

1 **Prevalence and management of chronic insomnia in Swiss primary care: Cross-sectional**  
2 **data from the Sentinella practice-based research network**

3 Running title: Chronic insomnia in Swiss primary care

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5

6 **Author contribution:** MM, RA and SL have designed the study, acquired, analysed the data,

7 and wrote the manuscript. CD, CM, SE, CN, SD, RH and CB were involved in study

8 conception. KT wrote the manuscript. CDG and LS helped with data analysis. All authors

9 revised the manuscript.

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## 1 **Summary**

2 We investigated the prevalence and treatment of patients with chronic insomnia presenting  
3 to Swiss primary care physicians (PCPs) part of “Sentinella”, a nationwide practice-based  
4 research network. Each PCP consecutively asked 40 patients if they had sleep complaints,  
5 documented frequency, duration, comorbidities, and reported ongoing treatment. We  
6 analyzed data of 63% (83/132) of the PCPs invited. PCPs asked 74% (2432/3216) of included  
7 patients about their sleep (51% female); 31% (761/2432) of these had had insomnia  
8 symptoms; 36% (875/2432) had current insomnia symptoms; 11% (269/2432) met DSM-5  
9 criteria for chronic insomnia (61% female). 75% (201/269) of patients with chronic insomnia  
10 had comorbidities, with 49% (99/201) reporting depression. Chronic insomnia was treated in  
11 78% (209/269), 70% (188/268) took medication, 38% (102/268) benzodiazepines or  
12 benzodiazepine receptor agonists; 32% (86/268) took antidepressants. Only 1% (3/268) had  
13 been treated with CBT-I.

14 A third of patients presenting for a non-urgent visit in Swiss primary care reported insomnia  
15 symptoms. 11% met DSM-5 criteria for chronic insomnia. Hypnotics were the most common  
16 treatment, but almost no patients received first-line CBT-I. Reducing the burden of insomnia  
17 depends on disseminating knowledge about and access to CBT-I, and encouraging PCPs to  
18 discuss it with and offer it as a first-line treatment to patients with chronic insomnia.

19  
20

21 **Keywords:** Chronic insomnia, primary care, cognitive behavioral therapy for insomnia, sleep,  
22 epidemiology

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## 1 **Introduction**

2 Almost a third of the general population suffers from insomnia symptoms, and about 10% of  
3 these have chronic insomnia disorder (Baglioni et al., 2019; Ohayon, 2002), posing a serious  
4 public health problem. Even brief bouts of insomnia can increase irritability and accident risk  
5 and decrease cognitive performance (Leger et al., 2014; Leger, Partinen, Hirshkowitz,  
6 Chokroverty, Touchette, et al., 2010). Chronic insomnia is an independent risk factor for  
7 depression (Baglioni et al., 2011) and cardiometabolic disorders (Li et al., 2014); and may  
8 significantly raise stroke risk, especially in younger adults (Zheng et al., 2019). People with  
9 insomnia are more likely to visit doctors (Novak et al., 2004); in the U.S., aggregate costs for  
10 insomnia were estimated to up to \$100 billion per year (Wickwire et al., 2016).

11 DSM-5 defines chronic insomnia as subjective sleep disturbance at least 3 nights/week for  
12 over 3 months, with concomitant daytime impairment (Association, 2013). Traditionally,  
13 insomnia was often considered secondary to other conditions, like depression and anxiety,  
14 but these views have changed considerably in the last decade. It is now considered a distinct  
15 condition (Riemann et al., 2017) that requires targeted treatment even when co-occurring.

16 First line treatment for insomnia is cognitive behavioral therapy for insomnia (CBT-I) because  
17 of better long-term results and fewer adverse effects than pharmacological treatment  
18 (Qaseem et al., 2016; Riemann et al., 2017). CBT-I is a multi-component approach including  
19 sleep hygiene, stimulus control, sleep restriction, relaxation, and other cognitive techniques.

20 It has been found effective if delivered face-to-face, in group settings, online, and even  
21 through self-help-books (Brasure et al., 2016). Not only patients with newly diagnosed  
22 chronic insomnia should be offered CBT-I, but also patients already taking hypnotics could  
23 profit of CBT-I when trying to deprescribe (Hintze & Edinger, 2018). Despite documented  
24 effectiveness of CBT-I, studies from other countries reveal that primary care physicians

1 (PCPs), who often manage chronic insomnia, predominantly prescribe drugs (Koffel et al.,  
2 2018; Medalie & Cifu, 2017; Ulmer et al., 2017). The scarcity of CBT-I referrals suggests that  
3 physicians are unaware of this effective and safe treatment, an argument supported by  
4 findings from a survey we sent to 395 Swiss PCPs (Linder et al., in prep.), where most PCPs  
5 knew little about CBT-I and 78% did not know a provider.

6 PCPs usually prescribe the hypnotic aids benzodiazepines (BZD) and benzodiazepine  
7 receptor agonists (BZRA) (Agarwal & Landon, 2019). Caution is required when prescribing  
8 these agents for insomnia, because poor sleep quality in particular predicts conversion to  
9 long-term use for BZD (Gerlach et al., 2018) and 20% of those who take hypnotics (especially  
10 BZRA) will become long-term users (Schonmann et al., 2018). Overall prescription rates for  
11 BZD and BZRA for insomnia have not diminished—they have instead increased and shifted  
12 towards BZRA (Agarwal & Landon, 2019; Hughes et al., 2016). Sedating antidepressants such  
13 as trazodone are also increasingly prescribed for insomnia (Bertisch et al., 2014; Lai et al.,  
14 2011) despite recommendations against their long-term use (Qaseem et al., 2016; Riemann  
15 et al., 2017). Even in comorbid depression, CBT-I is a better option to treat insomnia and  
16 depressive symptoms than antidepressants alone, and can significantly improve depressive  
17 symptoms in parallel (Baglioni et al., 2011; Wu et al., 2015). In an insomnia case vignette  
18 survey among 395 Swiss PCPs (Linder et al., in prep.), the majority said they would prescribe  
19 phytopharmaceuticals as a starting point. Phytopharmaceuticals are however not  
20 recommended to treat insomnia due to a lack of efficacy (Qaseem et al., 2016; Riemann et  
21 al., 2017).

22 While these findings suggest that evidence-based insomnia treatment has yet to find  
23 its way into primary care, limited data is available regarding DSM-5 chronic insomnia  
24 prevalence linked to specific treatment in this setting. We thus set out to estimate the

1 prevalence of adult patients with insomnia symptoms who visited a representative sample  
2 of Swiss PCPs for a regular consultation and determined 1) the proportion of patients who  
3 met criteria for DSM-5 chronic insomnia and 2) the pharmacological and non-  
4 pharmacological treatments prescribed.

5

## 6 **Methods**

### 7 *Study setting and design*

8 Our cross-sectional study in Swiss primary care practices was part of the Swiss Sentinella  
9 Surveillance network, a project of the Federal Office of Public Health (FOPH) in 2018.  
10 General practitioners, internists, and pediatricians in private practices voluntarily collect  
11 irreversibly anonymized morbidity data each week during regular consultations. We  
12 excluded pediatricians and invited the remaining 132 PCPs to participate. PCPs used the  
13 same paper data collection form as in previous studies in the Sentinella network, designed to  
14 fit the routine and schedule of PCPs (Braun et al., 2019). The questions on the form were  
15 based on the DSM-5 criteria (Association, 2013) for chronic insomnia.

16 The local ethics committee (Canton Bern, Switzerland) waived ethical approval for earlier  
17 studies we conducted in Sentinella (Braun et al., 2019) because the double irreversible  
18 patient-data anonymization process protected participants (FOPH cannot identify patients,  
19 investigators cannot identify PCPs). Thus, the study fell outside the scope of the Swiss  
20 Human Research Act.

