

GERD & SLEEP IN THE US GENERAL POPULATION: ESTABLISHING A LINK BETWEEN DISEASES, SYMPTOMS & CHRONICITY

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METHODS

- Interviews were conducted by phone using the Sleep-EVAL system.
- **A subject was characterized as having GERD if:**
 - It was stated by the subject (“my physician told me I have GERD”)
 - OR It was identified by Sleep-EVAL differential diagnosis and confirmed by clinical expert
 - AND Subject had at least 1 GERD symptom
- The interviews included, among else, socio-demographic information, sleep/wake schedule and sleeping habits.
- Diagnoses were given according to ICD-10 (organic diseases), DSM-IV-TR (sleep and mental disorders) and ICSD2 (sleep disorders).

STUDY SAMPLE

- Sample (13,937 subjects) of the general population over 18

- California,
- New York,
- Texas,
- Arizona,
- Colorado,
- Idaho,
- Oregon,
- Pennsylvania



Adult Population in these states = 230 million
(USA total Adult Population = 280 million)

- Sample is representative of these states:
 - Probability-to-size sampling (states with different population sizes)
 - Avoidance of within-sampling error by Kish method
 - Avoidance of participation bias (participation rate = 88%)

DISTRIBUTION OF THE SAMPLE BY STATES AT WAVE 1 AND WAVE 2

| | Wave 1 | Wave 2 |
|--------------|--------|--------|
| | N | N |
| California | 3104 | 2688 |
| New York | 3583 | 3442 |
| Texas | 2249 | 1872 |
| Arkansas | 704 | 605 |
| Colorado | 591 | 508 |
| Idaho | 173 | 167 |
| Oregon | 350 | 287 |
| Pennsylvania | 1464 | 1361 |
| Total | 12218 | 10930 |

STUDY SAMPLE

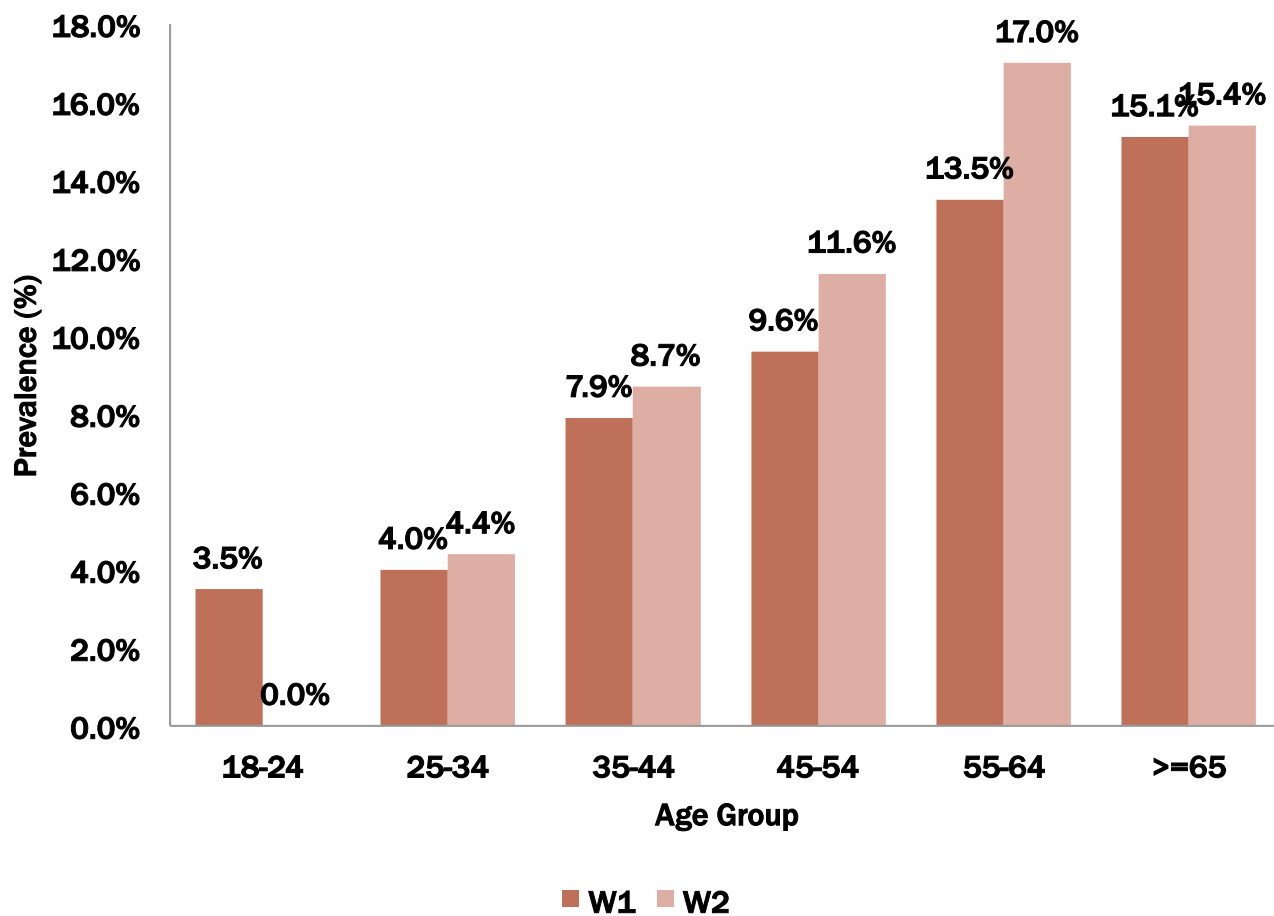
Longitudinal follow up of the sample:

