

Nocturnal Awakenings and Global Sleep Dissatisfaction in the General Population

Maurice M. Ohayon, MD, DSc, PhD

Director, Stanford Sleep Epidemiology Research Center
Stanford University, CA, USA

Objectives

- ✓ To assess the prevalence of nocturnal awakenings (NA) in the general population
- ✓ To evaluate associated daytime consequences
- ✓ To study comorbidity with mental, sleep and organic disorders

Methodology

- Representative sample, ≥ 18 years, California, New York and Texas population (66 millions inhabitants)
- 8,937 individuals
- Average participation rate: 85.3%

Collected data

- ✓ Socio-demographics
- ✓ Symptoms of sleep, psychiatric and organic disorders
- ✓ Quality of life
- ✓ Nocturnal awakenings (moderate & severe, 3 n./week, 1 month)
- ✓ NA comorbidity with psychiatric, sleep and organic disorders

Collected data

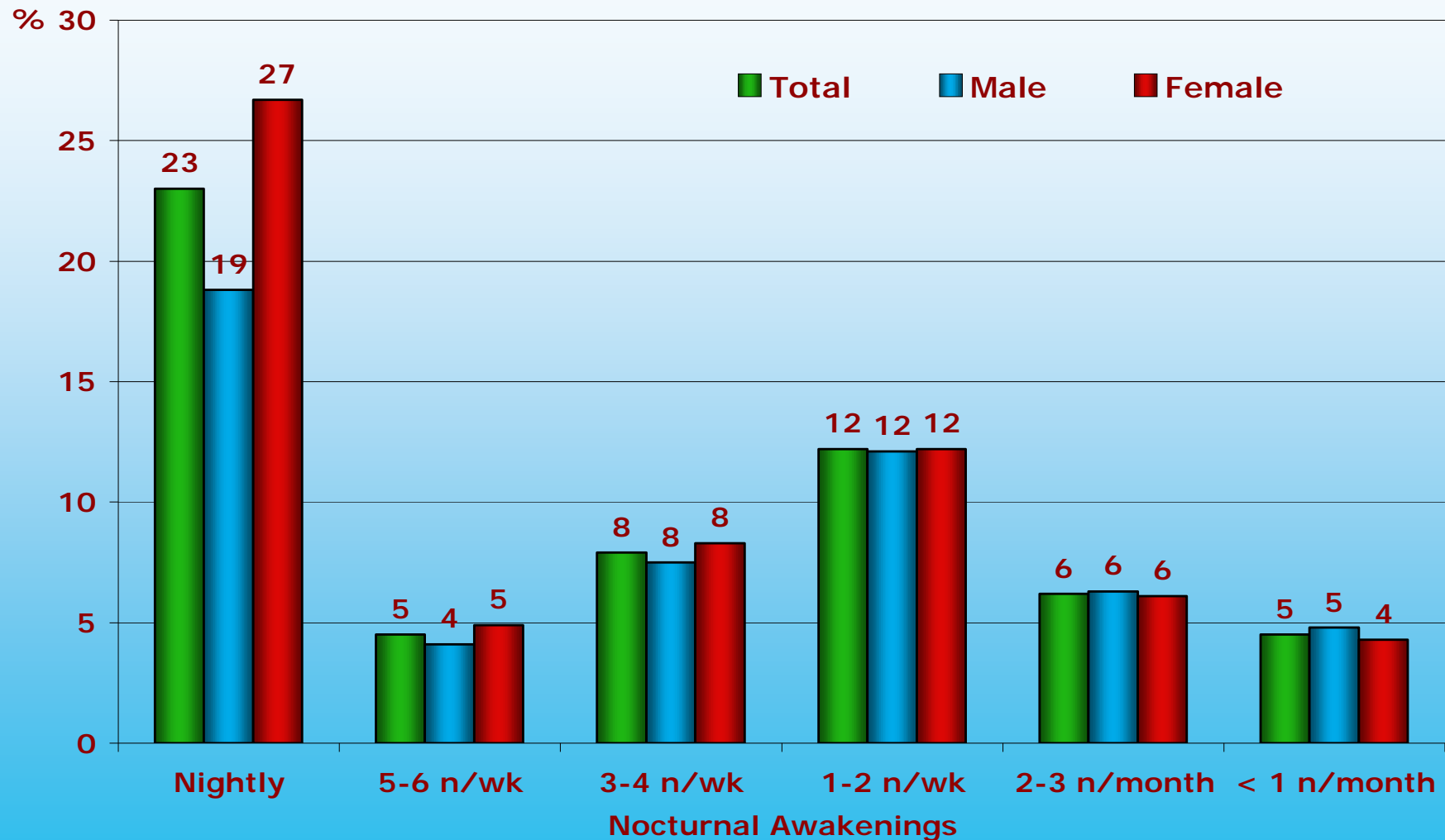
- ✓ Daytime functioning
 - Fatigue
 - Daytime sleepiness
 - Social functioning
- ✓ Medical history
 - Consultations, hospitalizations, medications, diseases, etc.

