



apneu  
vereniging

## **Monograph about the care pathway for sleep apnea**

A research report from  
ApneuVereniging (Dutch Apnea Association)  
in cooperation with Kantar

Piet Heijn van Mechelen  
Evelien Damhuis  
Evianne Hazeleger

**KANTAR**

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# Monograph about the care pathway for sleep apnea

## Contents

Preface .....	3
Introduction .....	4
Report explanation .....	7
1 Summary and conclusions .....	9
2 Pre-diagnosis .....	12
- Years before diagnosis	13
- Role of GP's	14
- Comorbidities	15-16
- Medical treatment prior to diagnosis	17
- Who detects apnea	18
3 Sleep clinic and sleep studies .....	19
- Number of sleep studies	20
- Goal of sleep studies and actual sleep apnea	21
- Throughput time	22-23
- Clinical or ambulant; PG or PSG	24-25
- Character of the sleep clinic	26
- Appreciation of sleep clinics	27
4 Diagnosis .....	28
- Leading medical specialism	29
- Specialists involved in diagnosis	30
- Multidisciplinary teams	31
5 Prescribed treatments .....	32
- Share of different treatments	33
- Number of CPAP and MAD prescribed	34
- Compliance CPAP	35
- Appraisal of CPAP	36
- Side effects of CPAP	37
- Effectivity and compliance MAD	38
- Monitoring functioning of MAD	39
- Sleep position training (SPT)	40
6 Education and guidance .....	41
- Actual education and guidance	42
- Appreciation of education and guidance	43
- Time spent on education and guidance	44
7 Follow-up care .....	45
- Periodical control	46
- Patient needs for periodical control	47
- Cooperation sleep clinic GP	48
- Patient appreciation of after care of GP	49
- Contacts with home care provider	50
- Periodic check of home care provider	51
- Appreciation of home care provider	52
- Aspects of appreciation of home care provider	53
8 Outcomes .....	54
- Average health gain of treatment	55
- Distribution of success of treatment	56
9 Appendices .....	57

# Surveys under sleep apnea patients and sleep clinics in the Netherlands

*Based on annual surveys commissioned by the ApneuVereniging in the period 2005 - 2020*

## Preface

This report contains the most important trends from annually alternating surveys under thousands of newly diagnosed and existing sleep apnea (OSA) patients and almost all sleep clinics in the Netherlands over a 15-year period from 2005-2020. The surveys were conducted by leading research agencies as Kantar on behalf of the Dutch Apnea Association<sup>1</sup>. Questions include how the diagnosis went, what treatment patients received, and how they felt about that treatment, equipment and services, both from healthcare professionals and home care providers. By comparing the annual data of the patients and clinics surveys, a complete and representative picture with important trends emerges. Meanwhile seven different OSA-treatments are covered by the Dutch basic health insurance. In the 'coronavirus' year 2020, it was decided to summarise the main results and trends in a monograph and present it to an international audience.

Initiator and project leader Piet-Heijn van Mechelen was a board member and chairman of the 'ApneuVereniging' for more than 15 years. In his introduction he outlines the background to these studies and gives a general overview of the developments in the field of OSA in the Netherlands since 1990 from the patient's perspective. Co-researchers at Kantar, Evelien Damhuis and Evianne Hazeleger, supplement this with a scientifically substantiated wealth of figures and graphs on individual subjects. Together this forms a unique and highly representative picture of the developments and state of affairs of the diagnostics and treatment of OSA in the Netherlands.

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<sup>1</sup> The Apnea Association (ApneuVereniging) is a Dutch patient association with > 9000 members (OSA patients or their partners) in 2020. It is run entirely by volunteers. Approximately 300 professionals involved in the diagnosis and treatment of OSA support the association as a 'Friend of the Apnea Association'.



# Introduction

## What is OSA?

Obstructive Sleep Apnea (OSA) is characterised by frequent breaks in breathing (apneas) during the night. The additional arousals cause a lack of (deep) restorative sleep. Daytime symptoms manifest as decreased cognitive function, mood swings and increased sleepiness. The apneas cause a decrease in oxygen saturation in the blood. Together, the fluctuating oxygen levels in the blood and the knocks to the system from the arousals, this can give rise to comorbidities such as high blood pressure and increased cardiovascular risk.

## Treatment

In the late 1980s and early 1990s OSA was sporadically diagnosed in the Netherlands. The treatment consisted mainly of ENT surgery. The Apnea Association was founded in 1990 to achieve recognition for the condition of OSA and to ensure that CPAP treatment is included in the mandatory basic health insurance package.

- Since 1996, the diagnosis and treatment of OSA with CPAP has been free to the patient.
- In 2010, the mandibular advancement device (MAD) was added.
- In 2016, the sleep position trainer (SPT) was included in the basic package.
- Since 2018 hypoglossus stimulation is reimbursed, albeit under strict conditions.
- The Medical Specialists Guideline 2018 also recognises jaw osteotomy (including bi-maxillary advancement) as a good treatment for OSA.
- ENT surgery is still provided but is no longer the treatment of first choice and has declined significantly in importance.
- Bariatric surgery is considered an effective treatment for OSA in cases of severe obesity (BMI > 35) but is predominantly used for other indications.

The Apnea Association has been actively involved in the approval process for the inclusion of the new treatments and plays a role in the drafting of the guidelines.

## Sharp increase in the number of patients

The number of diagnoses and treatments has increased significantly in recent years. To name the most important categories: In 2004, a total of 9,000<sup>2</sup> people used CPAP equipment. In 2019, that number had risen to 212,000. This is even more remarkable given that some 50,000<sup>3</sup> new MAD users have joined the ranks since 2010. (This growth has not been at the expense of growth in the number of CPAP equipment users). Sleep position training (SPT) has also seen an increase recently. This brings us to over 300,000 people with OSA who were treated in the Netherlands in 2020.

Tens of thousands of diagnosed patients are added each year.

In the year 2017, an overall number of at least **98,809** sleep studies were performed, of which:

**68,265** were based on suspicion of OSA, of which  
**47,836** were found to have OSA

In 2017, there were a total of at least

**27,490** XPAP devices and  
**14,444** MADs prescribed and  
**2,705** ENT surgical procedures performed  
**2,428** Sleep position training courses prescribed  
**289** Jaw osteotomy operations performed



<sup>2</sup> Based on the figures from the Netherlands Healthcare Institute.

<sup>3</sup> Based on research by the Apnea Association among all sleep clinics in the Netherlands.

## The Apnea Association and 15 years of surveys

Since 2005, the Apnea Association has conducted alternating annual surveys in the Netherlands. One year among patients (with 2.700-5.200 respondents yearly). The next year among all sleep clinics. There are two reasons for this.

First, the patient perspective. The medical literature concentrates on the diagnostic process and the start of treatment. We heard stories from patients that they had been walking around for years with symptoms that on closer inspection could be considered the result of OSA<sup>4</sup>. During those years, many people were also known to the medical community (and started treatments) without the suspicion or diagnosis of OSA. This deserves further investigation.

The history of OSA patients is characterised by a downward spiral over many years. Although the condition is not physically considered a serious illness (because it is not fatal), it has a great impact and is very disabling. A person with increased daytime sleepiness, decreased energy, procrastination, decreased cognitive functioning and mood swings becomes an increasingly unpleasant partner, father, mother, colleague, manager, or employee. In other words, untreated OSA leads to increasingly obvious dysfunction at home and at work and is often initially mistaken for overwork, burnout, or depression. Comorbidities such as obesity or cardiovascular disease initially receive more attention.

On the other hand, the treatment of OSA can be regarded as a medical success story. Not only is the deterioration stopped. People also get into an upward spiral for years. Treated patients can return to full function if they are not suffering from comorbidities. On average, they quote their quality-of-life with a high score, 36 percent even giving it an 8 or higher on a scale 1-10. Many patients say: 'I've gotten my life back'. The Apnea Association counts among its members patients who have been treated with surgery and/or devices for 30 years.

<sup>4</sup> On average, it takes 5-8 years for complaints and symptoms to be recognised by patients and physicians. In fact, according to 40% of patients, it takes more than 8 years to be diagnosed with OSA (see survey report below). It is also striking that this figure has barely fallen since the 2005 survey. This can be seen as an indication of a still existing diagnostic shortfall.

The patient perspective has grown in importance in recent years, as it has become increasingly clear that identifying the number of apneas and hypopneas – determining the AHI – is a necessary, but not sufficient condition for determining the severity of OSA. The role of complaints and symptoms is becoming progressively more important. Complaints and symptoms, preferably formalised in Patient Reported Outcome Measures (PROMs)/ Patient Experience Measures (PREMs), will even play a role in the Netherlands in determining whether a treatment was rightly launched and is producing sufficient results (more than just lowering the AHI).

A second reason for doing research was curiosity about day-to-day practice. For example: According to the literature and guidelines, all sleep clinics did clinical polysomnography (PSG). We spoke to quite a few patients who had had sleep studies at home without wires on their heads: ambulatory PG. We wanted to know what it was like. Who does what? Where will you be treated by an ENT surgeon? And do they more regularly perform ENT surgery? Where by a pulmonologist? And do they usually prescribe CPAP? Which clinic also treats CSAS? Where do they have a complete multidisciplinary team familiar with all sleep disorders? Etcetera. This is important information for patients who want to know the best place to go.

## Holding up a mirror

As a patient organisation, the Apnea Association knows its role. Regarding medical issues, such as the long-running debate over PSG versus PG, judgements are never made. Through the surveys, the day-to-day practice of diagnosis and treatment of OSA has been mapped.

However, patients' ratings of diagnosis and treatment have also been studied. What are the waiting and turnaround times like? Which clinics spend a lot of time on information and guidance (necessary for therapy compliance)? Where do patients feel heard and helped? Sleep clinics that scored above average received stars. Here, colleagues are the benchmark. Their approach proves feasible and possible in practice.

The surveys turned out to yield valuable information, both for patients and for professionals involved in diagnosis and treatment: medical specialists, policy makers, health insurers, manufacturers of medical devices and home care providers.

The Apnea Association reports are presented annually at a symposium for professionals attended by medical specialists from sleep clinics. The reports are widely distributed in printed form and digital pdf format. The Apnea Association is supported by a Medical Advisory Board in which all medical disciplines involved in diagnosis and treatment are represented.

## From CPAP clinic to centre for sleep and waking research

The repeated annual survey, alternating between patients and sleep clinics, creates a complete picture that can also be used to follow the development of sleep medicine in the Netherlands.

The growth of sleep clinics in number, size and quality is remarkable. Prior to 1996, diagnosis and treatment were the domain of a few ENT surgeons and a few enlightened pulmonologists. After 1996, 'CPAP clinics' were also established. A sleep clinic was organised where the pulmonologist made the diagnosis based on a sleep study and started treatment in collaboration with the home care provider<sup>5</sup>. The number of sleep clinics and their professionalism has grown ever since. There are now over eighty sleep clinics in the Netherlands. One in every major hospital. One or more in every major city. Almost all of them perform more than 500 sleep studies per year (20% even > 2000 sleep studies per year). They now work with multidisciplinary team consultation, somnologists, nurse practitioners and OSA nurses with time for information and guidance.

## Good care results in grateful and loyal patients

There is a lively ongoing debate in the medical literature as well as among national policy makers and health insurers about adherence and the question of overtreatment, given the sharp increase in the number of OSA diagnoses.

We know that therapy acceptance is problematic in the first few weeks. Good information and guidance are important. No one likes to go to sleep for the rest of their lives with a blowing mask, a mouthful of MAD or a position trainer with regular vibrations reminding you not to sleep on your back every night. Lifelong OSA therapies with medical devices are a heavy burden on the patient. This makes overtreatment unlikely. The patient survey includes questions on adherence. Almost everyone (98%) meets the international minimum of five days a week and more than four hours a night. Very many patients in the Netherlands use the CPAP or MAD every night (92%) and for 6 hours or more (79%).

If people benefit from the therapy, they become loyal users, as we hear from patients and the surveys show.

## About this monograph

Over the past 15 years, data has been collected for the Apnea Association by the major (internationally) recognised research firms such as Kantar and GfK. A new survey of sleep clinics was to take place in 2020. This has been dropped. In the context of COVID-19, the Apnea Association expected limited participation and a distorted picture. Partly in view of the 30th anniversary of the Apnea Association it seemed a good idea to bundle recent surveys (and where possible trends) in a monograph that gives a picture of the day-to-day practice of diagnosis and treatment of OSA in the Netherlands. For the first time translated and available for the international audience.

Piet-Heijn van Mechelen, MSc

*Honorary Chairman of the Apnea Association*

<sup>5</sup> In the Netherlands, the suppliers of medical devices play a strong supporting role so that we can actually designate them as home care providers. Several clinics have their sleep studies performed by home care providers: ambulant PG as well as ambulant PSG. The interpretation remains of course a matter for the medical specialist. In most clinics, they operate from the clinic. Home care providers are providing information and guidance at the start of treatment and during the trial period. Autopap titration is the most commonly used method. In the years that follow, the patient usually has more contact with the home care provider than with the sleep clinic.

## Report explanation



## Report explanation

This report gives an overview of developments with regard to sleep apnea. The data originates from surveys that Kantar carried out for the Apnea Association from 2011 up to and including 2019. The role of interviewee alternated between patients and sleep clinics each year, so that if the patients completed the survey one year, the sleep clinics would do so the next, and vice versa.

### Surveys among patients:

In 2011, 2015, 2017 and 2019 Kantar carried out the patient surveys. A large number of patients participated in the surveys during these years (2011 n=2,703, 2015 n=3,642, 2017 n=5,113, 2019 n=5,235). Some patients were recently diagnosed, while others were diagnosed at an earlier stage. When a question has only been posed to recently diagnosed patients, this will be indicated at the bottom of the page that the question is on.

The Apnea Association supplied the surveys. Recently diagnosed patients were contacted through CPAP and MAD home care providers. From 2015 onwards, members of the Apnea Association were also invited to participate in this survey. The latter group consisted mainly of patients who were given the sleep apnea diagnosis some time ago.

Over the years we have seen a rise in the number of women participating in the survey; the average age has increased and relatively more participating patients were diagnosed over a year ago.

### Surveys among sleep clinics:

The surveys among sleep clinics were carried out by Kantar in 2014, 2016 and 2018. For each survey among the sleep clinics, every Dutch clinic was invited to participate. In 2014 and 2016 nearly all clinics did (99% response). We were not able to match this in 2018, however. Only 81% of sleep clinics participated that year. This should be taken into account during the reading of the report and interpretation of the results.

During the survey, sleep clinics are questioned about the situation over the previous year, unless the question explicitly states that it only concerns the first half of the current year.