### 21 *Data collection form: Development and distribution*

22 We worked with insomnia specialists, PCPs and experts in public health and epidemiology to  
23 adapt the content of the data collection form and sought feedback from the Sentinella

1 board. One PCP piloted the form in his practice and we then adapted it based on his  
2 feedback. To standardize data collection, we supplied PCPs with a one-page summary and a  
3 detailed study description accompanied by instructions and suggested wording for questions  
4 directed at patients. All documents were provided in German and French. The FOPH  
5 distributed the documents to participating primary care practices in May 2018. PCPs could  
6 choose their start date but were encouraged to begin collecting data as soon as possible.  
7 PCPs could include each first patient per half day of work or the first two patients per half  
8 day of work excluding urgent consultations. We asked them to choose the approach they  
9 would take to data collection and not to deviate from it. If they forgot to collect data on a  
10 half day, we asked them to continue the next half day, until they reached 40 patients. We  
11 limited the number of patients to 40 to fit the tight schedule of PCPs and to collect data  
12 within a limited time window so we could maximize PCP response rate. We already showed  
13 feasibility of this approach in the Sentinella network (Braun et al., 2019).

14 In the Sentinella network, the geographic distribution of PCPs is representative of the  
15 Swiss population. Practice location (urban, intermediate, or rural) was defined by the size,  
16 population density, and accessibility criteria of the Federal Statistics Office (2017); all data  
17 were anonymized and provided by the FOPH. The number of PCPs regularly participating in  
18 Sentinella varies, ranging from 148 to 175 in 2018. PCPs are reimbursed for their  
19 participation in the Sentinella data collection by the FOPH. If multiple PCPs in a single  
20 practice reported to Sentinella, we asked that only one PCP collect data. One reminder was  
21 sent to non-responders in July 2018; data collection ended in October 2018. The FOPH  
22 collected all data forms and transferred them to us, ensuring double anonymization.

23

1 *Measures and outcomes*

2 The FOPH provided anonymized demographic data about PCPs (age; sex; practice location:  
3 urban, intermediate, rural). PCPs were instructed to systematically include 40 consecutive  
4 adult patients (>18 y) seen for a non-urgent consultation. PCPs were to follow a strict  
5 algorithm (Supplementary Fig. 1). On the first part of the data collection form, they  
6 documented patient data (sex: male/female; age; previous insomnia complaints by patient  
7 report/chart review). PCPs could choose not to discuss sleep with a patient (e.g., if the  
8 consultation was inappropriate); likewise, patients could refuse participation. In either case,  
9 PCPs filled in the first part of the form. The second part assessed insomnia complaints (none,  
10 current, in remission under ongoing treatment). If patients had current sleep complaints,  
11 they were asked how long the problem endured (<3 months; ≥3 months), how frequent it  
12 was (<3 nights/week; ≥3 nights/week), how symptoms manifested (difficulty falling asleep;  
13 fragmented sleep; early awakening; non-restorative sleep), and if they had daytime  
14 impairment (yes/no) defined as significant subjective impact of sleep complaints on daytime  
15 functioning in personal, professional or social life. Next, PCPs noted whether the patient had  
16 an adequate opportunity to sleep (yes/no to self- or other-imposed sleep time restrictions or  
17 disturbances). Last, PCPs assessed most frequent insomnia comorbidities (sleep apnea;  
18 restless legs syndrome; medication/drug abuse; anxiety; depression; and chronic pain)  
19 (Riemann et al., 2017). In the third part of the form, PCPs documented treatment including  
20 use of BZD, BZRA, antidepressants, neuroleptics, antihistamines, and phytopharmaceuticals.  
21 We did not ask PCPs to document subclasses. If a patient took BZD or BZRA, PCPs noted  
22 duration (<1 month, ≥1 month) and dose frequency (daily; several times/week; as needed).  
23 Then PCPs recorded non-pharmacological treatments (sleep hygiene; CBT-I; other  
24 psychotherapy; other). PCPs could write down multiple answers for insomnia type,



1 comorbidity, and medication. For patients in remission, PCPs only filled in the third part of  
2 the form.

3 Criteria for chronic insomnia conformed to DSM-5: subjective sleep complaints three or  
4 more nights per week for three or more months with significant daytime impairment despite  
5 adequate sleep opportunities (Association, 2013). If the patient met all these criteria, we  
6 classified them as suffering from chronic insomnia in our analyses. If sleep complaints were  
7 present but one of the DSM-5 criteria was not met, we classed the patient as having  
8 insomnia symptoms.

9 Our predictors were PCP and patient characteristics (including former insomnia symptoms);  
10 our primary outcomes were current sleep complaints (insomnia symptoms), chronic  
11 insomnia, and type of insomnia treatment. Secondary outcomes were comorbidities,  
12 insomnia type, and treatment duration.

13

#### 14 *Statistical methods*

15 We characterized the sample of PCPs and patients with descriptive statistics. Proportions in  
16 age categories and sex across groups were evaluated with Pearson Chi<sup>2</sup>. We calculated  
17 overall proportions of all included patients—those asked about sleep by their PCP who told  
18 they a) had sleep complaints, b) met criteria for chronic insomnia or c) were in remission  
19 under ongoing treatment, d) had had insomnia complaints in the past but were in full  
20 remission without ongoing treatment, or e) never had insomnia complaints. We then  
21 calculated proportions of patients treated for chronic insomnia, and for type of treatment  
22 for a) patients with chronic insomnia and b) in remission under treatment.

1 To cluster by PCP, we used multivariate mixed-effects logistic regression models that  
2 measured the association between patient characteristics, PCP demographics, and  
3 proportions of patients of each group. We modeled a random effect for PCP, and fixed  
4 effects for patient (age, sex, previous insomnia symptoms) and PCP level predictors (age  
5 groups: 30–39, 40–49, 50–59 and > 60 years, sex, practice location: urban, intermediate,  
6 rural). Then we measured the association between patient characteristics (age, sex, previous  
7 insomnia diagnosis, presence of comorbidity) and treatment with logistic regression models.  
8 We did not use specific statistical methods to impute missing data. We conducted all  
9 analyses with Stata version 15.1 (StataCorp LP, College Station, TX, USA).

## 10 **Results**

11 Fig. 1 shows the study flow chart of PCP and patient inclusion.

12 [Insert Figure 1]

### 13 *PCP characteristics*

14 Of 132 PCPs invited, 88 joined the study (66%). We excluded two PCPs due to non-  
15 adherence to inclusion criteria (repeatedly including patients <18 years), two PCPs because  
16 they filled out the data form incorrectly, and one PCP who stopped collecting data after 6  
17 patients because he was too busy. We included the remaining 83 PCP (63%) in data analysis.  
18 We report sociodemographic characteristics of PCPs in Supplemental Table 1. Most PCPs  
19 (77%, n=64) collected data on the two first patients each half day, and less than a quarter  
20 (22%, n=18) collected data on the first patient each half day. One PCP did not indicate the  
21 method used (1%).

### 22 *Patient characteristics*

1 Of a potential dataset of 3320 patients (40 patients x 83 PCPs), we were able to analyze data  
2 of 3216 (96%). Four PCPs only gathered data on 20 patients and we excluded 20 patients  
3 under 18y and four patients over 100y. PCPs discussed sleep with 2432/3216 of the  
4 remaining eligible patients (76%). They did not discuss sleep with 784 patients (24%),  
5 because they decided not to (82%, n=644/784), had already collected the patient's data in a  
6 previous consultation (9%, n=67/784), or the patient did not want to participate (9%,  
7 n=73/784). Age group and sex proportions across patients where sleep was or was not  
8 discussed were similar (sex: Pearson Chi<sup>2</sup> (1) = 1.04; p = 0.4; age groups: Pearson Chi<sup>2</sup> (3) =  
9 6.5, p = 0.09). We report patient characteristics in Table 1. In multivariate adjusted analyses,  
10 patients with known insomnia symptoms were more likely to be asked about sleep (OR=3.8,  
11 95% CI=2.8-5.3, p < 0.001). Patient age, sex, and physician-level predictors were not  
12 associated with discussion of sleep (all p > 0.05).