- Time between interviews (W1 & W2): 3 years (last interview 2014)
- Loss at follow up 10.5%
- As would be expected the average age of the sample at W2 was 3 years higher (56) compared to the sample at W1 (53)

RESULTS



PREVALENCE AT W1 AND W2

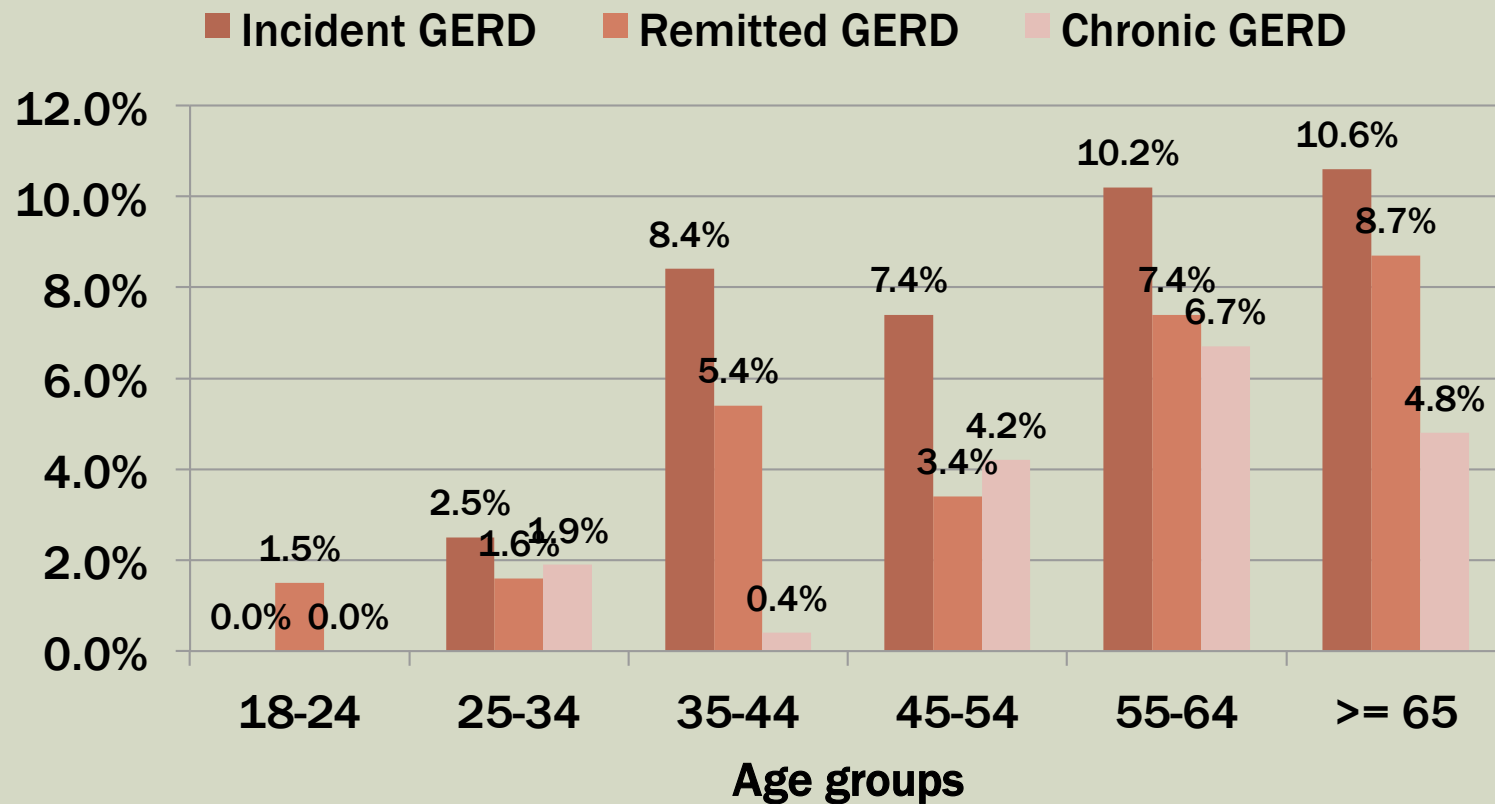


Prevalence significantly increased with age ($p < 0.0001$ in both waves)

PREVALENCE

- **At W1**, 10.6% (C.I. 95% 10.0%-11.2%) of the sample reported having seen a physician and/or were taking a medication for GERD (prescribed or over the counter).
- **At W2**, 12.4% (C.I. 95%, 11.8%-13.1%) of the sample consulted a physician for GERD and/or were taking a medication for GERD.
- 6% of the total sample reported GERD only at W1 (remitted GERD) (55.2% were women)
- 8.5% of the total sample reported GERD only at W2 (incident GERD) (63.5% were women)
- **3.9% of the sample reported GERD at W1 and W2 (chronic GERD)**

PREVALENCE OF GERD AT W2



- Prevalences are based on the total samples
- Note that incident GERD is not the incidence but the prevalence of new GERD cases in the total sample

RELATIVE RISKS (RR) BY GERD STATUS AT W2 AND AGE GROUPS

| | Remitted GERD (n=864) | | Incident GERD (n=656) | | Chronic GERD (n=492) | |
|------------------|--------------------------|--------------|--------------------------|--------------|-------------------------|---------------|
| | RR | 95% CI | RR | 95% CI | RR | 95% CI |
