

Development and validation of a health-related quality-of-life questionnaire in patients with yellow jacket allergy

Joanne N. G. Oude Elberink, MD,^a Jan G. R. de Monchy, MD, PhD,^a
David B. K. Golden, MD,^b Jan-Leendert P. Brouwer, MD,^a Gordon H. Guyatt, MD,^c
and Anthony E. J. Dubois MD, PhD^a Groningen, The Netherlands, Baltimore, Md, and
Hamilton, Ontario, Canada

Background: The effects of an anaphylactic reaction after a yellow jacket sting on health-related quality of life (HRQL) have not been studied and are thus unknown.

Objective: Development of a disease-specific instrument to measure HRQL in patients with yellow jacket allergy and validation of this instrument both cross-sectionally and longitudinally.

Methods: Quality-of-life items were generated from patient interviews. Items with the highest impact were considered and correlated cross-sectionally with an independent measure (consisting of 2 questions in which patients were asked what they expected would happen if they were stung again, "Expectation of Outcome" questionnaire). Cross-sectional and longitudinal validation was achieved by administering this instrument to 69 Dutch patients. The questionnaire was also administered to 50 patients with yellow jacket allergy in Baltimore, Maryland, to establish cross-sectional validity of the English version.

Results: The survey showed that patients experienced impairment in quality of life especially because of emotional distress. The resultant questionnaire has 14 items. The cross-sectional validation yielded a correlation coefficient of 0.69 for the Dutch version and 0.56 for the English version. The longitudinal validation yielded a correlation coefficient of 0.71. The responsiveness of this instrument was demonstrated by the questionnaire's ability to detect changes over time. It may be completed in approximately 10 minutes by patients without assistance.

Conclusion: Patients with yellow jacket allergy experience impairment in quality of life especially because of emotional distress. It has been possible to develop and validate a questionnaire (the Vespidae Allergy Quality of Life Questionnaire) by which the HRQL of these patients can be measured. The instrument may be administered rapidly and is easy to use. (*J Allergy Clin Immunol* 2002;109:162-70.)

Key words: Quality of life, yellow jacket allergy, insect allergy, Hymenoptera allergy, venom immunotherapy

Although it is widely recognized that most patients with Hymenoptera allergy make efforts to avoid a recurrence after an anaphylactic reaction, the impact of an anaphylactic reaction after a yellow jacket sting on health-related quality of life (HRQL) is unknown. Similarly, fear of a re-sting may have negative effects on their emotional, social, and sometimes even professional functioning, but this has never been studied systematically.

Although allergy to Hymenoptera stings is very common, the medical morbidity and mortality rates are low, partly because of the low re-sting frequency^{1,2} and also partly because of the natural history of insect sting anaphylaxis with a variable risk of anaphylaxis after re-exposure.³ In contrast to public opinion, the risk of death from a reaction to a sting, even when severe systemic reactions have occurred previously, is small.^{1,3,4}

Measurement of HRQL allows health states and outcomes of therapy to be evaluated in terms that are relevant to patients. Such measurements are particularly informative for conditions such as Hymenoptera allergy where mortality and medical morbidity are low¹ and thus insensitive to changes in health status. Similarly, such conditions generally do not lend themselves to measurement of HRQL with generic instruments, which are more suited to disorders characterized by a relatively large burden of symptoms. For these reasons, a disease-specific instrument was developed to measure HRQL in patients with yellow jacket allergy. This instrument was used in a Dutch language study examining the effects of venom immunotherapy (VIT) on HRQL, the results of which are presented elsewhere.⁵ Subsequently, an English language version of this instrument was studied in a group of American patients with yellow jacket allergy.

This report describes the methods used to develop and validate the original Dutch language version of the instrument, as well as the subsequent English translation.

METHODS

Item generation and reduction

Twenty adult patients who had had an allergic reaction after yellow jacket stings (severity ranging from mild to severe) were asked to identify issues in their daily lives affected by their allergy to yellow

From ^athe Department of Allergology, University Hospital Groningen, The Netherlands; ^bDepartment of Clinical Immunology, Johns Hopkins University School of Medicine, Baltimore, Maryland; and ^cDepartment of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, Ontario, Canada.

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Reprint requests: J. N. G. Oude Elberink, MD, Department of Allergology, University Hospital of Groningen, Hanzplein 1, PO Box 30.001, 9700 RB Groningen, The Netherlands.