*Extensive accountability statements for the surveys are attached in the appendix of this report.*

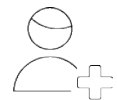
### Report structure:

In some instances, absolute numbers and/or percentages don't add up to the logical total. This is caused by rounding differences or because it concerns a multi-part question.

Significant differences compared to the most recent survey (2018 for sleep clinics, 2019 for patients) are indicated with +/- in the graphs and tables.

Whether the outcomes originates from the surveys among sleep clinics or those among patients is indicated on the lower right hand side.

Surveys among patients:



Surveys among sleep clinics:





# 1

## Summary and conclusions



## Research summary [1/2]



### Pre-diagnosis

- Many patients claim that they've been suffering with sleep apnea for a long time before being diagnosed. This has remained unchanged over the years. Clinics estimate this to period to be significantly shorter. 2018's estimation by clinics approximates that of the patients to a larger extent, compared to 2016.

- Patients believe there is room for improvement for GPs with regards to knowledge (34% excellent/very good in 2019) and with regards to how soon sleep apnea is detected (32% excellent/very good in 2019). The judgment of GPs has remained the same over the years. Sleep clinics are satisfied with the cooperation regarding the referral of patients.

- High blood pressure and excess weight are the most common comorbidities among patients. Patients indicate that comorbidities are usually not inventoried by sleep clinics however. This is despite the fact that the large majority of sleep clinics themselves also indicate that 50% or more of the patients have secondary diseases.

- Pre-diagnosis, half of the patients were already receiving some kind of treatment from a medical specialist. Many of those patients were not asked about sleep issues by that treating medical specialist, however. The partner and a medical specialist are the most important people when it comes to detecting sleep apnea.

### Sleep clinic and sleep studies

- The capacity of sleep clinics has been expanded over the years. Also the number of sleep studies that have been carried out has greatly increased. This increase may partly be linked to the increase of the number of sleep clinics that characterise themselves as a clinic aimed at all sleeping disorders instead of primarily being focused on sleep apnea. The majority of sleep studies is still aimed at diagnosing sleep apnea, however.

- Despite capacity expansions, the throughput time in the diagnostic process has not shortened, according to patients. Sleep clinics indicate that the throughput time of the diagnostic process is getting even longer. In 2014, 84% of clinics indicated that the process until the delivery of the CPAP equipment took a maximum of 8 weeks. By 2018, only 53% of clinics stated the same. There seems to be a similar trend for the fitting of the MAD.

- Sleep studies are increasingly taking place at home (30% in 2011 and 83% in 2019). According to the clinics, not everyone is diagnosed with sleep apnea after a sleep study. In 2018, 30% of people with suspected sleep apnea didn't actually have the disorder.

- The appreciation of the sleep clinics remains high.

### Diagnosis

- According to sleep clinics, the pulmonologist often takes charge in diagnosis and treatment; in 2018, this was the case with 70% of the clinics. Patients agree with this assessment and they meet with fewer and fewer other specialists. If another specialist is involved in the conversation at the time of diagnosis, it is usually the ENT-specialist.

- A possible explanation for patients interacting with fewer specialists may be that multidisciplinary team meetings for sleep apnea are increasingly becoming standard practice. In 2018, regular multidisciplinary team meetings took place in 99% of the sleep clinics. Moreover, the frequency seems to be increasing: in 2018 these meetings took place more often – with a frequency of 'once or more times per week/fortnight' – than in 2014 and 2016.

## Research summary [2/2]



### Prescribed treatments

When looking at the types of treatments, CPAP has remained the most frequently prescribed treatment over the years. The number of prescribed CPAP en MAD treatments has increased every year.

- Therapy compliance is high among CPAP equipment users. The vast majority of patients use their CPAP equipment every night and occasionally also during daytime naps. 8 out of 10 patients use the CPAP equipment for an average of 6 hours or longer per night.

- Patients are very positive about CPAP. The number of patients who suffer side effects from their CPAP equipment has been decreasing slightly: the number of patients that have indicated that they never suffer from dry mucous membranes or airway infections due to their CPAP equipment has grown somewhat.

- Patients are also satisfied with the MAD. In the 2019 survey, three-quarters of the patients judge the MAD's functioning to be (very) good. Moreover, the proportion of dissatisfied patients decreased from 15% in 2011 to 7% in 2019. Compliance is also high: the vast majority of patients uses the MAD every day. Sleep studies monitoring the functioning of the MAD are carried out less often, however.

- More recent is sleep position training (SPT). In 2018 this was a treatment option in nearly all clinics. However, the number of patients per clinic that is prescribed sleep position training is still low: fewer than 25 patients in half of the clinics. Sleep position training has a lot of potential. Sleep clinics believe that SPT, in combination with another treatment, may increase the effectiveness and also patients believe that a position trainer can be helpful.

### Education and guidance

- In 2019, 56% of the patients indicated to have had a form of education/guidance from a nurse or specialist. In 2018, 91% of the sleep clinics indicate that a separate officer for education/guidance is associated with their clinic. Nearly all patients find the education/guidance (more than) adequate.

- In sleep clinics however less time is spent on education/guidance of patients. The proportion of clinics that spends more than 90 minutes per patient on education and guidance, has decreased. The proportion that spends less than 15 minutes on these, has increased.

### Follow-up care

- Fewer clinics seem to systematically call upon patients for checking up on therapy compliance and effectiveness. The proportion of clinics that annually call upon patients to checking up with them seems to decrease. But the proportion of patients that feel an annual check-up is necessary, is also decreasing (50% still did so in 2019).

- With regard to follow-up care, GPs are still evaluated as poor by patients. However, sleep clinics rate their cooperation with GPs regarding treatment and following-up care as (very) good.

- Patients have frequent contact with home care providers. 7 out of 10 patients have contact with home care providers once a year or more. The vast majority of patients is (very) satisfied about the contact with home care providers. The overall evaluation of home care providers is good too. Home care providers check on the CPAP equipment at the patients' homes less frequently; check-ups more frequently take place remotely or not at all. Approximately half of the patients feel it's both pleasant as well as important that their CPAP data can be monitored remotely.

### The outcome

- The treatment of sleep apnea yields significant health benefits for patients. Where patients evaluated their health before treatment as unsatisfactory, after treatment they gave their health a (more than) satisfactory score.

# 2

## Pre-diagnosis



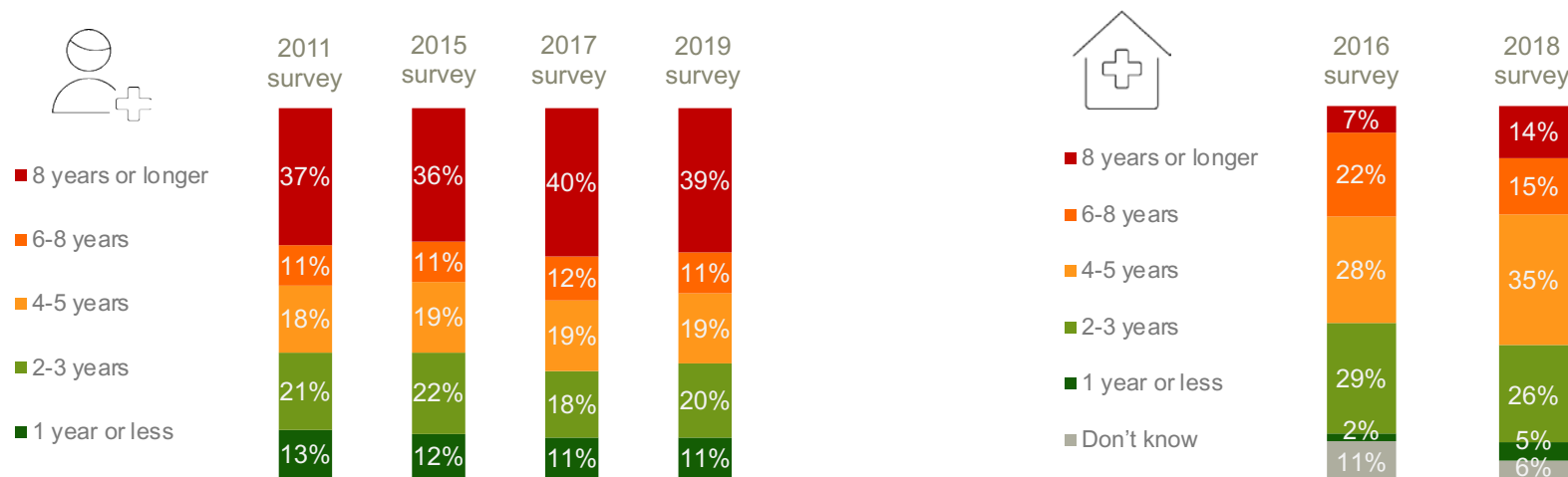
photo: iStock



## It is very likely that patients will have had sleep apnea for years pre-diagnosis

Nearly 7 out of 10 recently diagnosed patients think they've had sleep apnea for at least 4 years before being diagnosed with it. According to 39% of the patients it lasted even 8 years or longer. This has remained practically unchanged over the years. In comparison with the patients, sleep clinics believe that patients have had sleep apnea for a shorter period prior to the diagnosis. But in 2018, the impression that the sleep clinics had about this approximated the patients' view a little more.

### Duration sleep apnea pre-diagnosis



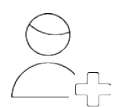
Question\_35P: Looking back now, for how long do you think you've actually lived with sleep apnea before it was detected and you were diagnosed? (recently diagnosed patients)  
2011 n=2703, 2015 n=1901, 2017 n=1878, 2019 n=2153

Question\_59S: How long do you believe patients have lived with sleep apnea before it was detected and they were diagnosed? 2016 n=82, 2018 n=66

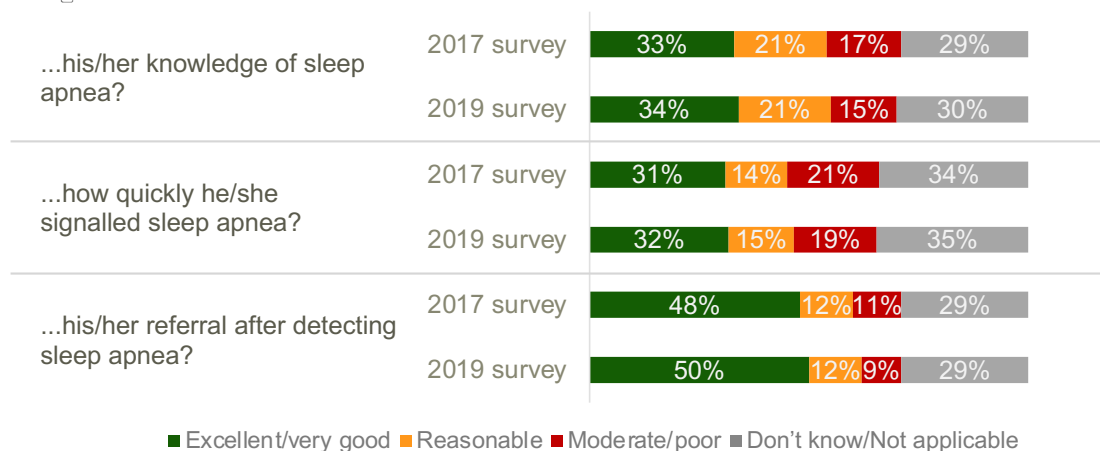


## Knowledge of and detection by GPs could be improved according to patients

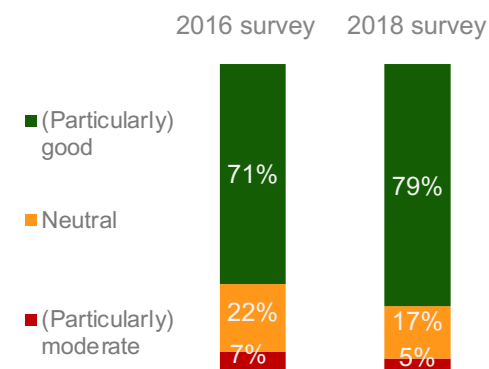
Approximately one third of the patients evaluate the GP as reasonable to poor regarding the aspects of knowledge and detection. Sleep clinics are satisfied with the cooperation when it comes to the referral of patients. The evaluation of the GP regarding the detection and referral of sleep apnea (patients) has remained unchanged over the past years.



### How do you assess your GP with respect to...



### Cooperation with GP regarding referral



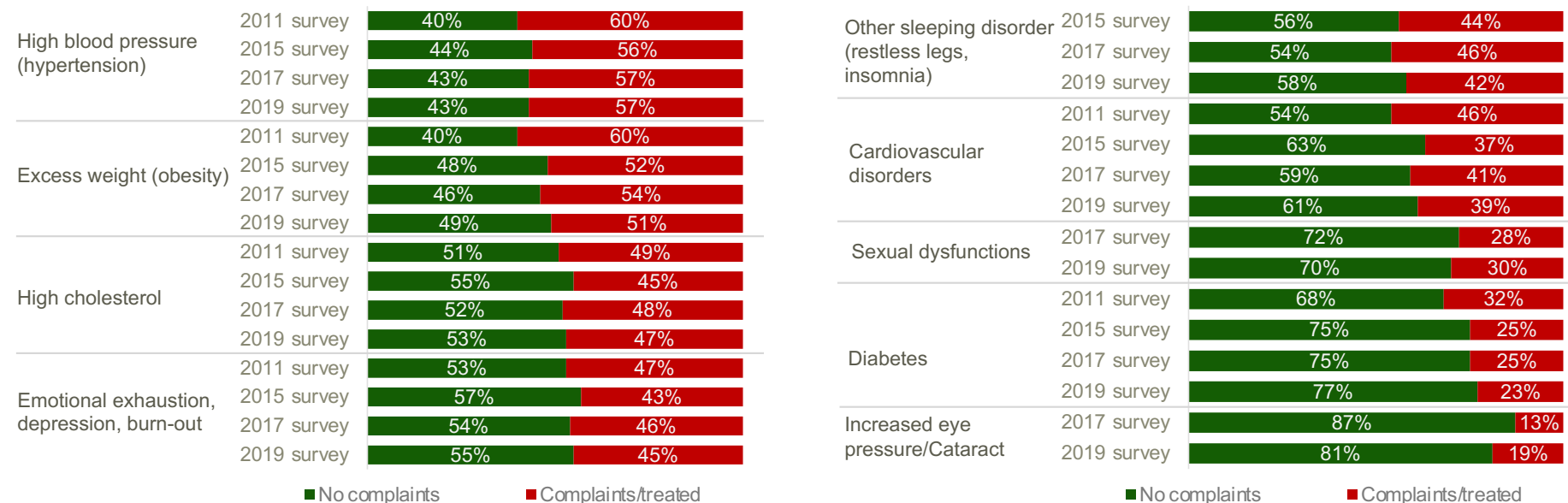
Question\_111P: How do you assess your GP with respect to...? 2017 n=5113, 2019 n=5235

Question\_61S: How do you experience the cooperation with the GP regarding the referral (correct timely referral)? 2016 n=83, 2018 n=66

## High blood pressure and excess weight most common comorbidities

Followed by high cholesterol, emotional exhaustion/depression/burn-out and other sleeping disorders. This is common in slightly less than half of the patients.

