

Original article

Quality of life in rhinoconjunctivitis assessed with generic and disease-specific questionnaires

Background: Illness as perceived by the allergic patient with asthma and/or rhinoconjunctivitis (RC) can be assessed by measurements of their health-related quality of life (HRQL). For this purpose the RC Quality of Life Questionnaire (RQLQ) has gained general acceptance; however, as most allergic patients experience symptoms from multiple organs, disease-specific HRQL measures may be deficient. This study compares a generic and a disease-specific HRQL instrument in grass and/or mite-allergic patients.

Methods: Two hundred and forty-eight patients with RC and 121 patients with both RC and asthma were studied. Questionnaire information was obtained about allergy-related RQLQ and a generic 15-dimensional instrument for measuring HRQL (15D). Doctors provided general and disease-specific information to classify disease severity according to the global initiative for asthma and allergic rhinitis and its impact on asthma guidelines.

Results: Rhinoconjunctivitis patients with persistent moderate-to-severe disease had an impaired quality of life on all items of RQLQ during allergen exposure. The 15D mean score was 0.98 on a day without allergy and 0.83 on a day with allergy ($P < 0.001$). The correlation between 15D and RQLQ was $r = -0.42$ on a day with allergy ($P < 0.001$). Only 15D scores showed statistically significant differences in HRQL between patients with and without asthma.

Conclusion: During allergen exposure patients with RC experience a serious deterioration in HRQL measured with the disease-specific RQLQ instrument and the generic 15D instrument. The 15D instrument seems to generate a more comprehensive view of the impact of allergen exposure on patient's quality of life than RQLQ.

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Key words: 15D; allergy; asthma; health-related quality of life; rhinoconjunctivitis; Rhinoconjunctivitis Quality of Life Questionnaire.

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Allergy to airborne particles results in co-morbid conditions with symptoms from eyes, nose, and lungs. Up to 40% of the patients with rhinitis also have asthma, and up to 80% of the patients with asthma experience nasal symptoms. The two conditions can be regarded as an allergic respiratory syndrome (1–3). Allergic asthma and rhinoconjunctivitis (RC) are common respiratory diseases. In Europe, approximately 25% of the population suffers from respiratory allergy. The prevalence of asthma and RC has increased in industrialized countries over the past decades, and thus, allergies constitute a public health problem (4, 5). The allergic diseases impair physical, psychological, and cognitive functions, and the

impact on the patient's health-related quality of life (HRQL) is frequently underestimated. Interventions against respiratory allergy include symptomatic treatment, allergen avoidance, and allergen-specific immunotherapy.

It is widely acknowledged that the personal burden of illness, as perceived by the allergic asthma and/or RC patient, cannot be fully assessed by traditional clinical symptoms and signs correlating only moderately with patients' perceptions and functional capabilities on a daily basis (6, 7). Specific instruments, such as the RC Quality of Life Questionnaire (RQLQ), have gained acceptance as methods to obtain a measure of disease perception in adults with RC (8, 9). Generic HRQL instruments have only been examined sporadically in allergy (10–14), and to our knowledge never with the generic 15-dimensional instrument for measuring HRQL (15D) instrument (15).

Specific instruments focus on health outcomes related to a specific disease, medical condition, or patient

Abbreviations: 15D, 15-dimensional instrument for measuring health-related quality of life; ARIA, allergic rhinitis and its impact on asthma; HRQL, health-related quality of life; RC, rhinoconjunctivitis; RQLQ, Rhinoconjunctivitis Quality of Life Questionnaire; SCIT, subcutaneous injection immunotherapy; SF, short form.

population. They concentrate on dimensions (or domains) of HRQL that are most relevant to the disease in question. The specific instruments are more responsive to changes in the particular disease-related aspect of the patient's HRQL compared to generic instruments, which focus on the patient's general health. Furthermore, it is likely that patients and physicians consider these instruments more relevant compared to generic instruments (16, 17). The main disadvantage of specific instruments is that they cannot be used to compare the quality of life across different diseases and patient types, and therefore cannot be used to compare the relative effectiveness and cost-effectiveness of programs in different disease areas. RQLQ is a validated and reliable instrument, but it does not produce a single quality of life score, but rather a profile of scores across different domains. In addition, scoring is not based on individual preferences for the various possible outcomes. Consequently, it is not clear whether high scores are associated with outcomes that are more or less preferred by the patient.

Generic instruments are broad-based measurements that can assess general HRQL over different disease states and conditions, treatment interventions, and population states. Generic instruments allow comparison of HRQL for different disease states, such as allergic RC, asthma, hypertension, and diabetes. Typically, they include consideration of physical functioning, ability for self-care, physiological status, level of pain or distress, and amount of social integration. Generic instruments can also serve as health profiles. The major disadvantage of generic instruments is the inclusion of items not relevant to the disease, and furthermore, the sensitivity may not be sufficient to differentiate between different levels of quality of life within a particular disease. Examples of generic instruments are the short form (SF) 36, the Nottingham Health Profile, the Sickness Impact Profile, the EQ-5D (18, 19), and the 15D. Only generic instruments based on public preferences, such as the EQ-5D and 15D can serve as a basis for comparison of the cost-effectiveness of programs in different disease areas. The 15D instrument for HRQL contains both a profile and a utility measure.

The present study compares results obtained by using the disease-specific RQLQ and the generic 15D instrument in the same population of adult allergic patients enrolled for subcutaneous injection immunotherapy (SCIT) against grass and/or house dust mites, so the impact of seasonal allergen exposure could be investigated. Previous studies have reported a relationship between disease severity and use of medication and health care services (20–22). The aim of the current study was to address a potential correlation between disease-specific and generic HRQL and disease severity classification of hay fever and asthma.

Methods

Data sources

The study had a cross-sectional, observational design. It was a multi-center study with patients recruited consecutively from 13 clinics that specialized in specific allergy management. Data were collected immediately before SCIT was initiated. The patients were referred to the specialist clinics by general practitioners for treatment of grass pollen and/or house dust mite allergy. The patients had to be at least 16 years of age. Data were collected by using specifically designed questionnaires for the doctors and for the patients.

Doctor's questionnaire

The specialist doctors provided information about the patients' general health, disease duration, and data on lung function, as well as specificity of their allergy and immunotherapy treatment. Furthermore, the doctors classified RC severity according to the allergic rhinitis and its impact on asthma (ARIA) as intermittent or persistent and as mild or moderate-to-severe (2, 23). Doctors classified asthma according to the global initiative for asthma guideline as intermittent, mild persistent, moderate persistent or severe persistent (24, 25).

Patients' questionnaires

The patient questionnaire included the RQLQ and 15D instruments. RC Quality of Life Questionnaire has 28 questions or items distributed across seven domains. The domain score is the average score within each domain. Each item has seven levels on an ordinal scale with zero denoting 'Not troubled' and six 'Extremely troubled'. Patients were asked to fill in the RQLQ items for a typical day with allergic symptoms, instead of the last week as prescribed by the standard RQLQ.

The 15D questionnaire is a generic self-administered multi-attribute HRQL measure (15, 26) assessing health status across 15 dimensions: mobility, vision, hearing, breathing, sleeping, eating, speech, eliminations, usual activities, mental function, discomfort and symptoms, depression, distress, vitality, and sexual activity (27, 28). Each dimension has five levels, ranging from level one indicating no problems in the dimension (e.g. able to walk normally indoors, outdoors, and on stairs) to level five signifying extreme problems (e.g. completely bed-ridden and unable to move about). A single index score was obtained by incorporating Danish population based preference weights (29, 30).