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Abbreviations used

HRQL: Health-related quality of life
VIT: Venom immunotherapy

low jackets. A list of 113 potentially important items (falling into 9 domains, see headings in Table I) was generated from these unstructured interviews, as well as from review of the literature and the experience of the investigators.

We then asked 26 other patients (11 men and 15 women; age range, 18-65 years) to indicate which of the 113 items were troublesome and to indicate how disturbing each of the identified items was. All of these patients had experienced a systemic reaction after a yellow jacket sting (severity graded according to the method of Mueller⁶: grade I: n = 2 [8%], grade II: n = 5 [19%], grade III: n = 9 [35%], grade IV: n = 4 [15%]). The specific relevance of each item in relation to allergy to yellow jackets was stressed by adding the phrase "because of your allergy" in an inquiry about the item. The response options were "yes" or "no" for each item, followed by a 5-point response option indicating the degree of importance related to that item. For each item, the proportion of subjects who labeled the item as troublesome (frequency), the mean importance score in those subjects indicating an item to be troublesome (mean importance), and the product of the frequency and the mean importance (impact) were calculated.^{7,8} The maximum possible impact if all 26 subjects chose an item and rated it 5 would be 5.0. Items with an impact of >1.0 were selected. Selected items were converted to questions with 7-point response rates for the cross-sectional validation.

Validation

"Expectation of Outcome" Questionnaire. Validation consists of the comparison of the measurement carried out with the specific HRQL instrument with an independent measure. In most quality-of-life studies, the independent measure is usually a combination of symptom scores, medication use, and other conventional medical measurements of the severity of disease. In patients with a yellow jacket allergy, an independent measure could be the outcome of a subsequent sting. However, because most patients do not experience a re-sting, such an independent measure is not suitable. Therefore, realizing that in patients who had experienced sting anaphylaxis the change in expected outcome of future stings is the most important target of intervention and the source of quality-of-life changes, we developed a specific instrument capable of capturing this expectation, the Expectation of Outcome measure. This questionnaire consists of 2 questions (Table II) with a 7-point scale in which patients were asked to indicate their expectation of the outcome of a future insect sting. The mean score of these items was used for statistical calculations.

Cross-sectional validation of individual items. This questionnaire was administered to 70 patients with yellow jacket allergy from 5 different treatment groups: (1) untreated, (2) recently started VIT (not yet receiving maintenance dose), (3) after 1 year of VIT, (4) after 3 years of VIT, (5) between 0 and 5 years after a 3- to 5-year course of VIT. Each treatment group consisted of 15 patients, except group 1 (n = 10). Cross-sectional validity was established by calculating Pearson's correlation coefficient between individual questions and the mean of both Expectation of Outcome questions. Questions with the highest correlation coefficients were selected for the final questionnaire. Cronbach's reliability coefficient was used to assess the internal consistency of the questionnaire as a whole. An $\alpha > .7$ was considered reliable.^{9,10}

Longitudinal validation. Longitudinal validation was carried out in the context of a randomized controlled trial of VIT described elsewhere.⁵ Briefly, patients who experienced a systemic reaction after a yellow jacket sting who visited the outpatient department were asked to complete the specific HRQL instrument (Vespid Allergy Quality of Life Questionnaire) and the Expectation of Outcome questionnaire. Patients were seen by a physician for a medical history and standard physical examination. Possible candidates for VIT were then given standardized written information about their allergy, as well as further explanation by the trial technician. Patients consenting to randomization were allocated by block stratification to one of the two open label study arms, namely, VIT for 1 year (n = 34) or carrying an Epipen for the same period (n = 35). If patients refused randomization, they were asked to participate in a non-randomized longitudinal study of either VIT or Epipen. The following summer, after 1 year of treatment with either VIT or an Epipen, the set of measures was re-administered. All patients participating in the study gave their written informed consent. The study was approved by the medical ethics committee of University Hospital Groningen.⁵

Translation and cross-sectional validation of the English version. The final Dutch language instrument was translated into English, as were the Expectation of Outcome questions, by a native Dutch and English speaker (A.E.J.D.), without backward translation. The resultant English language instrument was administered to 50 patients in Baltimore. External validity was investigated by means of the Pearson's correlation coefficient between individual items, the total questionnaire, and the Expectation of Outcome questionnaire. Cronbach's reliability coefficient was used to assess the internal consistency of the questionnaire as a whole. An $\alpha > .7$ was considered reliable.^{9,10}

RESULTS

Instrument development

The survey (Table I) showed that patients experienced impairment in quality of life especially because of emotional distress and the necessity of being alert during activities of daily living. Three domains (personal care, social interaction, and mobility) were not important at all. There were no particular activities in which every patient felt limited. The range of items was broad, and few of the activities were relevant to a majority of respondents. However, those items chosen by a patient were very important for that particular patient. In contrast, nearly all respondents indicated that many of the items in the domain "emotional feelings" were relevant and important. We therefore decided to score the instrument with no domains. Items considered for the final questionnaire were those that scored highest in impact. When an arbitrary cutoff value of 1.38 was used for impact, 15 items were initially identified.

