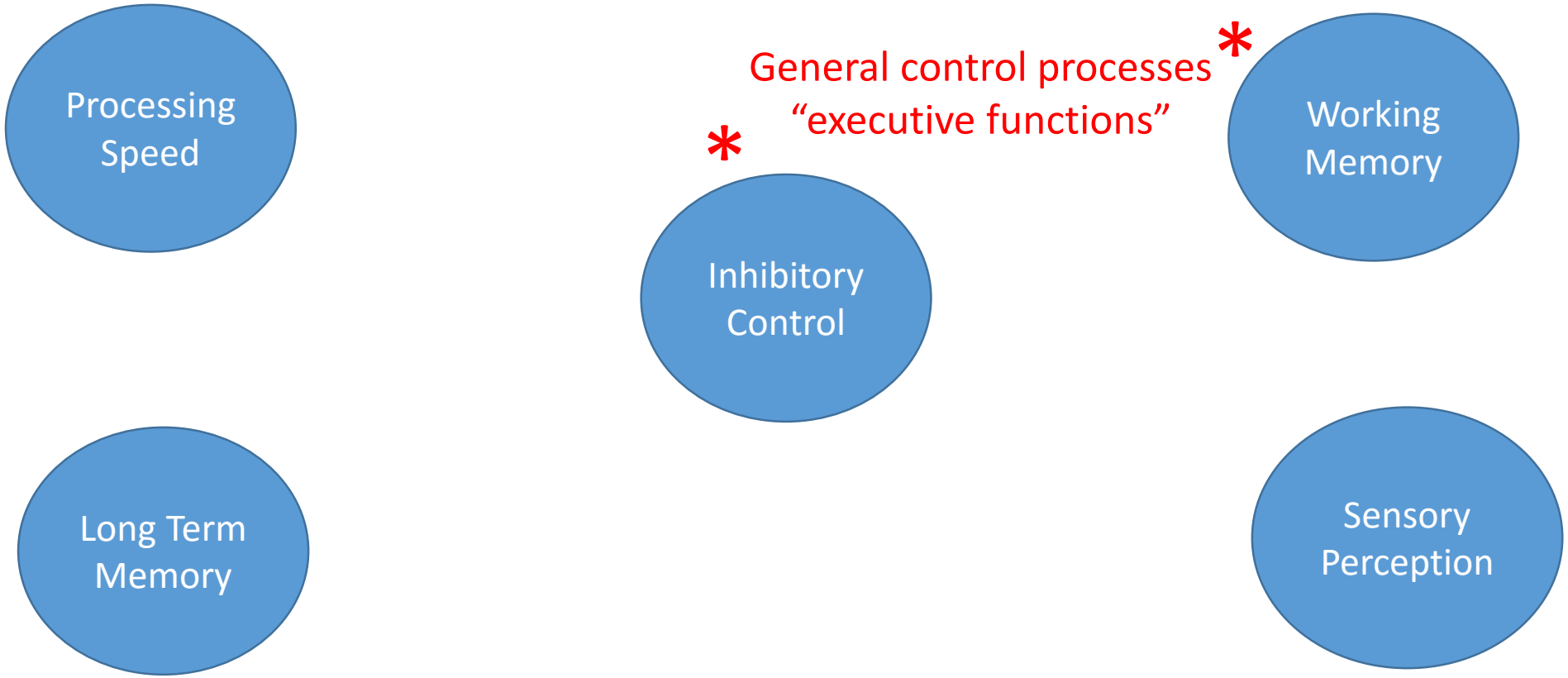
Normal Cognitive Aging

Subjective Cognitive Aging

Mild Neurocognitive Disorder

Major Neurocognitive Disorder

Cognitive Functions that are Vulnerable to the Effects of Aging



Mild Neurocognitive Disorder

- Significant, but less severe cognitive deficit
- Need to develop compensatory behaviors that limit the impact of cognitive decline
- May need more accommodation to maintain day-to-day function
- Interference with daily activities may not be noticeable but higher-level cognition is likely affected

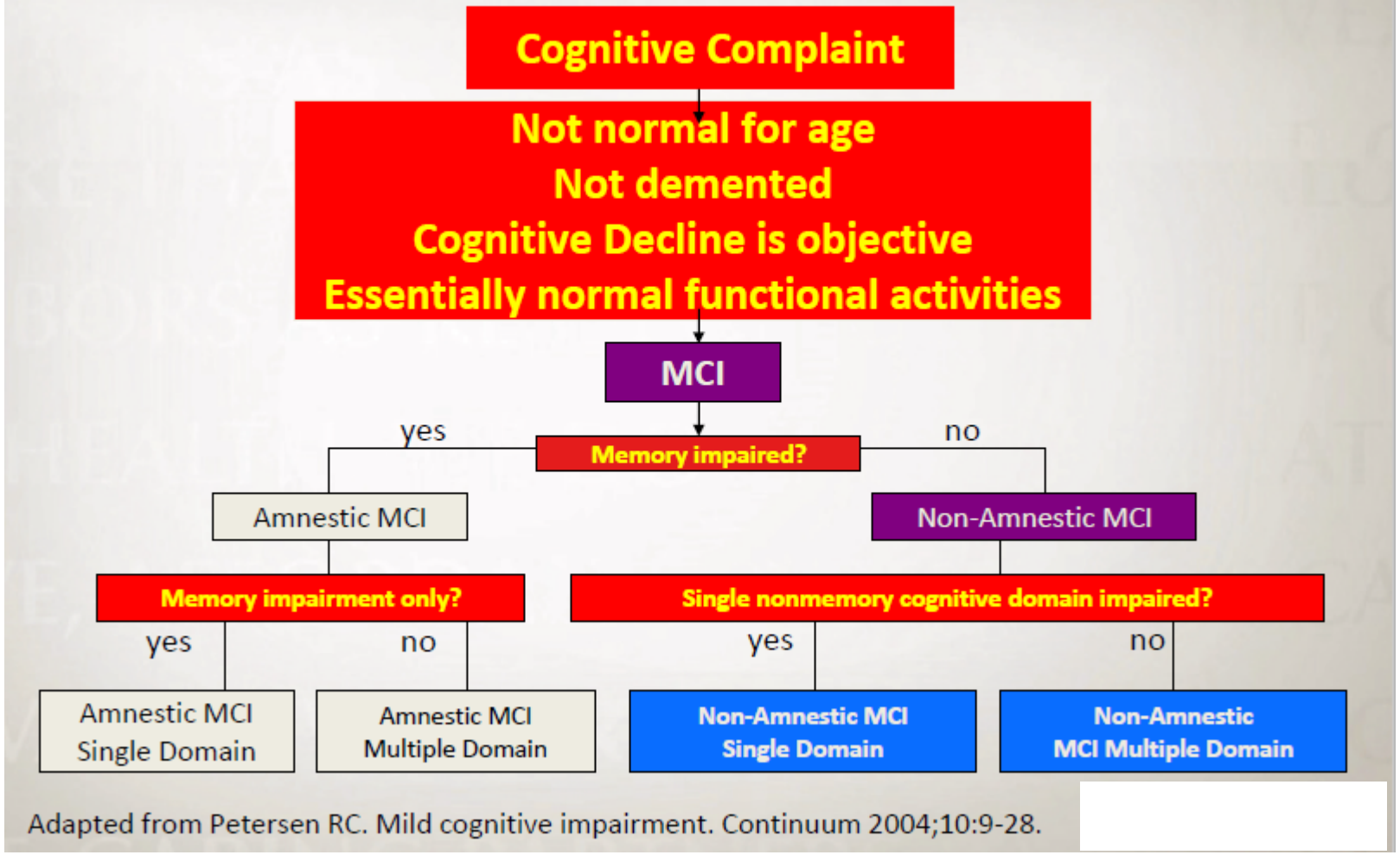
Adapted from the American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders: **DSM-5**. Washington, D.C: American Psychiatric Association.

Major Neurocognitive Disorder (aka Dementia)

- A significant cognitive decline from a previous level of performance in one or more cognitive domains
- The cognitive deficits interfere with independence of everyday activities (i.e. iADLs)
- This is not delirium or another mental disorder

Adapted from the American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders: **DSM-5**. Washington, D.C: American Psychiatric Association.

MCI: Definition and Subtypes



Adapted from Petersen RC. Mild cognitive impairment. Continuum 2004;10:9-28.

Example of Mild Cognitive Complaints

- A 64 yo overworked accountant is behind in his work and overwhelmed. He worries that his memory is failing and that he can't keep up with his responsibilities.

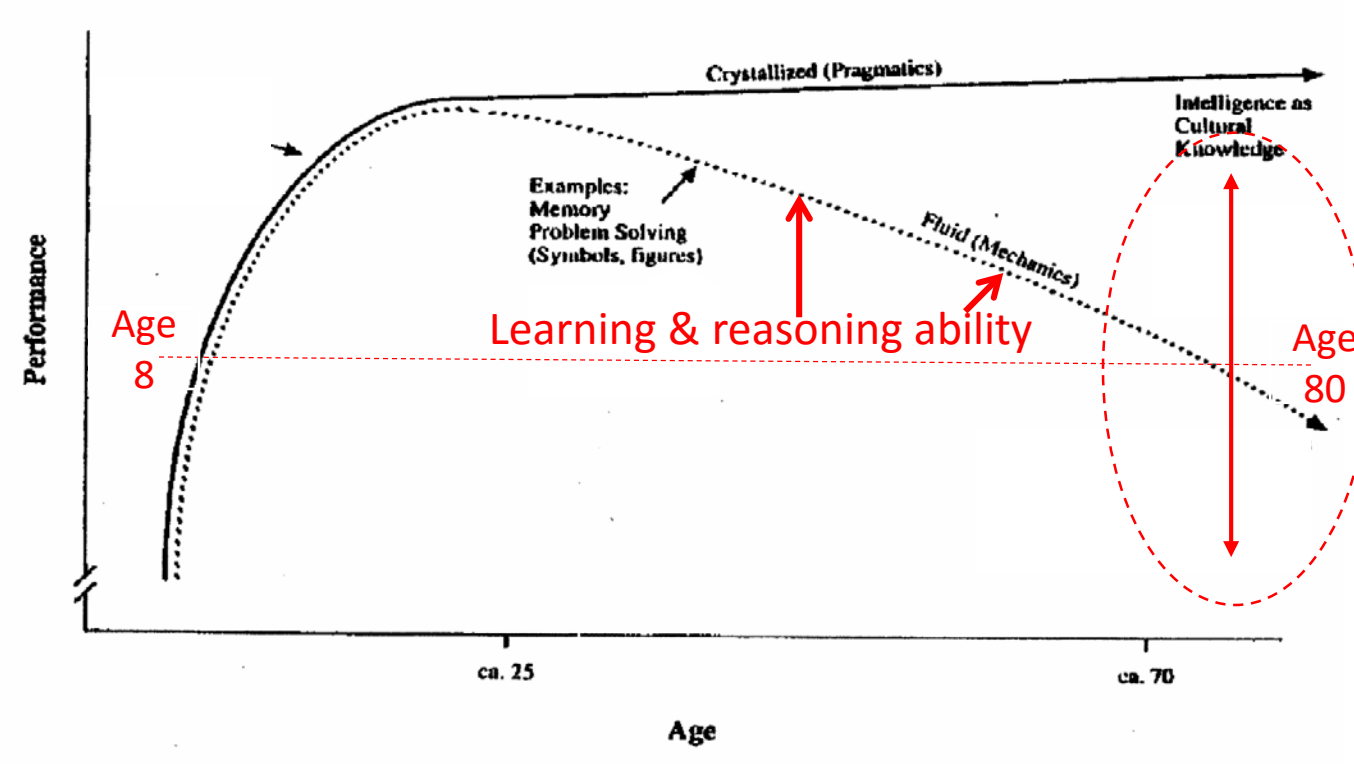
- He's using lists and GPS more and more. He came close to missing an important appointment, but was reminded of it, at the last minute.