| Age at W1 | | | | | | |
| <35 y.o. | 1.00 | | 1.00 | | 1.00 | |
| 35-44 y.o. | 2.14 | [1.47-3.10]* | 1.54 | [1.13-2.09]† | 1.86 | [1.00-3.47] |
| 45-54 y.o. | 1.51 | [1.02-2.23] | 2.06 | [1.54-2.76]* | 6.09 | [3.50-10.59]* |
| 55-64 y.o. | 2.95 | [2.04-4.26]* | 2.70 | [2.01-3.61]* | 7.37 | [4.23-12.83]* |
| >=65 y.o. | 4.18 | [2.98-5.88]* | 2.98 | [2.27-3.93]* | 5.63 | [3.25-9.75]* |

* p<.0001 ; † p <.01

Adjusted for sex; Reference: no GERD

PREVALENCE AND STABILITY OF GERD BY AGE GROUPS

| | Prevalence at W1 | W1-W2 changes | | |
|-------------------------|-------------------------|-----------------------|-------------------------|-------------------------|
| | % (95% CI) | Total Incidence | Chronic | Remitted |
| | | % (95% CI) | % (95% CI) | % (95% CI) |
| Age groups at W1 | | | | |
| 18-24 y.o. (n=530) | 3.6 (1.9-5.3) | 0 | 0 | 100 |
| 25-34 y.o. (n=1028) | 4.0 (2.7-5.2) | 7.7 (6.1-9.3) | 37.8 (34.8-40.8) | 62.2 (59.2-65.2) |
| 35-44 y.o. (n=1946) | 7.9 (6.7-9.2) | 6.7 (5.6-7.8) | 24.1 (22.2-26.0) | 75.9 (74.0-77.8) |
| 45-54 y.o. (n=2078) | 9.6 (8.3-10.9) | 9.9 (8.6-11.2) | 59.2 (57.1-61.3) | 40.8 (38.7-42.9) |
| 55-64 y.o. (n=1767) | 13.5 (11.9-15.2) | 12.1 (10.6-13.6) | 47.5 (45.2-49.8) | 52.5 (50.2-54.8) |
| >= 65 y.o. (n=2792) | 15.1 (13.7-16.5) | 13.1 (11.8-14.4) | 32.8 (31.1-34.5) | 67.2 (65.5-68.9) |
| Total (n=10,930) | 10.6 (10.0-11.2) | 9.7 (9.1-10.3) | 39.5 (38.6-40.4) | 60.5 (59.6-61.4) |

