Patient-reported outcome measures (PROMs) in rhinology: a review of instruments, psychometric properties and clinical applications

Jakub Nicer[1], Antonina Nicer[2], Dariusz Jurkiewicz[1], Piotr A. Rot[1]
[1] Clinic of Otolaryngology and Laryngological Oncology with Clinical Department of Cranio-Maxillofacial Surgery at the Military Institute of Medicine – National Research Institute (WIM-PIB), Warsaw
[2] Faculty of Medicine, Łazarski University, Warsaw

Abstract:
Patient-reported outcome measures have become the main way of assessing treatment effect in rhinology, where symptoms correlate only weakly with objective findings. This narrative review summarises the instruments used in chronic rhinosinusitis, nasal obstruction, rhinoplasty, allergic rhinitis and olfactory dysfunction, with their measurement properties, interpretive thresholds and the availability of validated Polish versions. Common pitfalls in interpretation are discussed.

Key words: patient-reported outcome measures, quality of life, SNOT-22, chronic rhinosinusitis, allergic rhinitis

Introduction

Sinonasal disease is seldom life-threatening, but the burden it imposes on daily functioning – disturbed sleep, reduced productivity, low mood, loss of smell – is considerable. Over the past two decades this has changed the way treatment success is judged, with growing weight given to what the patient reports and correspondingly less to the endoscopy score, the Lund–Mackay computed tomography (CT) score or rhinomanometry alone.

A patient-reported outcome measure (PROM) is a standardised, validated instrument, usually a questionnaire, that captures health status directly from the patient without interpretation by a clinician or other third party [1]. PROMs should not be confused with patient-reported experience measures (PREMs), which describe the experience of care rather than health status, nor with clinician-completed severity scales such as the nasal polyp score or the Lund–Kennedy score. Within the PROM family, generic instruments (EQ-5D, SF-36) serve different purposes from disease-specific ones.

Rhinology has a specific reason to rely on these instruments. In a systematic review of 59 studies, Ta et al. found that objective outcome measures and PROMs assessing sinonasal symptoms are, on the whole, poorly correlated, and recommended that the two be used alongside each other rather than as substitutes [2]. The clinical corollary is familiar from any rhinology clinic: some patients with extensive polyposis report relatively little trouble, while others with an unremarkable CT are severely symptomatic.

Interest in PROMs has increased further with the introduction of biologics for chronic rhinosinusitis with nasal polyps (CRSwNP), where SNOT-22

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now contributes to both eligibility assessment and response evaluation within the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS) 2020 and the EPOS/European Forum for Research and Education in Allergy and Airway Diseases (EUFOREA) frameworks [3, 4], and with the wider adoption of value-based health care.

This review sets out the principal PROMs used in rhinology, describes their construction and measurement properties, discusses how scores and score changes should be interpreted, and offers practical guidance on instrument selection, with attention to the availability of validated Polish versions.

Materials and methods

This is a narrative, non-systematic review. PubMed/MEDLINE, Embase and Scopus were searched up to 31 January 2026 (date of last search), using combinations of the terms patient-reported outcome measure, PROM, quality of life, rhinology, chronic rhinosinusitis, nasal obstruction, allergic rhinitis, olfactory dysfunction, validation and minimal clinically important difference. Only studies for which a full text was available in English or Polish were included. We considered original studies, systematic reviews, consensus documents (EPOS 2020, EPOS/EUFOREA, EAACI and ARIA position papers) and validation studies, with emphasis on the last decade; older development papers were retained where they remain the primary source for an instrument.

Instruments were selected pragmatically, on the basis of published development and validation data, use as an endpoint in registration trials or consensus documents, and relevance to European rhinological and allergological practice. Screening and selection were carried out by the authors by consensus; no dual independent screening or formal risk-of-bias assessment was performed.

The COSMIN (COnsensus-based Standards for the selection of health Measurement INstruments) framework [5, 6] was used as a conceptual guide for discussing measurement properties. No formal COSMIN rating of individual validation studies was undertaken, and this article should not be read as a graded quality appraisal of the instruments described.

