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## Measuring health-related quality of life in rhinitis

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### Abstract

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Patients with rhinitis are bothered both by the nasal symptoms themselves and by associated symptoms such as headache and fatigue. The combination can produce quite severe impairment of day-to-day physical, emotional, occupational, and social functioning and can cause emotional distress. This breadth of impairment of health-related quality of life in patients with rhinitis is often not recognized and is sometimes trivialized by some health care professionals. One of the aims of treating patients with rhinitis must be to ensure that all individual patient problems are recognized and treated appropriately. Several studies now show that correlations between conventional nasal symptom–severity diaries and health-related quality of life are only weak to moderate. Therefore, to

get an overall picture of a patient's health status, it is essential to measure quality of life. Generic health-status questionnaires are able to compare burden of illness across different medical conditions, but they are often not responsive enough to small but clinically important changes in patients' quality of life. As a result, we have seen the emergence of disease-specific instruments for rhinitis that have strong measurement properties and that are much more sensitive to these changes. Most clinical trials in rhinitis now include a measure of health-related quality of life as a primary outcome, and many clinicians are incorporating quality of life into routine clinical assessments. (J Allergy Clin Immunol 1997;99:S742-9.)

**FEV<sub>1</sub>** Forced expiratory volume in one second

**HRQL** Health-related quality of life

**MID** Minimal important difference

**NHP** Nottingham Health Profile

**SF-36** Medical Outcomes Survey Short Form 36

**SIP** Sickness Impact Profile

(Click on a term to search this journal for other articles containing that term.)

**Key Words:** [Quality of life](#), [health-related quality of life](#), [rhinitis](#), [disease-specific instruments](#)

Over the last 10 years, there has been an increasing awareness of the importance of including health-related quality of life (HRQL) in clinical assessments. For many clinicians, HRQL is a new term but certainly not a new concept. Some of the questions most commonly asked about the assessment of HRQL in patients with rhinitis will be discussed, as will the possible role of HRQL assessments in both clinical trials and clinical practice.

## What is health-related quality of life?

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“Quality of life” is a rather nebulous expression that often means different things to different people, thus making defining it very difficult. However, most debaters agree that many factors, such as finances, spirituality, and health, contribute to quality of life and also affect each other. Taken very simply, HRQL is the component of overall quality of life that is determined primarily by the person's health and that can be influenced by clinical interventions. With simplicity and focus, Schipper et al. define HRQL as “the functional effects of an illness and its consequent therapy upon a patient, as perceived by the patient.”<sup>1</sup> The final phrase is important because it emphasizes that these are the impairments that the patients themselves consider important.

## Why is HRQL important in rhinitis?

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If we accept the three reasons for treating patients; to prevent mortality, to reduce the probability of future morbidity, and to improve patient well-being,<sup>2</sup> then it is quite apparent that for the majority of rhinitis patients, and especially for patients with seasonal allergic rhinitis, improving patient well-being or, in other words, improving their HRQL, will be the primary goal of treatment.

Clinicians use a range of measures to assess the clinical status of the nose. These measures include such indexes as nasal symptom severity, rhinomanometry, cytology, and nasal hyperreactivity.<sup>3 4</sup> Certainly these measures are important for telling the clinician about the nose itself, but a growing body of evidence suggests that correlations between conventional clinical markers of nasal inflammation and a patient's rhinoconjunctivitis-specific quality of life are only weak to moderate.<sup>4 5</sup> Therefore, to determine the level of impairment of a patient's daily functioning as a result of rhinitis and whether treatment makes the patient feel better, HRQL has to be measured directly. Why should this relationship be so weak?