For the 15D items, respondents were asked to report their general health state on a typical day with allergy symptoms as well as on a typical day without allergy symptoms, instead of today as prescribed by the standard 15D. Asking respondents to report their HRQL in both settings enables estimation of the potential impact of allergy interventions in a later stage. For a detailed description of the questionnaire, see Appendix S1 and Appendix A.

Statistical analyses

Statistical analyses were performed using STATA 9.2 (StataCorp LP, College Station, TX, USA) and spss (SPSS Inc., Chicago, IL, USA) for Windows 14.0. Chi-squared tests were used to test differences on categorical variables. Student's *t* tests were used to compare mean values on continuous variables. Graph bars were drawn for the RQLQ items and for the 15D items including a day with allergy as well as a day without allergy. Normally distributed

data were analyzed using matched pairs *t*-test. Wilcoxon-signed rank test was used for ordinal paired variables (31).

We conducted linear regression of RQLQ and 15D on gender, age, SCIT modality, hay fever severity, and asthma severity using a 5% significance level. To test if missing values occurring with the RQLQ instrument influenced the results of the regression analysis and to enable comparison directly with the 15D instrument a RQLQ-missing dummy variable (= 1, 0 otherwise) was used.

Observations, where all dichotomous variables were zero, represented the reference patient for the analysis. Thus, the reference person in the regression model was a male, vaccinated against grass pollen, and classified as 'no or mild hay fever' without asthma. The correlation between the 15D score and the RQLQ score was assessed using the Pearson's correlation coefficient (32).

Ethical considerations

The study was approved by the Danish Data Agency (2005-41-5534). The scientific ethics committee did not find that the project needed permission from their committee.

Results

The study included 254 grass and/or house dust mite allergic patients, who were referred to specialist centers

with an indication to start SCIT between September 2005 and December 2006. One hundred and twenty-nine of the participants were men. One hundred and seventy patients were about to start SCIT with grass pollen alone, 30 were about to start SCIT with house dust mites only, and 54 were about to start vaccination against both grass pollen and house dust mite (Table 1).

There were no significant gender differences concerning the allergens with which vaccination was going to be initiated. Two hundred and forty-eight (97.3%) of the patients were diagnosed as RC patients, among those 127 (49.8%) were diagnosed as suffering from RC only. Six (2.4%) were diagnosed as bronchial asthma only and 121 (47.5%) of the patients were diagnosed as both RC and bronchial asthma (Table 2). The mean self-reported disease duration was 17.4 years. The doctors reported the mean time since diagnosis as 14.0 years. Hence, the average allergic patient in this study had suffered from allergic symptoms for 3.4 years prior to a doctor's diagnosis (Table 1).

Regression analyses of RQLQ and 15D, respectively on a typical day with allergy, on gender, age, vaccination modality, and disease severity are presented in Table 3. In the regression analysis, we omitted the six patients who

Table 1. Categorization of the patients by vaccination modality

	Vaccination with grass pollen extract only, (n = 170)	Vaccination with house dust mite extract only, (n = 30)	Vaccination with grass pollen and house dust mite extracts, (n = 54)	Total (n = 254)
Male	92 (54.1)	10 (33.3)	27 (50.0)	129 (51.0)
Female	78 (45.9)	20 (66.7)	27 (49.1)	125 (49.0)
Mean (SD) age in year [range in year]	33.4 (10.4) [16.1–64.4]	35.3 (9.4) [21.6–59.8]	33.2 (12.5) [16.1–66.3]	33.6 (10.8) [16.1–66.3]
Mean (SD) years with doctor diagnosed allergy [range in year]	15.0 (10.0) [1–44]	11.2 (9.6) [1–40]	14.0 (10.3) [1–45]	14.0 [1–45]
Mean (SD) years with self-reported allergy [range in year]	18.0 (11.1) [0–47]	14.3 (10.3) [0–41]	17.2 (12.9) [3–54]	17.4 (11.4) [0–54]

Figures represent number of patients (percentages in parenthesis) except if stated otherwise.

Table 2. Baseline diagnosis of the rhinoconjunctivitis patients according to ARIA and the asthma patients according to the GINA guidelines by vaccination modality

	Vaccination with grass pollen extract only, 170	Vaccination with house dust mite extract only, 30	Vaccination with grass pollen and house dust mite extracts, 54	Total 254
Rhinoconjunctivitis				
No rhinoconjunctivitis diagnosis	1 (0.6)	5 (13.6)	0	6 (2.4)
Intermittent mild	2 (1.2)	3 (10.0)	1 (1.9)	6 (2.4)
Intermittent moderate to-severe	5 (2.9)	1 (3.3)	3 (5.6)	9 (3.5)
Persistent mild	12 (7.1)	0	9 (16.7)	21 (8.3)
Persistent moderate-to-severe	150 (88.2)	21 (73.1)	41 (75.9)	212 (83.5)
Asthma diagnosis				
No asthma diagnosis	88 (51.8)	13 (43.3)	27 (49.1)	128 (50.4)
Intermittent	29 (17.1)	6 (20.0)	7 (12.7)	42 (16.5)
Mild persistent	21 (12.4)	1 (3.3)	6 (10.9)	28 (11.0)
Moderate persistent	29 (17.1)	8 (26.7)	11 (20.0)	48 (18.9)
Severe persistent	3 (1.8)	2 (6.7)	4 (7.3)	9 (3.5)

Figures represent number of patients (percentages in parenthesis).

ARIA, allergic rhinitis and its impact on asthma; GINA, the global initiative for asthma.

Table 3. Regression analysis of RQLQ and 15D on gender, age, vaccination modality, hay fever severity, and asthma severity on a typical day with allergy

	RQLQ-overall			15D		
	Coefficient	SE	P-value	Coefficient	Robust SE	P-value
Female	0.3137	0.1319	0.019	−0.0279	0.0099	0.005
Age (years)	−0.0015	0.0062	0.806	0.0009	0.0004	0.031
Vaccination against house dust mite	0.0551	0.2318	0.812	−0.0325	0.0184	0.079
Vaccination against house dust mite and grass	−0.7171	0.1598	0.000	0.0008	0.0120	0.946
Hay fever moderate-to-severe	0.4026	0.2056	0.052	−0.0415	0.0128	0.001
Asthma mild	−0.1278	0.1521	0.402	−0.0226	0.0112	0.045
Asthma moderate-to-severe	−0.2413	0.1675	0.152	−0.0457	0.0137	0.001
RQLQ-missing	n.a.	n.a.	n.a.	0.0183	0.0108	0.090
Constant	2.9081	0.2921	0.000	0.8564	0.0203	0.000
No of observations		170			240	

RQLQ, rhinoconjunctivitis Quality of Life Questionnaire; 15D, 15-dimensional instrument for measuring health-related quality of life; n.a., not applicable

were suffering from asthma only to simplify the interpretation of the coefficient associated with asthma (which then reflects the added health consequences of having asthma in addition to RC).

Females reported statistically significantly lower HRQL scores compared to men on both instruments. The sign of the coefficients to the covariate age were in accordance on the two instruments. On the 15D instrument, an increasing age was statistically significantly associated with a higher HRQL score on a day with allergy. Both instruments produced statistically significantly different scores for patients classified as 'no or mild' RC and those classified as 'moderate-to-severe'. The RQLQ did not differentiate between patients as those with or without asthma and between different severities of asthma. The 15D questionnaire on the other hand showed a statistically significant difference between patients with and without asthma (Table 3).

