

CORRECTION OF REFRACTIVE ERRORS OF THE EYE IN ADULTS

PART 1: PERCEPTIONS AND EXPERIENCES



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■ SCIENTIFIC REPORT

1 BACKGROUND AND SCOPE OF THE REPORT

1.1 Initial questions of stakeholders

The topic of refractive eye surgery in adults was introduced at the KCE by four stakeholders: the Minister of Social Affairs and Public Health, The Federal Public Service (Health, Food Chain Safety and Environment), the National Institute for Health and Disability Insurance (RIZIV-INAMI) and a sickness fund.

The most important questions related to the cost-effectiveness of various techniques of refractive surgery: indications, side effects and patients' satisfaction in comparison with other solutions (glasses or contact lenses). A connected question concerned the reimbursement of these techniques (see the current modalities in section 2). A last group of questions related to organization of refractive surgery in private clinics (quality of care – including safety – and regulations) given the rising number of patients operated in private settings. The absence of billing code makes it impossible to know the frequency of these procedures in Belgium.

1.2 Scope of this report

These questions have been divided into two KCE reports:

- This report analyses the visual acuity problems reported by a sample of the adult population in Belgium, with a focus on refractive errors. A qualitative study further scrutinizes how refractive error is experienced by the patients. These data will provide a background for another report.
- The other report will be a health technology assessment of refractive eye surgery techniques: clinical effectiveness and safety, cost-effectiveness, reimbursement schemes in other countries, private clinics' regulations, patients' experiences with refractive surgery.

1.3 Refractive error

This section provides an overview of the most common refractive errors in adults. It is mainly based on textbooks and internet sources. The graphics come from the website of the National Eye Institute website, part of the US National Institutes of Health ¹.

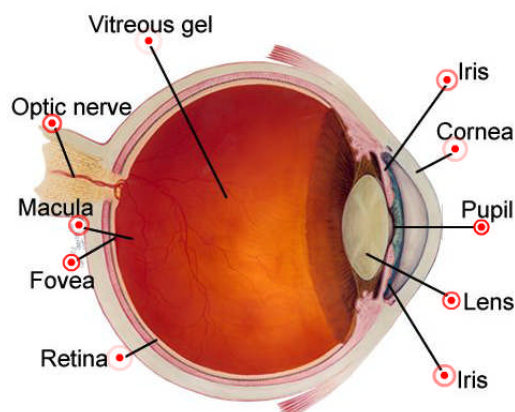


1.3.1 The normal eye

The eye is a small complex sensory organ whose functioning is close to the functioning of a camera:

- The transparent cornea first captures the external light and depending upon the curvature of the cornea the light is focussed a first time. The cornea is about 500-600 μ thick and the thickness is mainly determined by the transparent inner layer (stroma).
- The light passes through the pupil, that regulates the amount of light coming into the eye (the pupil is the opening situated in the central part of the coloured iris).
- The eye's adaptive crystalline lens located behind the pupil further focuses light. This lens, by changing shape, changes the focal distance of the eye so that it can focus on objects at various distances. This process is called "accommodation".
- Finally, the light is focused on the retina, a light-sensitive tissue lining the inner surface of the eye. The retina transforms optical images into electronic signals that are transmitted to the central nervous system through the optic nerve.

Figure 1 – Anatomy of the eye



Source: National Eye Institute¹

1.3.2 Refractive error

Refractive error occurs when the shape of the eye prevents light from focusing directly on the retina. The length of the eyeball (too long or too short), changes in the shape of the cornea or aging of the lens can cause refractive error.

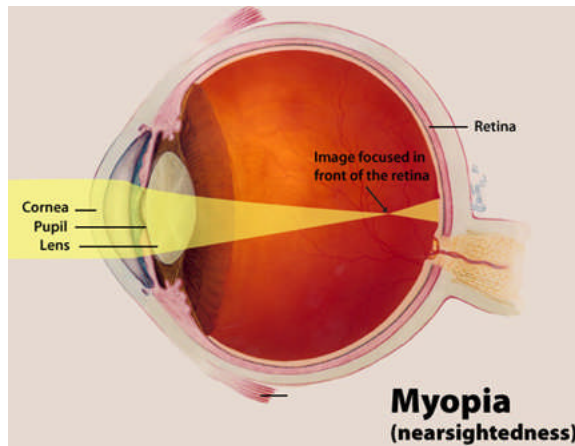
The refractive errors described in the following sections are myopia, hyperopia, presbyopia and astigmatism. The most common symptoms of refractive error are reduced visual acuity, blurred vision, eyestrain and headaches.

Anisometropia occurs when each eye presents a different refractive error. Both eyes may present the same type of refractive error with large differences in visual acuity or each eye may present a different error, for example hyperopia and myopia respectively.

Cataract is not a refractive error: its cause is a clouding of the lens that affects the vision. Most cataracts are related to aging but other causes include congenital cataracts, secondary cataracts after eye surgery, after injury or cataract related to other conditions as diabetes.

1.3.2.1 Myopia

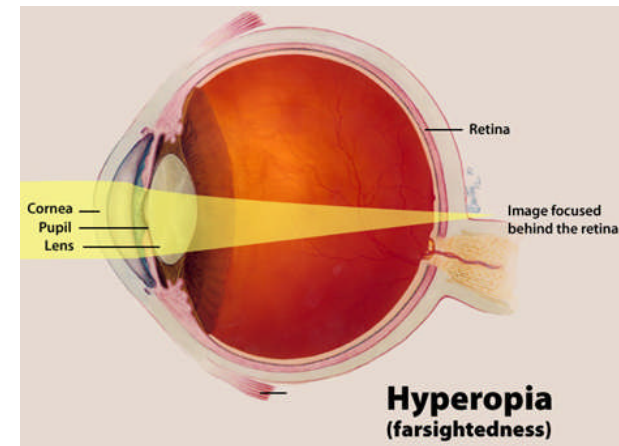
Myopia (nearsightedness or shortsightedness) is a condition where the light that comes in does not directly focus on the retina but in front of it as shown in Figure 2. Causes are either a too long eyeball axis and/or a too strong refractive power of the eye. As a result objects close-by appear clearly, while objects far away appear out of focus.

**Figure 2 – Refractive error in myopia**

Source: National Eye Institute, 2013¹

1.3.2.2 Hyperopia

Hyperopia (farsightedness, hypermetropia or hypermetropia) is a condition where the eyes focus images behind the retina instead of on the retina. The image of a distant object becomes focused behind the retina as shown in Figure 2. The causes are either a too short eyeball axis or insufficient refractive power of the eye. As a result objects close-by appear out of focus.

Figure 3 – Refractive error in hyperopia

Source: National Eye Institute, 2013¹

1.3.2.3 Presbyopia

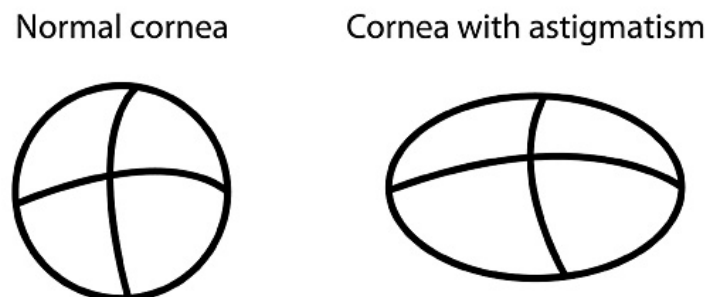
Presbyopia is another type of farsightedness. In this age-related condition the ability to focus up close becomes more difficult due to the hardening of the eye lens. The lens cannot longer change shape enough to allow the eye to focus on close objects.

1.3.2.4 Astigmatism

Astigmatism is a condition with an abnormal curvature of the cornea with some areas that are steeper or more rounded than others. This can cause images to appear blurry and stretched out because the eye does not focus light evenly onto the retina.



Figure 4 – Refractive error in astigmatism



Source: National Eye Institute, 2013¹

1.3.3 Prevalence of refractive error in Western populations

Few studies have been published on the prevalence of refractive error in Western populations. A search for prevalence data was conducted with the use of the subheading /epidemiology for the terms that describe refractive errors i.e. "Refractive Errors" OR ("refract\$.mp." and "error\$.mp.") OR "astigmatism" OR "hyperopia" OR "myopia" OR "nearsightedness.mp." OR "shortsightedness.mp." OR "farsightedness.mp.". The search focused on the subheading /epidemiology. Five studies conducted in Western populations were finally selected but comparisons between studies are difficult as the criteria for defining refractive error vary as well as the age groups under study.

The most detailed data on refractive error (without cycloplegum) have been published from the 1999-2004 National Health and Nutrition Examination Survey². The results are summarized in the table below:

Table 1 – Prevalence of clinically important refractive error: data from the NHANES study (N=12 010 adults)

	20-39 y	40-59 y	60 y and older
Myopia (≤ -1.0 D)	36.2%	37.6%	20.5%
Hyperopia (≥ 3.0 D)	1.0%	2.4%	10.0%
Astigmatism	23.1%	27.6%	50.1%
Any clinically important refractive error	46.3%	50.6%	62.7%

Source: Vitale, 2008²

The most recent epidemiological study found on this topic is a Dutch study in 444 hospital employees³. Nearly half of the sample (46%, n=202) was younger than 40 years. Of the 444 right eyes examined the following proportions (without cycloplegum) were found:

- 29.7% myopic (less than - 0.5 diopters): this percentage might be explained by the high proportion of highly educated employees (42%) in the sample;
- 9.9% hyperopic (more than 0.5 diopters);
- 25.2% had anisometropia (at least 1.0 D).

These proportions are similar to the ones published in an overview of 6 studies (n=29 281)⁴ that estimated that approximately one third of the persons aged 40 years or more in the US and Western European populations have refractive error (criteria were more severely defined than in the previous study). The estimated crude prevalence for Western European populations was 11.6% for hyperopia (at least +3 D) and 26.6% for myopia (- 1 D or less) of whom 4.6% had myopia of -5 D or less.

In Spain, the Segovia study⁵ analysed the prevalence of refractive error in an older population aged 40 to 79 years (n=417, visual acuity > 20/40).



The results showed a higher prevalence linked to more severe cut-off criteria:

- 25.4% for myopia (- 0.5 diopters or less):
- 43.6% for hyperopia (+ 0.5 diopters or more):
- 53.5% for astigmatism (over 0,50 diopters).

Finally, a Danish study⁶ on the prevalence of myopia in young men (conscripts) found that 12.8% of the population had myopia (≤ 0.5 D) and 0.3% showed severe myopia defined as $< - 6.5$ D.

1.4 Possible solutions: glasses, contact lenses or surgery

Glasses, contact lenses and surgery are three solutions to correct refractive error^{1, 7-9}. Side effects are broadly described in this section. Information on the patients' experience will be found in the results sections of this report. More technical information on the refractive surgery techniques and their safety are the main topic of the next report (health technology assessment).

1.4.1 Glasses

Eyeglasses are the most common solution to correct refractive error. Three main types of lenses add or subtract focusing power to the eye's cornea and lens:

- Concave lenses: used to correct myopia;
- Convex lenses: magnifying glasses used to correct hyperopia;
- Cylindrical lenses: used in astigmatism, they curve more in one direction than in the other one.

Presbyopia requires more sophisticated lenses that enable near vision in the lower portion of the lens and far vision in the upper portion. Lenses may be bifocal or trifocal with 2 or 3 separated zones. Today multifocal lenses are more comfortable for the user as they are adjusted to give the adapted power to any distance.

1.4.2 Contact lenses

Contact lenses are also designed to correct refractive error. The most common ones are spherical contact lenses, designed to correct myopia and hyperopia. Other designs include bifocal lenses (to correct presbyopia) and toric lenses (to correct astigmatism).

Two main types of contact lenses can be identified according to the type of material.

- Soft lenses made from water-containing plastics (hydrogels);
- Rigid, gas-permeable lenses: made from waterless plastics, usually used in hyperopia, presbyopia and high astigmatism.

The most common inconveniences for contact-lens wearers are irritation of the eyes, redness and blurred vision. These minor symptoms may signal the onset of more severe complications i.e. corneal abrasion and infection, with a possible resulting corneal ulcer (a potentially blinding condition).

1.4.3 Laser refractive Surgery

The aim of laser surgery is to reshape the cornea in order to modify its refractive properties and thereby correct myopia, hyperopia and/or astigmatism. The most common laser techniques were photorefractive keratectomy (PRK) and laser epithelial keratomileusis (LASEK), progressively replaced now by laser in-situ keratomileusis (LASIK)^{8, 9}. The most recent technique called ReLEx smile will be just mentioned as very few data on effectiveness and safety are available (see next report). Those laser procedures are performed under local anaesthesia using anaesthetic drops.

1.4.3.1 Photorefractive keratectomy (PRK)

The surgeon first removed a small area of the cornea epithelium by abrasion (scraping) and then reshaped the cornea using Excimer laser: this computer-controlled beam of light removes microscopic amounts of the surface of the cornea (surface ablation). After the procedure the epithelial layer spontaneously regenerated.

1.4.3.2 Laser-assisted sub-epithelial keratomileusis (LASEK)

This surface ablation technique is similar to PRK but in this procedure, the epithelium is not removed but an epithelial flap is first prepared with the help of ethanol, before the application of the Excimer laser. This epithelial flap is replaced afterwards and will heal during the following days.

Slightly different surface ablation techniques exist with different names: they differ by the way the epithelial flap is prepared.



1.4.3.3 *Laser in-situ keratomileusis (LASIK and Femto LASIK)*

The difference with the previously mentioned surface ablation techniques is a thicker flap, involving not only the epithelium but also the outer part of the corneal stroma (thickness of 100-180 μ as opposed to ~70 μ). In this more recent procedure a flap is made using either a microkeratome (LASIK) or using another type of laser (Femtosecond laser for Femto LASIK). The Excimer laser energy is applied at this deeper level of the corneal stroma.

In many countries this technique has replaced the previous ones because it provides less discomfort and gives a quicker visual recovery.

1.4.3.4 *ReLEx smile*

This most recent technique creates in a single step a thin lenticule together with a small access in the cornea (smile: small incision lenticule extraction). The lenticule will be removed through this incision, thereby changing the form of the cornea¹⁰.

1.4.3.5 *Side effects of laser surgery*

The HTA report will analyze in detail the safety aspects of the refractive techniques. This section just lists the possible complications.

- Infections after surgery are quite rare¹¹.
- Poor quality flaps: may be complications of LASEK and LASIK techniques, with decreased corrected visual acuity and visual disturbances.
- Postoperative pain and delayed visual recovery were common after the PRK and LASEK techniques.

Other effects mentioned in the literature are visual-related complications (overcorrected or undercorrected vision), epithelial ingrowth and striae (may be asymptomatic but can also lead to irregular astigmatism) and corneal ectasia (rare, with severe consequences).

1.4.4 *Intraocular refractive surgery*

The insertion of an intraocular lens of appropriate power is a second type of refractive surgery technique^{8, 12}. This procedure can be performed in topical, bulbar or general anesthesia.

A first possibility is the insertion of an additional lens (phakic Intraocular lens, pIOL) before the original lens, leaving this original lens in place and keeping the mechanism of accommodation. One advantage is that this procedure is reversible. A second possibility is the refractive lens exchange: the original lens is removed (as in a cataract operation) and replaced by a synthetic lens.

1.4.4.1 *Types of intraocular lenses in refractive surgery*

Different types of lenses are used for specific indications. Phakic intraocular lenses are often used for stable refraction errors or to correct severe ametropia. Synthetic lenses that replace the original lens can either be monofocal or multifocal, allowing for pseudo-accommodation. Toric intraocular lenses specifically address astigmatism.

1.4.4.2 *Side effects of intraocular refractive surgery*

Intraocular complications mainly consist of post-operative infections.

Other side effects include the risk of surgically induced astigmatism, chronic uveitis, pupillary block glaucoma, pigments deposits (usually reversible) and cataract (in case of implementation in the posterior chamber of the eye).



2 REIMBURSEMENT MODALITIES IN BELGIUM

2.1 Reimbursement of refractive error care by the National Institute for Health and Disability Insurance (RIZIV-INAMI)

In the vast majority corrective eyewear is not reimbursed by the national health insurance. A distinction in reimbursement is made according to age, diopter and type of correction (eyeglasses, lenses or surgery)¹³⁻¹⁶.

2.1.1 Reimbursement of glasses

2.1.1.1 Adults

Adults aged 18 and older are eligible for reimbursement of eyeglasses if they need an eye correction outside the interval between -8.25 and $+8.25$ diopters. The reimbursement fees vary between € 78 and € 362.

They are entitled to reimbursement of renewal of eyeglasses when the optical power in terms of diopters has increased by at least 0.5. If the optical power remains unchanged, people are eligible for reimbursement of renewal of glasses every five years.

2.1.1.2 Children

There is a specific scheme for all children (less than 18 years): they are entitled to reimbursement of one frame and one pair of eyeglasses, independently of the number of diopters.

- For the frame there is a lump-sum reimbursement of € 28.14 for opticians who agreed with "convention" (otherwise € 19.47).
- The reimbursement fees for the eyeglasses vary from € 43 to € 315 e.g. according to the number of diopters.

As for adults, renewal of eyeglasses is reimbursed in case of an increase of at least 0.5 diopter. For children under 18 years reimbursement can be repeated every other year.

2.1.1.3 Older adults

For people older than 65 years, the diopter threshold is lowered to ± 4.25 diopters (instead of ± 8.25), specifically for bifocal and multifocal glasses. The reimbursement fees vary from € 90 to € 315.

2.1.2 Reimbursement of contact lenses

Contact lenses are only reimbursed in case of monocular aphakia, anisometropia of at least 3 diopter, irregular astigmatism and ametropia of at least -8 or $+8$ diopter. The reimbursement fee varies across lens types (hard/soft/optical scleral, spherical/toric) and ranges from € 70 to € 210.

Renewal of lenses is reimbursed when there is an increase of at least one diopter. Otherwise the required time lap is three years for hard lenses and one year for soft lenses. The renewal and fitting of lenses's reimbursement is a lump sum of € 40. The National Institute for Health and Disability Insurance (RIZIV-INAMI) does not reimburse daily or weekly lenses.

2.1.3 Reimbursement of refractive eye surgery

Refractive eye surgery is not reimbursed by the National Institute for Health and Disability Insurance (RIZIV-INAMI). However, there is a reimbursement for a similar eye surgery i.e. implantation of intraocular lens for cataract surgery. The nomenclature codes' wording (*(Re) implant of a intraocular lens at another moment than the extraction of the eye lens*) does not allow to differentiate clearly between the underlying pathology: there is no diagnostic requirement conditioning this intervention.

2.2 Complementary insurance

Most, if not all, sickness funds provide complementary insurance for corrective eyewear. The coverage typically depends on the age of the patient and the indication. Reimbursement for corrective eyewear is either on recurrent (e.g. yearly or two-yearly) or on one-time basis. The reimbursement level is usually a maximum fixed amount (e.g. € 50 every 2 years).

Many complementary insurance policies also provide partial reimbursement for refractive eye surgery. In this case the reimbursement level is a fixed amount, ranging approximately from € 150 to € 300 for both eyes.



2.3 Voluntary insurance

Voluntary health insurance in Belgium is provided by sickness funds and private for-profit insurance companies, mainly for expenditures related to hospitalization¹⁷. Only a limited number of insurers also offer policies that cover ambulatory care.

Corrective eyewear is therefore often not part of the voluntary insurance package. Furthermore, the policies often stipulate that there is reimbursement only for treatments listed on the national reimbursement list or for treatments with curative goal and needed for the recovery of health. Three large private insurance companies were contacted by mail: none of them currently reimburses refractive eye surgery or did so in the past. One company stated that refractive eye surgery is eligible for reimbursement under specific conditions e.g. diopters higher than 7 in absolute value.

3 VISUAL ACUITY DISORDERS IN BELGIUM: A TELEPHONE SURVEY

A telephone survey was conducted to collect information among a sample of adults comparable to the Belgian population, in a time-efficient way. The objective was to give an estimate of the visual acuity disorders with a focus on refractive errors as reported by a sample of adults in Belgium and to collect information on the correction methods and costs related to refractive errors.

3.1 Methodological notes

3.1.1 *The telephone survey*

The interviews were performed via CATI method (Computer Assisted Telephone Interviewing).

In Belgium the penetration of telephones both fixed and mobile, is 99%. In order to include a relevant proportion of “mobile only” respondents (i.e. respondents without any fix line - this subgroup currently estimated around 40% in Belgium), recruitment via mobile and fixed telephone numbers were combined by a strict procedure to include the correct number of “mobile only”. Respondents with a fixed number were randomly selected from the White pages. Respondents with a mobile number were selected through a process of random digit dialing. In this process respondents were asked whether they also had a fixed number. If this was the case they were excluded. A detailed description of this procedure can be found in Appendix 1.1. This selection procedure excludes private telephone numbers, because they are not included in the White Pages, nor reached by random digit dialing (which excluded respondents with a fixed number).

The call centre of GfK Significant (Leuven) performed the interviews between 14 June and 16 July 2012 - on week days between 16h and 21h and on Saturdays between 10h and 16h. This time schedule aimed to guarantee the representativeness of the sample in terms of professional activity.



3.1.2 Questionnaire

The questionnaire used for the interviews comprised the following topics:

- Socio-demographic characteristics (age, gender, language, postal code/region);
- Evaluation of quality of eyesight;
- Health service use for eyesight problems;
- Reported visual acuity problems: words like astigmatism, myopia, hyperopia, presbyopia have been explained to the respondent (after approval of the formulation by an ophthalmologist);
- Use of eye correction method(s) (incl. detailed facts & figures and satisfaction regarding the methods used).
- Reimbursement of eye correction method;
- Attitude towards possible reimbursement of eye correction methods in the future.

The questionnaire was optimized after a pilot test with 10 respondents (5 Dutch- and 5 French-speaking). The final questionnaires can be provided upon request. Appendix 1.2 displays an overview of the interview.

Interview duration was 14 minutes on average for respondents with eye correction and 7 minutes for those without eye correction.

3.1.3 Data cleaning

After field termination, the raw data were analyzed and inconsistent answers were corrected or removed from the data-file:

- 265 respondents indicated that they suffered both from myopia and hyperopia, a combination of refractive errors which cannot occur were recoded to myopia and presbyopia;
- 70 respondents indicated that they had undergone eye surgery but their answers were removed from the corresponding questions because they were operated for cataract (n=25) or for another reason (n=45) (e.g. skewing, injuries...);
- Six respondents (n=6) indicated that they corrected their vision but gave a negative answer for the 3 proposed correction methods (glasses, contact lenses and eye surgery): their answers were recoded as 'not correcting'.

- The data from 125 respondents were removed because they indicated they corrected their vision but they did not report any refractive error;
- All myopic patients were considered as having a negative diopter - all hyperopic ones as having a positive one.
- All 0.99, 9.99, 99.00 and 99.99 codes in the questions on diopter were recoded in the data as a 'don't know' answer.

3.1.4 Weighting of the data

After the data-cleaning process, the profile of the final sample was compared to that of the total Belgian population on a selection of (controllable and measurable) criteria. From this analysis, it became clear that some subgroups were slightly under- or overrepresented. In order to correct for this and therefore to guarantee full representativeness of the results for the Belgian population, a weighting procedure was developed. This implies that a weighting coefficient was calculated for each single respondent, taking care that:

- subgroups that were underrepresented in the sample were given a higher weight in order to be represented according to their fair share.
- subgroups that were overrepresented in the sample were given a lower weight in order to be represented according to their fair share.

This procedure showed that the impact of the weighting was minimal since the weighting coefficients were low. Therefore it was decided to report unweighted results only.

3.1.5 Description of the sample

The call centre dialed 66 724 call numbers to obtain a sample of 4234 interviews (see details in Appendix 1). The response rate for this telephone survey was 26%. The socio-economic status of the non-respondents did not significantly differ from the one of the respondents.



3.1.5.1 Quota sample

The researchers opted for a quota sample. The tables in Appendix 1.4 display the comparison between theoretical and actual quotas in the survey for age and gender and the quotas by age, gender, language and region. The quotas are based on the 'Golden Standard' of the CIM¹⁸, an annually updated description of the socio demographic structure of the Belgian population aged 12 years and older.

