

# Effect of cognitive dysfunction on relationship between age and health literacy

**Kimberly A. Kaphingst, ScD**

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Department of Surgery  
Division of Public Health Sciences



Washington University in St. Louis

SCHOOL OF MEDICINE

# Background

- Previous studies have shown an inverse relationship between age and health literacy
- Research is exploring relationships between age, literacy, health literacy, and cognitive status
  - Among older adults, cognitive abilities explain at least some variance in health literacy
- Role of cognitive dysfunction is not well understood, but has implications for clinical interventions

(e.g., Baker et al. 2000; Morrow et al., 2006; Paasche-Orlow et al., 2005)

# Research questions

- 1) What is the relationship between age and health literacy among adult emergency department (ED) patients?
- 2) How does cognitive dysfunction among older patients in this population affect this relationship?

# Study design

- Cross sectional survey of ED patients 18 years of age or older
  - Urban academic level one trauma center
  - Over 95,000 annual visits
- Exclusion criteria
  - Patient distress as judged by physician
  - Acute trauma
  - Altered mental status, acute psychiatric illness
  - Previously diagnosed dementia
  - Aphasia
  - Non-English speaking
  - Corrected visual acuity worse than 20/100



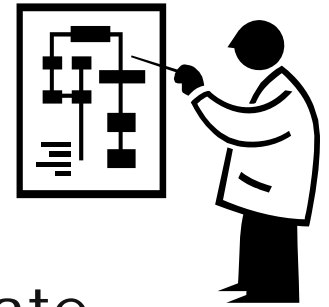
# Health literacy measures

- Abbreviated Short Test of Functional Health Literacy in Adults (S-TOFHLA)
- Rapid Estimate of Adult Literacy in Medicine - Revised (REALM-R)
- Newest Vital Sign (NVS)
- Three single item screener items
- Four numeracy items

# Cognitive dysfunction measure

- Brief Alzheimer Screen (BAS)
  - Short screen designed for clinical settings
  - Validated for adults 60 years of age or older
  - Score of  $\leq 26$  positive screen for cognitive dysfunction
- BAS items
  - Three items from Mini-Mental State Examination (MMSE)
  - Added verbal fluency task
  - Assesses orientation, registration-recall, verbal fluency, attention
  - Validated for use in ED

# Analysis



- Examined descriptive statistics and bivariate associations for overall sample
- Stratified sample
  - Patients less than 60
  - Patients 60+ with negative screen for cognitive dysfunction
  - Patients 60+ with positive screen for cognitive dysfunction
- Stratified analysis
  - Examined differences in health literacy between strata
  - Area under the receiver operating characteristic curve (AUROC) for REALM-R and NVS against abbreviated S-TOFHLA

# Patient sample

- Approached 590 ED patients
  - 132 (22.4%) refused
  - 12 (2.0%) ineligible
- N=446; 75.6% participation rate
  - 82 patients were 60+
- Age, gender, and race not significantly different between participants, those who refused, and ED patient population in 2011



# Characteristics of sample (N=446)

Variable	% or M(SD)
Female	55%
High school/GED or less	68%
Household income <\$40,000	72%
Race/ethnicity	
White	31%
Black	68%
Other	2%
Age	45 (16)

# Health literacy by patient strata

	Overall (N=446)	<60 (N=364)	60+ Negative screen (N=44)	60+ Positive Screen (N=38)
S-TOFHLA				
Inadequate	15%	10%	9%	84%
Marginal	11%	9%	16%	13%
Adequate	74%	80%	75%	3%
REALM-R				
Limited	49%	50%	21%	74%
Adequate	51%	50%	80%	26%
NVS				
Limited	31%	28%	16%	84%
Possible	35%	36%	39%	13%
Adequate	34%	36%	46%	3%

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# BAS task performance among patients 60+