Cross-sectional validation of individual items

Of the 70 patients, 58 returned their questionnaire (83%). The response of the different treatment groups varied between 73% (group 2 and 4), 86% (group 3 and 5), and 100% (group 1). Four patients (6.9%) failed to complete all items. The characteristics of the 58 patients

TABLE I. Item reduction

Domain	%	MI	OI
Working activities			
29 Alert during work	57.7	2.60	1.50
28 Less comfortable during work	26.9	3.29	0.89
27 Doing certain work less	19.2	3.40	0.65
26 Work more inside	15.4	3.00	0.46
25 Work less outside	15.4	2.00	0.31
Personal care			
37 Uneasy when barefoot	42.3	2.00	0.85
34 Uneasy with non-covering clothing	26.9	3.00	0.81
31 More covering clothing	23.1	3.33	0.77
35 Less walking barefoot	42.3	1.64	0.69
40 Using cosmetics less	34.6	1.60	0.55
30 Feeling limited in choice of clothing	11.5	3.33	0.38
33 More tight-/close-fitting clothing	11.5	3.00	0.35
42 Increased use of insect repellants	15.4	2.25	0.35
39 Feeling limited in choice of cosmetics	15.4	1.50	0.23
32 Taking kind of clothing into account	11.5	2.67	0.31
41 Uneasy when using perfumes	7.7	3.50	0.20
36 Wearing more closed footwear	3.8	1.00	0.03
38 Using other washing powder	0.0	0.00	0.00
Social interactions			
49 Alerting neighborhood	76.9	1.35	1.04
46 Giving information to friends	61.5	1.19	0.73
48 Talking about your allergy	34.6	1.00	0.35
47 Pointing out allergy to neighborhood	30.8	1.13	0.35
50 Feeling that family is afraid	15.4	2.00	0.31
44 Fewer activities with family/friends	11.5	3.30	0.38
51 Feeling that family feels limited	3.8	2.00	0.08
45 Visiting family less	0.0	0.00	0.00
Home care			
69 Alert during gardening	69.2	2.72	1.88
63 Using fly swatter	53.8	1.93	0.28
68 Uneasy during gardening	34.6	3.20	1.11
65 Feeling limited in gardening/doing odd jobs	23.1	4.17	0.96
67 Less gardening	23.1	3.00	0.69
59 Installing screens	23.1	1.67	0.39
64 Doing fewer odd jobs	19.2	4.00	0.77
62 Using wasp traps	19.2	1.20	0.23
58 Uneasy doing an errand	15.4	2.75	0.42
60 More closed windows and doors	15.4	2.25	0.35
54 Having less fruit at home	11.5	3.00	0.35
66 Adaptations in the garden	7.7	4.00	0.31
61 Putting less garbage outside	7.7	2.00	0.15
56 Uneasy when hanging out the laundry	3.8	5.00	0.19
57 Doing fewer errands	3.8	5.00	0.19
55 Not hanging out the laundry	3.8	2.00	0.08
71 Using insecticides	3.8	1.00	0.04
52 Feeling limited in housekeeping	3.8	1.00	0.04
53 Having fewer flowers at home	0.0	0.00	0.00
Eating and drinking			
74 Alert during eating	76.9	3.00	2.30
75 Feeling uneasy during eating	53.8	2.93	1.57
79 Covering food outside	46.2	2.00	0.92
80 Closing bottle/glass	38.5	2.10	0.81
78 Going less to sidewalk cafes	19.2	3.80	0.73
73 Eating outside less	19.2	3.40	0.65
76 Having less sweets on the table	19.2	2.40	0.46
77 Using some foods less	3.8	2.00	1.31
72 Feeling limited in choice of food/beverages	3.8	3.00	0.12
81 Using alcohol less	3.8	1.00	0.04

(continued)

TABLE I. (continued)