### Comorbidities

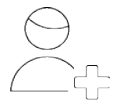


Question\_93P: Would you like to indicate if you've had complaints in the past – whether or not you saw your GP about it – and even received treatment for or are still being treated for?  
 2011 n=2703, 2015 n=3642, 2017 n=5113, 2019 n=5235

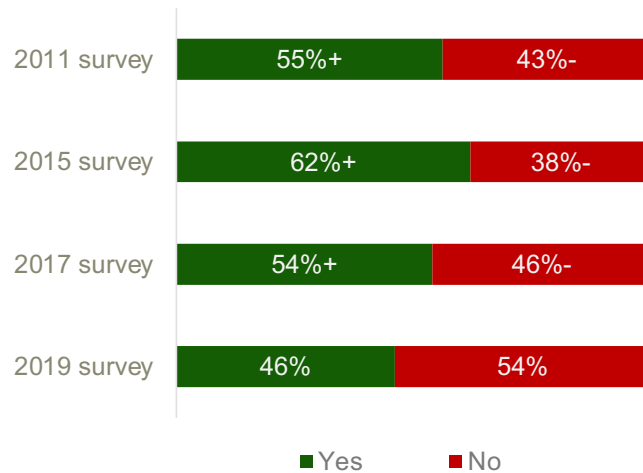


## Comorbidities often not inventoried by clinic

While the vast majority of sleep clinics also indicate that 50% or more of the patients have comorbidities, according to the patients they had on average 3,5 comorbidities at the moment of diagnosis of OSA.



### Has the sleep clinic inventoried comorbidities?

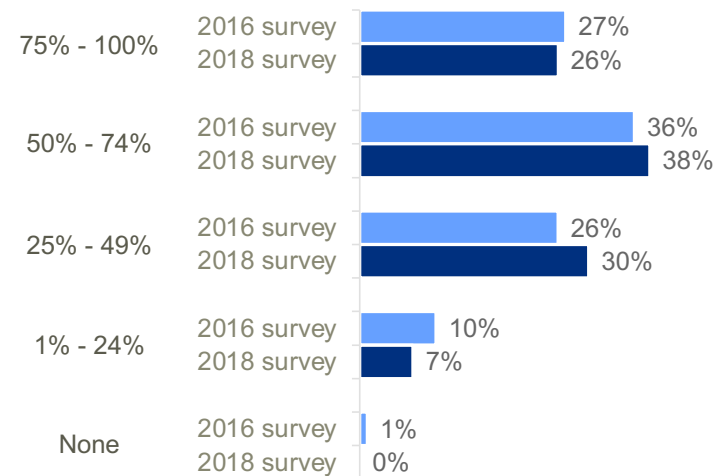


Question\_94P: Has the sleep clinic inventoried any of the stated disorders with you? 2011 n=2703, 2015 n=1901, 2017 n=1878, 2019 n=2153

Question\_60S: In your experience, what percentage of sleep apnea patients in the Netherlands has one or more comorbidities because of their sleep apnea? 2016 n=73, 2018 n=61



### How many apnea patients have comorbidities?





## Half of sleep apnea patients already treated by medical specialist pre-diagnosis

**Were you already being treated by one or more specialists pre-diagnosis?\***



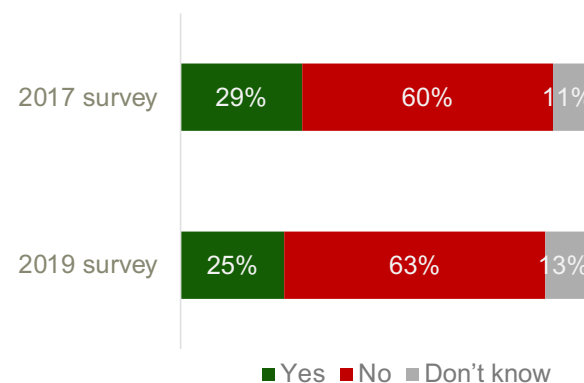
Question\_135P: Before your sleep apnea diagnosis, were you already being treated by one or more of the following specialists? 2017 n=5113, 2019 n=5235  
 Question\_136P: Were you also asked at that time whether you had sleeping problems? 2017 n=2353, 2019 n=2606

\*Please note: no annual data available for some types of medical specialists.

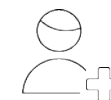
The majority of patients were not asked about sleeping problems by the medical specialist.

If patients are already receiving treatment before their sleep apnea diagnosis, it's usually from a cardiologist or internist.

**Were you also asked about sleeping problems at the time?**



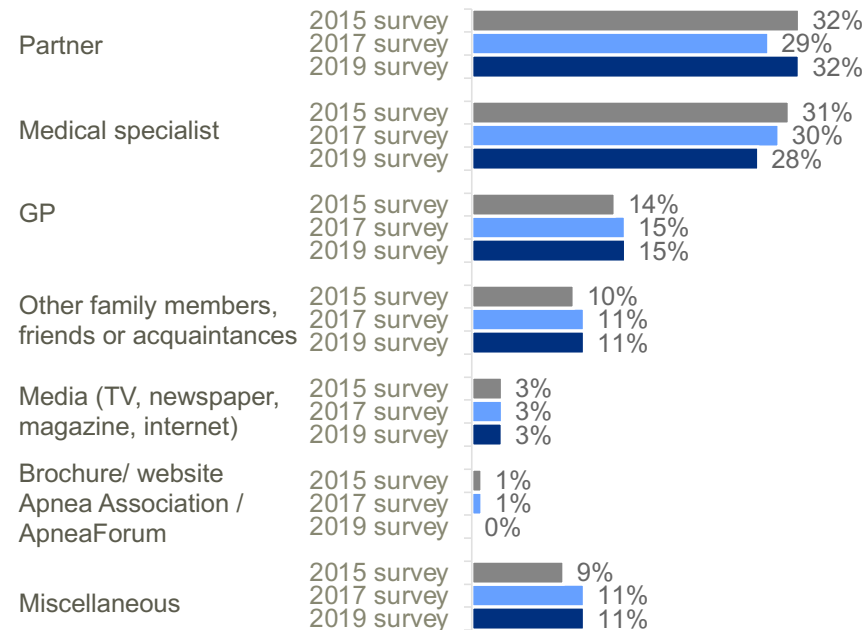
■ Yes ■ No ■ Don't know



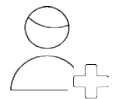
## Partner and medical specialist most important at detecting sleep apnea

One third of patients were made aware by their partners that they might have sleep apnea. Approximately one third were made aware of this by the medical specialist. The GP usually plays a smaller part in detection. 15% were made aware of their sleep apnea by the GP. Over the years this has remained unchanged.

### How did the patient become aware of the fact that they might have sleep apnea?



Question\_40P: What made you aware of the fact that you might have sleep apnea? 2015 n=3642, 2017 n=5113, 2019 n=5235



# 3

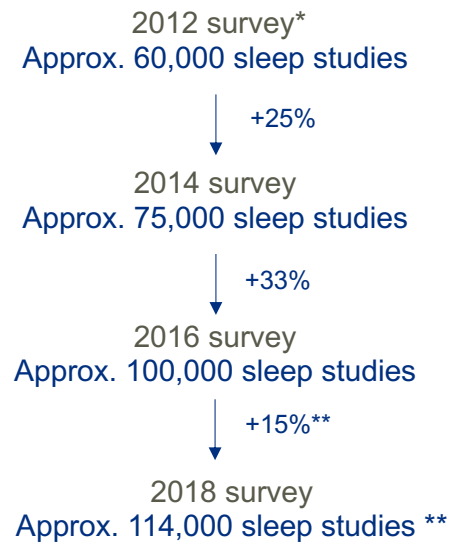
## Sleep clinic and sleep studies



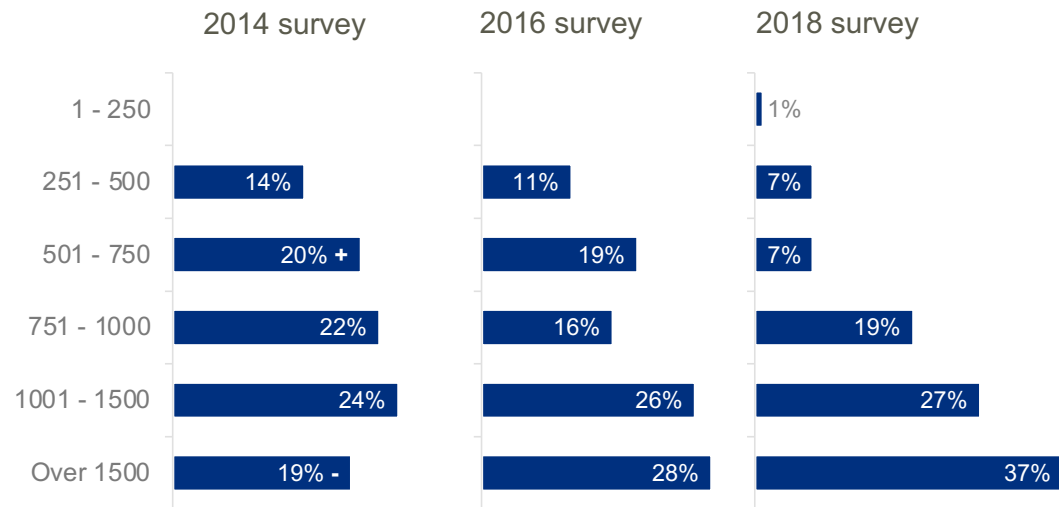
## Number of sleep studies increased significantly over the years

The overall sleep clinic capacity is increasing, while the number of smaller clinics is decreasing. Throughout all surveys, approximately 40% of sleep clinics indicate they will expand their capacity within 2-3 years. There is hardly any decline (on average 4% in all surveys).

### Total number of sleep studies



### Number of sleep studies per clinic



Question\_5S: How many sleep studies did your clinic perform in total [LAST YEAR]? [Sum total] 2014 n=83, 2016 n=81, 2018 n=67

Question\_18S: Which answer is the most suitable? 2014 n=79, 2016 n=83, 2018 n=67 > Note: no graph, but conclusion in subtitle.

\* this survey in 2012 was not carried out by Kantar \*\* Including correction for sleep clinics that did not participate in this survey



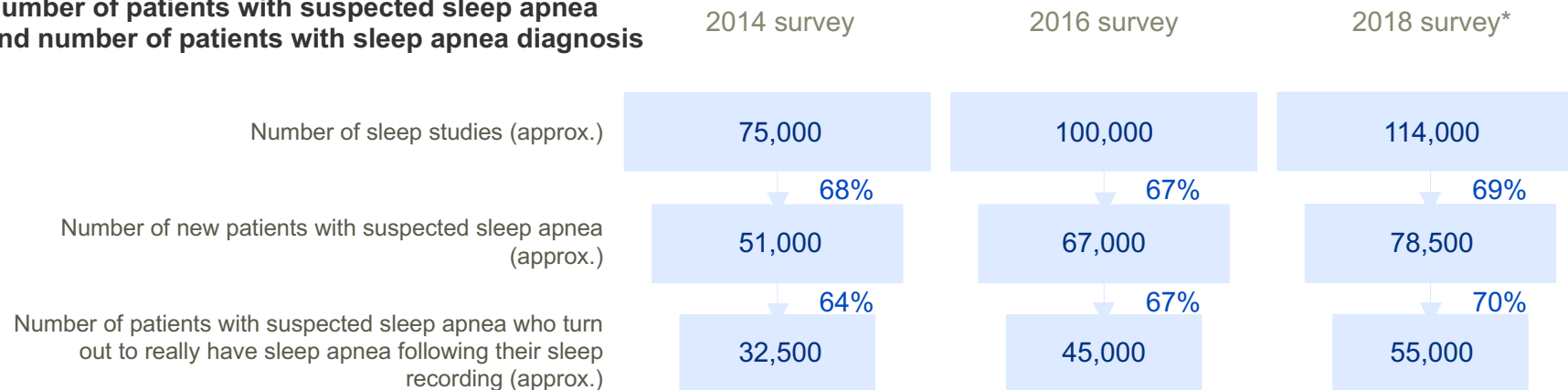


## Majority of sleep studies aimed at diagnosing sleep apnea

Out of all sleep recordings, approximately 68% is aimed at patients with suspected sleep apnea (other surveys for other sleeping disorders and periodic check-ups). There is a slight upward trend in the number of patients who do subsequently turn out to have apnea.

There is still an annual increase in the number of patients diagnosed with sleep apnea, but the increase is getting smaller (based on calculations with averages).

### Number of patients with suspected sleep apnea and number of patients with sleep apnea diagnosis



Question\_5S: How many sleep studies did your clinic perform in total [LAST YEAR]? [Sum total] 2014 n=83, 2016 n=81, 2018 n=67

Question\_6S: Can you give a rough breakdown of the sleep recordings opposite? [Sum total] 2014 n=83, 2016 n=82, 2018 n=68

Question\_7S: What proportion of people with suspected sleep apnea that you refer to sleep recording, actually turn out to have sleep apnea? [Sum total] 2014 n=80, 2016 n=81, 2018 n=68

\* Including correction for sleep clinics that did not participate in this survey

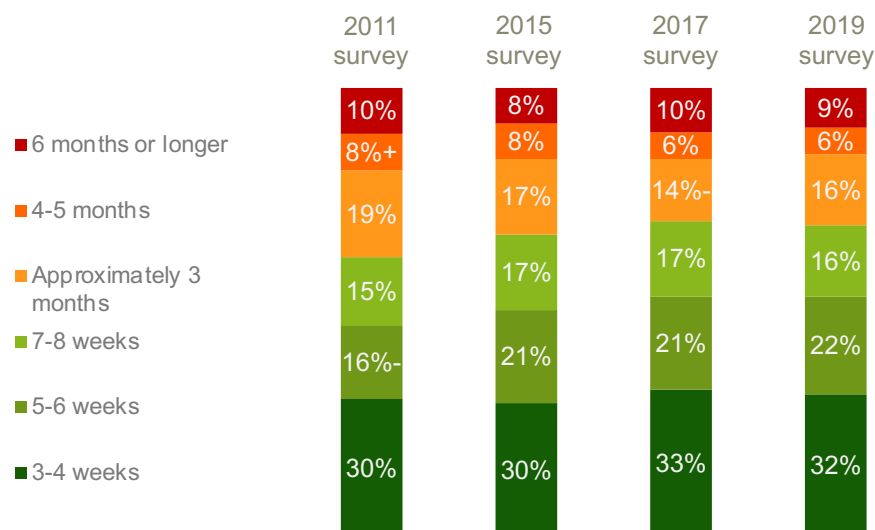
Please note: all figures are rounded.



