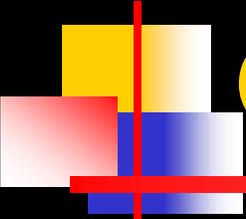# Insomnia in the General Population: Prevalence, Risk Factors and Natural Evolution

Maurice M. Ohayon, MD, DSc, PhD

Professor of Psychiatry & Behavioral Sciences

Director, Stanford Sleep Epidemiology Research Centre (SSERC)

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Objectives

- Influence of anxiety and depression on the development of insomnia

- Interface between mental issues, pain, and organic diseases with insomnia

- Pain related issues associated with the development of insomnia

- Predictor, cause or consequence roles of insomnia

- Common answer: longitudinal studies in representative cohorts of the General Population.

Prevalence Evolution of Insomnia

70s to
mid 90s

> 1996
Ohayon et al.

> 1996
Ohayon et al.

> 1997
Ohayon et al.

Insomnia Symptoms
BINARY PRESENCE: 30-48%
SEVERITY: Moderately to extremely: 10-28%
FREQUENCY: 3 nights/wk,often,always: 16-21%

**Insomnia Symptoms +
daytime consequences**
9-15%

**Dissatisfaction with Sleep
Quality or Quantity (GSD)**
8-18%

**Insomnia
diagnoses**
6%

Ohayon MM. Epidemiology of Insomnia: What We Know and What We Still Need to Learn. 2002.

Dissatisfaction with quantity

Sleep not enough

Sleep too much

Husby and Lingjaerde, 1992, Norway (Tromso)
Ohayon et al., 1997, UK
Ohayon et al., 1997, CA (Mtl)
Ohayon et al., 2001, Europe

Bixler et al., 1979, USA (Los Angeles, CA)
Ford and Kamerow, 1989, USA (Baltimore, Durham, Los Angeles)
Tellez-Lopez et al, 1995, Mexico (Monterrey)
Ohayon et al., 1997, UK