Let us take, as an example, two hypothetical patients. Both have identical clinical rhinitis. The first patient is really bothered by the symptoms themselves. In addition, she is a light sleeper; her rhinitis prevents her from getting a good night's sleep, and so she feels tired during the day. She is susceptible to headaches. She is a model, and her appearance prevents her from working. She is a very uptight person, and her rhinitis tends to make her feel very irritable. The second patient ignores her symptoms and is a sound sleeper. She rarely gets headaches and cares little about how she looks. All in all, she is a very laid-back person. Although these two patients have identical clinical rhinitis, HRQL in the first patient is likely to be much more impaired than in the second patient. If we take this scenario one step further and treat both patients with an identical medication that produces an identical improvement in clinical rhinitis, the improvement in HRQL is likely to be much greater in the first patient than in the second patient because her symptoms are far less troublesome; she can sleep well and function normally at work.

There has been a tendency among some clinicians to underestimate the problems of patients with rhinitis. Recent work by Bousquet et al.<sup>6</sup> has shown convincingly that rhinitis can be very troublesome to patients and cause quite severe impairment of HRQL. They examined the burden of illness experienced by a sample of asthma patients ( $n = 252$ ) with a full range of asthma severity<sup>7</sup> and a sample of patients with perennial rhinitis ( $n = 111$ ).<sup>6</sup> By means of the generic health profile Medical Outcomes Survey Short Form 36 (SF-36), they showed that in 7 of the 9 domains, quality of life tended to be worse in the patients with rhinitis than in the patients with asthma.

## What problems are most troublesome to patients with rhinitis?

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Although there are some studies on the functional status of patients with rhinitis, the outcomes have been chosen by clinicians, and there is inadequate evidence that these outcomes are actually important to the patients themselves.<sup>8 9</sup> When we developed our disease-specific HRQL questionnaire for adults and children with rhinitis,<sup>5 10</sup> we asked the patients to tell us which impaired functions were most important to them in their day-to-day lives. The problems identified most frequently and that scored the highest in importance (1 = not important, 5 = very important) can be

summarized in 6 domains: sleep problems, nonnasal symptoms, nasal symptoms, practical problems, activity limitations, and emotional problems.

Adults with both rhinitis and rhinoconjunctivitis are certainly bothered by the symptoms themselves, particularly stuffy/blocked nose, runny nose, and sneezing. They also are bothered by not being able to sleep well at night, and often they feel tired and worn out during the day. They have nonnasal symptoms that are troublesome, such as thirst, poor concentration, and headache. They find practical problems annoying (e.g., having to carry tissues, always having to blow their nose), and they are limited in their daily activities and feel frustrated and irritable.<sup>5</sup>

Adolescents (12 to 17 years of age) with rhinoconjunctivitis have very similar problems to adults except that they do not have the sleeping problems. However, they do have more problems with concentration, particularly with school work.<sup>10</sup>

Younger children (6 to 12 years of age) appear to present a different picture (Juniper EF and Roberts N, unpublished data). Although they are bothered by their symptoms and the practical problems of carrying tissues and taking medications, they tend to have minimal interference with normal daily activities and do not have the emotional dysfunction experienced by adults and adolescents. We observed that parents seemed to be much more bothered by their child's rhinitis than the child was. This finding is very consistent with other conditions, such as asthma, where parents appear to have a poor perception of their child's HRQL.<sup>11</sup>

## Selecting a quality-of-life instrument

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We now have a range of valid instruments for measuring HRQL in patients with rhinitis. There is no best instrument; each has been developed for a different purpose and has different measurement properties. The purpose of the next section is to help the clinician who wants to begin using HRQL to select the most appropriate instrument for the task at hand.

### Generic versus specific

There are two types of HRQL questionnaires: generic and specific (Table I).