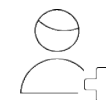
## Despite capacity expansion, throughput time in diagnostic process does not decrease

It appears that the duration of the diagnostic process became slightly shorter after 2011, but that trend didn't continue. In 2011, 61% of recently diagnosed patients received the diagnosis sleep apnea within 8 weeks after referral by their GP. In subsequent years that percentage remained at approximately 70% (2015 68%, 2017 71%, 2019 70%).

### Duration diagnostic process (from GP referral up to and including diagnosis)



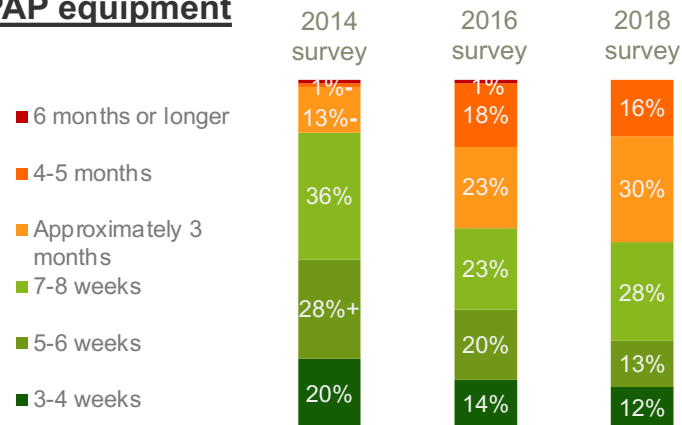
Question\_34P: How long do you think the whole diagnostic process took? With the process we mean referral by the GP (several appointments and examinations at the hospital) up to and including diagnosis (result of the sleep study). (recently diagnosed patients) 2011 n=2703, 2015 n=1901, 2017 n=1878, 2019 n=2153



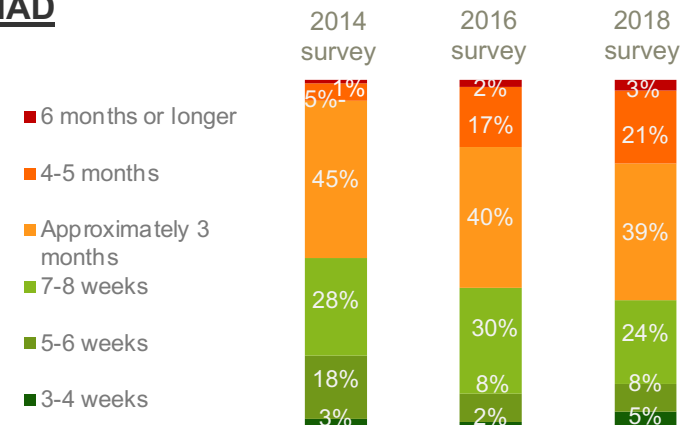
## According to sleep clinics, the throughput time of the diagnostic process is lengthening

In 2014, 84% of clinics still indicated that the process up to the delivery of the CPAP equipment took 8 weeks or less. By 2018, only 53% of clinics stated the same. The same observation holds true for the process of fitting the MAD: in 2014 this took less than 8 weeks for 49% of the clinics; in 2018 this applies to only 37% of the clinics.

### Duration of diagnostic process until delivery of CPAP equipment



### Duration of diagnostic process until fitting MAD



Question\_32S: On average, how long did the diagnostic process take during the first six months of (THIS YEAR), from referral by the GP, several appointments and examinations, until the issuing of CPAP equipment?

2014 n=75, 2016 n=83, 2018 n=67

Question\_41S: On average, how long did the diagnostic process take in the first six months of (THIS YEAR), from referral by the GP, several appointments and examinations, until the fitting of the MAD?

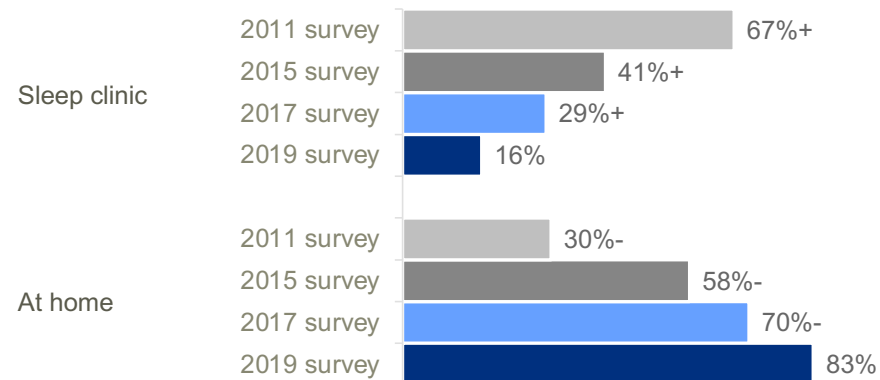
2014 n=76, 2016 n=83, 2018 n=66



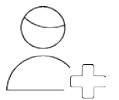
## Sleep study: from mostly done at the clinic to usually done at home

In 2011, two thirds of the sleep studies still took place in the sleep clinic and only one third at home. In 2018, according to patients the division was 44% PSG, 50% PG and 6% didn't know. In 2019, already more than 8 out of 10 sleep studies took place at home and only 16% in the clinic. The majority of sleep clinics (59%) said PG is the most common sleep study.

### Sleep study location



Question\_30P: Where did the sleep study take place? (recently diagnosed patients) 2011 n=2703, 2015 n=1901, 2017 n=1878, 2019 n=2153  
Were there wires on your head during the sleep study?

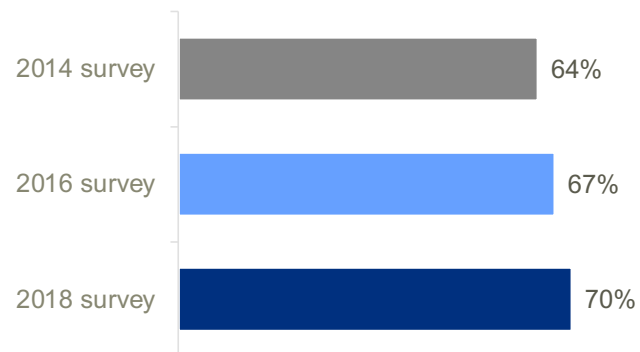




## Not everybody with suspected sleep apnea has sleep apnea

A significant group of patients with suspected sleep apnea appears not to have sleep apnea after the sleep study (in 2018 these amounted to 30%). However, there is a slight increase in the number of patients that actually turn out to have sleep apnea after the sleep study.

### Average number of sleep apnea diagnoses after sleep study



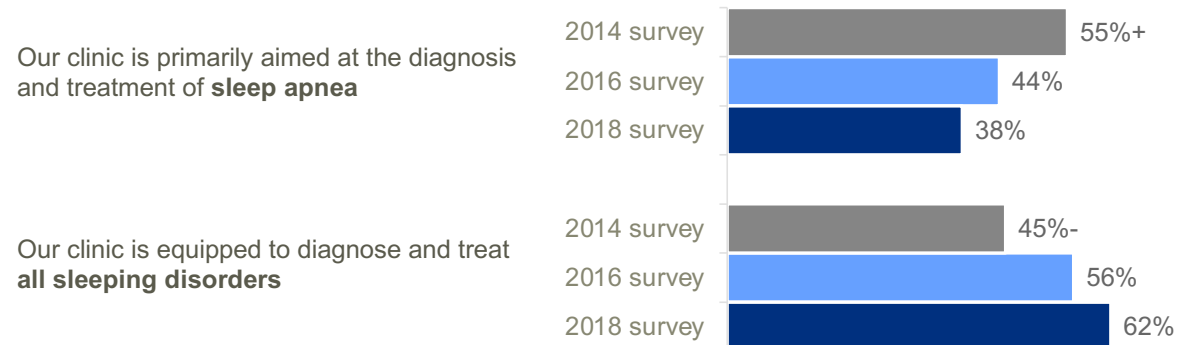
Question\_7S: What proportion of people with suspected sleep apnea that you refer to sleep recording, actually turn out to have sleep apnea? (average) 2014 n=80, 2016 n=81, 2018 n=68



## From apnea clinic to sleep clinic

More and more sleep clinics are aimed at the diagnosis and treatment of all sleeping disorders; not only primarily sleep apnea.

### How would you best characterise your sleep clinic?



Question\_16S: How would you best characterise your sleep clinic? 2014 n=80, 2016 n=84, 2018 n=65



## Appreciation of the sleep clinics is high

In 2011 and 2015 the overall satisfaction with the clinic is expressed in a high score. 7.9 in 2011 and 8.3 in 2015.

The overall assessment of the sleep clinics, expressed through the performance score, is high and the preference score is average. Collectively, this adds up to a reasonably high appreciation score of 66 in 2017 and 61 in 2019.

### Evaluation of sleep clinic as a whole

*Please note: since 2017, a globally validated method to determine the appreciation of patients is used instead of a score: the TRI\*M method. See Annex 2 for an explanation of this method.*

2011 survey

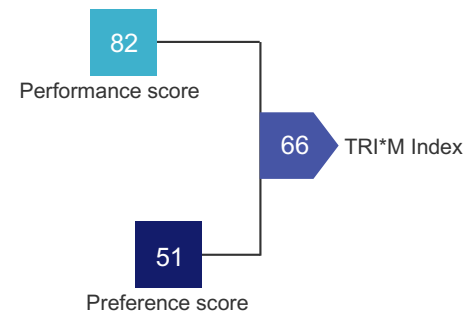
**7.9**

2015 survey

**8.3**

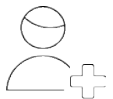
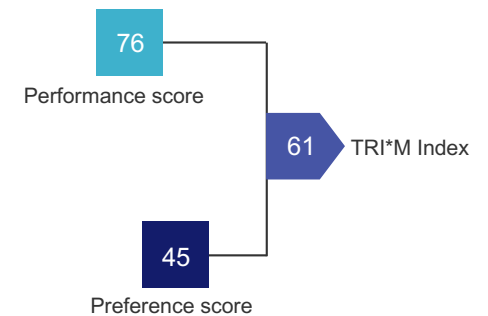
Question\_23P: If you would have to rate your satisfaction with the routine in the hospital or sleep centre (with a score between 1-10), how would you rate the following aspects? Clinic or sleep centre as a whole 2011 n=2703, 2015 n=3642

2017 survey



Question\_112P: Overall, how would you rate your current sleep clinic/hospital regarding diagnosis, treatment and/or follow-up care for sleep apnea? 2017 n=4137, 2019 n=4088  
Question\_113P: How strong is your preference for your current sleep clinic/hospital compared to other hospitals when it comes to sleep apnea? 2017 n=4137, 2019 n=4088

2019 survey



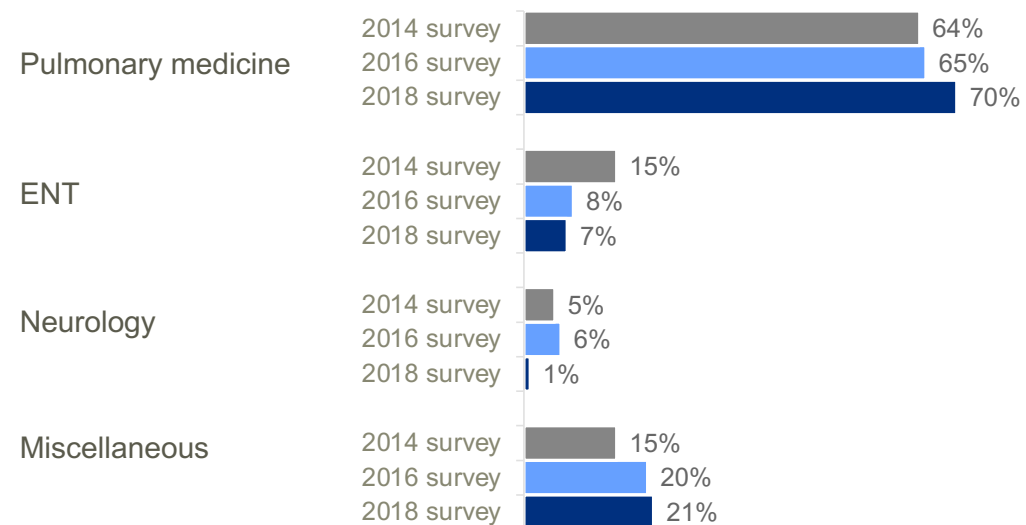
# 4

## Diagnosis



## According to clinics, the pulmonologist is often leading in diagnosis and treatment

### Leading specialism during diagnosis



Question\_23S: Which of the specialisms is leading during diagnosis and treatment of sleep apnea in your clinic? 2014 n=73, 2016 n=84, 2018 n=67

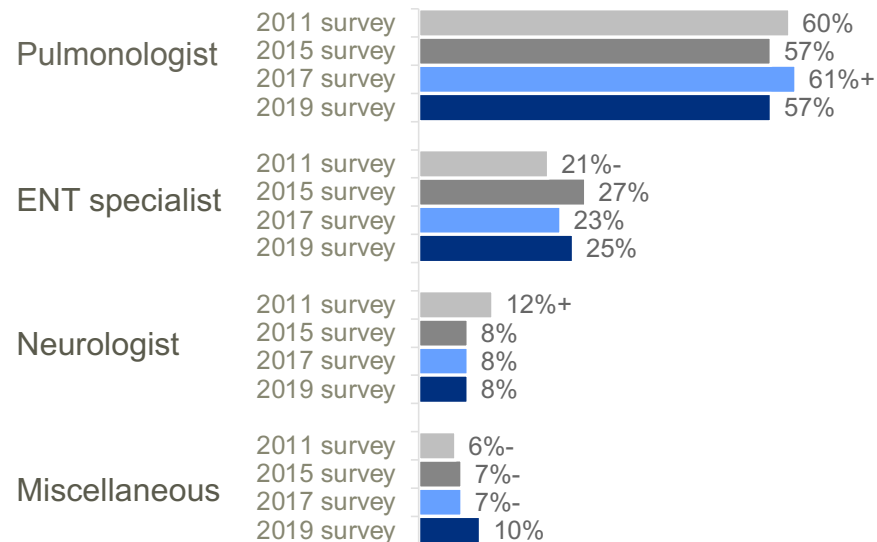




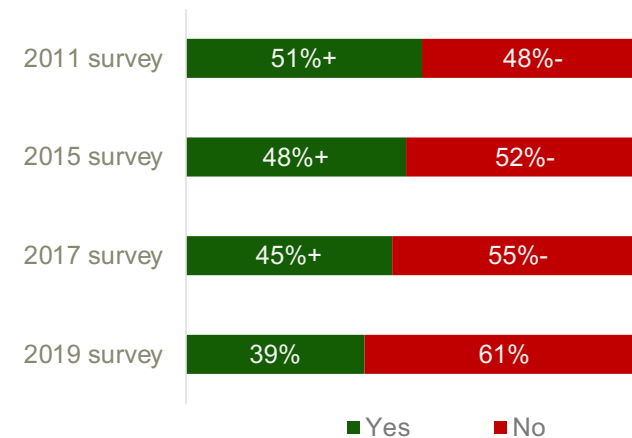
## Patients also believe the pulmonologist is usually leading during diagnosis and they see fewer and fewer other specialists.

