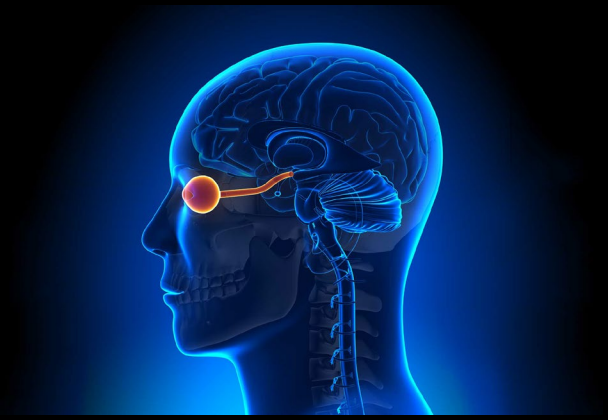
Sensory Health, Dementia, and Delirium



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NIDUS Delirium Network Webinar
September 24, 2024

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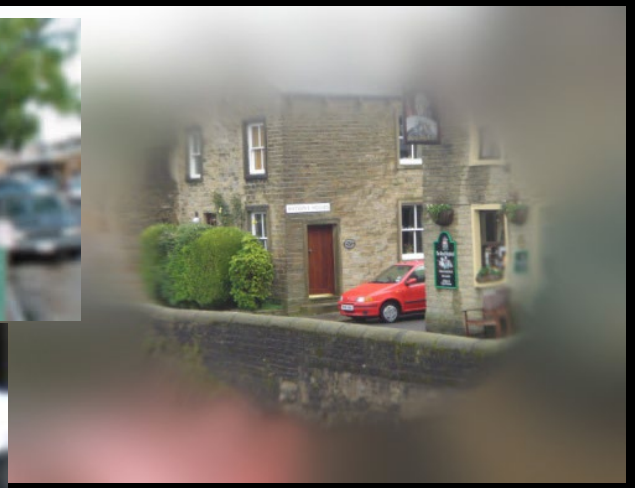