**Table I.** Types of health-related quality of life instruments

| Instrument type |                                                                           | Strengths | Weaknesses                                                                                        |
|-----------------|---------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------|
| Health profiles | Comparison across conditions possible                                     |           | Do not focus adequately on areas of interest; may not be responsive to change                     |
|                 | Single value representing quality of life; cost-utility analysis possible |           | Do not allow examination of different aspects of quality of life; may not be responsive to change |
| Utilities       |                                                                           |           |                                                                                                   |

Generic instruments are designed to be applicable to patients in all health states. The most commonly used and the best validated are the Sickness Impact Profile (SIP),<sup>12</sup> the SF-36,<sup>13</sup> the Nottingham Health Profile (NHP),<sup>14</sup> and the McMaster Health Index Questionnaire.<sup>15</sup> Although each profile attempts to measure all important aspects of health-related function, each achieves this in a different way. For instance, the SF-36 contains nine domains that can be combined into two primary functions: mental and physical. In contrast, the SIP has two major domains, physical and psychosocial, that combine to give one overall score.

The great advantage of generic instruments is that the burden of illness can be compared across different medical conditions. For instance, the burden of illness experienced by patients with rhinitis can be compared to patients with asthma, inflammatory bowel disease, or rheumatoid arthritis. However, because these instruments are required to be broad in their comprehensiveness, they have very little depth; as a result, impairments that are important to patients with a specific condition may not be included. Consequently in many conditions, including rhinitis, generic instruments are often unresponsive to small but, from the patient's perspective, important changes in their HRQL (Juniper EF, et al., unpublished data).<sup>16 17</sup> Therefore, the use of generic instruments in clinical trials and clinical practice, in which the effect of treatment within individuals or groups of patients are examined, is limited.

This lack of depth of focus of the generic instruments has led to the development of specific instruments. These instruments may be specific for a group of patients (e.g., the elderly), a particular function (e.g., pain, sexual function), or a disease. Disease-specific instruments are developed by asking the patients themselves about the impairments most important to them, thereby focusing on problems that are targets for clinical interventions. As a result, disease-specific instruments are much more likely to detect clinically important changes in patients' problems.

## Utilities

These instruments measure the value that either the patient or society places on various health states. They are very popular with health economists because they provide a single value representing HRQL, from 0 = death to 1 = perfect health, and because the majority of instruments meet the assumptions for utility theory. For measuring the value that patients themselves place on their own health state, the most common instruments are the Standard Gamble,<sup>18</sup> the Time Trade Off,<sup>18</sup> and the Feeling Thermometer.<sup>18</sup> For measuring the value that society places on various health states, there are the Quality of Well-Being,<sup>19</sup> the Multiattribute Health Utilities Index,<sup>20</sup> and the EuroQol.<sup>21</sup> For a long time these instruments were only used in generic form (i.e., to be applicable in all medical conditions), and in this form they have the same weakness as the generic health profiles: they are unresponsive to change.<sup>16 17</sup> Recently, the Standard Gamble and the Feeling Thermometer have been modified for use as disease-specific instruments and appear to have much improved measurement properties.<sup>17</sup> As yet, there have been no evaluations of these instruments in rhinitis.

## Measurement properties

Once the decision is made to use a generic or specific instrument, the next step is to determine which instrument has the best measurement properties for the task at hand.

### *Face and content validity.*

When selecting an instrument, it is important to ensure that it has face and content validity. The instrument, on reading over the items, measures what it purports to measure (face validity), and the items in the questionnaire have been selected by recognized procedures that ensure capture of all areas of function considered important by patients (content validity). Feinstein<sup>22</sup> has called these properties “sensibility.” Questionnaires in which items have been selected by clinicians rarely meet this criterion because some impairments that patients consider important may have been omitted.

## Evaluation versus discrimination

Instruments that are to be used in cross-sectional studies (e.g., screening and surveys) are known as discriminative instruments because they are required to discriminate between patients with different levels of impairment. Instruments that are to be used in longitudinal studies (clinical trials and clinical practice) are called evaluative instruments because they are required to evaluate change in impairment over time. The two types of instruments require quite different measurement properties, although some well-constructed instruments will be capable of both functions (Table II).<sup>23</sup>

|                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------|
| <b>Table II.</b><br>Measurement<br>properties<br>necessary for<br>evaluative and<br>discriminative<br>instruments |
| Table not available                                                                                               |