Domain	%	MI	OI
Mobility			
85 Alert when being out and about	50.0	2.54	1.27
82 Feeling limited in freedom of movement	30.8	2.75	0.85
89 Feeling uneasy when walking	30.8	2.75	0.85
87 Feeling uneasy when bicycling	26.9	2.86	0.77
91 Being afraid of being stung during driving	15.4	3.00	0.49
58 Feeling uneasy doing an errand	15.4	2.75	0.42
84 Feeling uneasy when being out and about	15.4	2.75	0.42
86 Less bicycling	7.7	3.00	0.23
88 Less walking	7.7	2.50	0.19
57 Doing errands less	3.8	5.00	0.19
83 Being out and about less	0.0	0.00	0.00
90 Using a car less	0.0	0.00	0.00
92 Adapting your route	0.0	0.00	0.00
Outdoor activities			
101 Alert when out in the country	76.9	2.75	2.11
102 Feeling uneasy in the country	42.3	3.00	1.27
99 Feeling limited in going to the country	30.8	3.25	1.00
98 Feeling uneasy doing odd jobs	19.2	2.80	0.54
96 Feeling limited in doing odd jobs	15.4	3.50	0.54
100 Spending less time in the country	15.4	3.50	0.54
103 Going on fewer trips	11.5	3.67	0.42
95 Feeling uneasy during sports	11.5	3.00	0.34
97 Practicing fewer hobbies	7.7	4.00	0.31
93 Feeling limited doing sports	3.8	2.00	0.08
94 Participating in sports less	0.0	0.00	0.00
Holidays			
110 Alert during holidays	76.9	2.95	2.27
112 Having doctor's address while on holiday	46.2	1.75	0.80
109 Feeling uneasy during holidays	38.5	3.30	1.27
111 Taking precautions during holidays	38.5	2.50	0.96
113 Insufficient medical care in foreign countries	26.9	2.29	0.61
104 Feeling limited in holiday destinations	19.2	4.00	0.77
106 Adapt holiday destination	15.4	3.25	0.50
107 Adapt time of holidays	15.4	2.25	0.35
108 Adapt kind of holidays	11.5	2.00	0.23
105 Fewer holidays	3.8	4.00	0.15
Emotional feelings			
19 Frightened of being stung	96.2	3.48	3.34
3 Alert outside	96.2	2.80	2.69
9 Alert during summer	96.2	2.64	2.54
17 Alert because of allergy	88.5	2.70	2.39
12 Move away from insects	80.8	3.00	2.42
14 Become agitated near insects	80.8	3.00	2.42
4 Frightened of any sting	73.1	3.16	2.31
20 Afraid of insects	69.2	3.39	2.35
6 Avoidance of certain places where insects are likely to be	65.4	3.00	1.96
13 Driving off insects	65.4	3.00	1.96
5 Avoidance of certain places where insects are	65.4	2.94	1.92
11 Checking areas for insects	50.0	2.77	1.39
10 Feeling uneasy during summer	46.2	3.08	1.42
2 Feeling uneasy outside	46.2	3.00	1.38
8 Feeling limited during summer	42.3	3.27	1.38
15 Feeling limited	34.6	3.44	1.19
23 Fear being stung preferentially by insects	30.8	3.38	1.04
70 Feeling more uneasy during the day than evening	30.8	3.13	0.96
18 Feeling uneasy	30.8	3.00	0.92
16 Being occupied with allergy	26.9	3.00	0.80
22 Undertaking fewer things spontaneously	26.9	3.00	0.80
21 Afraid of all insects	23.1	3.17	0.73
1 Outside less	19.2	3.60	0.69
7 Avoiding sunny places	3.8	2.00	0.08

MI, Mean importance; OI, overall importance.

TABLE II. Expectation of Outcome questionnaire

- How great do you think your chance is of having a serious reaction should you be stung again by the insect to which you had an allergic reaction (yellow jacket, hornet, or wasp)?
Please indicate by marking the circle next to the most appropriate answer how great you think your chance is of having a serious reaction should you be stung again.
 - ☐ I think I have *no chance* of having a serious reaction.
 - ☐ I think I have *a very small chance* of having a serious reaction.
 - ☐ I think I have *a small chance* of having a serious reaction.
 - ☐ I think I have *a moderate chance* of having a serious reaction.
 - ☐ I think I have *a large chance* of having a serious reaction.
 - ☐ I think I have *a very large chance* of having a serious reaction.
 - ☐ I think I will *always* have a serious reaction.
- How great do you think your chance is of dying should you be stung again by the insect to which you had an allergic reaction (yellow jacket, hornet, or wasp)?
Please indicate by marking the circle next to the most appropriate answer how great you think your chance of dying is should you be stung again.
 - ☐ I think I have *no chance* of dying should I be stung again.
 - ☐ I think I have *almost no chance* of dying should I be stung again.
 - ☐ I think I have *a very small chance* of dying should I be stung again.
 - ☐ I think I have *a small chance* of dying should I be stung again.
 - ☐ I think I have *a moderate chance* of dying should I be stung again.
 - ☐ I think I have *a large chance* of dying should I be stung again.
 - ☐ I think I have *a very large chance* of dying should I be stung again.