The selection criteria age and gender were combined in a matrix, of which the cells were systematically filled with completed interviews. At the beginning of each telephone interview respondents were asked about their age and gender. Once the cell with a particular combination was full, respondents were thanked for their willingness to participate and the interview was terminated. The selection criteria region and language were taken into account, but in a more general way, they were not combined in a matrix with age and gender.

3.1.5.2 Sample size calculation

The sample size was estimated at n=4672 to collect data on a minimum sample of 100 persons having undergone a refractive eye surgery (main topic of the following HTA report). The calculation was based on a prevalence of 2.2% (extracted from a US study¹⁹), with a probability of 95%.¹⁹

3.1.5.3 Final sample

Table 1 shows the composition of the (unweighted) sample (n=4234) by province, gender, age, family situation, socio-economic class, nationality, language spoken at home and language of the interview. Details are displayed in Appendix 1.4.

For the socio-economic status, the calculation of the groups is based on a ratio of the occupation of the head of the family and his/her educational level. In a following step the population is ordered in function of this ratio and subsequently divided into eight more or less equal groups. The group with the highest values has the highest professional/educational level. For this study the eight groups were grouped into three larger ones, taking together level 1-2, 3-6 and 7-8 (see Appendix 1.5).

Table 2 – Description of the socio-demographic profile of the sample (N=4234)

Variable	Category	N	%
Gender	Men	2100	49.6
	Women	2134	50.4
Age	20-24 years	385	9.1
	25-44 years	1665	39.3
	45-64 years	1823	43.1
	65+	361	8.5
Socio-economic status	Low	389	9.2
	Middle	1787	42.2
	High	1656	39.1
Nationality	Belgian	3923	92.7
	Other than Belgian	311	7.3
Language	Dutch	2373	56.0
	French	1861	44.0
Total		4234	

Key points

- **This telephone survey includes a quota sample with characteristics in line with the Belgian population of N=4234.**
- **The interpretation of the results should consider the uncertainty linked to the knowledge of the respondents interviewed, versus prevalence figures based on measurements.**



3.2 Results of the telephone survey

3.2.1 Self-perceived eyesight quality

Almost 90% of the respondents report good, very good or perfect visual acuity (with a correction method if applicable). Answers varied according to age, gender and socio-economic status:

- Younger age categories (i.e. between 20 and 44 y) assess their eyesight significantly better than the total sample ($\chi^2=32.37$; $p<0.001$);
- Men's rating is better than women's rating, although this difference is far less outspoken than for age ($\chi^2=11.53$; $p=0.001$);
- People in the lowest SES groups report significantly worse visual acuity than the higher groups.

Table 3 – General self-perceived eyesight quality (with use of correction method) according to age and gender

	Total		Age								Gender			
			20-24y		25-44y		45-64y		65+y		Men		Women	
	N=4234		N=385		N=1665		N=1823		N=361		N=2100		N=2134	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Not so good, not good at all and blind	454	10.7	27	7.0	136	8.2	244	13.4	47	13.0	191	9.1	263	12.3
Almost perfect, very good and good	3780	89.3	358	93.0	1529	91.8	1579	84.6	314	87.0	1909	90.9	1871	89.3

For a more detailed table see Appendix 1.6.



In the subgroup of respondents with refractive error, those wearing contact lenses reported a significantly better self-perceived eyesight quality compared to those not wearing contact lenses (Table 4: odds ratio=1.33; $p=0.036$) after control for gender, age, socio-economic class and general perceived health variables. In the same way the interviewees having undergone surgery reported a better eyesight than those without surgery (Table 4: odds ratio=1.958; $p=0.018$). On the contrary, respondents wearing glasses report lower eyesight quality compared to respondents without glasses (group including the other correction methods).

Table 4 – Determinants of general self-perceived eyesight quality (logistic regression with subsample of respondents with a refractive error, N=3050)

	Odds ratio	Lower 95% CI	Upper 95% CI	p
Intercept	0.893			0.707
Gender (men=1; women=0)	1.156	0.974	1.372	0.098
Age (65+ = ref.)				
< 25 years	1.053	0.675	1.639	0.819
25 – 44 years	1.142	0.837	1.565	0.405
45 – 64 years	0.768	0.578	1.025	0.071
Socio-economic class (lowest = ref.)				
High	1.501	1.102	2.061	0.011
Middle	1.084	0.802	1.478	0.604
General perceived health	0.457	0.384	0.543	<0.0001
Use of glasses (yes=1;no=0)	0.671	0.424	1.057	0.086
Use of contact lenses (yes=1;no=0)	1.330	1.017	1.736	0.036
Use of eye surgery (yes=1;no=0)	1.958	1.125	3.431	0.018

3.2.2 Visual acuity problems

3.2.2.1 Visual acuity problems reported by all interviewees

About 7 out of 10 respondents (72.1%) specifically report at least one type of refractive error. Myopia is the most frequent refractive error (38.4%), closely followed by presbyopia (35.8%). Astigmatism (10.9%) and hyperopia (9.0%) are less often mentioned.

Table 5 compares these results with two other studies^{2, 4} mentioned in section 1.3.3. However no comparison is possible as these studies measured the refractive error (versus self-reporting in this study). In addition, age groups differ, as is indicated in the table headings.



Table 5 – Reported eye problems (including refractive errors): comparison with the results of two other studies

Belgian data ^a total sample ^a for +18 years old (N=4232)						Vitale et al., 2008 ^b for +20 years old (N=12 010)		Belgian data ^a for +45 years old (N=2 184)		Kempen et al., 2004 ^c for +40 years old (N=29 281)
	no		yes							
	n	%	n	%	[95% CI]	%	[95% CI]	%	[95% CI]	%
Myopia	2602	61.6	1624	38.4	[36.9-39.9]	33.1	[31.5-34.7]	38.7	[36.7-40.7]	26.6
Hyperopia	3845	91.0	378	9.0	[8.0-9.8]	3.6	[3.2-4.0]	11.5	[10.2-12.8]	11.6
Astigmatism	3759	89.1	459	10.9	[9.9-11.7]	36.2	[34.9-37.5]	10.0	[8.7-11.3]	-
Presbyopia	2711	64.2	1511	35.8	[34.3-37.1]	-		62.1	[60.1-64.1]	-
Cataract	4107	97.3	116	2.7	[2.21-3.19]	-		4.5	[3.6-5.4]	-
Other	3882	91.8	346	8.2	[7.37-9.03]	-		9.9	[8.7-11.2]	-

^a These percentages are self-reported, whereas in the other studies refractive errors are clinically measured (spherical equivalent value of 3D or more for hyperopia and -1D or less for myopia).

^b The study of Vitale et al. (2008) is based on the 1999-2004 National and Nutrition Examination Survey (NHANES) among 14 213 participants aged 20 years or older. Refractive error data were obtained for 12 010 or 84.5% percent of the participants. The presented prevalence's are age-standardized.

^c This research gives the results of a meta-analysis from six studies providing data from 29 281 persons in US, Western Europe and Australia in 2000 among a population of 40 years or older. We present here the prevalence's for Western Europe.



3.2.2.2 Reported refractive errors according to age

Table 6 presents the age distribution of refractive error in the sample. About half of respondents younger than 45 years report a refractive error but this number increases up to 87.2% amongst respondents aged 45 to 64 and to 95.3% among respondents aged 65+ ($\chi^2=624.35$; $p<0.001$). These latter percentages are mainly due to the report of presbyopia in the oldest age groups. More details on prevalence are displayed in Appendix 1.7.

Table 6 – Reported refractive errors according to age (total sample)

	20-24 year		25-44 years		45-64 years		65+ years		Total
	n	%	n	%	n	%	n	%	
With refractive error	194	50.4	923	55.4	1589	87.2	344	95.3	3050
Without refractive error	191	49.6	742	44.6	234	12.8	17	4.7	1184
Total	385	100	1665	100	1823	100	361	100	4234

3.2.2.3 Reported refractive errors according to gender and socio-economic class

Some differences can be noted in terms of socio-demographic characteristics (see Table 7):

- Myopia: female respondents and respondents from the highest socio-economic status report it more often;
- Hyperopia is (but only slightly) less reported by respondents from the highest socio-economic class;
- Astigmatism is more often reported by women and by respondents from higher socio-economic status. However, respondents from the lower socio-economic status and equally higher age groups frequently 'don't know', which could mean that these respondents are more often unaware or unsure about this term.
- Presbyopia expectedly occurs more often among the older respondents (aged 45+ and especially 65+, see Appendix 1.7), also more often with a lower socio-economic status.

Table 7 – Reported refractive errors according to gender and socio-economic class (total sample)

	Gender						Socio-economic class							
	Men		Women		Chi ²	p	High		Middle		Low		Chi ²	p
	N=2099		N=2133				N=1656		N=1787		N=388			
	n	%	n	%			n	%	n	%	n	%		
Myopia	694	33.1	930	43.6	49.71	<0.001	749	45.2	606	33.9	128	33.0	53.09	<0.001
Presbyopia	723	34.4	788	36.9	2.95	0.086	467	28.2	695	38.9	201	51.8	93.01	<0.001
Hyperopia	185	8.8	193	9.0	0.079	0.778	132	8.0	170	9.5	47	12.1	7.23	0.027
Astigmatism	170	8.1	289	13.5	32.26	<0.001	261	15.8	145	8.1	15	3.9	74.27	<0.001

**Key points**

- Slightly over 7 out of 10 respondents report at least one type of refractive error.
- Myopia is the most often reported refractive error (38.4%), closely followed by presbyopia (35.7%). Astigmatism (10.8%) and hyperopia (8.9%) are less often reported.
- About half of respondents younger than 45 years report a refractive error and this percentage raises to 95.3% in the group older than 65 years.
- Women report more often myopia (43.6%) than men (33.1%).
- Respondents from the highest socio-economic class report more often refractive error, myopia in particular (43.2% versus 33.0%).

3.3 Severity of refractive error

Questions on the diopters (before surgery if operated) aimed to assess the severity of reported refractive error.

A first striking fact is that almost half of the respondents do not know their (approximate) diopter. This is true in particular amongst the older age groups and in the lower socio-economic status. In terms of eye correction method used, the subgroup wearing contact lenses is more aware of their diopter than respondents wearing glasses or having undergone eye surgery. This observation might be explained by e.g. their younger age and by the fact that the exact correction is mentioned on most packs of contact lenses.

For myopic respondents, the category 65+ report the most severe error. Sample sizes were too small to draw any conclusion by age group for the other refractive errors.

Looking at the severity of the refractive error according to the type of eye correction, respondents having undergone eye surgery report the most severe error in terms of diopters.

Key points

- Almost half of the respondents do not know their (approximate) diopter.
- Among those who reported their diopter, respondents who had eye surgery reported the most severe diopter in comparison with those wearing glasses or contact lenses.

3.4 The use of correction method(s)**3.4.1 The use of correction methods in general****3.4.1.1 Respondents who use a correction method**

Two thirds (65.6%) of the sample reported the use of a correction method. In the Belgian National Health Survey²⁰ 61.9% of the respondents declared that they wore glasses or contact lenses.

The comparison between the reported correction methods and the previously reported refractive errors (72.1%) means that 6.5% of the sample does not use any method to correct for refractive errors. If we recalculate for respondents with refractive errors only, 8.9% do not use a correction method (see Table 8 and Table 9).

Table 8 – Use of correction methods

	Refractive error				Total	
	Yes		No			
	n	%	n	%	n	%
Eye correction	2778	91.1	0	0.0	2778	65.6
No eye correction	272	8.9	1184	100.0	1456	34.4
Chi ² (p-value)	3135.98 (<0.001)				4232	


Table 9 – Reported correction methods according to age and gender

	Total		Age				Gender							
	20-24y		25-44y		45-64y		65+y		Men		Women			
	N=4232		N=1665		N=1822		N=361		N=2099		N=2133			
	n	%	n	%	n	%	n	%	n	%	n	%		
Eye correction	2778	65.6	167	43.5	791	47.5	1490	81.8	1490	91.4	1282	61.1	1496	70.1
No eye correction	1454	34.4	217	56.5	874	52.5	332	18.2	332	8.6	817	38.9	637	29.9

3.4.1.2 Respondents who mention a refractive error but do not use any correction method

A proportion of the sample who reported refractive error(s) stated that they did not use any correction method (6.5%, n=272). They rated their eyesight quality as “less good” compared to the total sample (78.2% compared to 90.0%).

In terms of refractive errors, these respondents reported that they suffered from myopia (38.4%), presbyopia (45.2%) and hyperopia (13.2%) more frequently than the respondents from the general sample.

The tables in Appendix 1.8 display more details on this subgroup.

3.4.2 Age and gender differences in the use of glasses, contact lenses and refractive eye surgery

The most common eye correction method are glasses i.e. 95.7% (n=2659) of all respondents using a correction method. Only 13.6% (n=377) wear contact lenses. About 3 out of 4 contact lens users, however, combine this correction method with glasses. Only 2.6% (n=71) of the respondents with eye correction had a refractive eye surgery.

Older age groups opt more often for glasses whereas the youngest group is more likely to wear contact lenses: 71.8% (n=271) of the lens users are younger than 45 years.

In this sample the users of glasses, contact lenses and eye surgery are on average respectively 49.7 (n=2659; SD=12.94), 38.3 (n=377; SD=12.19) and 46.1 (n=71; SD=12.10) years old (see also appendix 5.0).

Gender differences in the use of correction methods are significant in particular for contact lenses (16.8% women versus 9.7% men). Women also had more often surgery than men but the sample size is smaller.

Table 10 – Age and gender differences in the use of glasses, contact lenses and eye surgery (subsample with refractive errors)

	Total		20-24y		25-44y		45-64y		65+y				Men		Women			
	N=2786		N=167		N=795		N=1493		N=331		Chi²	p	N=1286		N=1500		Chi²	p
	n	%	n	%	n	%	n	%	n	%			n	%	n	%		
Glasses	2659	95.4	161	96.4	712	89.6	1459	97.7	327	98.8	90.0	<0.001	1242	96.6	1417	94.5	7.1	0.005
Contact	377	13.5	68	40.7	203	25.5	97	6.5	9	2.7	299.66	<0.001	125	9.7	252	16.8	29.7	<0.001
Refractive eye surgery	71	2.5	2	1.2	31	3.9	32	2.1	6	1.8	8.7	0.033	25	1.9	46	3.1	3.5	0.039



In the subsample of respondents with refractive error (n=3050), 76.6% use glasses only, 2.7% exclusively contact lenses and 1.2% had eye surgery, without using glasses or lenses in combination i.e. 80.4% of them use only one correction method. This means that only about 10.5% of the respondents with a refractive error combine several methods (see Table 11).

Table 11 – Combined use of eye corrections differentiated by age (subsample with refractive error)

	20-24 y	25-44 y	45-64 y	65+ y	Total
	N %	N %	N %	N %	N %
One correction method	103 53.1	639 69.2	1393 87.7	318 92.4	2453 80.4
Glasses, lenses and eye surgery	0 0.0	3 0.3	1 0.1	0 0.0	4 0.1
Glasses and lenses	63 32.5	145 15.7	74 4.7	7 2.0	289 9.5
Glasses and surgery	1 0.5	4 0.4	21 1.3	5 1.5	31 1.0
Lenses and surgery	0 0.0	0 0.0	1 0.1	0 0.0	1 0.0
No correction	27 13.9	132 14.3	99 6.2	14 4.1	272 8.9
Total	194	923	1589	344	3050

3.4.3 Satisfaction with glasses, contact lenses and refractive eye surgery

3.4.3.1 Satisfaction with glasses

Almost all respondents wearing glasses (96.3%) are either extremely/very satisfied (55.5%, n=1474) or satisfied (40.8%, n=1086) (see details in Appendix 1.10.1). Younger respondents (20 to 44 years) are especially satisfied about wearing glasses, about the impact glasses have on their appearance, about the ease of use and the comfort.

The most important source of dissatisfaction regarding glasses is the price: 24.5% are somewhat or very dissatisfied about the price of glasses. About 9% are somewhat or very dissatisfied about the ease of use and 8% about both the impact on appearance and comfort (Table 12).

3.4.3.2 Satisfaction with contact lenses

In the same way, 93.9% of the users of contact lenses reported to be (extremely/very) satisfied with their lenses.

Users of contact lenses in the younger age groups (25-44y) are more satisfied than older respondents (see Table 43 in appendix). These differences between age groups are less outspoken than those noted between respondents wearing glasses (see Appendix 1.10.1).

3.4.3.3 Comparison of dissatisfaction with glasses and lenses

Dissatisfaction with glasses is higher than with contact lenses for the following aspects (see Table 12):

- 24.5% versus 22.5% are (very) dissatisfied about the price of glasses and contact lenses respectively;
- 7.9% versus 0.0% are (very) dissatisfied about the impact on appearance of respectively glasses and contact lenses;
- 9.3% versus 6.1% are (very) dissatisfied about the comfort of wearing respectively glasses and contact lenses;


Table 12 – Satisfaction with different aspects of wearing glasses and contact lenses (subsample with refractive error)

	Price				Impact on appearance				Comfort of wearing				Ease of use				Quality of sight			
	Glasses		Contact lenses		Glasses		Contact lenses		Glasses		Contact lenses		Glasses		Contact lenses		Glasses		Contact lenses	
	N=2659		N=377		N=2659		N=377		N=2659		N=377		N=2659		N=377		N=2659		N=377	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Satisfied	2008	75.5	292	77.5	2448	92.1	377	1000	2450	92.1	346	91.8	2412	90.7	354	93.9	2527	95.0	359	95.2
Unsatisfied	651	24.5	85	22.5	211	7.9	0	0	209	7.9	31	8.2	247	9.3	23	6.1	132	5.0	18	4.8

3.4.3.4 Satisfaction with surgery

Seventy patients (n=70) underwent eye surgery: 60 (85.7%) of them were satisfied, very or extremely satisfied (see Appendix 1.10.1). Satisfaction is high with both organizational and medical aspects (information received, waiting time, perceived competence of the surgeon, eye checks before and after the surgery) as with its results in terms of quality of sight afterwards (see Table 13). The price is the major source of dissatisfaction (23 respondents).

However 10 operated patients felt generally dissatisfied: this proportion is higher in comparison with contact lenses and (especially) glasses users (dissatisfaction of 14.3% for eye surgery vs. 6.1% for contact lenses and 3.7% for glasses).

Table 13 – Satisfaction with surgery

	Satisfaction regarding													
	Information received		Professional competence		Eye checks before		Eye checks after surgery		Price		Waiting time		Quality of sight	
	N=70		N=70		N=70		N=70		N=70		N=70		N=70	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Satisfied	64	91.3	65	92.8	69	98.6	67	95.7	47	67.1	69	98.6	64	91.4
Dissatisfied	6	8.6	5	7.2	1	1.4	3	4.3	23	32.9	1	1.4	6	8.6



The intention to do it again ("I would do again") and the recommendation to others ("I would recommend it to others") also score high (see Appendix 1.10.4):

- 88.5% of all patients having undergone eye surgery would make the same decision again (of whom 77.1% definitely and 11.4% probably).
- About the same proportion of patients (88.6%) would recommend surgery to other people (71.4% definitely and 17.1% probably).

Key points

General

- **Two thirds of the sample use an eye correction method.**
- **About 1 out of 20 Belgians who report refractive error does not use any correction method.**
- **Glasses are the most commonly used correction method (95.7% of the respondents who report refractive error); contact lenses are used by 13.6%, and 2.6% had surgery.**

Age differences

- **Older age groups opt more often for glasses whereas the youngest group is more likely to wear contact lenses.**

Gender differences

- **Contact lenses and surgery are more popular among women, while glasses are more popular among men.**

Users satisfaction

- **The users' satisfaction scores high for all correction methods: 96.3% among users of glasses, 93.9% about contact lenses and 85.7% about surgery.**
- **Respondents are most critical about the cost of the correction methods.**

In the group of respondents not wearing glasses all the time glasses were used especially to read for a long period of time (62.8%, n=866) or to read small characters (53.2%, n=733). This is mainly the case for the two oldest age categories (45-64y and 65+). The youngest respondents (20-24) mainly wear glasses to watch television (71.6%), to work on the computer (43.2%), to drive a car (41.1%) or for work related activities (27.4%). The group that combine glasses and contact lenses mostly wear glasses to watch television (49.2%).

3.5.2 Drivers for wearing glasses

The main reason for wearing glasses (n=2659) versus another eye correction method is comfort (25.8%).

Compared to contact lenses, however, the specific drivers for wearing glasses are the fact that they only need correction for reading (17.9%) and an inability to wear contact lenses (too sensitive eyes (11.4%) or specific error that does not allow to wear contact lenses (9.8%)).

Wearing glasses is merely a habit for about 8.8% of the sample (especially older respondents) and another 4.6% did not think yet about changing their correction method. The ranking of drivers to wear glasses does not differ between men and women.

3.5.3 Purchase process of new glasses

The reasons for buying a new pair of glasses are mostly linked to necessity: 54.6% indicate that they bought new glasses because their glasses needed to be adapted to changes in eyesight and 28.4% because they were torn or broken.

A significantly lower percentage (16.7%) mention a wish for a new trendy frame. Other less frequently cited reasons (each 2.2% or less) are the need for an extra pair of glasses, replacement of lost or stolen glasses, need for a new look, old glasses uncomfortable and promotion or sales.

3.5 Glasses: activities, drivers, purchase of new glasses

3.5.1 Specific activities for which glasses are worn

Some respondents do not wear their glasses all the time (n=1378). This is especially true for the youngest age group (<25 years) (59.0% vs. 51.8% in the total sample).



Key points

- The main reason for wearing glasses versus another eye correction method is comfort.
- For more than half of the respondents (54.6%) buying new glasses is often a necessity (change in eyesight, broken or torn glasses).

3.6 Contact lenses: type, activities and drivers

3.6.1 Profile of respondents who have tried contact lenses

A small proportion of the respondents who wear glasses (16.7%) tried contact lenses before (see Appendix 1.10.2). Especially younger people (< 45 years) indicated having ever tried contact lenses. The main reasons for not wearing contact lenses anymore are the side effects (63.0% e.g. dry eyes, allergies, redness), contact lenses being too much fuss to use (29.6%) and no appropriate contact lens available for error (7.1%).

People who never tried contact lenses ranked these reasons differently. The 'fuss factor' ranked highest (34.6%). The side effects followed at the second place (17.2%). About 12% of the respondents also stated that there was no appropriate lens available for their refractive error and that they did not need the correction all the time (8.1%).

3.6.2 The most popular contact lens

The most popular type of contact lenses is the soft monthly disposable lens (64.5%). Soft daily disposable lenses come in second place (17.2%) followed by hard contact lenses (6.6%) (see Table 14).

Table 14 – Types of contact lenses

	Total N=377	
	n	%
Soft, monthly disposable lenses	243	64.5
Soft, daily disposable lenses	65	17.2
Hard lenses	25	6.6
Soft, ordinary lenses	24	6.4
Soft, disposable lenses for 1 or 2 weeks	12	3.2
Lenses for medical purposes	6	1.6
Night lenses	2	0.5

3.6.3 Specific activities for which contact lenses are worn

About half of the respondents using contact lenses (or 54.6%) report to wear them all the time. Overall respondents wear their contact lenses on average 5.2 days a week. The most common activities for which lenses are worn are exercising (66.1%), going out (55.0%), working (31.6%), driving a car (26.9%), reading (32.2%) and watching television (18.7%) (see Appendix 1.10.3).

3.6.4 Drivers to wear contact lenses

The main drivers for wearing contact lenses are comfort (50.7%), ease for specific activities (36.6%) and aesthetics (27.3%). In addition more than 7% of the respondents believe that the quality of their sight is better compared to glasses. The Appendix 1.10 shows gender differences: women emphasize comfort (53.6%) and aesthetics (31%), while men wear contact lenses especially in function of specific activities (48%).

Key points

- Less than 20% of the sample report to have ever tried contact lenses.
- The most popular type of contact lenses is soft monthly disposable lenses (64.5%).
- The main drivers for wearing contact lenses are comfort (50.7%), ease for specific activities (36.6%) and aesthetics (27.3%).