Appraising a PROM

Frequency of use is not, in itself, evidence of quality, and it is worth being clear about what makes one instrument better than another. The COSMIN initiative groups the relevant measurement properties under reliability, validity and responsiveness [5, 6]. Reliability is the more familiar of these, and includes internal consistency (Cronbach's α, with values of roughly 0.70–0.95 usually regarded as adequate), test–retest reproducibility and measurement error. Responsiveness – the ability to detect genuine change over time – matters most when an instrument is used to follow treatment. The property that tends to receive least attention, yet is arguably the most important, is content validity: whether the items actually cover what matters to patients. Current COSMIN methodology places it first, and it is precisely the property that ad hoc translations and hastily assembled questionnaires most often lack.

For the practising clinician, though, the real difficulty is rarely which instrument to pick but how to read the number it produces. Four concepts are involved and are routinely treated as if they were one. The minimal clinically important difference (MCID) is the smallest change in score that patients notice as beneficial. The minimal important difference (MID) is often used as a synonym, though in the allergy literature it usually means a within-person change threshold derived without reference to a specific treatment. Neither should be confused with a severity threshold – a cut-off on the absolute score, such as the SNOT-22 value taken to indicate substantially impaired quality of life – or with a control threshold, which separates adequately from inadequately controlled disease. The distinction is not pedantic: as the sections below show, the same instrument may have all of these attached to it, and reporting a control threshold as though it were an MCID is a common and consequential error.

A further caution concerns the MCID itself, which is frequently quoted as though it were a fixed property of a questionnaire. It is not. It is derived either by anchor-based methods, generally preferred, or by distribution-based methods such as 0.5 SD [7], and it shifts with the population, the intervention, the anchor and the method used; it is also baseline-dependent, so that a patient starting from a low score may find it arithmetically harder to reach. It is not the same as statistical significance, since a large trial can produce a significant but trivial difference. Floor and ceiling effects and response shift – the way patients recalibrate their own standards over years of illness – complicate matters further.

Chronic rhinosinusitis

SNOT-22

The Sino-Nasal Outcome Test-22 derives from Piccirillo's Rhinosinusitis Outcome Measure-31 via the SNOT-20 [8], and was validated psychometrically by Hopkins et al. in more than 2000 patients undergoing sinus surgery [9]. It has 22 items scored 0–5, giving a total of 0–110, with higher scores indicating greater burden. Patients also mark up to 5 items that matter most to them; in our experience this section is often left unread, although it is arguably the most useful part of the questionnaire when agreeing treatment goals with a patient.

The domain structure remains unsettled, with 4-, 5- and 6-domain models described. Dejaco et al. reported that in European patients with chronic rhinosinusitis (CRS) the item-to-domain assignment differed from previously published models, and that the nasal-symptom domain correlated with the Lund–Mackay score (r = 0.48) rather better than the total score does [10]. The clinical implication is that two patients with the same total score may have quite different symptom profiles, and that domains do not necessarily respond to treatment in parallel.

The MCID most often quoted is 8.9 points [9]. It tends to be over-generalised: it appears to be specific but not sensitive for identifying patients who report noticeable improvement [11], and domain-specific values differ from the total-score figure [12]. Toma and Hopkins proposed severity bands for the absolute score of 0–7 (none or trivial), 8–20 (mild), 21–50 (moderate) and above 50 (severe) [13].

Within EPOS-based pathways, a SNOT-22 score ≥40 is commonly used as an indicator of substantially impaired quality of life and forms one component of eligibility assessment for biologic treatment in severe uncontrolled CRSwNP; the assessment also takes account of type 2 inflammation, need for systemic corticosteroids or previous surgery, olfactory loss and comorbid asthma [3, 4]. A score of 40 does not by itself qualify a patient for a biologic, and it is worth being explicit about this when the questionnaire is used in a referral letter.

Morawska et al. carried out the cross-cultural adaptation and validation of the Polish SNOT-22, reporting internal consistency of Cronbach's α = 0.89 and clear separation between patients and controls (median 32 vs 5 points) [14]. It is currently the best-established Polish-language disease-specific PROM for adult CRS, with the caveat that the validation cohort consisted of patients with CRSwNP.

Many SNOT-22 items are extranasal (sleep, mood, function), which makes the total score sensitive to comorbid depression, anxiety and insomnia, and probably contributes to its weak correlation with endoscopic and radiological findings. The questionnaire is copyrighted (© Washington University, St. Louis); commercial use requires permission, which is occasionally overlooked in industry-sponsored work.