- Assessment: normal MRI, but low scores in executive functioning and memory.

Example of Mild Cognitive Complaints

- A 68 yo attorney is forgetting appointments and relying more on her GPS.
- Her car, in neutral, rolled out of the driveway and hit a car.
- She paid a large bill twice and never recorded it in her checkbook.
- Assessment: apparent mild decline in memory storage and executive function

Normal age-related cognitive decline



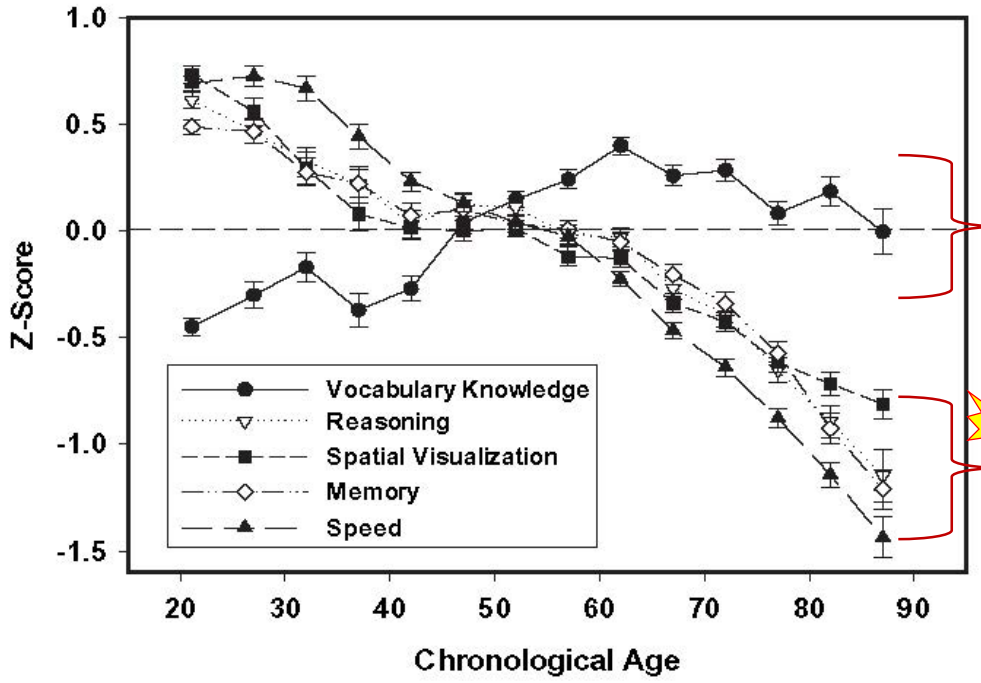
Basic cultural Knowledge (G_C)

g - Basic information processing (G_F)

Age-related cognitive decline

Normal age-related cognitive decline

A finer-grained look



"Crystallized" intelligence [past learning]

- Breadth/depth of general knowledge (e.g., language)
- Accrued over lifetime based on fluid intelligence, education, interests

"Fluid" intelligence [on-the-spot learning & reasoning]

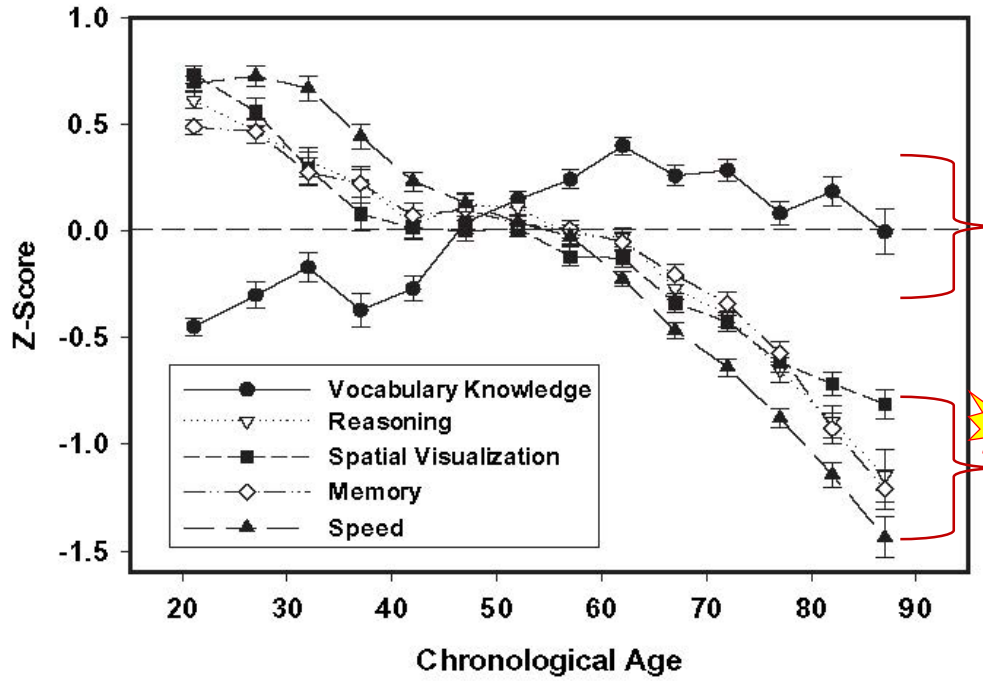
- Aptness in processing information (e.g., learning, reasoning, abstract thinking, problem solving)
- Includes executive function, working memory
- Reflects overall integrity of brain (speed, connectedness, etc.)

***This is the norm, but individuals vary a lot around the norm!**

Source: Figure 1 in Salthouse, T. A. (2009). Selective review of cognitive aging, *J of Int Neuropsych Soc, 16*, 754-760.

Normal age-related cognitive decline

A finer-grained look



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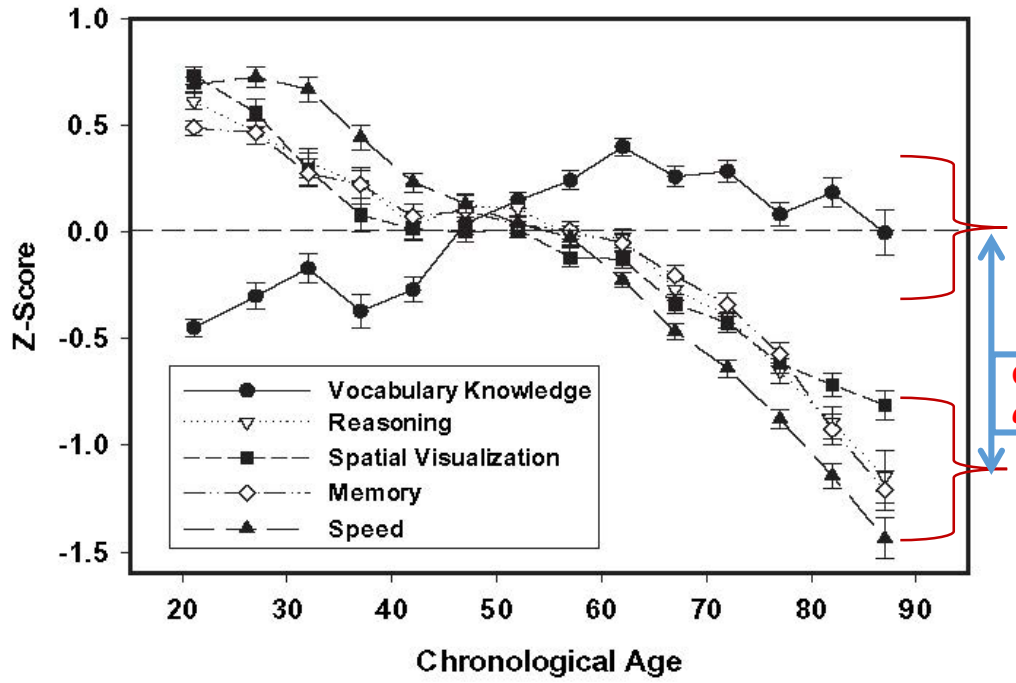
DSM tasks require "fluid intelligence"

Source: Figure 1 in Salthouse, T. A. (2009). Selective review of cognitive aging, *J of Int Neuropsych Soc, 16*, 754-760.

Normal age-related cognitive decline

A finer-grained look



"Crystallized" intelligence [past learning]

- Breadth/depth of general knowledge (e.g., language)
- Accrued over lifetime based on fluid intelligence, education, interests

Growing gap – *past learning* is faulty guide to *current* cognitive capacity

"Fluid" intelligence [current ability to learn & reason]

- Aptness in processing information (e.g., learning, reasoning, abstract thinking, problem solving)
- **Includes executive function, working memory**
- Reflects overall integrity of brain (speed, connectedness, etc.)

Source: Figure 1 in Salthouse, T. A. (2009). Selective review of cognitive aging, *J of Int Neuropsych Soc, 16*, 754-760.

Executive function—the brain's "command & control" system

It refers to mental processes that enable us to:

- plan
- focus attention
- remember instructions
- juggle multiple tasks successfully

These mental processes include:

- Working Memory (how much information the mind can hold & work on at the same time)
- Attention (keep focusing on what is relevant)
- Inhibition (suppress irrelevant & impulsive thoughts)

The brain uses these processes to:

- filter distractions
- prioritize tasks
- set and achieve goals
- control impulses

It is like:

- **an air traffic control system at a busy airport,** which safely manages the arrivals and departures of many aircraft on multiple runways