AGE, BMI, SMOKING STATUS, ALCOHOL AND COFFEE INTAKE BY GERD AT W1

| | Never GERD % | GERD at | | |
|-----------------------|-------------------|--------------------|--------------------|--------------------|
| | | W1 only % | W2 only % | W1 & W2 % |
| W1 | | | | |
| Age | 51.64 (±17.14) | 59.64* (±16.11) | 59.29* (±15.00) | 56.38* (±13.22) |
| BMI | 27.83 (±6.00) | 28.91* (±6.44) | 29.21* (±6.91) | 30.35* (±6.94) |
| Smoking status | | | | |
| - Non-smoker | 75.1 | 69.5 | 71.9 | 70.6 |
| - Smoker | 5.1 | 3.7 | 7.7 | 6.1 |
| - Former smoker | 18.9 | 26.8 | 20.4 | 23.3 |
| Alcohol | | | | |
| - 1 drink/day | 2.9 | 5.2 | 1.7 | 3.6 |
| - 2+ drinks/day | 8.1 | 10.0 | 8.1 | 2.9 |
| Coffee | | | | |
| - 1 cup/day | 25.4 | 38.2 | 34.4 | 23.5 |
| - 2+ cups/day | 32.8 | 29.0 | 28.1 | 29.6 |

AGE, BMI, SMOKING STATUS, ALCOHOL AND COFFEE INTAKE BY GERD AT W2

| | Never GERD % | GERD at | | |
|-----------------------|--------------------------|---------------------------|---------------------------|---------------------------|
| | | W1 only % | W2 only % | W1 & W2 % |
| W2 | | | | |
| Age | 54.26 (±17.15) | 62.18* (±16.15) | 61.96* (±15.38) | 58.88* (±13.07) |
| BMI | 28.10 (±6.00) | 29.39* (±7.73) | 28.98* (±6.95) | 31.40* (±8.02) |
| Smoking status | | | | |
| - Non-smoker | 77.0 | 81.5 | 66.2 | 81.5 |
| - Smoker | 6.2 | 2.4 | 7.9 | 2.4 |
| - Former smoker | 16.8 | 16.1 | 25.9 | 16.1 |
| Alcohol | | | | |
| - 1 drink/day | 5.7 | 6.3 | 7.1 | 3.6 |
| - 2+ drinks/day | 4.9 | 3.9 | 1.7 | 1.6 |
| Coffee | | | | |
| - 1 cup/day | 26.6 | 42.9 | 33.9 | 18.1 |
| - 2+ cups/day | 32.9 | 17.1 | 31.2 | 42.7 |

MEDICAL CONDITIONS AT W1 BY GERD

| | Never GERD % | GERD at | | |
|---|------------------------|------------------|------------------|---------------------|
| | | W1 only % | W2 only % | W1 & W2 % |
| Diseases at W1 | | | | |
| Hypercholesterolaemia - Disorders of lipoprotein metabolism | 8.5 | 25.3* | 13.0* | 19.2* |
| Malignant neoplasm | 0.8 | 3.1* | 4.0* | 2.9* |
| Diseases of the Central Nervous System | 1.1 | 0.6 | 1.7 | 6.1* |
| Heart diseases | 5.0 | 21.3* | 6.1 | 13.3* |
| Diseases of the musculoskeletal system & connective tissue | 11.1 | 26.9* | 12.4 | 30.9* |
| Disorder of the thyroid gland | 5.7 | 8.5* | 3.9 | 10.2* |
| Hypertension | 21.5 | 43.9* | 33.6* | 40.0* |
| Cerebrovascular diseases | 2.3 | 5.6* | 4.2 | 2.5 |
| Lower respiratory tract diseases | 1.6 | 4.4* | 1.1 | 0.9 |
| Upper respiratory tract diseases | 8.7 | 12.4 | 11.3 | 28.0* |
| Diseases of the urinary system | 1.7 | 7.7* | 4.0* | 4.7* |
| Diabetes | 5.3 | 11.1* | 4.2 | 5.2 |