TABLE III. Patient characteristics of the Dutch and American populations used for the cross-sectional validation of the HRQL

	Dutch	American
Number	58	50
Sex (female/male)	39/19	30/20
Age (y)		
Mean	49	47
SD	14	13
Severity of reactions		
Grade I	7 (12%)	3 (6%)
Grade II	15 (26%)	16 (32%)
Grade III	23 (40%)	21 (42%)
Grade IV	13 (22%)	10 (20%)

participating in this part of the study are shown in Table III. The responses to all items were normally distributed. Each item was correlated with the mean of the Expectation of Outcome questionnaire. One item scored only 0.21 and was therefore excluded. Of the 15 items having the highest impact, 7 were presented in 2 alternative wordings (questions 8-14), allowing for the selection of the best version. The items with the highest correlation

were chosen. The final questionnaire has 14 items with correlation coefficients ranging between 0.45 and 0.70. The mean for the whole instrument versus the Expectation of Outcome questionnaire was 0.69. The Cronbach α of the 14 items was .96. The Pearson correlation coefficients between the individual items and the mean of all items and the Expectation of Outcome of the resultant questionnaire are shown in Table IV. Patients did not require assistance to complete the questionnaire and were able to do so in approximately 10 minutes.

Cross-sectional instrument validation (Dutch version)

Cross-sectional validity was studied in the context of a randomized controlled trial in 74 patients (36 of whom were randomly assigned to VIT and 38 to Epipen).⁵

Pearson's correlation coefficient between the pretreatment HRQL score (mean, 4.31; SD, 1.49) and pretreatment score of the Expectation of Outcome questionnaire (mean, 2.57; SD, 1.24) was 0.59 ($P < .0001$). After 1 year of treatment, correlation between the HRQL score (mean, 4.61; SD, 1.41) and the Expectation of Outcome score (mean, 3.54; SD, 1.52) was 0.72 ($P < .0001$). These data indicate cross-sectional validity of the specific instrument.

Longitudinal instrument validation (Dutch version)

Longitudinal validity was studied in the context of a randomized controlled trial in the 74 patients mentioned previously.⁵ The questionnaire was administered by mail. The response rate was 91%.

The correlation between the mean change in HRQL score (mean, 0.31; SD, 1.23) and mean change in Expectation of Outcome score (mean, 0.89; SD, 1.65) was 0.72 ($P < .0001$). This indicates longitudinal construct validity of the specific instrument.

Cross-sectional validation (English version)

The English version of the instrument is presented in its entirety as Appendix A. The characteristics of the 50 American patients are shown in Table III. Four patients (8%) failed to complete all items. The responses to all items were normally distributed. The Pearson correlation coefficients between the items and the Expectation of Outcome questionnaire items are shown in Table IV. The correlation coefficient between the total score of the questionnaire and the mean of the 2 questions of the Expectation of Outcome questionnaire was 0.56. This indicates cross-sectional validity for this instrument. The Cronbach α of the 14 items was .88.

DISCUSSION

In this study we developed a disease-specific questionnaire for patients allergic to yellow jackets and validated it both cross-sectionally and longitudinally. Cross-sectional validity was established for both the Dutch and English versions by correlating responses to the items

TABLE IV. External validity of the Dutch and English questionnaire

Number of item	Dutch version			English version		
	1	2	Mean of 1 and 2	1	2	Mean of 1 and 2
1	0.57*	0.53*	0.59*	0.52*	0.46*	0.57*
2	0.60*	0.58*	0.62*	0.35†	0.44*	0.46*
3	0.50*	0.45*	0.51*	0.32†	0.23	0.32†
4	0.45*	0.45*	0.47*	0.62*	0.50*	0.65*
5	0.52*	0.50*	0.54*	0.50*	0.36†	0.50*
6	0.45*	0.47*	0.49*	0.26	0.26	0.30†
7	0.64*	0.47*	0.59*	0.32†	0.20	0.30†
8	0.65*	0.53*	0.63*	0.41*	0.25	0.39*
9	0.65*	0.54*	0.63*	0.36†	0.21	0.34†
10	0.67*	0.63*	0.69*	0.10	0.37†	0.22
11	0.61*	0.53*	0.61*	0.47*	0.41*	0.50*
12	0.70*	0.49*	0.64*	0.60*	0.36*	0.55*
13	0.68*	0.58*	0.67*	0.30†	0.28	0.34†
14	0.60*	0.52*	0.59*	0.59†	0.41†	0.58*
Mean (1-14)	0.69*	0.62*	0.69*	0.53*	0.42*	0.56*