If another specialist is involved during diagnosis, it is usually the ENT specialist.

### Specialist during diagnosis



### Other specialist during diagnosis



Question\_36P: Which specialist finally delivered the sleep apnea diagnosis to you? (recently diagnosed patients) 2011 n=2703, 2015 n=1901, 2017 n=1878, 2019 n=2153

Question\_37P: Did you speak to/have examinations with other specialists before the diagnosis? (recently diagnosed patients) 2011 n=2703, 2015 n=1901, 2017 n=1878, 2019 n=2153



## Multidisciplinary team meetings are becoming standard and are increasing in frequency

In 2014, 93% of all sleep clinics indicated that there were regular multidisciplinary team meetings with regards to sleep apnea. In 2016, this rose to 96%; in 2018 it rose to 99% of sleep clinics.

In 2018, this consultation was more likely to occur with a frequency of ‘once or more times per week/fortnight’, compared to 2014 and 2016.

### Frequency multidisciplinary team meetings

	2014 survey	2016 survey	2018 survey
Once or more times per week/fortnight	64%-	62%-	81%
Once a month	28%+	28%+	12%
Once every 3 months or less	3%	6%	0%
Miscellaneous	4%	4%	7%

Question\_25aS: Are there regular multidisciplinary team meetings concerning sleep apnea? 2014 n=83, 2016 n=84, 2018 n=68 > Note: no graph, but conclusion in (sub)title.  
Question\_25cS: Are there regular multidisciplinary team meetings concerning sleep apnea? If Yes: 2014 n=67, 2016 n=81, 2018 n=67



# 5

## Prescribed treatments

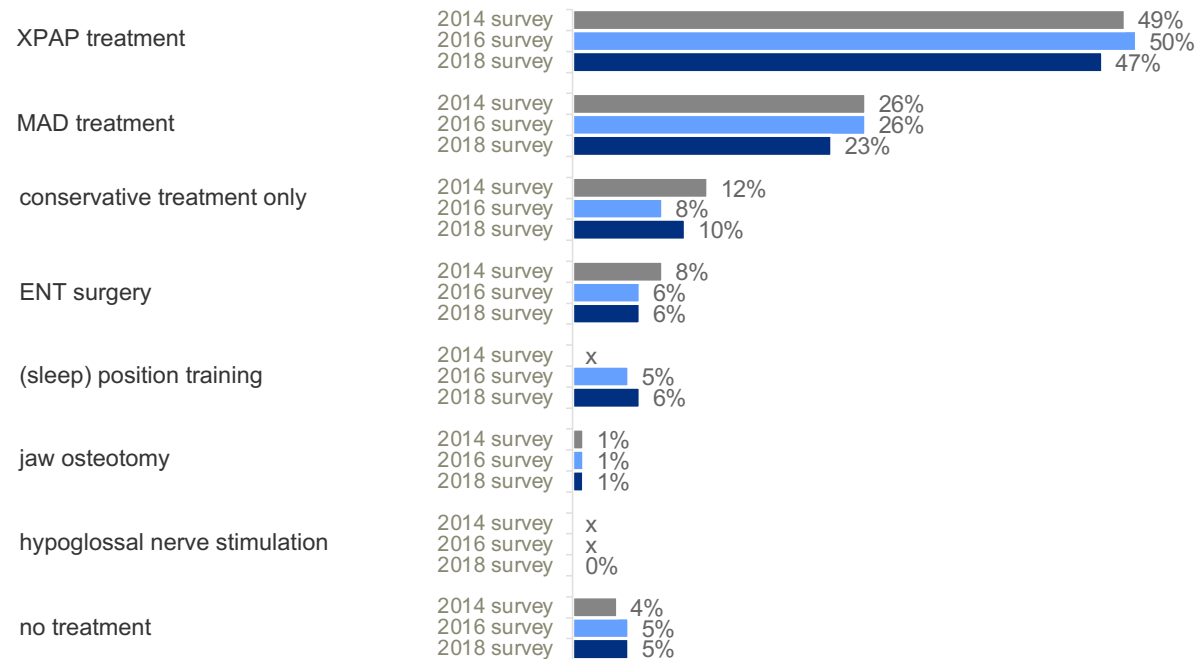


photo: bigstock / alexrains

## CPAP remains the most frequently prescribed treatment

Over the years, there are no significant visible increases or decreases in the prescribed treatments.

### What proportion of the patients was prescribed...\*



Question\_27S: What proportion of the people who received the OSA diagnosis (LAST YEAR) was prescribed.... 2014 n=81, 2016 n=81, 2018 n=67  
 \* Please note: for some procedures or prescriptions there is only data for some years, while there is no data for others.



## Number of prescribed CPAP and MAD treatments increases every year

However, ENT surgery appears to be stabilising. Jaw osteotomy is decreasing (slightly).

### Number of prescribed treatments

	2014 survey	2016 survey	2018 survey (number incl. correction*)
Number of prescribed cpap treatments (approx.)	24,600	25,500	27,500 (32,000*)
Number of prescribed mad treatments (approx.)	10,750	12,200	14,400 (16,250*)
Number of ENT surgical procedures carried out (approx.)	2,700	3,100	2,700 (3,150*)
Number of sleep position trainers given (approx.)	Not asked	Not asked	2400 (unknown*)
Number of jaw osteotomy procedures carried out (approx.)	390	300	290 (350*)

Question\_28S: How many patients in your clinic were prescribed XPAP treatment in the past year (LAST YEAR)? [Sum total] 2014 n=82, 2016 n=80, 2018 n=66

Question\_33S: How many OSA patients were fitted with an MAD in the past year (LAST YEAR)? [Sum total] 2014 n=82, 2016 n=81, 2018 n=66

Question\_42S: How many OSA patients were given sleep position training as a treatment in the past year (LAST YEAR)? [Sum total] 2018 n=65

Question\_44S: How many OSA patients had OSA surgery (LAST YEAR)? [Sum total] 2014 n=81, 2016 n=82, 2018 n=65

Question\_51S: How many OSA patients underwent a jaw osteotomy (LAST YEAR)? [Sum total] 2014 n=81, 2016 n=83, 2018 n=68

\* Including corrections for the sleep clinics that did not participate in this survey Please note: numbers are rounded.





## Compliance is high, patients use the CPAP equipment often

The vast majority of patients use their CPAP equipment every night and occasionally also during daytime naps. On average, 8 out of 10 patients use the CPAP appliance for 6 hours or more per night.

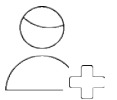
### How often do patients use their CPAP appliance?

	2015 survey	2017 survey	2019 survey
Always, also for daytime naps	13%	15%	15%
Every night	69%-	76%	77%

### And for how long do patients use their CPAP appliance per night?

	2017 survey	2019 survey
On average for 6 hours or more	78%	79%
On average for 5-6 hours	15%	15%
Less than 5 hours	6%	6%

Question\_550P: Question\_550: Which answer is the most suitable? I use my CPAP equipment... 2015 n=2998, 2017 n=4557, 2019 n=4332  
 Question\_560P: Which answer is the most suitable? When using my CPAP equipment, I will use it... 2017 n=4492, 2019 n=4290 (patients who use their CPAP equipment)



## Patients appraise their CPAP equipment as very good

In 2011 and 2015 the satisfaction about the functioning of the current CPAP equipment is given a very high average score. 7.6 in 2011 and 8.0 in 2015.

### CPAP equipment evaluation

*Please note: since 2017, a globally validated method to determine the appreciation of patients is used instead of a score: the TRI\*M method. See Annex 2 for an explanation of this method.*

2011 survey

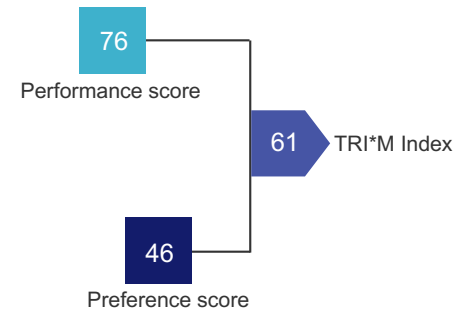
7.6

Question\_49P: If you would have to rate (1-10) your satisfaction with the functioning of your current CPAP equipment (Auto-PAP, Bi-PAP, VPAP), what rating would you give for the following aspects? 2011 n=2480, 2015 n=2,998

2015 survey

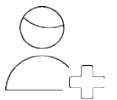
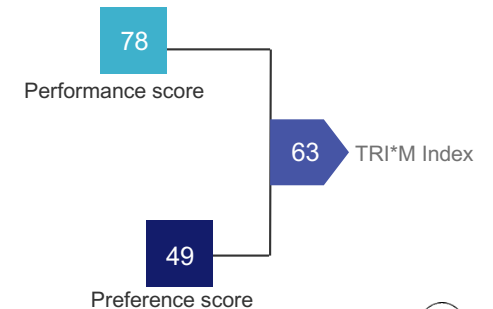
8.0

2017 survey



Question\_1150P: Overall, how do you evaluate your current CPAP equipment? 2017 n=4530, 2019 n=4314  
Question\_1160P: How strong is your preference for your CPAP appliance compared to other CPAP appliances? 2017 n=4530, 2019 n=4314

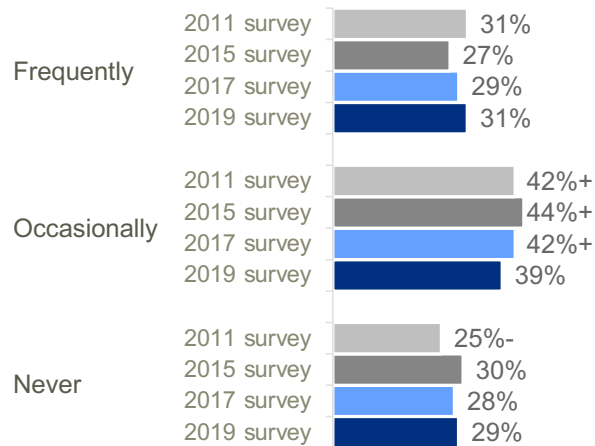
2019 survey



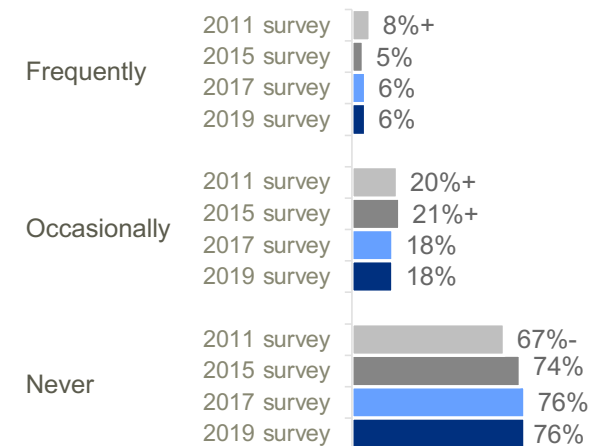
## Patients suffer side-effects from their CPAP equipment slightly less often

The proportion of patients that never suffers from dry mucous membranes or airway infections due to their CPAP, has (slightly) increased in comparison with 2011. Furthermore, there were (slightly) more patients using a device with humidification in 2019.

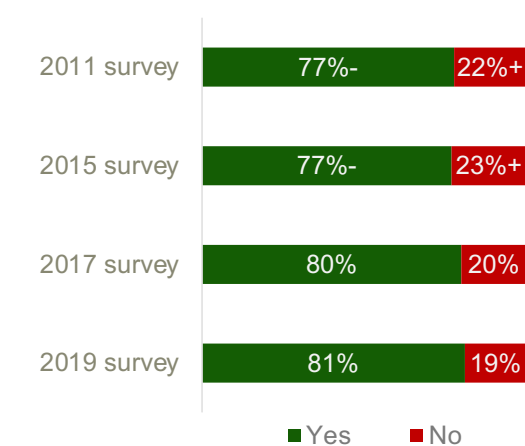
### To what extent suffering from dry mucous membranes?



### To what extent suffering from airway infections?



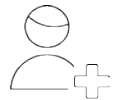
### Are you using a device with humidification?



Question\_470aP: Can you please indicate to what extent you suffer from dry mucous membranes due to using your CPAP equipment? 2011 n=2523, 2015 n=2998, 2017 n=4557, 2019 n=4332

Question\_470bP: Can you please indicate to what extent you suffer from airway infections due to using your CPAP equipment? 2011 n=2523, 2015 n=2998, 2017 n=4557, 2019 n=4332

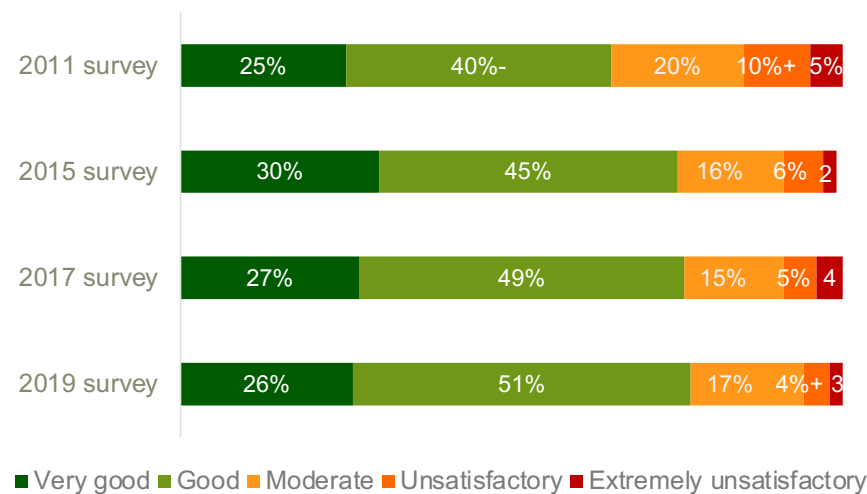
Question\_48P: Do you use your CPAP appliance with humidification? 2011 n=2523, 2015 n=2998, 2017 n=4557, 2019 n=4332



## Over three quarters of the patients say the MAD works (very) well

The proportion of patients who are dissatisfied with the MAD dropped from 15% in 2011 to 7% in 2019. Compliance of MAD users is high too. The vast majority of patients use it every day.