13 [Insert Table 1]

14

#### 15 *Subjective sleep disturbance (insomnia symptoms)*

16 Of the included 2432 patients, PCPs already knew that 31% (n=761/2432) had had insomnia  
17 symptoms at some point. Over a third of patients reported current symptoms (36%,  
18 n=875/2432; 56% women) (Fig. 2, Table 1), of these, the PCP was aware of previous  
19 complaints in 61% (n=535/875). A fraction of patients without current insomnia symptoms  
20 (6%, n= 133/2432) were under ongoing treatment (“in remission under treatment”); 4%  
21 (n=107/2432) had had symptoms but were in full remission and untreated. Close to half of  
22 the patients asked (46%, n=1115/2432) had had insomnia symptoms at some point (Fig. 2).  
23 Previous insomnia symptoms were a significant predictor of current insomnia symptoms

1 (OR=10.8, 95% CI=8.6-13.7,  $p < 0.001$ ). No patient or PCP predictors were significant (all  $p >$   
2 0.05).

3

#### 4 *Chronic insomnia according to DSM-5*

5 A total of 269/2432 patients met DSM-5 criteria for chronic insomnia (11% of all patients  
6 asked, 61% women). Thus, a third (31%,  $n = 269/875$ ) of the patients presenting with  
7 symptoms met DSM-5 criteria for chronic insomnia (Fig. 2, Table 1). We summarize the  
8 distribution of insomnia types in Supplementary Table 2 and describe comorbidities in Table  
9 2 and Supplementary Fig. 2. Chronic insomnia was significantly associated with previous  
10 insomnia symptoms (OR=3.0, 95% CI=2-4.4,  $p=0.00$ ) and women were more likely to have  
11 chronic insomnia (OR=1.4, 95% CI=1-1.9,  $p=0.048$ ). No other predictors were significant (all  $p$   
12  $> 0.05$ ).

13 [Insert Figure 2]

14 [Insert Table 2]

#### 15 *Treatment of patients with chronic insomnia*

16 Most patients with chronic insomnia were treated (78%,  $n=209/268$ ), see Figure 3. Data for  
17 one patient was missing. Most were prescribed medication (70%,  $n=188/268$ ). Fig. 3 shows  
18 distribution of pharmacological treatment: 38% ( $n= 102/268$ ) took BZD or BZRA (BZD: 23%,  
19  $n=63/268$ ; BZRA: 18%,  $n=48/268$ ); 79% of took them for over a month ( $n=81/102$ ); 78% for  
20 several nights/week to daily ( $n=80/102$ ). Two-thirds of the patients took these medications  
21 several nights/week to daily for over four weeks (66%,  $n=67/102$ ) (Fig. 4). Antidepressants  
22 were prescribed to 32% ( $n=86/268$ ).

23 Fig. 3 shows non-pharmacological treatments: 12% received treatments not on our list  
24 ( $n=33/268$ ); 11.5% followed sleep hygiene advice ( $n=31/268$ ), and, 11% were in

1 psychotherapy (n=30/268). Three patients with chronic insomnia (n=3/268) had gone  
2 through CBT-I (1%).  
3 Previous insomnia symptoms were a significant predictor for pharmacological treatment (OR  
4 2.9, 95% CI 1.5-5.5, p=0.002) and BZD/BZRA intake (OR 2.2, 95% CI 1.1-4.4, p=0.029).  
5 Women and older patients were more likely to have had pharmacological treatment  
6 (women OR 2.4, 95% CI=1.3-4.4, p=0.004; age group 66-100 y, OR=4.1, 95% CI=1.5-11.3,  
7 p=0.005, reference group: 18-35 y). Older age was also associated with BZD/BZRA-use (age  
8 group 66-100y, OR=5.8, 95% CI=1.8-18.8, p=0.003, reference group: 18-35y).

9 [Insert Figure 3 and 4]

10

#### 11 *Treatment of patients in remission under ongoing treatment*

12 We had data on treatment type for 132/133 patients in remission. About half (51%) took  
13 BZD or BZRA (n=67/132) (33% BZD (n=44/132); 21% BZRA (n=28/132)). A large majority  
14 (90%; n=60/67) took BZD or BZRA for over 4 weeks, 88% daily or several nights/week  
15 (n=59/67), and 80% daily or several nights/week for over 4 weeks (n=54/67); 26% took  
16 antidepressants (n=35/132), 11% took phytopharmaceuticals (n=15/132), 9% took other  
17 medication (n=12/132), 5% neuroleptics (n=6/132), and 3% antihistamines (n= 4/132). Most  
18 (77%) patients taking BZD or BZRA were older than 66y. Most (61%, n=80/132) received no  
19 non-pharmacological treatment; 15% practiced sleep hygiene (n= 20/132); 13% were treated  
20 with other psychotherapy (n=17/132), 10% were treated with other methods that were not  
21 on our list (n=14/132), and one patient was prescribed CBT-I (<1%).

22

23

## 1 **Discussion**

2 More than a third of 2432 adult patients who visited the participating PCPs in the Swiss  
3 Sentinella network in 2018 had subjective sleep complaints. Among the 11% who met DSM-5  
4 criteria for chronic insomnia, women were overrepresented (61%). Most (70%) of patients  
5 with chronic insomnia took medication, most commonly BZD and BZRA, which were taken by  
6 more than a third of all patients (38%). BZD/BZRA use was associated with older age; chronic  
7 consumption was common. CBT-I, first-line treatment for chronic insomnia according to  
8 guidelines, was drastically underprescribed (1%).

9 Our data reveal the high prevalence of insomnia symptoms in Swiss primary care,  
10 comparable to studies conducted in other countries (Bjorvatn et al., 2017; Leger, Partinen,  
11 Hirshkowitz, Chokroverty, Hedner, et al., 2010). Prevalence for chronic insomnia in other  
12 studies in primary care varied, depending on diagnostics applied (Riemann et al., 2017), but  
13 could be as high as 50% based on DSM-4 criteria (Bjorvatn et al., 2017; Leger, Partinen,  
14 Hirshkowitz, Chokroverty, Hedner, et al., 2010; Wittchen et al., 2001). We used DSM-5  
15 criteria, which are stricter for duration (3+ months). DSM-4 and ICD-10 criteria are 4+ weeks.  
16 This may explain the lower prevalence (11%) that we identified. There is a scarcity of cross-  
17 sectional data for chronic insomnia in Europe based on DSM-5 criteria (Riemann et al.,  
18 2017), so we look forward to new research that will allow us to better contextualize our  
19 findings.

20 Over 70% of chronic insomnia patients, whether treated or in remission, took  
21 medication —up to half were prescribed BZD or BZRA and took it daily or several times a  
22 week for over a month, matching results of studies in other countries (Bjorvatn et al., 2017;  
23 Pillai et al., 2017; van Rijswijk et al., 2007). The older a patient was, the more likely they took  
24 medication, even though several medical societies recommend against prescribing BZD or

1 BZRA long term (By the American Geriatrics Society Beers Criteria Update Expert, 2019). This  
2 finding similar to studies in other countries (Bjorvatn et al., 2017; Maust et al., 2016; Olfson  
3 et al., 2015). The high number of patients who received antidepressants against insomnia  
4 symptoms in our data set (32 %) aligns with previous studies that showed this off-label  
5 treatment is increasing (Bertisch et al., 2014; Lai et al., 2011; Walsh & Schweitzer, 1999).  
6 Despite the many PCPs who indicated in clinical vignettes they would use  
7 phytopharmaceuticals to treat insomnia (Linder et al., in prep.), we found only a small  
8 fraction of patients took them (10%). This difference between theory and practice might  
9 indicate that PCPs perhaps first prescribe phytopharmaceuticals first, and this could prime  
10 patients to take a pill against sleep complaints. Because these agents are often ineffective,  
11 patients might ask for stronger agents and end up with a prescription for BZD, BZRA or  
12 antidepressants. PCPs should take note of this potential escalation and discuss non-  
13 pharmacological options early on.