### *Discriminative properties.*

An instrument that is to be used to distinguish between individuals or groups of patients at a single point in time (e.g., between individuals who do or do not have impaired HRQL or, within rhinitis patients, between those who have mild, moderate, or severe impairment) requires reliability and cross-sectional construct validity.<sup>24</sup>

Reliability is the ability of the instrument to measure differences between patients at a single point in

time. If one considers this in terms of the signal-to-noise ratio, the signal is the between-subject variance and the noise is the within-subject variance. The test statistic usually used to express reliability is the intraclass correlation coefficient (ICC), which relates the between-subject variance to the total variance. (Cronbach's alpha, which measures the internal consistency, does not give an indication of this property.)

When there is no gold standard against which to demonstrate that the instrument is actually measuring what it purports to measure, the developer puts forward hypotheses or constructs. If these are met, they provide evidence that the instrument is valid (construct validity). The approach frequently used is to demonstrate that the various domains of the new HRQL instrument correlate in a predicted manner with other indexes of rhinitis severity and with other HRQL instruments.

### *Evaluative properties.*

An instrument that is to be used to measure longitudinal change within an individual or group of patients must have good responsiveness and longitudinal validity.<sup>24</sup> Responsiveness is the ability of the instrument to respond to small but clinically important changes that occur either spontaneously or as a result of an intervention. The signal is the true within-subject change over time, and the noise is the within-subject variance unrelated to the true within-subject change; the relationship between the two is known as the responsiveness index.<sup>25</sup> If a formal estimate of the responsiveness index is not available, an instrument that has already performed well in a clinical trial will probably have acceptable responsiveness.

Evaluative instruments also require longitudinal validity. A change in score must reflect a true change in rhinitis HRQL. Longitudinal validity is usually demonstrated by showing that changes in the various domains of the new HRQL instrument correlate in a predicted manner with changes in other outcome measures, such as clinical rhinitis severity and generic HRQL.

Most developers publish reliability and cross-sectional validity data and, good as these may be, they are no guarantee that the instrument will be capable of performing well in a clinical trial. In a number of studies, patients had clinically important changes in HRQL that instruments with good reliability and cross-sectional validity failed to detect (Juniper EF, et al., unpublished data).<sup>16 17</sup>

## Interpreting quality of life data

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Repeated experience with a wide variety of physiologic measures allows clinicians to make meaningful interpretation of results. For instance, the experienced clinician has little difficulty in interpreting a 0.5 L increase in forced expiratory volume in 1 second (FEV<sub>1</sub>). In contrast, the meaning of a change in score of 1.0 on an HRQL instrument is less obvious intuitively because there are no units, health professionals seldom use HRQL measures in clinical practice, and each instrument has its own scoring system.

Two approaches have been suggested for the interpretation of HRQL data.<sup>26</sup> The first approach, "distribution-based," is based entirely on the statistical distribution of the results, with the most commonly used being the effect size derived from the magnitude of change and the variability in

stable subjects. The problem with this approach is that there is still no indication as to whether the effect is important to the patient.