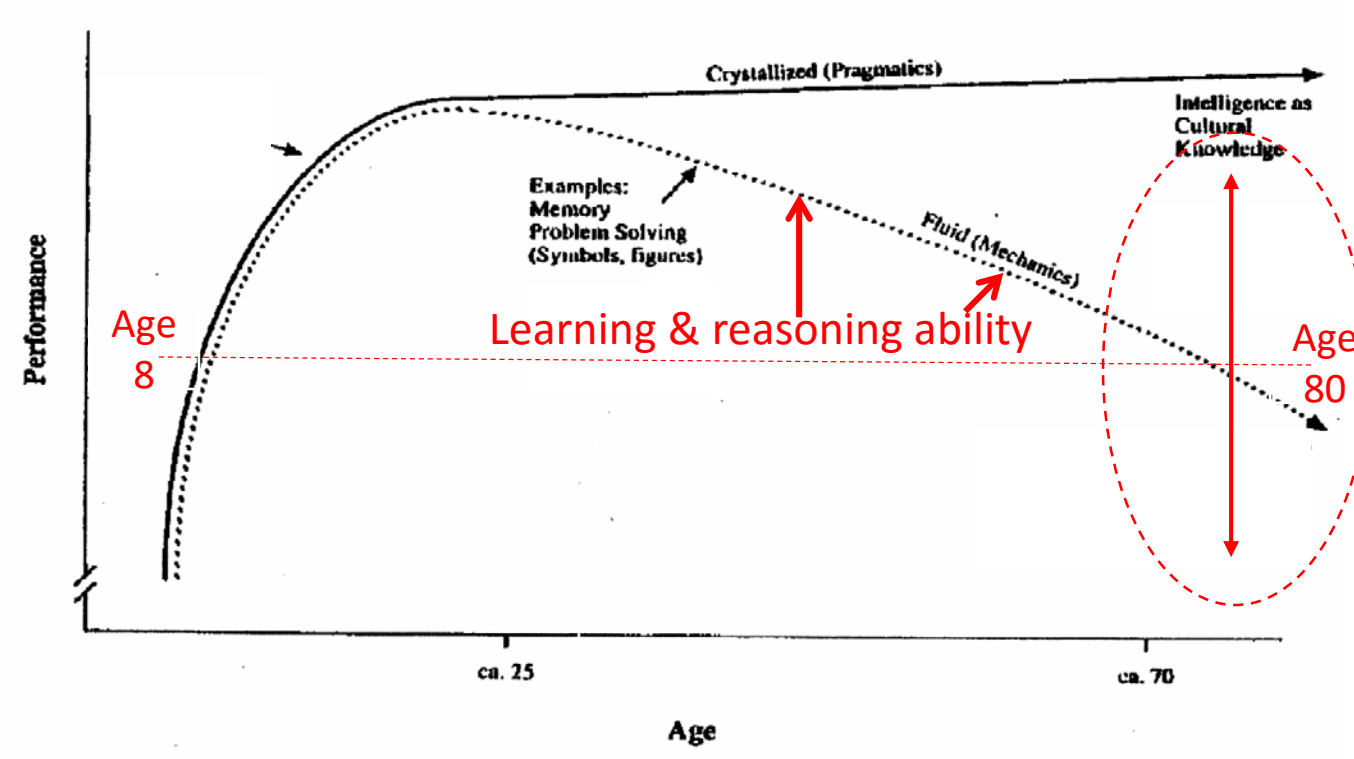
Example: Your patient is an elderly professor starting a new meter and/or insulin device

He may be highly literate and well-read *(crystallized intelligence)*, but that does not guarantee he grasped your instructions for how and when to use the new device *(fluid intelligence)*.

Age-related cognitive decline

Normal age-related cognitive decline

How important?
Cognitive ability ≈ ability to learn & reason well ≈ functional literacy Cognitive ability ⇒ better DSM Functional literacy ⇒ better adherence



Basic cultural Knowledge (G_C)

***g* - Basic information processing (G_F)**

Cognitive Impairment and Diabetes

Cognitive dysfunction in patients with diabetes mellitus was first noted in 1922.

Patients with diabetes, who were “free from acidosis but usually not sugar free,” were found to have impaired memory and attention when compared with controls.

Endocr Rev. 2008 Jun; 29(4): 494–511.
Cognitive Dysfunction and Diabetes Mellitus
Christopher T. Kodl and Elizabeth R. Seaquist

Recent evidence for cognitive changes in PWDs

ACCORD-MIND

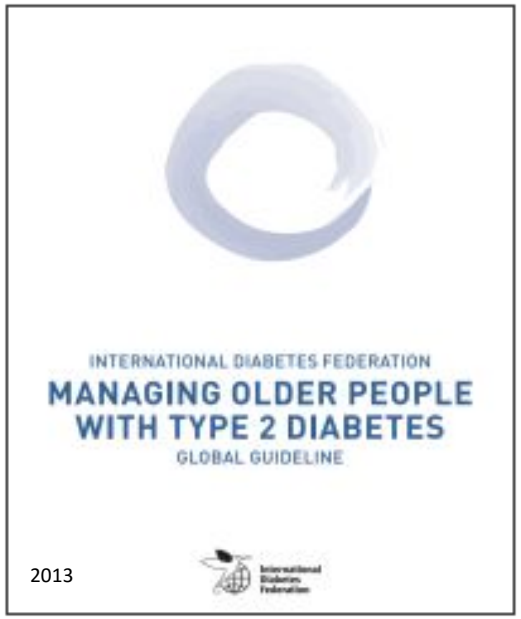
"..neither intensive glycemic control nor blood pressure control…was shown to prevent a decline in brain function"

Swedish National Diabetes Registry

In DM2 patients, an

A1c in excess of 10% substantially increased the rate of dementia.

No dementia risk at A1c < 6.7% but it increased substantially thereafter



- Consider factors that contribute to medicine related adverse events:
  - Polypharmacy.
  - Inappropriate prescribing.
  - Not recognizing medicines as a contributing cause of signs and symptoms which can lead to a 'prescribing cascade' and compound the risks.
  - Presence of renal and/or liver disease.
  - Prescribed high risk medicines such as insulin, certain sulfonylureas and warfarin.
  - Living alone.
  - Cognitive and functional impairment.
  - Sensory deficits such as vision, hearing, and medicines self-management behaviours in self-caring older people.

Emerging Issues in Diabetes

Evidence is emerging that diabetes is associated with additional comorbidities including:

- Cognitive impairment
- Incontinence
- Fracture risk
- Cancer risk and prognosis

The importance of both diabetes and these comorbidities will continue to increase as the population ages. Therapies that have proven to reduce microvascular and macrovascular complications will need to be assessed in light of the newly identified comorbidities.

SPECIAL ARTICLE

Diabetes in Older Adults: A Consensus Report

M. Sue Kirkman, MD,[a] Vanessa Jones Briscoe, PhD, NP, CDE,[b] Nathaniel Clark, MD, MS, RD,[c] Hermes Florez, MD, MPH, PhD,[d] Linda B. Haas, PHC, RN, CDE,[e] Jeffrey B. Halter, MD,[f] Elbert S. Huang, MD, MPH,[g] Mary T. Korytkowski, MD,[h] Medha N. Munshi, MD,[i] Peggy Soule Odegard, BS, PharmD, CDE,[j] Richard E. Pratley, MD,[k] and Carrie S. Swift, MS, RD, BC-ADM, CDE[l]

Journal of the American Geriatrics Society 2012

Cognitive Dysfunction

Alzheimer's-type and multi-infarct dementia are approximately twice as likely to occur in those with diabetes compared with age-matched nondiabetic control subjects.[59] The presentation of cognitive dysfunction can vary from subtle executive dysfunction to overt dementia and memory loss.

Such dysfunction makes it difficult for patients to perform complex self-care tasks such as glucose monitoring, changing insulin doses, or appropriately maintaining timing and content of diet. In older patients with cognitive dysfunction, regimens should be simplified, caregivers involved, and the occurrence of hypoglycemia carefully assessed.

Diabetes in Older Adults: A Consensus Report

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“Hypoglycemia is linked to cognitive dysfunction in a bidirectional fashion”

- cognitive impairment increases the subsequent risk of hypoglycemia
- and a history of severe hypoglycemia is linked to the incidence of dementia

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ADA Standards of Care 2016

NEUROCOGNITIVE FUNCTION

Older adults with diabetes are at higher risk of cognitive decline and institutionalization (4,5). The presentation of cognitive impairment ranges from subtle executive dysfunction to memory loss and overt dementia. Diabetes increases the incidence of all-cause dementia, Alzheimer disease, and vascular dementia when compared with rates in people with normal glucose tolerance (6). The

Diabetes Care 2016;39(Suppl. 1):S81–S85 | DOI: 10.2337/dc16-S013

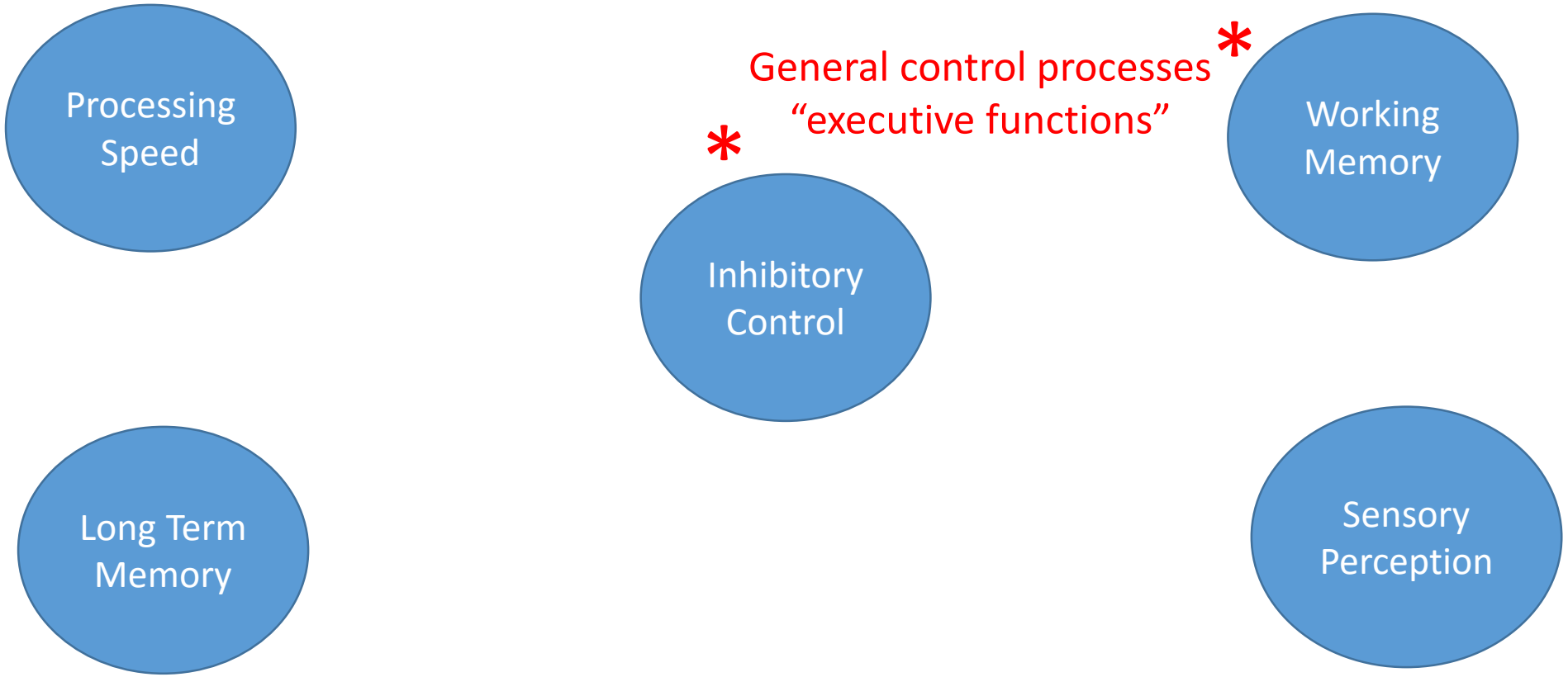
ADA Standards of Care 2016

The presence of cognitive impairment can make it challenging for clinicians to help their patients to reach individualized glycemic, blood pressure, and lipid targets. Cognitive dysfunction makes it difficult for patients to perform complex self-care tasks, such as glucose monitoring and adjusting insulin doses. It also hinders their ability to appropriately maintain the timing and content of diet. When clinicians are managing these types of patients, it is critical to simplify drug regimens and to involve caregivers in all aspects of care.