MEDICAL CONDITIONS AT W2 BY GERD

| | Never GERD % | GERD at | | |
|---|------------------------|------------------|------------------|---------------------|
| | | W1 only % | W2 only % | W1 & W2 % |
| Diseases at W2 | | | | |
| Hypercholesterolaemia - Disorders of lipoprotein metabolism | 15.5 | 28.9* | 31.2* | 25.6* |
| Malignant neoplasm | 1.3 | 4.0* | 2.8 | 2.9 |
| Diseases of the Central Nervous System | 1.6 | 0.6 | 1.5 | 8.1* |
| Heart diseases | 8.1 | 23.4* | 18.3* | 18.6* |
| Diseases of the musculoskeletal system & connective tissue | 14.4 | 29.9* | 24.6* | 38.8* |
| Disorder of the thyroid gland | 7.6 | 11.6* | 7.0 | 15.8* |
| Hypertension | 25.0 | 42.1* | 45.2* | 48.0* |
| Cerebrovascular diseases | 3.9 | 6.5* | 8.5* | 9.3* |
| Lower respiratory tract diseases | 1.9 | 5.5* | 3.4 | 1.8 |
| Upper respiratory tract diseases | 11.2 | 13.4 | 27.2* | 36.4* |
| Diseases of the urinary system | 8.6 | 8.4 | 12.4* | 15.8* |
| Diabetes | 6.9 | 11.9* | 11.0* | 10.6* |

COMPARISON OF MEDICAL CONDITIONS AT W1 AND W2 BY TYPE OF GERD

| | Disease present at W1 | | | | Disease present at W2 | | |
|---|------------------------|--------------|--------------|-----------------|-----------------------|--------------|-----------------|
| | Never GERD % | GERD at | | | GERD at | | |
| | | W1 only % | W2 only % | W1 & W2 % | W1 only % | W2 only % | W1 & W2 % |
| Hypercholesterolaemia - Disorders of lipoprotein metabolism | 8.5 | 25.3* | 13.0* | 19.2* | 28.9* | 31.2* | 25.6* |
| Malignant neoplasm | 0.8 | 3.1* | 4.0* | 2.9* | 4.0* | 2.8 | 2.9 |
| Diseases of the Central Nervous System | 1.1 | 0.6 | 1.7 | 6.1* | 0.6 | 1.5 | 8.1* |
| Heart diseases | 5.0 | 21.3* | 6.1 | 13.3* | 23.4* | 18.3* | 18.6* |
| Diseases of the musculoskeletal system & connective tissue | 11.1 | 26.9* | 12.4 | 30.9* | 29.9* | 24.6* | 38.8* |
| Disorder of the thyroid gland | 5.7 | 8.5* | 3.9 | 10.2* | 11.6* | 7.0 | 15.8* |
| Hypertension | 21.5 | 43.9* | 33.6* | 40.0* | 42.1* | 45.2* | 48.0* |
| Cerebrovascular diseases | 2.3 | 5.6* | 4.2 | 2.5 | 6.5* | 8.5* | 9.3* |
| Lower respiratory tract diseases | 1.6 | 4.4* | 1.1 | 0.9 | 5.5* | 3.4 | 1.8 |
| Upper respiratory tract diseases | 8.7 | 12.4 | 11.3 | 28.0* | 13.4 | 27.2* | 36.4* |
| Diseases of the urinary system | 1.7 | 7.7* | 4.0* | 4.7* | 8.4 | 12.4* | 15.8* |
| Diabetes | 5.3 | 11.1* | 4.2 | 5.2 | 11.9* | 11.0* | 10.6* |