3.7 Refractive surgery: attitude, drivers and inhibitors

3.7.1 General attitude towards surgery

The proportion of respondents with a refractive error who already considered eye surgery is rather limited, i.e. 15.3% (n=404).

Respondents between 20 and 25 years were about 2 times, and those between 25 and 45 years 2.5 times more likely to have considered a refractive eye surgery. Socio-economic class was not associated with the likelihood of considering surgery after control for age, type of refractive error and type of correction.

Among the patients having ever considered eye surgery only 2.7% had actually planned an operation at the moment of the interview. When recalculating this figure on the total sample of patients with a refractive error, this comes down to 0.4% (mostly male and aged 45-64y).

Table 15 – Did respondents ever consider an eye surgery? (subsample with refractive error)

		n	%	Chi ²	p
Total (N=2638)	Considered eye surgery	404	15.3		
Age	20-24 (n=164)	46	28.0	126.459	<0.001
	25-44 (n=748)	191	25.5		
	45-64 (n=1421)	148	10.4		
	65+ (n=305)	19	6.2		
Gender	Men (1218)	180	14.8	0.502	0.479
	Women (1420)	224	15.8		
Socio-economic class	High (1051)	214	20.4	36.903	<0.001
	Middle (1098)	134	12.2		
	Low (259)	23	8.9		

3.7.2 Drivers for considering eye surgery

These drivers are firstly the perceived comfort of not needing glasses or contact lenses anymore (65.1% of respondents who have ever considered surgery). One tenth (9.9%) also believe that the quality of their sight would improve after eye surgery (see Table 16). A better look (5.2%) and savings (4.2%) are other drivers.

Table 16 – Drivers for considering eye surgery

	Total N=404	
	n	%
Due to the comfort (of not needing glasses/contacts)	263	65.1
Believe the quality of my sight will be better than using glasses/contacts	40	9.9
Because I expect to look better	21	5.2
Will be cheaper in the long run	17	4.2
Other	116	28.7

3.7.3 Inhibitors

Inhibitors for undergoing eye surgery are less explicit, mainly linked to satisfaction with the current correction method (26.4%), the perception that specific types of refractive errors cannot be corrected with surgery (19.8%), the perception that surgery is only for severe errors (18.4%), and the fear that something would go wrong during the operation (14.3%).

The expected cost of the intervention is a minor reason for not considering eye surgery (5.6%). The latter finding corresponds with the results of the individual in-depth interviews displayed in section 4.3.6.2.

However, patients who considered eye surgery but did not take the final step towards the intervention mention costs as the first reason (32.1%). Secondary reasons are the fear that something would go wrong during the operation (20.1%), the fear of side effects afterwards (8.1%), and the belief that the refractive error cannot be helped with eye surgery (11.2%).


Table 17 – Reasons for not considering and for not opting for eye surgery (amongst respondents who ever considered it)

Reasons for not considering eye surgery	Total N=2234		Reasons for not opting for eye surgery after taking it in consideration	Total N = 393	
	n	%		n	%
Am satisfied with my glasses/contacts	589	26.4	Too expensive	126	32.1
My error cannot helped with refractive surgery	442	19.8	Am afraid something would go wrong	79	20.1
Not (yet) necessary, not severe enough	410	18.4	My error cannot helped with refractive surgery	44	11.2
Am afraid something would go wrong	319	14.3	Fear for side effects	32	8.1
Too expensive	126	5.6	My sight is not stabilized yet	32	8.1
Fear for side effects	118	5.3	Am satisfied with my glasses/contacts	26	6.6
No interest in surgery, don't want surgery	106	4.7	Not recommended. did not discuss yet with physician	17	4.3
Not recommended, did not discuss yet with physician	95	4.3	My environment or physician advised me against	17	4.3
Did not think about it yet	55	2.5	Not yet necessary. not severe enough	14	3.6
Did not know it existed	54	2.4	I am too old	12	3.1
I am too old	53	2.4	No time	11	2.8
Not 100% sure of result	19	0.9	Not 100 sure of result	8	2.0
Refractive error is not yet stable	18	0.8	I am too young	8	2.0
I am too young	10	0.4	No interest in surgery. don't want surgery	7	1.8
My environment or physician advised me against	10	0.4	Good result only temporary	5	1.3
Good result only temporary	8	0.4	Did not think about it yet	2	0.5
No time	5	0.2	Other	37	9.4
Other	19	0.9	Don't know/no answer	11	2.8
Don't know/no answer	89	4.0			



3.8 Health service use for eyesight problems

3.8.1 Consultation of an ophthalmologist

3.8.1.1 A large proportion never consulted

About 7 out of 10 respondents have ever consulted an ophthalmologist. More respondents of the oldest age group (87.3%) ever consulted an ophthalmologist but in the group aged 20 to 24 years the percentage is already 56.3%. Women are more likely (75.2%) to have consulted an ophthalmologist than men (65.0%). Differences according to socio-economic class are rather small, with 69.3% in the lowest status and 73.7% in the highest ones (see table below). These findings may be explained by gender difference in health care use in general²¹ and by a higher number of refractive errors reported by older respondents, by the women and by people from higher socio economic status (see chapter 3.2.2).

All people having had refractive eye surgery ever consulted an ophthalmologist, followed by the subgroup wearing contact lenses (94.4%). Among those wearing glasses 90% ever consulted an ophthalmologist. In terms of refractive error, myopic respondents were more likely to consult an ophthalmologist (92% versus 86.5% among hyperopic respondents) than respondents with other errors (see Appendix 1.11). In Flanders 67.4% of the respondents report to have ever consulted an ophthalmologist, compared to 67.9% in Wallonia and 76.2% in Brussels.

About 30.0% of the sample (n=1265) say they never consulted any ophthalmologist: still within this group, 28.9% (n=365) report to have a refractive error and 22.0% (n=280) used a means to improve eyesight.

3.8.1.2 Reasons for non-consultation

The first reason for not consulting an ophthalmologist (see Appendix 1.11) was that this consultation was not necessary (82.4% of these respondents with 12.4% who consulted an optician). The second and third most reported reasons were the consultation of an occupational physician or optician (6.6% and 4.3% respectively). Other reported reasons were lack of time (n=40; 3.2%), consultation of GP instead of an ophthalmologist (n=12; 0.9%) and too expensive (n=9; 0.7%).

3.8.2 Consultation of an optician

Opticians are less likely to be consulted than ophthalmologists (i.e. 70.1% versus 43.1%) but the pattern according to age and gender is similar. Older people (46.8%) and women (46.4%) are more likely to have ever consulted an optician compared to younger (20-24 years; 38.8%) and male respondents (39.8%). Among respondents with a higher socio-economic status 46.4% report to have ever consulted an optician, compared 40.5% among the lower class (see Table 18).

Among respondents using contact lenses 75.6% report to have ever consulted an optician, versus 58.7% of the respondents wearing glasses and 56.3% of those having had an eye surgery. Regional differences are less outspoken compared to ophthalmologists: in Flanders 42.7% ever contacted an optician, in Wallonia 42.5% and in Brussels 48.4%.

The reasons for not consulting an optician are similar to those for not consulting an ophthalmologist. First people do not consider it as necessary (75.5%). Second, they consulted an ophthalmologist (13.9%). Third, they already consulted another physician (4.7%). Other cited reasons are a lack of time (n=37, 2.5%) and the price (n=9; 0.6%) (see Appendix 1.11).



Table 18 – Did respondents ever consult an ophthalmologist/optician?

		Ophthalmologist (Total sample)				Ophthalmologist (subsample with refractive error)				Optician (Total sample)				Optician (subsample with refractive error)			
		n	%	chi ²	p	n	%	chi ²	p	n	%	chi ²	p	n	%	chi ²	p
Total (N=4232)		2967	70.1			2685	88.0			1824	43.1			1750	57.4		
Age	20-24 (n=384)	216	56.3	254.24	<0.001	172	88.7	6.2	0.103	149	38.8	49.12	<0.001	137	70.6	45.1	<0.001
	25-44 (n=1665)	988	59.3			829	89.8			622	37.4			585	63.4		
	45-64 (n=1822)	1448	79.5			1377	86.7			884	48.5			861	54.2		
	65+ (n=361)	315	87.3			307	89.2			169	46.8			167	48.5		
Gender	Men (n=2099)	1364	65.0	52.2	<0.001	1473	85.2	20.7	<0.001	835	39.8	18.7	<0.001	801	56.3	1.3	0.271
	Women (n=2133)	1603	75.2			1212	90.5			989	46.4			949	58.3		
Socio-economic status	High (n=1656)	1220	73.7	14.9	0.001	1113	92.0	33.5	<0.001	768	46.4	10.2	0.006	739	61.1	16.6	<0.001
	Middle (n=1787)	1210	67.7			1083	86.4			740	41.4			709	56.5		
	Low (n=388)	269	69.3			255	81.7			157	40.5			152	48.7		

3.8.3 Characteristics associated with the consultation of an ophthalmologist or optician

The logistic regression presented in Table 19 shows that men are less likely than women to have consulted an ophthalmologist or optician.

In comparison to the +65 years age group, those younger than 45 years are less likely to have consulted an ophthalmologist or optician (see Table 19 for the odds ratios). However younger people are more likely than the older group to have consulted an optician.

High and middle class respondents are respectively 2 and 1.5 times more likely than the low class respondents to have consulted an ophthalmologist (findings similar for opticians, but the odds ratios are 1.4 and 1.3 respectively).

In Flanders respondents are less likely to have consulted an ophthalmologist or optician, compared to Wallonia.



Table 19 – Determinants of at least once in a life time consultation of ophthalmologist or optician (logistic regression, total sample)

	Ophthalmologist				Optician			
	Odds ratio	Lower 95% CI	Upper 95% CI	p	Odds ratio	Lower 95% CI	Upper 95% CI	p
Gender (men=1; women=0)	0.669	0.556	0.805	<.0001	0.909	0.785	1.053	0.205
Age (65+ = ref.)								
< 25 years	0.615	0.379	0.986	0.046	2.106	1.442	3.086	0.0001
25 – 44 years	0.668	0.444	0.987	0.047	1.597	1.214	2.103	0.0008
45 – 64 years	0.786	0.531	1.140	0.217	1.220	0.947	1.571	0.124
Socio-economic class (lowest=ref.)								
High	2.082	1.518	2.843	<.0001	1.437	1.117	1.850	0.005
Middle	1.510	1.114	2.038	0.007	1.305	1.022	1.668	0.033
Region (Wallonia=ref.)								
Flanders	0.041	0.033	0.05	<.0001	0.04	0.03	0.053	<.0001
Brussels	0.51	0.415	0.625	<.0001	0.983	0.838	1.152	0.830
Refractive error (no=0; yes=1)	1.035	0.704	1.533	0.861	1.167	0.875	1.562	0.296



3.8.4 People with a refractive error who never consulted

Among the respondents who reported a refractive error 6% (n=184) consulted neither an ophthalmologist, nor an optician (See Table 20). However in this subgroup of non-users of health services for eye problems, still 65% (n=120) wears glasses. In addition, these non-users are mostly (75%) older than 45 years (n=138). Stated the other way round, 94% of the respondents who reported a refractive error ever consulted either an ophthalmologist or an optician.

Table 20 – Consultation once in a life time, ophthalmologist and/or optician (subsample with refractive error)

		Ever consulted an optician		
		Yes	No	Total
Ever consulted an ophthalmologist	Yes	1569	1116	2685
	% of total	51.4	36.6	88.0
	No	181	184	365
	% of total	5.9	6.0	12
Total		1750	1300	3050
		57.4	42.6	100

Finally, the answers show that more than half of the respondents (55.8% for ophthalmologist; 58.7% for optician) who ever consulted an ophthalmologist/optician, had their last consultation more than one year ago.

Key points

- About 70% of the respondents have ever consulted an ophthalmologist, 43.1% ever consulted an optician.
- Female gender, age and high socio-economic class are associated with a higher probability of consultation (ophthalmologist and to a lesser extent optician).

- Among the respondents who report a refractive error, 6% consulted neither an ophthalmologist, nor an optician: still two thirds of them wear glasses.

3.9 Costs, reimbursement, willingness to pay

3.9.1 Estimated costs of different types of eye correction

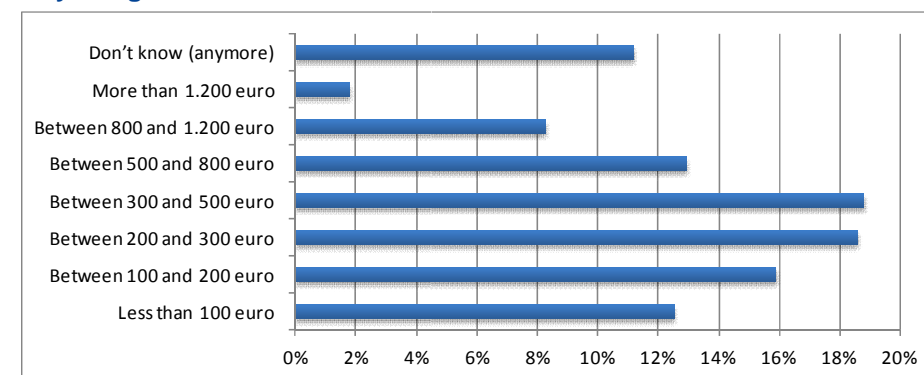
3.9.1.1 Costs linked to glasses

The reported costs do not only comprise the cost of the frame but also the cost of glasses. Whereas the expenditure for the frame is to large extent a personal choice, the expenditure for the glasses mostly depends on the severity and type of refractive error.

About 2/3rd of the respondents spent a maximum of € 500 on a pair of glasses (Figure 5): 19% spent between € 300 and € 500.

Differences between men and women are displayed in Appendix 1.12.1.

Figure 5 – How much did respondents pay for the last glasses that they bought?



- Influence of age

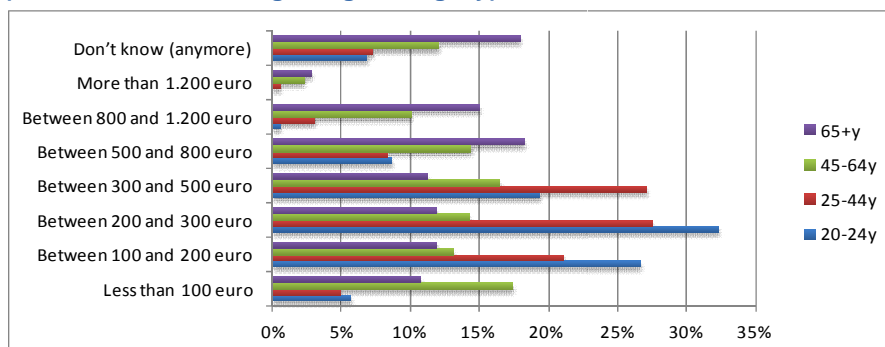
The amount spent on glasses was higher in older age groups (Figure 6):

- Most respondents between 20 and 24 years spend less than € 300,
- Most respondents between 25 and 44 years spend up to € 500,



- Respondents over 45 years are more likely to spend more than € 500: the need for multifocal glasses in this age group might explain this higher expenditure.

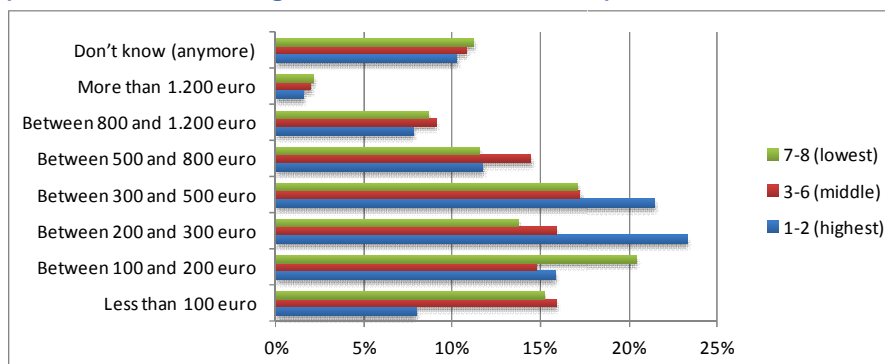
Figure 6 – How much did respondents pay for the glasses last bought (breakdown according to age category)?



- Influence of socio-economic status

Most respondents with a higher socio-economic status (1 and 2) spend up to € 500 on glasses while people with a lower socio-economic status (3 to 5) are more likely to spend a maximum of € 200 (Figure 7).

Figure 7 – How much did respondents pay for the glasses last bought (breakdown according to socio-economic class)?



- Influence of concomitant use of lenses

No clear conclusion can be drawn from the data on whether people who also wear contact lenses spend less on glasses. Respondents who wear glasses as well as contact lenses are less likely to spend more than € 800 than persons who wear glasses only (see Appendix 1.12.2). On the other hand they are also less likely to spend less than € 100 for their glasses.

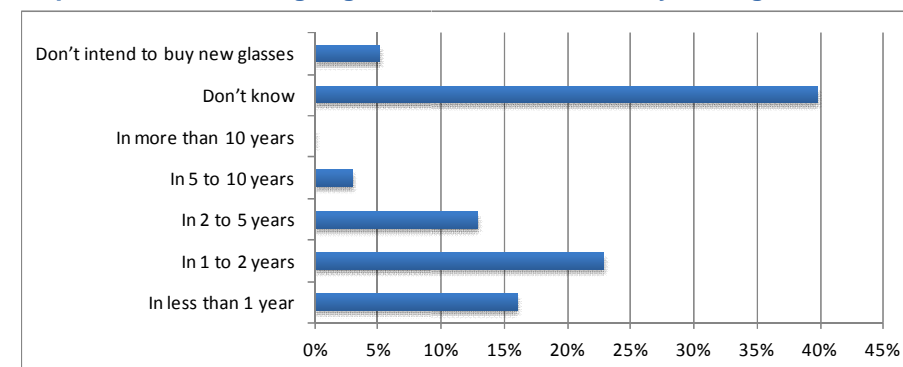
- Influence of surgery

Respondents who underwent surgery spent less on their glasses than people who did not undergo surgery (see Appendix 1.12.2) (respondents were only included when they wear glasses).

- Renewal term

The majority of respondents did not know when to renew their glasses. Among those who gave an estimation, the majority expected to renew them within 1 to 5 years (Figure 8). The budget spent on glasses according to the expected duration of use is in 0).

Figure 8 – Expected time until purchase of new glasses amongst respondents who bought glasses between 1 and 2 years ago



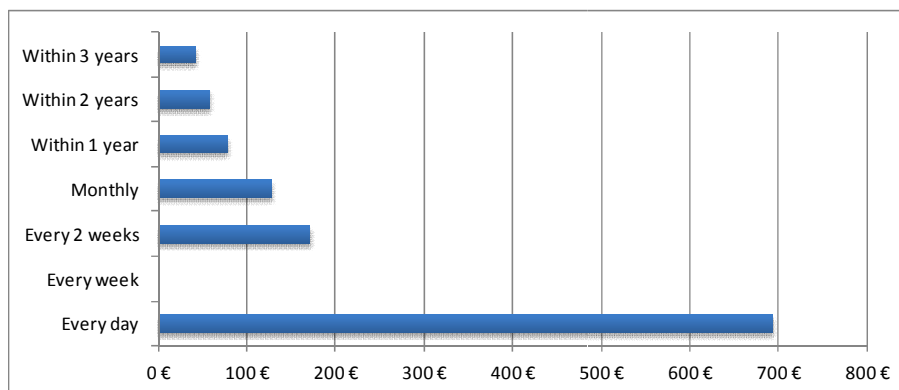
3.9.1.2 Costs linked to contact lenses

The yearly costs of lenses depend on the type of lenses (estimate based on the answers about costs of an individual contact lens and the renewal terms). The results shown in Figure 9 need to be interpreted with caution:



- the yearly cost of € 700 to € 950 for day lenses is much higher than the yearly costs for day lenses estimated by the A.P.O.O.B. (Algemene Professionele Opticiens- en Optometristenbond van België – Association Professionnelle des Opticiens et Optométristes de Belgique) at € 440.
- a yearly cost of € 120 for monthly lenses appears to be rather on the low side as the A.P.O.O.B estimated the yearly cost for monthly lenses at € 220.

Figure 9 – Yearly cost of contact lenses (cleaning products not included): calculation based on the cost of a single contact lens and renewal term



3.9.1.3 Costs linked to eye surgery

The median reported cost for eye surgery including both eyes is € 2 000 (n=56 respondents, 14 non-response).

These results have to be interpreted with caution as most respondents underwent the surgery more than 10 years ago and some reported a very low cost. One outlier reported a cost of € 13 000 and a quarter (25%) of the respondents mentioned a total cost of € 1000 or less (5 respondents within this group answered € 300 or less). The expert group agreed these amounts could certainly not concern refractive surgery. Leaving out these answers, the median result is € 2230.

Key points

- About two-thirds of the respondents spent a maximum of € 500 on a pair of glasses: 19% spent an amount between € 300 and € 500.
- The yearly cost for day lenses is estimated at € 700 to € 950. This is however much higher than expected. A yearly cost of € 120 for monthly lenses appears rather on the low side. We therefore suspect that some of the respondents did not answer the question in a precise way.
- The median cost of refractive eye surgery for both eyes is € 2230 but the result should be interpreted with caution as most respondents underwent the surgery more than 10 years ago.

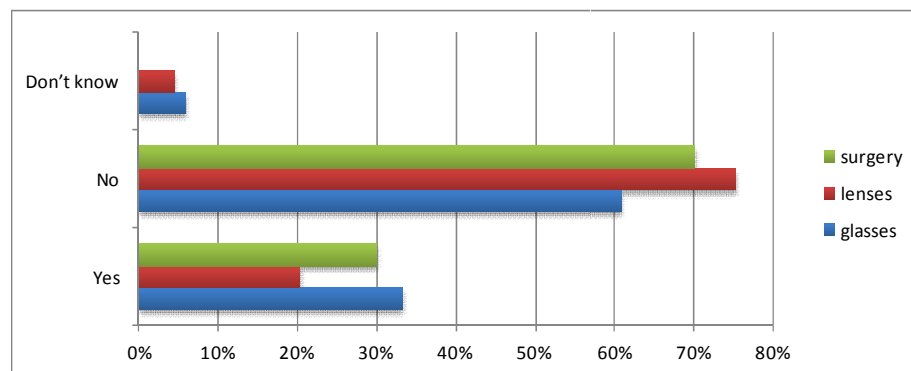
3.9.2 Reimbursement of different types of eye correction

The data presented in this section are based on the responses of the telephone survey, not on reimbursement rules.

Respondents mentioned the fact that glasses and eye surgery are more likely to be reimbursed by an insurance than contact lenses (Figure 10). Excluding the respondents who do not know, 35% of people wearing glasses received reimbursement, compared to 21% of contact lens wearers and 30% of the surgery group.



Figure 10 – Did respondents receive reimbursement (either from health insurance or private insurer) (breakdown according to glasses, lenses or surgery)



3.9.2.1 Reimbursement: differences between age groups

The details by age group are in Figure 10 in appendix:

- 28% of the oldest age groups (45 – 64 years and 65+) stated they received reimbursement,
- 34% of the age group 25 – 44 years stated having received reimbursement,
- in the youngest age group (20 – 24 years) a considerable proportion of respondents did not know whether they have received reimbursement.

3.9.2.2 Reimbursement: differences between socio-economic status

Differences between socio-economic status were also noted. Respondents from the highest socio-economic class (1 and 2) more often state to have benefited from reimbursement (33% versus 29% for lowest class) (Appendix 1.13). For surgery the 3 respondents from the lowest socio-economic class claimed that received reimbursement as well as one quarter of respondents from the highest socio-economic class (n=42).

3.9.3 Willingness to pay

Nearly half of the sample (47.9%) are willing to pay more taxes or social security contribution for reimbursement of eye surgery by the obligatory health insurance, versus 38.7% for glasses and 31.9% for contact lenses. Respondents aged between 20 and 44 years, men, respondents of the lower socio-economic status, respondents with no refractive error and respondents who had eye surgery are more willing to pay taxes/social security contribution for reimbursement by obligatory health insurance for glasses and contact lenses. The details by age, gender, socio-economic class are available in Appendix 1.14.