Diabetes Care 2016;39(Suppl. 1):S81–S85 | DOI: 10.2337/dc16-S013

RECALL

Cognitive Functions that are Vulnerable to the Effects of Aging



Executive function—the brain's "command & control" system

RECALL

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- plan
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These mental processes include:

- Working Memory (how much information the mind can hold & work on at the same time)
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The brain uses these processes to:

- filter distractions
- prioritize tasks
- set and achieve goals
- control impulses

It is like:

- **an air traffic control system at a busy airport,** which safely manages the arrivals and departures of many aircraft on multiple runways

Many studies have shown that,
in patients with **T1DM**, the following are affected:

Information processing

Attention

Visuoconstruction

Mental flexibility

Psychomotor efficiency

Cognitive impairment in diabetic patients: Can diabetic control prevent cognitive decline?
Takahiko Kawamura[1,2,*], Toshitaka Umemura[3] and Nigishi Hotta[1]
Journal of Diabetes Investigation
Volume 3, Issue 5, pages 413–423, October 2012

Neuropsychological studies consistently report
modest cognitive decrements in patients with **T2DM**,
even in people without dementia.

….This is reflected in worse performance on measures of :

Information processing speed

Attention

Executive functioning

Verbal memory

Exalto, L.G., et al. An Update on type 2 diabetes, vascular dementia and Alzheimer's Disease.
Experimental Gerontology 47(2012)858-864.

Questions about patients with diabetes and glucose intolerance:

- What causes the decline in cognitive function?
- What can be done to prevent future dementia in patients?
- What is the impact of glycemic control on cognitive function?
- Can good glucose control suppress cognitive impairment and prevent progression to dementia ?

Cognitive impairment in diabetic patients: Can diabetic control prevent cognitive decline?
Takahiko Kawamura[1,2,*], Toshitaka Umemura[3] and Nigishi Hotta[1]
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The pathophysiology underlying the development of cognitive dysfunction in patients with diabetes has not been completely elucidated.

Evidence supports possible causative roles for

- hyperglycemia
- vascular disease
- hypoglycemia
- insulin resistance
- amyloid deposition

….. the cause of cognitive dysfunction in patients with diabetes

may turn out to be a combination of these factors…..

Endocr Rev. 2008 Jun; 29(4): 494–511.
Cognitive Dysfunction and Diabetes Mellitus
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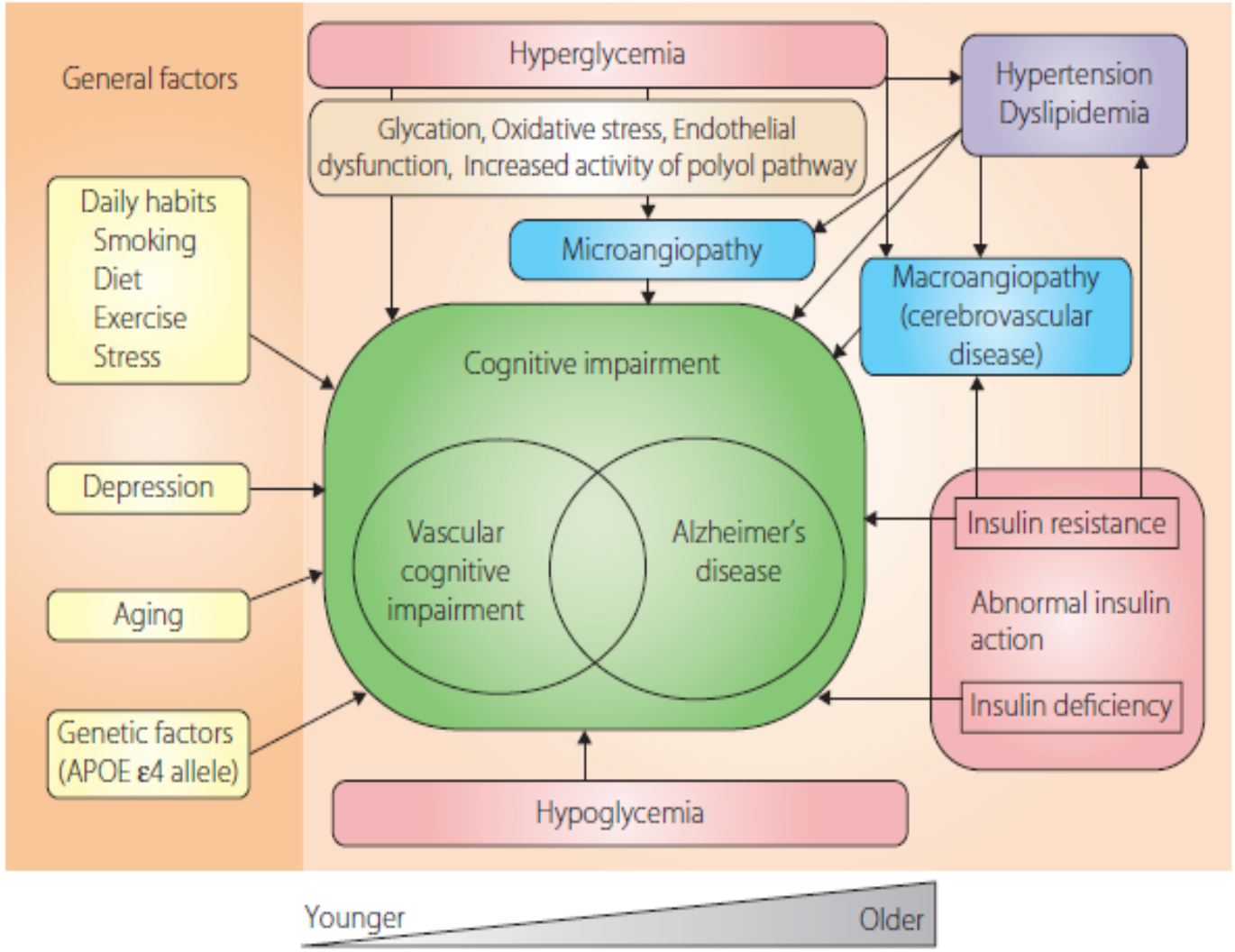

Figure 1 | Possible mechanistic contribution to cognitive impairment seen in diabetes mellitus. Hyperglycemia, hypoglycemia and abnormal insulin action have been implicated as major causes of cognitive impairment in diabetic patients, but many other factors, such as those shown in the figure, are also involved. APOE, apolipoprotein E.

Cognitive impairment in diabetic patients: Can diabetic control prevent cognitive decline?
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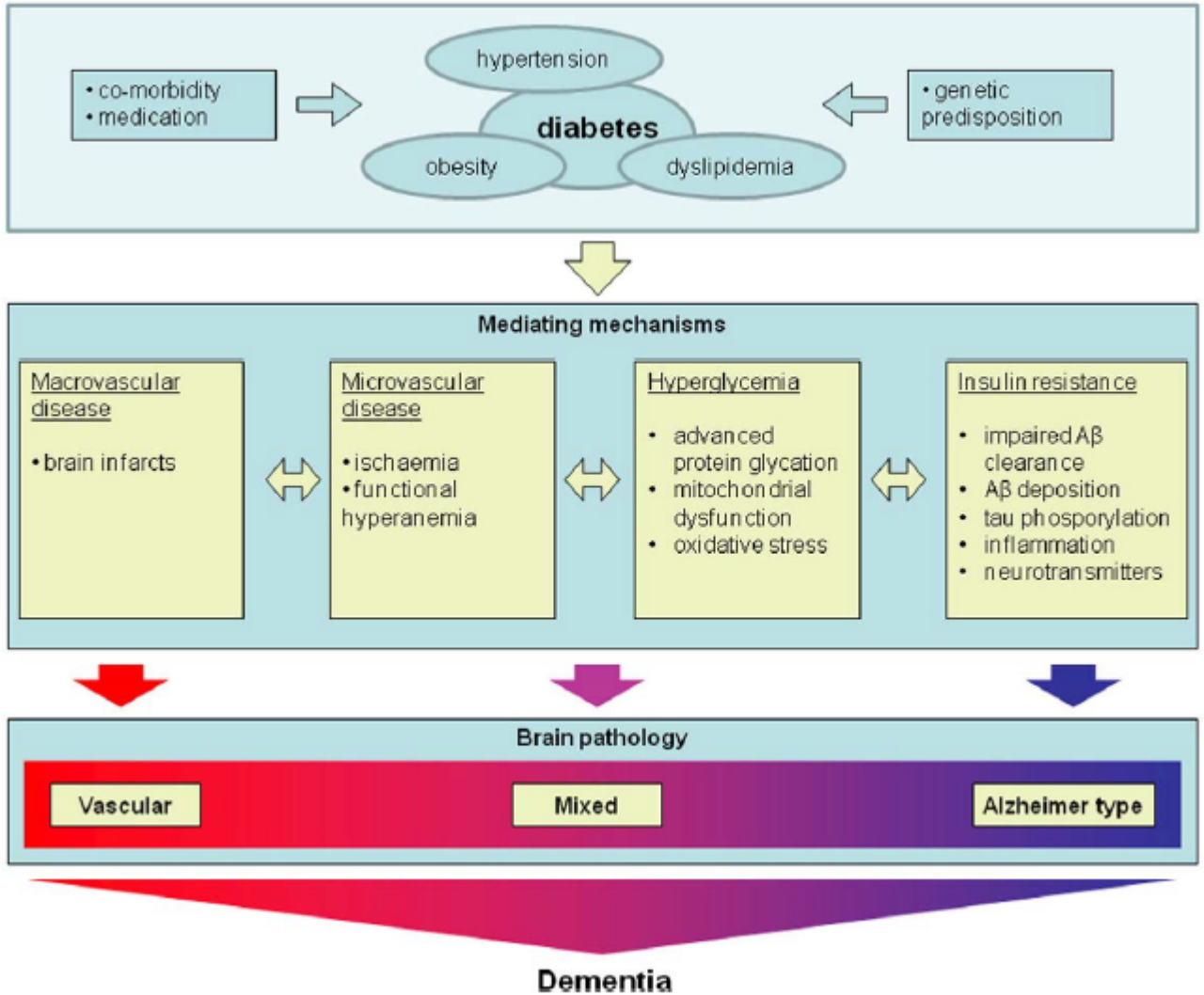
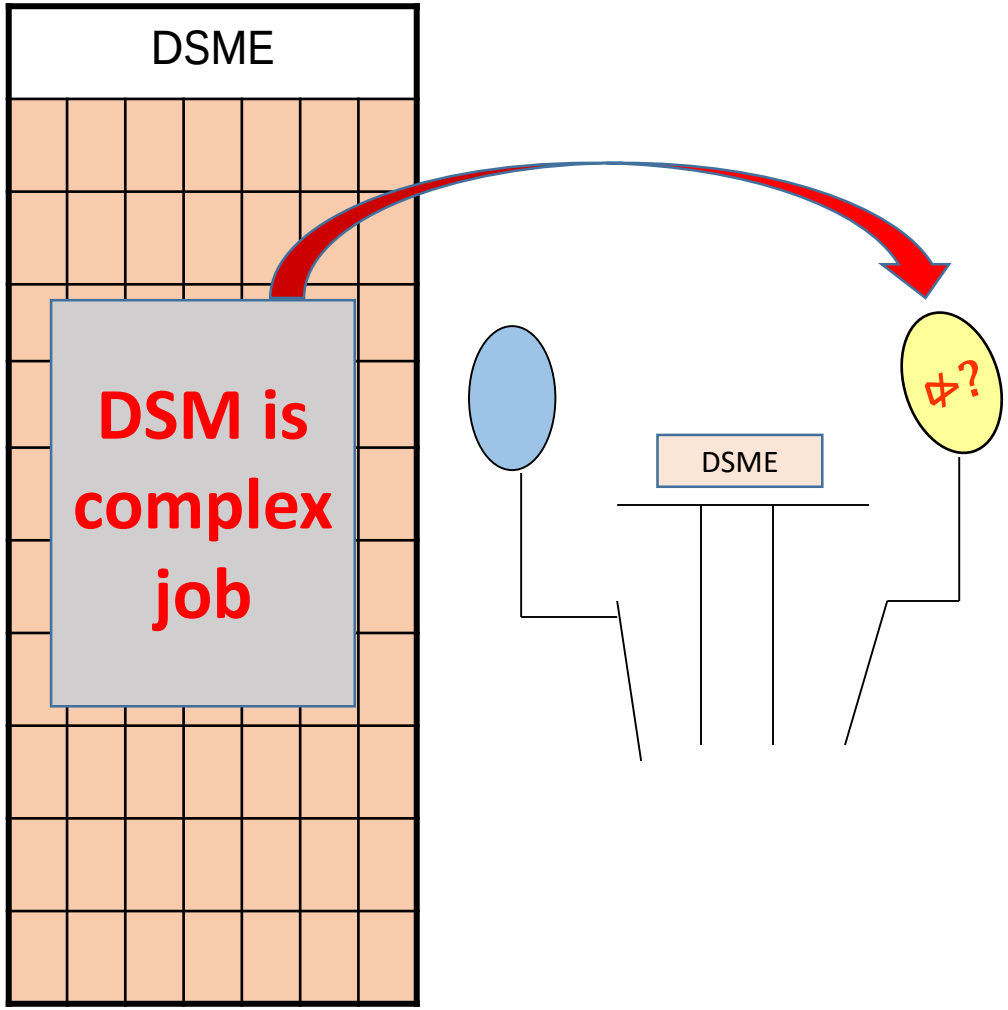