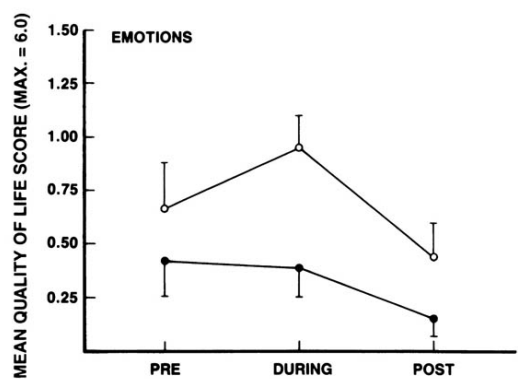
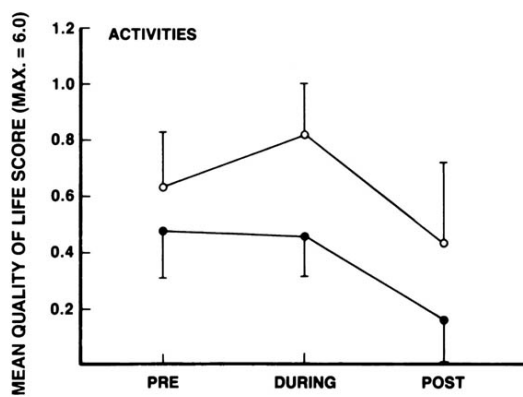
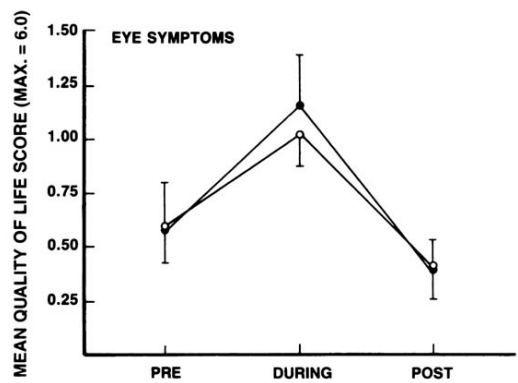
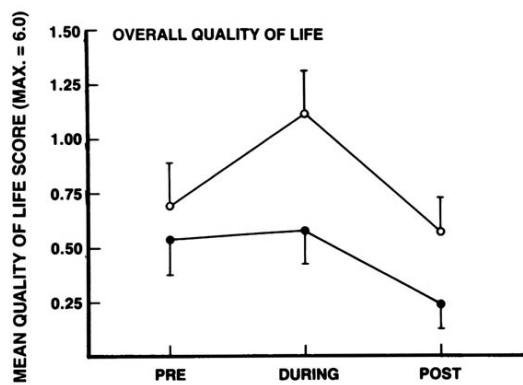
The second approach, which is the one we use and which has been used for the St. George's Respiratory Questionnaire, is "anchor-based," where the changes in HRQL measures are compared or anchored to other clinically meaningful outcomes. For our instruments, we have calculated the minimal important difference (MID, defined as the smallest difference in score in the domain of interest that patients perceive as beneficial and that would mandate, in the absence of troublesome side effects and excessive cost, a change in the patient's management) using patients' global rating of change questionnaires.<sup>27</sup> For the Rhinoconjunctivitis Quality of Life Questionnaire (Appendix ■), we have found the MID to be a change in mean score of 0.5.<sup>28</sup> Other developers have determined the MID from patient-perceived benefits during clinical trials<sup>29</sup> and patients' perception of their own illness relative to other patients.<sup>30</sup>