	S-TOFHLA score			p-value
	Inadequate	Marginal	Adequate	
Total BAS score	17 (7.0)	26 (5.8)	30 (4.7)	<.0001
Know correct date	86.2%	92.3%	97.4%	0.2
# of 3 items recalled	1.5 (1.0)	2.1 (1.0)	2.4 (0.9)	0.002
# of animals in 30 seconds	7.6 (2.9)	10.9 (2.7)	12.5 (3.4)	<.0001
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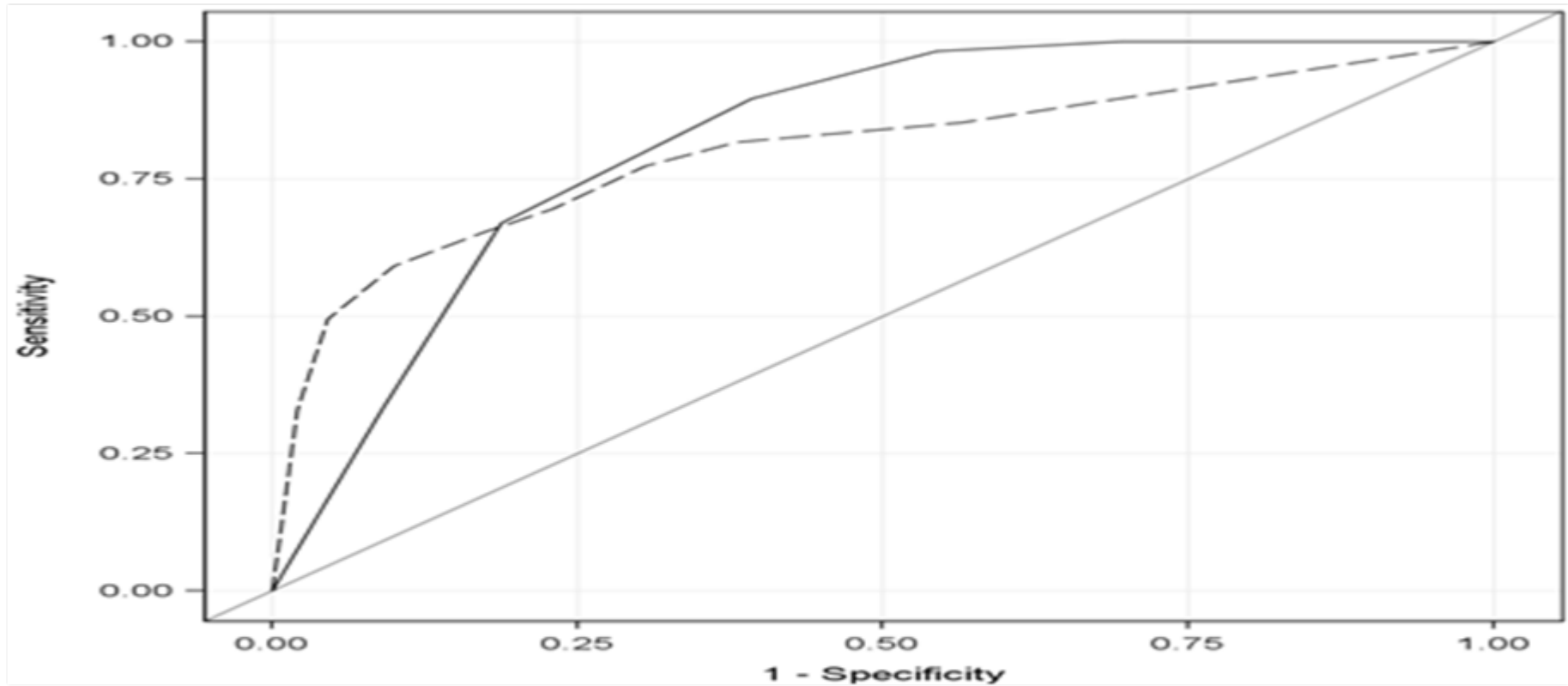
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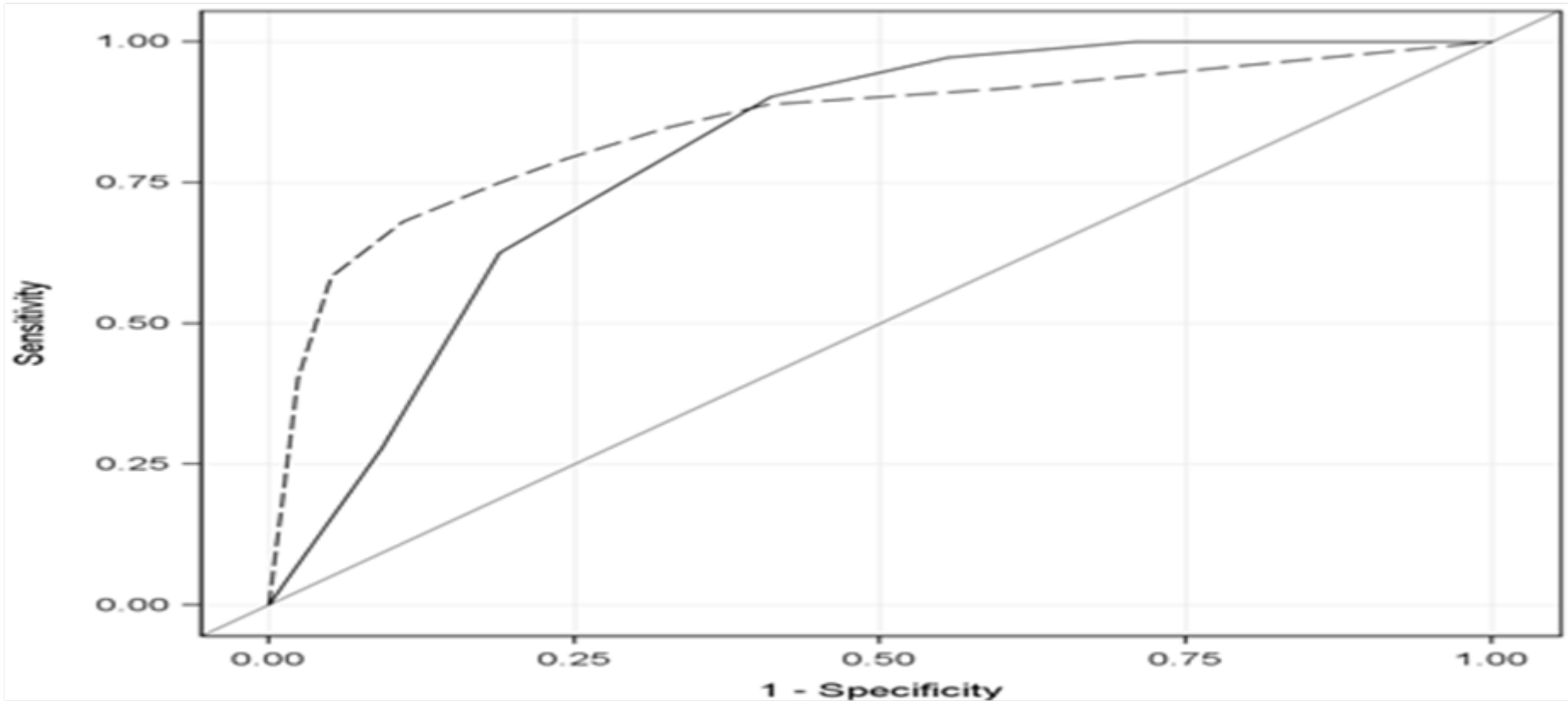
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# Overall, N=446