Figure 11 and Figure 12 show that the willingness to pay more taxes in order to get a reimbursement for glasses, lenses or surgery is not particularly concentrated in the groups who would benefit most of reimbursement.



Figure 11 – Willingness to pay more taxes in order to reimburse glasses, lenses or surgery (Total sample)

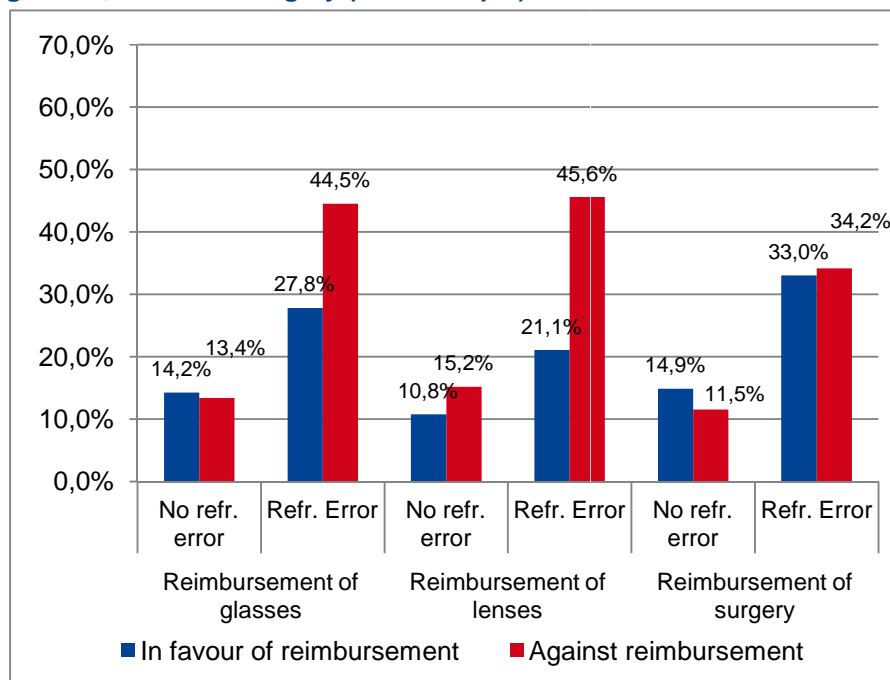
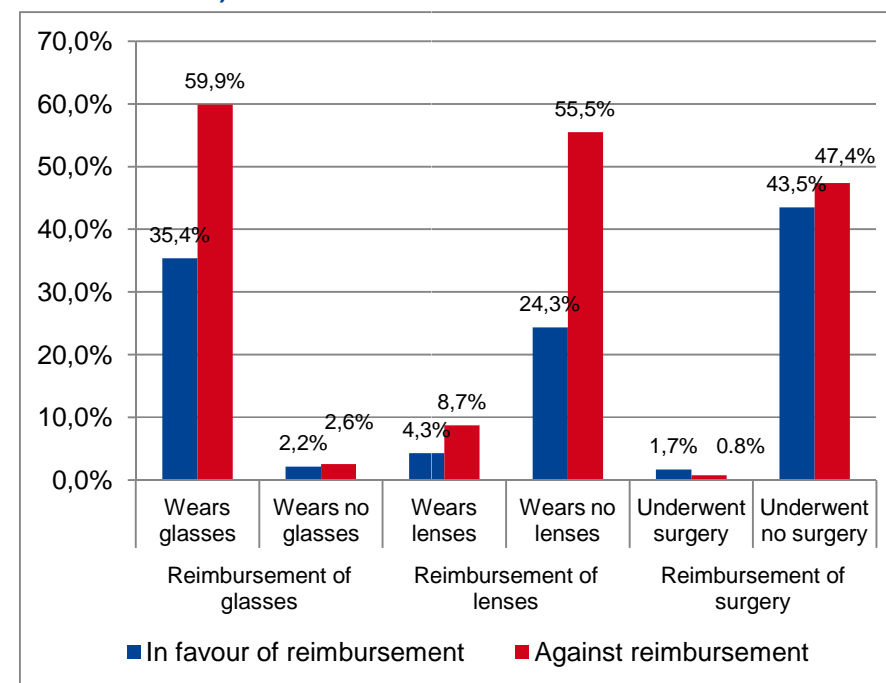


Figure 12 – Willingness to pay more taxes in order get a reimbursement for glasses, lenses or surgery (subgroup with refractive errors)



Furthermore, 80.5% of those in favour of reimbursement agreed that everyone should be eligible for reimbursement of glasses.

Respondents with a refractive error but no eye correction had a more positive attitude towards paying more taxes or social security contribution for reimbursement of all types of eye correction: 44.1% of them were willing to pay more taxes/social security contribution for reimbursement by obligatory health insurance of glasses. Of this subsample, 82.5% agreed that everyone should be eligible for reimbursement of glasses.



Table 21 – Willingness to pay more taxes/social security contribution for reimbursement of glasses, contact lenses and eye surgery by obligatory health insurance

	Total		Refractive error				Type of eye correction					
	N=4234		Yes N=3050		No N=1182		Glasses N=2659		Contacts N=377		Eye surgery N=71	
	n	%	n	%	n	%	n	%	n	%	n	%
Glasses												
Yes	1640	38.7	1085	35.6	555	47.0	913	34.3	130	34.5	34	47.9
No	2257	53.3	1735	56.9	520	44.0	1544	58.1	224	59.4	33	46.5
No opinion/don't know	337	8.0	230	7.5	107	9.1	202	7.6	23	6.1	4	5.6
Contact lenses												
Yes	1349	31.9	893	29.3	456	38.6	747	28.1	120	31.8	25	35.2
No	2573	60.8	1931	63.3	641	54.2	1716	64.5	243	64.5	41	57.7
No opinion/don't know	312	7.4	226	7.4	85	7.2	196	7.4	14	3.7	5	7.0
Eye surgery												
Yes	2028	47.9	1399	45.9	628	53.1	1193	44.9	153	40.6	47	66.2
No	1935	45.7	1447	47.4	488	41.3	1284	48.3	210	55.7	22	31.0
No opinion/don't know	271	6.4	204	6.7	66	5.6	182	6.8	14	3.7	2	2.8



Key points

- **35% of people wearing glasses stated that they received reimbursement, compared to 21% of contact lens wearers and 30% of the surgery group.**
- **Nearly half of the sample (47.9%) are willing to pay more taxes or social security contribution for reimbursement of eye surgery by the obligatory health insurance, versus 38.7% for glasses and 31.9% for contact lenses. 80.5% of those in favour of reimbursement agreed that everyone should be eligible for reimbursement of glasses.**

3.10 Summary of findings

The main objective of the telephone survey was to give an estimate of the visual acuity disorders (with a focus on refractive errors) as reported by a sample of adults in Belgium.

The following main findings emerge from this investigation:

- Slightly over 7 out of 10 respondents have at least one type of refractive error. Myopia is the most frequent refractive error with 38.4 percent, closely followed by presbyopia with 35.8%. Astigmatism and hyperopia represent respectively 10.9% and 9%.
- Two thirds of the sample use an eye correction method. Glasses are the most popular with 95.7% of the respondents having a refractive error, contact lenses are used by 13.6 percent and 2.6 percent has undergone a refractive eye surgery. Older age groups are more likely to wear glasses, whereas the younger ones prefer contact lenses. Refractive eye surgery is most popular among the group between 25 to 44 years old. Although gender differences in refractive eye surgery were non-significant, it was clear that contact lenses were more popular among women, while glasses were preferred by men. For all correction methods users' satisfaction was generally high: 96.3% among users of glasses, 93.9% about contact lenses and 85.7% about refractive eye surgery. Respondents were most critical about the cost of correction methods.
- About 70% of the respondents ever consulted an ophthalmologist, 43.1% an optician.

- Based on the survey data, the median cost of refractive eye surgery is € 2230, the yearly cost of day lenses is estimated at € 700 to € 950, but this is likely to be an overestimation. For comparison, data estimates from the Algemene Professionele Opticiens- en Optometristenbond van België – Association Professionnelle des Opticiens et Optométristes de Belgique (A.P.O.O.B.) show a yearly cost of € 440 for day lenses. With regard to glasses 2/3rd of the respondents reported to have spent a maximum of 500 euro on a pair.
- Concerning reimbursement of eye corrections, 35% of people wearing glasses received reimbursement, compared to 21% of contact lens wearers and 30% of the surgery group. Nearly half of the sample would be willing to pay more taxes or social security contribution for the reimbursement of eye surgery as part of compulsory health insurance, versus 38.7% for glasses and 31.9% for contact lenses. Four out of five respondents in favour of reimbursement agreed that everyone should be eligible for reimbursement of glasses.

3.11 Limitations in the interpretation of results

Telephone surveys compared with face-to-face interviewing are more time-efficient and the control of the interview is easier²². However some disadvantages should be taken into account. The quality of the estimates produced from telephone survey data depends on a number of factors, e.g. how the use of the telephone determines the answers given by the respondent (mode effect), coverage of the target population, the method of selecting persons from selected households and non-response. First, the mode effect has been shown to be limited: telephone surveys were found to have slightly lower item non-response, more socially desirable answers and less answers to open-ended questions²³. Second, in Belgium telephone coverage (both fixed and mobile lines) is estimated to be around 99%²⁴. Therefore bias due to non-coverage of households without a telephone will be limited.

However the following limitations may bias the results:

- **The probability of selection in the sample is unknown.** In probability samples each member of the population has a known chance to be selected into the sample which differs from zero. This is not the case for the quota sampling that is considered as a superior form of non-probability sampling. In statistical terms this implies that



the variance around estimates cannot be calculated²⁵. Responses to many questions were dichotomised and the statistical significance of differences between estimates was calculated for differences between proportions, but this assumes simple random sampling, which is not strictly statistically valid here.

- **The response rate for this telephone survey was 26 percent, which could be considered as a low percentage.** Yet the non-response bias is limited. First, respondents with refractive errors were not more inclined to participate since the survey was introduced as a general health survey. Second, an item non-response analysis showed that for the reported costs of contact lenses and refractive eye surgery, the median age was higher for non-respondents. No socio-economic class differences were identified. The respondents who did not report their diopter were also considerably older, and mostly from middle socio-economic status, while respondents were mostly from high socio-economic status.
- **The sample is representative on selected criteria such as age and gender, but it is unclear how the sample performs on other characteristics.** We compared our estimates to the prevalences measured in two other studies. The study of Kempen et al. (2004) is based on the 1999-2004 National and Nutrition Examination Survey (NHANES) among 14 213 participants aged 20 years or older. Refractive error data were obtained for 12010 or 84.5% of the participants. This research gives the results of a meta-analysis from six studies providing data from 29 281 persons in US, Western Europe and Australia in 2000 among a population of 40 years or older. For myopia estimates in our study were close to the prevalences measured by Vitale et al. (2008)² (38.4% and 33.1% respectively). The review of Kempen et al. (2004)⁴ had a lower prevalence of 26.6%. For hyperopia and astigmatism we note large differences with the prevalences measured by Vitale et al. study, but not with the Kempen study: for hyperopia the prevalence was estimated at 9% in this sample, 11% in the Kempen et al. study, but only 3.6% in the Vitale et al. study. For astigmatism only the Vitale et al. study gives an estimate, which is 36.2% versus 10.9% only in our sample. The reported refractive errors in our study give different estimates than the prevalences in the other studies that measured refractive errors (spherical equivalent value of 3D or more for hyperopia and -1D or less for myopia). This brings us to the fourth point of discussion.
- **Respondents were asked about their refractive errors, but their perception might be inaccurate.** Respondents knowledge about their eyesight problems seems to be limited. For example on the question about what was their diopter, the item non-response was high: almost half of the sample did not know their (approximate) diopter and there is no certainty about the answers of the respondents who stated they knew it. The reported diopter could date back to their last ophthalmologist consultation. This item non-response was most problematic for the older age groups and in the lower socio-economic status. Another example is that 265 respondents indicated that they suffered from both myopia and hyperopia, a combination of refractive errors which rarely occurs (anisometropia). A final example is that 9 respondents in the age group 20 to 25 years reported presbyopia. Possibly some respondents misunderstood the types of refractive errors in spite of the explanation given for each question buy the interviewer.
- **Respondents were asked about refractive surgery but the nature of the intervention might be inaccurate.** Seventy (n=70) respondents reported that they underwent refractive eye surgery but still the nature of their intervention is unknown. The fact that a number of respondents reported to have paid less than € 1000 strengthens this suspicion as cataract operations for example are cheaper for the patient given the reimbursement by the National Health Insurance.



4 PERCEPTIONS OF THE PATIENTS WITH REFRACTIVE ERROR: A QUALITATIVE APPROACH

4.1 Introduction and objectives

The aim of this part is to analyse the perception of patients who have a refractive error to gain insights into the determinants of eye care choice and more specifically into the role of cost in this decision making process.

The Ipsos team conducted a qualitative study with the following objectives:

- To identify the drivers and inhibitors to opt for specific refractive error corrections (including refractive eye surgery);
- To gain opinion on reimbursement of the different refractive error correction options;
- To deepen findings of the quantitative survey described above;
- To evaluate the satisfaction of the patients after refractive eye surgery.

The sections below present the results of the 3 first points: the last one will be published in the second report dedicated to refractive eye surgery.

4.2 Methodology

The researchers opted for a qualitative methodology to collect information on the experience of refractive surgery and to understand the patients' motivations, inhibitors and choice criteria. Qualitative methodologies enable to get access to the deep lying perceptions and motivations of the target group in order to understand the genuine needs and motivations of the patients.

4.2.1 Data collection

We opted for individual semi-structured face-to-face interviews as these allow to analyze in depth the respondent's perception and to avoid influence from other people's experience. Semi-structured interviews ensure a good compromise between attaining the research objectives and the respondents' natural story telling.

4.2.1.1 Sample

Whereas the telephone survey sample aimed to reflect the characteristics of the general population, the profile of the participants to the face-to-face interviews was oriented towards refractive eye surgery. We targeted to build a purposive sample in order to carry out 36 face-to-face individual interviews which people having considered, planned or underwent a refractive surgery.

Inclusion and exclusion criteria

Relevant criteria used to select participants were:

- age (≥ 20 years),
- suffering from myopia or hyperopia, whether or not in combination with other eye disorders such as astigmatism,
- having considered, planned or undergone refractive surgery less than 4 years ago.

Medical conditions such as cataract, glaucoma, presbyopia alone and eye injuries were excluded from this assessment.

Criteria to build purposive sample

- Status according to refractive surgery:
 - Respondents who had considered surgery, but had not been further in this project (not planned or undergone the surgery): in order to gain insight in the main barriers.
 - Respondents who had either planned or undergone surgery – where respondents who had planned surgery are those who decided to undergo the intervention after having collected information and/or have made the appointment for the surgery. They were included in order to gain insight in the main drivers towards surgery, the role of costs in the decision making process. and for those who have effectively undergone surgery, the patient satisfaction.

For respondents who have undergone refractive surgery, we recruited patients who had undergone surgery less than 4 years ago to ensure that the decision making process and the experience were recent in their mind.



- **Socio economic status:**
We used the ESOMAR social grades (A, B, C1, C2, D, E1, E2 & E3) for the recruitment. ESOMAR is an organization for encouraging, advancing and elevating market research worldwide. The ESOMAR social grades are commonly used for market research across countries and cultures: they are based on the final education level and on the occupation of the main income earner (see Appendix 2.1). For this research, we opted to include social grades A, B, C1, C2 and D to ensure that respondents were sufficiently fluent and able to provide a clear argumentation on their reasons behind eye care choice and perception of refractive surgery. These categories are briefly described here.

Table 22 – Description of social grades categories A, B, C1, C2 and D

A	'well educated top managers and professionals': well-educated top to middle level managers with responsibility for more extensive personnel, well-educated independent or self-employed professional people;
B	'middle managers': well educated non-manual employees, skilled workers and business owners, smaller middle level managers; well educated non-manual employees, supervisors/skilled manual workers and small business owners; less well educated managers;
C1	'well educated non-manual employees, skilled workers and business owners': smaller middle level managers; well educated non-manual employees, supervisors/skilled manual workers and small business owners; less well educate managers;
C2	'skilled workers and non-manual employees': better educated supervisors/skilled manual workers; moderately well educated non-manual employees and small business owners;
D	'skilled and unskilled manual workers and poorly educated people in non-manual/managerial positions': less well educated supervisors/skilled and unskilled manual workers and poorly educated non-manual workers; poorly educated top/middle managers or smaller business owners;

The ESOMAR social grades are constructed in a similar way compared to the socio-economic status applied in the quantitative telephone survey: a ratio of the occupation of the head of the family and his educational level. The population is ordered in function of this ratio and subsequently divided

into eight more or less equal groups (groups 1 – 8 for the telephone survey, later regrouped to 3: high, medium and low ; groups A, B, C1, C2, D, E1, E2, E3 for the qualitative interviews). ESOMAR uses a predetermined table to award people to a specific group, whereas for the telephone survey, respondents were given a certain grade per occupation & education level, which was then calculated into 8 groups. Considering the fact that similar criteria are used to assign respondents, we can assume that groups 1-4 from the telephone survey correspond to socio-economic groups A-C2 from the qualitative interviews.

Participants' characteristics

The researchers built a theoretical grid to recruit participants in order to guarantee a good spread of the opinions (see Appendix 2.2). Moreover, they did strive to include various diopters' problems in the sample to understand whether or not the diopter influences the eye care choice in general and the choice for refractive surgery in particular.

Recruitment and selection of participants

The respondents were recruited by telephone. A part of the respondents were recruited from the sample of telephone survey participants: respondents who mentioned surgery were asked if they agreed to participate in a qualitative interview. Other interviewees were recruited from a free database of Ipsos. A snowball recruiting method was also applied, starting from both lists.

The respondents were screened by means of a selection questionnaire in which all sample criteria were included, such as sex, age, visual acuity disorder and considering (screener available in Dutch and French upon request). The screener was used during the recruitment call to ensure that a potential respondent was eligible for the survey. The topic of the survey was presented as related to public health and visual acuity disorders.

4.2.1.2 Data collection tool

The interviews were moderated on basis of the semi-structured interview guide including all topics to be discussed. This interview guide was developed during an interactive process, in consultation with KCE.

The following topics were covered in the interview guide (interview guide is available upon request):



- Introduction of research, moderator and respondent;
- Exploration of the experience of having refractive error(s);
- Exploration of the choice process for refractive error solutions with a specific focus on:
 - Choice drivers, influences and inhibitors for refractive surgery for those who had considered it but not undergone;
 - Choice drivers, influences, doubts & expectations for refractive surgery for those who had planned it;
 - Choice drivers, influencers, experience and satisfaction of refractive surgery for those who had undergone refractive surgery;
- Exploration of the perception of reimbursement for glasses, lenses and refractive surgery.

Three pilot interviews were conducted to enable the research team to observe the first interviews and to fine tune the methodology, terminology and interview guide.

We included the following to fine tune the interview guide:

- Adjusted timings,
- Exploration of the conversation between patient & physician on refractive surgery,
- Experience before and during refractive surgery
- Pain experience during and after refractive surgery,
- For those who had not undergone or planned refractive surgery: what are the expectations related to the process (duration, type of anaesthesia) and choice criteria for hospital or private practice.

The revised interview guide was used for all interviews as a guideline, ensuring all research objectives were covered but leaving sufficient flexibility for the respondent to tell his/her story. Priority was given to the natural process of the conversation over the interview guide structure.

The interviews were conducted at respondent's best convenience – in home or on location. They were foreseen to last 1 hour each. Moderation was led by an experienced qualitative researcher in the native language.

All interviews were audio-recorded and written out at a later stage.

4.2.2 Data analysis

The data analysis was an interactive process. After all interviews were conducted, an internal debriefing was organized by Ipsos with all moderators involved and the account directors. In this debriefing, initial ideas were shared from the Flemish and French speaking interviews by the moderators and challenged by the account directors. Each moderator also challenged the other moderator to discover similarities or differences based on language. After this debriefing meeting, the project leader read the transcripts from all interviews and made general comments and comments per specific target group. The analysis is based on the information from the transcripts as well as the audio files since non verbal communication is also very important.

The project leader started building the flow of the report and the main overall findings. After the key findings have been elaborated, the project leader focused on detecting specific differences between target groups and highlighting this in the report. A second meeting was organized between moderators and account directors to go through the report and challenge the findings.

A random selection of transcripts was shared with the KCE team and a first debriefing meeting was organized between KCE and Ipsos to share the main findings and discuss the report structure and outline. Ipsos then further developed the report and sent for input and validation to KCE. The final report is the result of an interactive process between KCE and Ipsos.

4.3 Results

4.3.1 Description of achieved sample

The findings in this report are based on the analysis of 36 qualitative interviews with patients who have at least considered refractive surgery (or planned/underwent it).



Table 65 and table 66 in appendix show the final achieved sample of participants that finally counts:

- 9 patients aged 20-30 years, 16 patients aged 31-40 years and 12 patients older than 40 years;
- 22 women and 14 men;
- 16 persons who considered surgery (but decided not to do it after thorough information), 7 persons who planned an operation and 13 persons who had refractive surgery.

4.3.2 Diagnosis of refractive error

Myopia was usually discovered at a relatively young age, ranging from 6 – 12 years old.

The refractive error was detected:

- In case of difficulties at school or at home (e.g. ability to read the black board or watch TV, headaches);
- During routine medical check-ups – respondent was not aware that there was a problem.

An appointment was made with the ophthalmologist, together with the parents, to diagnose and decide on the correction method.

Hyperopia was generally detected at a later age, 30+ years old:

- When difficulties were experienced while driving (especially at night), watching TV, reading.
- When suffering from headache or eye fatigue.

The impact of the refractive error on daily life was considered **quite important**: relatively more for respondents with myopia (with or without astigmatism) than for respondents with hyperopia.

4.3.3 Experience of refractive error

Having a refractive error was linked to feelings of **lower self worth** – feel incompetent and handicapped, **embarrassment** – not able to recognize people and **danger** – crossing the street, driving a car, not being able to take care of your children properly,... . The severity of the refractive error seemed to reinforce these kind of emotions.

“Ik had problemen met het ver zien, tijdens het auto rijden kon ik niet meer zo goed ver zien. Voor mijn werk gingen we met de kinderopvang zwemmen en in het zwembad kon ik niet zien zowel met mijn bril op als af, dus dat was heel vervelend.” (female, 31 years old, myopia, -2,5, underwent refractive surgery)

Next to the refractive error itself, the treatment choice also seems to have an impact on daily life. Respondents mentioned a **limitation of freedom** – not being able to participate in favourite activities, feeling dependent of glasses/lenses, not feeling like yourself anymore.

“Ik heb er nooit echt een probleem mee gehad dat ik minder goed zag...maar ik haat brillen. Een ‘ziekenkasbrilleke’ zoals ze zeggen. Het zit niet goed, ik sta er niet goed mee en als je aan het koken bent, dampen die glazen aan...nee, dat was echt een ramp voor mij. Op het einde voelde ik me ook niet meer goed bij lenzen. Mijn ogen werden heel gevoelig van al die jaren lenzen te dragen. Ik had altijd prikkelbare ogen. Irriterend en storend, het voelde niet meer echt aan.” (female, 35 years old, myopia, -6, underwent refractive surgery)

For respondents whose refractive error deteriorated quickly in a short period of time, we noticed consequences on:

- An **economical** level – the need to change eye glasses or lenses on a regular level for often more expensive eye glasses and lenses.
- An **emotional** level - Feelings of frustration and helplessness. They feel more confronted with the fact that they have a problem than those respondents whose refractive error stabilized after a few years.

4.3.4 Steps from glasses to refractive surgery: perceptions related to glasses

The first proposed correction was glasses, prescribed by the ophthalmologist. Patients felt that they had no other choice than opting for eye glasses – a forced rather than a voluntary choice.

“Je ne sais pas si on faisait l’opération déjà il y a 20 ans... je crois que je n’ai même pas eu d’autres options que les lunettes.” (female, 32 years old, myopia + astigmatism, -2,25 & -2,75, underwent refractive surgery)

The age one has when the problem is diagnosed appears to affect one’s attitude towards eye glasses.