Diagnoses

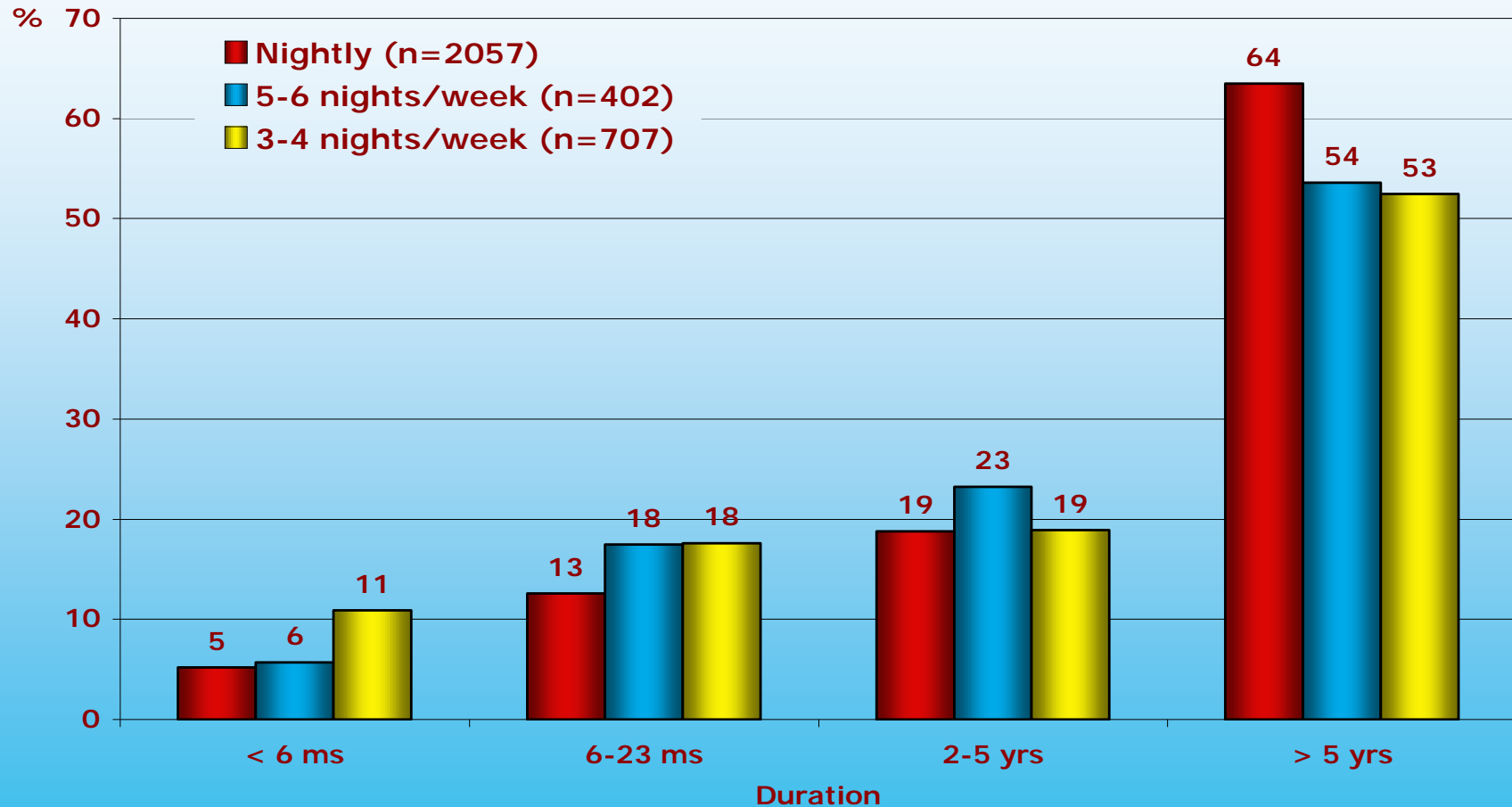
- ✓ Sleep disorder diagnoses according to DSM-IV and ICSD*
- ✓ Mental disorder diagnoses according to DSM-IV*
- ✓ Organic diseases according to ICD-10
- ✓ Psychotropic consumption according to the roster of pharmacological compounds

*** Positive and differential diagnoses**

How frequent are nocturnal awakenings?