### How well do patients feel their MAD works?



### How often do patients use their MAD?

	2015 survey	2017 survey	2019 survey
Always, also for daytime naps	2%	4%	3%
Every night	73%-	75%	78%

### And for how long do patients use their MAD per night?

	2017 survey	2019 survey
On average for 6 hours or more	88%	89%
On average for 5 hours or more	8%	9%
Less than 5 hours	3%	2%

Question\_780P: To what extent do you feel that the MAD is helping you? 2011 n=113, 2015 n=485, 2017 n=366, 2019 n=478

Question\_760P: Which answer is the most suitable? I use my MAD ... 2015 n=485, 2017 n=366, 2019 n=478

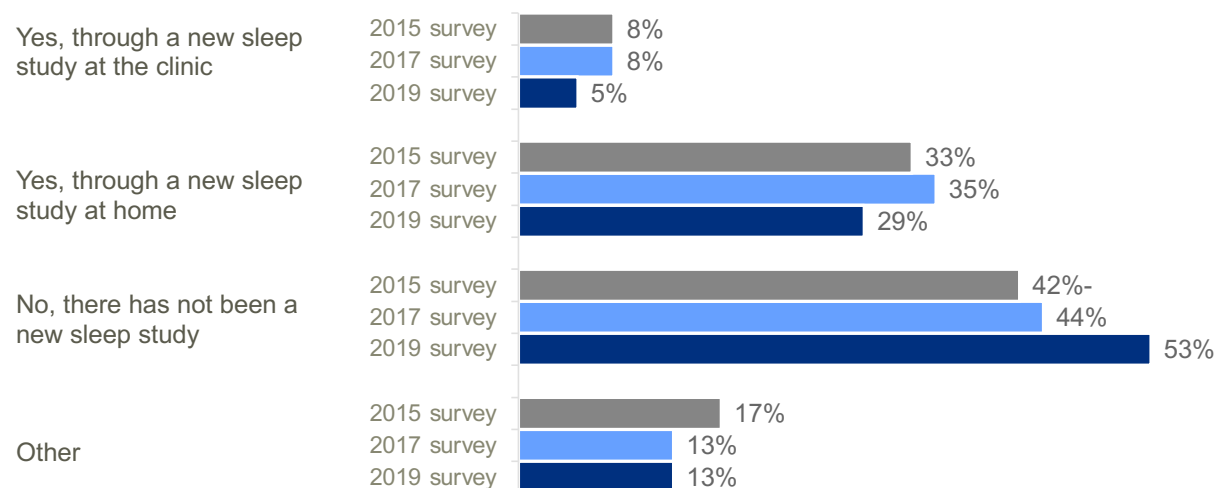
Question\_770P: Which answer is the most suitable? When using my MAD, I use it... 2017 n=299, 2019 n=397 (patients using their MAD)



## Fewer sleep studies are carried out to monitor the functioning of MAD

In 2015, 42% of the patients with an MAD did not undergo a new sleep study; in 2019 this was the case with 53% of the patients\*.

### Have checks been carried out regarding the effectiveness of the treatment?



\* With an AHI < 15 no check by sleep test is required according the Dutch Guideline

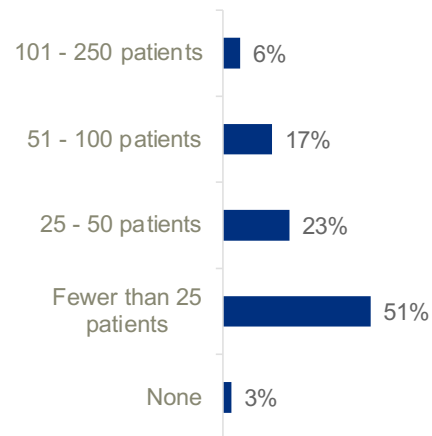
Question\_750: Have checks been carried out (several months) after the start of the therapy to find out whether the treatment is actually effective? (recently diagnosed patients) 2011 n=113, 2015 n=371, 2017: n=178, 2019: n=249



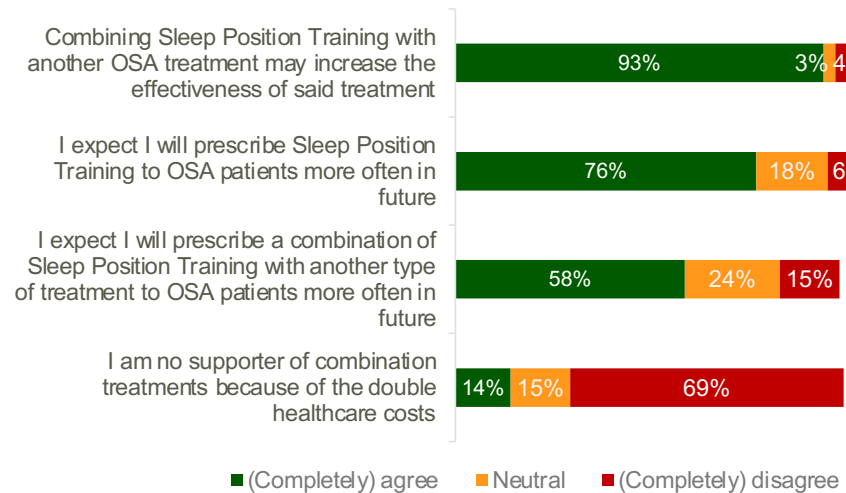
## More recent is the Sleep Position Training (SPT): in 2018, this was given as a treatment option in nearly all clinics

However, the number of patients per clinic who are prescribed the Sleep Position Training remains low. According to patients, the position training is effective: 82% of patients say SPT works (very) well.

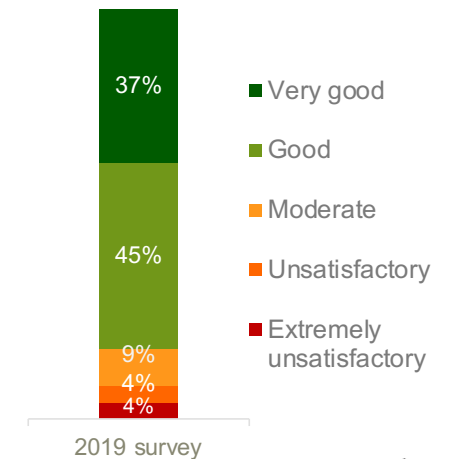
### How many OSA patients undergo Sleep Position Training as a treatment?



### To what extent (dis)agree with the statements below?



### To what extent feel that the position trainer helps?



Question\_42S: 42a. How many OSA patients were given sleep position training as a treatment in the past year (LAST YEAR)? 2018: n=65

Question\_43S: To what extent do you agree/disagree with the following statements: 2018: n=67 & Question\_1530P: To what extent do you feel that the Position Trainer helps you? 2019: n=223





# 6

## Education and guidance



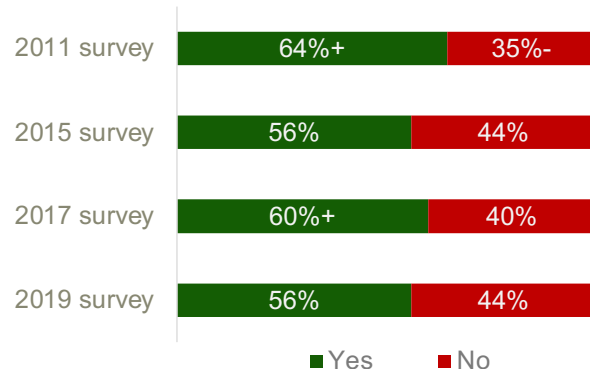
photo: Vedeazy.com

## Over half of the patients have been given a form of education/guidance by a nurse or specialist

That means that - according to the patients - less than 50% didn't get any form of education/guidance. This is despite the fact that in 2018 more than 9 out of 10 sleep clinics indicated that a nurse or specialist had been appointed as separate education/guidance officer. (Cause of confusion might be that in a big number of sleep clinics education/guidance is taken care of by the home care providers.)



### Did patients get any form of education/guidance from a specialist, assistant or OSA-nurse?



Question\_390P: Did you get any form of education from a specialist, assistant or OSAS nurse in your sleep clinic/hospital (LAST YEAR)? (previously diagnosed patients)  
2011 n=2703, 2015 n=1741, 2017 n=3235, 2019 n=3082

Question\_52S: Is there a separate education/guidance officer associated with your clinic? 2014 n=72, 2016 n=84, 2018 n=68

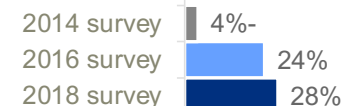


### Is there a separate education/guidance officer associated with your clinic?

Yes, OSA nurse, pulmonary function or KNF lab technician, physician assistant, etc.



Yes, this is taken care of by the home care provider who is available for consultations at our location.



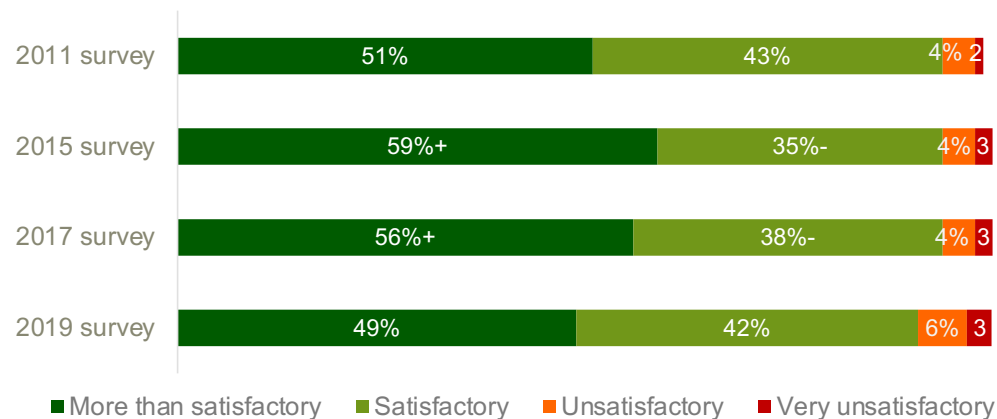
No, this is an integral part of the specialist's job



## Nearly all patients find the education/guidance (more than) satisfactory

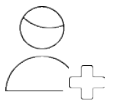
However, the proportion of patients who experience this as (notable) unsatisfactory has increased slightly over the years.

### To what extent did the patients find the guidance satisfactory?



Question\_400P: To what extent did you get adequate guidance or education in your sleep clinic/hospital? (recently diagnosed and previously diagnosed patients who have received guidance in the past year) 2011 n=1741, 2015 n=2875, 2017 n=3807, 2019 n=3877

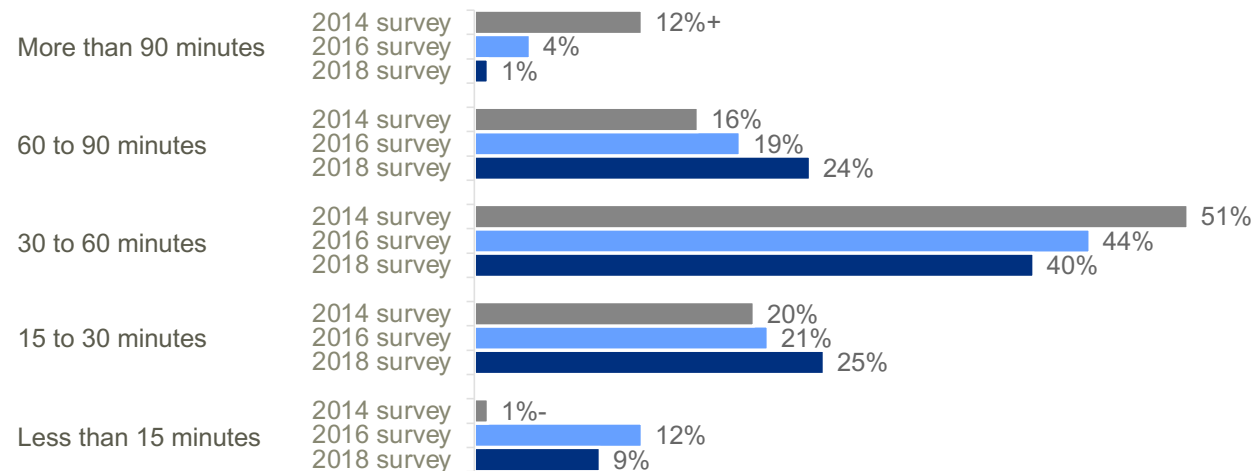
Question\_53S: On average, how much time does this officer spend on education and guidance per patient during the diagnostic process? 2014 n=76, 2016 n=75, 2018 n=67



## Amount of time spent on education/guidance per patient during diagnostic process has decreased

Thus, the number of sleep clinics that spend 90 minutes per patient on this has decreased by 11% compared to 2014. The number of clinics that spend less than 15 minutes on this, has increased.

On average, how much time is spent on education/guidance per patient during the diagnostic process?