• co-morbidity
• medication
hypertension
diabetes
obesity
dyslipidemia
• genetic predisposition
Mediating mechanisms
Macrovascular disease
• brain infarcts
Microvascular disease
• ischaemia
• functional hyperanemia
Hyperglycemia
• advanced protein glycation
• mitochondrial dysfunction
• oxidative stress
Insulin resistance
• impaired Aβ clearance
• Aβ deposition
• tau phosporylation
• inflammation
• neurotransmitters
Brain pathology
Vascular
Mixed
Alzheimer type
Dementia

DSM is a cognitively demanding “job”

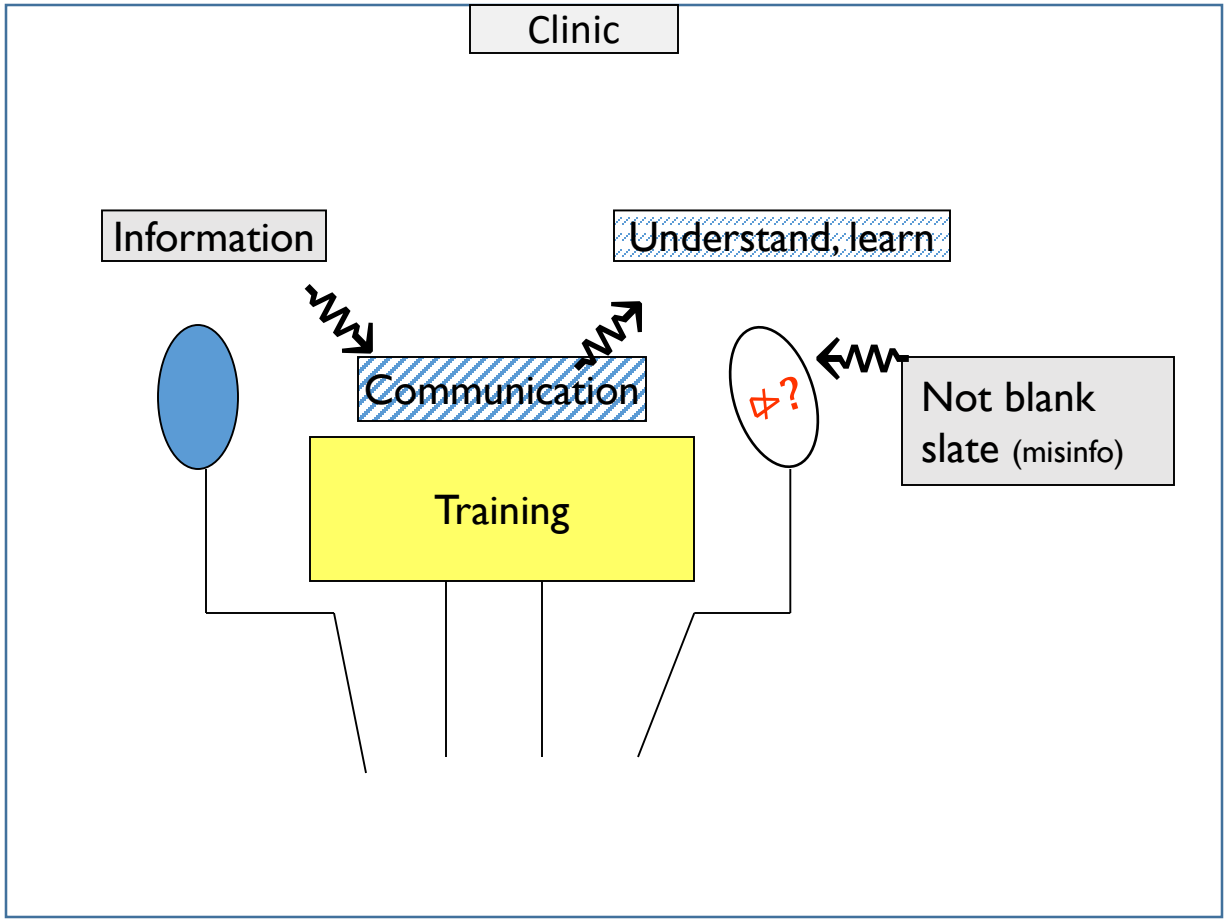
DSM from patient's perspective



Risk of cognitive overload!