COMPARISON OF PSYCHIATRIC DISORDER AT W1 AND W2 BY TYPE OF GERD

Disorder present at W1

Disorder present at W2

| | Never GERD | GERD at | | | Never GERD | GERD at | | |
|---|------------|---------|---------|---------|------------|---------|---------|---------|
| | | W1 only | W2 only | W1 & W2 | | W1 only | W2 only | W1 & W2 |
| | % | % | % | % | % | % | % | % |
| Psychiatric Disorders at W2 | | | | | | | | |
| Major Depressive Disorder | 4.2 | 19.4* | 5.5 | 6.7 | 3.7 | 3.1 | 6.7* | 9.9* |
| Dysthymic Disorder | 1.1 | 2.7 | 0.0 | 0.9 | 1.7 | 4.7* | 0.0 | 3.4 |
| Bipolar Disorder | 1.2 | 1.2 | 0.0 | 0.0 | 1.0 | 3.9* | 0.4 | 2.4 |
| Any mood Disorder | 6.4 | 23.3* | 5.5 | 7.6 | 6.4 | 11.6* | 7.1 | 15.7* |
| Generalized Anxiety Disorder | 0.9 | 2.9 | 2.1 | 0.0 | 1.0 | 3.9* | 1.6 | 0.0 |
| Obsessive-Compulsive Disorder | 1.1 | 3.1 | 0.0 | 0.0 | 2.5 | 0.0 | 2.7 | 1.7 |
| Posttraumatic Stress Disorder | 2.6 | 8.9 | 6.8 | 3.2 | 3.0 | 5.8 | 5.1 | 0.0 |
| Social Anxiety Disorder (Social Phobia) | 7.4 | 5.8 | 4.7 | 11.3 | 2.5 | 5.4* | 0.0 | 3.1 |
| Agoraphobia | 1.6 | 2.9 | 1.8 | 2.3 | 3.8 | 10.4* | 0.7 | 4.6 |
| Panic Disorder | 3.1 | 7.2 | 6.5 | 5.3 | 2.9 | 4.3 | 2.1 | 6.0* |
| Simple Phobia | 1.6 | 4.9 | 0.0 | 0.7 | 6.9 | 3.9 | 9.7* | 5.5 |
| Any Anxiety Disorder | 13.0 | 20.4* | 17.2* | 15.3 | 17.0 | 23.2* | 15.9 | 15.1 |
| Mixed Mood and Anxiety Disorders | | | | | 3.0 | 4.8 | 4.8 | 5.3 |
| Adjustment Disorder | 1.3 | 2.7 | 1.0 | 0.0 | 2.4 | 2.3 | 0.0 | 3.2 |
| Alcohol Use Disorder | 3.9 | 1.8* | 4.0 | 2.9 | 0.9 | 0.0 | 1.2 | 0.0 |

*p<0.001 with Never GERD

| | Sleep Disorder present at W1 | | | | Disorder present at W2 | | | |
|--|------------------------------|---------|---------|---------|------------------------|---------|---------|---------|
| | Never GERD | GERD at | | | Never GERD | GERD at | | |
| | | W1 only | W2 only | W1 & W2 | | W1 only | W2 only | W1 & W2 |
| ‡ Only among subjects reporting nocturnal awakenings | % | % | % | % | % | % | % | % |
| Symptoms at W1 | | | | | | | | |
| Insomnia symptoms | | | | | | | | |
| - Sleep dissatisfaction | 14.7 | 31.8* | 18.6 | 15.3 | 13.5 | 14.3 | 22.2* | 24.2* |
| - Difficulty initiating sleep | 9.1 | 19.7* | 11.2 | 10.0 | 8.0 | 10.0 | 13.7* | 15.2* |
| - Nocturnal Awakenings | 19.4 | 45.8* | 22.4 | 21.9 | 28.3 | 46.1* | 39.8* | 33.9* |
| - 1 awakening‡ | 47.2 | 20.5 | 49.7 | 62.9 | 44.8 | 28.7 | 34.3 | 38.6 |
| - 2 awakenings‡ | 29.5 | 34.7 | 19.0 | 17.6 | 29.9 | 31.2 | 30.7 | 40.3 |
| - 3+ awakenings‡ | 23.3 | 44.7 | 31.3 | 19.5 | 25.3 | 40.1 | 35.0 | 21.2 |
| - Difficulty resuming sleep once awakened‡ | 39.8 | 60.6* | 35.6 | 29.5 | 40.7 | 51.4 | 43.9 | 19.9 |
| - Early morning awakenings | 7.9 | 15.0* | 10.0 | 7.2 | 5.5 | 9.2 | 15.1* | 4.0 |
| - Non-restorative sleep | 13.1 | 22.8* | 16.9 | 21.0* | 10.8 | 14.1 | 18.3* | 15.6* |
| Number of insomnia symptoms | | | | | | | | |
| - 1 symptom | 13.7 | 16.8 | 13.1 | 16.5 | 23.1 | 30.9 | 21.8 | 28.8 |
| - 2 symptoms | 7.5 | 16.3 | 7.5 | 5.0 | 7.3 | 10.7 | 8.9 | 14.8 |
| - 3 or more | 10.0 | 22.5 | 10.0 | 13.5 | 8.8 | 13.9 | 17.4 | 8.9 |
| - At least 1 insomnia symptom | 31.2 | 55.6 | 30.6 | 35.0 | 39.1 | 65.5 | 49.1 | 52.5 |
| Insomnia Disorder | 13.4 | 26.8* | 20.9* | 19.5* | 14.4 | 16.7 | 16.0 | 24.5* |
| Circadian Rhythm Disorder | 4.7 | 5.6 | 2.2 | 8.5* | 4.5 | 6.7 | 1.2* | 4.4 |
| Obstructive Sleep Apnea Disorder | 3.4 | 15.0* | 4.5 | 6.1 | 5.2 | 11.4* | 8.3* | 9.5* |
| Restless Legs Syndrome | 3.0 | 7.4* | 6.4* | 6.6* | 2.2 | 4.5* | 8.3* | 3.5 |