14         Only three people with chronic insomnia and one person in remission were treated  
15 with CBT-I, demonstrating drastic underuse of this effective first-line treatment, even though  
16 both online and face-to-face CBT-I are covered by mandatory health insurance if prescribed  
17 by a medical doctor in Switzerland. One explanation is a lack of knowledge about CBT-I,  
18 supported by Linder et al. (in prep.), found most Swiss PCPs knew little about CBT-I and  
19 knew no providers. Their busy schedules and the complex histories of their patients might  
20 make them reluctant to recommend non-pharmacological treatment. As Moloney et al.  
21 noted, “sometimes, it’s easier to write the prescription” than to take time to discuss sleep  
22 (Moloney, 2017). PCPs also often feel pressured to prescribe hypnotics (Linder et al., in prep,  
23 (Everitt et al., 2014; Hughes et al., 2016)). The patient’s lack of familiarity with CBT-I or their  
24 sense that mental health care is stigmatized could also reduce CBT-I use. Future researchers

1 may want to test interventions that address PCPs' and patients' lack of knowledge about  
2 CBT-I and providers , since this may reduce barriers to CBT-I implementation (Koffel et al.,  
3 2018) and starting points for interventions.

4 To address the dissemination gap in non-pharmacological treatment for chronic  
5 insomnia in primary care, we may need to change the minds of both patients and physicians.  
6 Courses or workshops on CBT-I could improve PCP knowledge of evidence-based insomnia  
7 care (Baglioni et al., 2019), and encourage PCPs to discuss this therapeutic option with  
8 patients. Decision aids could encourage informed decision-making and empower patient.  
9 Actively linking PCPs with specialists who offer CBT-I by creating a national register might  
10 also increase referrals.

11 The busy routines of PCPs limited the number of questions we could ask so we could  
12 not gather much demographic data on patients, but we found that even busy PCPs could  
13 collect useful data within routine consultation in primary care. Other studies on insomnia  
14 prevalence were often conducted in the waiting room (e.g., by medical students). Our PCPs  
15 included most patients and discussed sleep with them, but we also observed that in more  
16 than a third of the cases, the PCP did not know about the sleep complaints of their patient.  
17 Our data suggests that a more proactive approach by PCPs to discuss sleep quality is feasible  
18 during routine consultations. Along with this, our finding that a PCP's knowledge of prior  
19 insomnia symptoms was associated with a higher probability of discussing sleep may reflect  
20 bias in one of two directions. 1) It is possible that PCPs missed new insomnia cases because  
21 patients never complained about sleep disturbance and were therefore not asked about  
22 sleep. Studies have shown that many patients do not address their sleep complaints with  
23 their PCP (Ancoli-Israel & Roth, 1999). We do not yet know if screening for insomnia would  
24 significantly reduce its burden, but it is possible that early intervention could prevent chronic



1 insomnia and reduce risk for secondary conditions like depression (Baglioni et al., 2011;  
2 Baglioni et al., 2011; Wickwire et al., 2019). 2) We may have overestimated the percentage  
3 of patients with insomnia complaints because patients without insomnia symptoms may  
4 have been selectively excluded. To determine the extent of this possible bias, we estimated  
5 prevalence of chronic insomnia in patients who did not discuss sleep with their PCPs  
6 (Supplementary Fig. 3). Taking into account the excluded group, the estimated prevalence  
7 was 10.9 %, close to our measured value of 11.1 %. Future studies should also include  
8 aspects of sleep onset latency, sleep duration and sleep timing to better characterize  
9 insomnia patients; unfortunately, PCP schedules were too busy to allow to include those  
10 questions in our study. To learn more about prevalence of all sleep disorders in primary care,  
11 future studies could take a broader approach to sleep disorders, not limited to insomnia.  
12 Prevalence of insomnia symptoms in Swiss primary care patients is high and almost none of  
13 these patients receives CBT-I, first-line treatment recommended in guidelines. PCPs know  
14 little about CBT-I and rarely refer patients for CBT-I treatment, perhaps because they lack  
15 professional contacts trained in administering the therapy. To ensure most patients receive  
16 optimal care and reduce the burden of chronic insomnia, interventions should be designed  
17 to educate PCPs and patients, train more professionals in CBT-I, and connect PCPs to  
18 specialists who can provide CBT-I.  
19

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7

8

9

## 1 References

- 2 Agarwal, S. D., & Landon, B. E. (2019). Patterns in Outpatient Benzodiazepine Prescribing in  
3 the United States. *JAMA network open*, 2(1), e187399. <Go to  
4 ISI>://MEDLINE:30681713  
5
- 6 Ancoli-Israel, S., & Roth, T. (1999, May 1). Characteristics of insomnia in the United States:  
7 results of the 1991 National Sleep Foundation Survey. I. *Sleep*, 22 Suppl 2, S347-353.  
8 <https://www.ncbi.nlm.nih.gov/pubmed/10394606>  
9
- 10 Association, A. P. (2013). *Diagnostic and Statistical Manual of Mental Disorders, DSM-5*.  
11 American Psychiatric Publishing.  
12
- 13 Baglioni, C., Altena, E., Bjorvatn, B., Blom, K., Bothelius, K., Devoto, A., Espie, C. A., Frase, L.,  
14 Gavriloff, D., Tuuliki, H., Hoflehner, A., Hogl, B., Holzinger, B., Jarnefelt, H., Jernelov,  
15 S., Johann, A. F., Lombardo, C., Nissen, C., Palagini, L., Peeters, G., Perlis, M. L.,  
16 Posner, D., Schlarb, A., Spiegelhalder, K., Wichniak, A., & Riemann, D. (2019, Dec 19).  
17 The European Academy for Cognitive Behavioural Therapy for Insomnia: An initiative  
18 of the European Insomnia Network to promote implementation and dissemination of  
19 treatment. *J Sleep Res*, e12967. <https://doi.org/10.1111/jsr.12967>  
20
- 21 Baglioni, C., Battagliese, G., Feige, B., Spiegelhalder, K., Nissen, C., Voderholzer, U.,  
22 Lombardo, C., & Riemann, D. (2011, Dec). Insomnia as a predictor of depression: a  
23 meta-analytic evaluation of longitudinal epidemiological studies. *J Affect Disord*,  
24 135(1-3), 10-19. <https://doi.org/10.1016/j.jad.2011.01.011>  
25
- 26 Baglioni, C., Spiegelhalder, K., Nissen, C., & Riemann, D. (2011). Clinical implications of the  
27 causal relationship between insomnia and depression: how individually tailored  
28 treatment of sleeping difficulties could prevent the onset of depression. *The EPMA*  
29 *journal*, 2(3), 287-293. <Go to ISI>://MEDLINE:23199164  
30 [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3405397/pdf/13167\\_2011\\_Article\\_79.pdf](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3405397/pdf/13167_2011_Article_79.pdf)  
31
- 32 Bertisch, S. M., Herzig, S. J., Winkelman, J. W., & Buettner, C. (2014, Feb 1). National use of  
33 prescription medications for insomnia: NHANES 1999-2010. *Sleep*, 37(2), 343-349.  
34 <https://doi.org/10.5665/sleep.3410>  
35
- 36 Bjorvatn, B., Meland, E., Flo, E., & Mildestvedt, T. (2017, Feb). High prevalence of insomnia  
37 and hypnotic use in patients visiting their general practitioner. *Fam Pract*, 34(1), 20-  
38 24. <https://doi.org/10.1093/fampra/cmw107>  
39
- 40 Brasure, M., Fuchs, E., MacDonald, R., Nelson, V. A., Koffel, E., Olson, C. M., Khawaja, I. S.,  
41 Diem, S., Carlyle, M., Wilt, T. J., Ouellette, J., Butler, M., & Kane, R. L. (2016, Jul 19).  
42 Psychological and Behavioral Interventions for Managing Insomnia Disorder: An  
43 Evidence Report for a Clinical Practice Guideline by the American College of  
44 Physicians. *Ann Intern Med*, 165(2), 113-124. <https://doi.org/10.7326/M15-1782>  
45
- 46 Braun, A. L., Prati, E., Martin, Y., Dvorak, C., Tal, K., Biller-Andorno, N., Bulliard, J. L., Cornuz,  
47 J., Selby, K., & Auer, R. (2019, Sep). Variation in colorectal cancer testing between