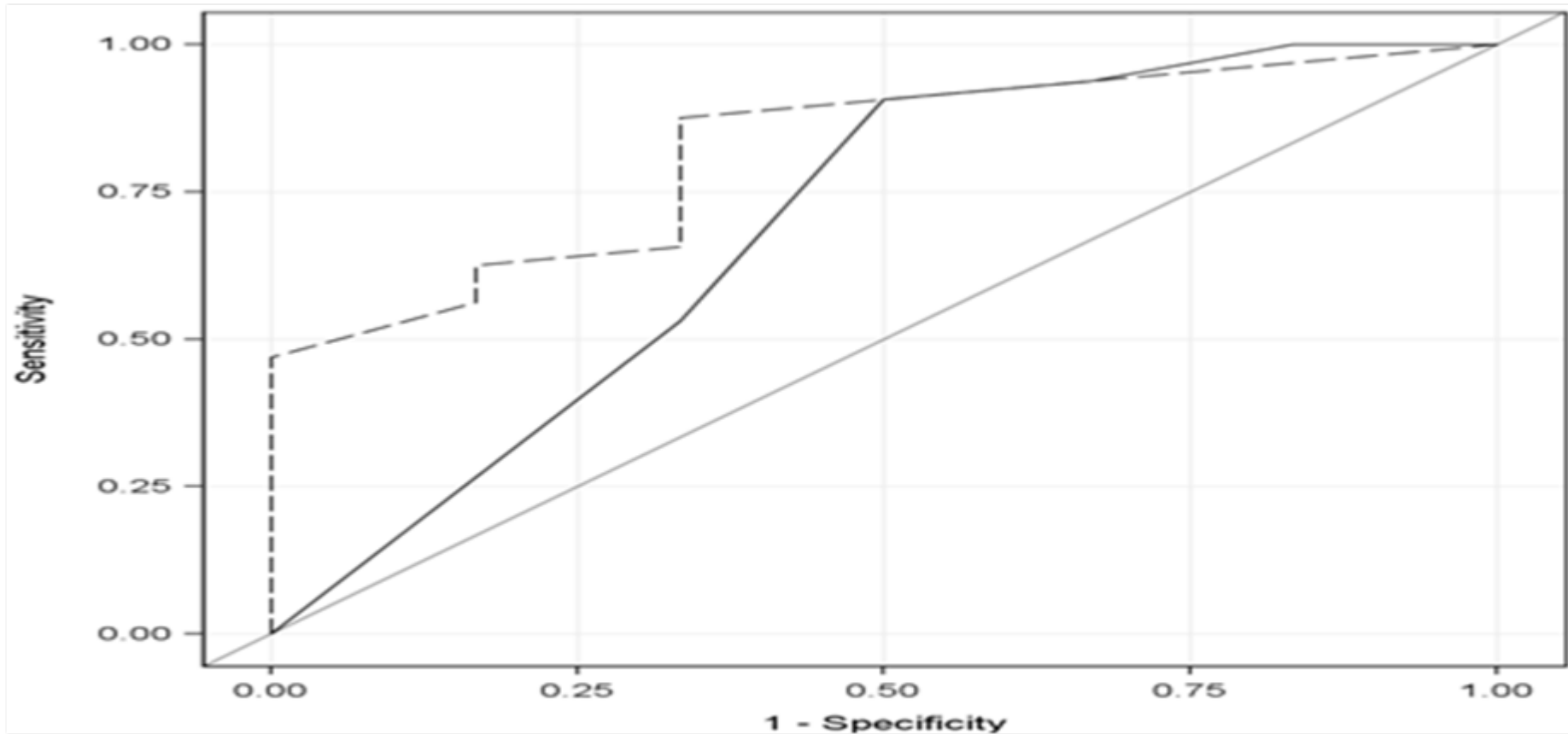
**ROC Curve (Area)**  
—— NVS (0.8208)    - - - - REALM-R (0.7991)