Especially when cognitive resources are weak or declining

Get little training or supervision



Will need to apply DSME on their own

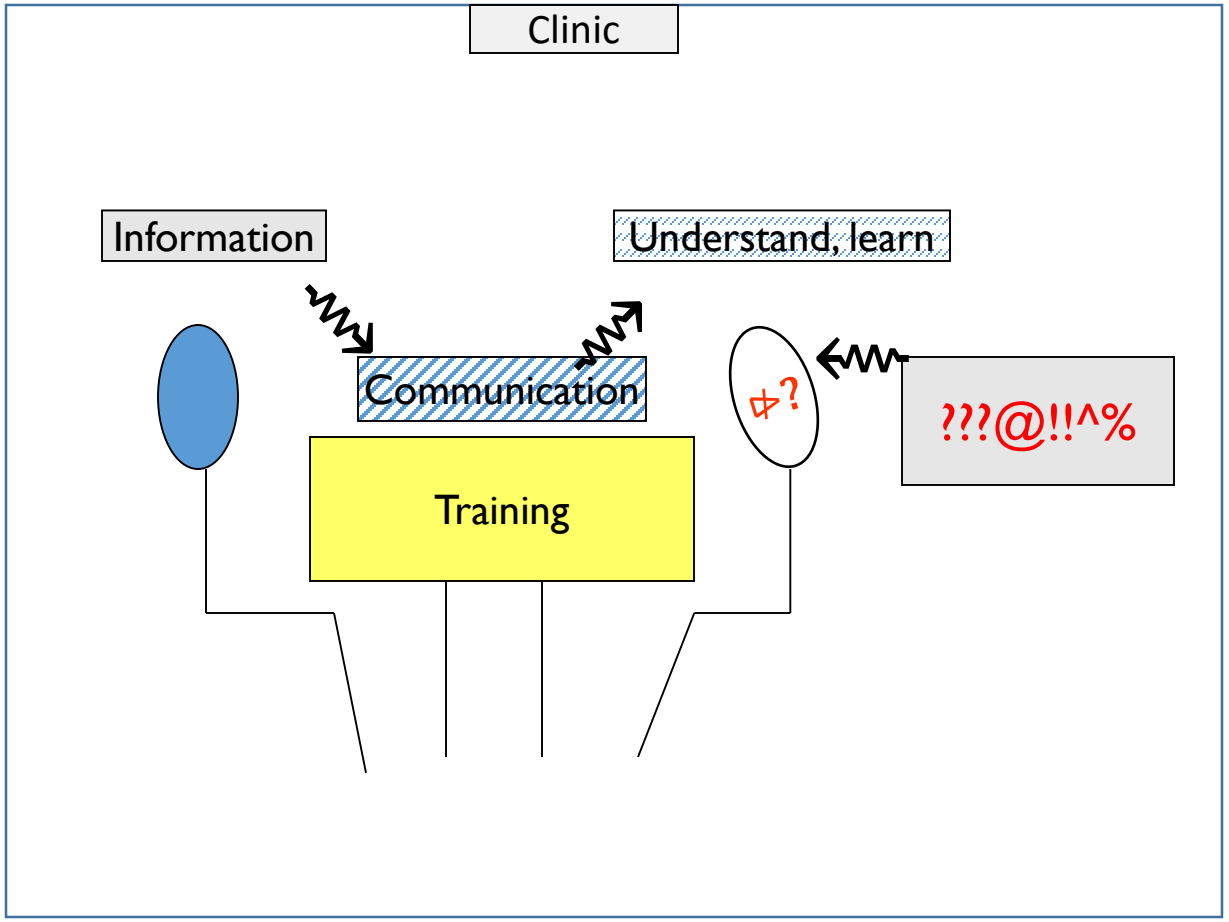
"Adhere" in daily life

- 24 hours/day
- 7 days/week

Where circumstances

- Changing
- Ambiguous
- Stressful
- Complicated

???@!!^%

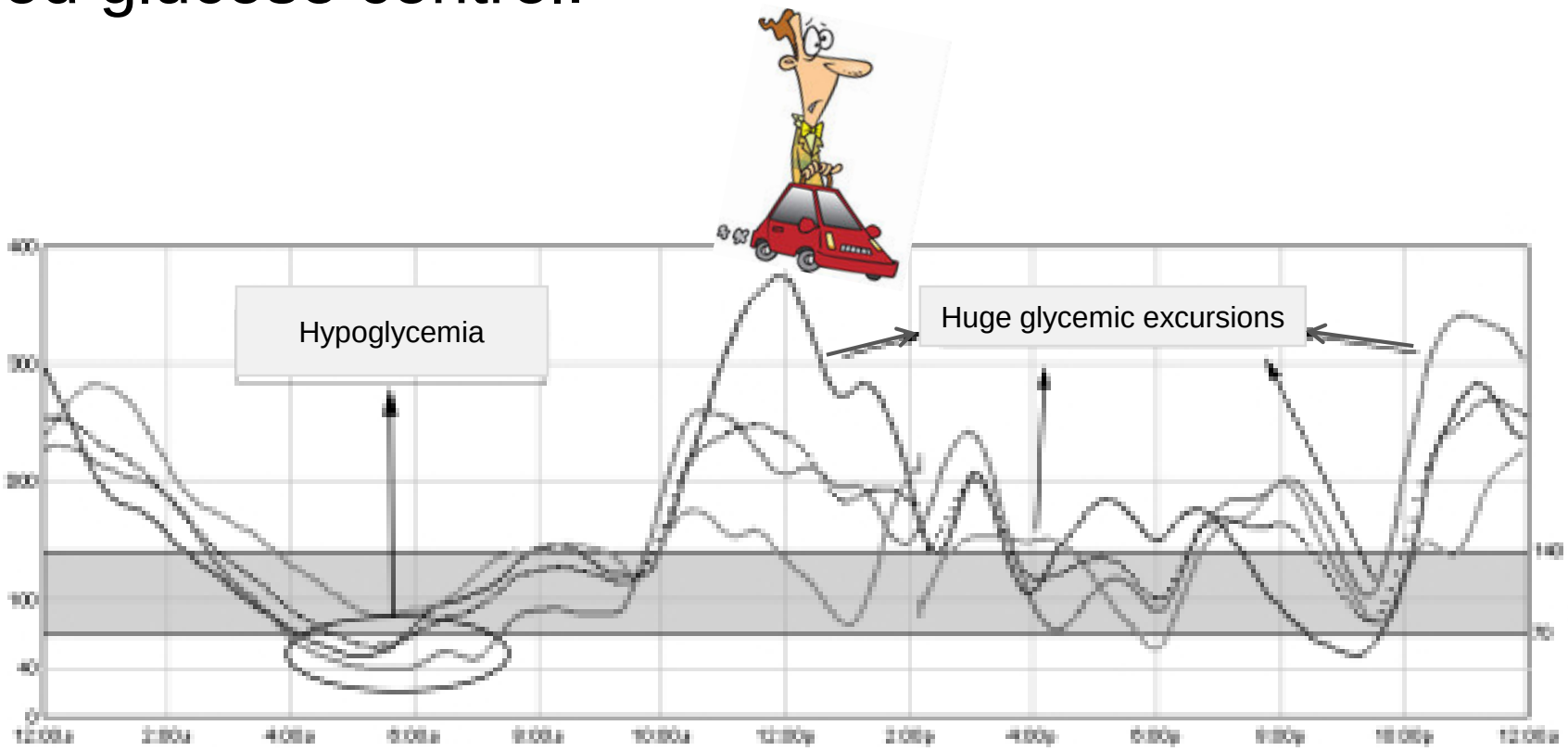


Patient Responsibilities for Effective DSM

Objective: Keep blood glucose within safe limits

- **Learn about diabetes in general (ongoing)**
  - Physiological process
  - Interdependence of diet, exercise, meds
  - Symptoms & corrective action
  - Consequences of poor control
- **Apply knowledge to own case (Daily, Hourly)**
  - 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)**
  - Negotiate changes in activities with family, friends, job
  - Enlist/capitalize on social support
  - Communicate status and needs to practitioners
- **Update knowledge & adjust regimen (Occasionally)**
  - 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**

PWDs must prevent glycemic excursions and maintain optimal blood glucose control.



- Preventing/minimizing excursions is *cognitive* process
- 24/7 job for patient

Successful DSM requires good cognitive abilities

- **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

What do the large national surveys of adult functional literacy reveal about:

- the cognitive demands of different DSM tasks
- older adults' ability to master them

Typical literacy items, by difficulty level

National Adult Literacy Survey (NALS), 1993

Community dwelling

NALS difficulty level	% US adults peaking at this level: Prose scale				Simulated everyday tasks
	Age				Daily self-maintenance in modern literate societies
	16-59	60-69	70-79	80+	
5	4	1	1	0	▪ Use calculator to determine cost of carpet for a room ▪ Use table of information to compare 2 credit cards
4	20	8	5	1	▪ Use eligibility pamphlet to calculate SSI benefits ▪ Explain difference between 2 types of employee benefits
3	35	27	19	6	▪ Calculate miles per gallon from mileage record chart ▪ Write brief letter explaining error on credit card bill
2	25	33	22	27	▪ Determine difference in price between 2 show tickets ▪ Locate intersection on street map
1	16	30	42	66	▪ Total bank deposit entry ▪ Locate expiration date on driver's license

Includes normal cognitive decline

Typical literacy items, by difficulty level

National Adult Literacy Survey (NALS), 1993

NALS difficulty level	% US adults peaking at this level: Prose scale				Simulated everyday tasks
	Age				Daily self-maintenance in modern literate societies
	16-59	60-69	70-79	80+	
5	4	1	1	0	▪ Use calculator to determine cost of carpet for a room ▪ Use table of information to compare 2 credit cards
4	20	8	5	1	▪ Use eligibility pamphlet to calculate SSI benefits ▪ Explain difference between 2 types of employee benefits
3	35	27	19	6	▪ Calculate miles per gallon from mileage record chart ▪ Write brief letter explaining error on credit card bill
2	25	33	22	27	▪ Determine difference in price between 2 show tickets ▪ Locate intersection on street map
1	16	30	42	66	▪ [illegible] ▪ Locate expiration date on driver's license

NOT reliable informants!

Typical literacy items, by difficulty level

National Adult Literacy Survey (NALS), 1993

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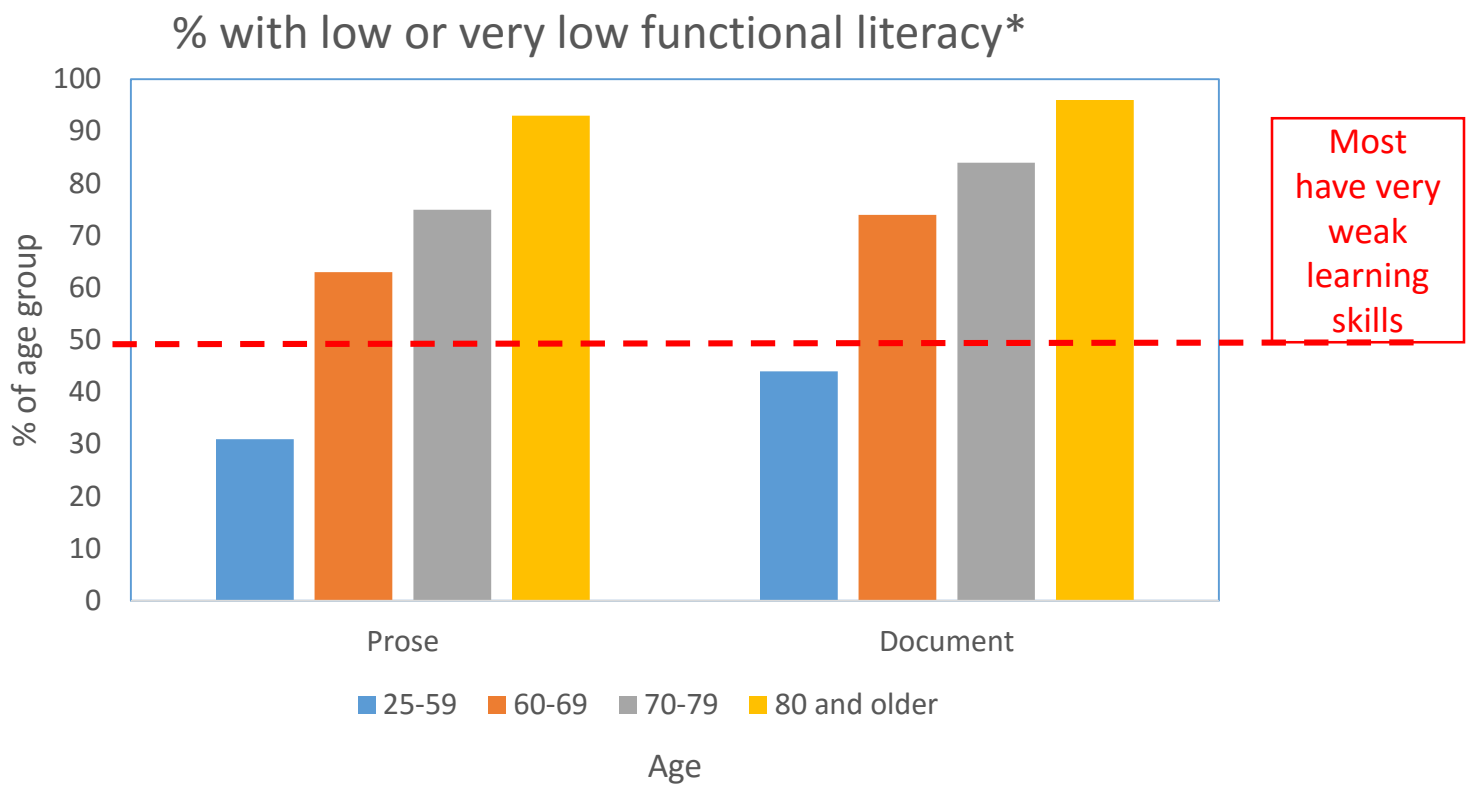
1	16	30	42	66	▪ Total bank deposit entry ▪ Locate expiration date on driver's license

a b i l i t y

The "simple" becomes harder or impossible to do

To summarize:

Most older adults have very weak learning skills.
Their brain's "command & control" centers not working well
So they need lots of cognitive help



*Level 1 or 2 on NCES adult literacy survey's 5-level scale Source: Tables 1.2 and 1.3 of *Literacy of Older Adults in America*, 1996, http://nces.ed.gov/pubs97/97576.pdf (accessed 8/1/14)