1 primary care physicians: a cross-sectional study in Switzerland. *Int J Public Health*,  
2 64(7), 1075-1083. <https://doi.org/10.1007/s00038-019-01259-4>  
3

4 By the American Geriatrics Society Beers Criteria Update Expert, P. (2019, Apr). American  
5 Geriatrics Society 2019 Updated AGS Beers Criteria(R) for Potentially Inappropriate  
6 Medication Use in Older Adults. *J Am Geriatr Soc*, 67(4), 674-694.  
7 <https://doi.org/10.1111/jgs.15767>  
8

9 Everitt, H., McDermott, L., Leydon, G., Yules, H., Baldwin, D., & Little, P. (2014, Feb). GPs'  
10 management strategies for patients with insomnia: a survey and qualitative interview  
11 study. *Br J Gen Pract*, 64(619), e112-119. <https://doi.org/10.3399/bjgp14X677176>  
12

13 Gerlach, L. B., Maust, D. T., Leong, S. H., Mavandadi, S., & Oslin, D. W. (2018, Nov 1). Factors  
14 Associated With Long-term Benzodiazepine Use Among Older Adults. *JAMA Intern  
15 Med*, 178(11), 1560-1562. <https://doi.org/10.1001/jamainternmed.2018.2413>  
16

17 Hintze, J. P., & Edinger, J. D. (2018, Jun). Hypnotic Discontinuation in Chronic Insomnia. *Sleep  
18 Med Clin*, 13(2), 263-270. <https://doi.org/10.1016/j.jsmc.2018.02.008>  
19

20 Hughes, L. D., Raitt, N., Riaz, M. A., Baldwin, S. J., Erskine, K., & Graham, G. (2016, Jul-Sep).  
21 Primary care hypnotic and anxiolytic prescription: Reviewing prescribing practice  
22 over 8 years. *J Family Med Prim Care*, 5(3), 652-657. [https://doi.org/10.4103/2249-  
23 4863.197312](https://doi.org/10.4103/2249-4863.197312)  
24

25 Koffel, E., Bramoweth, A. D., & Ulmer, C. S. (2018). Increasing access to and utilization of  
26 cognitive behavioral therapy for insomnia (CBT-I): a narrative review.  
27

28 Lai, L. L., Tan, M. H., & Lai, Y. C. (2011). Prevalence and factors associated with off-label  
29 antidepressant prescriptions for insomnia. *Drug Healthc Patient Saf*, 3, 27-36.  
30 <https://doi.org/10.2147/DHPS.S21079>  
31

32 Leger, D., Bayon, V., Ohayon, M. M., Philip, P., Ement, P., Metlaine, A., Chennaoui, M., &  
33 Faraut, B. (2014, Apr). Insomnia and accidents: cross-sectional study (EQUINOX) on  
34 sleep-related home, work and car accidents in 5293 subjects with insomnia from 10  
35 countries. *J Sleep Res*, 23(2), 143-152. <https://doi.org/10.1111/jsr.12104>  
36

37 Leger, D., Partinen, M., Hirshkowitz, M., Chokroverty, S., Hedner, J., & Investigators, E. S.  
38 (2010, Dec). Characteristics of insomnia in a primary care setting: EQUINOX survey of  
39 5293 insomniacs from 10 countries. *Sleep Med*, 11(10), 987-998.  
40 <https://doi.org/10.1016/j.sleep.2010.04.019>  
41

42 Leger, D., Partinen, M., Hirshkowitz, M., Chokroverty, S., Touchette, E., Hedner, J., & group,  
43 E. s. i. (2010, Dec). Daytime consequences of insomnia symptoms among outpatients  
44 in primary care practice: EQUINOX international survey. *Sleep Med*, 11(10), 999-  
45 1009. <https://doi.org/10.1016/j.sleep.2010.04.018>  
46

- 1 Li, M., Zhang, X. W., Hou, W. S., & Tang, Z. Y. (2014, Oct 20). Insomnia and risk of  
2 cardiovascular disease: a meta-analysis of cohort studies. *Int J Cardiol*, 176(3), 1044-  
3 1047. <https://doi.org/10.1016/j.ijcard.2014.07.284>  
4
- 5 Maust, D. T., Kales, H. C., Wiechers, I. R., Blow, F. C., & Olfson, M. (2016, Dec). No End in  
6 Sight: Benzodiazepine Use in Older Adults in the United States. *J Am Geriatr Soc*,  
7 64(12), 2546-2553. <https://doi.org/10.1111/jgs.14379>  
8
- 9 Medalie, L., & Cifu, A. S. (2017, Feb 21). Management of Chronic Insomnia Disorder in  
10 Adults. *JAMA*, 317(7), 762-763. <https://doi.org/10.1001/jama.2016.19004>  
11
- 12 Moloney, M. E. (2017, Mar). 'Sometimes, it's easier to write the prescription': physician and  
13 patient accounts of the reluctant medicalisation of sleeplessness. *Sociol Health Illn*,  
14 39(3), 333-348. <https://doi.org/10.1111/1467-9566.12485>  
15
- 16 Novak, M., Mucsi, I., Shapiro, C. M., Rethelyi, J., & Kopp, M. S. (2004, May). Increased  
17 utilization of health services by insomniacs--an epidemiological perspective. *Journal*  
18 *of psychosomatic research*, 56(5), 527-536.  
19 <https://doi.org/10.1016/j.jpsychores.2004.02.007>  
20
- 21 Ohayon, M. M. (2002, Apr). Epidemiology of insomnia: what we know and what we still need  
22 to learn. *Sleep Med Rev*, 6(2), 97-111.  
23 <http://www.ncbi.nlm.nih.gov/pubmed/12531146>  
24
- 25 Olfson, M., King, M., & Schoenbaum, M. (2015, Feb). Benzodiazepine use in the United  
26 States. *JAMA Psychiatry*, 72(2), 136-142.  
27 <https://doi.org/10.1001/jamapsychiatry.2014.1763>  
28
- 29 Pillai, V., Roth, T., Roehrs, T., Moss, K., Peterson, E. L., & Drake, C. L. (2017, Feb 01).  
30 Effectiveness of Benzodiazepine Receptor Agonists in the Treatment of Insomnia: An  
31 Examination of Response and Remission Rates. *Sleep*, 40(2).  
32 <https://doi.org/10.1093/sleep/zsw044>  
33
- 34 Qaseem, A., Kansagara, D., Forcica, M. A., Cooke, M., Denberg, T. D., & Clinical Guidelines  
35 Committee of the American College of, P. (2016, Jul 19). Management of Chronic  
36 Insomnia Disorder in Adults: A Clinical Practice Guideline From the American College  
37 of Physicians. *Ann Intern Med*, 165(2), 125-133. <https://doi.org/10.7326/M15-2175>  
38
- 39 Riemann, D., Baglioni, C., Bassetti, C., Bjorvatn, B., Dolenc Groselj, L., Ellis, J. G., Espie, C. A.,  
40 Garcia-Borreguero, D., Gjerstad, M., Goncalves, M., Hertenstein, E., Jansson-  
41 Frojmark, M., Jennum, P. J., Leger, D., Nissen, C., Parrino, L., Paunio, T., Pevernagie,  
42 D., Verbraecken, J., Weess, H. G., Wichniak, A., Zavalko, I., Arnardottir, E. S., Deleanu,  
43 O. C., Strazisar, B., Zoetmulder, M., & Spiegelhalder, K. (2017, Sep 05). European  
44 guideline for the diagnosis and treatment of insomnia. *J Sleep Res*.  
45 <https://doi.org/10.1111/jsr.12594>  
46
- 47 Schonmann, Y., Goren, O., Bareket, R., Comaneshter, D., Cohen, A. D., & Vinker, S. (2018,  
48 Dec). Chronic hypnotic use at 10yearsdoes the brand matter? *European Journal of*

1            *Clinical Pharmacology*, 74(12), 1623-1631. <https://doi.org/10.1007/s00228-018-2531-4>

2

3

4            Ulmer, C. S., Bosworth, H. B., Beckham, J. C., Germain, A., Jeffreys, A. S., Edelman, D., Macy, S., Kirby, A., & Voils, C. I. (2017, Aug 15). Veterans Affairs Primary Care Provider Perceptions of Insomnia Treatment. *J Clin Sleep Med*, 13(8), 991-999.