- **Diagnosis at a young age** (i.e. still in school) – wearing eye glasses can be rather traumatic (fear of name calling/teasing). As one gets older, one's confidence starts to grow. One gets more used to wearing eye glasses and one is also able to spend more money on a more fashionable frame.
 - **Diagnosis at an older age** – wearing eye glasses is seen as less traumatic.
- Table 24 shows the perceived drivers and inhibitors for wearing glasses, on a functional and emotional level.

Table 23 – Overview of the specific perceived drivers and inhibitors for wearing eye glasses on a functional and emotional level (interviewees who have considered, planned or underwent refractive surgery)

Drivers		Inhibitors	
Functional	Emotional	Functional	Emotional
Vision aspects		Limited field of vision <ul style="list-style-type: none">Not ideal – limited by the eye glasses	
Health aspects	Safety & health <ul style="list-style-type: none">No direct contact with the eyes – lower risk of irritationLeast intrusive		
Comfort aspects	Most common & well-know correction method <ul style="list-style-type: none">Standard and straightforward	Discomfort <ul style="list-style-type: none">Physical hindrance for sports/workFear of breaking/loosingWeight on nose	
Economical aspects	<ul style="list-style-type: none">Price – can be economical if<ul style="list-style-type: none">opting for basic framerefractive error has stabilized	Price – can be expensive if <ul style="list-style-type: none">the myopia/hyperopia is severe and still unstableneed for adjusted sun glassesRegular change of frame	
Aesthetical aspects/image	Experiment with my look <ul style="list-style-type: none">Trendy accessory – match my overall styleMakes me look different – possibility to present a different image (e.g. more mature & responsible)	Aesthetical issues <ul style="list-style-type: none">Changes the way I look (e.g. less attractive, older, more serious)Make-up is less visibleMakes my eyes look red & hollow	



Drivers		Inhibitors	
Functional	Emotional	Functional	Emotional
		Social consequences <ul style="list-style-type: none">• Changes the way people see me• Fear of being laughed at• Feeling insecure & different	
Convenience aspects	<ul style="list-style-type: none">• Easy to put on and off• Easy to clean	Inconvenience <ul style="list-style-type: none">• Planning is needed - always have to think about it/carry it along• Glasses get dirty• Glasses get steamed up	
Values & emotions	Part of my identity <ul style="list-style-type: none">• Glasses can become part of who I am – difficult to part with• People only recognize me with glasses.	Limitation of freedom <ul style="list-style-type: none">• Hinders me in being myself• Impact on job or sports performance• Barrier for solicitation/recruitment (e.g. pilot or police)• Not able to experience the world fully (e.g. not feeling the wind on your eyes) : Feel the need to be careful all the time – never let go fully	Explicit confrontation with problem <p>It reminds me & other people of the fact that I have a 'handicap'</p>



“Mijn grootste angst was dat ik gepest ging worden voor brilsмурf of brillie. Toen was er niemand in mijn klas met een bril, nu komt het veel vaker voor dan toen. Ik was echt één van de weinigen die zo vroeg een bril moest dragen. Het was echt wenen, wenen, na een tijd werd ik het gewoon, die bril hoort bij mij, je krijgt een leuk modelletje.” (female, 35 years old, myopia, -6,5, refractive surgery planned)

“Je me déteste avec des lunettes, je n’aime pas du tout mon look avec des lunettes.” (female, 34 years old, myopia + astigmatism, -2,25 & -2,50, underwent refractive surgery)

Key points

The sample of this study includes participants older than 20 years, suffering from eye refractive error myopia or hyperopia and having considered, planned or undergone surgery less than 2 years ago.

- Their reported inhibitors and drivers towards eye glasses are functional and/or emotional:
- Drivers are mainly functional: glasses are perceived as safe, easy to use and clean, economic if you opt for a basic frame and/or if your refractive error is stabilised. On a emotional plan, they allow to experiment different looks.
- Functional inhibitors relate to the limited field of vision, the discomfort, the price and the inconvenience due to the necessity of taking glasses with you everywhere, to the fact that glasses get dirty or steamed up.
- The emotional inhibitors concern aesthetical issues, a limitation of being yourself, a limitation of freedom, not being able to do everything people would like to do/the way I would like to do it.

4.3.5 Steps from glasses to refractive surgery: perceptions related to contact lenses

Some people try to wear lenses in replacement or in complement of eye glasses, other will not.

4.3.5.1 Reasons for not trying lenses

From the interviews, the following reasons emerged for not trying lenses:

- The perceived risk for infections & the trouble to put the lenses in & out
“Ik wou lenzen wel proberen, maar dan had ik gehoord dat het soms kan ontsteken en daar wou ik niet aan beginnen. Het moet nogal een gedoe zijn”. (female, 64 years old, myopia, -2,5 & -2,25, considered refractive surgery)
- Lenses were not suitable for one's profession
“Les lentilles, c’est un corps étranger et je ne peux pas en avoir au travail (ouvrier polyvalent en verrerie) à cause de la poussière. On est obligé de porter des lunettes faites à notre dioptrie avec des coquilles de protection sur le côté qui sont fournies par l’employeur.” (male, 37 years old, myopia, -2,50 & -2,75, considered refractive surgery)
- Eye glasses are seen as satisfactory solution or are not used long/often enough to cause any discomfort or dissatisfaction.

4.3.5.2 Reasons to switch from glasses to contact lenses

Respondents who (tried to) wear lenses gave reasons to switch from wearing eye glasses to lenses. These were related to:

- the conflict between the eye glasses and ‘my look’ (aesthetical issues) – feeling **uncomfortable with one's appearance**;
- the conflict between the eye glasses and ‘my lifestyle’ (physical discomfort & limitation of freedom) - eye glasses are hindering one's job or work performance;
- eye glasses are hindering the relationship/interaction with others (social).



4.3.5.3 Reasons for switching from eye glasses to lenses

It appears also that the switch from eye glasses to lenses seems to often coincide with 'life transitions':

- Puberty (around the age of 14-15 years old) – start to feel very insecure about looks, especially when dealing with the opposite sex.

"J'achetais des lentilles en cachette avec mon argent de poche parce que ma maman ne voulait pas que je mette des lentilles. L'ophtalmo et l'opticien ne voulaient pas, ils disaient que c'était beaucoup trop tôt, je n'avais que 12 ans. Et j'achetais des lentilles qui n'étaient pas adaptées à ma vue, enfin qui étaient plus ou moins adaptées mais je pouvais ne pas mettre mes lunettes donc c'était bien. Je partais de la maison avec les lunettes et je mettais mes lentilles après, parce que c'était moche des lunettes." (female, 29 years old, myopia + astigmatism, -8,25 & -7,75, considered);

- University entrance – starting a new chapter in life, meeting new people;
- First job experience – importance of confidence.

4.3.5.4 Lenses used as a supplement and not a full replacement to eye glasses

Amongst the respondents interviewed, lenses could constitute a supplement and not a full replacement to eye glasses – perceived as a 'double burden'.

Lenses were worn throughout the day or at specific moments during the day (e.g. at work, at school, when performing physical activities, when going out). Eye glasses were put on when arriving home. It was stated that the switch between lenses and eye glasses can cause headache because the eyes have to adjust.

"Van mijn 17 tot 30 jaar zal ik 90% bril doen en 10% lenzen. Lenzen draag ik om te zwemmen, naar sauna te gaan, te gaan dansen, uitgaan of sporten. Anders is het altijd een bril. Het feit dat lenzen moeilijk zijn om te dragen maakt dat ik het niet meer erg vind om een bril te dragen. Ik ben het ook gewoon om een bril te dragen. Ik draag hem al zoveel jaren. Ik draag liever maar 10% die lenzen voor die leuke dingen, dan helemaal niet. Ze hebben me verteld dat als ik alleen die lenzen zou dragen, dat ik een reactie kan krijgen en dat het dan voor altijd gedaan is. Dat zou ik spijtig vinden. Het gevoel dat je vastzit en dat het van 'moetens' is. Nu heb ik nog het gevoel dat ik de keuze heb om af te wisselen." (female, 29 years old, hyperopia, 9,5 & 10,5, refractive surgery planned)

4.3.5.5 Perceived drivers and inhibitors for wearing lenses

Table 25 shows the perceived drivers and inhibitors for wearing lenses, on a functional and emotional level.



Table 24 – Overview of specific perceived drivers and inhibitors for wearing lenses on a functional and emotional level (interviewees who have considered, planned or underwent refractive surgery)

Drivers		Inhibitors	
Functional	Emotional	Functional	Emotional
Vision aspects	Vision experience <ul style="list-style-type: none">• Close to ideal• No longer hindered by the eye glasses		
Health aspects		<ul style="list-style-type: none">• Can cause eye fatigue	Intrusive and potentially harmful to the eye (direct contact) – fear of damaging the eye <ul style="list-style-type: none">• Risk of eye infection/irritation• Risk of becoming allergic/oversensitive to lenses (e.g. after pregnancy)
Comfort aspects	<ul style="list-style-type: none">• Able to wear sun glasses• Allows an active lifestyle (sport/work)• No heavy feeling on the nose	<ul style="list-style-type: none">• Risk of loosing• Can cause dry or watery eyes• Inserting the lenses into the eye	
Economical aspect		Need to buy lenses and lens care products	
Aesthetical aspect / image	Less confronting/apparent <ul style="list-style-type: none">• Others will not obviously notice that you have a problem• I feel less confronted with my problem during the day Social consequences <ul style="list-style-type: none">• No risk of being laughed at• Feel more secure and confident		



		Drivers		Inhibitors	
		Functional	Emotional	Functional	Emotional
		Aesthetical <ul style="list-style-type: none"> Does not affect my looks 			
Convenience aspects		<ul style="list-style-type: none"> Easier to wear make-up 		<ul style="list-style-type: none"> Need to buy and store additional lenses and lens care products Need to carry lens care products with you – conscious planning Time consuming (cleaning, taking them in & out) In case of 'emergencies' at night – takes time to put them in Limited on wearing time per day – need to take them out Cannot sleep with lenses 	
Values and emotions		Higher sense of freedom <ul style="list-style-type: none"> Less impact on sports/work performance Experience the world more fully – no perceived barrier between me and the outside world <p>Feel like myself again – my natural/normal looks</p>		Fear – confronted with the fragility of the eye <ul style="list-style-type: none"> Scary Foreign object in the eye Afraid to put fingers in the eye 	



Key points

The target population perceived lenses as being comfortable, providing a very good vision experience, allowing to wear sun glasses and to do sport.

Drivers on an emotional plan are described as follows: lenses seem to answer at least partially to the glasses' barrier 'limitation of being yourself'. Wearing lenses allowed the respondents to feel more like themselves, as before the diagnosis of refractive error problems. Lenses also facilitate make up.

Functional inhibitors to use lenses are eye fatigue, the additional lenses and products (to buy, to store, to take everywhere), the manipulation (cleaning, placing and taking out) and the costs.

On an emotional plan, lenses are perceived as intrusive and potentially harmful to the eye. They cause fear because you need to put your finger in the eye to place a foreign object.

4.3.6 Steps from glasses to refractive surgery: perceptions related to the intervention

4.3.6.1 General perception of refractive surgery

The following perceptions emerged from the interviews:

- Refractive eye surgery is expensive:
Interviewees reported different perceptions about the cost of refractive eye surgery:
 - Respondents who had considered refractive surgery estimated the cost at € 2000-€ 3000 for both eyes. Some even estimated the cost up to € 6000.
 - Respondents who had planned or underwent refractive surgery also mentioned a cost of € 2000-€ 3000 for both eyes.

This price included preliminary examinations, surgery, medication, aftercare and check-up appointment(s).

Refractive eye surgery is experienced as rather expensive. Respondents felt that € 2000 or € 3000 is a lot of money to spend on a surgery that lasts only 5 to 15 minutes. Respondents expected that the main cost would stem from the technology and equipment used. The expectation is that the

cost will go down in the future as the surgery becomes more and more integrated.

- Refractive eye surgery is a luxury surgery because:
 - It is seen as expensive, dedicated for people who have the money for it.
 - The surgery does not yet seem fully established in the society (compared with eye glasses/lenses) as a solution for refractive error. It is to a certain extent linked to people who highly value aesthetics (i.e. snobbish, vain).
 - There exist other valid alternatives, which appear to be less costly at first glance and less invasive (eye glasses/lenses).

It is important to note that respondents who have undergone surgery as a 'last resort' or respondents with a severe diopter do not personally think that refractive surgery is luxury. They experience the surgery as 'life saving'. For them, the surgery can not be compared with other aesthetic or 'comfort' surgeries (e.g. nose surgery, protruding ears).

"Het is echt niet te vergelijken met schoonheidsoperaties, dit doet niemand zomaar. Je levenskwaliteit wordt erdoor verbeterd, het is niet levensbedreigend maar het kan een verbetering betekenen aan je dagdagelijkse ervaring. Met lenzen kon je niet gaan zwemmen, voor mensen die een actief leven hebben kunnen dan terug alles doen, het is geen medisch noodzakelijke ingreep maar toch." (female, 51 years old, hyperopia, 0,75, underwent refractive surgery)

"Ze zien de operatie als een cosmetische ingreep, maar voor mij niet, het heeft niets aan mijn uiterlijk veranderd, ik zou risico's oplopen door het niet te doen." (male, 23 years old, myopia, - 3,5, underwent refractive surgery)

"Quand vous êtes vraiment myope déjà avec -5-6 vous êtes handicapé, vous savez rien faire sans vos lunettes, vous êtes réellement perdu, vous ne savez pas regarder la tv, vous savez rien faire." (male, 54 years old, myopia, -5 & -6, underwent refractive surgery)

Respondents who have not yet undergone surgery or who underwent refractive surgery for comfort reasons, can to a certain extent relate to the



idea of refractive surgery as luxury. They acknowledge that there are/they had other, less invasive solutions.

- **Refractive eye surgery is surgery for a non life threatening condition.** The intervention is not compulsory, but it involves risks. Interviewees therefore ask:
 - Am I willing to take these risks for something that is not life threatening and for which I have other solutions?
 - Am I willing to pay the price for something that is not life threatening? Is the surgery really worth it?

“Een operatie doen terwijl je eigenlijk goed functioneert, dat is toch moeilijk, dat is een andere beslissing dan wanneer je ziek bent en er moet iets uit je lichaam gesneden worden. Dit is een soort luxeprobleem.” (female, 43 years old, myopia, -3,25, considered refractive surgery)

“Als er iets misloopt...het is een operatie die je niet echt nodig had, dan zoek je de risico's eigenlijk voor niets op.” (female, 23 years old, myopia, -6,5, considered refractive surgery)

“Il y a toujours un risque. Mon ophtalmo ne poussait pas à faire l'opération. C'était un luxe quand même sauf pour ceux qui avaient vraiment des gros problèmes. Pour moi, sincèrement, même si on me l'avait proposé gratuitement, je ne l'aurais pas fait. C'est quand même une opération uniquement pour le plaisir de ne plus mettre des lunettes, pas parce que c'est nécessaire.” (male, 66 y.o, myopia, -2,25 & -0,75, considered refractive surgery)

- **Refractive eye surgery, using laser technology, is considered to still be fairly new. In consequence,**
 - The surgery is to some extent for people who are willing to take risks.
 - There is still an important need for reassurance and confirmation on the safety and performance of the technology – from both 'experts by experience' and ophthalmologists.

- **Other beliefs:**

- When you receive refractive eye surgery, you will probably have to wear eye glasses for presbyopia sooner.
- If you have worn soft lenses for too long, you can no longer undergo refractive eye surgery.
- After a certain age, you no longer qualify for refractive eye surgery.
- Once you have undergone refractive eye surgery, you can not have additional refractive surgery.
- If you are too near sighted, refractive eye surgery can not fully correct the refractive error.

Table 26 shows the perceived drivers and inhibitors for choosing refractive surgery, on a functional and emotional level:



Table 25 – Overview of specific perceived drivers and inhibitors for choosing refractive surgery, on a functional and emotional level (interviewees who have considered, planned or underwent refractive surgery)

Drivers		Inhibitors	
Functional	Emotional	Functional	Emotional
Vision aspects	Ideal vision experience <ul style="list-style-type: none"> Nothing hindering my view Experiencing the world as it is 		
Health aspects	Experienced as the 'last resort' <ul style="list-style-type: none"> Lenses are no longer a possible solution due to health concerns 	Surgery is not an option (yet) <ul style="list-style-type: none"> Refractive error has not yet stabilized Too old for surgery Refractive error is too severe 	Fear and anxiety <ul style="list-style-type: none"> Risk of becoming blind Risk of infections Fear of surgery, needles in general Not fully anaesthetized – 'conscious' during the surgery Confrontation with the fragility of the eye Low pain threshold Perception of refractive surgery as surgery for a 'non life-threatening' condition <ul style="list-style-type: none"> Is it worth the risks and cost?
Comfort aspects	<ul style="list-style-type: none"> Discomfort barrier towards eye glasses feels insurmountable 		
Economical aspects	Seen as a long term investment <ul style="list-style-type: none"> No longer need to buy eye glasses every few years or lenses and lens care products every few months 	Cost – perceived to be expensive. A non-recurring, yet large expense <ul style="list-style-type: none"> Need to feel 'it is worth it' Needs to fit in with other priorities (e.g. holidays, renovations) – needs to fit in the reality of the family 	Perception of refractive surgery as luxury surgery <ul style="list-style-type: none"> Feeling guilty/selfish to spend considerable amount of money on oneself
Aesthetical aspects/image	<ul style="list-style-type: none"> Aesthetical barrier towards eye glasses feels insurmountable 	Regain my identity <ul style="list-style-type: none"> Feel like myself again Feel normal, just like everybody else 	



		Drivers		Inhibitors	
		<i>Functional</i>	<i>Emotional</i>	<i>Functional</i>	<i>Emotional</i>
Convenience aspects		<ul style="list-style-type: none"> No longer hindered in activities or work/sports performance Time saving No longer need to plan in advance or carry glasses/lenses everywhere 		'Hassle' – complicated and time-consuming process <ul style="list-style-type: none"> Gather information on the surgery Make appointment(s) Take time off work for surgery and period of recovery 	
Professional aspects		Professional reason <ul style="list-style-type: none"> Necessary to apply for police job 			
Values & emotions		Peace of mind <ul style="list-style-type: none"> Feeling reassured No risk of losing or breaking eye glasses/lenses Feel reborn <ul style="list-style-type: none"> Feel as if I never had a problem Freedom & carefreeness <ul style="list-style-type: none"> Vision no longer interferes with life Able to experience the world & life to the fullest Being able to do what I like, how & when I like 		No guarantee – lack of knowledge/information. Insecurity <ul style="list-style-type: none"> Physician cannot guarantee complete correction – still need to wear glasses afterwards Long term effects of the surgery are not known/proven yet – technology is still in its infancy, still developing Lack of clarity on the period of being 'glasses-free' after the surgery 	



Key points

In this sample that considered, planned or undergone surgery less than 4 years ago:

- **Functional drivers towards surgery are related to the quality of the vision achieved, to the fact that sometimes it is a last resort when lenses are no option anymore, it is comfortable, aesthetical, practical (sport, time saving, etc.). Refractive eye surgery allows to access to some professions. On an economical point of view, surgery is perceived as a long term investment.**
- **Emotional drivers concern a regain of identity, even a reborn, peace of mind and freedom and carefreeness.**
- **The functional inhibitors to undergo refractive eye surgery are related to the gravity or the stabilization of the refractive error; the price of the surgery, the complex and time consuming process and the absence of guarantee that the correction will be complete with long-term effect.**
- **On an emotional point of view, people fear the consequences and feel anxious towards surgery. The perception that refractive surgery is a luxury surgery can provoke feelings of guilty or selfishness.**

4.3.6.2 Considering refractive surgery

When?

Respondents have considered refractive surgery at the following moments:

- When needing to switch back from lenses to eye glasses because of health issues/issues with lenses, including when the lenses or eye glasses are giving an uncomfortable feeling (e.g. dry eyes, watery eyes, tired eyes).
- When switching from eye glasses to lenses because of aesthetic or comfort/convenience reasons.
- When lenses or eye glasses hindered sport activities, job solicitation or interaction with others (e.g. not being able to play with the kids, not being able to respond to emergencies during the night quickly enough)

- When hearing positive feedback on the refractive eye surgery from 'experts by experience' (i.e. people who have undergone the surgery - e.g. friends, family, colleagues).

Respondents who had considered refractive eye surgery had either:

- Thought about it at a certain point in time (mostly through recommendations by others), but had not undertaken additional steps.
- Thought about it and consulted experts by experience, Internet or the ophthalmologist.

How?

The main instigators for considering refractive eye surgery were:

- Personal communication with 'experts by experience': sharing their experiences or actually recommending the surgery to respondents
- Ophthalmologist recommending the refractive eye surgery during a medical check-up mostly after the respondent expressed his or her concerns or issues with the current solution (lenses or eye glasses).
- Hearing or reading about the refractive surgery in the media (e.g. TV program, article)

Refractive eye surgery appeared not to be fully established in respondents' mindset. They started considering surgery mostly when triggered by personal communication or the ophthalmologist's recommendation. It was usually not something they thought of spontaneously.

Sources of information

Respondents have undertaken different steps and consulted different parties in their search for information:

1. **'Experts by experience'**. They are considered to be the most reliable and credible to provide information on:
 - The overall experience of the surgery: did they experience pain during and after the surgery, the side-effects?
 - The satisfaction after the surgery: was the surgery worth the risks, the cost and the pain?
 - The vision experience after the surgery: how well could they see after surgery?



The input from the experts by experience can influence the decision to undergo or not RES. Positive experiences could help to reassure and convince the respondent on the relevance of the surgery while negative experiences could lead to postponement or even rejection of refractive eye surgery.

“L’expérience de ma femme est la raison pourquoi je ne me suis pas encore fait opérer. L’opération s’est très bien passée comme il fallait... mais les trois premiers jours elle a vraiment hurlé de mal... Au bout d’une semaine, elle n’avait plus mal donc elle se promenait, mais elle ne voyait pas mieux qu’avant sans ses lunettes. Elle prenait un repère au fond du jardin, elle disait « je ne vois nettement pas ». Elle ne me voyait même plus... Elle a prolongé un peu son certificat médical de deux jours à une semaine, puis finalement elle a quand même pris deux semaines au total de certificat parce qu’elle était incapable de prendre la voiture pour y aller... Pendant un mois, elle a pensé « l’opération a raté, je ne verrais plus jamais, tous les autres après 4, 5 jours ils voient bien, je ne saurais pas prendre la voiture » (...) Ça a duré bien 3 mois avant qu’elle se dise qu’elle avait retrouvé la vue... et voilà pourquoi. L’opération, c’est une question de confort et je me suis posé la question « est-ce que mon confort vaut le coup de prendre ce risque ? » Au niveau professionnel, être incapable de travailler pendant 3 mois ?” (male, 34 years old, myopia + astigmatism, -1,5, considered refractive surgery)

2. **Internet** (e.g. Google, specialized websites, health forums) – before meeting with ophthalmologist: Internet is consulted to feel prepared and more specifically to learn about:
 - The different surgery techniques,
 - The risks of the surgery,
 - Experiences of other persons.

From the interviews, we noticed that the search process on the Internet can cause or worsen the feeling of fear towards the refractive surgery. Respondents mentioned being confronted with ‘scary’ images (e.g. image of dilated eyes, laser on the eye).

3. The **ophthalmologist – can be the surgeon** (focus on questions related to surgery) **or the physician** (ask advice mostly during a routine check-up, not a specific appointment to discuss refractive

surgery) is considered an important source of information related to the following topics:

- Whether respondents would qualify for refractive surgery,
- Which techniques of surgery exist and would be recommendable,
- The cost of the surgery,
- The risks of the surgery,
- The procedure of the surgery (before, during and after the surgery),
- The long term effect of the surgery (potential side-effects, guarantee of lifelong glasses-free),
- The success rate of the surgery.

Next to a source of information, the ophthalmologist is seen to influence the decision in different ways:

- He/she can reassure on the risks or success rate of the surgery;
- He/she can discourage respondents to undergo the refractive surgery:
 - Advice against the surgery (e.g. too old, cornea is too much damaged, technology is not perfected yet),
 - Show limited commitment or willingness to provide information – respondents do not feel comforted or reassured,
 - Not enough time during the appointment to ask all questions,
 - Difficult to arrange an appointment.