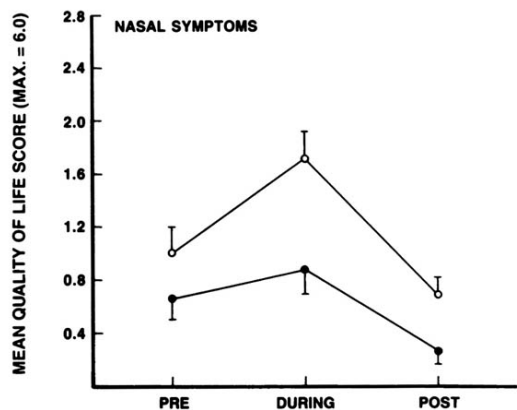
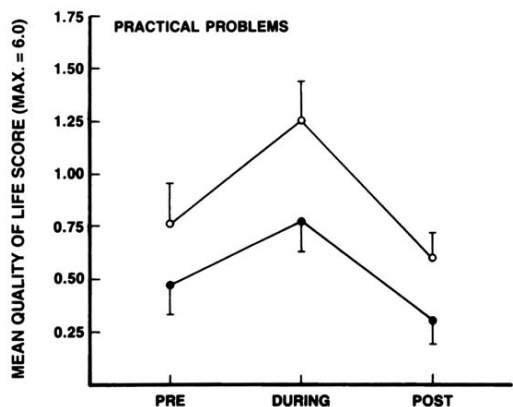
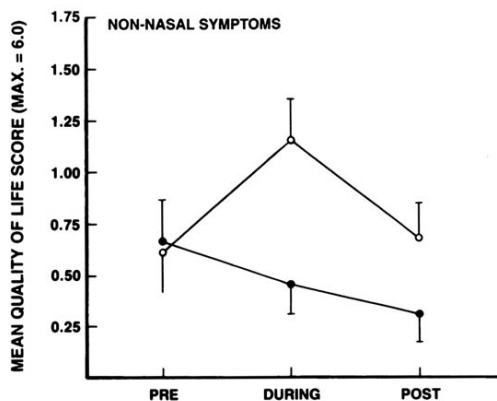
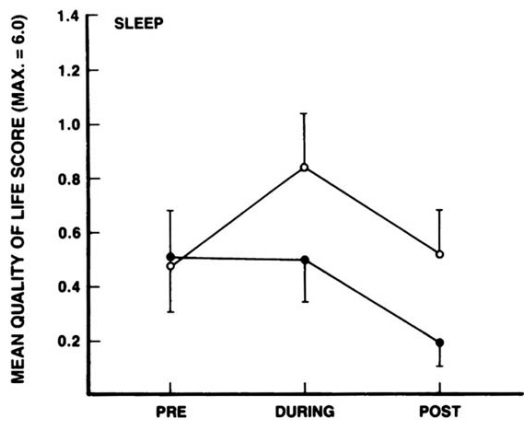
## The place of HRQL assessments in clinical trials and clinical practice

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The recognition of the importance of HRQL, the poor correlation between the conventional clinical indexes of nasal impairment and HRQL, and the advent of HRQL instruments with strong measurement properties has already ensured that a number of rhinitis clinical trials include an assessment of HRQL as one of the primary end points (Fig. 1).<sup>31</sup>

**FIG. 1.** HRQL results from clinical trial that compared regular (*black circles*) vs as-needed (*white circles*) beclomethasone dipropionate nasal spray in the treatment of ragweed pollen-induced rhinoconjunctivitis.<sup>32</sup> In patients with moderate to severe rhinoconjunctivitis there was minimal impairment of quality of life at height of ragweed season (1 = hardly troubled at all). Differences between the two treatment groups were statistically significant for all but eye symptom and activities domains. However, in none of the domains was mean difference in score >0.5 (MID) at height of ragweed season. This finding strongly suggests that very few patients will have better HRQL if they use beclomethasone dipropionate regularly compared with using it only as needed.





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These instruments are short, easily understood, and usually in self-administered format, making completion of little burden either to the investigator or the patient. In fact, we have found that

patients enjoy completing HRQL questionnaires because they can relate to the questions and know that things that are important to them are being taken into consideration. In addition, it is likely that national pharmaceutical regulatory agencies will soon ask for HRQL data as part of new product submissions.

The role of HRQL instruments in clinical practice is still not clear. The reality is that a disease-specific quality of life questionnaire is no more than a formalized and quantified method of taking a simple patient history. The advantages are that the patient can complete the questionnaire while sitting in the waiting room and that a quick scan of the responses will save consultation time. The interviewer does not have to remember all of the important questions, the clinician can quickly focus on areas of particular impairment to the patient, and responses from each clinic visit can be compared to determine whether interventions have been beneficial. Therefore, from the practical point of view, there appear to be benefits in including HRQL assessments in clinical practice. The next question is whether clinical practice is altered by the inclusion of HRQL in routine clinical assessment. This and other questions about the usefulness of HRQL in clinical practice have yet to be addressed in formal studies; however, as more clinicians start using HRQL instruments in innovative ways, further uses are likely to emerge.

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## Appendix

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## Publishing and Reprint Information

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