Other instruments

CRS-PRO, a 12-item measure developed by Ghadersohi et al. in line with current FDA guidance on content validity, was constructed with extensive patient input and has good reliability (Cronbach's α = 0.86; intraclass correlation coefficient 0.89) and a high correlation with SNOT-22 (r = 0.83) [15]; responsiveness in patients undergoing endoscopic sinus surgery has since been demonstrated [16]. In a recent prospective cohort, preoperative PROMs combined with objective features predicted postoperative disease control in CRSwNP, although the model has not been externally validated [17].

Abbreviated versions have also been proposed. A rhinology-focused SNOT-5 correlated significantly with nasal polyp and Lund–Mackay scores where the full SNOT-22 did not, which supports the argument that extranasal items dilute the sinonasal signal, though this was a single-centre retrospective analysis [18]. For anyone selecting an instrument, the systematic quality appraisal of adult CRS PROMs by Rudmik et al. remains a useful starting point [19].

Disease control is a separate construct. EPOS 2020 classifies CRS as controlled, partly controlled or uncontrolled on the basis of patient-reported symptoms over the preceding month, together with endoscopy and rescue corticosteroid use [3] – a hybrid of PROM and clinician assessment, closer in spirit to asthma control than to conventional severity grading.

Nasal obstruction and functional nasal surgery

NOSE

The Nasal Obstruction Symptom Evaluation (NOSE), published by Stewart et al. in 2004, has 5 items scored 0–4; the sum multiplied by 5 gives a score of 0–100, higher values indicating greater obstruction [20]. It is the instrument most often used in septoplasty and nasal valve surgery.

Rhee et al. proposed severity categories for the absolute score (5–25 mild, 30–50 moderate, 55–75 severe, 80–100 extreme) together with nor-

mative ranges [21]. The MCID has not been settled. Published estimates vary considerably with population, handling of the scale and choice of anchor: an anchor-based rhinoplasty cohort produced a value of 24 points [22], whereas improvements of around 15 points, or of 30–40% of baseline, are applied elsewhere. Any claim of clinically meaningful improvement in NOSE should therefore be accompanied by the threshold used and its source.

A Polish translation and cross-cultural adaptation has been published by Dąbrowska-Bień et al., who assessed internal consistency, reproducibility, validity, responsiveness and interpretability in 51 patients and 51 matched controls [23].

The nasal obstruction visual analogue scale (VAS; 0–10 cm or 0–100 mm) remains the quickest option. It correlates moderately with NOSE and weakly with rhinomanometry and acoustic rhinometry; among objective measures, peak nasal inspiratory flow appears to correlate best with PROMs [2]. Its drawbacks are unidimensionality and sensitivity to the way the question is phrased.

Rhinoplasty

SCHNOS (Standardized Cosmesis and Health Nasal Outcomes Survey) has 10 items in two separately scored domains, obstruction (SCHNOS-O) and cosmesis (SCHNOS-C), and was designed for functional and cosmetic rhinoplasty [24]. MCIDs are domain-specific: in an anchor-based prospective cohort they were estimated at 28 points for SCHNOS-O and 18 points for SCHNOS-C [22]. A single MCID for the instrument as a whole should not be quoted, though this is occasionally seen. A Polish translation and validation has been published by Jadczak et al. [25], making SCHNOS one of the few rhinoplasty-specific instruments available for use in Polish patients.

ROE and the FACE-Q Rhinoplasty modules address satisfaction with appearance; FACE-Q was developed with patient involvement at the item-generation stage. ENS6Q, a 6-item screening instrument for empty nose syndrome, has become more relevant as attention has turned to the sequelae of aggressive turbinate reduction [26].

Allergic rhinitis

Rhinologists and allergologists have to some extent settled on different instrument sets, which makes it awkward to compare findings across the two specialties in the same patient.