“Ik had de oogarts gevraagd om te opereren, maar volgens hem was het nog te vroeg. Ik vind dat ik ook te weinig uitleg krijg van hem. Omdat hij vaak operaties deed dacht ik van het zal wel niet nodig zijn. Ik heb toch liever iemand die meer uitleg geeft want dat doet hij niet.” (female, 64 years old, myopia, -2,5 & -2,25, considered refractive surgery)

“C’est resté assez vague, c’était un rendez-vous où on n’a pas vraiment pris le temps d’approfondir la chose.” (male, 35 years old, hyperopia, considered refractive surgery)

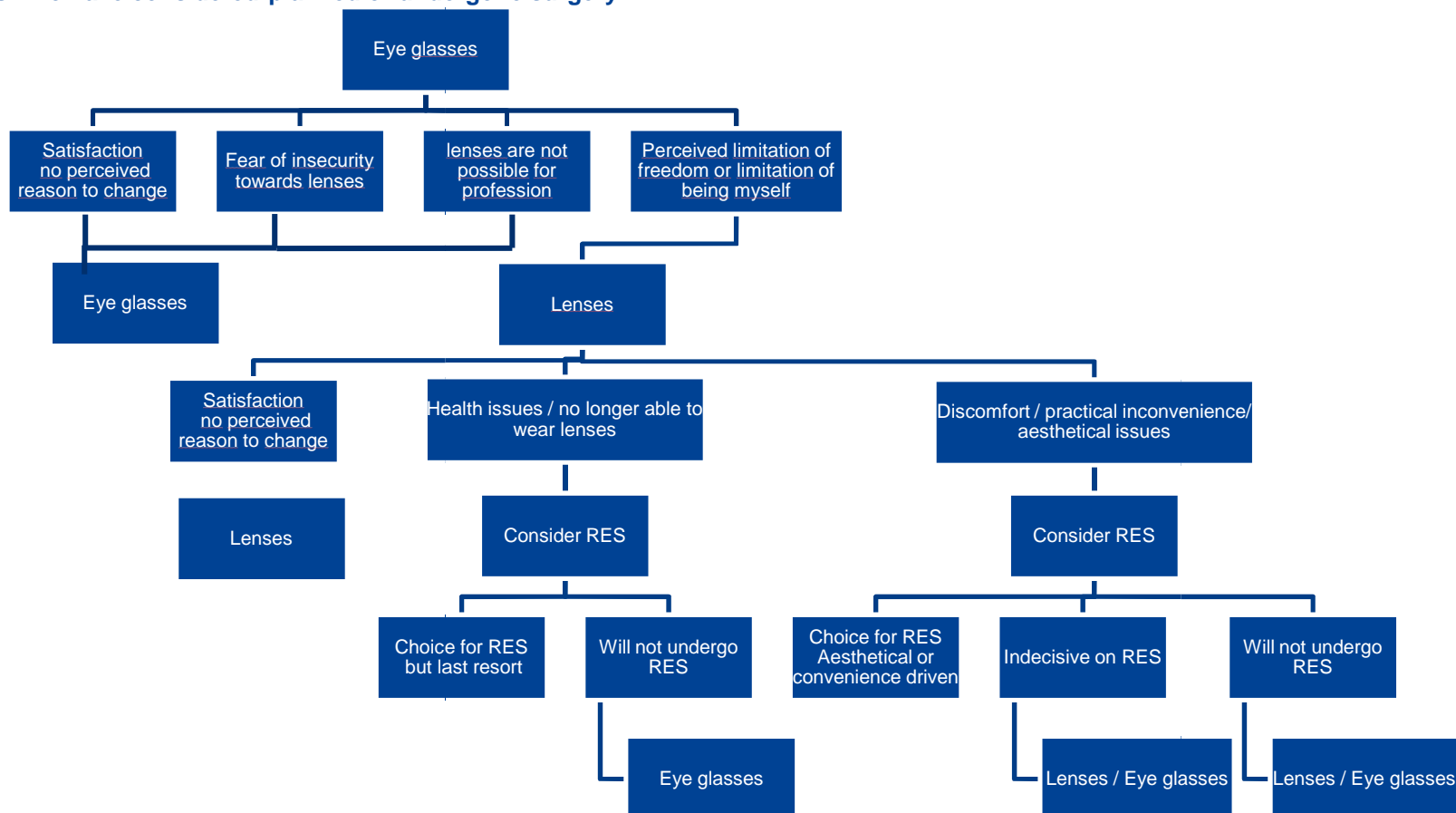


4.3.6.3 Final decision and motivation for refractive surgery

Figure 11 gives an overview of the different consecutive steps in the search for the optimal refractive error treatment or management. It only reflects the interviewees' attitudes and responses, i.e. respondents who

have considered-planned or undergone surgery, Other pathways possibly exist (e.g. from glasses to surgery) and this scheme cannot be generalized to the population.

Figure 13 – Overview of the identified consecutive steps in the search for the optimal refractive error treatment or management among a sample of patients who have considered-planned or undergone surgery





The tables below display the perception and motivation of patients who have undergone refractive eye surgery (Table 26), who are indecisive (Table 27) and who decided not to opt for surgery (Table 28).

Table 26 – Overview of perceptions and motivations towards refractive surgery among patients who have undergone the intervention

Reason behind attitude	Patient typology
OWN, VOLUNTARY CHOICE	<p>Aesthetical and/or convenience driven.</p> <p>They consider refractive eye surgery to be a luxury or comfort solution. They are aware of the fact that they had other alternatives (eye glasses or lenses), but they preferred to go for refractive eye surgery because they did not like the way they looked with eye glasses and/or because the lenses or eye glasses were causing them some discomfort or inconvenience.</p> <p><i>“L’opération c’est de la chirurgie esthétique. Ça paraît quand-même un peu du luxe. Moi j’ai choisi de le faire parce que voilà je suis sportive. Y a peut-être 90% des gens qui ne le font pas parce qu’ils ont peur, parce que c’est cher ou... parce qu’ils ont des lunettes et qu’ils aiment bien les lunettes....” (female, 34 years old, myopia + astigmatism, -2,25 & -2,50, underwent refractive surgery)</i></p>
BEYOND MY CONTROL	<p>Last resort.</p> <p>They experience refractive eye surgery as almost ‘forced’. They feel that they had no other option than surgery. For them, it is not a luxury or comfort solution, but it is considered the only solution left to deal with their refractive error.</p> <ul style="list-style-type: none"> They could no longer wear lenses due to health issues (e.g. allergy or over sensitivity) and they had more or less traumatic experiences with eye glasses. They did not want to go back to wearing eye glasses. <p>The surgery was needed to be able to apply for their dream job (e.g. police).</p> <p><i>“Mijn ogen werden hoe langer hoe gevoeliger dus er moest echt wel iets gebeuren bij mij. Of ik moest overschakelen op een bril, en dat wou ik niet.” (female, 35 years old, myopia, -6, underwent refractive surgery)</i></p>

Table 27 – Overview perception and motivation towards refractive surgery among patients who are indecisive

Reason behind attitude	Patient typology
PRACTICAL REASONS	<p>The surgery does not fit in their lives at the moment.</p> <ul style="list-style-type: none"> Not possible or willing to invest time to go to appointments and undergo the surgery.
COST	<p>Other priorities such as holiday, renovation, children/family in terms of budget (influenced by life stage and SEC)</p> <p>They wait because:</p> <ul style="list-style-type: none"> They expect the refractive surgery to become less expensive <p><i>“Ik ben opgegroeid in een gezin waar elk jaar op reis werd gegaan. Als ik een jaar niet op reis ben geweest, vrees ik dat ik de rest van het jaar niet meer genoeg energie zal hebben. Ik wil die reis eigenlijk niet opgeven voor de operatie. Een reis is ook fijn voor iedereen. Terwijl ik de enige ben die plezier beleeft aan die operatie. Stel dat ik een win for life win, dan zou ik het direct doen...dan moet je ook geen vakantie</i></p>



Reason behind attitude	Patient typology	
	<p>in the future.</p> <ul style="list-style-type: none"> Want/need to put money aside for the surgery 	<p>nemen voor de operatie, je hebt dan volop tijd om voor jezelf te zorgen.” (female, 43 years old, myopia, -3,25, considered refractive surgery)</p> <p>“Ik spaar voor de operatie. Eigenlijk moet dat niet, maar toch wilde ik het niet van mijn spaarboekje moeten pakken, ik wil het niet voelen. Ik heb er een andere rekening voor, waar ik spaar voor vakantie. Die oogoperatie valt voor mij ook onder die rekening, dat is echt bevrijding gewoon zo’n operatie. Het heeft wel een grote impact, 3000 euro op gezinsbudget. Die aparte rekening is voor verwennerijtjes en zo’n operatie is eigenlijk wel een luxe voor mij want ik kan nog wel verder met bril, maar ik ben die bril gewoon beu.” (female, 35 years old, myopia + astigmatism, -6,5, refractive surgery planned)</p>
NEED FOR GUARANTEE	<p>They need more reassurance and clarity on the long term effects of the surgery and the risks involved.</p> <p>They expect the surgery techniques to improve and physicians to become more experienced.</p>	<p>“J’imagine toujours encore un jour de faire l’opération, mais j’attends d’être plus rassuré, et si par rapport à la gêne des lunettes et la vue qui se dégrade encore... maintenant ce n’est pas une gêne que je ressens toute la journée.” (male, 35 years old, hyperopia, considered refractive surgery)</p>
HEALTH ASPECTS	<p>The current solution (eye glasses or lenses) is not experienced as too hindering or inconvenient. (link with increase in severity of refractive error and potential future health issues) or the refractive error is not yet stabilized.</p>	<p>“J’y pense puis j’y pense plus, ce n’est pas forcément l’aspect financier, ce n’est pas la peur de le faire non plus, mais ce n’est pas primordial.” (male, 27 years old, myopia, -1,50, considered refractive surgery)</p>

Table 28 – Overview perception and motivation towards refractive surgery among patients who will not undergo the intervention

Reason behind attitude	Patient typology	
RISK AVERSION	<p>The personal inhibitors for refractive eye surgery are experienced as insurmountable. This relates specifically to feelings of fear and the perceived risks of surgery. It is not about cost.</p>	<p>“Ze gaan me nooit volledig kunnen geruststellen. Enkel als er een garantie is dat ik in mijn geval van 9.5 naar 0 ga, en dat het risicovrij is, maar ik denk niet dat dat mogelijk is.” (male, 39 years old, myopia + astigmatism, -10, considered refractive surgery)</p>
BEYOND MY CONTROL	<p>RES is no longer considered an option, because:</p> <ul style="list-style-type: none"> The ophthalmologist advised against it. They are not in the target group for refractive eye surgery. <p>They would still need to wear eye glasses after the surgery – their problem would not be entirely solved.</p>	<p>“Mon ophtalmo m’a dit que je suis tellement myope que ce n’est pas sûr qu’on sache tout ravoïr, peut-être que plus tard ce sera possible. Je ne vais pas subir cette opération si c’est pour continuer à avoir les mêmes problèmes qu’avant.” (female, 29 years old, myopia + astigmatism, -8,25 & -7,75, considered refractive surgery)</p>



Key points

Three types of respondents are included in this sample: patients who have considered refractive eye surgery but finally not opted for it, patients who are undecided and patients who did it. This last group underwent refractive eye surgery either because they clearly chose it or because they had no other solution apart from continuing to wear glasses.

The indecisive patients are still waiting for practical reasons: the cost of surgery, the need for more guarantee and/or their relative satisfaction with their current eye correction.

Some patients will not opt for refractive surgery: either they are not eligible or they will not plenty benefit from this intervention.

The decision to opt for refractive eye surgery is often a lengthy process – ranging from a few months to several years. This process is influenced by the following factors:

- **Necessary adjustment time:** It seems that respondents need some time to feel comfortable with the idea of surgery and the risks involved. They gather information and weigh up the pros and cons of surgery.
- **Budget-wise:** some respondents want to put money aside for the surgery, especially those who are more aesthetic or convenience driven. They approach surgery as a luxury solution.

Several factors influence the decision for surgery.

The necessity: From the interviews, it becomes clear that a certain 'tipping point' needs to be reached before refractive eye surgery is decided upon. This 'necessity' is nevertheless subjective. It can range from feelings of discomfort and inconvenience (i.e. frustration) to health/medical issues with current solutions (i.e. obligation). Otherwise the surgery is experienced too much as 'luxury' and it is considered either not worth the risks or the cost. It is not considered a priority.

"De doorslag voor de operatie was dat ik er echt last van had. Ik wou mij beter voelen, ik was vermoeid en altijd die bril meesleuren. Ik had ook veel problemen met auto rijden in het donker. Ik wou er gewoon helemaal vanaf zijn, ik heb vrij snel contact genomen met een arts en

een datum vastgelegd." (female, 51 years old, hyperopia, 0,75, underwent refractive surgery)

"De operatie is meer voor mensen die lenzen en brillen echt beu zijn, ik ben daar nog niet volledig. Je moet echt dat gevoel hebben om gemotiveerd te zijn voor de operatie. Als ik ouder ben, is het niet zo erg als de operatie mislukt en ik toch een bril moet dragen." (male, 23 years old, myopia, -7,5, considered refractive surgery)

- **The life stage** also appeared to influence the decision for RES. The family budget needs to allow spending money on RES. When respondents were renovating or had other important expenses planned, refractive eye surgery was not considered a first priority.
- **The cost of the refractive surgery** plays a role in the decision making process, in particular due to the fact that refractive surgery is seen as a luxury solution for a non life threatening condition. This can lead to the fact that people feel selfish/guilty for spending a considerable amount of money for themselves. The cost is always taken into account when deciding whether or not to opt for the refractive surgery but costs were not mentioned as a barrier by people who did not opt for it:
 - Relatively more by respondents who opted for the refractive surgery as a 'luxury solution' and respondents with a 'wait and see' attitude.
 - Respondents who considered the refractive surgery as a 'last resort solution' claimed that the cost of the surgery would not hold them back. They would save for it if necessary or ask their parents to contribute.

Intermediate costs versus long term expenses

Despite the fact that the surgery is experienced as expensive, the cost was almost never a reason not to opt for the surgery.

Most respondents weigh off the cost of the refractive surgery against a lifelong spending on eye glasses, lenses and lens care products.

The outcome of this calculation is that the refractive surgery would be 'paid for' after 4 to 6 years. The younger the respondent, the more this calculation was seen as a valid and convincing argument, since they will be relatively longer 'glasses free' compared to older respondents.



The main difference between refractive surgery and other solutions would be the fact that payment is spread over time versus immediate.

In some cases, the immediate payment is considered financially too difficult considering one's current economical situation or family reality.

The cost of the surgery then becomes a reason to postpone the surgery rather than a no go.

"Ik wou de operatie ook gewoon heel graag dus ik zag het als een investering in mezelf. De kost heeft me niet afgeschrikt maar het heeft wel lang geduurd om de stap te nemen. Stel dat het terugbetaald zou worden, dan had ik die stap al veel langer gezet. Dat denk ik wel, want dan had ik er ook niet voor moeten sparen. Dan had ik meteen bij de eerste afspraak de beslissing genomen. Het duurt wel even voor je dat bedrag bijeen hebt gespaard." (female, 27 years old, myopia, -4,5, underwent refractive surgery)

"L'opération facilite franchement la vie, plus de lunettes, de lentilles. C'est plus agréable. Le coût peut être un frein mais au fond c'est vite rentabiliser parce que les lunettes et les lentilles, ça coûte aussi de toute façon." (female, 32 years old, myopia + astigmatism, -2,25 & -2,75, underwent refractive surgery)

"Ik heb wel even moeten sparen voor de operatie. Daarom heb ik ook geen geld uitgegeven aan een goede bril, om meer te kunnen sparen voor die operatie. Ik had wel zoiets van 'dat kost veel geld', maar ik wist dat het het waard was, omdat ik nooit meer lenzen of een bril zou moeten kopen." (female, 35 years old, myopia, -6, underwent refractive surgery)

"Als het om de kostprijs gaat van mijn gezondheid, dan maakt de prijs niet uit." (male, 45 years old, myopia, -4,5, considered refractive surgery)

Key points

In this sample, the cost of refractive surgery seems to have relatively more influence on the moment of the surgery rather than on the choice for surgery.

This finding is not valid for the respondents who consider refractive surgery as a "no go": in this case, fear and insecurity seem to drive this decision more than the cost of surgery.

4.3.7 Opinions on reimbursement of the different possibilities of correction

In what follows we will discuss respondents' perception of reimbursement for the different refractive error solutions (glasses, lenses and refractive surgery).

4.3.7.1 Perception of reimbursement for eye glasses

Most respondents feel that eye glasses should be accessible to all and therefore there should be some kind of reimbursement system.

Not all respondents knew whether eye glasses were reimbursed by the sickness funds. There also seemed to be unclarity on the exact amount of reimbursement, even for respondents wearing eye glasses. Respondents mentioned reimbursement between € 50 and € 75 per year on average, except for severe diopter. This is seen by most as a rather insignificant sum, but nice to have.

Respondents felt that the current reimbursement system for eye glasses is relatively fair. Reimbursement should be targeted at those with more severe dioptre since the glasses are more expensive. It is seen as a gradual reimbursement related to the deterioration of the refractive error. Reimbursement should not be meant to pay for 'luxury' issues such as elegant or trendy frames. It should be linked to health, not to aesthetics or fashion.

4.3.7.2 Perception of reimbursement for lenses

Lenses are considered a more convenient and aesthetically interesting option than eye glasses. It is also a rather established and common solution for refractive error. In terms of reimbursement, respondents tended to follow the same reasoning as for eye glasses. There should a reimbursement system, but the level of reimbursement should be related to the severity of the refractive error.

Overall, the idea of reimbursement is seen as a support for and recognition of one's problem.

"Je kan het een handicap noemen, want ik heb een vrij hoge afwijking. Er zijn middelen. Als je deftige glazen koopt die het beste van het beste zijn...Glazen die redelijk dun zijn en die het licht niet weerkaatsen. Daar hangt een prijskaartje aan. Dat is 300 euro per glas. Maar gelukkig is het



een handicap en wordt er een heel deel van terugbetaald. Om de twee of drie jaar mag je van het ziekenfonds een nieuwe bril kopen en dan wordt er meer voor terugbetaald. In plaats van 70 euro per jaar krijg ik gelukkig iets meer...Het is toch een hoge kostprijs. Ik moet het ook kopen want anders zie ik niet.” (female, 29 years old, hyperopia, 9,5 & 10,5, refractive surgery planned)

“Als je moet gaan kijken naar het gebruiksgemak en kostprijs, dan misschien toch lenzen (terugbetalen). Dat is niet modegebonden. De tussenkomst blijft hetzelfde, is dat na een halfjaar, geen probleem. Iemand die om de twee jaar een nieuwe bril wil vanwege de mode... als ik van de drie moest kiezen, dan toch de lenzen. Dat is het meest relevant.” (male, 41 years old, myopia + hyperopia, -7,25 & 4,5, considered refractive surgery)

“Een bril heeft de kleinste instap en is het gemakkelijkste. Lenzen zijn al esthetischer en als derde komt dan de operatie. Zo zou het ook moeten zijn voor terugbetaling.” (male, 39 years old, myopia, -10, considered refractive surgery)

4.3.7.3 Perception of reimbursement for refractive surgery

The reimbursement issue of refractive eye surgery was overall considered a complex and ambiguous discussion.

There is not always a clear distinction between the compulsory health insurance and the complementary health insurance in respondents' mind. Moreover, amongst the respondents interviewed, there seems to be some lack of clarity when it comes to reimbursement of refractive eye surgery.

- Is refractive surgery reimbursed or not? Reimbursement was mentioned but according to respondents, only if the surgery is performed by a surgeon linked to the sickness funds.
- Some respondents stated to have received reimbursement for their refractive eye surgery ranging between € 100 -€ 200.
- Respondents also feel it is unfair that there is a difference between different sickness funds when it comes to reimbursement policy.

“Ce que je trouve de négatif, c'est que les mutuelles n'interviennent pas parce que c'est quand-même rarement une motivation esthétique pure. On ne veut pas se faire charcuter les yeux pour le plaisir donc je trouve que, quand on regarde ce qu'ils remboursent pour d'autres opérations et que

celle-là ne l'est pas, je trouve ça vraiment dommage. Même 125 euro par œil c'est rien du tout sur 850 euro. Et on est mal informée. Parce que moi l'article que j'avais lu était assez sérieux et ça disait bien qu'ils intervenaient s'il y avait une cause médicale ou professionnel... Moi, j'avais les deux, et ils ne sont pas intervenus.” (female, 32 years old, myopia + astigmatism, -2,25 & -2,75, underwent refractive surgery)

None of the respondents would opt for a 100% reimbursement of refractive eye surgery

- It is considered too heavy on the tax payer.
- It is seen as illogical since it is a non life threatening condition.
- It is considered unfair as there exist other solutions.



The following elements are taken into account by respondents when considering reimbursement for refractive surgery.

Table 29 – Overview of arguments pro and con reimbursement of refractive surgery (interviewees who considered, planned or underwent the intervention)

Pro reimbursement	Con reimbursement
<ul style="list-style-type: none">• Refractive surgery implies a non-recurring cost per patient. Profitable on the long term• Refractive surgery is more durable than eye glasses/lenses ('eco friendly')• Refractive surgery implies a clear improvement on the quality of life• Refractive error is a medical problem• Refractive surgery can be the last resort (obligation)	<ul style="list-style-type: none">• There exist cheaper and less invasive solutions• Refractive error is a non life threatening condition• Refractive surgery is luxury because it is driven by aesthetic or comfort reasons• There are more important (i.e. life threatening or higher impact on life quality) medical issues that could use (a higher level of) reimbursement or investment (e.g. cancer treatment/research, diabetes)• Fear of abuse ('profiteer')• Reimbursement would lower the threshold for the surgery – i.e. incite people who do not 'need' the surgery to opt for it

For most respondents, reimbursement can only be justified for 'elementary' interventions – to maintain or improve people's health. They feel it would be unfair to reimburse surgery that is driven by aesthetical or comfort reasons.

"Celui qui a les oreilles décollées et qui se fait opérer, la mutuelle intervient pour ça et là à part le côté esthétique... ça n'influe pas sur la santé. Je trouve ça plus logique une intervention sur la myopie que sur les oreilles décollées." (female, 26 years old, myopia, -7,5, refractive surgery planned)

"Un remboursement des opérations? Pour mon portefeuille oui, mais si on réfléchit pour l'état et les mutuelles, ça serait plus cher... C'est quand-même une opération de confort. Mais ça dépend aussi par rapport aux soucis, si c'est vraiment très handicapant, au cas par cas. Ne plus avoir besoin de l'artifice des lunettes c'est un plus, mais il y a d'autres options." (male, 35 years old, hyperopia, considered refractive surgery)

"Ik ben voor belastingen die in het voordeel voor de mens zijn. Oogoperaties zijn voor mij een luxe operatie, het is weer een stap verder van het concept bril. Tenzij het echt om gezondheidsredenen gaat en als dat bewezen kan worden, dan wel. Die terugbetaling geldt dan ook weer voor mensen met een grote afwijking vind ik." (male, 45 years old, myopia, -4,5, considered refractive surgery)

More concretely, this means that respondents (even who had undergone surgery) were looking for ways to ensure that reimbursement would only be applicable for those to whom refractive surgery is necessary and health beneficial (i.e. obligation).



4.3.7.4 Reimbursement of refractive surgery: summary

Overall, respondents suggested several possibilities to deal with the reimbursement issue of refractive surgery:

- Lay down criteria for reimbursement:
 - **Medical criteria:** reimbursement only from a specific diopter – people who cannot see or hardly see without glasses/lenses or people who need to wear very thick glasses. However, the specific diopter is again considered a subjective issue.
 - **Social criteria:** reimbursement for people with lower incomes or who have other health problems on top of refractive error.
 - **Impossibility to wear eye glasses/lenses** because of health issues or professional reasons.
- Reimbursement by sickness funds to make refractive surgery more accessible.
- Suggestion of an 'eye policy' or 'eye budget': each person with refractive error(s) would receive a fixed budget. The patient then decides to spend it on eye glasses, lenses or refractive surgery.