On the RQLQ instrument, the respondents reported statistically significantly higher quality of life if they were about to start SCIT with both grass pollen and house dust mites as compared to patients that were about to start SCIT with grass pollen only ($P = 0.000$).

All 15 items on the generic 15D questionnaire comparing a typical day without allergy with a typical day with allergy is presented in Fig. 1. The respondents hardly had any problems on a day without allergy measured with 15D. On a day with allergy, however, the scores were statistically significantly higher on the five digit ordinal scale ($P < 0.001$) for all 15 items meaning that HRQL on a day with allergy was statistically significantly lower compared to a day with no allergy. The mean utility score on a day with no allergy was 0.98 (SD 0.03) compared to 0.83 (0.08) on a day with allergy. The difference between the scores was 0.15 (0.07) ($P < 0.001$).

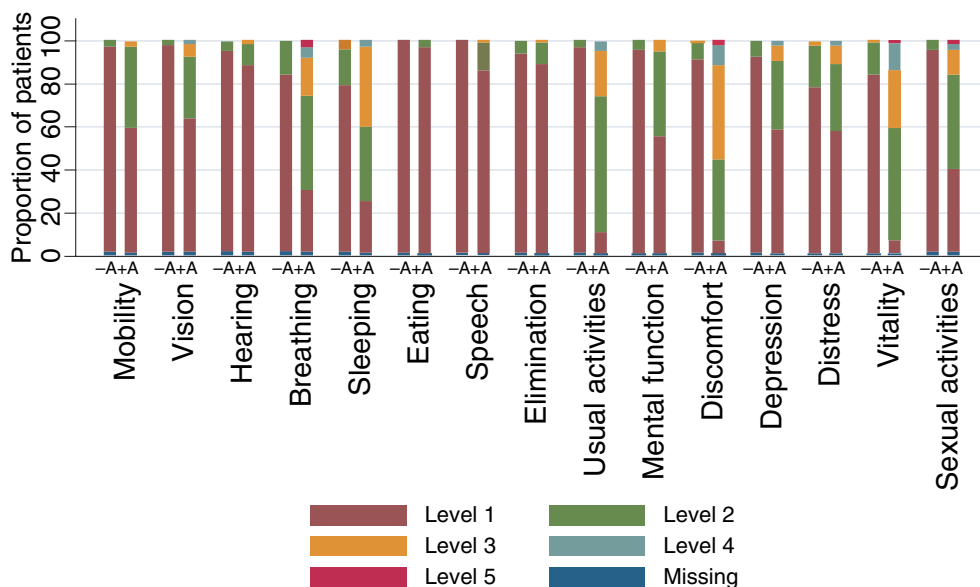


Figure 1. 15D profile of patients ($n = 254$) screened to SCIT on a day without allergy (−A), and on a day with allergy (+A).

The ‘overall’ mean score on a day with allergy on the RQLQ instrument was 3.1 (0.9). The domain item ‘activity’ had the highest mean score of 4.4 (1.2) meaning it was the item affecting the respondents most. The item ‘sleep’ had the lowest mean score of 2.1 (1.6) meaning that it was the item least affecting the respondents on the RQLQ instrument (Fig. 2).

On all domain items on the RQLQ instrument, women reported a lower HRQL. For the five domain items and the overall-score, the difference between gender was statistically significant ($P \leq 0.05$). On 12 out of 15 items on the 15D instrument, women had a lower HRQL score as compared to men. On the six items ‘mobility’, ‘breathing’, ‘sleeping’, ‘elimination’, ‘depression’, and ‘vitality’, this HRQL was significantly lower compared to that of males ($P \leq 0.05$).

According to the ARIA classification, all RQLQ domain items, (with the exception of the ‘emotional’ item), the patients classified as ‘moderate-to-severe’ RC had statistically significantly lower HRQL, as compared to patients classified as ‘no or mild’ RC ($P < 0.05$). The utility scores on the 15D instrument measured the same difference between these two severity groups ($P = 0.01$) on a day with allergy, whereas on a day with no allergy there was no difference ($P = 0.99$). On 13 out of 15 items on the 15D instrument patients diagnosed with ‘moderate-to-severe’ RC had lower HRQL scores as compared to patients diagnosed with ‘no or mild’ RC. On the items

‘mobility’, ‘breathing’, ‘sleeping’, and ‘vitality’ the scores were statistically significantly lower ($P \leq 0.05$), indicating that the 15D instrument was capable of differentiating patients according to disease severity.

On a typical day with allergy there was a negative correlation between the two instruments as shown in Fig 3. The correlation between the 15D score and the RQLQ overall score was $r = -0.42$ ($P < 0.001$). The correlation between the seven RQLQ domain items and the 15D items was assessed to see which domains were linked Table 4.

Discussion

In recent years, it has become increasingly clear that co-morbid disease conditions are the rule rather than the exception in allergy. Allergic patients exclusively suffering from asthma are rare. Although this is not an epidemiological study, only six out of 254 patients included did not show signs of RC. According to the ‘one airway, one disease’ concept introduced in the ARIA document, allergy is a systemic condition in the immune system and asthma and RC can be considered local manifestations of this underlying immunological condition.

The 15D instrument demonstrated that allergy affects all dimensions of life, signified by a statistically significant movement on all 15 items on a day of allergy. The 15D

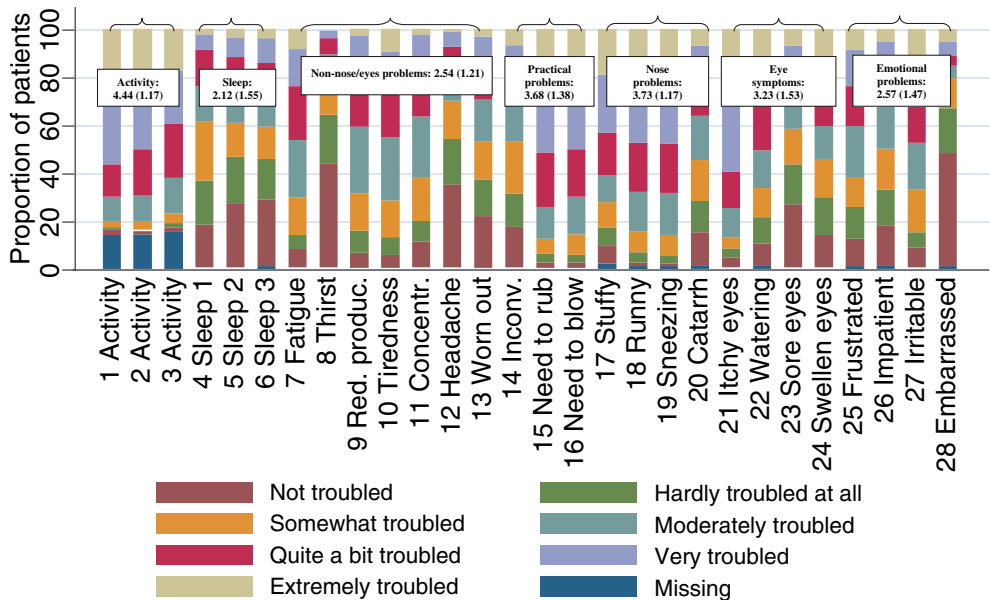


Figure 2. RQLQ profile of patients ($n = 254$) screened to SCIT on a typical day with allergy. The domain item ‘activities’ are illustrated by the bars activity1–3. Respondents made a choice between 29 different activities, which were limited by their nose/eye symptoms. The domain item ‘sleep’ is illustrated by the bars sleep1–3: sleep1, difficulties getting to sleep; sleep2, wake up during night; sleep3, lack of good night’s sleep. The domain item ‘Non-nose/eye symptoms’ is illustrated by the bars 7–13. The domain item ‘Practical problems’ is illustrated by the bars 14–16: 14, inconvenience of having to carry tissues or handkerchief; 15, need to rub nose/eyes; 16, need to blow nose repeatedly. The domain item ‘nasal symptoms’ are illustrated by the bars 17–20. The domain item ‘eye symptoms’ is illustrated by the bars 21–24, and the domain item ‘emotional’ is illustrated by the bars 25–28. (For a detailed description see Appendix A.