5

6            <https://doi.org/10.5664/jcsm.6702>

7

8

9            van Rijswijk, E., Borghuis, M., van de Lisdonk, E., Zitman, F., & van Weel, C. (2007, Jan). Treatment of mental health problems in general practice: a survey of psychotropics prescribed and other treatments provided. *Int J Clin Pharmacol Ther*, 45(1), 23-29.

10           <http://www.ncbi.nlm.nih.gov/pubmed/17256447>

11

12

13

14           Walsh, J. K., & Schweitzer, P. K. (1999, May 1). Ten-year trends in the pharmacological treatment of insomnia. *Sleep*, 22(3), 371-375.

15

16           <https://www.ncbi.nlm.nih.gov/pubmed/10341388>

17

18           Wickwire, E. M., Shaya, F. T., & Scharf, S. M. (2016, Dec). Health economics of insomnia treatments: The return on investment for a good night's sleep. *Sleep Med Rev*, 30, 72-82. <https://doi.org/10.1016/j.smrv.2015.11.004>

19

20

21

22           Wickwire, E. M., Tom, S. E., Scharf, S. M., Vadlamani, A., Bulatao, I. G., & Albrecht, J. S. (2019, Apr 1). Untreated insomnia increases all-cause health care utilization and costs among Medicare beneficiaries. *Sleep*, 42(4). <https://doi.org/10.1093/sleep/zsz007>

23

24

25

26           Wittchen, H. U., Krause, P., Hofler, M., Pittrow, D., Winter, S., Spiegel, B., Hajak, G., Riemann, D., Steiger, A., & Pfister, H. (2001). [NISAS-2000: The "Nationwide Insomnia Screening and Awareness Study". Prevalence and interventions in primary care]. *Fortschr Med Orig*, 119(1), 9-19. <https://www.ncbi.nlm.nih.gov/pubmed/11935661> (NISAS-2000: Die "Nationwide Insomnia Screening and Awareness Study." Pravalenz und Verschreibungsverhalten in der allgemeinarztlichen Versorgung.)

27

28

29

30

31

32

33           Wu, J. Q., Appleman, E. R., Salazar, R. D., & Ong, J. C. (2015, Sep). Cognitive Behavioral Therapy for Insomnia Comorbid With Psychiatric and Medical Conditions: A Meta-analysis. *JAMA Intern Med*, 175(9), 1461-1472.

34

35           <https://doi.org/10.1001/jamainternmed.2015.3006>

36

37

38           Zheng, B., Yu, C., Lv, J., Guo, Y., Bian, Z., Zhou, M., Yang, L., Chen, Y., Li, X., Zou, J., Ning, F., Chen, J., Chen, Z., Li, L., & China Kadoorie Biobank Collaborative, G. (2019, Dec 3). Insomnia symptoms and risk of cardiovascular diseases among 0.5 million adults: A 10-year cohort. *Neurology*, 93(23), e2110-e2120.

39

40           <https://doi.org/10.1212/WNL.0000000000008581>

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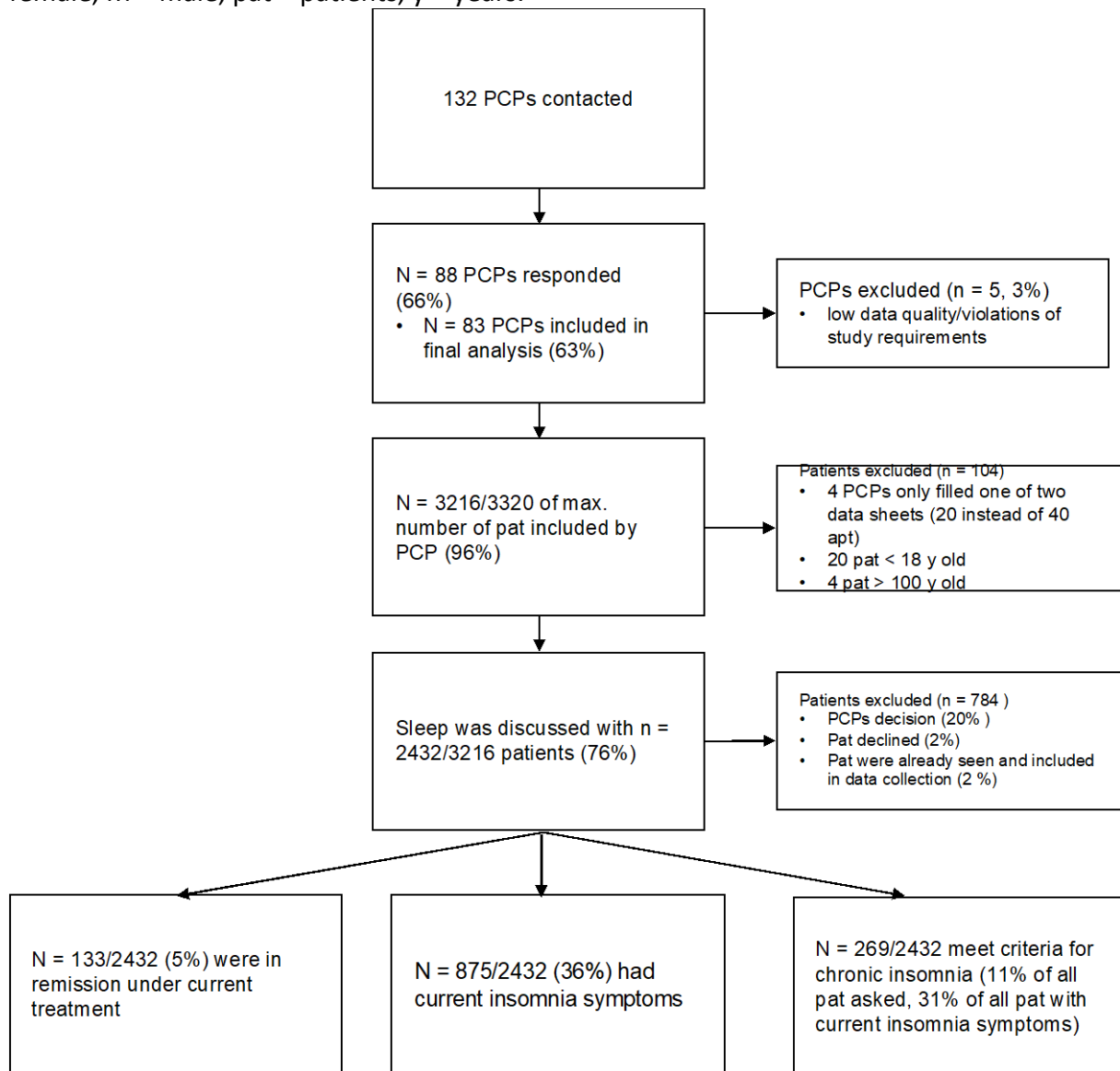
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1 **Figure 1: Study flow chart.**

2 Insomnia symptoms = any subjective sleep disturbance. PCPs = primary care physicians, F =  
 3 female, M = male, pat = patients, y = years.

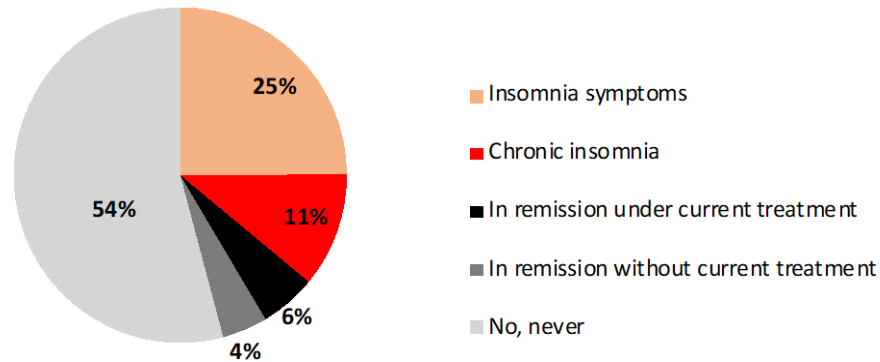


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6 **Figure 2. Subjective sleep problems in adult patients in primary care.**

7 Proportion of patients with current subjective sleep problems (insomnia symptoms),  
 8 patients meeting DSM-5 criteria for chronic insomnia, patients who had sleep problems but  
 9 have no symptoms under ongoing treatment (in remission under treatment), patients who  
 10 had sleep complaints in the past but are now without symptoms and under no treatment,  
 11 and patients without ever sleep complaints.