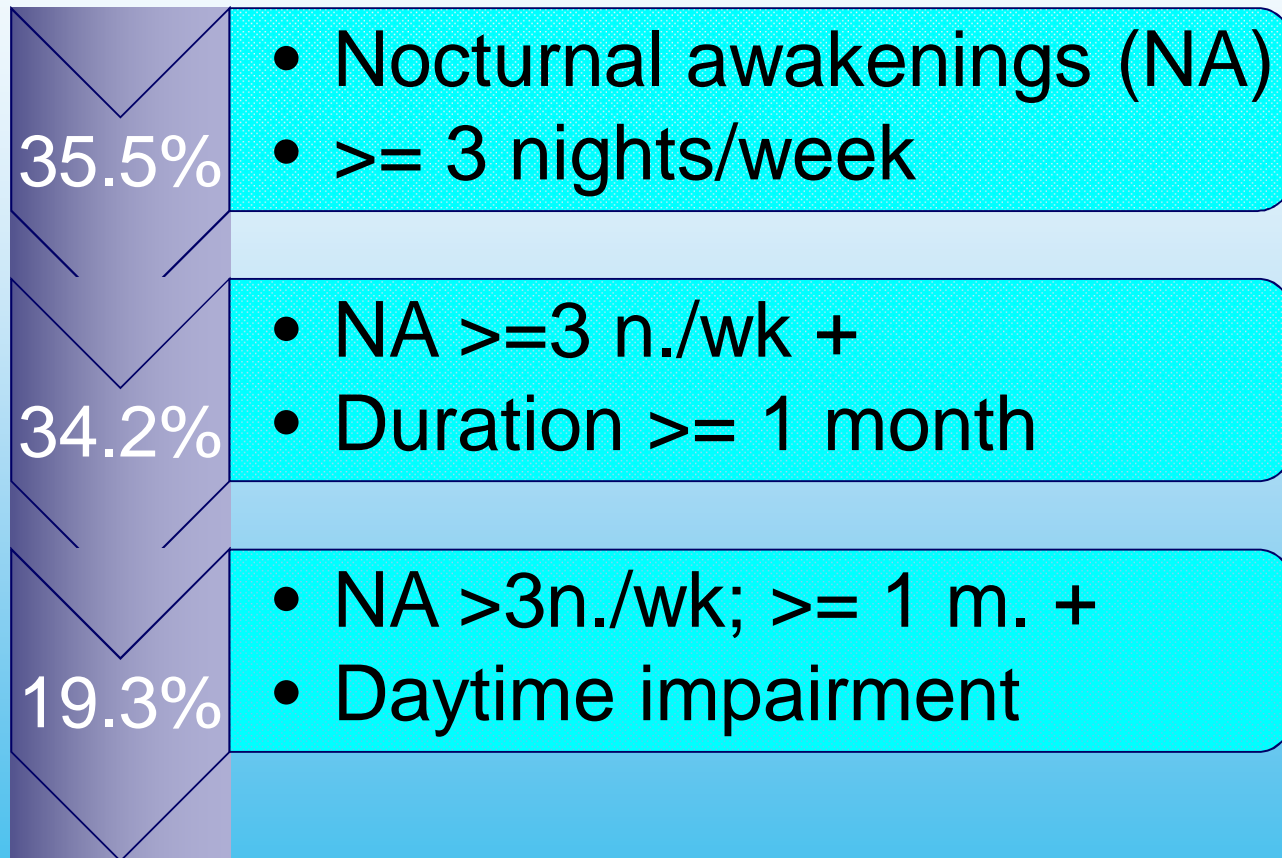


What is the duration?

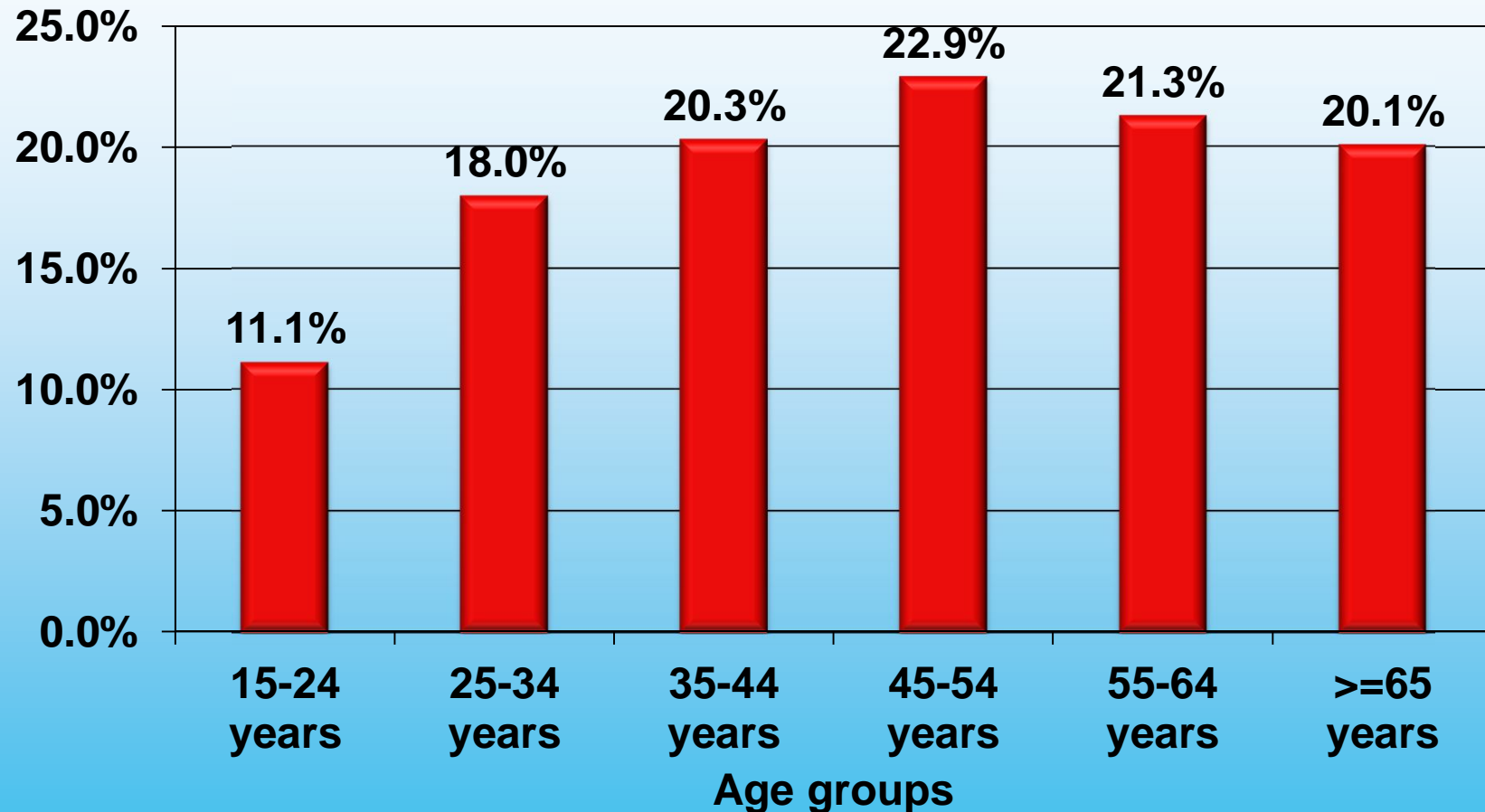


- ✓ Nocturnal awakenings occurring every night were experienced for a longer period than the other frequency groups