# Patients age <60, N=364



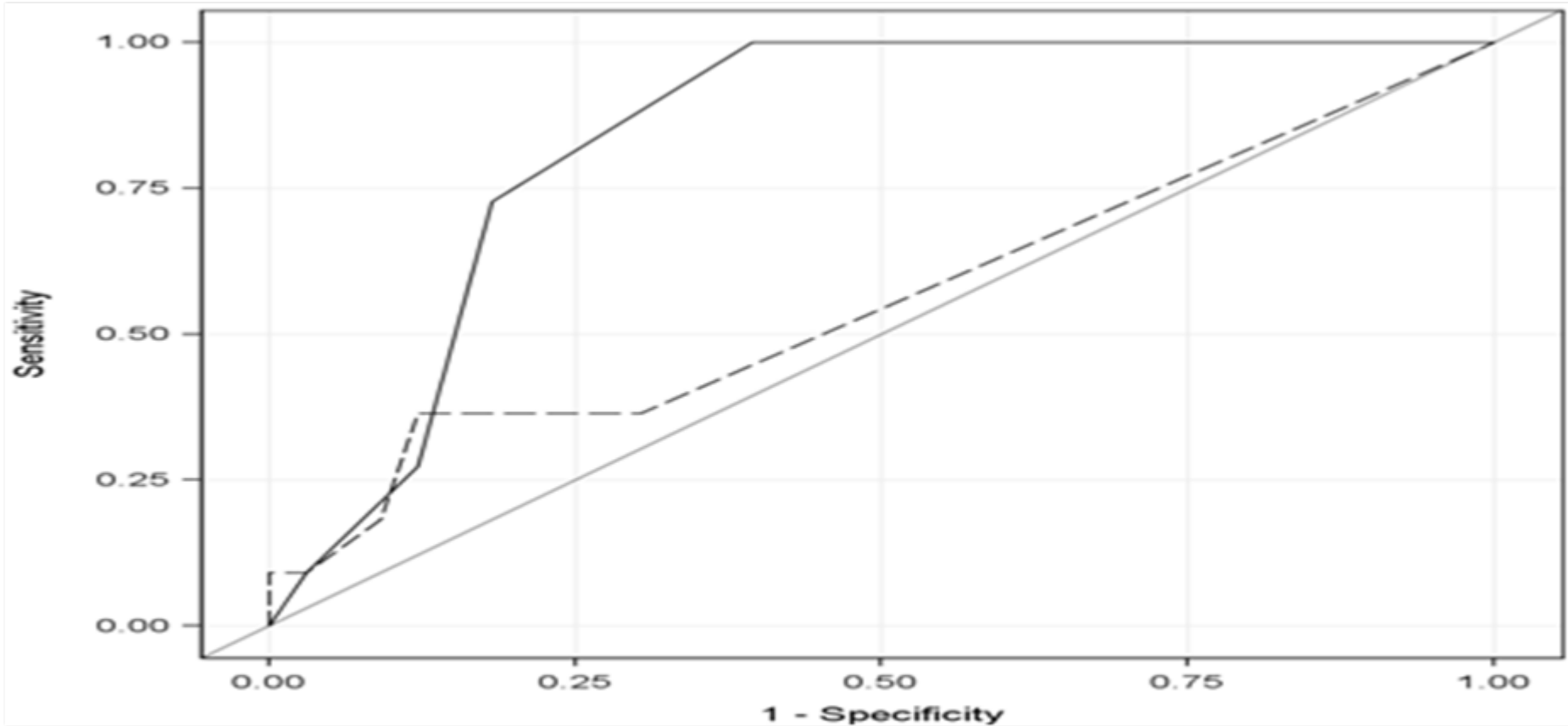
**ROC Curve (Area)**  
—— NVS (0.8041)    - - - - REALM-R (0.8495)

# Older patients positive screen, N=38



**ROC Curve (Area)**  
—— NVS (0.6901)    - - - - REALM-R (0.8177)

# Older patients negative screen, N=44



**ROC Curve (Area)**  
—— NVS (0.8375)    - - - - REALM-R (0.5606)



# Limitations

- Single institution
- Limits of existing health literacy measures
- BAS is a screen, not diagnostic tool
- Sample size for older patients

# Discussion

- Health literacy did not differ between younger patients and older patients who screen negative for cognitive dysfunction with S-TOFHLA and NVS
  - Older patients who screen positive have lower health literacy
  - For REALM-R, older patients with negative screen had highest levels of health literacy
- Older adults who screen positive may be an important target for clinical interventions
- Implications of cognitive dysfunction for measurement of health literacy among older adults



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**Kim Kaphingst**  
**Assistant Professor**  
**Campus Box 8100**  
**660 S. Euclid Ave.**  
**St. Louis, MO 63110**  
**(314) 935-3726**

**[kaphingstk@wudosis.wustl.edu](mailto:kaphingstk@wudosis.wustl.edu)**

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