Challenges of DSM

Diabetes self-management is inherently complex

↓

Relentless, evolving cognitive demands

↓

Frequent cognitive overload

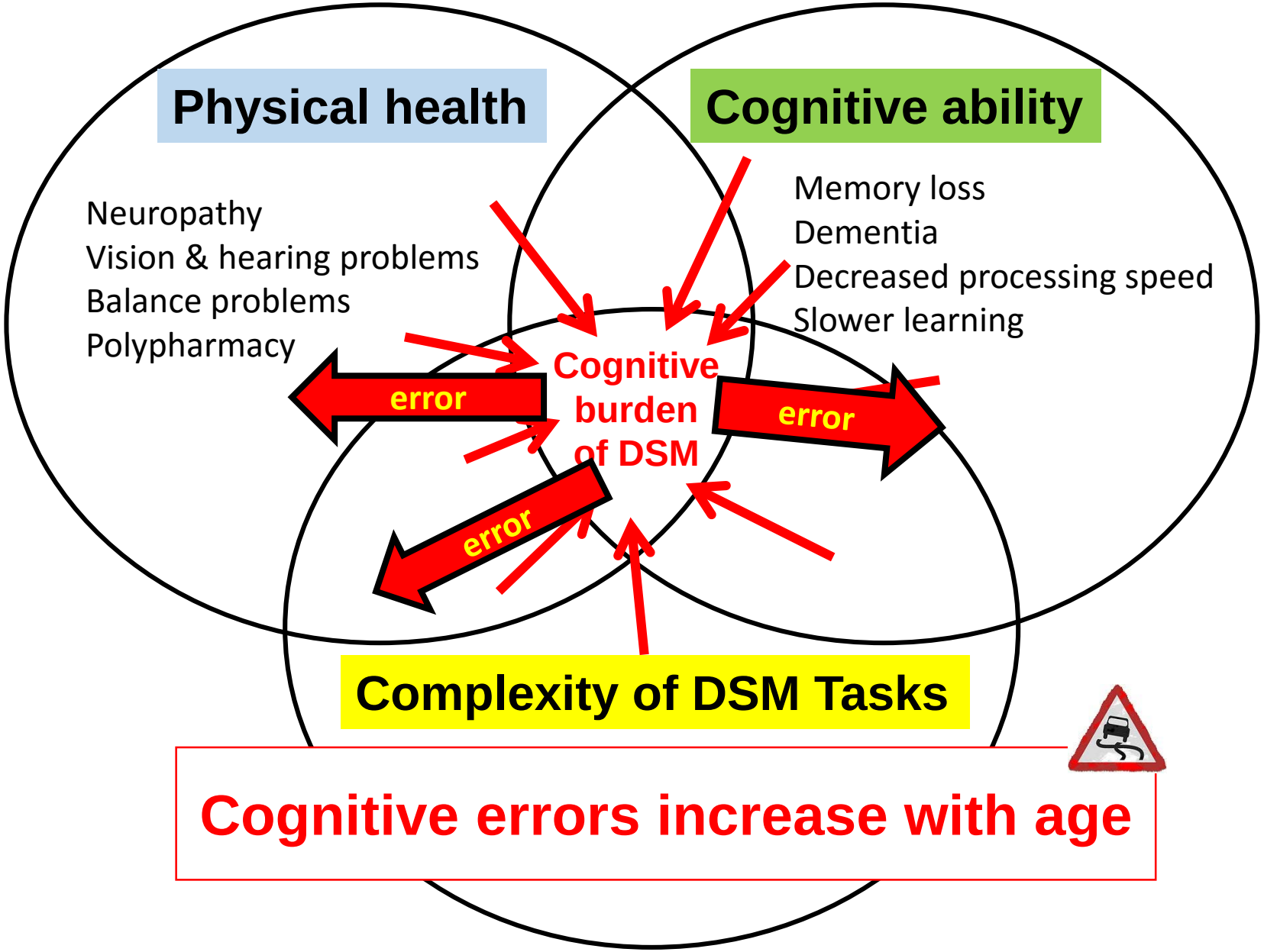
↓

High-risk errors = noncompliance

Effective DSME/S

Recognize the Cognitive Burdens of DSM

Provide DSME/S to reduce those burdens


Physical health
Cognitive ability
Neuropathy
Vision & hearing problems
Balance problems
Polypharmacy
Memory loss
Dementia
Decreased processing speed
Slower learning
Cognitive burden of DSM
error
error
error
Complexity of DSM Tasks
Cognitive errors increase with age

Case Studies

- Complexity of DSM from the patient's perspective

- Cognitive errors

All Insulins Not the Same

I recently had a home care patient who had been discharged from a skilled nursing facility with a prescription for regular insulin, and who was put on a sliding scale dosage. The patient was experiencing hypoglycemic reactions. I was called to see him to find out why he was having multiple hypoglycemic reactions. When I asked to see how he and his wife were calibrating and injecting his insulin, she brought out a bottle of Lantus insulin....

The patient's wife had not filled the new prescription for the regular insulin because she thought that she already had insulin that her husband could use at home. She had the Lantus insulin which he was on prior to his hospitalization, and she wanted to use that insulin before purchasing any more. She was using Lantus for the sliding scale dosage instead of the regular insulin which was proving highly dangerous.

Lesson Learned:

Never take for granted that the patient is dosing properly or is using the insulin the doctor has prescribed.

Linda, RN, CDE

Substituting is more complex

than

adding or subtracting something.

Insulin timing error

Table 4. Number of Cases and Estimates of Precipitating Factors Identified in ED Visits for IHEs (United States, 2007-2011)[a]

Precipitating Factor	ED Visits for IHEs: Cases, No.	ED Visits for IHEs: Annual National Estimate, % (95% CI)	Illustrative Cases[b]
Other misadventure[c]	211	13.4 (10.4-16.4)	• 76-year-old male with syncopal episode after mowing lawn for 3 hours; took usual insulin at noon rather than in the morning–passed out. Diagnosis: hypoglycemic reaction.

National Estimates of Insulin-Related Hypoglycemia and Errors Leading to Emergency Department Visits and Hospitalizations
Andrew I. Geller, MD; Nadine Shehab, PharmD, MPH; Maribeth C. Lovegrove, MPH; Scott R. Kegler, PhD; Kelly N.Weidenbach, DrPH; Gina J. Ryan, PharmD, CDE; Daniel S. Budnitz, MD, MPH
JAMA Intern Med. 2014;174(5):678-686

A married male patient, 68 years of age, has been prescribed long-acting insulin twice a day because once-daily does not work 24 hours for him, and his dose is large. Therefore breaking it into two smaller injections helps bring down his glucose, but only when he remembers to take his insulin. The provider has been working with him for two years offering different strategies for him to remember to take his insulin including reminders on his phone. The wife is present on all visits. Knowing the marriage is strong and the wife is very organized, the provider asked the patient and wife if it would be okay for the wife to get more involved in making sure the patient took his medication on time. They both agreed but....

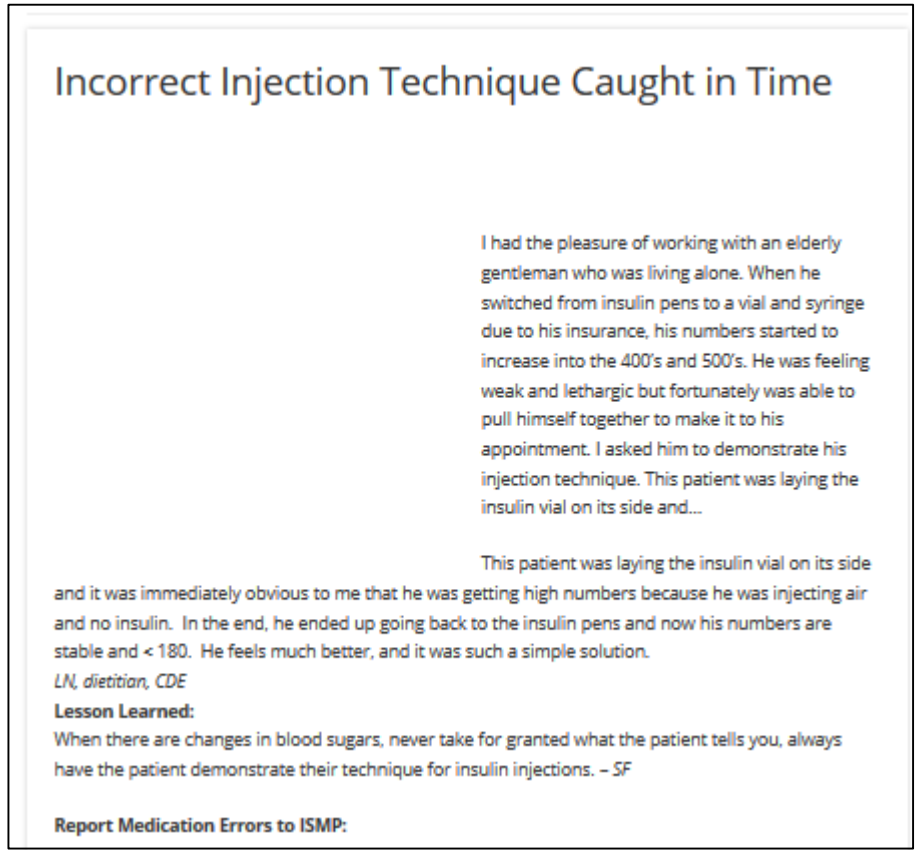
They both agreed, but she said, "He really needs to do this on his own." The patient then promised that he would. The provider said to both of them, "I agree, but we've been talking about this for over a year. We need to come up with a different plan, your A1C is not coming down." The patient and his wife both then agreed with this assessment. The wife noted that she brushes her teeth every night before going to bed. The new plan is to have a small calendar in the bathroom, and then, when the patient takes his insulin, he will put a check on the date in the calendar. If there is no check, the wife will wake her husband up and ask if him if he remembered to take his insulin. If he didn't, she will give him the pen so he can do it immediately. If he says he has taken it then, well, that's it, they're done and he'll go back to sleep. They seemed pleased with the plan. Time, numbers, and A1C will tell if this plan works.

Lessons Learned:

- Regular timing of medications is hard for some people to remember.
- When it comes to long-acting insulin taken at night, many patients forget.
- Patients want to improve their care, will promise to do so, but for many, "life" seems to get in the way.
- Having a support system can help, but only if the patient and support system are in agreement.
- Sometimes, as a healthcare provider "you got to do what you got to do" in the patient's best interest.

Diabetes Disaster Averted series:

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



Incorrect Injection Technique Caught in Time

I had the pleasure of working with an elderly gentleman who was living alone. When he switched from insulin pens to a vial and syringe due to his insurance, his numbers started to increase into the 400's and 500's. He was feeling weak and lethargic but fortunately was able to pull himself together to make it to his appointment. I asked him to demonstrate his injection technique. This patient was laying the insulin vial on its side and...

This patient was laying the insulin vial on its side and it was immediately obvious to me that he was getting high numbers because he was injecting air and no insulin. In the end, he ended up going back to the insulin pens and now his numbers are stable and < 180. He feels much better, and it was such a simple solution.

LN, dietitian, CDE

Lesson Learned:

When there are changes in blood sugars, never take for granted what the patient tells you, always have the patient demonstrate their technique for insulin injections. – *SF*

Report Medication Errors to ISMP:

Diabetes Disaster Averted series:

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

Is It Sugar-Free or Isn't It?

One of my long term patients called my office because she could not figure out what was happening with her post breakfast glucose readings. She counted carbs and would typically have a 2 hour ppg of no more than 145 mg/dl but even though her pre-breakfast readings were around 110 mg/dl she was experiencing glucose levels near 200 mg/dl. I had her do a morning food diary for 7 days and we identified 3 days when she was eating French toast when her readings were going over 200 mg/dl. This meal had never been a problem in the past. We went over the ingredients and that is when we found the problem.

It appears that for the past 3 years she had been using a sugar free low carb name brand syrup that only delivered 10 grams of carbs in the serving she had been using. On her last trip to the grocery she had picked up the regular syrup and was actually putting 60 grams of carbs on her meal.

She got the sugar free choice from the grocery and her levels returned to normal.