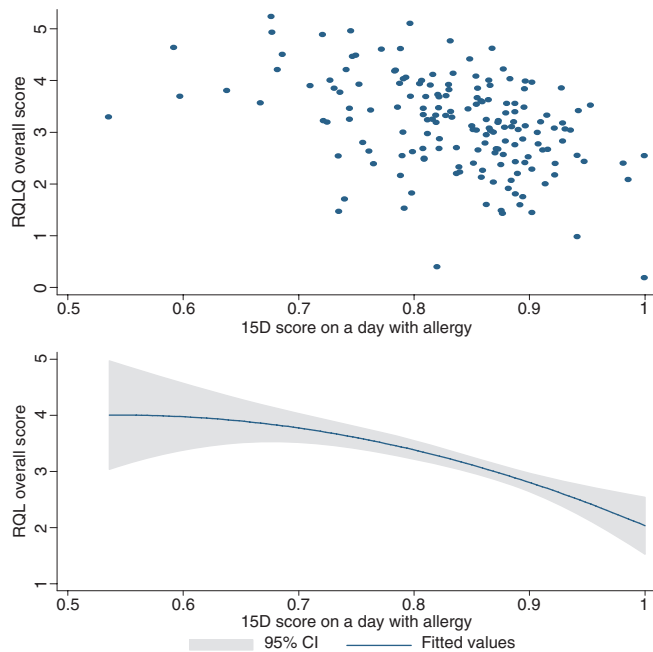


Figure 3. RQLQ score dependent of 15D utility score on a day with allergy ($n = 168$).

and the RQLQ instruments both showed a statistically significantly lower HRQL for women. Patients diagnosed with 'moderate-to-severe' RC had a statistically significantly lower HRQL than patients with 'no or mild' RC. This was found for all items on both instruments, confirming the hypothesis that a more severe RC diagnosis correlates with a lower HRQL. On the 15D instrument higher age was statistically significantly associated with a higher HRQL score. This was not observed

on the disease-specific RQLQ instrument. This result suggests that older people are better at coping with their allergy, a factor which is not captured by the RQLQ instrument.

In this study, the patients were interviewed just prior to the start of SCIT treatment. To the extent that respondents have an inclination to justify their choice of SCIT by exaggerating their symptoms on a day with allergy, this may bias the presented results. Another potential source of bias in the study was that the patients were self-selected to the study; hence they are unlikely to be representative of the population of allergy patients. There was no possibility, however, of a baseline analysis, as patients were enrolled only when appearing at the specialist center for the purpose of initiating SCIT treatment.

Patients filled in the questionnaires as they recalled a typical day caused by allergy and a typical day without allergic symptoms. Although this method may have introduced recall bias as compared to studies in and out of the pollen season, results obtained in this study (RQLQ-overall score = 3.1) did not differ substantially compared to previous studies (9, 33, 34).

This study shows that it was possible to measure a difference in the HRQL on the generic preference-based 15D utility instrument among allergic patients, and that the burden of disease was significant for this particular group of patients. The correlation analysis of the two instruments showed that they were statistically significantly correlated; the correlation coefficient was (-0.42). Analysis of correlations between the two instruments dimensions generally showed coefficients of equal or lower magnitude (Table 4). Interestingly, those 15D dimensions which appeared to be most sensitive to

Table 4. Correlation between 15D items and RQLQ domain items on a day with allergy

15D items	RQLQ domain items							RQLQ Overall ($n = 168$)
	Activity ($n = 180$)	Sleep ($n = 244$)	Non-nose/eye symptoms ($n = 243$)	Practical problems ($n = 246$)	Nose problems ($n = 242$)	Eye problems ($n = 245$)	Emotions ($n = 245$)	
Mobility	0.10	0.13*	0.25*	0.04	0.03	0.11	0.13*	0.06
Vision	0.21*	0.15*	0.24*	0.21*	0.16*	0.33*	0.31*	0.29*
Hearing	-0.00	0.04	0.11	-0.02	0.03	0.02	0.04	0.09
Breathing	0.07	0.34*	0.31*	-0.02	0.08	0.10	0.10	0.20*
Sleep	0.12	0.67*	0.26*	0.02	0.14*	0.10	0.15*	0.31*
Eating	0.01	0.03	0.11	0.10	0.02	0.06	0.13*	0.07
Speech	-0.26*	0.04	0.09	-0.18*	-0.04	-0.01	0.06	-0.11
Elimination	-0.09	0.02	0.14*	-0.07	0.02	0.02	0.07	-0.07
Usual activities	0.28*	0.16*	0.46*	0.16*	0.21*	0.21*	0.36*	0.37*
Mental function	0.14	0.14*	0.41*	0.10	0.17*	0.21*	0.31*	0.19*
Discomfort	0.30*	0.09	0.30*	0.22*	0.21*	0.38*	0.39*	0.38*
Depression	-0.02	0.06	0.29*	0.05	0.03	0.11	0.45*	0.23*
Distress	0.03	0.06	0.36*	0.03	0.03	0.13*	0.40*	0.26*
Vitality	0.27*	0.23*	0.54*	0.15	0.19*	0.24*	0.43*	0.41*
Sexual activity	0.16*	0.17*	0.44*	0.04	0.16*	0.16*	0.30*	0.32*
15D-score	-0.19*	-0.33*	-0.58*	-0.11	-0.19*	-0.32*	-0.49*	-0.42*

RQLQ, rhinoconjunctivitis Quality of Life Questionnaire; 15D, 15-dimensional instrument for measuring health-related quality of life.

*Significantly correlated items $P < 0.05$.

HRQL changes amongst the allergy/asthma patients did not correlate strongly with any of the RQLQ dimensions, suggesting that there are elements of HRQL which are not adequately captured by the RQLQ instrument. What is also clear is that the RQLQ dimensions 'Non-nose/eye symptoms' and 'Emotions' are most markedly associated with general HRQL.

In accordance with the previous studies, we found that the RQLQ scores do not differ statistically significantly across patients both with and without an asthma diagnosis RC Quality of Life Questionnaire is a tool developed for specific evaluation of patients suffering from RC. In the light of the 'one airway, one disease' concept, this can be regarded as a major shortcoming. A comprehensive assessment of allergic RC patients needs not only to take symptoms from the nose and eyes into consideration, but also symptoms from the lungs. The understanding of allergy being a systemic, immunological condition underlying asthma and RC has only surfaced recently; however, the present study seems to suggest that it has implications for HRQL assessment. For many years the common use of the RQLQ may have underestimated the real burden of disease in patients with allergic RC, as symptoms from the lungs were ignored by the RQLQ, although these are present in a large proportion of the RC patients. The present study indicates that the generic instrument 15D is capable of providing a more balanced view of the HRQL impairment in patients suffering from inhalation allergy.