The Total Nasal Symptom Score (TNSS) sums 4 symptoms (obstruction, rhinorrhoea, sneezing, itch) scored 0–3 and is a standard endpoint in registration trials, usually completed as a diary. The Combined Symptom and Medication Score (CSMS) is the EAACI-recommended composite endpoint for allergen immunotherapy trials, combining symptoms and rescue medication use [27]. Pfaar et al. have recently derived an MCID for the CSMS 0–6 scale of about -0.22 points, corresponding to roughly -16% on a composite endpoint scale, using direct patient feedback (n = 1,071) and a phase III dataset anchored to the RQLQ(S) [28]. This is a trial-level threshold for immunotherapy against placebo and should not be transposed to individual patients or to other interventions.

The Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ) and its short form (mini-RQLQ) have 28 items in seven domains scored 0–6, with higher scores indicating worse quality of life; a within-person change of 0.5 points is the traditionally accepted MID [28–30], although more recent work suggests the clinically relevant difference depends on population and context [7, 27]. Within the ARIA/MASK framework, the nasal-symptom VAS underpins the assessment of control, with a threshold of 5/10 indicating uncontrolled disease [31]. The Rhinitis Control Assessment Test (RCAT) has 6 items and a score of 6–30, with a score of 21 or below indicating inadequate control; this is a control threshold and not an MCID [32]. MASK-air (Allergy Diary), the ARIA mobile application recording daily symptom VAS, medication use and work impact, is an established example of an electronic PROM platform generating real-world data [33].

SNOT-22 has also been shown to be reliable and responsive in allergic rhinitis, with an MCID estimated at 6–11 points in that population [34], which makes it a reasonable single instrument in patients with overlapping CRS and allergic rhinitis – a common situation in a Polish ENT outpatient setting, where many patients are referred with both diagnoses already made.

Olfactory dysfunction

Loss of smell is among the symptoms with the greatest impact on quality of life in CRSwNP, and among the least well captured by a single questionnaire item. Psychophysical tests (Sniffin' Sticks, UPSIT) measure olfactory performance, not its consequences, and the two do not necessarily move together.

The Questionnaire of Olfactory Disorders – Negative Statements (QOD-NS) has 17 statements on the negative consequences of olfactory dysfunc-

tion, each scored 0–3, giving a total of 0–51; a 7-item brief version (B-QOD) has been developed and psychometrically evaluated in CRS [34, 35]. Scoring direction depends on whether raw or reverse-coded scoring is applied: in some publications higher scores indicate worse olfactory-specific quality of life, in others the reverse. Whichever version is used, the range, scoring direction, method of calculation and interpretation of change should be stated explicitly – advice that applies to every instrument discussed here, and that is not always followed.

Interest in olfactory PROMs grew after the COVID-19 pandemic, in which the agreement between psychophysical testing and patient self-assessment has repeatedly proved poor – one more reason to use both types of measurement together.

Generic PROMs and utility measures

Disease-specific instruments permit neither cross-specialty comparison nor health-economic analysis. For those purposes the field uses EQ-5D-5L (5 dimensions plus a health VAS, yielding a utility index and quality-adjusted life years), SF-36/SF-6D, and PROMIS, the NIH item-bank system built on item response theory, which supports computerised adaptive testing and can shorten administration without much loss of precision. Utility measures underpin cost-effectiveness analyses of endoscopic sinus surgery and of biologic therapy in CRSwNP, and therefore, in practice, reimbursement decisions – which is a good reason for rhinologists not to confine themselves to disease-specific tools.

Children

Paediatric instruments lag behind. SN-5 (Sinus and Nasal Quality of Life Survey; 5 domains, for children aged 2–12, completed by a caregiver) [37] and a modified adolescent version are in use. A recent systematic review of the content validity of paediatric sinonasal PROMs found that most were developed without meaningful involvement of children at the item-generation stage, which limits confidence in them [38]. Proxy reporting adds a further, systematic discrepancy relative to the child's own account.

Limitations and pitfalls

The dissociation between PROMs and objective findings is a property of the disease rather than a defect of the instruments. It follows that PROMs should not be modified or chosen simply to maximise correlation with CT findings; the two classes of measure carry complementary information [2].

Comorbidity is a recurring confounder. Depression, anxiety, insomnia and pain syndromes raise SNOT-22 scores independently of sinus status, and domain-level analysis will only partly disentangle this.

Interpretive thresholds are frequently misapplied. An MCID derived in a surgical cohort need not hold for medical or biologic therapy, and a severity or control threshold should never be reported as though it were an MCID [7, 11, 12].