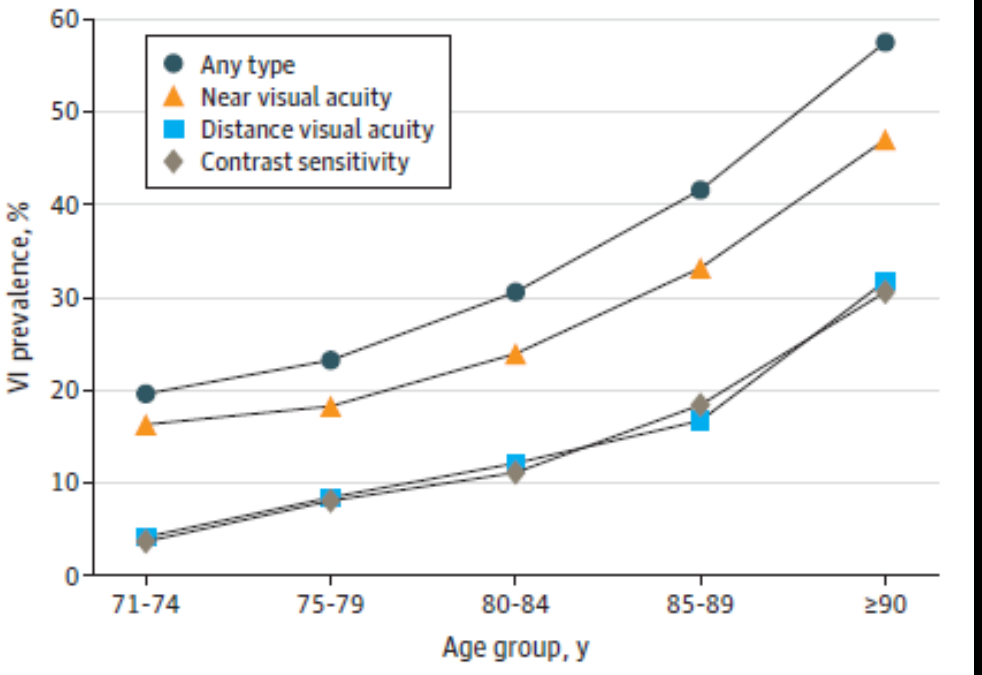
VI prevalence with age

JAMA Ophthalmology | Brief Report

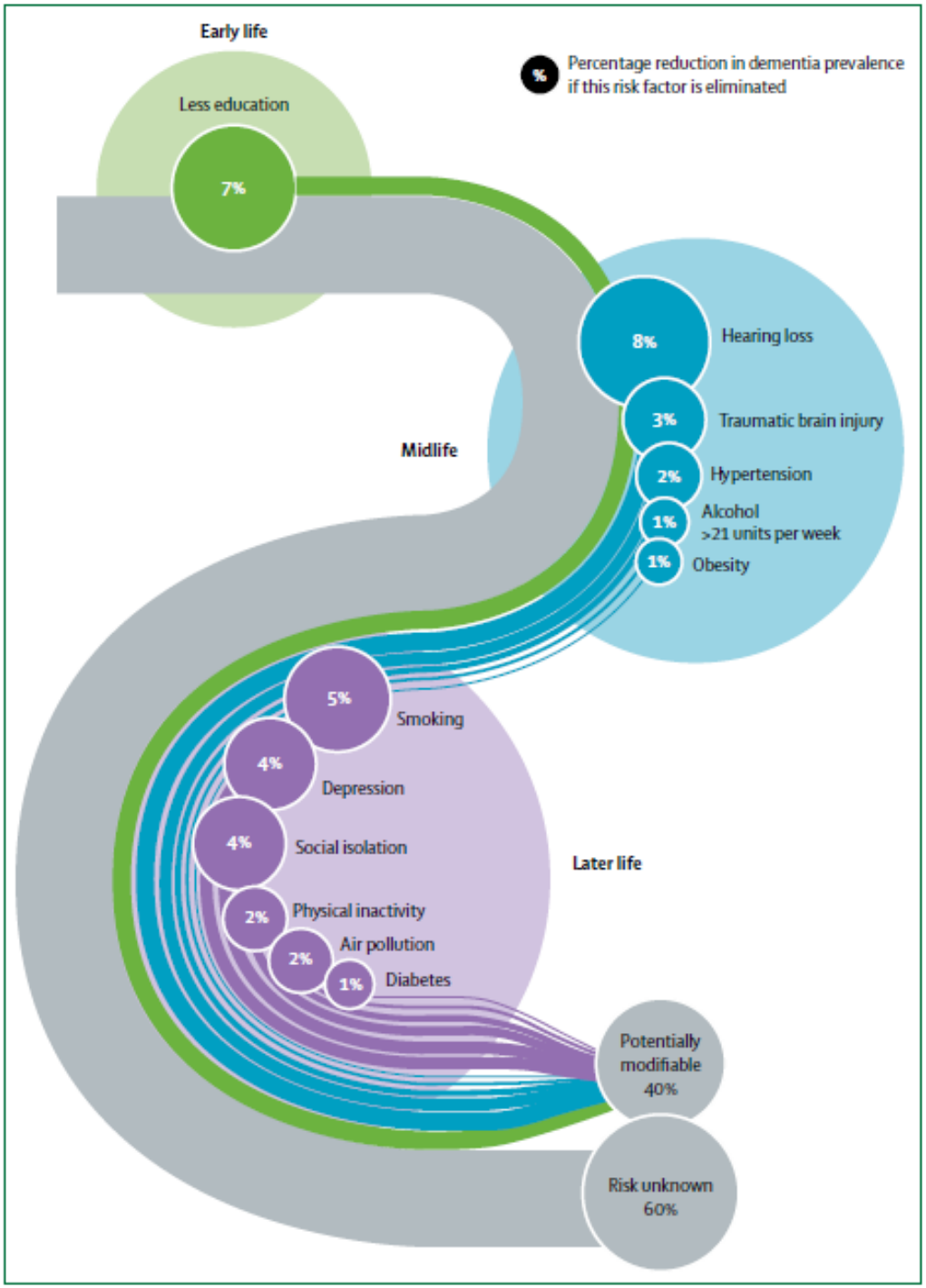
Objectively Measured Visual Impairment and Dementia Prevalence in Older Adults in the US

Olivia J. Killeen, MD, MS; Yunshu Zhou, MS; Joshua R. Ehrlich, MD, MPH

Figure. Prevalence of Vision Impairment (VI) by Age Group



2020 risk factor model

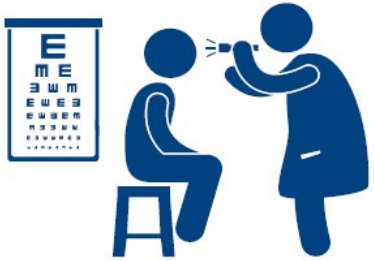


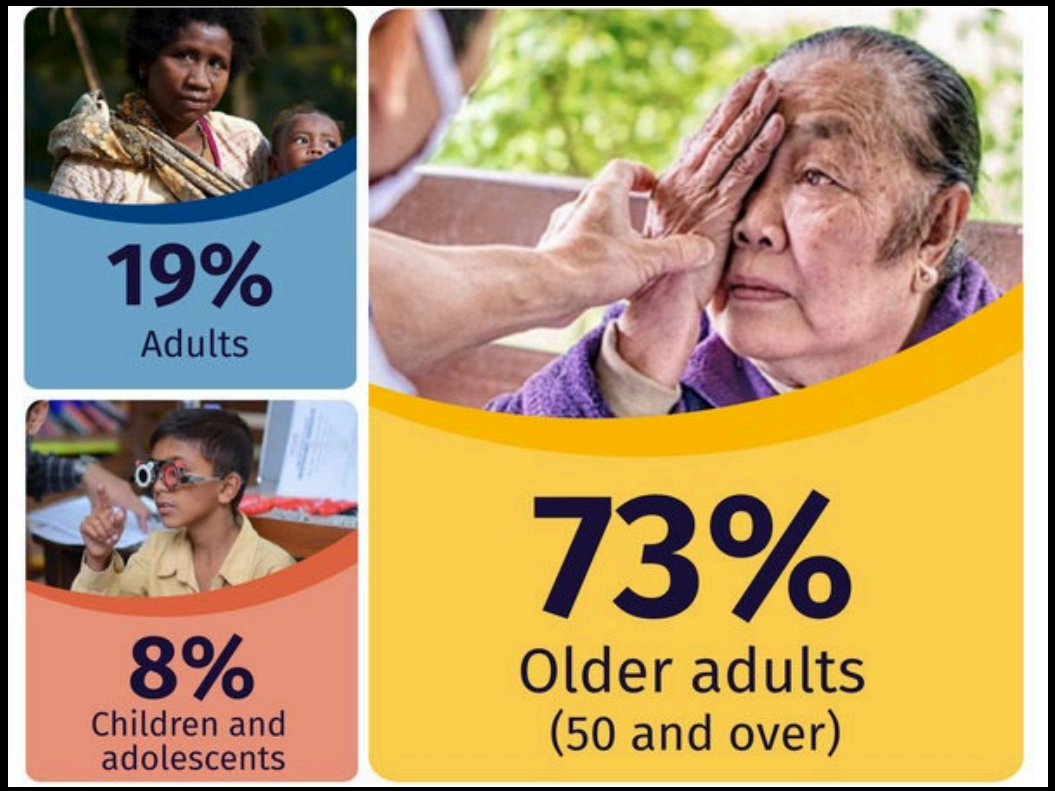
Dementia prevention, intervention, and care: 2020 report of the *Lancet* Commission.