Question\_53S: On average, how much time does this officer spend on education and guidance per patient during the diagnostic process? 2014 n=76, 2016 n=75, 2018 n=67



# 7

## Follow-up care

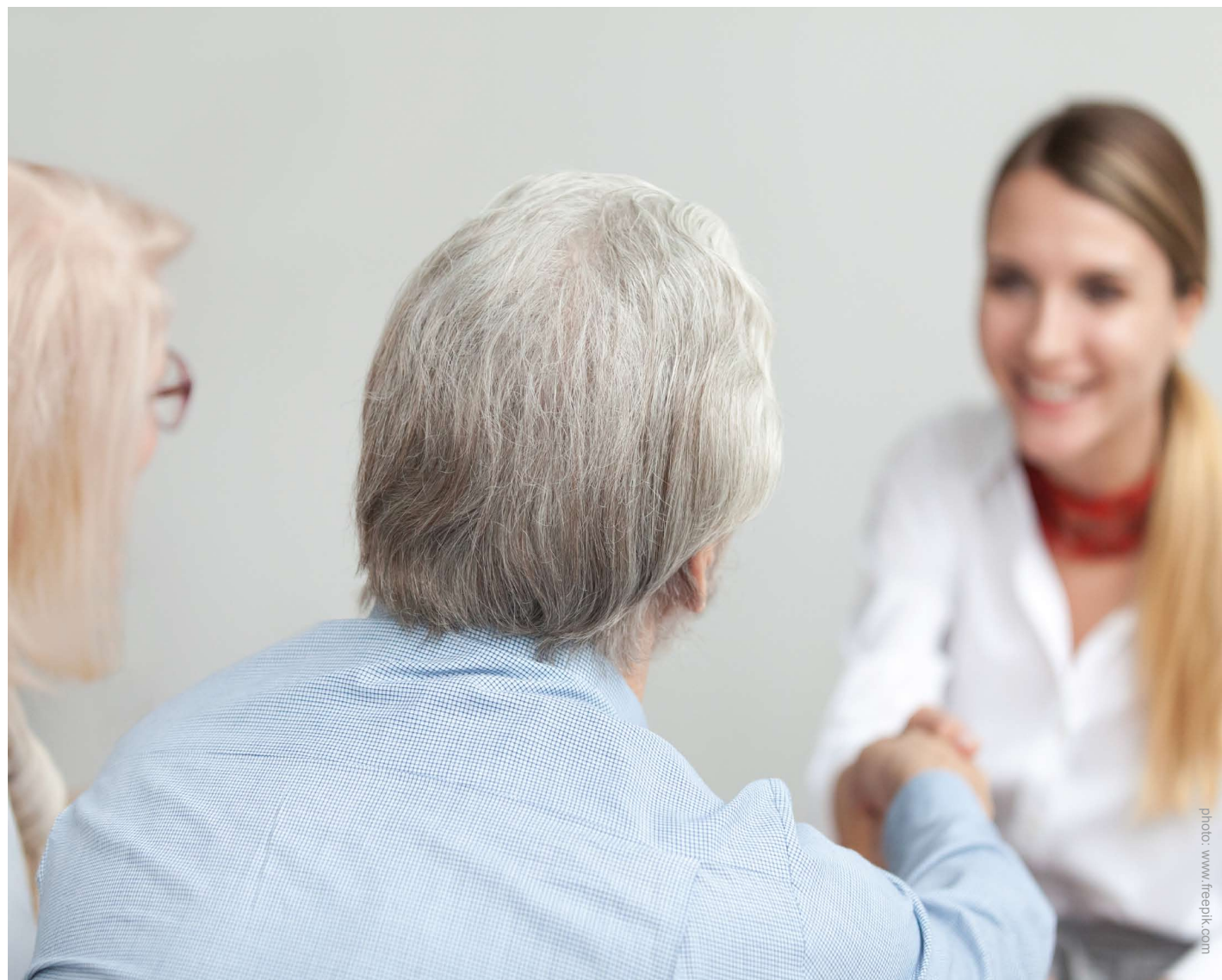
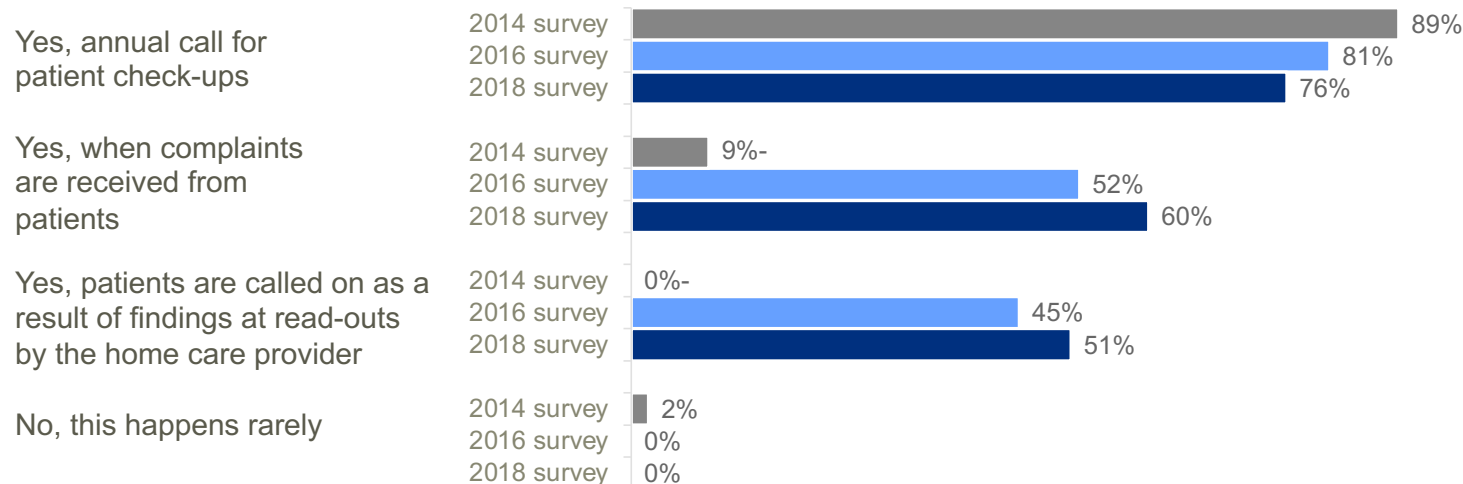


photo: www.freepik.com

## Less clinics seem to systematically call on patients to check compliance and effectiveness

The number of clinics that call on patients for annual check-ups seems to decrease. Checking with patients based on their complaints or as a result of the findings at read-outs by the home care provider seem to occur more often.

### Check-ups therapy effectiveness and compliance



Question\_56S: Do you also check therapy efficacy and compliance after the trial period? 2014 n=56, 2016 n=83, 2018 n=68

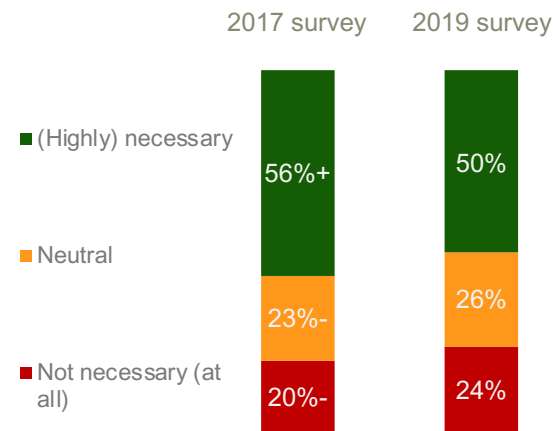




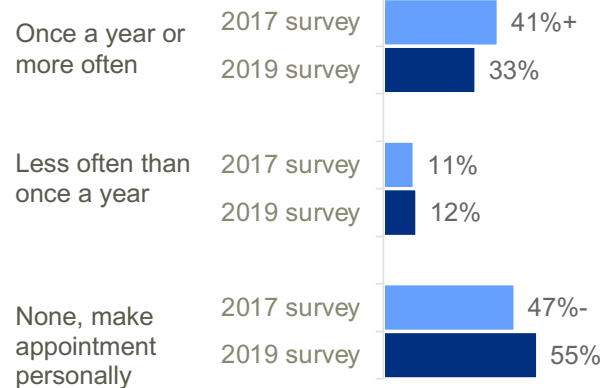
## Not all patients feel that annual check-ups are necessary

Moreover, the proportion of patients who feel that annual check-ups are (highly) necessary has decreased. Furthermore, fewer patients are receiving a periodic check-up call from the sleep clinic and patients are increasingly made personally responsible for making a check-up appointment. This means fewer patients go to the sleep clinic for an annual check-up.

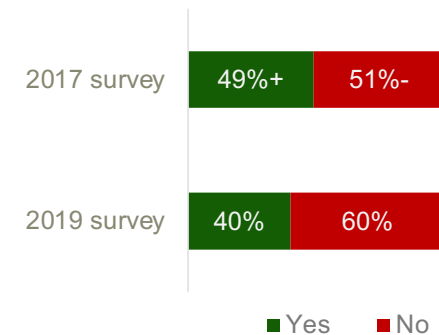
### Annual check-up necessary



### Periodic check-up call



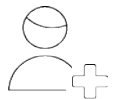
### Do patients go to the sleep clinic for an annual check-up?



Question\_129P: To what extent do you find it necessary to go to your sleep clinic/hospital every year for a check-up? 2017 n=5113, 2019 n=5235

Question\_137P: Are you periodically called on by the sleep clinic for check-ups? (Previously diagnosed patients) 2017 n=3235, 2019 n=3082

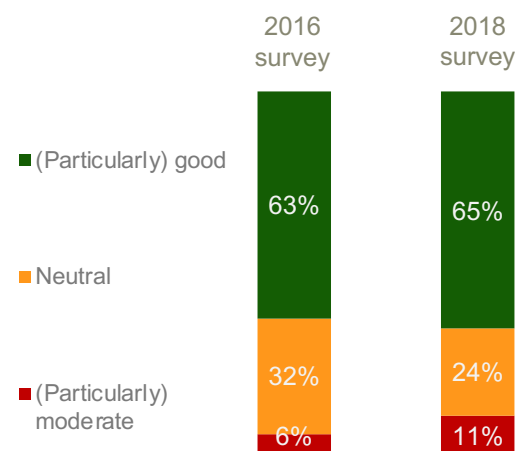
Question\_130P: Do you go to your sleep clinic/hospital every year for a check-up with your specialist, assistant or OSAS nurse? (Previously diagnosed patients) 2017 n=3235, 2019 n=3082



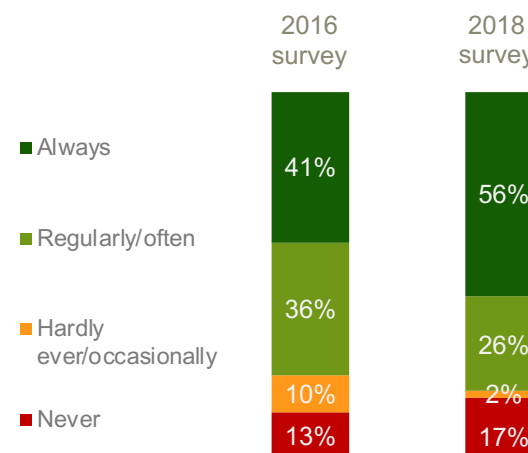
## Majority of sleep clinics believe cooperation with GPs regarding treatment and after-care remains (very) good

It appears that ZorgDomein (digital process) is used more often by sleep clinics in the communication with GPs.

Cooperation with GPs regarding treatment and after-care



Use of ZorgDomein for communication with GPs



Question\_62S: How often do you use ZorgDomein for communication with the GP? 2016 n=83, 2018 n=66

Question\_63S: How do you experience the cooperation with the GP regarding treatment and after-care (contact, exchange of data)? 2016 n=82, 2018 n=66

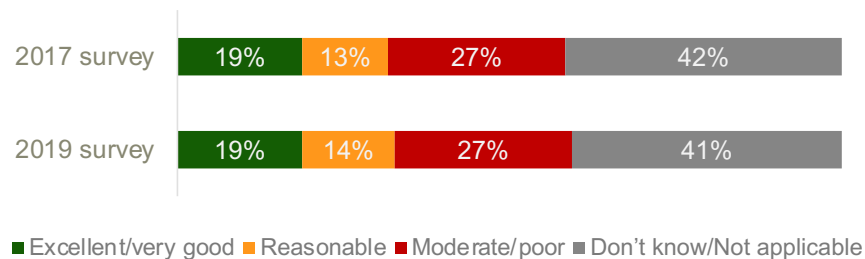


## Patients are not very positive about the after-care offered by GP

However, there is also a large proportion of patients without an opinion. (The source of this might be that patients do not experience after care from the GP as many GP's rely on the sleep clinic for OSA after care.)

The score that patients give the GP before and after the sleep apnea diagnosis is more or less the same. However, the score seems to have decreased slightly in comparison with 2015.

**How do you rate your GP with respect to the after-care that they offered for your sleep apnea?**

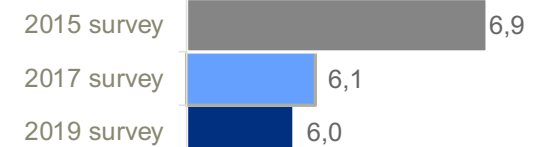


**GP score**

Before sleep apnea diagnosis



Now that the treatment for sleep apnea has started



Question\_111P: How do you assess your GP with respect to...? 2017 n=5113, 2019 n=5235

Question\_5P: If you have to rate your GP (their knowledge about and support for apnea). How would you rate the GP? 2015 n=3642, 2017 n=5113, 2019 n=5235



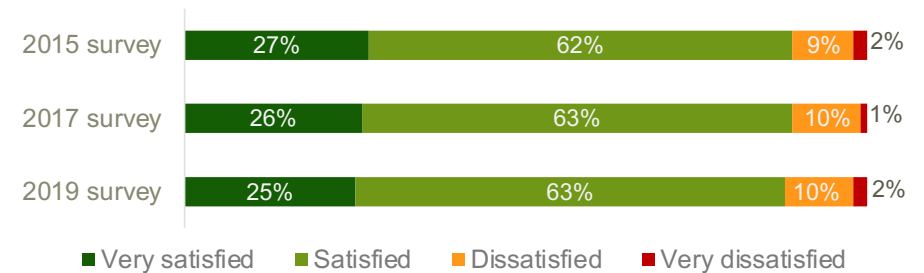
## 7 out of 10 patients are in contact with home care provider once a year or more often

The vast majority of patients is (very) satisfied about the contact with home care providers.

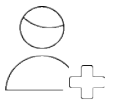
### How often are patients in contact with their home care provider?