Prevalence of nocturnal awakenings

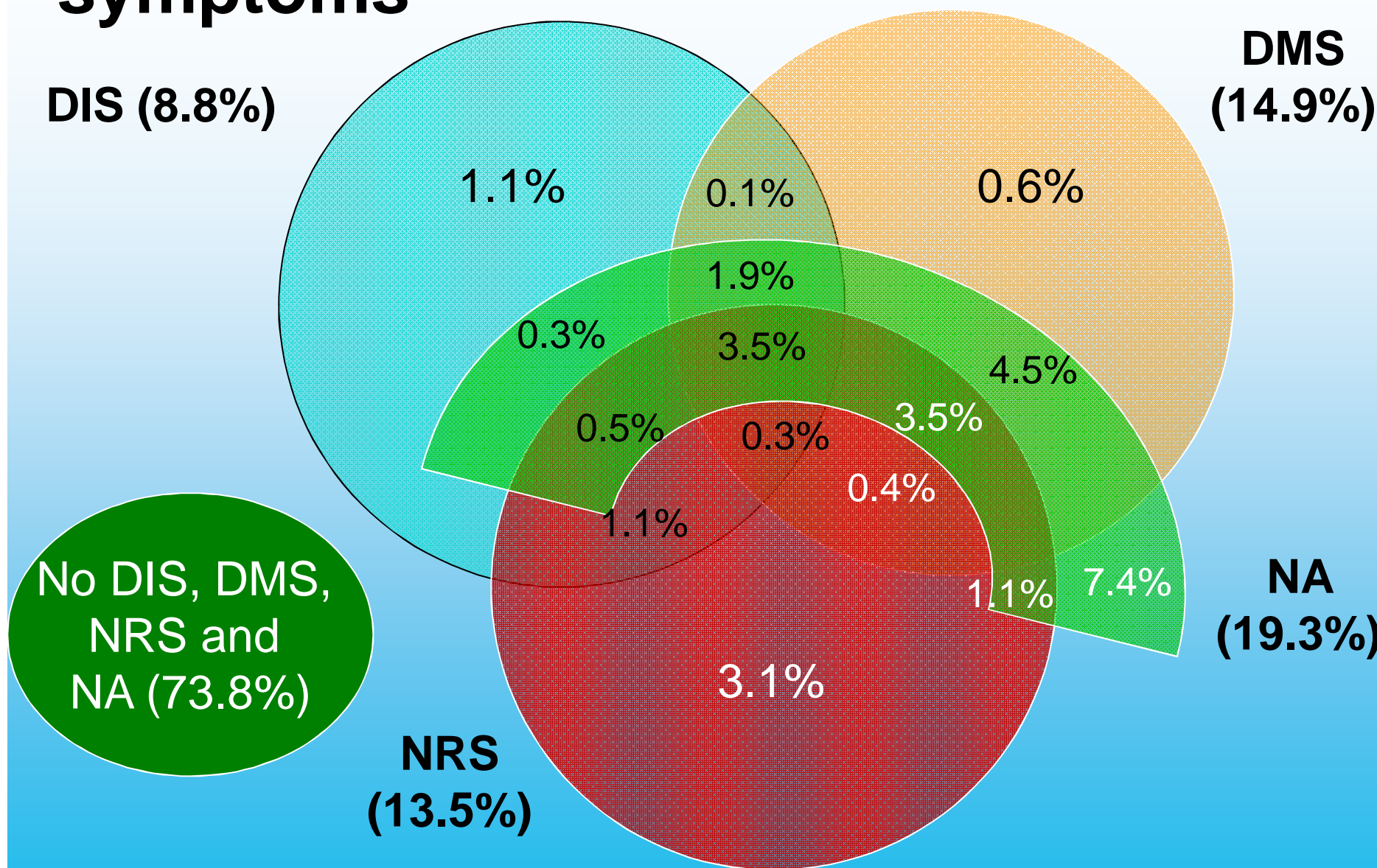


How do NA change with age?