High prevalence

1.1 billion
people

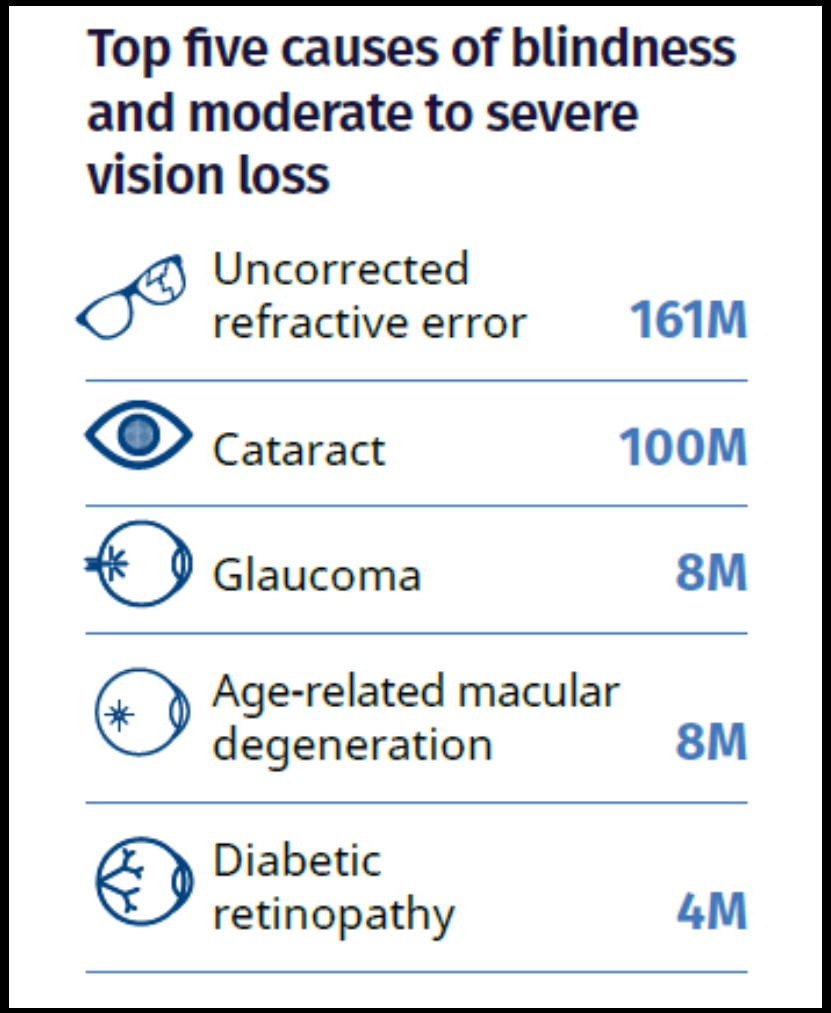
are living with
vision loss
because they
do not have access
to basic
eye care services