Prevalence: 20% to 41.7%

Prevalence: 2.8% to 9.5%

Dissatisfaction with quality

Difficulty falling asleep
P: 4% - 17%

Nocturnal awakenings
P: 12% - 32%

Early morning awakening
P: 5%-16%

Non-restorative sleep
P: 3% - 15%
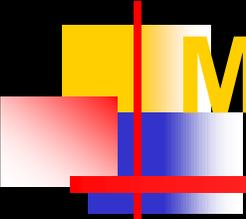
Pain during sleep
P: 4% - 14%
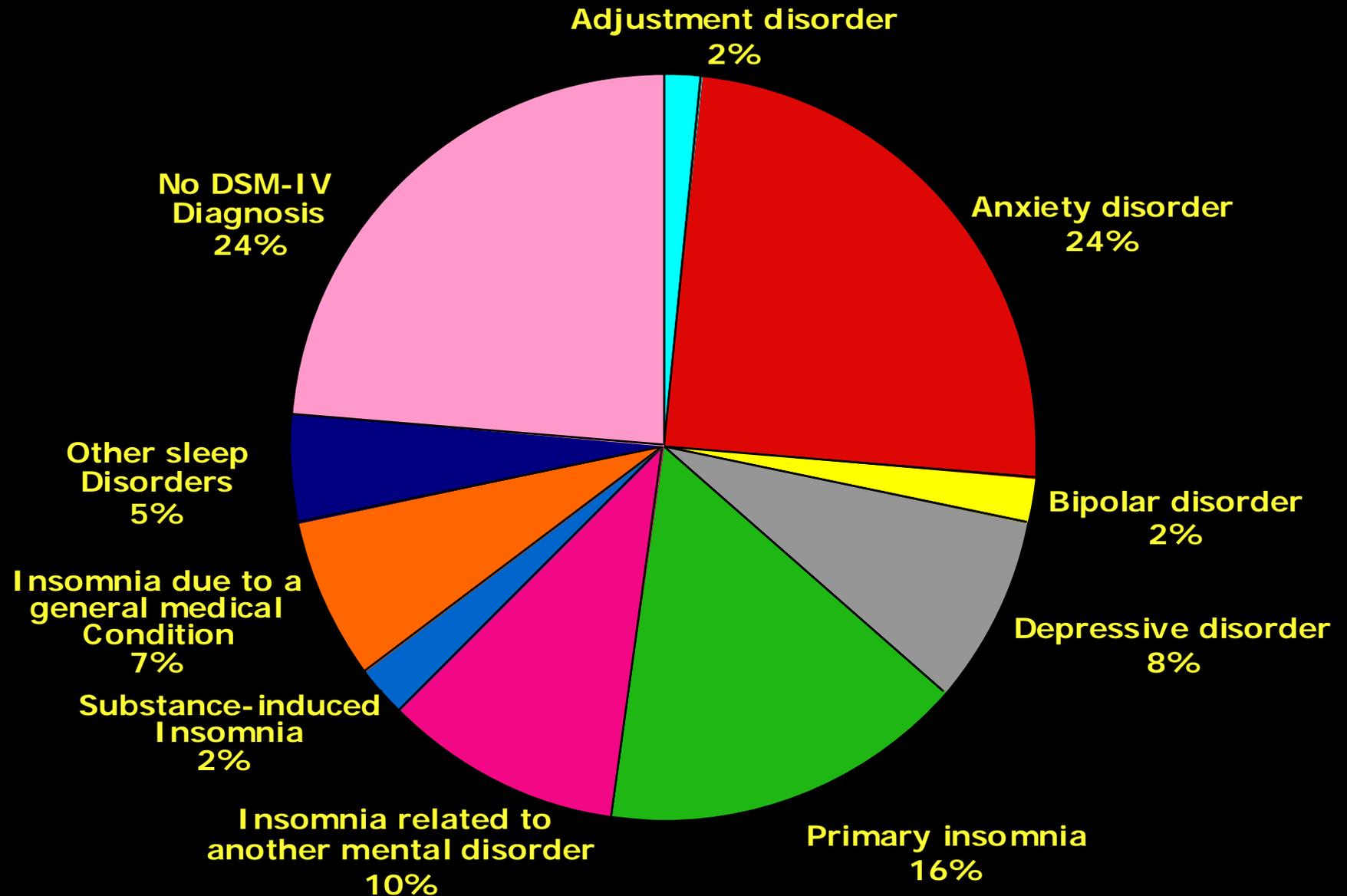
Difficulty breathing
P: 2% - 9%

Mental Disorders and Insomnia

- **What we know from cross-sectional studies:**
  - Subjects with insomnia exhibit **SYMPTOMS** of depression in 40% to 60% of the cases (Mellinger et al., 1985; Hendersen et al., 1995; Foley et al.,1995; Ohayon et al., 1998)

  - Subjects with insomnia have a **DIAGNOSIS** of depression in 10% to 25% of cases. (Ohayon et al., 1997, 2000;2003; Maggi et al., 1998; Taylor et al., 2005).

  - Subjects with insomnia have a **DIAGNOSIS** of anxiety disorder in 20% to 30% of cases . (Ohayon et al., 1997, 2000;2003; Maggi et al., 1998; Taylor et al., 2005)

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# DSM-IV Diagnostic Distribution (subjects with insomnia)

- Adjustment disorder 2%
- Anxiety disorder 24%
- Bipolar disorder 2%
- Depressive disorder 8%
- Primary insomnia 16%
- Insomnia related to another mental disorder 10%
- Substance-induced Insomnia 2%
- Insomnia due to a general medical Condition 7%
- Other sleep Disorders 5%
- No DSM-IV Diagnosis 24%

Ohayon MM. Epidemiology of Insomnia: What We Know and What We Still Need to Learn. Sleep Medicine Reviews 2002; 6:97-111.
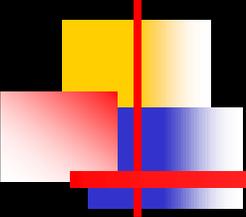
In summary …

- **The association between insomnia, depression and anxiety is highly prevalent.**