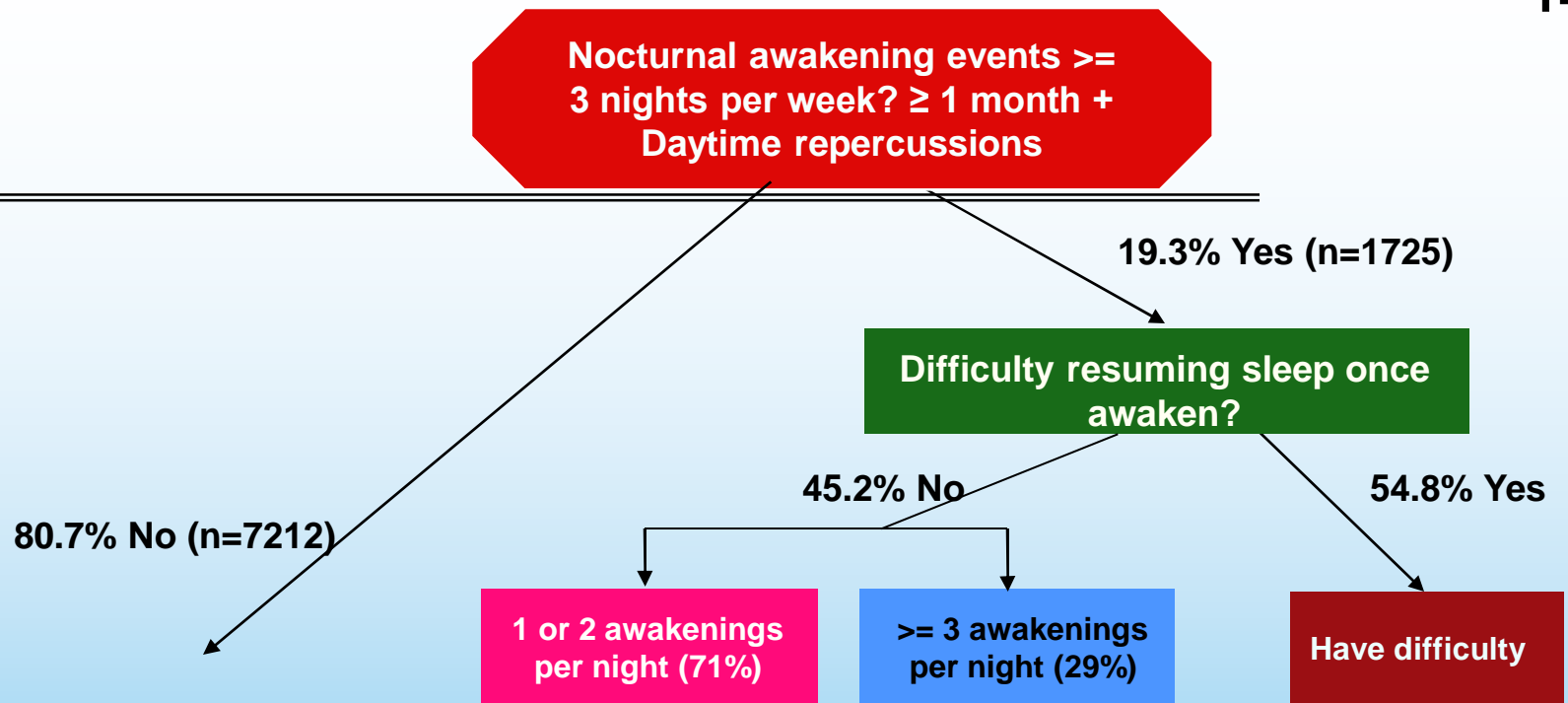
NA: ≥ 3 n/wk; ≥ 1 m + daytime consequences

Associations between insomnia symptoms



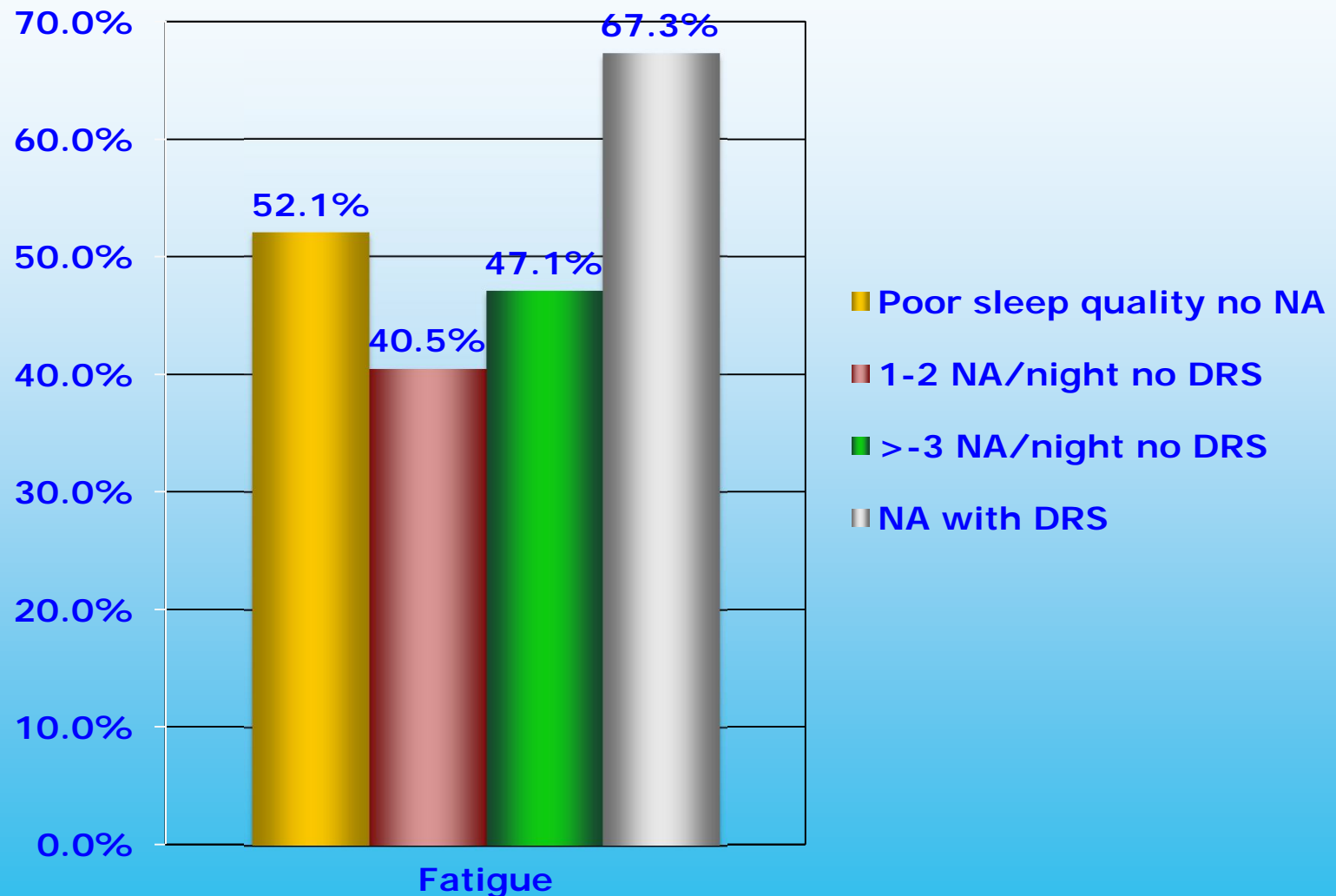
NA, DIS, DMS, NRS: ≥ 3 n/wk; ≥ 1 m. + daytime consequences