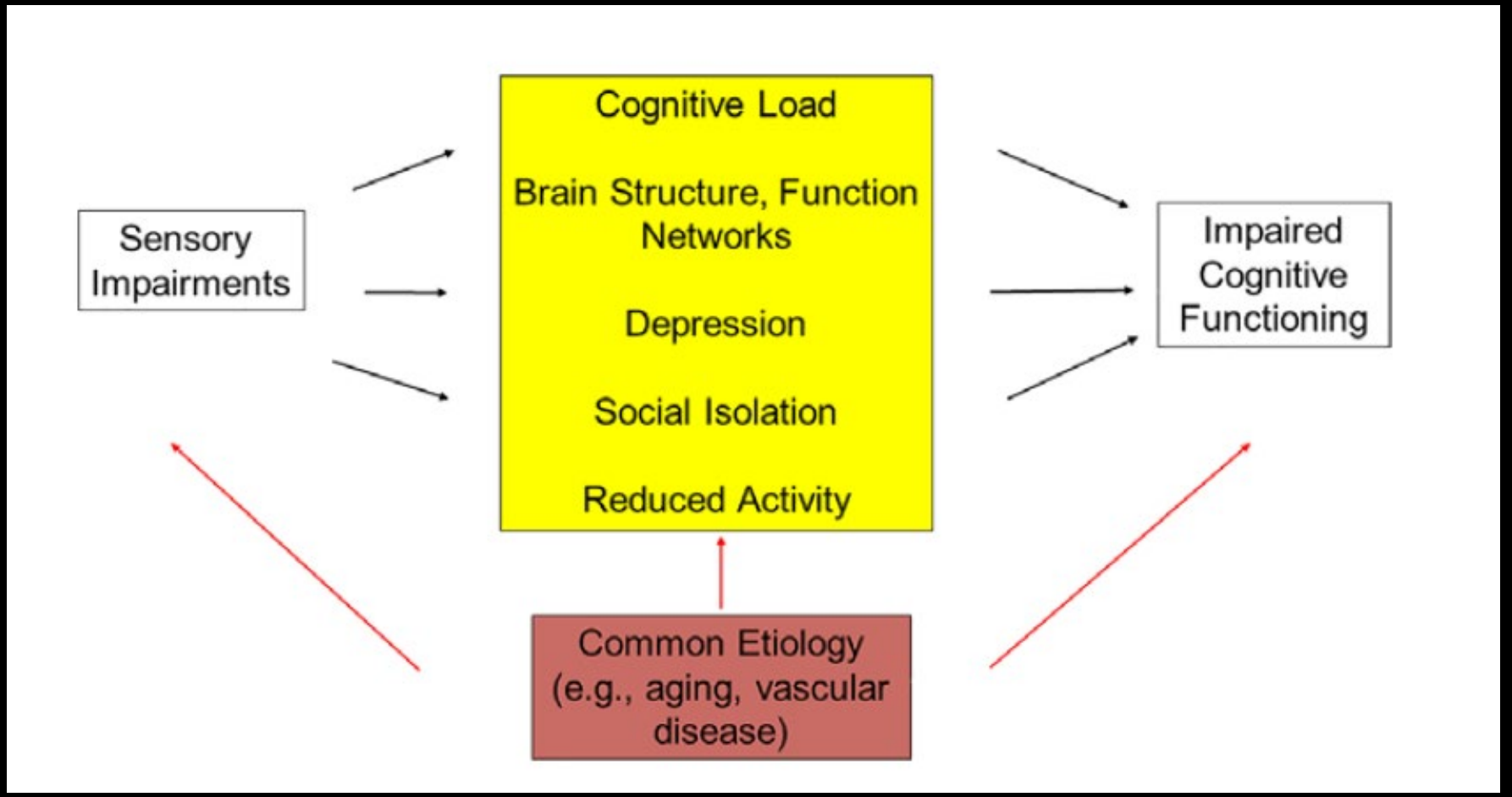
IAPB Vision Atlas

Visual impairment is largely preventable or correctable



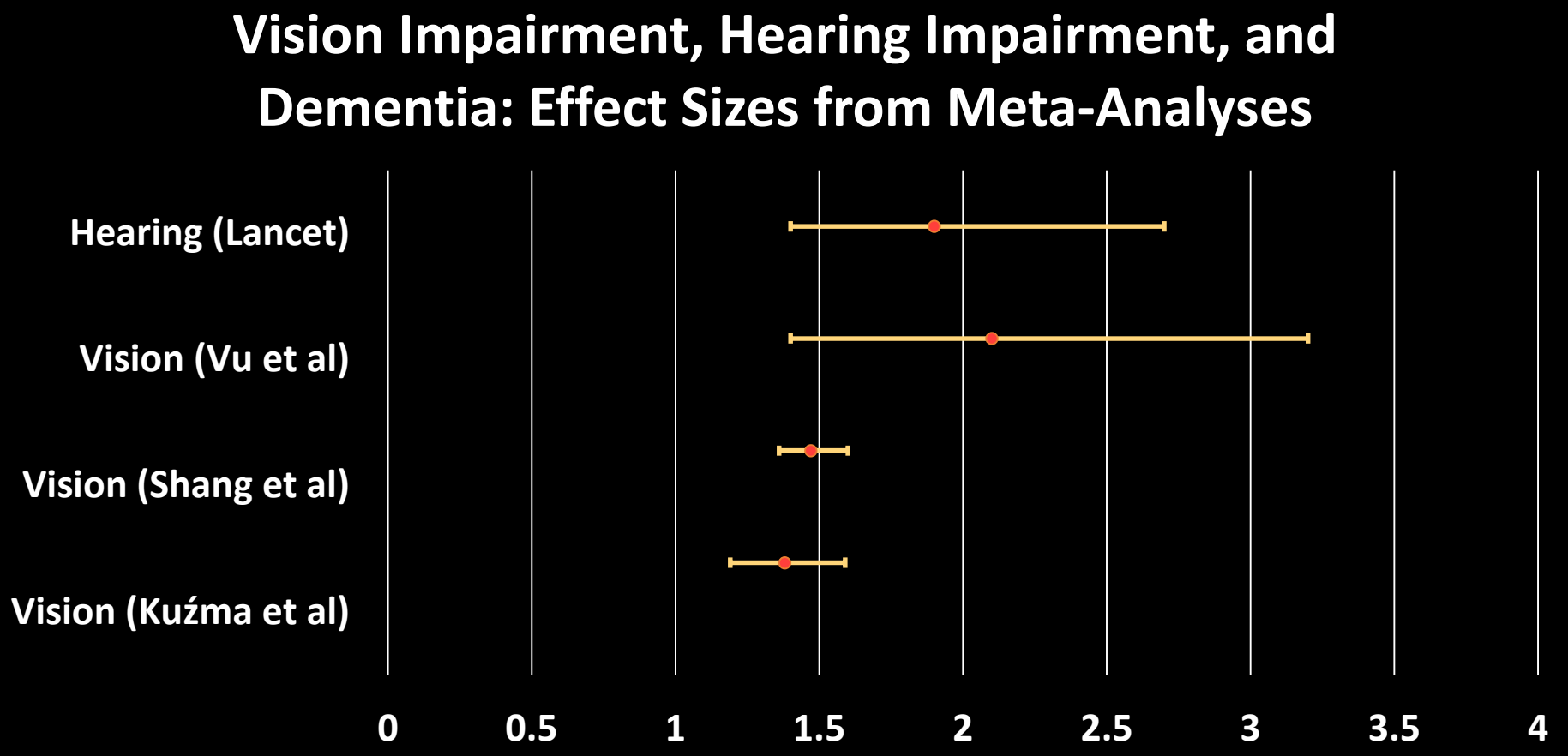
IAPB Vision Atlas. iapb.org

Hypothesized pathways

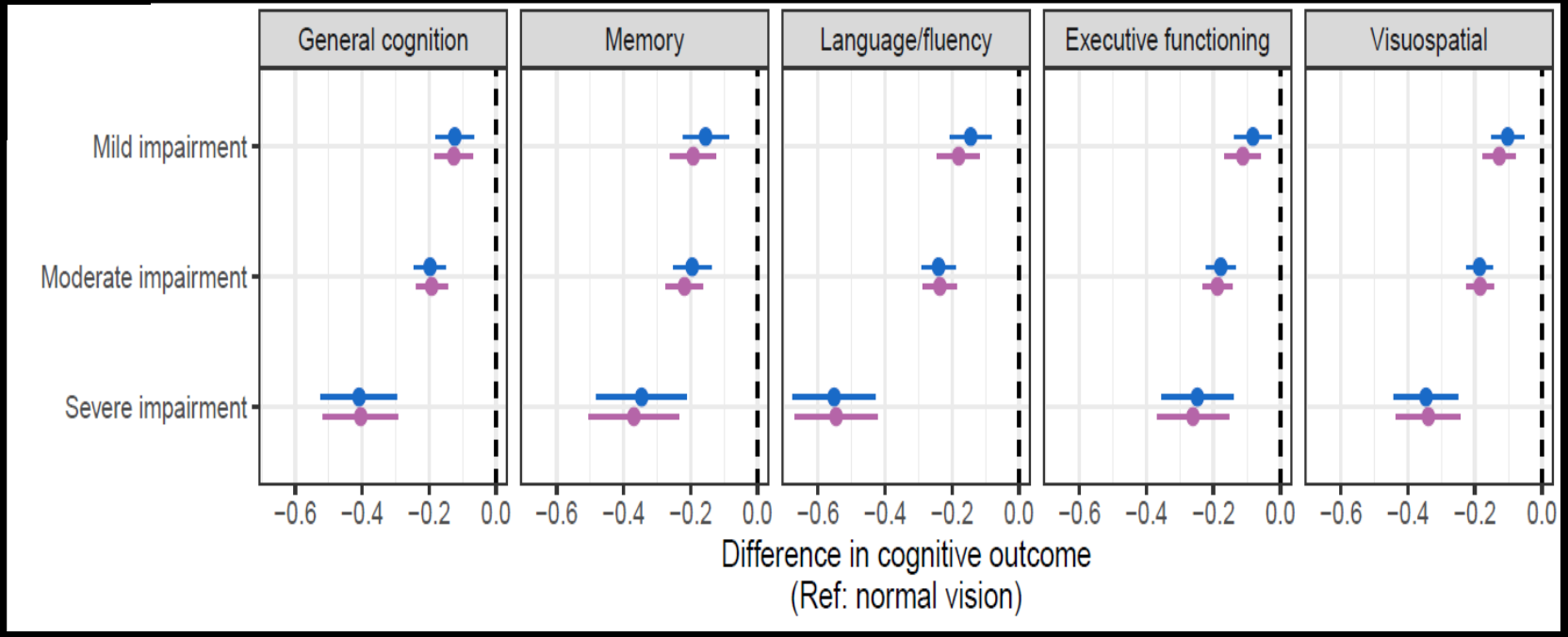


Whitson HE. *J Am Geriatr Soc*. 2018;66(11):2052.