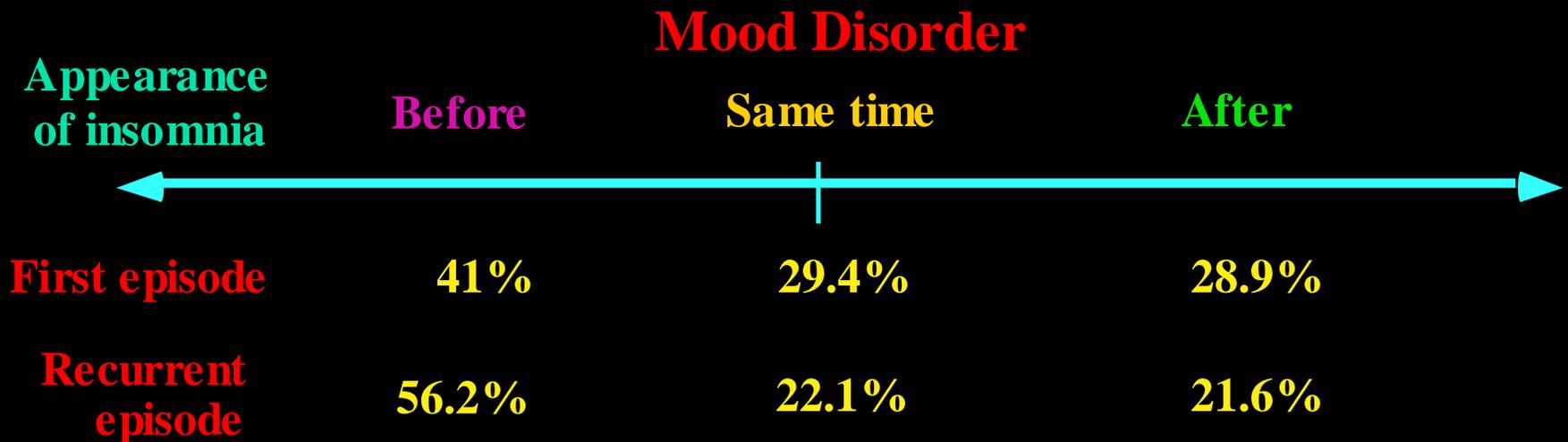- **Better control over other predictors of mental disorders (obesity, chronic pain…) might offer a clearer picture**

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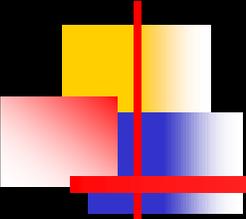
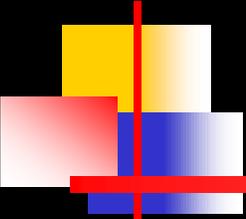# The psychiatric risk: Longitudinal studies

- **Insomnia at point 1 predicts depression at point 2 (Ford & Kamerow, 1989; Breslau et al., 1996; Weissman et al., 1997; Roberts et al., 2000)**

- **Persistence of insomnia (present in both evaluation) is a stronger predictor of depression at point 2 (Ford & Kamerow, 1989; Roberts et al., 2000; Perlis et al., 2006)**

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Timeline Insomnia/depression

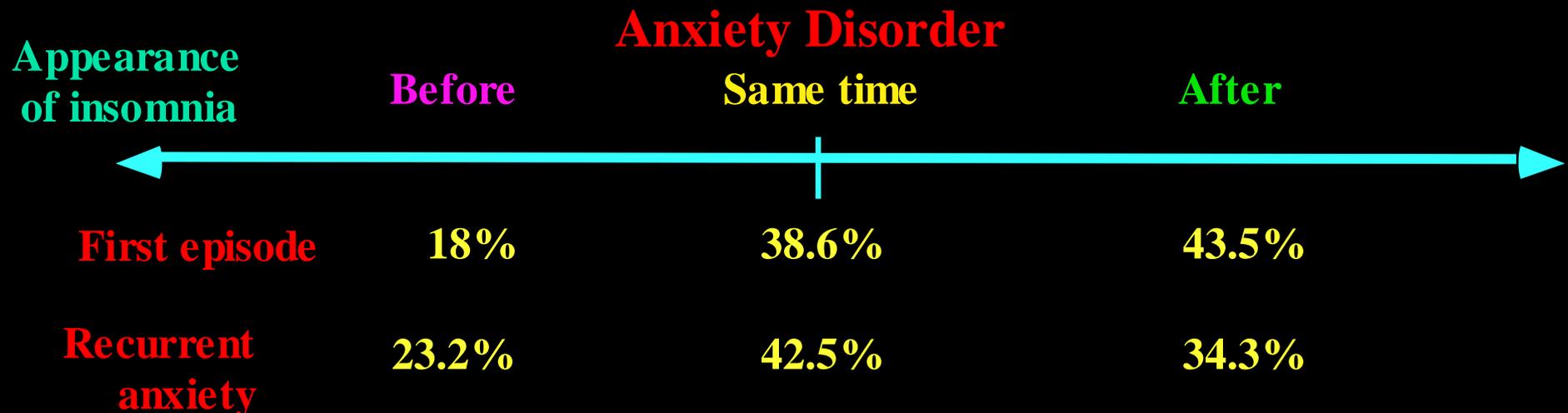| Appearance of insomnia	Mood Disorder		
	Before	Same time	After
First episode	41%	29.4%	28.9%
Recurrent episode	56.2%	22.1%	21.6%