Respondents would opt for a partial reimbursement (e.g. 10 – 20% of the total sum) taking into account the reimbursement criteria mentioned above.

Key points

The position of respondents regarding reimbursement of eye corrections follows the general idea that luxury surgery does not have to be reimbursed by health insurance. Eye corrections should be reimbursed gradually, according to the severity of the refractive error, as a 'recognition' and a support of the individual's problem.

Refractive surgery should not be 100% reimbursed because it would be too heavy for the tax payer: it is not a life threatening condition and it would be unfair since other solutions exist. A reimbursement could be considered according to medical criteria, social criteria or for practically insurmountable issues.

5 DISCUSSION AND CONCLUSIONS

This scientific report analysed the visual acuity problems reported by a sample of the adult population in Belgium, with a focus on refractive errors. A qualitative study further scrutinizes how refractive error is experienced by the patients.

These data will provide a background for a forthcoming health technology assessment of refractive surgery.

The reader will find the summary of the main results and their discussion in the synthesis of the report published in an separate document on the KCE website.



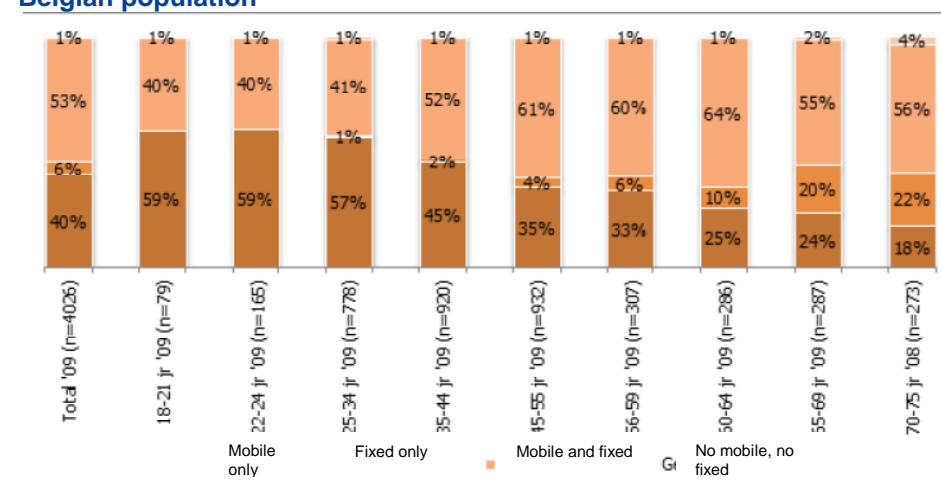
■ APPENDICES

APPENDIX 1. SURVEY ON REFRACTIVE ERROR IN BELGIUM

Appendix 1.1. Explanation dialing fixed and mobile numbers

Nearly the whole population (99%) in Belgium can be reached by telephone. This was the conclusion of a large scale face-to-face survey of GfK Significant²⁶ (see Figure 14 below).

Figure 14 – Age-distribution of the accessibility by telephone in the Belgian population



Note that the proportion mobile is 40% in Belgium, so that mobile numbers must be taken into account to get a representativity of the Belgian population. Therefore the following procedure for telephone surveys has been applied:

1. Random digit dialing: determination of all possible mobile numbers,
2. Collection of all fixed numbers in Belgium (from Infobel, White Pages, etc.),
3. Screening procedure at the start of each interview to distinguish between owners of a fixed and/of mobile line.



Step one: Random Digit Dialing (RDD)

RDD generates new numbers starting with a limited number of start numbers. By adding or subtracting figures from the start numbers, new numbers are created. A computer dials randomly selected numbers automatically, but only connects to the interviewer if the respondent unhook. As soon as the interviewer is ready with the interview, the computer dials a new number. No answers and fax or modem numbers are not connected to the interviewer, which saves time. All contacts are registered in order to calculate the non-response at the end.

Step two: fixed numbers

Fixed numbers are randomly selected from the Infobel and or White pages by means of the following procedure:

From face-to-face research Significant knows the proportion of mobile only users and owners of a fixed line for each region, age group and gender (in addition to other socio-demographic data). If this distributions are respected in the net sample, the impact of the data collection method on the sampling is neutralized.

This means that 60% of the telephone interviews will be owners of a fixed line or owners of both a fixed and mobile number, 40% of the interviews will be mobile only users.

Step three – the contact procedure differs for mobile and fixed numbers:

Contact via mobile number: first question to the respondent “do you have a fixed number?”:

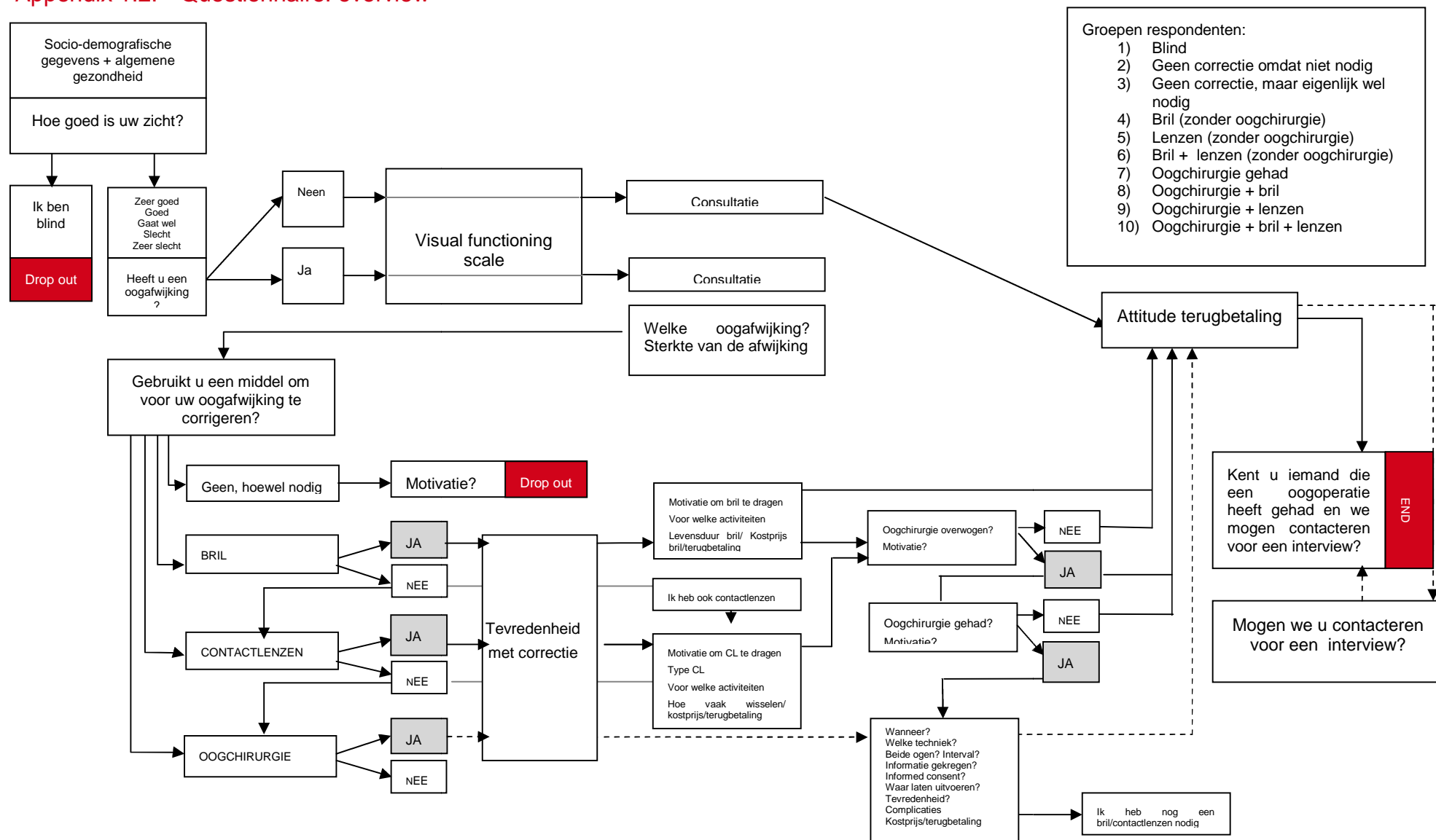
- If no: this respondent belongs to the mobile only group and can participate
- If yes: since the respondent has two numbers (one fixed, one mobile) this respondent has double chance to be selected in the sample. Therefore he cannot participate, the interview is terminated. The doubled chance is avoided by eliminating respondents who have been contacted on their mobile number but report to have also a fixed number.

Contact via fixed line: Every family member reachable through the fixed number can participate. The respondent is asked whether he has a mobile number too, in order to categorize him as a fixed only user or a mixed (fixed and mobile) user.

It is avoided to survey only the person in the household who picks up the phone, by asking for the household member who is the first to celebrate his anniversary and is 18 or older. If this person is not available, the interviewer enters the time at which the person is expected to be available and the computer will automatically redial this number at that time.



Appendix 1.2. Questionnaire: overview





Appendix 1.3. Results of dialed calls

Table 30 – Overview non-response

	Frequency	Percent	Valid Percent	Cumulative Percent
Occupied	470	.5	.7	.7
No answer	13563	14.2	20.3	21.0
Answering machine	7167	7.5	10.7	31.8
Call back today	52	.1	.1	31.9
Call back another day	1326	1.4	2.0	33.8
Call back fixed time point	736	.8	1.1	34.9
Interrupted interview (can be continued)	7	.0	.0	35.0
Call back (soft appointment)	477	.5	.7	35.7
Drop	888	.9	1.3	37.0
Principal refusal	5714	6.0	8.6	45.6
Refusal because of the topic	2554	2.7	3.8	49.4
Refusal because no time	3121	3.3	4.7	54.1
Refusal because of the method (do not want to participate in telephone surveys)	321	.3	.5	54.5
Refusal during the interview	323	.3	.5	55.0
26.00 26 Respondent asked to be subscribed on the Robinson list.	18	.0	.0	55.1
Respondent claims to have already participated	39	.0	.1	55.1
Fax/modem	817	.9	1.2	56.3
Technical problems (no signal, invalid number, etc.)	3272	3.4	4.9	61.2



	Frequency	Percent	Valid Percent	Cumulative Percent
Automatic reply (message of an operator)	1358	1.4	2.0	63.3
No answer after ten attempts	34	.0	.1	63.3
Person cannot participate because of a language problem	864	.9	1.3	64.6
Person cannot participate because he does not belong to target group	2981	3.1	4.5	69.1
Person cannot participate because quota reached	4226	4.4	6.3	75.4
Wrong or invalid number	11949	12.5	17.9	93.3
Person cannot be reached (e.g. on holiday)	171	.2	.3	93.6
Completed interview	4234	4.5	6.4	100.0
Interrupted interview (continued later)	7	.0	.0	100.0
Total	66689	69.8	100.0	

Appendix 1.4. Description of the sample

Table 31 – Theoretical and actual quota (%): age and gender

	Men			Women		
	Theoretical	Unweighted reached	Weighted reached	Theoretical	Unweighted reached	Weighted reached
20-24 years	9.4	4.5	4.7	9.2	4.6	4.6
25-44 years	42.7	18.2	21.3	42.0	21.2	21.0
45-64 years	40.3	22.6	20.1	40.4	20.4	20.2
65+ years	7.6	4.3	3.8	8.4	4.2	4.2

**Table 32 – Quotas: Gender - Age - Language - Region**

Age	Total N=4200	Male N=2100	Female N=2100
20-24 years	9.3%	9.4%	9.2%
25-44 years	42.3%	42.7%	42.0%
45-64 years	40.4%	40.3%	40.4%
65+ years	8.0%	7.6%	8.4%
Total	100.0%	100.0%	100.0%

Language	Total N=4200
Dutch	56.7%
French	43.3%
Total	100.0%

Region	Total N=4.200
FLANDERS	58.1%
Antwerpen	16.2%
Oost-Vlaanderen	13.2%
West-Vlaanderen	10.8%
Vlaams Brabant	9.8%
Limburg	8.1%
WALLONIA	32.2%
Hainaut	12.0%
Liège	9.9%
Namur	4.3%
Brabant Wallon	3.5%
Luxembourg	2.5%
BRUSSELS	9.8%
Total	100.0%

Appendix 1.5. Socio-economic status

The socio-economic status is based on 2 variables: the profession of the person responsible for the family income and his/her level of education. Indices are assigned to the different levels of each variable.

Table 33 – Numerical values for each educational level

Level of education	
No education or primary school	10
Lower secondary school (general)	35
Lower secondary school (technical. professional. artistic)	25
Higher secondary school (general)	50
Higher secondary school (technical. artistic)	45
Higher secondary school (professional)	40



Graduate. bachelor	75
Post graduate. master. master after master	85
Doctors degree	100

Table 34 – Numerical values for each professional level

Current profession	
A. Self employed	
Farmer	45
Craftsman. merchant. 5 employees or less	70
Industrial. merchant. 6 employees or more	90
Free profession	100
B. Employee (private or public)	
Member of the general board. higher management	
• responsible for 5 employees or less	80
• responsible for 6 to 10 employees	90
• responsible for 11 employees or more	100

**Current profession**

Middle management. responsible for 5 employees or less	70
Middle management. responsible for 6 employees or more	75
Other employee with mainly office tasks (e.g. secretary. assistant. ...)	65
Other employee with no office tasks (e.g. teacher. nurse. ...)	60
C. Labourer (private or public)	
Schooled labourer	50
Unschooler labourer	25
D. No professional activity	
Early retirement	75% of the weight of the last performed profession
Retired	60% of the weight of the last performed profession
Disabled. unfit for work	10
Scholar. student	10
Houseman or housewife	10
Unemployed	60% of the weight of the last performed profession
Other	50
Never worked	10

Both indices are then multiplied for each individual respondent in the sample into a final socio-economic class index (e.g. someone who received a degree in primary school and works as a police officer gets a total socio-economic class index of $10 \times 60 = 600$ points).

Based on this total index the sample is divided in 8 social groups or socio-economic status:


Table 35 – Cut-off points for each socio-economic class

Socio-economic class	
Socio-economic class 1 = highest	6300-10 000 points
Socio-economic class 2	4800-6000 points
Socio-economic class 3	3240-4500 points
Socio-economic class 4	2520-3000 points
Socio-economic class 5	1750-2500 points
Socio-economic class 6	900-1500 points
Socio-economic class 7	375-750 points
Socio-economic class 8 = lowest	60-360 points

Appendix 1.6. Self-perceived eyesight quality

Table 36 – General self-perceived eyesight quality with use of correction method according to age and gender

	Total		Age								Gender			
	N=4234		20-24y		25-44y		45-64y		65+y		Male		Female	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Almost perfect	844	19.9	139	36.1	479	28.8	196	10.8	30	8.3	464	22.1	380	17.8
Very good	1095	25.9	101	26.2	519	31.2	382	21.0	93	25.8	549	26.1	546	25.6
Good	1841	43.5	118	30.6	531	31.9	1001	54.9	191	52.9	896	42.7	945	44.3
Not so good	396	9.4	19	4.9	114	6.8	221	12.1	42	11.6	167	8.0	229	10.7
Not good at all	56	1.3	7	1.8	22	1.3	22	1.2	5	1.4	23	1.1	33	1.5
Blind	2	0.0	1	0.3	0	0.0	1	0.1	0	0.0	1	0.0	1	0.0



Appendix 1.7. Reported refractive errors

Table 37 – Reported refractive errors according to age¹ (total sample)

	Total		Age								Chi²	p
	N=4232		20-24y N=384		25-44y N=1665		45-64y N=1822		65+y N=361			
	n	%	n	%	n	%	n	%	n	%		
Myopia	1624	38.4	157	40.9	621	37.3	701	38.5	145	40.2	2.40	0.493
Presbyopia	1511	35.7	9	2.3	153	9.2	1085	59.5	264	73.1	1375.42	<0.001
Hyperopia	378	8.9	15	3.9	112	6.7	216	11.9	35	9.7	41.70	<0.001
Astigmatism	459	10.8	36	9.4	206	12.4	195	10.7	22	6.1	13.43	0.004
Cataract	116	2.7	1	0.3	17	1.0	60	3.3	38	10.5	111.23	<0.001
Other	346	8.2	18	4.7	113	6.8	166	9.1	49	13.6	26.57	<0.001

¹ Each refractive error is a separate dichotomous variable (yes/no) in the analysis. The percentages presented in this table are the respondents with e.g. myopia in the age group 20-24y (n = 157; 40.9%) versus the respondents who did not report myopia (n=226; 60.1%). The respondents reporting 'no myopia' are not represented in the table.

Appendix 1.8. Respondents with an uncorrected refractive error

Table 38 – Age distribution of respondents with a refractive error but no eye correction compared to the age distribution in the total sample

Variable	Category	Total sample (N=4234)		Subgroup (N=272)	
		n	%	n	%
Gender	Men	2100	49.6	141	51.8
	Women	2134	50.4	131	48.2
Age	20-24 years	385	9.1	27	9.9
	25-44 years	1665	39.3	132	48.5
	45-64 years	1823	43.1	99	36.4
	65+	361	8.5	14	5.1
Socio-economic class	Low	389	9.2	99	36.40
	Middle	1787	42.2	101	37.13
	High	1656	39.1	40	14.71



Variable	Category	Total sample (N=4234)		Subgroup (N=272)	
		n	%	n	%
Nationality	Belgian	3923	92.7	234	86.00
	Other than Belgian	311	7.3	38	14.20
Language	Dutch	2373	56.0	121	44.5
	French	1861	44.0	151	55.5
Total		4234		272	

Table 39 – Reported refractive errors amongst respondents with a refractive error and no eye correction

	Total N=272	
	n	%
Myopia	116	42.6
Presbyopia	123	45.2
Hyperopia	36	13.2
Astigmatism	39	14.3
Cataract	17	6.3
Other	27	9.9



Appendix 1.9. Types of eye correction

Table 40 – Age differences in the use of glasses, contact lenses and eye surgery (subsample with refractive errors)

	Total		Age								Chi ²	p
	N=2786		20-24y N=167		25-44y N=795		45-64y N=1493		65+y N=331			
Glasses	n	%	n	%	n	%	n	%	n	%		
Yes	2659	95.4	161	96.4	712	89.6	1459	97.7	327	98.8	89.969	<0.001
No	117	4.6	6	3.6	83	10.4	34	2.3	4	1.2		
Contact lenses												
Yes	377	13.5	68	40.7	203	25.5	97	6.5	9	2.7	299.596	<0.001
No	2409	86.5	99	59.3	592	74.5	1396	93.5	322	97.3		
Eye surgery												
Yes	71	2.5	2	1.2	31	3.9	32	2.1	6	1.8	8.737	0.033
No	2718	97.5	166	98.8	766	96.1	1461	97.9	325	98.2		

Table 41 – Average age for each type of eye correction

	n	Mean	St. dev.	St. error mean
Glasses	2659	49.71	12.94	0.25
Contact lenses	377	38.30	12.19	0.63
Eye surgery	71	46.10	12.10	1.44


Table 42 – Determinants of the use of glasses, contact lenses and eye surgery (subsample of respondents with a refractive error)¹

	Glasses				Contact lenses			
	Odds ratio	Lower 95% CI	Upper 95% CI	p	Odds ratio	Lower 95% CI	Upper 95% CI	p
Gender (men=1; women=0)	1.438	0.961	2.180	0.081	0.591	0.455	0.765	<.0001
Age (65+ = ref.)								
< 25 years	0.686	0.132	3.010	0.624	7.942	3.750	18.540	<.0001
25 – 44 years	0.208	0.048	0.615	0.012	3.784	1.918	8.374	0.0003
45 – 64 years	0.581	0.136	1.704	0.384	1.501	0.77	3.291	0.268
Socio-economic class (lowest = ref.)								
High	0.329	0.079	0.929	0.068	2.655	1.476	5.155	0.002
Middle	0.386	0.092	1.096	0.119	1.697	0.935	3.317	0.099
Refractive error								
Myopia (yes=1; no = 0)	0.360	0.171	0.707	0.005	4.110	2.670	6.531	<.0001
Presbyopia (yes=1; no = 0)	2.570	1.451	4.752	0.002	0.518	0.366	0.728	0.0002
Hyperopia (yes=1; no = 0)	0.517	0.21	1.273	0.148	1.745	0.954	3.184	0.069
Astigmatism (yes=1; no = 0)	1.400	0.849	2.423	0.206	1.304	0.962	1.755	0.083
Cataract (yes=1; no = 0)	0.412	0.155	1.422	0.107	0.833	0.28	1.985	0.708
Other (yes=1; no = 0)	0.837	0.418	1.822	0.634	0.871	0.509	1.436	0.599

¹ No logistic regression was executed for the use of refractive eye surgery, because the number of respondents (N=70) was too low for this type of analysis with this number of dependent variables.