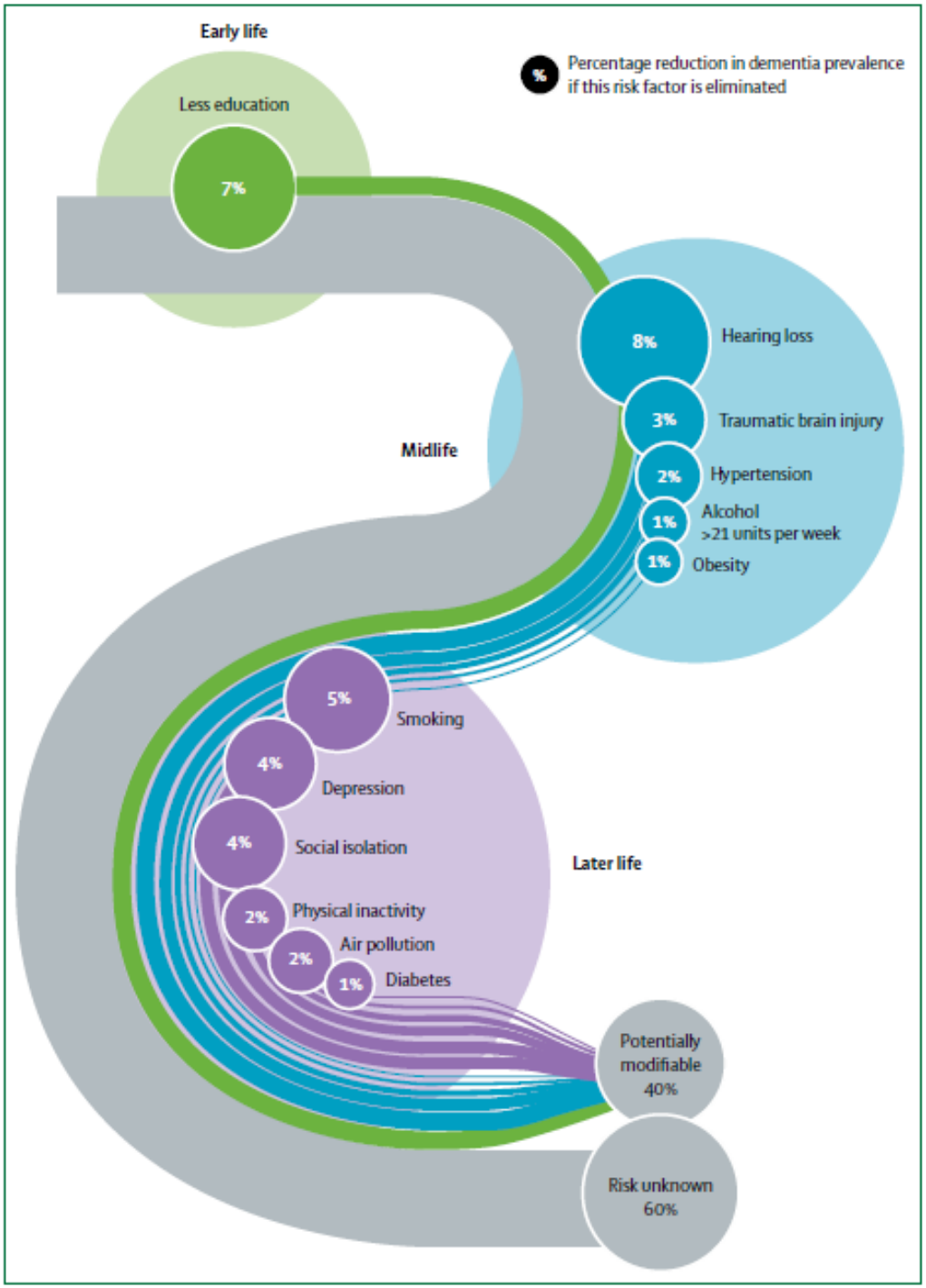
Effect sizes



Are we measuring what we think we are?



Ehrlich et al. *Innov in Aging.* 2024. 9;8(9):igae071. doi: 10.1093/geroni/igae071.



Building on the 2020 risk factor model

Dementia prevention, intervention, and care: 2020 report of the *Lancet* Commission.