## Subjective sleep problems (% of n = 2432)

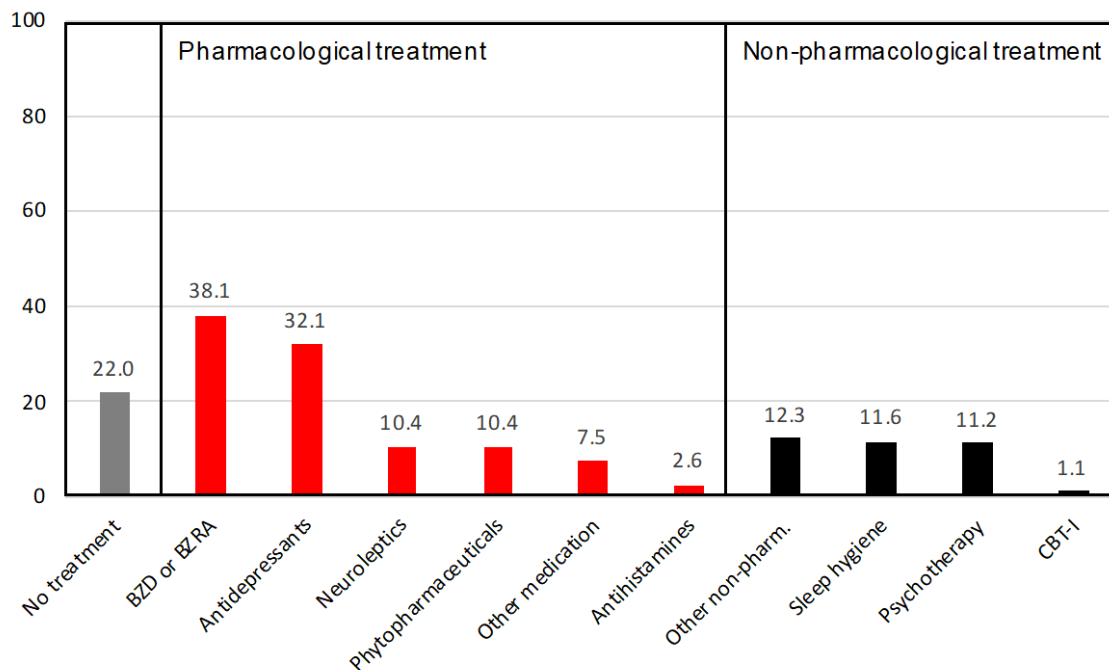


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### Figure 3. Treatment in patients with chronic insomnia.

Percentage of different treatments in patients with chronic insomnia per medication and different non-pharmacological treatments. Information on treatment type was available for n = 268/269 patients with chronic insomnia. Multiple answers per patients were possible within categories. Grey bar: Proportion of patients with no ongoing treatment. Red bars: Pharmacological treatments. Black bars: Non-pharmacological treatments. BZD: Benzodiazepines, BZRA: Benzodiazepine receptor agonists, Other non-pharm.: Non-pharmacological treatments not further specified. CBT-I: Cognitive behavioral therapy for insomnia.

### Proportion of treatment in patients with chronic insomnia (% of n = 268)

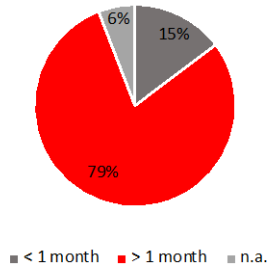


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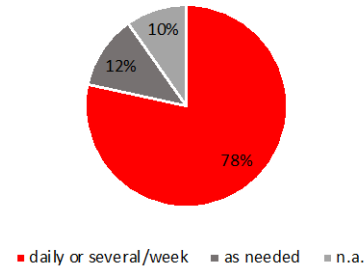
**Figure 4. Duration and frequency of hypnotic intake.** Duration and frequency of benzodiazepine (BZD) or benzodiazepine receptor agonist (BZRA) intake in patients with chronic insomnia treated accordingly (n = 102). N.a.: data missing. Chronic use is defined as daily to several/week for > 1 month.



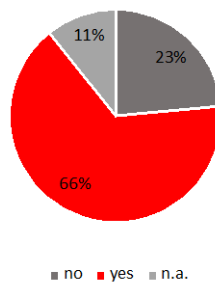
Duration of BZD/BZRA intake (% of n = 102)



Frequency of BZD/BZRA intake (% of n = 102)



Chronic use of BZD/BZRA intake (% of n = 102)



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**Table 1**

Sociodemographic characteristics and previous insomnia symptoms of patient study population (n = 3216). In patients where sleep was not discussed (last column), sex and age were documented for all patients and previous insomnia symptoms for most (n = 644), but no further information on current sleep problems or treatment was gathered.

	Sleep was discussed (76%, n = 2432/3216)		In remission under current treatment (6%, n=133/2432)		Current insomnia symptoms (36%, n=875/2432)		Meet criteria for chronic insomnia (11%, n=269/2432)		Sleep was not discussed (24%, n = 784/3216)	
	N	%	N	%	N	%	N	%	N	%
Sex										
female	1235	51	91	68	491	56	163	61	415	53
Age group (years)	N	%	N	%	N	%	N	%	N	%
18-35	379	16	9	7	115	13	27	10	142	18
36-50	463	19	21	16	164	19	56	21	153	20
51-65	647	27	27	30	251	29	86	32	222	28
66-100	942	38	76	57	345	39	100	37	267	34
Mean age	female	male	female	male	female	male	female	male	female	male
Years (SD)	58 (18)	58 (20)	67 (18)	63 (16)	59 (18)	59 (18)	61(17)	57 (18)	57 (20)	56 (18)
Previous insomnia symptoms	N	%	N	%	N	%	N	%	N	%
	761	31	119	90	535	61	205	76	131	17

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**Table 3**

Comorbidities in chronic insomnia patients (n = 269). Multiple responses per patient were possible.

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Comorbidity	N	%
Total	201	75
Depression	99	49
Anxiety	76	38

Chronic pain	70	35
Sleep apnea	31	15
Drug/medication abuse	31	15
Restless legs	25	12

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**Table 2**

Type of sleep complaints in insomnia patients (n = 269). Multiple responses per patient were possible.

Insomnia type	N	%
Difficulties falling asleep	168	62.45
Fragmented sleep	207	76.95
Early awakening	108	40.15
Non restorative sleep	123	45.72
More than one type	195	72.49
Single type insomnia	74	27.51

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1 **Supplementary Tables**

2

3 **Supplementary Table 1**

Sociodemographic characteristics of participating Sentinella primary care physicians (n = 83).