Lesson Learned:

Many manufacturers package full-sugar and sugar-free in similar containers, it is easy to mistakenly pick up the wrong one when shopping. In addition, they will update packaging occasionally, and patients should always check the new packaging carefully.

Diabetes Disaster Averted series:

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

John, a gentleman in his 70's who has diabetes, always visited my group after he exercised.

I noticed he always had something (hard candy) in his mouth and he seemed tired. I asked him why he was doing this candy thing. He said, "After exercise I like to refresh my breath, and want to make sure I prevent a low blood sugar." I was thinking he could very well be having high glucose levels, not low. So, I asked him to check. Sure enough, his glucose was in the 200s.

This was a perfect teaching moment. The whole group was watching and engaged. Even though I'd been teaching the importance of checking glucose levels, seeing was believing.

I taught them the importance of checking glucose levels before and after exercise, not just to take for granted their levels are low because they exercised.

The group, including John, started checking before and after. This gave me the opportunity to teach about when to and what to snack on before exercise to prevent the highs and lows.

Lessons Learned:

- Be alert and attentive to your patients' actions and reactions. Speak up if you notice something out of the ordinary.
- Take advantage of teachable moments and teach!
- Teach the importance of actually checking glucose levels, not just guessing.
- Although exercise has been shown to provide benefits, it needs to be balanced with glucose levels to prevent negative aspects of exercise.
- Sometimes you are teaching more people than the one you think you are focusing on.

Diabetes Disaster Averted series:

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

Patient's Method of Figuring Meal-time Insulin Doesn't Quite Work

Recently I assessed an 84 year old inpatient with diabetes for his insulin usage at home. In reporting his dosing he stated that after he checked his glucose before each meal he took the "first two numbers of the result," and made that his dosage for meal-time insulin. For example, if the glucose reading was 240, he would take 24 units of Humalog.

I asked him if this was his instruction per his provider and he said, "No, but it was the only thing that made sense to me that I could remember."...

A specific teaching plan with simple dosing was designed for him and a home health evaluation for medication administration safety was also made on his return home.

Lesson Learned:

This example once again reiterates the importance of having the patient give you a verbal and sometimes a practice demonstration of what they understand to be the practice for medication administration.

Diabetes Disaster Averted series:

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

The Power and Dangers of Advertising

November 17th, 2013

Recently a 69-year-old man returned to see me after being started on a single bedtime dose of Levemir via the Flex pen along with a long-acting sulfonylurea. He had received education about basal insulin action from the start. On return his morning glucose was terrible but I noticed that the rest of the day his glucose was near goal. I began to wonder if his sulfonylurea was working better with the addition of basal insulin but was puzzled by the worsening overnight rise. I was considering lowering the oral dose and increasing the basal dosing to balance glucose control better when he volunteered a critical piece of information nonchalantly….

He proudly announced that he had been listening to NovoNordisk commercials on TV and realized that when you use the Flex pen you need to eat a meal right afterwards. Since he was getting his insulin at bedtime, he decided he should add a fourth meal to the day. This was occurring after his bedtime dose of insulin and AFTER his glucose check.

It was then obvious he did not need a basal rate increase but instruction in the action of Levemir and the difference to the Novolog Flex pen action. If adjustments had been made without changing the dietary cause, this individual may have needed a very high basal dose to control this prandial problem and could have experienced increased hypoglycemia during the day.

Lesson Learned:

Many other sources of information through the media are now available and can be very confusing to a patient. Take time to re-evaluate a patient's understanding of their medications at subsequent visits.

Diabetes Disaster Averted series:

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

The Dangers of Sharing Medications

A 63 y/o female insulin-using type 2 patient who had suddenly gone out of control was referred to me.

She had been doing very well on Humalog 50/50 three times a day with meals. Her last A1c was 5.8 and she was rarely over 170mg/dl post-prandial and had not suffered from any hypoglycemia in some time. Six days ago she had begun to spiral out of control and she was experiencing post meal hypoglycemia once or twice a day and was consistently waking up with glucose levels over 200 mg/dl.

I had the patient bring in her meter, log book, insulin vials and syringes so that I could look things over and see if she was using her insulin correctly. She came well-prepared and showed up with everything including 8 boxes of insulin. I first had her draw up a dose with her open vial and she was doing it correctly. As I looked at the boxes of insulin I noticed that they did not have her name on the pharmacy label. I asked her about this and she informed me that the spouse of a good friend had passed away and she had been given the insulin to use since her friend's spouse had also been using Humalog.

I then saw what the problem was. Her friend's spouse had been using Humalog plain and she was injecting this instead of the Humalog 50/50 prescribed to her. This change of insulins explained all the problems and I discussed this with her, and called her doctor to explain what had happened and why she should not use the plain Humalog.

Lesson Learned:

Older patients often share medications with others when a spouse or friend passes. Although this could happen with oral medications for diabetes or other disease states as well, there is probably no medicine that can cause rapid problems as fast as insulin so we need to make sure that our patients know to check with us before using any "shared" medications.

Diabetes Disaster Averted series:

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

These tasks were low complexity.

Cognitive complexity was minimal.

But

The tasks were difficult for these patients,

because their cognitive abilities were declining.

All older adults' have more difficulty learning because:

The aging brain doesn't work as fast or efficiently as before,
for example:

- Slower processing speed
- Weaker working memory

RECALL

Neuropsychological studies consistently report modest cognitive decrements in patients with **T2DM**, even in people without dementia.

….This is reflected in worse performance on measures of :

Information processing speed

Attention

Executive functioning

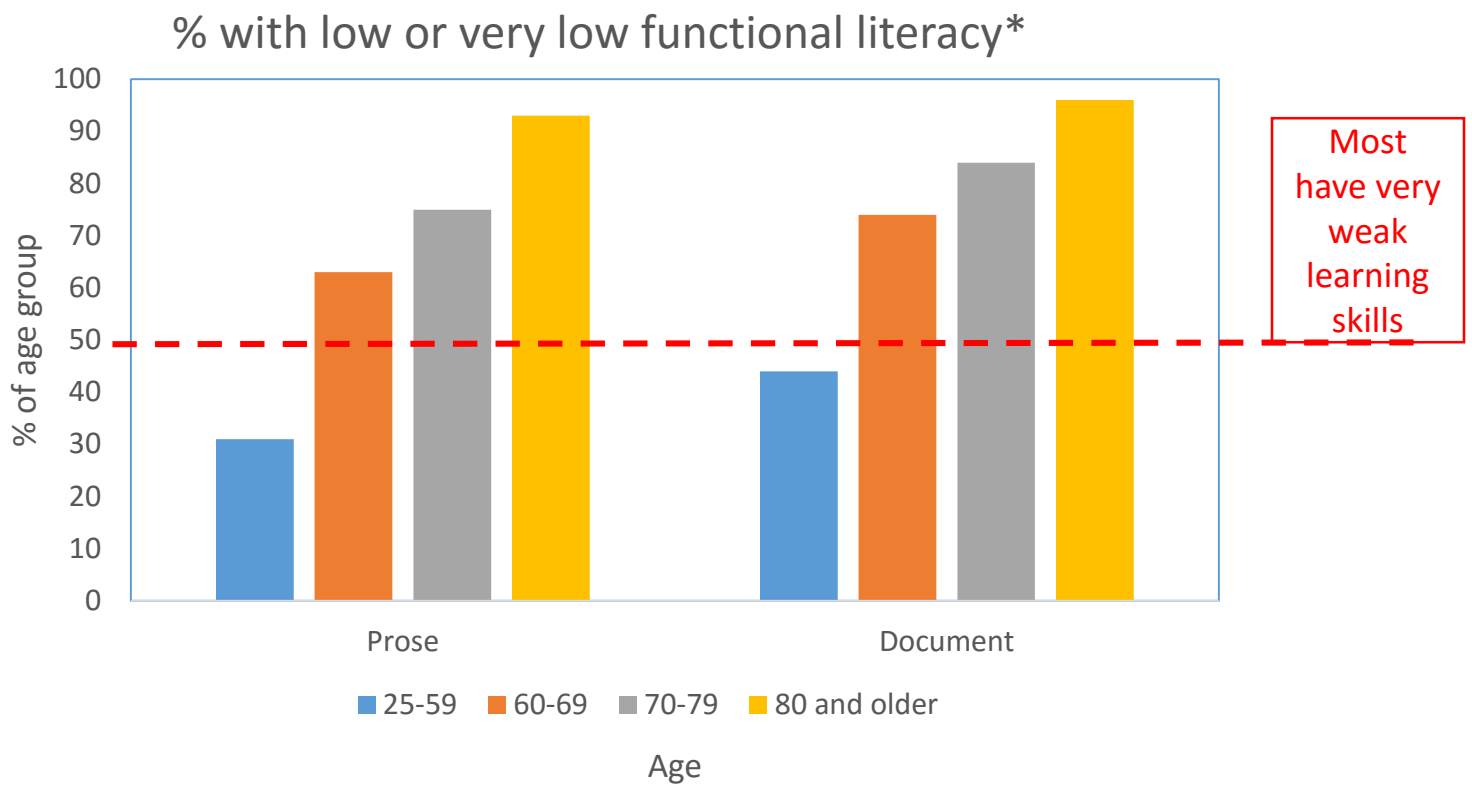
Verbal memory

Exalto, L.G., et al. An Update on type 2 diabetes, vascular dementia and Alzheimer's Disease. Experimental Gerontology 47(2012)858-864.

RECALL

To summarize:

Most older adults have very weak learning skills.
Their brain's "command & control" centers not working well
So they need lots of cognitive help



*Level 1 or 2 on NCES adult literacy survey's 5-level scale Source: Tables 1.2 and 1.3 of *Literacy of Older Adults in America*, 1996, http://nces.ed.gov/pubs97/97576.pdf (accessed 8/1/14)

How can DSME/S address these cognitive changes ?

How can DSME/S address these cognitive changes ?

- Target the most critical tasks
- Identify their cognitive demands

DSME/S must assure the *cognitive accessibility* of information & materials.

Even if the DSM “job” did not get more complex, cognitive decline makes it more difficult.

Educational strategy

1. Identify cognitive hurdles
   - Identify what makes the task(s) cognitively complex
   - Anticipate common errors
   - Identify which errors most critical

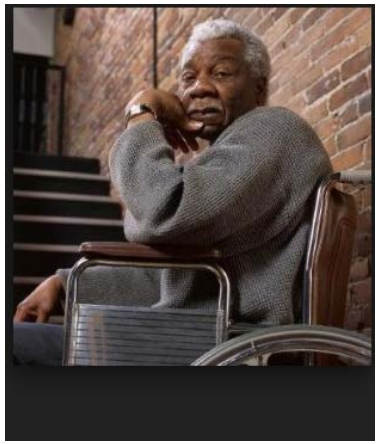
2. Wherever possible, lower task complexity
   - Focus on essentials
   - Then simplify

3. Tailor DSME to patient's literacy level to avoid cognitive overload
   - Narrow the task domain (triage) when necessary
   - Provide more "scaffolding" for learning
   - Increase supervision (monitoring, feedback)

To summarize……

➢ Many of your patients/clients will:

- have complex medical problems,
- experience heavy burdens in self-care,
- but have fewer physical and cognitive reserves for effective self-care.



➢ Patients' physical and cognitive health trajectories will differ widely

Complexity & aging

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


Questions

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