Several instruments have no validated Polish version (CRS-PRO, QOD-NS, ENS6Q). Working translations without formal cross-cultural adaptation are a methodological error and, in our view, should be picked up at peer review rather than in print. Licensing and copyright restrictions apply to others, notably SNOT-22 and RQLQ.

Missing data are a practical problem in registries: patients doing worst are least likely to return follow-up questionnaires, which will tend to inflate apparent treatment effects. Finally, where PROM thresholds gate access to expensive therapies or determine reimbursement, there is at least a theoretical risk of strategic score reporting by patients or clinicians. We are not aware of this having been quantified in rhinology, and it should be treated as a hypothesis rather than an established phenomenon.

Future directions

Electronic PROMs and remote monitoring – mobile applications, patient portals, integration with the electronic health record – improve data completeness and allow symptom trajectories to be followed rather than sampled at isolated visits. Computerised adaptive testing based on item response theory, as in PROMIS, may shorten questionnaires while preserving precision. Predictive models combining baseline PROMs with objective features such as eosinophil count, polyp score and Lund–Mackay score may eventually help individualise the selection of candidates for biologics [17], though the evidence base is at present thin. Agreement on a core outcome set for CRS and nasal surgery trials would do more than any single new instrument to make future meta-analyses meaningful; the heterogeneity of endpoints remains the main obstacle.

Practical recommendations

Table 1. *Suggested selection of PROMs by indication.*

Clinical setting	First-choice instrument	Complementary
CRS (with and without polyps): diagnosis, monitoring, contribution to selection for surgery or biologics	SNOT-22 (validated Polish version)	EPOS 2020 control assessment; QOD-NS when hyposmia dominates
Nasal obstruction, septoplasty, nasal valve surgery	NOSE (validated Polish version)	VAS; SCHNOS if an aesthetic component is present
Rhinoplasty	SCHNOS (report SCHNOS-O and SCHNOS-C separately) or FACE-Q Rhinoplasty	NOSE
Allergic rhinitis	VAS + RCAT (control)	RQLQ/mini-RQLQ; CSMS in immunotherapy trials
Olfactory dysfunction	QOD-NS / B-QOD	Psychophysical testing (Sniffin' Sticks)
Health-economic analysis, cross-specialty comparison	EQ-5D-5L	SF-36

B-QOD – brief Questionnaire of Olfactory Disorders; CRS – chronic rhinosinusitis; CSMS – Combined Symptom and Medication Score; EPOS – European Position Paper on Rhinosinusitis and Nasal Polyps; EQ-5D-5L – EuroQol 5-dimension 5-level questionnaire; NOSE – Nasal Obstruction Symptom Evaluation; PROM – patient-reported outcome measure; QOD-NS – Questionnaire of Olfactory Disorders – Negative Statements; RCAT – Rhinitis Control Assessment Test; RQLQ – Rhinoconjunctivitis Quality of Life Questionnaire; SCHNOS – Standardized Cosmesis and Health Nasal Outcomes Survey; SCHNOS-C – SCHNOS cosmesis domain; SCHNOS-O – SCHNOS obstruction domain; SF-36 – 36-Item Short Form Health Survey; SNOT-22 – 22-item Sino-Nasal Outcome Test; VAS – visual analogue scale.

Table 2. *Key characteristics of the principal PROMs in rhinology.*

Instrument	Items	Range (direction)	Population	Interpretive value	Polish version
SNOT-22	22	0–110 (higher = worse)	CRS, AR	MCID 8.9 points [9]; severity bands 8–20 mild, 21–50 moderate, >50 severe [13]; ≥40 indicates markedly impaired QoL and is one component of biologic eligibility assessment [3, 4]	validated [14]
CRS-PRO	12	0–48 (higher = worse)	CRS	MCID not established	none published
NOSE	5	0–100 (higher = worse)	nasal obstruction	MCID estimates vary; 24 points in an anchor-based cohort [22]; ~15 points or 30–40% of baseline applied elsewhere	validated [23]
SCHNOS	10 (2 domains)	0–100 per domain (higher = worse)	rhinoplasty	domain-specific MCID: SCHNOS-O 28 points, SCHNOS-C 18 points [22]	validated [25]
RQLQ	28	0–6, mean (higher = worse)	AR	traditional within-person MID 0.5 points [29]	licensed translation available; no published Polish psychometric validation identified
RCAT	6	6–30 (higher = better control)	AR	Poor-control threshold ≤21 [32]	no published Polish validation identified
CSMS0–6	variable	0–6 (higher = worse)	AR (immunotherapy trials)	trial-level minimal important difference estimate: approx. -0.22 points (≈ -16%), for immunotherapy vs placebo [28]	not applicable (diary-based)
QOD-NS (B-QOD)	17 (7)	0–51; direction depends on whether raw or reverse-coded scoring is used – state which	olfactory dysfunction	MCID not established	none published
EQ-5D-5L	5 + VAS	utility index	generic	population-specific value sets	validated