Appendix 1.10. Drivers, inhibitors and satisfaction regarding glasses, contact lenses and eye surgery

Appendix 1.10.1. Satisfaction with glasses and contact lenses

Table 43 – Satisfaction with glasses and contact lenses

	Price				Impact on appearance				Comfort of wearing				Ease of use				Quality of sight			
	Glasses		Contact lenses		Glasses		Contact lenses		Glasses		Contact lenses		Glasses		Contact lenses		Glasses		Contact lenses	
	N=2659		N=377		N=2659		N=377		N=2659		N=377		N=2659		N=377		N=2659		N=377	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Extremely	121	4.6	25	6.6	160	6.0	96	25.5	245	9.2	61	16.2	232	8.7	53	14.1	324	12.2	63	16.7
Very satisfied	411	15.5	44	11.7	562	21.1	179	47.5	790	29.7	141	37.4	744	28.0	159	42.2	1.05	39.6	172	45.6
Satisfied	147	55.5	223	59.2	1726	64.9	102	27.1	1415	53.2	144	38.2	1.43	54.0	142	37.7	1.14	43.2	124	32.9
Somewhat	513	19.3	83	22.0	178	6.7	0	0.0	179	6.7	27	7.2	223	8.4	19	5.0	113	4.2	17	4.5
Very	138	5.2	2	0.5	33	1.2	0	0.0	30	1.1	4	1.1	24	0.9	4	1.1	19	0.7	1	0.3

*Appendix 1.10.2. Former trials of lenses***Table 44 – Did respondents ever try contact lenses in the past?**

		n	%
Total (N=2366)	yes	395	16.7
Age	20-24 (n=98)	23	23.5
	25-44 (n=564)	160	28.4
	45-64 (n=1384)	190	13.7
	65+ (n=320)	22	6.9
	Chi ²	89.45	
	p	<0.001	

**Table 45 – Reasons for never having tried contact lenses amongst respondents who never tried contact lenses**

	Total N=1971	
	n	%
Too much fuss. think I won't be able to handle them	681	34.6
Think I won't be able to wear them and will get side effects e.g. dry eyes, allergies, redness	339	17.2
No appropriate contact lens for my diopter/refractive error	245	12.4
Only wear glasses to read. in front of PC. to drive a car. need glasses once in a while	160	8.1
Not yet necessary	144	7.3
Satisfied with glasses: comfortable. look better. am used to them. is easier	116	5.9
Don't want lenses. no interest. no need	109	5.5
My physician advised against it	84	4.3
Did not think about them yet. not suggested by eye physician	43	2.2
My environment advised against it	40	2.0
Lenses not fit for work. sports	32	1.6
Too expensive	23	1.2
Am too old. can't put lenses in	12	0.6
Lack of information	10	0.5
Other	42	2.1
Don't know	126	6.4

**Table 46 – Reasons for not wearing contact lenses anymore amongst respondents who ever tried contact lenses**

	Total	
	N=395	
	n	%
Couldn't wear them. had side effects e.g. dry eyes. allergies. redness	249	63.0
Too much fuss. couldn't handle them	117	29.6
Didn't find the appropriate contact lens for my diopter	28	7.1
My physician advised against it	12	3.0
Too expensive	4	1.0
Other	29	7.3
Don't know	4	1.0

Appendix 1.10.3. Questions on contact lenses

Table 47 – Do respondents wear their contact lenses all the time?

		n	%
Total (N=377)	yes	206	54.6
Age	20-24 (n=98)	33	16.0
	25-44 (n=564)	107	51.9
	45-64 (n=1384)	59	28.6
	65+ (n=320)	7	3.4
	Chi ²	4.771	
	p	0.189	

**Table 48 – Satisfaction with contact lenses breakdown according to age - gender**

	Total		Age								Gender			
			20-24y		25-44y		45-64y		65+y		Men		Women	
	N=377		N=68		N=203		N=97		N=9		N=125		N=252	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Extremely satisfied	70	18.6	14	20.6	35	17.2	18	18.6	3	33.3	23	18.4	47	18.7
Very satisfied	170	45.1	31	45.6	96	47.3	39	40.2	4	44.4	55	44.0	115	45.6
Satisfied	114	30.2	21	30.9	60	29.6	31	32.0	2	22.2	39	31.2	75	29.8
Somewhat dissatisfied	19	5.0	2	2.9	10	4.9	7	7.2	0	0.0	6	4.8	13	5.2
Very dissatisfied	4	1.1	0	0.0	2	1.0	2	2.1	0	0.0	2	1.6	2	0.8

Table 49 – Activities for which contact lenses are worn breakdown according to age amongst respondents who do not always wear their contact lenses

	Total		Age			
			20-24y		25-44y	
	N=171		N=35		N=96	
	n	%	n	%	n	%
To exercise	113	66.1	25	71.4	63	65.6
To go out restaurant. etc.	94	55.0	26	74.3	51	53.1
To work	54	31.6	15	42.9	29	30.2
To drive a car	46	26.9	9	25.7	26	27.1
To work on the computer	33	19.3	11	31.4	19	19.8
To watch television	32	18.7	8	22.9	18	18.8
To read for a long period of time	29	17.0	10	28.6	17	17.7
To read something in small print	26	15.2	8	22.9	16	16.7
Other	46	26.9	11	31.4	24	25.0


Table 50 – Drivers for choosing contact lenses for men and women

	Total		Gender			
	N=377		Men N=125		Women N=252	
	n	%	n	%	n	%
Due to the comfort	191	50.7	56	44.8	135	53.6
Easier for certain activities	138	36.6	60	48.0	78	31.0
Because I expect to look better	103	27.3	25	20.0	78	31.0
Believe the quality of my sight will be better than other corrections	28	7.4	8	6.4	20	7.9
Will be cheaper in the long run	5	1.3	1	0.8	4	1.6
Other	43	11.4	13	10.4	30	11.9

Appendix 1.10.4. Questions on the choice of surgery

Table 51 – Drivers for choosing eye surgery

	Total		Gender			
	N=70		Men N=25		Women N=45	
	n	%	n	%	n	%
Due to the comfort of not needing glasses/contacts	42	60.0	15		27	
Believe the quality of my sight will be better than other corrections	10	14.3	4		6	
Because I expect to look better	4	5.7	1		3	
Will be cheaper in the long run	3	4.3	1		2	
Other	26	37.1	9		17	

**Table 52 – Satisfaction with eye surgery**

	Total N=70	
	n	%
Extremely satisfied	29	41.4
Very satisfied	22	31.4
Satisfied	9	12.9
Somewhat dissatisfied	9	12.9
Very dissatisfied	1	1.4

Table 53 – Would respondent make the same choices if given the possibility to do it again amongst respondents who have had an eye surgery

	Total N=70	
	n	%
Definitely	54	77.1
Probably	8	11.4
Probably not	2	2.9
Definitely not	6	8.6

Table 54 – Would respondent recommend surgery to others amongst respondents who have had an eye surgery

	Total N=70	
	n	%
Definitely	50	71.4
Probably	12	17.1
Probably not	4	5.7
Definitely not	4	5.7

Appendix 1.11. Health services use

Table 55 – Consultation with an ophthalmologist: breakdown according to type of eye correction

	Total		Type of eye correction					
	N=4232		Glasses N=2659		Contacts N=377		Eye surgery N=71	
	n	%	n	%	n	%	n	%
Yes	2967	70.1	2385	89.7	356	94.4	71	100.0
No	1265	29.9	274	10.3	21	5.6	0	0.0

Table 56 – Consultation with an ophthalmologist: breakdown according to type of refractive error

	Type of refractive error							
	Myopia N=3050		Hyperopia N=1624		Other N=378		Other N=1048	
	n	%	n	%	n	%	n	%
Yes	2685	88.0	1505	92.7	333	88.1	847	80.8
No	365	12.0	119	7.3	45	11.9	201	19.2


Table 57 – Reasons for not consulting an ophthalmologist according to the consultation with optician

	Total		Consulted an optician			
	N=1265		Yes N=214		No N=1051	
	n	%	n	%	n	%
Not necessary	1042	82.4	129	60.3	913	86.9
Consulted the occupational physician instead of the ophthalmologist	83	6.6	7	3.3	76	7.2
Consulted an optician instead of the ophthalmologist	55	4.3	53	24.8	2	0.2
No time	40	3.2	9	4.2	31	2.9
Consulted my GP instead of the ophthalmologist	12	0.9	3	1.4	9	0.9
Too expensive	9	0.7	2	0.9	7	0.7
Waiting list too long	5	0.4	3	1.4	2	0.2
Other	33	2.6	6	2.8	27	2.6
Don't know	15	1.2	8	3.7	7	0.7

Table 58 – Did respondent ever consult an optician breakdown according to type of refractive error

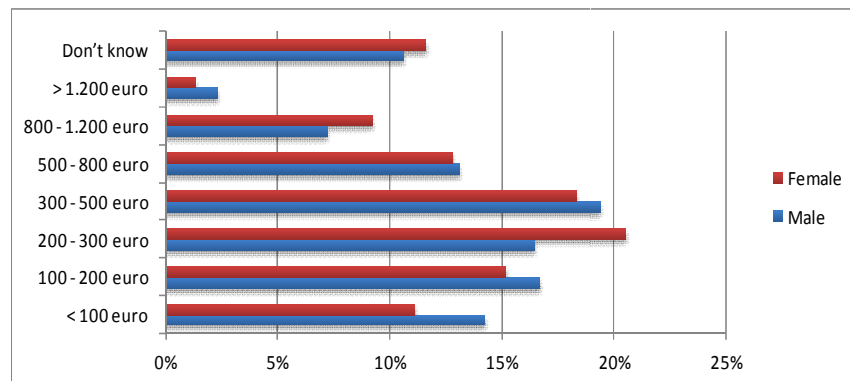
	Type of refractive error							
	N=3050		Myopia N=1624		Hyperopia N=378		Other N=1048	
	n	%	n	%	n	%	n	%
Yes	2.685	88.0	1015	62.5	236	62.4	499	47.6
No	365	12.0	609	37.5	142	37.6	549	52.4


Table 59 – Reasons for not consulting an optician amongst respondents according to previous consultation with ophthalmologist

	Total		Consulted an ophthalmologist			
	N=1470		Yes N=419		No N=1051	
	n	%	n	%	n	%
Not necessary	1110	75.5	176	42.0	934	88.9
Consulted an ophthalmologist instead of the optician	205	13.9	198	47.3	7	0.7
Consulted the occupational physician instead of the optician	69	4.7	5	1.2	64	6.1
No time	37	2.5	10	2.4	27	2.6
Too expensive	9	0.6	3	0.7	6	0.6
Consulted my GP instead of the optician	8	0.5	5	1.2	3	0.3
Other	36	2.4	17	4.1	19	1.8
Don't know	25	1.7	18	4.3	7	0.7

Appendix 1.12. Costs

Appendix 1.12.1. Costs according to gender

Figure 15 – Budget spent on last bought glasses (breakdown according to gender)


Appendix 1.12.2. Costs according to use of contact lenses - surgery

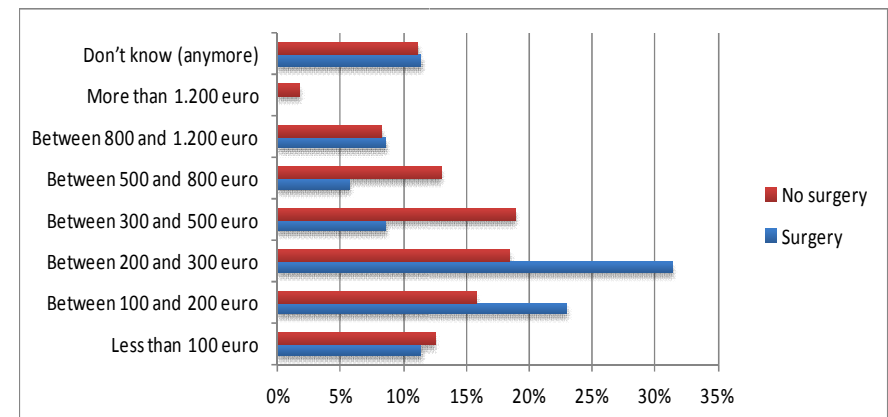
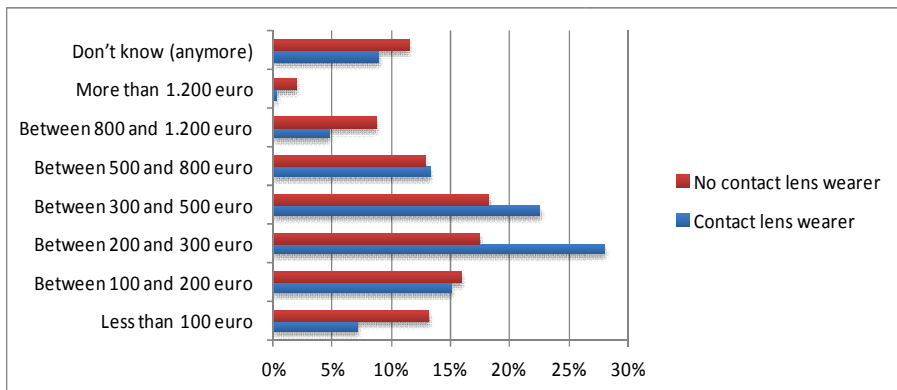
Figure 16 – Budget spent on last bought glasses (breakdown according to whether patients had eye surgery or not)


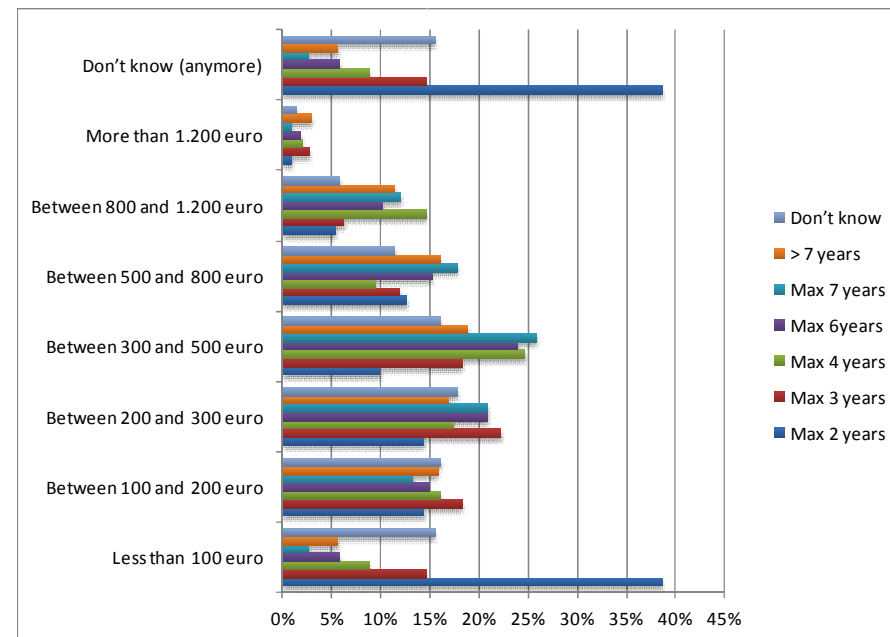


Figure 17 – Budget spent on last bought glasses (breakdown according to whether people also wear contact lenses or not)



Costs according to expected duration of use

Figure 18 – Budget spent on last bought glasses (breakdown according to expected lifecycle of glasses)





Appendix 1.13. Reimbursement according to age – socio-economic class

Figure 19 – Did respondents receive reimbursement either from health insurance or private insurer breakdown according to age

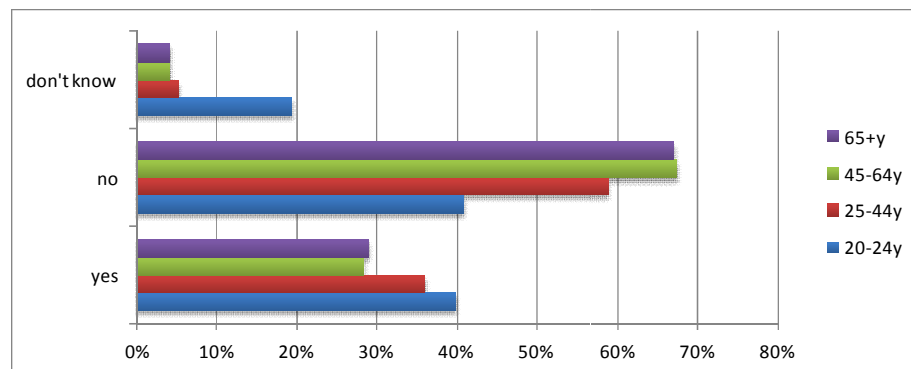


Figure 20 – Did respondents receive reimbursement either from health insurance or private insurer breakdown according to socio-economic class

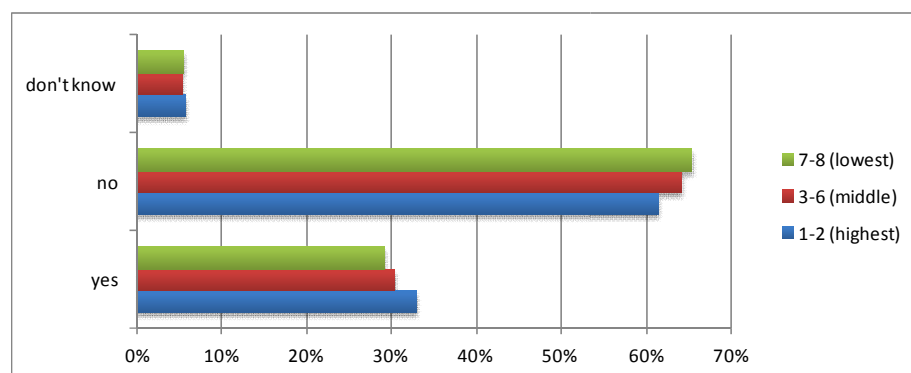
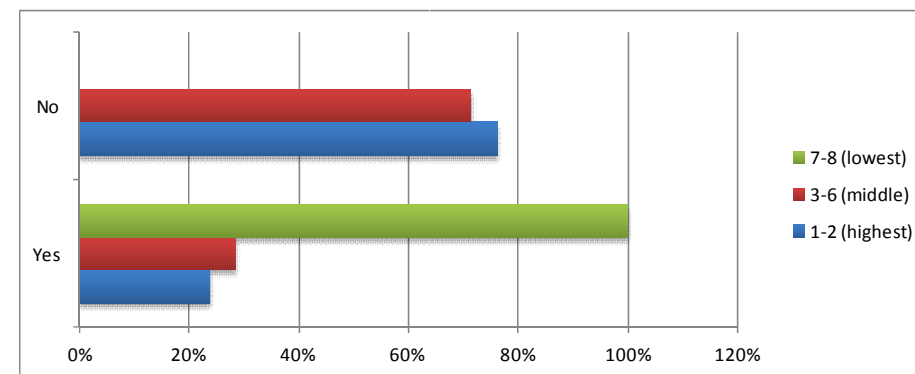


Figure 21 – Did respondents receive reimbursement for refractive eye surgery either from health insurance or private insurer breakdown according to socio-economic class





Appendix 1.14. Willingness to pay

Table 60 – Willingness to pay more taxes and/or social security contribution for reimbursement by obligatory health insurance: breakdown according to age - gender

	Total		Age								Gender			
	N=4234		20-24y N=385		25-44y N=1665		45-64y N=1823		65+y N=361		Men N=2100		Women N=2134	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Glasses														
Yes	1640	38.7	170	44.2	693	41.6	659	36.1	118	32.7	842	40.1	798	37.4
No	2257	53.3	166	43.1	858	51.5	1025	56.2	208	57.6	1097	52.2	1160	54.4
No opinion/ don't know	337	8.0	49	12.7	114	6.8	139	7.6	35	9.7	161	7.7	176	8.2
Contact lenses														
Yes	1349	31.9	134	34.8	571	34.3	553	30.3	91	25.2	698	33.2	651	30.5
No	2573	60.8	211	54.8	1003	60.2	1119	61.4	240	66.5	1241	59.1	1332	62.4
No opinion/ don't know	312	7.4	40	10.4	91	5.5	151	8.3	30	8.3	161	7.7	151	7.1
Eye surgery														
Yes	2028	47.9	180	46.8	830	49.8	866	47.5	152	42.1	1027	48.9	1001	46.9
No	1935	45.7	173	44.9	760	45.6	826	45.3	176	48.8	948	45.1	987	46.3
No opinion/ don't know	271	6.4	32	8.3	75	4.5	131	7.2	33	9.1	125	6.0	146	6.8

Table 61 – Willingness to pay more taxes and/or social security contribution for reimbursement of glasses by obligatory health insurance: breakdown according to socio-economic class

	Total		High		Social class Middle		Low	
	N=4234		N=1656		N=1787		N=389	
	n	%	n	%	n	%	n	%
Glasses								
Yes	1640	38.7	632	38.2	717	40.1	165	42.4
No	2257	53.3	910	55.0	928	51.9	192	49.4
No opinion/ don't know	337	8.0	114	6.9	142	7.9	32	8.2



	Total		High		Social class		Low	
	n	N=4234 %	n	N=1656 %	n	Middle N=1787 %	n	N=389 %
Contact lenses								
Yes	1.349	31.9	513	31.0	595	33.3	133	34.2
No	2.573	60.8	1.041	62.9	1.068	59.8	217	55.8
No opinion/ don't know	312	7.4	102	6.2	124	6.9	39	10.0
Eye surgery								
Yes	2.028	47.9	755	45.6	928	51.9	186	47.8
No	1.935	45.7	812	49.0	757	42.4	171	44.0
No opinion/ don't know	271	6.4	89	5.4	102	5.7	32	8.2



APPENDIX 2. INTERVIEWS ON PATIENTS' PERCEPTIONS

Appendix 2.1. ESOMAR social grades system

The table below was used to determine the social economic class during recruitment.

Table 62 – Overview of ESOMAR social grades system to determine social economic status used during recruitment

		Education level of the main income earner (terminal level)			
		University	Higher non university education	Higher secondary education or higher technical	Lower secondary education or lower technical or primary school
Occupation of the main income earner	Profession (physician, lawyer, dentist,...) or higher management, senior official, commanding officer, responsible for at least 5 people	A	A	B	B
	Middle management, executive official, officer	B	B	B	B
	Self-employed, trader, craftsman with 5 employees or less	B	B	B	C1
	Other non-manual labor (office workers, minor official, soldier, education, representative)	B	C1	C1	C2
	Agriculturalist	C1	C1	C2	C2
	Worker	C2	C2	C2	D
	Unemployed, job-seeker	C2	D	D	D
	Pensioner (calculation based on last occupation and education level)				



Appendix 2.2. Intended sample of patients

Table 63 – Intended sample for patients

Age	Had considered refractive eye surgery, but had not undergone									Had either planned refractive eye surgery or underwent refractive surgery in the past 4 years								
	20 - 30 years old			31 - 40 years old			more than 40 years old			20 - 30 years old			31 - 40 years old			more than 40 years old		
SEC	A, B	C1	C2, D	A, B	C1	C2, D	A, B	C1	C2, D	A, B	C1	C2, D	A, B	C1	C2, D	A, B	C1	C2, D
Language	F	N	F	N	F	N	F	N	F	N	F	N	F	N	F	N	F	N
Number of interviews	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 64 – Achieved sample for patients

Age	Considered refractive eye surgery, but did not undergo it									Either planned refractive eye surgery or underwent refractive surgery in the past 4 years								
	20 - 30 years old			31 - 40 years old			more than 40 years old			20 - 30 years old			31 - 40 years old			more than 40 years old		
SEC	A, B	C1	C2, D	A, B	C1	C2, D	A, B	C1	C2, D	A, B	C1	C2, D	A, B	C1	C2, D	A, B	C1	C2, D
Language	F	N	F	N	F	N	F	N	F	N	F	N	F	N	F	N	F	N
Number of interviews	0	1	1	1	0	0	1	1	1	1	2	1	1	1	1	1	2	0



Table 65 – Description of the interviewees

Dutch-speaking

Respondent	LEEFTIJD	Geslacht	Socio-economic status	Corrigerende oogoperatie: gepland of ondergaan	Corrigerende oogoperatie overwogen, maar niet ondergaan
1	43 jaar	Vrouw	C1		myopie - oogoperatie overwogen, maar niet ondergaan
2	27 jaar	Vrouw	B	myopie - oogoperatie ondergaan -2 jaar geleden	
3	39 jaar	Man	B		myopie + astigmatisme
4	79 jaar	Vrouw	D	myopie + presbyopie + cataract - oogoperatie ondergaan -2 jaar geleden	
5	64 jaar	Vrouw	D		myopie + presbyopie - oogoperatie overwogen, maar niet ondergaan
6	45 jaar	Man	B		myopie - oogoperatie overwogen, maar niet ondergaan
7	39 jaar	Man	C1		Myopie + astigmatisme aan 1 oog - oogoperatie overwogen, maar niet ondergaan
8	31 jaar	Vrouw	C1	myopie - oogoperatie ondergaan -2 jaar geleden	
9	51 jaar	Vrouw	B	hyperopie - oogoperatie ondergaan -2 jaar geleden	
10	35 jaar	Vrouw	B	myopie + astigmatisme oogoperatie gepland	
11	23 jaar	Man	C1	myopie - oogoperatie ondergaan -2 jaar geleden	
12	41 jaar	Man	C1		myopie + hyperopie - oogoperatie overwogen, maar niet ondergaan
13	39 jaar	Vrouw	C1		hyperopie - oogoperatie overwogen, maar niet ondergaan
14	23 jaar	Vrouw	C2		myopie - oogoperatie overwogen, maar niet ondergaan
15	22 jaar	Man	A		myopie - oogoperatie overwogen, maar niet ondergaan



16 35 jaar Vrouw D myopie - oogoperatie ondergaan -2 jaar geleden

17 67 jaar Vrouw B hyperopie - oogoperatie ondergaan -2 jaar geleden

18 29 jaar Vrouw B hyperopie - oogoperatie gepland

French-speaking

Respondent	AGE	Gender	Socio-economic status	Subi ou prévu une opération des yeux (moins de 2 ans)	Considééré une opération, mais pas subi
1	44	homme	C2		myopie - considéré une opération, mais pas subi
2	32	femme	B	myopie + astigmatisme - subi une opération des yeux	
3	26	femme	C1	myopie + prévu une opération des yeux	
4	34	femme	B	myopie + astigmatisme + subi une opération des yeux	
5	54	homme	B	myopie + subi une opération des yeux	
6	45	femme	B		myopie - considéré une opération, mais pas subi
7	35	homme	C1		hypermétropie + astigmatisme - considéré une opération, mais pas subi
8	35	homme	C2		myopie - considéré une opération, mais pas subi
9	66	homme	C1		myopie + astigmatisme - considéré une opération, mais pas subi
10	27	homme	C2	myopie + prévu une opération	
11	54	femme	C1	myopie + hypermétropie + presbytie + prévu une opération des yeux	
12	34	homme	B		myopie + astigmatisme - considéré une opération, mais pas subi
13	34	femme	B	myopie + prévu une opération des yeux	
14	35	femme	B	myopie - subi une opération des yeux	
15	34	femme	C1	myopie + subi une opération des yeux	
16	27	femme	C1		myopie - considéré une opération, mais pas subi
17	38	homme	C1	myopie + astigmatisme + subi une opération des yeux	
18	43	femme	C1	myopie + astigmatisme + prévu une opération des yeux	



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