- ✓ 70.1% of **DIS** subjects also have **NA**
- ✓ 63.4% of **NRS** subjects also have **NA**
- ✓ 90.3% of **DMS** subjects also have **NA**



DIS?	19.6% (3.0%)	8.0% (14.0%)	4.8% (21.0%)	43.5% (44.8%)
EMA?	26.7% (3.6%)	6.5% (9.9%)	4.3% (16.6%)	47.9% (43.1%)
NRS?	19.2% (4.5%)	10.6% (28.2%)	6.3% (42.0%)	34.6% (54.1%)
GSD?	23.0% (5.5%)	7.9% (21.5%)	7.0% (45.3%)	40.6% (62.1%)
Unrested upon awakening?	42.4% (16.4%)	9.5% (43.6%)	5.1% (58.3%)	25.2% (67.9%)

Daytime repercussions: fatigue

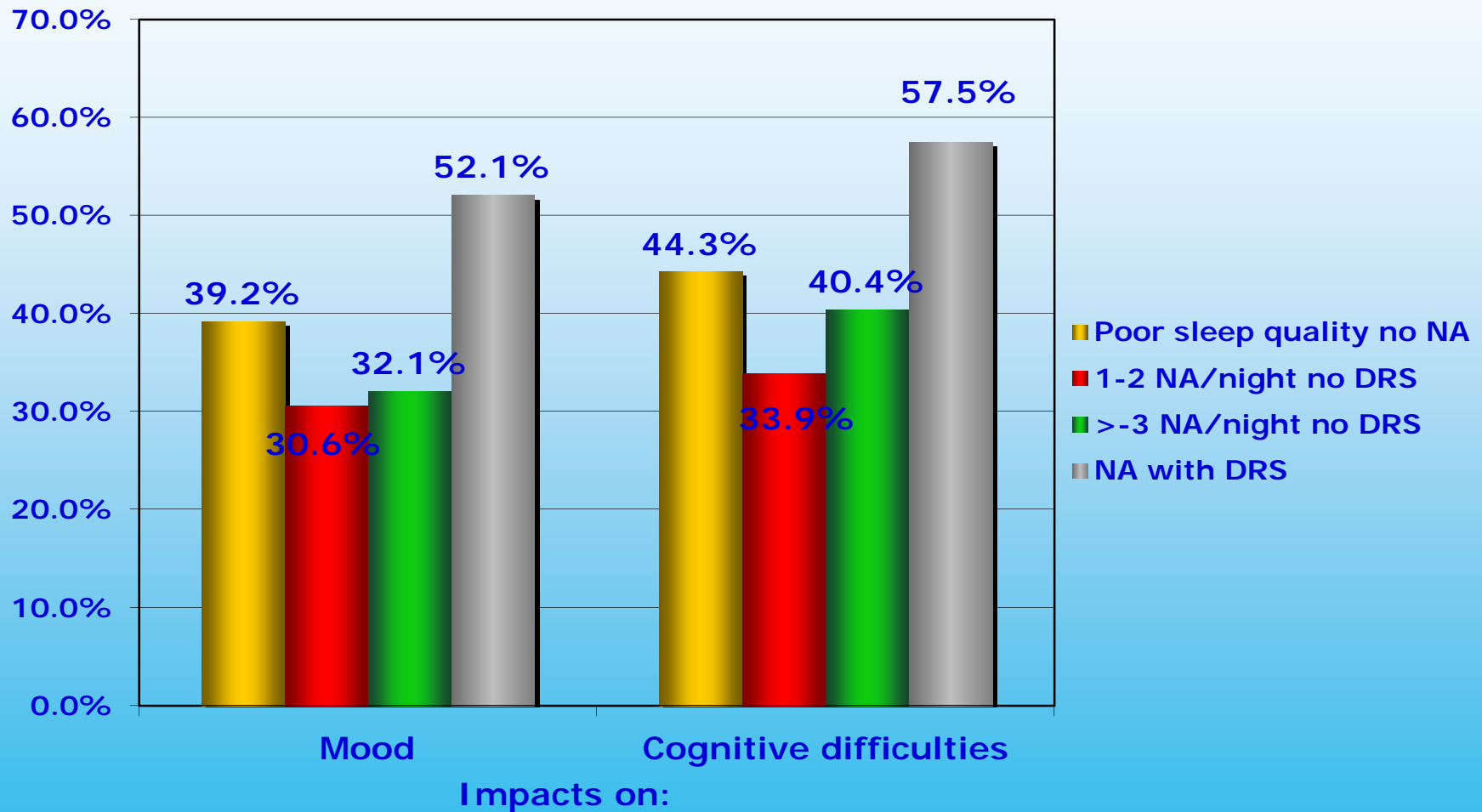


$p < .001$ DRS vs. all other groups

$P < .001$ Poor sleep vs. NA no DRS groups

NA: ≥ 3 n/wk; ≥ 1 m + daytime consequences

Repercussions on mood & cognition

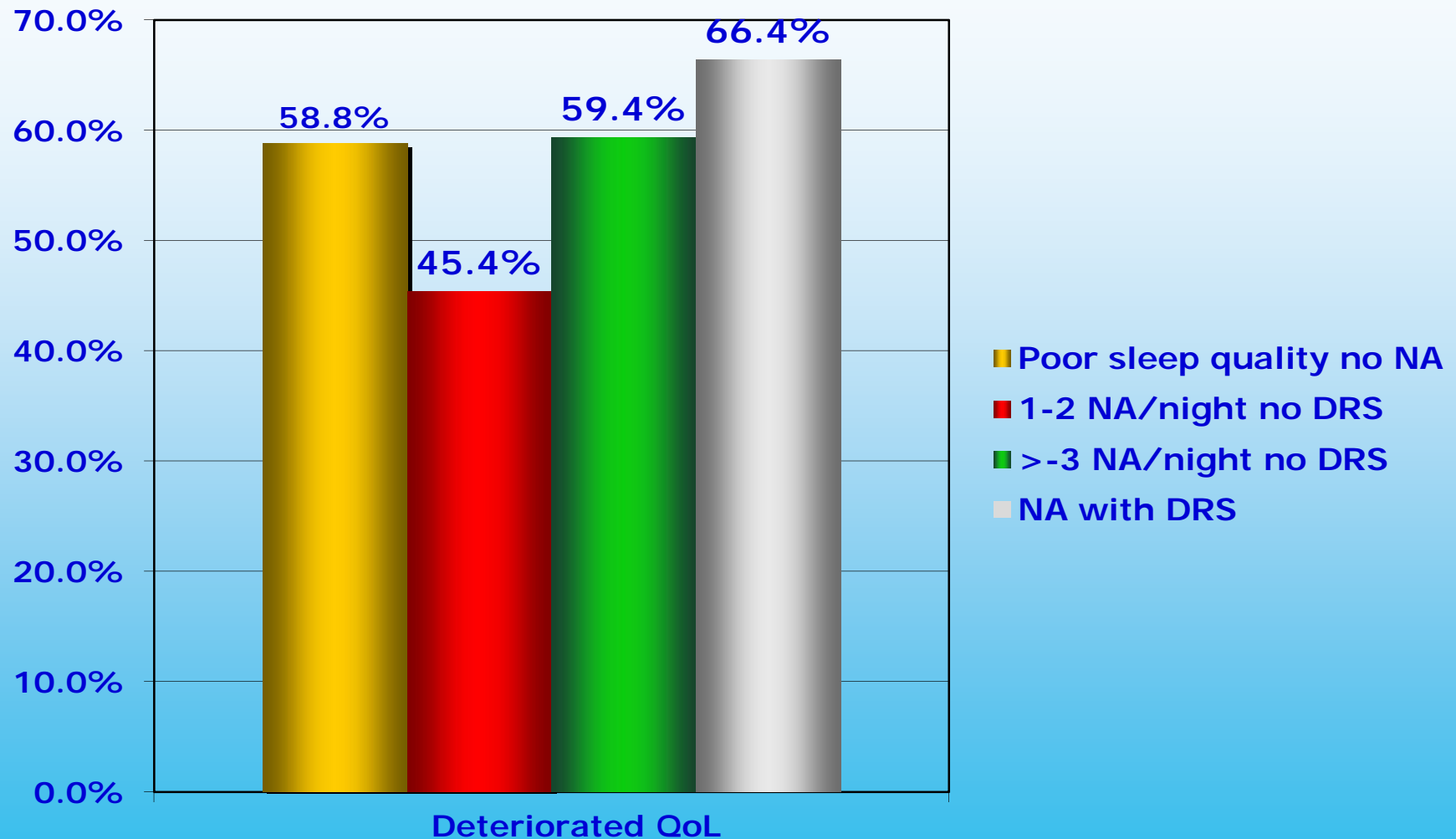


$p < .001$ DRS vs. all other groups

$P < .001$ Poor sleep vs. 1-2 NA no DRS

NA: ≥ 3 n/wk; ≥ 1 m + daytime consequences

Repercussions on QoL



$p < .001$ DRS vs. all other groups

$P < .001$ Poor sleep vs. 1-2 NA/n. no DRS

NA: ≥ 3 n/wk; ≥ 1 m + daytime consequences

Comorbidity with mental disorders

	Odds ratio (95% CI) ^a		
	1-2 NA ^b /night no DRS	>=3 NA ^b /night no DRS	NA ^b with DRS
Major depressive disorder	2.6 [1.8-3.8]	3.0 [1.8-5.0]	4.9 [3.8-6.3]
Anxiety	1.6 [1.2-2.0]	1.9 [1.4-2.8]	2.2 [1.9-2.7]
Bipolar disorder	2.1 [1.1-4.3]	-	4.6 [3.0-7.0]

^aCompared with subjects without nocturnal awakenings; CI: confidence interval

ORs adjusted for age and gender

From a representative sample of 8,937 American subjects (using the Sleep-EVAL system)