- Insomnia is present in nearly 70% of mood disorders
- Insomnia preceded the apparition of mood disorders in nearly half cases

In: Ohayon, 2003: Place of chronic insomnia in the course of depressive and anxiety disorders. J Psychiatr Res

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Timeline Insomnia/Anxiety

Anxiety Disorder

Appearance of insomnia	Before	Same time	After
First episode	18%	38.6%	43.5%
Recurrent anxiety	23.2%	42.5%	34.3%

- Insomnia is present in about 1/3 of anxiety disorders
- Insomnia preceded the apparition of anxiety disorders in about 1/5 cases

In: Ohayon, 2003, Place of chronic insomnia in the course of depressive and anxiety disorders. J Psychiatr Res
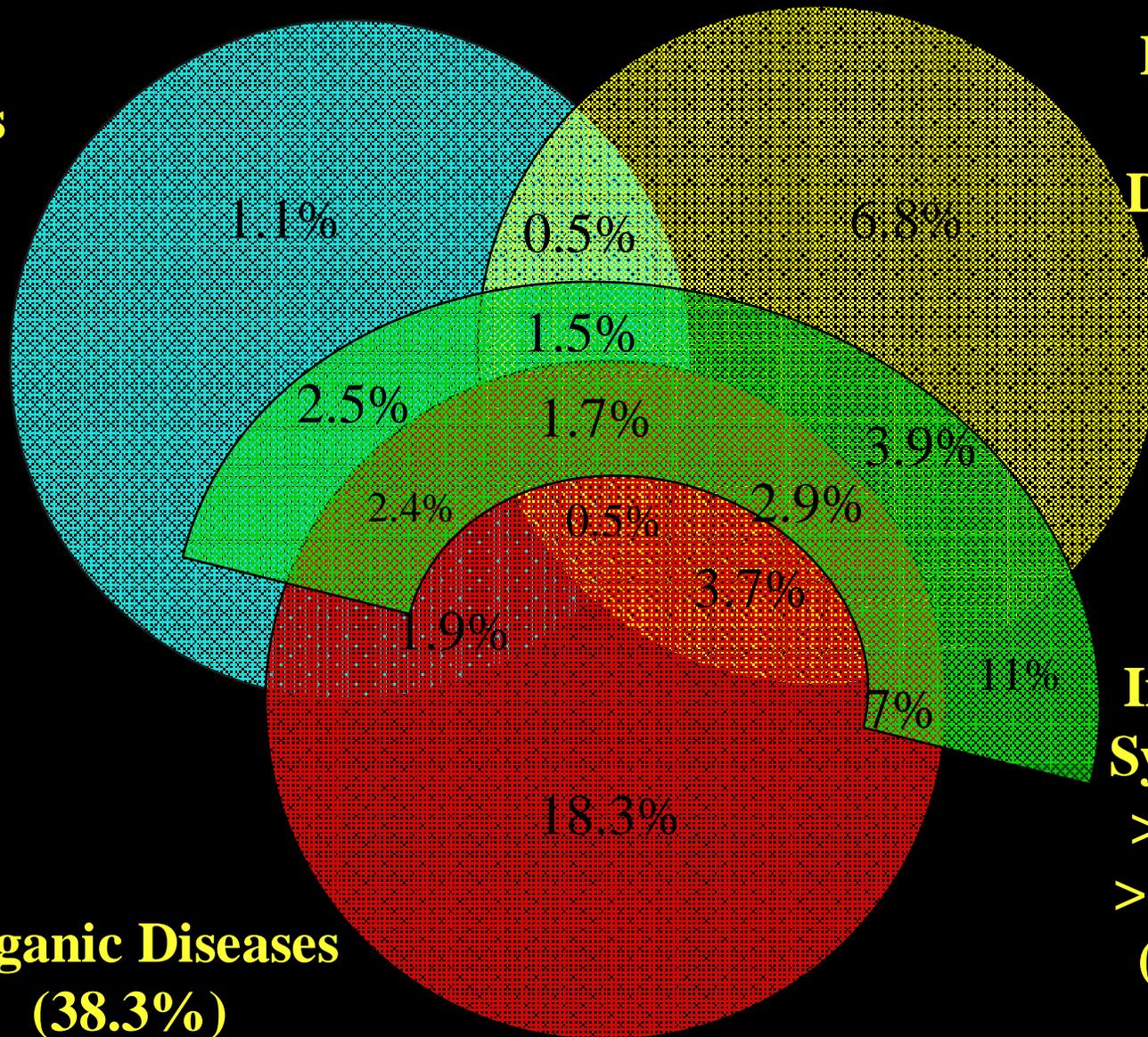
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In summary …