SLEEP SYMPTOMS & DISORDER **at W1**

at W2

| ‡ Only among subjects reporting nocturnal awakenings | No GERD % | GERD Treatment W1 | | | No GERD % | GERD Treatment W1 | | |
|--|-----------|-------------------|-------|--------------------------|-----------|-------------------|-------|--------------------------|
| | | No-trt % | PPI % | Other trt ^a % | | No-trt % | PPI % | Other trt ^a % |
| Symptoms at W1 | | | | | | | | |
| Insomnia symptoms | | | | | | | | |
| - Sleep dissatisfaction | 14.9 | 41.0* | 20.1* | 19.7 | 14.3 | 16.7 | 19.9* | 17.9 |
| - Difficulty initiating sleep | 0.3 | 16.7* | 18.9* | 5.1 | 8.2 | 16.9 | 11.9* | 14.3 |
| - Nocturnal Awakenings | 19.9 | 47.7* | 30.6* | 37.9* | 39.8 | 60.5* | 51.1* | 42.7 |
| - 1 awakening‡ | 47.6 | 32.7 | 35.6 | 41.9 | 43.6 | 35.7 | 27.1 | 51.2 |
| - 2 awakenings‡ | 28.3 | 40.1 | 33.6 | 2.4 | 30.0 | 18.2 | 44.9 | 25.0 |
| - 3+ awakenings‡ | 24.2 | 27.2 | 30.8 | 55.6 | 26.4 | 46.2 | 28.0 | 23.8 |
| - Difficulty resuming sleep once awoken‡ | 40.0 | 59.9 | 48.1 | 37.9 | 41.1 | 43.9 | 37.4 | 30.6 |
| - Early morning awakenings | 8.0 | 16.3 | 9.9 | 12.1 | 6.2 | 8.8 | 5.2 | 10.0 |
| - Non-restorative sleep | 13.4 | 32.9* | 17.8* | 22.8* | 11.1 | 18.7 | 10.6 | 21.9* |
| Number of insomnia symptoms | | | | | | | | |
| - 1 symptom | 13.9 | 17.9 | 14.9 | 22.3 | 13.9 | 17.9 | 14.9 | 22.3 |
| - 2 symptoms | 7.3 | 16.7 | 9.7 | 10.7 | 7.3 | 16.7 | 9.7 | 10.7 |
| - 3 or more | 10.4 | 27.5 | 16.6 | 15.2 | 10.4 | 27.5 | 16.6 | 15.2 |
| Insomnia Disorder | 14.3 | 26.5* | 20.8* | 31.3* | 14.1 | 23.8* | 18.7* | 17.5 |
| Circadian Rhythm Disorder | 4.5 | 2.7 | 8.8* | 5.6 | 7.7 | 4.2 | 9.6 | 4.9* |
| Obstructive Sleep Apnea Disorder | 3.5 | 19.2* | 6.8* | 16.7* | 8.2 | 12.8 | 11.7* | 9.4 |
| Restless Legs Syndrome | 3.4 | 4.1 | 9.3* | 4.0 | 2.6 | 4.2 | 3.2 | 6.8 |



EVOLUTION OF GERD SYMPTOMS BETWEEN W1 AND W2

| | GERD Treatment W1 | | |
|-----------------------------------|-------------------|----------|-----------------------------|
| | No-trt % | PPI % | Other trt ^a % |
| Evolution of GERD symptoms | | | |
| No Change | 47.5 | 58.3 | 41.1 |
| Improved | 32.9 | 33.9 | 38.1 |
| Worst | 19.6 | 7.8* | 20.8 |

Individuals taking PPI at W1 were LESS likely to have an increase in the severity of their symptoms at W2.