	2015 survey	2017 survey	2019 survey
More than 3 times a year	2%	2%	2%
2 to 3 times a year	11%-	11%-	14%
On average, once a year	57%+	58%+	53%
Less than once a year	21%	20%	21%
Never	10%	8%	11%

### How satisfied are patients about the contact with the home care provider?



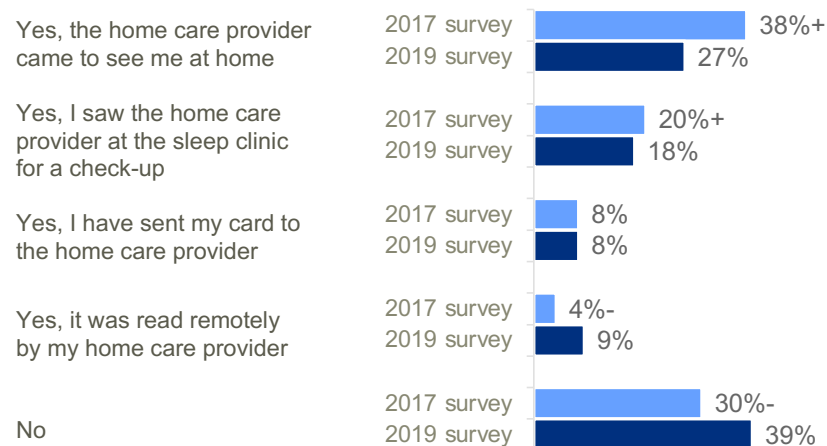
Question\_62P: On average, how often are you in contact with the home care provider? 2015 n=1542, 2017 n=2916, 2019 n=2655  
 Question\_63P: How satisfied are you about the contact with the home care provider? 2015 n=1389, 2017 n=2680, 2018 n=2363



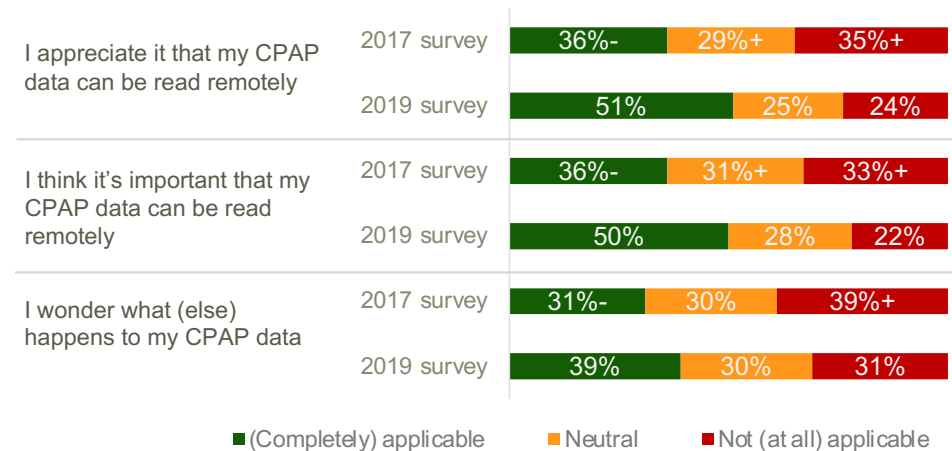
## Fewer patients have their CPAP equipment checked at home by the home care provider; check-ups are more frequently taking place remotely or not at all

In 2019, approximately half of the patients indicated they find it pleasant and important that their CPAP data can be read remotely. This is a significant increase in comparison with 2017.

### Has the CPAP appliance been checked by the home care provider?

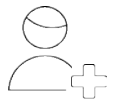


### To what extent do the following statements apply?



Question\_1310P: Has your CPAP equipment been checked by the home care provider in the past year (LAST YEAR)? (previously diagnosed patients) 2017 n=2916, 2019 n=2655

Question\_1330P: It is possible to have the data from your CPAP equipment read remotely by the home care provider. The following statements concern this topic. To what extent do the following statements apply to you? 2017 n=4557, 2019 n=4332



## Patients rate their home care provider as good

In 2011 and 2015 the satisfaction of home care provider services got a high average score 7.7 in 2011 and 7.8 in 2015.

### Evaluation home care provider services

*Please note: since 2017, a globally validated method to determine the appreciation of patients is used instead of a score: the TRI\*M method. See Annex 2 for an explanation of this method.*

2011 survey

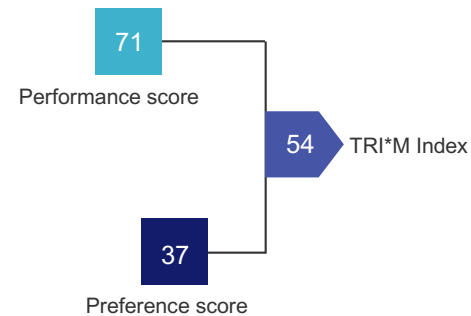
7.7

2015 survey

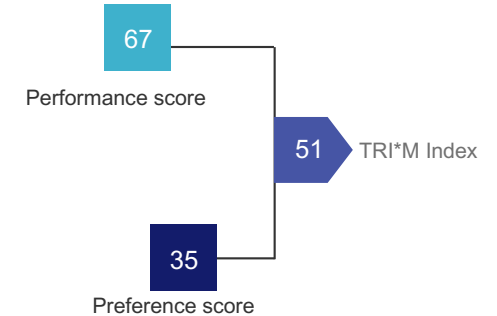
7.8

Question\_67P: If you would have to rate (1-10) your satisfaction with your home care provider services, how would you rate them? 2011 n=2523, 2015 n=2998

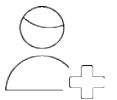
2017 survey



2019 survey



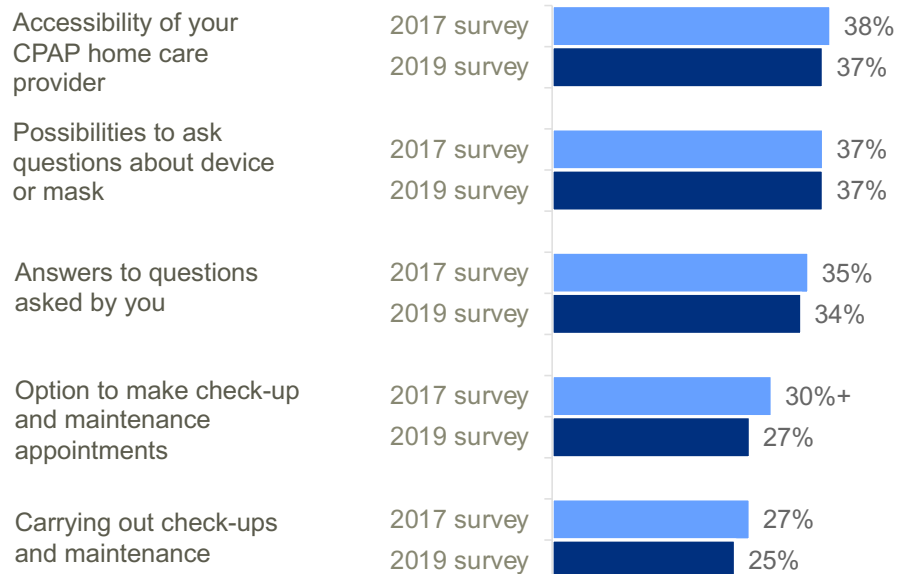
Question\_126P: How do you rate your home care provider overall? 2017 n=4557, 2019 n=4332  
Question\_127P. Question\_1270: How strong is your preference for your home care provider in comparison to other home care providers? 2017 n=4557, 2019 n=4332



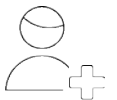
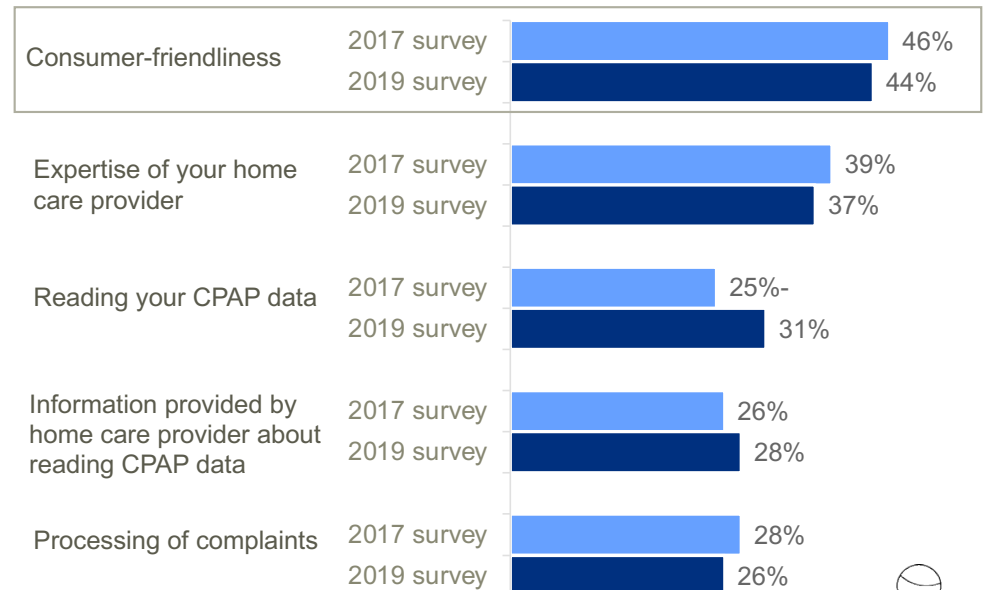
## Consumer-friendliness of the home care provider is rated most highly

In 2019, more than 4 out of 10 patients rated consumer-friendliness as very good or excellent. In 2019, home care providers were judged to be better at reading CPAP data than in 2017.

### Home care provider evaluation regarding several aspects\*



Question\_1280: How do you rate your home care provider on the following aspects? 2017 n=4557, 2019 n=4332  
\* Percentage very good + excellent





# 8

## Outcomes



## Sleep apnea treatment brings significant health gains for patients

Where patients evaluated their health on average as unsatisfactory before treatment, this score changed to (highly) satisfactory after treatment.

### (Average) score personal health before treatment

2011 survey **5.2**

2015 survey **5.3**

2017 survey **5.0**

2019 survey **5.1**

### (Average) score personal health after treatment

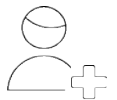
2011 survey **7.3**

2015 survey **7.3**

2017 survey **7.0**

2019 survey **6.9**

Question\_970P: If you would have to rate (1-10) your health before you were treated for sleep apnea and after you were treated, what rating(s) would you give? 2011 n=2703, 2015 n=3642, 2017 n=5113, 2019 n=5235

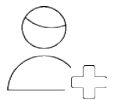


## The success of treatment

Prior to treatment, respondents rated their health in 2019 on average as a 5.1 on a scale 1 - 10. Of them, 56% regarded their health as unsatisfactory, 19% even gave a note 3 or lower. After the start of treatment, they ranked their health significantly higher at an average rate of 6.9. Only 3% now gave a 3 or lower. 81% judged their health at least as satisfactory, and 36% even as (very) good to excellent at level of 8 or higher. This shows the success of the apnea treatment.

How do you rate your health?											
	1	2	3	4	5	6	7	8	9	10	unknown
Prior to treatment	3%	4%	12%	17%	20%	18%	12%	6%	2%	1%	5%
After treatment	1%	0%	2%	4%	7%	18%	27%	25%	9%	2%	5%

(This distribution of ratings however is a challenge for developers of PROMS. While undiagnosed OSA patients will mostly dysfunction at home and at work, some might even have experienced a (near-) car accident, still a significant part of them does not report symptoms or complaints in health prior to treatment: 39% rate their health as satisfactory; even 9% as very good to excellent. On the other hand, with treated persons we still see 14% ratings in the categories of unsatisfactory health due to comorbidities.)



# 9

## Appendices



## Appendix 1 - overview survey specifications

### Patients

#### Sample size

2011: The final response was n=2702 apnea patients

2015: The final response was n=3642 apnea patients

2017: The final response was n=5113 apnea patients

2019: The final response was n=5235 apnea patients

It applies to every one of the surveys that patients who participated in the survey were recruited with the cooperation of sleep clinics and CPAP home care providers. As of 2015, patients were also been contacted through the Apnea Association.

#### Fieldwork method

2011: Patients received a letter with an invitation to the survey. For this year, the option was given to do partake in the survey via the internet; a link to the survey was included in the letter. Patients who did not want to/were not able to complete online, could request a paper questionnaire.

2015: This survey made full use of the CAWI method (CAWI: Computer Assisted Web Interviewing)

2017: The CAWI method was used.

2019: The CAWI method was used.

#### Fieldwork period:

2011: The fieldwork period ran from March up to and including July 2011.

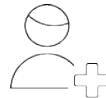
2015: The fieldwork period ran from July 1 up to and including August 2, 2015.

2017: The fieldwork period ran from June 14 up to and including July 23, 2017.

2019: The fieldwork period ran from June 13 up to and including July 14, 2019.

#### Questionnaire

The questionnaires have largely remained the same over the years.



### Sleep clinics

#### Sample size

2014: 88 sleep clinics were invited. The final response was n=83.

2016: 88 sleep clinics were invited. The final response was n=86.

2018: 93 sleep clinics were invited. The final response was n=84.

#### Fieldwork method

2014: The PAPI method was used (PAPI: Pen and Paper Interviewing). The questionnaires were sent by the Apnea Association, in PDF format, to the contact persons at every sleep clinic.

2016: The PAPI method was used.

2018: The PAPI method was used.

For every year applies that a paper questionnaire was chosen since often different medical specialists complete different parts of the questionnaire. By working with a paper questionnaire, this was easier to coordinate for the sleep clinics.

#### Fieldwork period:

2014: The fieldwork period ran from July 15 up to and including September 22, 2014.

2016: The fieldwork period ran from June 16 up to and including September 19, 2016.

2018: The fieldwork period ran from June 25 up to and including August 28, 2018.

#### Questionnaire

The questionnaires have largely remained the same over the years.

Important: the sleep clinics were asked to base their answers on the previous calendar year (so the 2014 survey is about 2013, the 2016 survey concerns 2015 and the 2018 survey is about 2017).



## Appendix 2 - TRI\*M-method: measurement of appreciation reflected in 1 figure

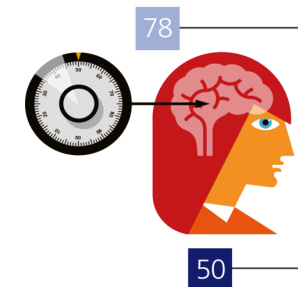
The TRI\*M Index is expressed in a number that generally has a value between 0 and 100. The index indicates how deep the appreciation is for the care in sleep clinics, the services of home care providers of appliances and the appliances themselves (a score below 10 indicates very poor appreciation; a score of 100 is very high). The method has been globally validated by Kantar by means of over than 50,000 surveys – it is a very robust and reliable appreciation score therefore.

To determine appreciation two questions were asked:

- Overall, how do you rate your ...?
- How strong is your preference for your ... in comparison with other ...?

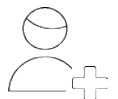
Fictitious example

Performance score



TRI\*M  
score

Preference score





ApneuVereniging | P.O. Box 134 | 3940 AC Doorn | The Netherlands | [www.apneuvereniging.nl](http://www.apneuvereniging.nl)

Questions about the report: [vanmechelen@apneuvereniging.nl](mailto:vanmechelen@apneuvereniging.nl)