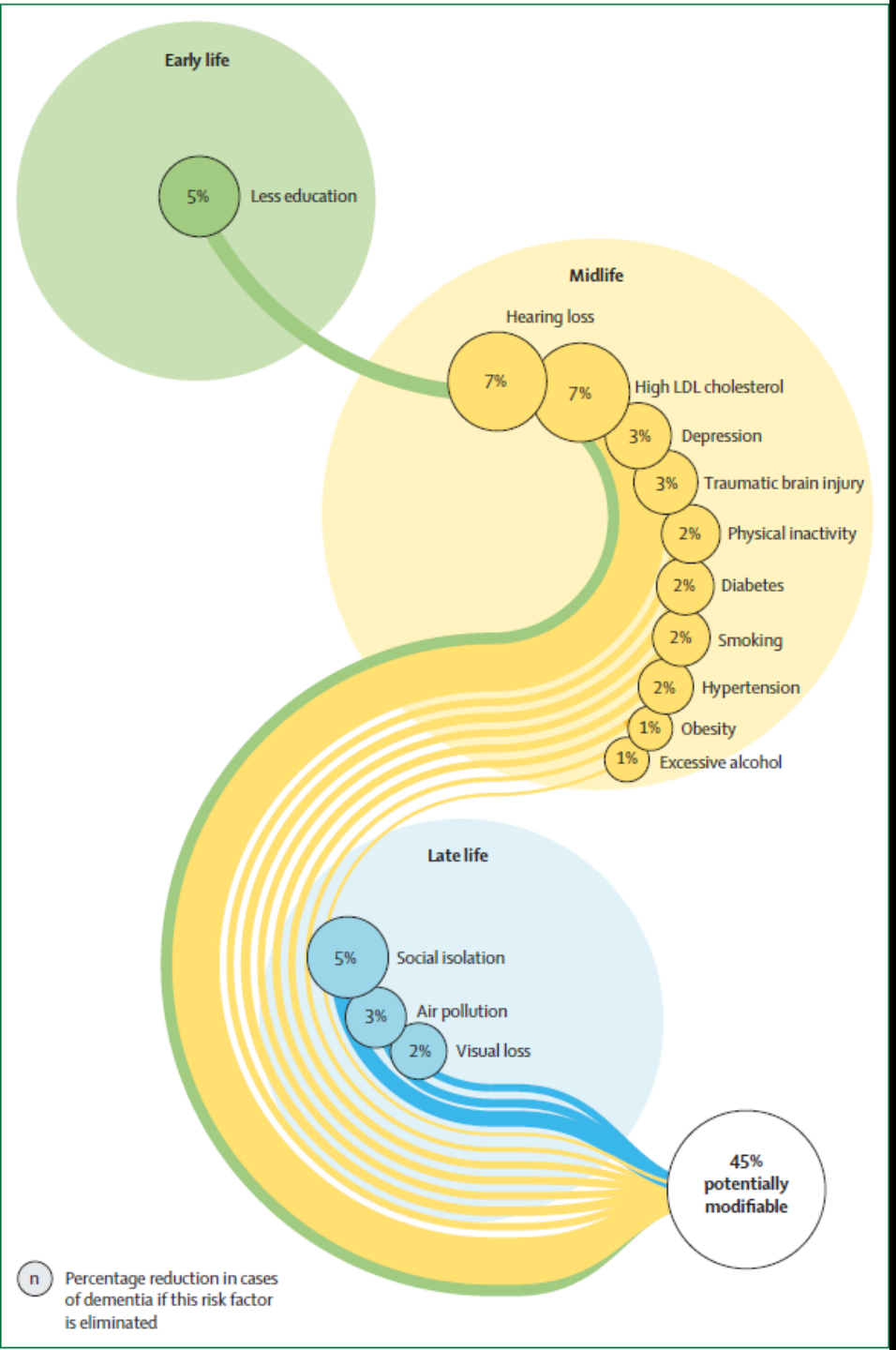
JAMA Neurology | Brief Report

Addition of Vision Impairment to a Life-Course Model of Potentially Modifiable Dementia Risk Factors in the US

Joshua R. Ehrlich, MD, MPH; Jenna Goldstein, BA; Bonnie K. Swenor, PhD, MPH; Heather Whitson, MD, MHS; Kenneth M. Langa, MD, PhD; Phillip Veliz, PhD

- PAF (2%) comparable to social isolation, >alcohol
- 100,000 cases of dementia in U.S. preventable w/ good vision
- ↑PAF with ↑prevalence of VI (e.g., 6x more VI in India)

Ehrlich et al. JAMA Neurology. 2022.



14 *potentially* modifiable risk factors

Dementia prevention, intervention, and care: 2024 report of the *Lancet* Commission.