- **Most longitudinal studies present the association insomnia-mental disorder as unidimensional while multi-dimensional models would be more appropriate**

- **Is insomnia a precursor rather than a cause of mental disorder?**

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Overlapping Mental, Organic and Sleep Disorders (General Population)

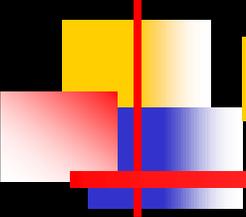
Dysomnias DSM-IV, ICSD Dx (12.2%)

DSM-IV Mental Disorders (21.4%)

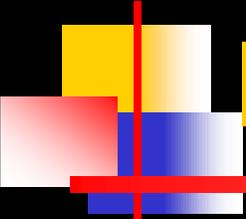**Insomnia Symptoms >=3n/wk > 1 month (33.0%)**

Organic Diseases (38.3%)

1.1%
0.5%
6.8%
1.5%
2.5%
1.7%
3.9%
2.4%
0.5%
2.9%
3.7%
1.9%
1.1%
7%
18.3%

From Ohayon MM. J Psy Res 2006

In summary …

- Insomnia symptoms rarely occur alone:
  - In half cases a concurrent organic disease is observed
  - In a third of cases a mental disorder is present
  - In 1 on 10, organic disease and mental disorder are present.
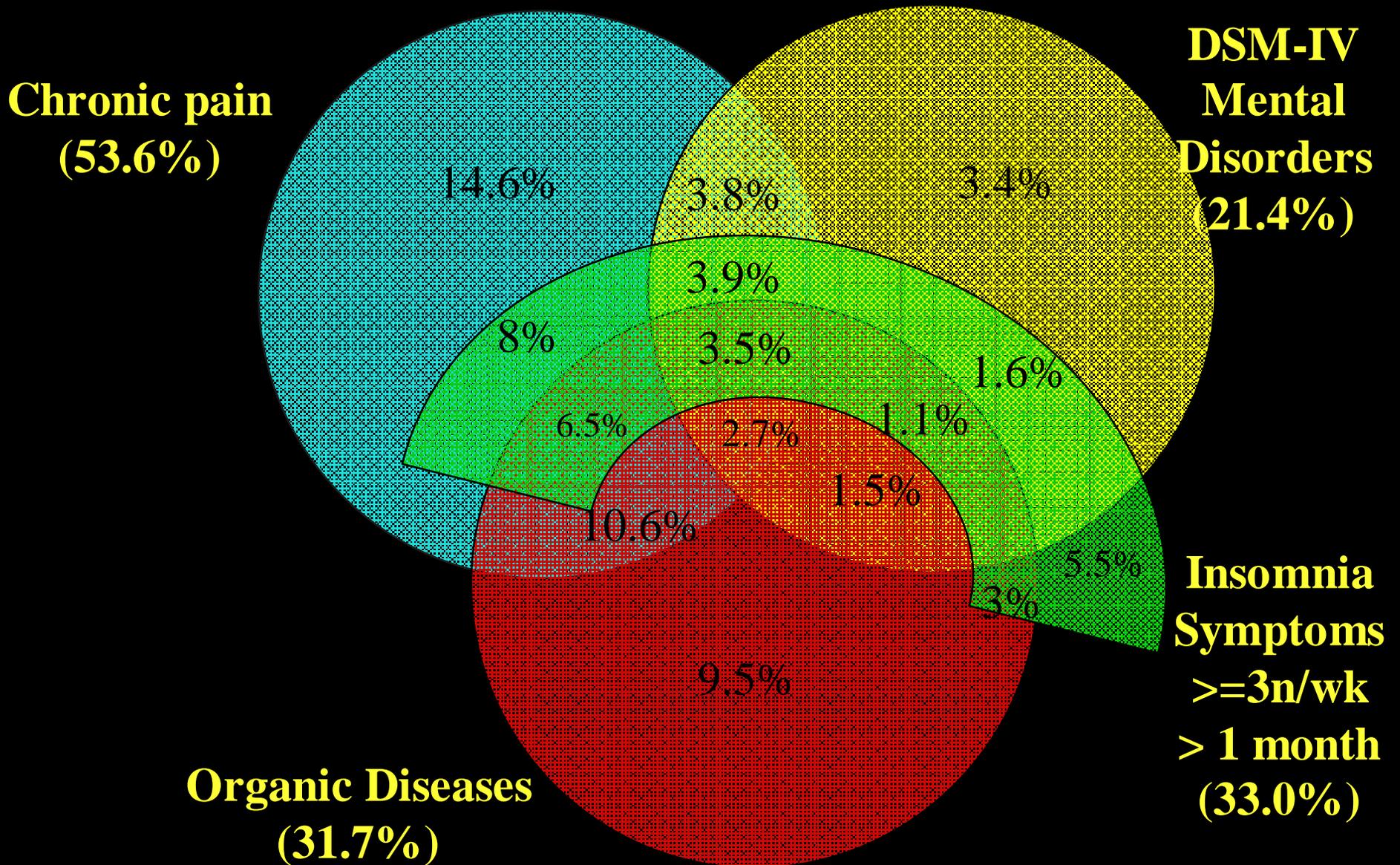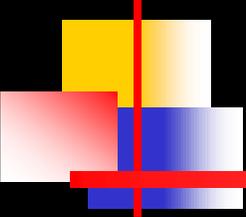
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In summary …

- In nearly 70% of cases, mental disorders are concomitant with organic diseases and/or other dyssomnias.

- More than 50% of organic diseases are accompanied with mental disorders and/or other dyssomnias (OSAS; RLS; circadian rhythm disorders; hypersomnia; narcolepsy).

# Overlapping Pain, Mental and Organic Disorders
(General Population)

Chronic pain (53.6%)

DSM-IV Mental Disorders (21.4%)

Organic Diseases (31.7%)

Insomnia Symptoms >=3n/wk > 1 month (33.0%)