The 15D instrument and the RQLQ instrument were capable of differentiating RC patients across different disease severities. The 15D instrument was, in addition, capable of differentiating asthma patients from nonasthma patients. The 15D appears to be able to capture dimensions of HRQL, which are not incorporated in the RQLQ. One of the strengths of the 15D instrument is that the total score is a weighted average across several dimensions, with the assignment of relative weightages based on the public preferences. In contrast, the RQLQ

score is based on an unweighted average, which implicitly assumes equal weightage. Hence, a comparison of RQLQ scores across health states which involve problems on more than one dimension may be invalid.

An additional advantage of including generic instruments (such as the 15D) in evaluations of interventions targeted at allergy patients is that such measures are preference-based, allowing for calculation of quality adjusted life-years. The quality adjusted life-year is a generic outcome measure. Such evaluations represent a useful tool for decision makers and may be a valuable input for optimizing the resource allocation across different patient groups.

Supplementary material

The following supplementary material is available for this article:

Appendix S1. Health economic analyses of treatment strategies for allergic respiratory tract illnesses (SABAL).

This material is available as part of the online article from: <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1398-9995.2007.01583.x> (This link will take you to the article abstract).

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Appendix A

More information on the EQ-5D and 15D instruments is available from the following web sites (November 2007):

EQ-5D: <http://www.euroqol.org/>

15D: <http://www.15d-instrument.net/15d>

**Health Economic Analyses of
Treatment Strategies for Allergic
Respiratory Tract Illnesses (SABAL)**

(SABAL)

A collaboration between the Health Economics Research Unit at the University of Southern Denmark, the Department of Respiratory Medicine at Århus Hospital and ALK-Abelló A/S, in an Industrial PhD project by Karin Dam Petersen.

PQ

Participant information for persons suffering from grass pollen and/or house dust mite allergies who are about to start specific desensitization treatment in the autumn, winter and spring of 2005/2006

You are being asked to participate in this project because you are about to start a desensitization treatment for allergy.

We wish to investigate the extent to which allergies affect people's quality of life and financial status. In a follow-up questionnaire that you will receive after about one year, we will ask your opinion about the desensitization treatment that you are now starting.

We ask you, therefore, to complete this questionnaire before you start desensitization treatment and to answer an almost identical questionnaire in about a year's time. The questionnaire will take approximately 20 minutes to complete.

This study is expected to contribute to improving treatment for allergic persons such as yourself. This makes it important that you participate in the study by filling in the enclosed questionnaire.

The study is based on this questionnaire as well as information from your medical journal and information from the Danish health insurance. The study will not have any immediate influence on your treatment, but its results may influence the treatment for future allergy patients.

Most questions may be answered by marking an X in a box, but some need a number or words. Please use capital letters when you write your answers. Some questions may be difficult to answer, but please try to answer by writing the answer that you think is best. This will help us more than if you give no answer at all.

If you have any questions, please feel free to contact the project leader by phone: (+45) 22 28 89 14 or by e-mail: kdbetersen@health.sdu.dk

When you have answered all the questions please return the questionnaire either to the physician who is giving you the desensitization treatment or to the secretary.

We hope you will be willing to answer the questionnaire.

Thank you in advance for your help.

Best regards,

Professor dr. med. Ronald Dahl, Århus Hospital, Department of Respiratory Medicine
Dr. med. Henning Løwenstein, Senior Vice President, Scientific Affairs ALK-Abelló
Professor Ph.d., MSc Dorte Gyrd-Hansen and Industrial PhD student, cand. odont., MPH Karin Dam Petersen, Health Economics Research Unit at the University of Southern Denmark.

Date of completion: |_|_| - |_|_| - |_|_|_|_| Danish social-security no. _____
 day month year

1. Are you allergic to ☐ Grass pollen ☐ House dust mites ☐ Other
 2. For how many years would you say you have been suffering from allergies? _____ years
 3. How many of the last 12 months have you been uncomfortable because of allergy symptoms? _____
 4. How would you characterize the average intensity of your allergy symptoms in the last 12 months?

	Intensity of symptoms						
	Not uncom- fortable	Slightly uncom- fortable	A little uncom- fortable	Somewhat uncom- fortable	Quite uncom- fortable	Very uncom- fortable	Extremely uncom- fortable
	0	1	2	3	4	5	6
Grass pollen	☐	☐	☐	☐	☐	☐	☐
House dust mites	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐
 5. Have you been forced to stay home from your work/education due to your allergy/asthma within the last 12 months?

Yes ☐ No ☐ If yes for how many days? _____ within the last 12 months
 6. Have there been days within the last 12 months where you have been unable to perform your usual leisure activities and daily chores because of your allergy/asthma?

Yes ☐ No ☐ If yes how many days? _____ within the last 12 months.
 7. How many kilometres will you have to travel to get to your challenge vaccination treatment? (the challenge vaccination phase is the period during which you are vaccinated about once a week with increasing doses) Km: _____
- Roughly how much time do you expect to use per vaccination during this challenge vaccination phase? (everything included) Time: _____

PQ

8. Do you expect to attend for the desensitization treatment during work/education hours or during leisure time?

- ☐ 100% work hours/education hours
- ☐ approx. 75% work hours/education hours and 25% leisure time
- ☐ approx. 50% work hours/education hours and 50% leisure time
- ☐ approx. 25% work hours/education hours and 75% leisure time
- ☐ 100% leisure time

9. Have you been in contact with an on-call doctor, an emergency department, a hospital or other health professionals within the last 12 months due to your allergy/asthma?

No ☐

On-call doctor? No. of times _____

Emergency dept.? No. of times _____ Which emergency dept.? _____

Admitted? No. of days _____ Which hospitals? _____

Other health professionals? No. of times _____ Which health professionals? _____

10. Have you used any form of non-prescribed medication (over-the-counter) or alternative treatment for your allergy/asthma in the last 12 months? ☐ Yes ☐ No

If yes, which? _____

How much has this roughly cost you (all included) in DKK? _____

11. To what extent has medication helped your hay fever/asthma symptoms in the last 12 months? Include prescription and over-the-counter/alternative medication (Please mark only one X in each column).

	Hay fever symptoms	Asthma symptoms
The medication has eliminated all symptoms	☐	☐
The medication has helped a lot	☐	☐
The medication has helped fairly well	☐	☐
The medication has only helped to some degree	☐	☐
The medication has not helped	☐	☐
Have not used medication for hay fever/asthma symptoms in the last 12 months	☐	☐

12. Have there been any side-effects in relation to the medication you have used in the last 12 months?

- Many and serious side-effects ☐
- Some side-effects ☐
- Only few side-effects ☐
- No side-effects ☐
- Have not used medication ☐

13. Do you have any pets at home?

Yes ☐ No ☐ If Yes: Which animals? _____

On the following pages you will be asked to answer questions from three different internationally used questionnaires (measuring instruments). The questionnaire that starts on the next page is the RQLQ. It is a disease-specific questionnaire that is used for patients suffering from allergy or asthma. The second questionnaire starts on page 9 and is called EQ-5D. This is a rough measuring instrument that is used to assess general health-related quality of life. The third questionnaire starts on page 12 and is called 15-D. This is a more refined instrument that is also used to assess general health. You might find that some questions in these instruments seem very alike. We use several questionnaires, however, as we would like to investigate which of these best measure allergy/asthma-related discomfort.