External validity was determined with Pearson's correlation coefficient between individual items, the mean score (1-14), and the Expectation of Outcome questionnaire (questions 1 and 2).

* $P < .01$.

† $P < .05$.

with the Expectation of Outcome questionnaire and was comparable with other instruments.^{8,11,12} We also showed high internal consistency by comparing the inter-item correlation by means of the Cronbach α . The fact that we were able to cross-sectionally validate this instrument in 2 different languages and cultural settings indicates that the problems of patients with yellow jacket allergy are quite similar in these 2 contexts. This suggests that this instrument will lend itself to adaptation to other cultural settings. Furthermore, this instrument has been longitudinally validated in a Dutch study,⁵ which bodes well for longitudinal validation in English and other languages.

The differences in correlation coefficients of individual items between the Dutch and English language versions are probably partly due to a more urban patient population in Baltimore as compared with Groningen. Items with lower correlations relating to increased vigilance in routine daily summertime activities including work (items 7-10) probably reflect less frequent exposure to stinging insects in the more urban environment. Avoidance (item 5) seems to be relevant but is probably easier to achieve in the city. In contrast, in specific settings where stinging insects are likely to occur (items 11, 12, and 14), concern about vigilance correlates to sting outcome expectations to a comparable degree in the urban (Baltimore) and the more rural (Groningen) population.

By validating individual items, the length of the questionnaire has been reduced to a minimum. This is reflected in the fact that patients were easily able to fill out this instrument by themselves.

It should be stressed that this instrument is suitable for adult patients with yellow jacket allergy. In our experience, the problems of patients allergic to honey bees are quite different from those of patients allergic to yellow jackets mainly because of differences in the risk of being stung. Furthermore, almost all of our patients with honey

bee allergy are bee-keepers or their family members, for whom entirely different HRQL issues prevail. However, it is possible that this instrument could be suitable for non-bee-keepers who are allergic to honey bees. We were not able to determine whether this instrument is suited to studying patients with allergy to *Polistes* species, because these insects are not found in our region.

In summary, we present here a disease-specific instrument suitable for the measurement of HRQL in patients with yellow jacket allergy, which has been both cross-sectionally and longitudinally validated and is rapidly administered and easy to use. This instrument should yield information that should improve our ability to effectively treat patients with this form of allergy by ensuring that such intervention also improves patients' HRQL.

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APPENDIX

Final HRQL questionnaire consisting of 14 items

Introduction

The return of summer also marks the return of stinging insects such as yellow jackets, hornets, and wasps. An allergy to these insects can cause various symptoms after a sting.

With this questionnaire, we wish to find out whether this allergy also has negative effects on your emotional and social functioning. We also want to find out if your work is affected.

There are 14 questions. Every question has between 6 and 8 possible answers.

Please answer the following questions by placing an x in the circle next to the most appropriate answer.

1. How frightened or scared are you, because of your allergy, of being stung?
Please indicate by marking the circle next to the most appropriate answer how frightened or scared you are of being stung because of your allergy.
☐ I am *not at all* frightened or scared.
☐ I am *very slightly* frightened or scared.
☐ I am *slightly* frightened or scared.
☐ I am *somewhat* frightened or scared.
☐ I am *moderately* frightened or scared.
☐ I am *very* frightened or scared.
☐ I am *extremely* frightened or scared.
2. How often do you, because of your allergy, become agitated in the presence of stinging insects (yellow jackets, hornets, and wasps)?
Please indicate by marking the circle next to the most appropriate answer how often you become agitated in the presence of stinging insects because of your allergy.
☐ I *never* become agitated.
☐ I *almost never* become agitated.
☐ I *sometimes* become agitated.
☐ I *regularly* become agitated.
☐ I *often* become agitated.
☐ I *almost always* become agitated.
☐ I *always* become agitated.
3. How often do you, because of your allergy, move away from areas where stinging insects (yellow jackets, hornets, and wasps) turn up?