14.6% 3.8% 3.4%

3.9%

8% 3.5% 1.6%

6.5% 2.7% 1.1%

1.5%

10.6% 5.5%

3%

9.5%

In summary …

- 66.8% of Insomnia symptoms are associated with chronic pain

- 72% of subjects with mental disorders also have chronic pain

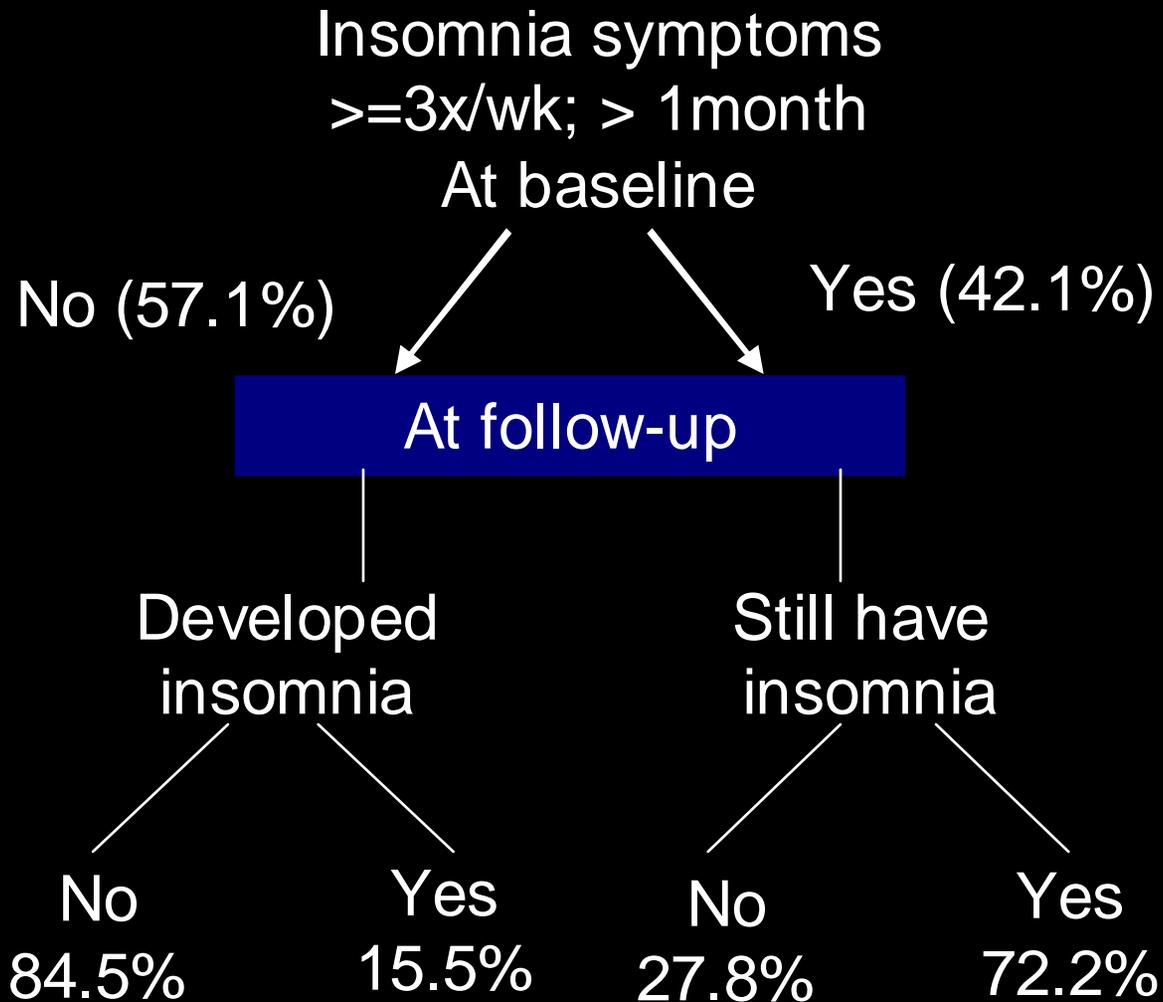- 79% of subjects with organic disease also have chronic pain

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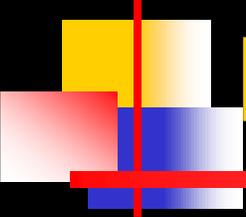
Evolution of insomnia

- Baseline: 3,249 adults from the general population; 2,729 agreed to be part of the longitudinal survey

- 3 years follow-up: 1,957 were reached
  - Among participants lost to follow-up: 17 had died; 41 were seriously ill or hospitalized; 379 numbers were disconnected; 132 refused to participate and 203 numbers were attributed to a new household

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Evolution of insomnia

Insomnia symptoms
>=3x/wk; > 1month
At baseline

No (57.1%)   Yes (42.1%)

At follow-up

Developed
insomnia

Still have
insomnia

No
84.5%

Yes
15.5%

No
27.8%

Yes
72.2%

Ohayon MM, 2007

Are pre-existing pain and mental disorders predictors for the development of insomnia?