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<b>Sex</b>	<b>N</b>	<b>%</b>	<b>5</b>
female	19		63
<b>Age group (years)</b>	<b>N</b>	<b>%</b>	<b>7</b>
30-39	5		8.6
40-49	16		19.3
50-59	28		34.0
>60	34		41.1
<b>Mean age</b>	<b>female</b>	<b>male</b>	<b>13</b>
years (SD)	50 (9)	57 (9)	
<b>Region</b>	<b>N</b>	<b>%</b>	<b>15</b>
urban	63		76.1
intermediate	13		16.0
rural	7		8.4

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21 **Supplementary Table 2**

22 Type of sleep complaints in insomnia patients (n = 269). Multiple responses per patient were  
23 possible.

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<b>Insomnia type</b>	<b>N</b>	<b>%</b>
Difficulties falling asleep	168	62.45
Fragmented sleep	207	76.95
Early awakening	108	40.15
Non restorative sleep	123	45.72
More than one type	195	72.49
Single type insomnia	74	27.51

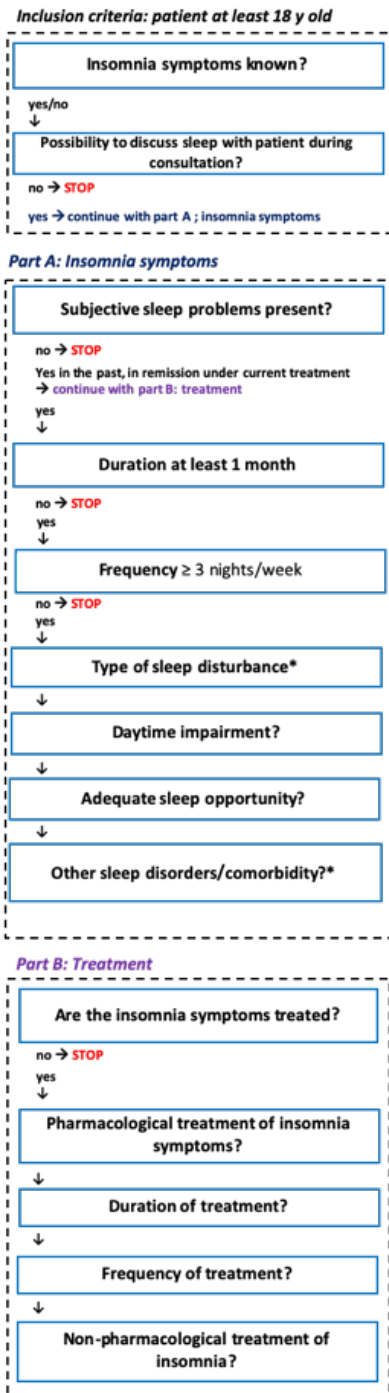
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2 **Supplementary Figures**

3 **Supplementary Figure 1.**



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5 **Supplementary Figure 1. Data collection algorithm.**

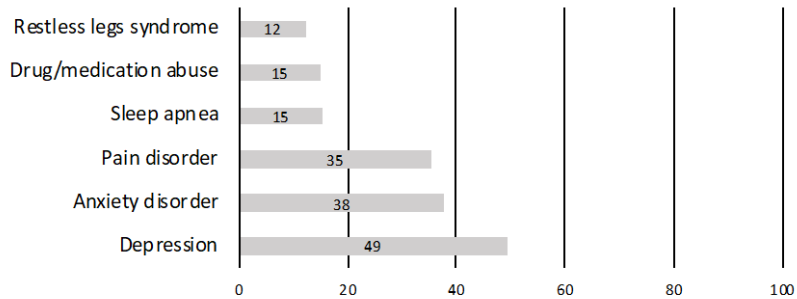
6 Flow chart explaining data collection procedure distributed to PCPs. \*Multiple answers  
7 possible. Duration and frequency of treatment was assessed for benzodiazepines and  
8 benzodiazepine receptor agonists only.

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1 **Supplementary Figure 2.**

**Comorbidities in patients with chronic insomnia (% of n = 201)**



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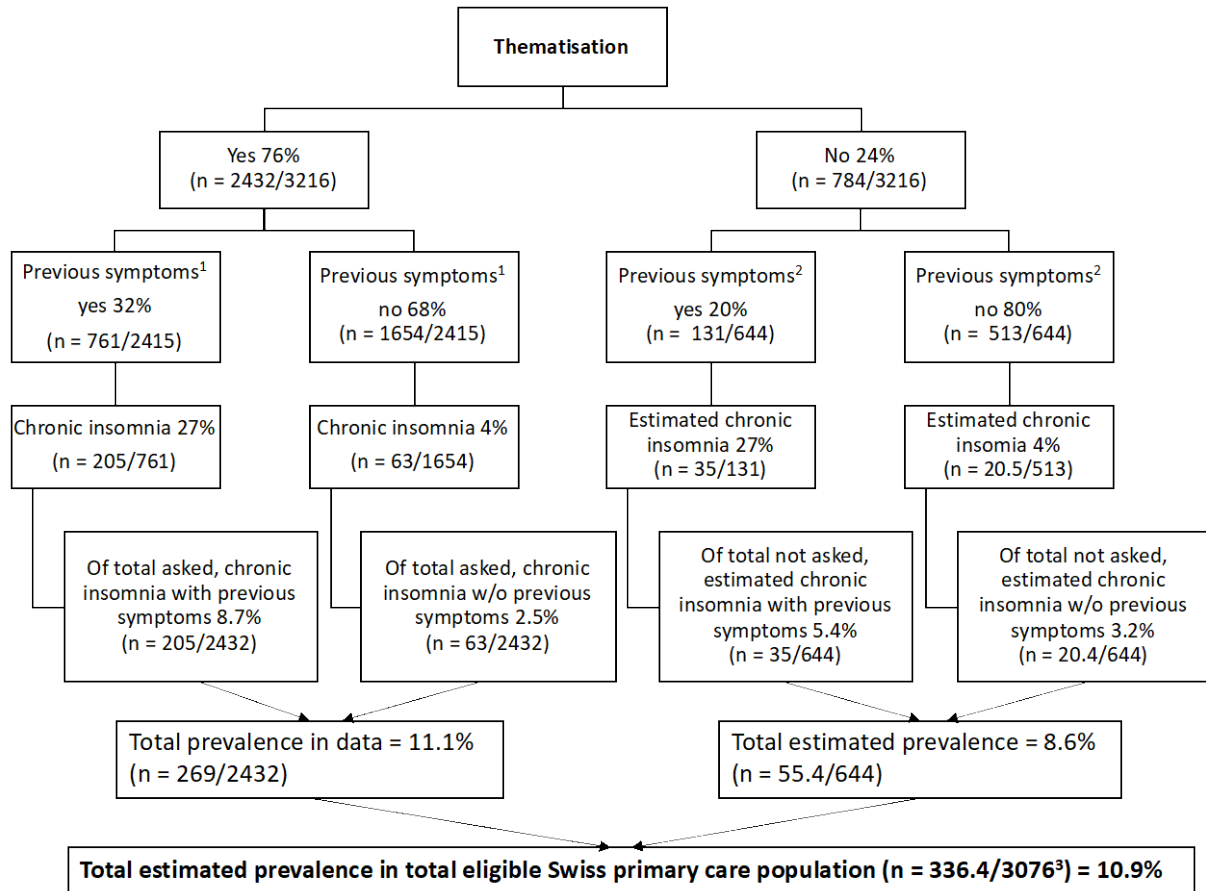
3 **Supplementary Figure 2. Comorbidities in patients with chronic insomnia.**

4 N = 201/269 (75%) patients with chronic insomnia had at least one comorbidity. The figure  
5 shows the proportion for prespecified comorbidities as assessed by the PCP in these 201  
6 patients (multiple answers possible per patient).

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1

2 **Supplementary Figure 3.**



3

4 **Supplementary Figure 3. Prevalence estimation for eligible Swiss primary care population.**

5 Flow chart shows estimation of prevalence in the general Swiss primary care population.  
 6 Previous insomnia symptoms (i.e., the primary care physician (PCP) already knew about  
 7 previous sleep complaints of a patient) were a significant predictor for thematization of  
 8 sleep problems in an eligible patient. This represents a risk for bias towards an  
 9 overestimation of the real prevalence. To explore the extent of the bias, we estimated the  
 10 prevalence of chronic insomnia in patients where sleep was not discussed. We then derived  
 11 the estimated prevalence of the total study collective (10.9%), deviating less than 1% from  
 12 our measured data (11.1%). <sup>1</sup>For 17/2432 (0.7%) patients, data on previous insomnia  
 13 symptoms were missing, one patient of those had chronic insomnia. <sup>2</sup>For 140/784 (18%)  
 14 patients, data on previous insomnia symptoms were missing. <sup>3</sup>Estimation is based on total  
 15 number where information on previous symptoms was available.

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