ESTABLISHING A LINK BETWEEN DISEASES, SYMPTOMS & CHRONICITY

GERD chronicity is predicted by a disease or symptom when:

- The prevalence of the disease/symptom in chronic GERD patients (W1&W2) is **significantly higher** than the prevalence of the disease/symptom for patients without GERD

AND

- The prevalence of the disease/symptom chronic GERD patients (W1&W2) is **higher** than the prevalence of the disease/symptom in patients with remitted GERD in (W1 only) and patients with incident GERD (W2 only)

| Symptoms | Never GERD % | GERD at | | |
|---------------------------------------|--------------|--------------|--------------|--------------|
| | | W1 only | W2 only | W1 & W2 % |
| Insomnia symptoms | | | | |
| Sleep dissatisfaction | 13.5 | 14.3 | 22.2* | 24.2* |
| Difficulty initiating sleep | 8 | 10 | 13.7* | 15.2* |
| Nocturnal awakening | 28.3 | 46.1* | 39.8* | 33.9* |
| 1 awakening | 44.8 | 28.7 | 34.3 | 38.6 |
| 2 awakenings | 29.9 | 31.2* | 30.7 | 40.3* |
| 3+ awakenings | 25.3 | 40.1 | 35 | 21.2 |
| Difficulty resuming sleep once awoken | 40.7 | 51.4 | 43.9 | 19.9 |
| Early morning awakening | 5.5 | 9.2 | 15.1 | 4 |
| Non-restorative sleep | 10.8 | 14.1 | 18.3* | 15.6* |
| Number of insomnia symptoms | | | | |
| 1 symptom | 23.1 | 30.9* | 21.8 | 28.8* |
| 2 symptoms | 7.3 | 10.7* | 8.9* | 14.8* |
| 3+ symptoms | 8.8 | 13.9* | 17.4* | 8.9 |
| At least 1 insomnia symptom | 39.1 | 65.5* | 49.1* | 52.5* |
| Insomnia disorder | 14.4 | 16.7 | 16 | 24.5* |
| Circadian Rhythm Disorder | 4.5 | 6.7 | 1.2* | 4.4 |
| Obstructive Sleep Apnea | 5.2 | 11.4* | 8.3* | 9.5* |
| Restless Leg Syndrome | 2.2 | 4.5* | 8.3* | 3.5 |
| Major Depressive Disorder | 4.2 | 19.4* | 5.5 | 6.7 |

BMI & CHRONICITY

| | Never GERD | GERD at | | |
|-----|------------------|-------------------|-------------------|--------------------------|
| | | W1 only | W2 only | W1 & W2 |
| | % | % | % | % |
| BMI | 27.83 (±6.00) | 28.91* (±6.44) | 29.21* (±6.91) | 30.35* (±6.94) |

Individuals with never GERD have a BMI of 27.83.

Conversely, individuals with chronic GERD (i.e. GERD at W1 & W2) are significantly heavier than all the other groups (W1 only, W2 only and never GERD)

BMI is a predictor of GERD chronicity.

CONCLUSION: SLEEP SYMPTOMS & CHRONICITY

GERD chronicity is better predicted by:

- Insomnia disorder
- Sleep Dissatisfaction
- Difficulty Initiating Sleep

Nocturnal Awakenings, Sleep Apnea and RLS are frequent comorbid conditions but are not predictors.

High BMI is associated with chronic GERD AND Sleep Apnea.

SMOKING, ALCOHOL, COFFEE & CHRONICITY

| | GERD | W1 only | W2 only | W1 & W2 |
|-----------------|------|---------|---------|---------|
| | % | % | % | % |
| W1 | | | | |
| Smoking status | | | | |
| - Non-smoker | 75.1 | 69.5 | 71.9 | 70.6 |
| - Smoker | 5.1 | 3.7 | 7.7 | 6.1 |
| - Former smoker | 18.9 | 26.8 | 20.4 | 23.3 |
| Alcohol | | | | |
| - 1 drink/day | 2.9 | 5.2 | 1.7 | 3.6 |
| - 2+ drinks/day | 8.1 | 10 | 8.1 | 2.9 |
| Coffee | | | | |
| - 1 cup/day | 25.4 | 38.2 | 34.4 | 23.5 |
| - 2+ cups/day | 32.8 | 29 | 28.1 | 29.6 |

Smoking, Alcohol & Coffee use do not predict chronicity