PQ

RHINOCONJUNCTIVITIS QUALITY OF LIFE QUESTIONNAIRE (RQLQ)

We would like you to think of ways in which your nose/eye symptoms trouble you in your life. We are particularly interested in activities that you do, but which are limited by your nose/eye symptoms. You may be limited because you do these activities less often, or less well, or because they are less enjoyable. It should be activities which you do frequently and which are important to your everyday-life.

Answer ALL questions by choosing the number that best describes how troubled you are on A TYPICAL DAY WHEN YOU SUFFER FROM ALLERGY DUE TO YOUR NOSE/EYE SYMPTOMS.

Here is a list of activities in which some people with nose/eye symptoms are limited. We hope that this will help you identify the 3 most important activities in which you have been limited by your nose/eye symptoms ON A TYPICAL DAY WHEN YOU SUFFER FROM ALLERGY

1. BICYCLING	16. SINGING
2. READING	17. DOING REGULAR SOCIAL ACTIVITIES
3. SHOPPING	18. HAVING SEXUAL RELATIONS
4. DOING HOME MAINTENANCE	19. TENNIS
5. DOING YOUR HOUSEWORK	20. TALKING
6. GARDENING	21. EATING
7. WATCHING TV	22. VACCUMING
8. EXERCISING OR WORKING OUT	23. VISITING FRIENDS OR RELATIVES
9. GOLF	24. GOING FOR A WALK
10. USING A COMPUTER	25. WALKING THE DOG
11. MOWING THE LAWN	26. OUTSIDE ACTIVITIES
12. PLAYING WITH PETS	27. CARRYING OUT YOUR ACTIVITIES AT WORK
13. PLAYING WITH CHILDREN OR GRANDCHILDREN	28. SITTING OUTSIDE
14. PLAYING SPORTS	29. TAKING CHILDREN TO THE PARK
15. DRIVING	

Please write your 3 most important activities below.

ACTIVITIES

ON A TYPICAL DAY WHEN YOU SUFFER FROM ALLERGY, how **TROUBLED** are you in each of these activities due to your nose/eye symptoms?

	Not troubled 0	Hardly troubled 1	Somewhat troubled 2	Moderately troubled 3	Quite a bit troubled 4	Very troubled 5	Extremely troubled 6	Activity not done 9
1. _____	☐	☐	☐	☐	☐	☐	☐	☐
2. _____	☐	☐	☐	☐	☐	☐	☐	☐
3. _____	☐	☐	☐	☐	☐	☐	☐	☐

SLEEP

How **TROUBLED** are you ON A TYPICAL DAY WHEN YOU SUFFER FROM ALLERGY by each of these sleep problems due to your nose/eye symptoms?

	<i>← more</i> Not troubled 0	<i>more ←</i> Hardly troubled 1	<i>more ←</i> Somewhat troubled 2	<i>more ←</i> Moderately troubled 3	<i>more ←</i> Quite a bit troubled 4	<i>more ←</i> Very troubled 5	<i>Very troubled</i> Extremely troubled 6
4. Difficulty getting to sleep	☐	☐	☐	☐	☐	☐	☐
5. Wake up during the night	☐	☐	☐	☐	☐	☐	☐
6. Lack of a good night's sleep	☐	☐	☐	☐	☐	☐	☐

NON-NOSE/EYE SYMPTOMS

How troubled are you ON A TYPICAL DAY WHEN YOU SUFFER FROM ALLERGY due to these symptoms?

	Not troubled 0	Hardly troubled 1	Somewhat troubled 2	Moderately troubled 3	Quite a bit troubled 4	Very troubled 5	Extremely troubled 6
7. Fatigue (lack of energy)	☐	☐	☐	☐	☐	☐	☐
8. Thirst	☐	☐	☐	☐	☐	☐	☐
9. Reduced productivity	☐	☐	☐	☐	☐	☐	☐
10. Tiredness	☐	☐	☐	☐	☐	☐	☐
11. Poor concentration	☐	☐	☐	☐	☐	☐	☐
12. Headache	☐	☐	☐	☐	☐	☐	☐
13. Worn out	☐	☐	☐	☐	☐	☐	☐

PRACTICAL PROBLEMS

How troubled are you ON A TYPICAL DAY WHEN YOU SUFFER FROM ALLERGY in each of these activities due to your nose/eye symptoms?

	Not troubled 0	Hardly troubled 1	Somewhat troubled 2	Moderately troubled 3	Quite a bit troubled 4	Very troubled 5	Extremely troubled 6
14. Inconvenience of having to carry tissues or handkerchiefs	☐	☐	☐	☐	☐	☐	☐
15. Need to rub nose or eyes	☐	☐	☐	☐	☐	☐	☐
16. Need to blow nose repeatedly	☐	☐	☐	☐	☐	☐	☐

PQ

NASAL SYMPTOMSHow troubled are you ON A TYPICAL DAY WHEN YOU SUFFER FROM ALLERGY by each of these symptoms?

	Not troubled 0	Hardly troubled 1	Somewhat troubled 2	Moderately troubled 3	Quite a bit troubled 4	Very troubled 5	Extremely troubled 6
17. Stuffy or blocked nose	☐	☐	☐	☐	☐	☐	☐
18. Runny nose	☐	☐	☐	☐	☐	☐	☐
19. Sneezing	☐	☐	☐	☐	☐	☐	☐
20. Catarrh (drainage of mucous down the back of your nose)	☐	☐	☐	☐	☐	☐	☐

EYE SYMPTOMSHow troubled are you ON A TYPICAL DAY WHEN YOU SUFFER FROM ALLERGY by each of these symptoms?

	Not troubled 0	Hardly troubled 1	Somewhat troubled 2	Moderately troubled 3	Quite a bit troubled 4	Very troubled 5	Extremely troubled 6
21. Itchy eyes	☐	☐	☐	☐	☐	☐	☐
22. Watery eyes	☐	☐	☐	☐	☐	☐	☐
23. Sore eyes	☐	☐	☐	☐	☐	☐	☐
24. Swollen eyes	☐	☐	☐	☐	☐	☐	☐

EMOTIONALHow often ON A TYPICAL DAY WHEN YOU SUFFER FROM ALLERGY are you troubled by the below emotions as a result of your nose/eye symptoms?

	Not troubled 0	Hardly troubled 1	Somewhat troubled 2	Moderately troubled 3	Quite a bit troubled 4	Very troubled 5	Extremely troubled 6
25. Frustrated	☐	☐	☐	☐	☐	☐	☐
26. Impatient or restless	☐	☐	☐	☐	☐	☐	☐
27. Irritable	☐	☐	☐	☐	☐	☐	☐
28. Embarrassed by your symptoms	☐	☐	☐	☐	☐	☐	☐

YOUR GENERAL HEALTH RELATED QUALITY OF LIFE; EuroQoL-5D

By placing a tick in one box in each group below, please indicate which statements best describe your own health state on a typical day when you **DO NOT** suffer from allergy (tick in the box in the left side) and a typical day when you **suffer** from allergy (tick in the box in the right side).