^bNA: >= 3 n/wk; >= 1 m + daytime consequences

Comorbidity with organic diseases

	Odds ratio (95% CI) ^a		
	1-2 NA ^b /night no DRS	≥3 NA ^b /night no DRS	NA ^b with DRS
Headache/migraine	1.8 [1.3-2.6]	3.3 [2.1-5.2]	3.7 [2.9-4.7]
Diabetes	1.6 [1.0-2.3]	n.s.	1.5 [1.0-2.1]
Upper airway disease	n.s.	1.8 [1.1-3.0]	1.3 [1.0-1.8]
Heart disease	1.8 [1.2-2.6]	n.s.	2.1 [1.5-3.0]
Chronic pain	1.6 [1.3-1.9]	2.8 [2.1-3.7]	2.8 [2.4-3.2]
G.E.R.D.	1.8 [1.1-2.8]	4.9 [3.1-7.8]	2.0 [1.2-3.2]

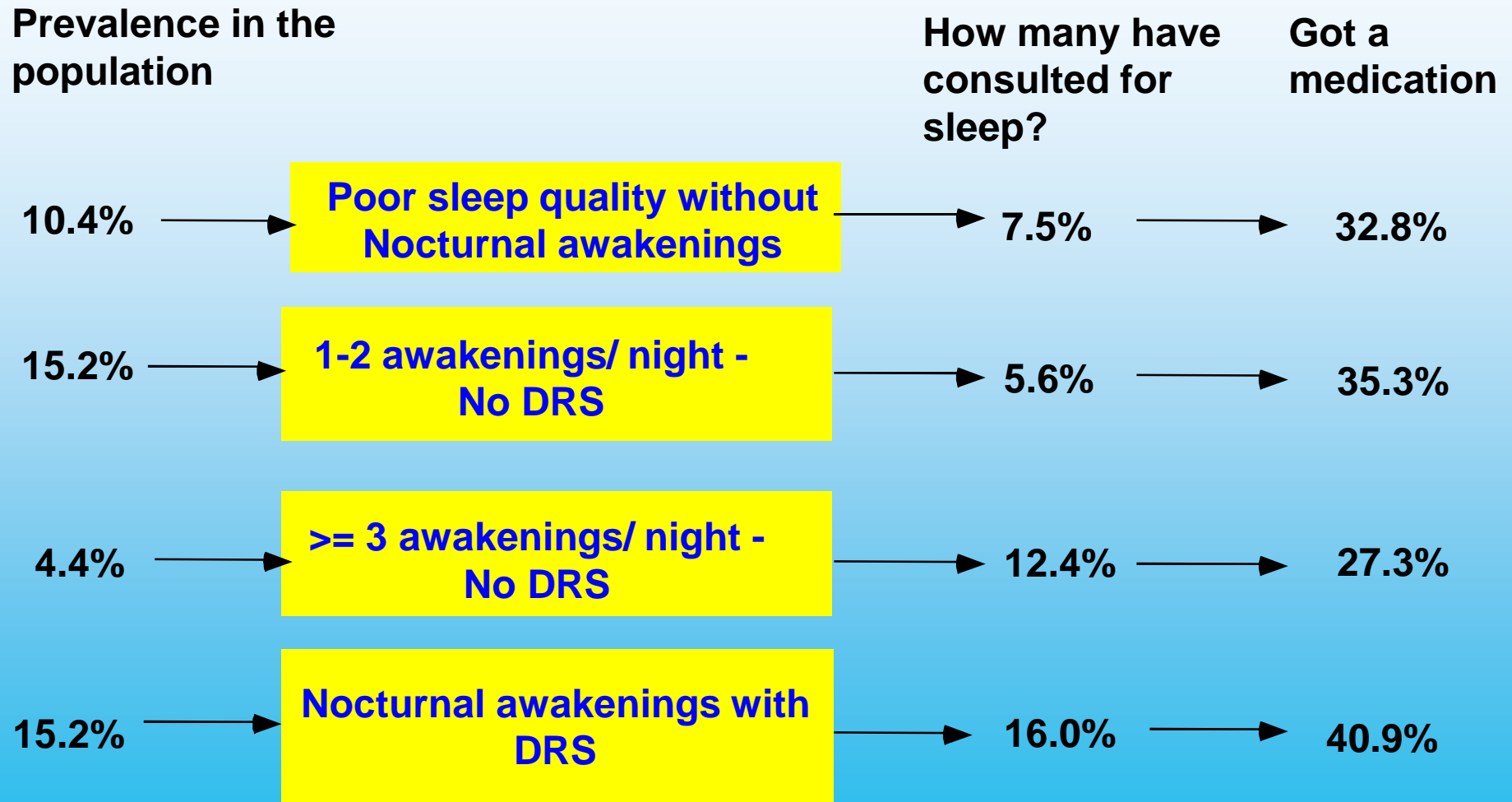
^aCompared with subjects without nocturnal awakenings; CI: confidence interval

ORs adjusted for age and gender

From a representative sample of 8,937 American subjects (using the Sleep-EVAL system)

^bNA: ≥ 3 n/wk; ≥ 1 m + daytime consequences

Consultation & treatment



DRS: difficulty resuming sleep

Conclusions

- ✓ 35.5% of the general population report nocturnal awakenings ≥ 3 nights per week
- ✓ 15.2% of the general population report difficulty resuming sleep once awoken
- ✓ NA with difficulty resuming sleep is strongly associated with greater daytime impairment