Please indicate by marking the circle next to the most appropriate answer how often you get away from areas where stinging insects turn up because of your allergy.

- ☐ I *never* get away.
- ☐ I *almost never* get away.
- ☐ I *sometimes* get away.
- ☐ I *regularly* get away.
- ☐ I *often* get away.
- ☐ I *almost always* get away.
- ☐ I *always* get away.

4. How often do you become frightened, because of your allergy, when you are stung by an insect?

Please indicate by marking the circle next to the most appropriate answer how often you become frightened when you are stung by an insect because of your allergy.

- ☐ I *never* become frightened.
- ☐ I *almost never* become frightened.
- ☐ I *sometimes* become frightened.
- ☐ I *regularly* become frightened.
- ☐ I *often* become frightened.
- ☐ I *almost always* become frightened.
- ☐ I *always* become frightened.

5. How often do you avoid, because of your allergy, certain places?

Please indicate by marking the circle next to the most appropriate answer how often you avoid certain places because of your allergy.

- ☐ I *never* avoid certain places.
- ☐ I *almost never* avoid certain places.
- ☐ I *sometimes* avoid certain places.
- ☐ I *regularly* avoid certain places.
- ☐ I *often* avoid certain places.
- ☐ I *almost always* avoid certain places.
- ☐ I *always* avoid certain places.

6. How often do you, because of your allergy, check certain places for stinging insects (yellow jackets, hornets, and wasps)?

Please indicate by marking the circle next to the most appropriate answer how often you check certain places for stinging insects because of your allergy.

- ☐ I *never* check certain places.
- ☐ I *almost never* check certain places.
- ☐ I *sometimes* check certain places.
- ☐ I *regularly* check certain places.
- ☐ I *often* check certain places.
- ☐ I *almost always* check certain places.
- ☐ I *always* check certain places.

7. Do you feel limited in your activities during the summer months because of your allergy?

Please indicate by marking the circle next to the most appropriate answer how limited you feel in your activities during the summer months because of your allergy.

- ☐ *Not* limited at all
- ☐ Only *a little* limitation

- ☐ *Some* limitation
- ☐ *Moderately* limited
- ☐ *A good deal* of limitation
- ☐ *A great deal* of limitation
- ☐ *A very great deal* of limitation

8. How often are you, because of your allergy, troubled by the fact that you watch out for stinging insects (yellow jackets, hornets, and wasps)?

Please indicate by marking the circle next to the most appropriate answer how often you are troubled by the fact that you watch out for stinging insects because of your allergy.

- ☐ I am *never* troubled by the fact that I watch out for stinging insects.
- ☐ I am *almost never* troubled by the fact that I watch out for stinging insects.
- ☐ I am *sometimes* troubled by the fact that I watch out for stinging insects.
- ☐ I am *regularly* troubled by the fact that I watch out for stinging insects.
- ☐ I am *often* troubled by the fact that I watch out for stinging insects.
- ☐ I am *almost always* troubled by the fact that I watch out for stinging insects.
- ☐ I am *always* troubled by the fact that I watch out for stinging insects.

9. How often are you, because of your allergy, troubled by the fact that you watch out for stinging insects (yellow jackets, hornets, and wasps) when you are outdoors?

Please indicate by marking the circle next to the most appropriate answer how often you are troubled, because of your allergy, by the fact that you watch out for stinging insects when you are outdoors.

- ☐ I am *never* troubled by the fact that I watch out for stinging insects when I am outdoors.
- ☐ I am *almost never* troubled by the fact that I watch out for stinging insects when I am outdoors.
- ☐ I am *sometimes* troubled by the fact that I watch out for stinging insects when I am outdoors.
- ☐ I am *regularly* troubled by the fact that I watch out for stinging insects when I am outdoors.
- ☐ I am *often* troubled by the fact that I watch out for stinging insects when I am outdoors.
- ☐ I am *almost always* troubled by the fact that I watch out for stinging insects when I am outdoors.
- ☐ I am *always* troubled by the fact that I watch out for stinging insects when I am outdoors.

10. Do you work?

No. Go to the next question

Yes. How often are you, because of your allergy, troubled by the fact that you watch out for stinging insects (yellow jackets, hornets, and wasps) at work?

Please indicate by marking the circle next to the

most appropriate answer how often you are troubled, because of your allergy, by the fact that you watch out for stinging insects at work.