1. Mobility on a typical day;

Heading with one style

when you **DO NOT** suffer from allergy

same style

when you suffer from

allergy

- ☐ ₁ I have no problems in walking about..... ☐ ₁
- ☐ ₂ I have some problems in walking about..... ☐ ₂
- ☐ ₃ I am confined to bed ☐ ₃

All subheadings same/eqnot style

2. Self-Care on a typical day;

when you **DO NOT** suffer from allergy

when you suffer from

allergy

- ☐ ₁ I have no problems with self-care..... ☐ ₁
- ☐ ₂ I have some problems with washing or dressing myself..... ☐ ₂
- ☐ ₃ I am unable to wash or dress myself..... ☐ ₃

3. Usual Activities (e.g. work, study, housework, family or leisure activities) on a typical day;

when you **DO NOT** suffer from allergy

when you suffer from

allergy

- ☐ ₁ I have no problems performing my usual activities..... ☐ ₁
- ☐ ₂ I have some problems with performing my usual activities..... ☐ ₂
- ☐ ₃ I am unable to perform my usual activities ☐ ₃

PQ

same style

4. Pain/discomfort on a typical day;

when you DO NOT suffer from allergy

when you suffer from allergy

- ☐ ₁ I have no pain or discomfort ☐ ₁
- ☐ ₂ I have moderate pain or discomfort ☐ ₂
- ☐ ₃ I have extreme pain or discomfort ☐ ₃

5. Anxiety/depression on a typical day;

when you DO NOT suffer from allergy

when you suffer from

allergy

- ☐ ₁ I am not anxious or depressed ☐ ₁
- ☐ ₂ I am moderately anxious or depressed ☐ ₂
- ☐ ₃ I am extremely anxious or depressed ☐ ₃

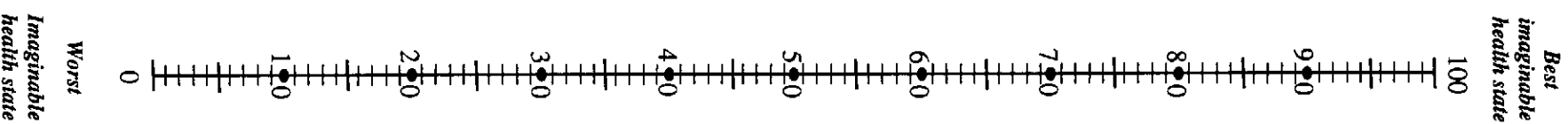
PQ

To help people say how good or bad a health state is, we have drawn a scale (rather like a thermometer) on which the best state you can imagine is marked 100 and the worst state you can imagine is marked 0.

We would like you to indicate on this scale how good or bad your own health is on a typical day when your **DO NOT suffer** from allergy (**draw a line from the upper part of the box**) and how good or bad your own health is on a typical day when you **suffer** from allergy (**draw a line from the lower part of the box**). Please do this by drawing a line from the box below to whichever point on the scale indicates how good or bad your health state is on the two different situations

Your health state on a typical day when you **DO NOT** suffer from allergy

Your health state on a typical day when you **SUFFER** from allergy



PQ

QUALITY OF LIFE QUESTIONNAIRE 15D

Instructions: For each of the categories Mobility, Vision, Hearing etc. below, please indicate which alternative best describes your health state on a typical day when you **ARE NOT suffering** from allergy (tick in the box in the left side) and a typical day when you **suffer** from allergy (tick in the box in the right side).

1. Mobility on a typical day

when you ARE NOT suffering from allergy

when you are suffering from allergy

I am able to walk normally (without difficulty) indoors, outdoors and

☐ 1..... on stairs..... ☐ 1

I am able to walk without difficulty indoors, but outdoors and/or on stairs

☐ 2..... I have slight difficulties..... ☐ 2

I am able to walk without help indoors (with or without an appliance), but outdoors

☐ 3..... and/or on stairs only with considerable difficulty or with help from others. ☐ 3

☐ 4..... I am able to walk indoors only with help from others ☐ 4

☐ 5..... I am completely bed-ridden and unable to move about ☐ 5
2. Vision on a typical day

when you ARE NOT suffering from allergy

when you are suffering from allergy

I see normally, i.e., I can read newspapers and TV text without difficulty

☐ 1..... (with or without glasses) ☐ 1

I can read papers and/or TV text with slight difficulty (with or without

☐ 2..... glasses) ☐ 2

I can read papers and/or TV text with considerable difficulty (with or

☐ 3..... without glasses) ☐ 3

I cannot read papers or TV text either with glasses or without, but I can see

☐ 4..... enough to walk about without guidance..... ☐ 4

I cannot see enough to walk about without a guide, i.e. I am almost or

☐ 5..... completely blind ☐ 5

3. Hearing on a typical day

when you ARE NOT suffering from allergy

when you are suffering from allergy

- ☐₁..... I can hear normally, i.e. normal speech (with or without a hearing aid) ☐₁
- ☐₂..... I can hear normal speech with a little difficulty ☐₂
- I can hear normal speech with considerable difficulty; in conversation I need
- ☐₃..... voices to be louder than normal ☐₃
- ☐₄..... I hear even loud voices poorly; I am almost deaf ☐₄
- ☐₅..... I am completely deaf ☐₅

4. Breathing on a typical day;

when you ARE NOT suffering from allergy

when you are suffering from allergy

- I am able to breathe normally, i.e. with no shortness of breath or other
- ☐₁..... breathing difficulty ☐₁
- I have shortness of breath during heavy work or sports, or when walking
- ☐₂..... briskly on a flat ground or slightly uphill ☐₂
- I have shortness of breath when walking on flat ground at the same speed as
- ☐₃..... others my age ☐₃
- I get shortness of breath even after light activity, e.g. washing or dressing
- ☐₄..... myself ☐₄
- ☐₅..... I have breathing difficulties almost all the time, even when resting ☐₅

5. Sleeping on a typical day;

when you ARE NOT suffering from allergy

when you are suffering from allergy

- ☐₁..... I am able to sleep normally, i.e. I have no problems with sleeping ☐₁
- I have slight problems with sleeping e.g. difficulty in falling asleep, or sometimes
- ☐₂..... waking at night ☐₂
- I have moderate problems with sleeping, e.g. disturbed sleep, or feeling I
- ☐₃..... have not slept enough ☐₃
- I have great problems with sleeping, e.g. having to use sleeping pills often or
- ☐₄..... routinely, or usually waking at night and/or too early in the morning ☐₄
- I suffer severe sleeplessness, e.g. sleep is almost impossible even with full
- ☐₅..... use of sleeping pills, or staying awake most of the night ☐₅

PQ

6. Eating on a typical day;**when you ARE NOT suffering from allergy****when you are suffering from allergy**

- ☐ 1..... I am able to eat normally, i.e. with no help from others ☐ 1
- I am able to eat by myself with minor difficulty (e.g. slowly, clumsily, shakily,
- ☐ 2..... or with special appliances) ☐ 2
- ☐ 3..... I need help from another person in eating ☐ 3
- ☐ 4..... I am unable to eat by myself at all, so I must be fed by another person ☐ 4
- ☐ 5..... I am unable to eat at all, so I am fed either by tube or intravenously ☐ 5

7. Speech on a typical day**when you ARE NOT suffering from allergy****when you are suffering from allergy**

- ☐ 1..... I am able to speak normally, e.g. clearly, audibly and fluently ☐ 1
- I have slight speech difficulties e.g. occasional fumbling for words,
- ☐ 2..... mumbling or changes of pitch ☐ 2
- I can make myself understood, but my speech is e.g. disjointed, faltering,
- ☐ 3..... stuttering or stammering ☐ 3
- ☐ 4..... Most people have great difficulty understanding my speech ☐ 4
- ☐ 5..... I can only make myself understood by gestures ☐ 5