Baseline (no insomnia)	Incident insomnia at 3-year follow-up
MDD (3.7%)	RR: 3.8
Anxiety disorder (11.3%)	RR: 2.6
Chronic pain (40.6%)	RR: 1.8

RR adjusted for age, gender and race

Is insomnia predictor for the development of pain and mental disorders?

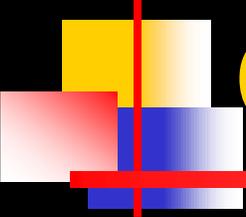| Baseline Presence of insomnia with	Incident disorder at 3-year follow-up
No MDD (87.2%)	RR: 2.1
No Anxiety disorder (76.2%)	RR: 1.9
No Chronic pain (41.7%)	RR: 1.2 (n.s.)

RR adjusted for age, gender and race

Conclusions

- Insomnia, psychiatric disorders, organic diseases and pain are closely interrelated

- MDD at baseline is the strongest predictor of developing insomnia

- Insomnia at baseline is associated with 3 times the risk of developing MDD and anxiety at 3-year follow-up

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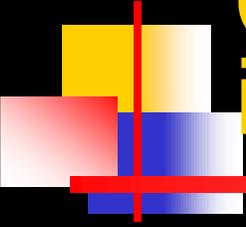
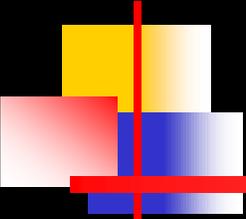# Other risk factors associated to insomnia

- Life style

- Psycho-active substances
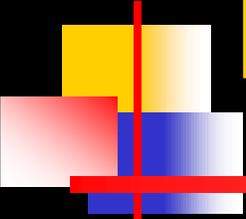
Life Style

- **Epidemiological studies have reported higher risks of insomnia in individuals with:**

  - **High stress** (Ohayon et al., 2001, 2002)

  - **No work** (Hoffmann, 1999; Vela-Bueno et al., 1999; Ohayon et al., 1997; Chevalier et al., 1999)

  - **Shift/night work** (Ohayon et al., 1997, 2002)

 - **Inappropriate bedroom temperature** (Ohayon et al., 2001)

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Psycho-active substances

Epidemiological studies have reported higher risks (odds of 1.2 to 2) of insomnia in individuals using:

- **Tobacco** **(Janson et al., 1995; Philips and Danner,1995; Wetter and Young, 1994; Revicki et al., 1991)**

- **Antihypertensive drugs** **(Bardage and Isacson, 1993; Gislason and Almqvist, 1987)**

- **Alcohol** **(Ohayon et al., 2001; Ancoli-Israel and Roth, 1999; Pillitteri et al., 1994)**

- **Alcohol used as a sleeping aid in 4 out of 10 individuals with sleep disturbances** **(Johnson et al., 1998; Ancoli-Israel and Roth, 1999; Roehrs et al., 2002)**
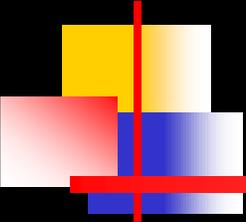
Occupational and domestic accidents

- **In elderly, insomnia was associated with:**
  - increased risk of hip fracture (Fitzpatrick et al., 2001)
  - falls (Brassington et al., 2000; Mendez Rubio et al., 1997)
- **Occupational accidents**
  - Relative risk of 1.9 for fatal occupational accidents in individuals with difficulty in sleeping (Akerstedt et al., 2002)
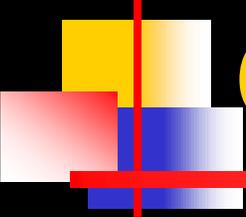
Conclusions

- **About 1 individual in 3 report insomnia**

- **In about 75% of cases, association with other factors such as organic diseases,mental disorders or sleep disorders are observed**
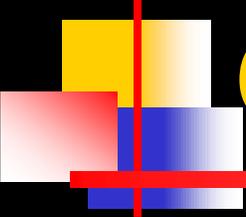
Conclusions

- **Risks of having insomnia are the highest when a mental disorder is present**

- **Insomnia can be both a cause or a consequence of a mental disorder**

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