- ☐ I am *never* troubled by the fact that I watch out for stinging insects at work.
- ☐ I am *almost never* troubled by the fact that I watch out for stinging insects at work.
- ☐ I am *sometimes* troubled by the fact that I watch out for stinging insects at work.
- ☐ I am *regularly* troubled by the fact that I watch out for stinging insects at work.
- ☐ I am *often* troubled by the fact that I watch out for stinging insects at work.
- ☐ I am *almost always* troubled by the fact that I watch out for stinging insects at work.
- ☐ I am *always* troubled by the fact that I watch out for stinging insects at work.

11. Do you go on vacation?

No. Go to the next question

Yes. How often are you, because of your allergy, troubled by the fact that you watch out for stinging insects (yellow jackets, hornets, and wasps) while on vacation?

Please indicate by marking the circle next to the most appropriate answer how often you are troubled, because of your allergy, by the fact that you watch out for stinging insects while on vacation.

- ☐ I am *never* troubled by the fact that I watch out for stinging insects while on vacation.
- ☐ I am *almost never* troubled by the fact that I watch out for stinging insects while on vacation.
- ☐ I am *sometimes* troubled by the fact that I watch out for stinging insects while on vacation.
- ☐ I am *regularly* troubled by the fact that I watch out for stinging insects while on vacation.
- ☐ I am *often* troubled by the fact that I watch out for stinging insects while on vacation.
- ☐ I am *almost always* troubled by the fact that I watch out for stinging insects while on vacation.
- ☐ I am *always* troubled by the fact that I watch out for stinging insects while on vacation.

12. Do you garden?

No. Go to the next question

Yes. How often are you, because of your allergy, troubled by the fact that you watch out for stinging insects (yellow jackets, hornets, and wasps) while gardening?

Please indicate by marking the circle next to the most appropriate answer how often you are troubled, because of your allergy, by the fact that you watch out for stinging insects while gardening.

- ☐ I am *never* troubled by the fact that I watch out for stinging insects while gardening.
- ☐ I am *almost never* troubled by the fact that I watch out for stinging insects while gardening.
- ☐ I am *sometimes* troubled by the fact that I watch out for stinging insects while gardening.

- ☐ I am *regularly* troubled by the fact that I watch out for stinging insects while gardening.
- ☐ I am *often* troubled by the fact that I watch out for stinging insects while gardening.
- ☐ I am *almost always* troubled by the fact that I watch out for stinging insects while gardening.
- ☐ I am *always* troubled by the fact that I watch out for stinging insects while gardening.

13. Do you eat outdoors?

No. Go to the next question

Yes. How often are you, because of your allergy, troubled by the fact that you watch out for stinging insects (yellow jackets, hornets, and wasps) when eating outdoors?

Please indicate by marking the circle next to the most appropriate answer how often you are troubled, because of your allergy, by the fact that you watch out for stinging insects when eating outdoors.

- ☐ I am *never* troubled by the fact that I watch out for stinging insects when eating outdoors.
- ☐ I am *almost never* troubled by the fact that I watch out for stinging insects when eating outdoors.
- ☐ I am *sometimes* troubled by the fact that I watch out for stinging insects when eating outdoors.
- ☐ I am *regularly* troubled by the fact that I watch out for stinging insects when eating outdoors.
- ☐ I am *often* troubled by the fact that I watch out for stinging insects when eating outdoors.
- ☐ I am *almost always* troubled by the fact that I watch out for stinging insects when eating outdoors.

- ☐ I am *always* troubled by the fact that I watch out for stinging insects when eating outdoors.

14. Do you go out in the country?

No. Go to the next question.

Yes. How often are you, because of your allergy, troubled by the fact that you watch out for stinging insects (yellow jackets, hornets, and wasps) when you are out in the country?

Please indicate by marking the circle next to the most appropriate answer how often you are troubled, because of your allergy, by the fact that you watch out for stinging insects when you are out in the country.

- ☐ I am *never* troubled by the fact that I watch out for stinging insects while out in the country.
- ☐ I am *almost never* troubled by the fact that I watch out for stinging insects while out in the country.
- ☐ I am *sometimes* troubled by the fact that I watch out for stinging insects while out in the country.
- ☐ I am *regularly* troubled by the fact that I watch out for stinging insects while out in the country.
- ☐ I am *often* troubled by the fact that I watch out for stinging insects while out in the country.
- ☐ I am *almost always* troubled by the fact that I watch out for stinging insects while out in the country.
- ☐ I am *always* troubled by the fact that I watch out for stinging insects while out in the country.