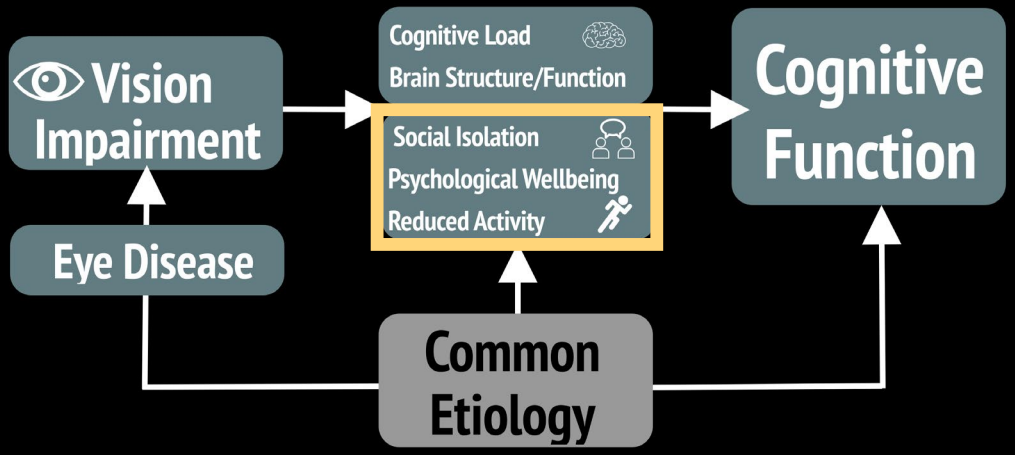
2024 risk factor model

	RR for dementia (95% CI)	Risk factor prevalence, %	Communality, %	Unweighted PAF, %	Weighted PAF, %	Weighted PAF rounded to nearest whole number, %
Early life						
Less education	1·6 (1·3–2·0)[302]	23·2%[303]	0·608	12·2%	4·5%	5%
Midlife						
Hearing loss	1·4 (1·0–1·9)*	59·0%[304]	0·609	19·1%	7·0%	7%
High LDL cholesterol	1·3 (1·3–1·4)[36]	76·5%†	0·469	18·7%	6·9%	7%
Depression	2·2 (1·7–3·0)*	7·2%[305]	0·452	8·3%	3·0%	3%
Traumatic brain injury	1·7 (1·4–1·9)[127]	12·1%[306]	0·423	7·8%	2·9%	3%
Physical inactivity	1·2 (1·2–1·3)[173]	27·5%[307]	0·567	6·4%	2·4%	2%
Smoking	1·3 (1·2–1·4)[148]	22·3%[308]	0·650	6·3%	2·3%	2%
Diabetes	1·7 (1·6–1·8)[309]	9·3%[310]	0·493	6·4%	2·3%	2%
Hypertension	1·2 (1·1–1·4)[311]	31·1%[312]	0·595	5·9%	2·2%	2%
Obesity	1·3 (1·0–1·7)[206]	13·0%[313]	0·622	3·8%	1·4%	1%
Excessive alcohol consumption	1·2 (1·0–1·5)[213]	13·3%[213]	0·772	2·6%	1·0%	1%
Late life						
Social isolation	1·6 (1·3–1·8)[221]	24·0%[314]	0·408	12·6%	4·6%	5%
Air pollution	1·1 (1·1–1·1)[315]	75·0%[315]	0·341	7·0%	2·6%	3%
Untreated vision loss	1·5 (1·4–1·6)[262]	12·7%[260]	0·553	6·0%	2·2%	2%
Overall PAF for all risk factors	--	--	--	--	45·3%	45%

RR=relative risk. PAF=population attributable fraction. *Calculated by the authors in this Commission. †Prevalence derived from 37 000 participants aged ≥45 years from the Norwegian HUNT study.[316]

Dementia prevention, intervention, and care: 2024 report of the *Lancet* Commission.

CORRECTABLE VISION LOSS	INTERVENTION
Refractive error Presbyopia Cataract	Eyeglasses Cataract surgery



CLEVER

Cognitive Level Enhancement
through Vision Exams
and Refraction

Sensory loss & delirium

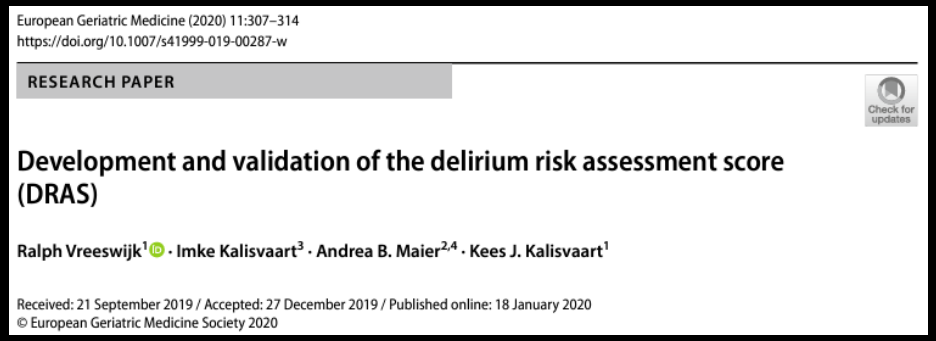
Sensory loss & delirium

Visual and Hearing Impairment Are Associated With Delirium in Hospitalized Patients: Results of a Multisite Prevalence Study

Alessandro Morandi MD, MPH[a,b,c,*], Marco Inzitari MD, PhD[c,d], Cristina Udina MD[c,d], [No Title] MD, PhD[c], Miriam Mota MSc[c], Elena Tassistro MS[e], Anita Andreano MSc[e], Antonio Cherubini MD, PhD[f], Simona Gentile MD[a,b], Enrico Mossello MD[g], Alessandra Marengoni MD, PhD[h], Anna Olivé MD[i], Francesc Riba MD[j], Domingo Ruiz MD, PhD[k,l], Elisabet de Jaime MD, PhD[m], Giuseppe Bellelli MD[n,o], on behalf of the Italian Study Group of Delirium[1]

- Sensory loss common in delirium; among 3038 adults 65+ admitted to hospital:
  - Hearing (31% vs 18%)
  - Vision (24% vs 16%)
  - Dual sensory (16% vs 8%)
- Dual sensory loss independently associated with development of delirium

Sensory loss & delirium



European Geriatric Medicine (2020) 11:307–314
https://doi.org/10.1007/s41999-019-00287-w

RESEARCH PAPER

Check for updates

Development and validation of the delirium risk assessment score (DRAS)

Ralph Vreeswijk[1] · Imke Kalisvaart[3] · Andrea B. Maier[2,4] · Kees J. Kalisvaart[1]

Received: 21 September 2019 / Accepted: 27 December 2019 / Published online: 18 January 2020

Systematic review of delirium risk factors	
Acute admission	>4 alcoholic drinks/day
Cognitive impairment	ADL impairment
Age >75	Prior delirium
≥ 5 medications	>2 morbidities
Male	Hearing and/or vision problem

Sensory loss & delirium

European Geriatric Medicine (2020) 11:307–314
https://doi.org/10.1007/s41999-019-00287-w