8. Elimination on a typical day**when you ARE NOT suffering from allergy****when you are suffering from allergy**

- ☐ 1..... My bladder and bowel work normally and without problems ☐ 1
- I have slight problems with my bladder and/or bowel function, e.g. difficulties
- ☐ 2..... with urination, or loose or hard bowels ☐ 2
- I have marked problems with my bladder and/or bowel function, e.g. occasional
- ☐ 3..... 'accidents', or severe constipation or diarrhoea ☐ 3
- I have serious problems with my bladder and/or bowel function, e.g. routine
- ☐ 4..... 'accidents', or need for catheterization or enemas ☐ 4
- ☐ 5..... I have no control over my bladder and/or bowel function ☐ 5

9. Usual activities on a typical daywhen you ARE NOT suffering from allergywhen you are suffering from allergy

I am able to perform my usual activities (e.g. employment, studying,

☐ ₁..... housework, leisure activities) without difficulty..... ☐ ₁

I am able to perform my usual activities slightly less effectively or with

☐ ₂..... minor difficulty ☐ ₂

I am able to perform my usual activities much less effectively, with

☐ ₃..... considerable difficulty, or not completely ☐ ₃☐ ₄..... I can only manage a small proportion of my previous usual activities ☐ ₄☐ ₅..... I am unable to manage any of my previously usual activities ☐ ₅**10. Mental function on a typical day**when you ARE NOT suffering from allergywhen you are suffering from allergy☐ ₁..... I am able to think clearly and logically, and my memory functions well..... ☐ ₁

I have slight difficulties in thinking clearly and logically, or my memory

☐ ₂..... sometimes fails me ☐ ₂

I have marked difficulties in thinking clearly and logically, or my memory

☐ ₃..... is somewhat impaired..... ☐ ₃

I have great difficulties in thinking clearly and logically, or my memory

☐ ₄..... is seriously impaired ☐ ₄☐ ₅..... I am permanently confused and disoriented in place and time ☐ ₅**11. Discomfort and symptoms on a typical day**when you ARE NOT suffering from allergywhen you are suffering from allergy☐ ₁..... I have no physical discomfort or symptoms, e.g. pain, ache, nausea, itching etc..... ☐ ₁☐ ₂..... I have mild physical discomfort or symptoms, e.g. pain, ache, nausea, itching etc. ☐ ₂☐ ₃..... I have marked physical discomfort or symptoms, e.g. pain, ache, nausea, itching etc. ☐ ₃☐ ₄..... I have severe physical discomfort or symptoms, e.g. pain, ache, nausea, itching etc... ☐ ₄

I have unbearable physical discomfort or symptoms, e.g. pain, ache, nausea,

☐ ₅..... itching etc. ☐ ₅

PQ

12. Depression on a typical daywhen you ARE NOT suffering from allergywhen you are suffering from allergy

- ☐₁..... I do not feel at all sad, melancholic or depressed ☐₁
- ☐₂..... I feel slightly sad, melancholic or depressed ☐₂
- ☐₃..... I feel moderately sad, melancholic or depressed ☐₃
- ☐₄..... I feel very sad, melancholic or depressed ☐₄
- ☐₅..... I feel extremely sad, melancholic or depressed ☐₅

13. Distress on a typical daywhen you ARE NOT suffering from allergywhen you are suffering from allergy

- ☐₁..... I do not feel at all anxious, stressed or nervous ☐₁
- ☐₂..... I feel slightly anxious, stressed or nervous ☐₂
- ☐₃..... I feel moderately anxious, stressed or nervous ☐₃
- ☐₄..... I feel very anxious, stressed or nervous ☐₄
- ☐₅..... I feel extremely anxious, stressed or nervous ☐₅

14. Vitality on a typical daywhen you ARE NOT suffering from allergywhen you are suffering from allergy

- ☐₁..... I feel healthy and energetic ☐₁
- ☐₂..... I feel slightly weary, tired or feeble ☐₂
- ☐₃..... I feel moderately weary, tired or feeble ☐₃
- ☐₄..... I feel very weary, tired or feeble ☐₄
- ☐₅..... I feel extremely weary, tired or feeble ☐₅

15. Sexual activity on a typical daywhen you ARE NOT suffering from allergywhen you are suffering from allergy

- ☐₁..... My state of health has no adverse effect on my sexual activity ☐₁
- ☐₂..... My state of health has a slight effect on my sexual activity ☐₂
- ☐₃..... My state of health has a considerable effect on my sexual activity ☐₃
- ☐₄..... My state of health makes sexual activity almost impossible ☐₄
- ☐₅..... My state of health makes sexual activity impossible ☐₅

As all answers are anonymous it would help us understand your answers better if we have a little background data, which is provided by the following questions.

- 1. Have you experienced severe illness?**
- | | Yes | No |
|----------------------|--------------------------|--------------------------|
| in yourself | ☐ | ☐ |
| in your family | ☐ | ☐ |
| in caring for others | ☐ | ☐ |

- 2. Are you a:**
- | | |
|-------------------|--------------------------|
| current smoker | ☐ |
| former smoker | ☐ |
| have never smoked | ☐ |

- 3. Do you work, or have you ever worked, in health or social services?**
- | | Yes | No |
|--|--------------------------|--------------------------|
| | ☐ | ☐ |

If yes, in what capacity?

- 4. Which of the following best describes your main activity? (please mark one X only)**
- | | |
|---------------------------|--------------------------|
| employed or self-employed | ☐ |
| retired | ☐ |
| housework | ☐ |
| student | ☐ |
| seeking work | ☐ |
| other (please specify) | ☐ |
-

- 5. What level of school education do you have? (please mark one X only)**
- | | |
|--|--------------------------|
| Danish 7th grade or less | ☐ |
| Danish 8th grade | ☐ |
| Danish 9th grade, middle school exam | ☐ |
| Danish 10th grade, lower secondary school leaving exam | ☐ |
| Danish advanced level certificate or similar | ☐ |
| Danish Diploma in Commerce or similar | ☐ |
| Other | ☐ |

PQ

6. What vocational or further education do you have apart from your school education? (please mark one X only)

- | | |
|---|--------------------------|
| Semi-skilled worker | ☐ |
| Basic training for skilled worker (not including second part) | ☐ |
| Apprentice or similar | ☐ |
| Other vocational education of at least 12 months duration | ☐ |
| Further education (less than 3 years) | ☐ |
| Further education (3-4 years) | ☐ |
| Further education (more than 4 years) | ☐ |
| Other vocational education | ☐ |
| No vocational education | ☐ |

8. What is your area code?

9. What is your household's total annual income before tax (gross income)? (please mark one X only)

- | | |
|----------------------|--------------------------|
| Below 100.000 DKK | ☐ |
| 100.000-199.999 | ☐ |
| 200.000-299.999 | ☐ |
| 300.000-399.999 | ☐ |
| 400.000-499.999 | ☐ |
| 500.000-599.999 | ☐ |
| 600.000-699.999 | ☐ |
| 700.000-799.999 | ☐ |
| 800.000-899.999 | ☐ |
| 900.000-999.999 | ☐ |
| More than 1.000.000 | ☐ |
| Do not know | ☐ |
| Prefer not to answer | ☐ |

10. How many persons live in your household: _____

11. May we contact you by telephone if we have further questions? Yes ☐ No ☐

If yes, please write your telephone number(s) here: _____

Please check that you have answered all the questions

Thank you for your help