RESEARCH PAPER

Development and validation of the delirium risk assessment score (DRAS)

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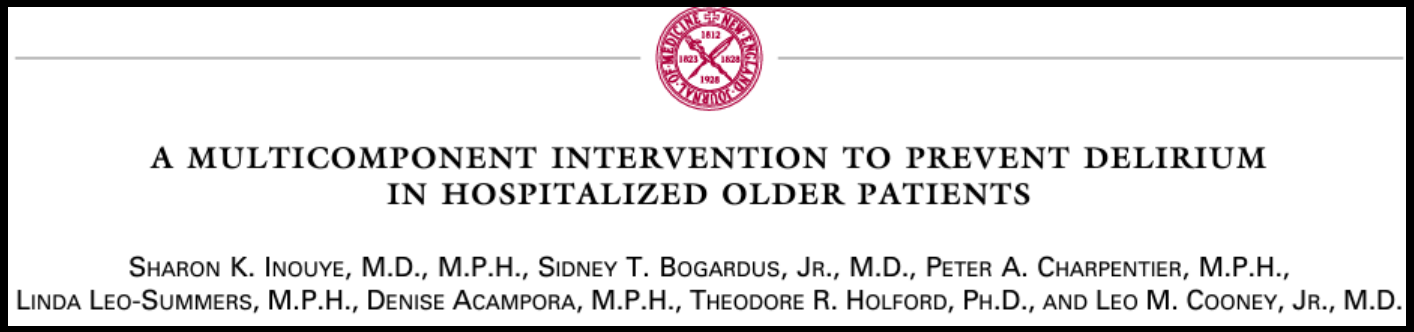
Received: 21 September 2019 / Accepted: 27 December 2019 / Published online: 18 January 2020

Table 2 Development of the delirium risk assessment score (DRAS) to predict delirium in the development cohort ($N=842$), univariate and multivariate analyses

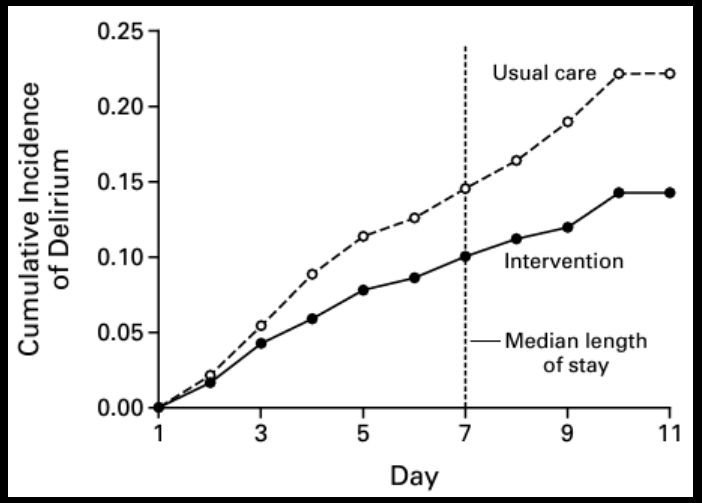
Risk factors	Univariate			Multivariate			Final DRAS
	OR	95% CI	*P*	OR	95% CI	*P*	Points
Acute admission	4.04	2.94–5.55	<0.001	2.99	2.12–4.22	<0.001	3
Alcohol, 4 or more units/day	1.85	1.00–3.41	0.046	2.7	1.34–5.45	0.01	3
Cognitive impairment	3.41	2.51–4.63	<0.001	2.4	1.72–3.36	<0.001	3
ADL/mobility problems	2.88	2.14–3.89	<0.001	1.91	1.36–2.68	<0.001	2
Age, 75 years or older	2.27	1.52–3.39	<0.001	1.46	0.93–2.28	0.14	1
Vision/hearing problems	2.09	1.54–2.83	<0.001	1.34	0.95–1.90	0.10	1
Medication, 5 or more prescriptions	1.92	1.43–2.57	<0.001	1.35	0.97–1.88	0.10	1
History of delirium	1.71	1.01–2.92	0.045	1.54	0.84–2.83	0.16	1
Comorbidity, 2 or more illnesses	2.19	1.60–1.49	<0.001	Excluded		0.83	Excluded
Gender (male)	1.36	1.00–1.84	0.051	Excluded			Excluded

Sensory loss & delirium



A MULTICOMPONENT INTERVENTION TO PREVENT DELIRIUM IN HOSPITALIZED OLDER PATIENTS

SHARON K. INOUYE, M.D., M.P.H., SIDNEY T. BOGARDUS, JR., M.D., PETER A. CHARPENTIER, M.P.H., LINDA LEO-SUMMERS, M.P.H., DENISE ACAMPORA, M.P.H., THEODORE R. HOLFORD, PH.D., AND LEO M. COONEY, JR., M.D.



- Early description (1999) of role of decreased sensory input in delirium risk
- Intervention on 6 risk factors, including vision (visual aids) & hearing loss (amplifiers)
- Outcomes: lower incidence of delirium, fewer episodes & days

Sensory loss & delirium

Original Study

A Delirium Risk Modification Program Is Associated With Hospital Outcomes

James L. Rudolph MD, SM[a,b,c,*], Elizabeth Archambault MSW, LICSW[a], Brittany Kelly BA[a,d] on behalf of the VA Boston Delirium Task Force

- Older VA patients (78.2 years), n=1527
- Modification of delirium risk through
  - Cognitive stimulation
  - Sensory improvement
  - Sleep promotion

Sensory loss & delirium

Original Study

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- Modification of delirium risk through
  - ➢ Cognitive stimulation
  - ➢ Sensory improvement
  - ➢ Sleep promotion

✓ ↓ length of stay
✓ ↓ restraint use
✓ ↓ costs (trend)

Concluding thoughts

- VI impacts many facets of life, including brain health
- Vision may be a modifiable lever to optimize late-life health and wellbeing, including dementia and delirium risk
- Longitudinal, generalizable, rigorous evidence is needed

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Research to Prevent Blindness