AR – allergic rhinitis; B-QOD – brief Questionnaire of Olfactory Disorders; CRS – chronic rhinosinusitis; CRS-PRO – Chronic Rhinosinusitis Patient-Reported Outcome measure; CSMS – Combined Symptom and Medication Score; EQ-5D-5L – EuroQol 5-dimension 5-level questionnaire; MCID – minimal clinically important difference; MID – minimal important difference; NOSE – Nasal Obstruction Symptom Evaluation; PROM – Patient-Reported Outcome Measure; QoL – quality of life; QOD-NS – Questionnaire of Olfactory Disorders – Negative Statements; RCAT – Rhinitis Control Assessment Test; RQLQ – Rhinoconjunctivitis Quality of Life Questionnaire; SCHNOS – Standardized Cosmesis and Health Nasal Outcomes Survey; SNOT-22 – 22-item Sino-Nasal Outcome Test; VAS – visual analogue scale.

Conclusions

PROMs now inform indications for surgery and for biologic therapy, contribute to the definition of disease control, and underpin cost-effectiveness assessment. That makes some familiarity with their construction and limitations part of ordinary rhinological competence, and not merely a matter for those designing trials.

SNOT-22 and NOSE remain the reference instruments in their respective domains and both have validated Polish versions. MCIDs, severity thresholds and control thresholds are distinct quantities and should not be used interchangeably, which in the published literature they frequently are. PROMs and objective investigations answer different questions and are best read together. For Polish centres, the more useful next steps are probably the publication of Polish psychometric validations for further instruments – CRS-PRO and QOD-NS, neither of which has one, and RQLQ, for which a licensed Polish translation exists but no

published validation was identified – together with the routine collection of PROMs in electronic form, which in most departments is still not standard.

References

1. *Weldring T, Smith SMS. Patient-reported outcomes (PROs) and patient-reported outcome measures (PROMs). Health Serv Insights. 2013; 6: 61-8. https://doi.org/10.4137/HSI.S11093.*
2. *Ta NH, Gao J, Philpott C. A systematic review to examine the relationship between objective and patient-reported outcome measures in sinonasal disorders: recommendations for use in research and clinical practice. Int Forum Allergy Rhinol. 2021; 11(5): 910-23. https://doi.org/10.1002/alr.22744.*
3. *Fokkens WJ, Lund VJ, Hopkins C et al. European Position Paper on Rhinosinusitis and Nasal Polyps 2020. Rhinology. 2020; 58(Suppl. S29): 1-464. https://doi.org/10.4193/Rhin20.600.*
4. *Fokkens WJ, Viskens AS, Backer V et al. EPOS/EUFOREA update on indication and evaluation of biologics in chronic rhinosinusitis with nasal polyps 2023. Rhinology. 2023; 61(3): 194-202. https://doi.org/10.4193/Rhin22.489.*
5. *Mokkink LB, Terwee CB, Patrick DL et al. The COSMIN checklist for assessing the methodological quality of studies on measurement properties of health status measurement instruments: an international Delphi study. Qual Life Res. 2010; 19(4): 539-49. https://doi.org/10.1007/s11136-010-9606-8.*
6. *Prinsen CAC, Mokkink LB, Bouter LM et al. COSMIN guideline for systematic reviews of patient-reported outcome measures. Qual Life Res. 2018; 27(5): 1147-57. https://doi.org/10.1007/s11136-018-1798-3.*
7. *Sedaghat AR. Understanding the minimal clinically important difference (MCID) of patient-reported outcome measures. Otolaryngol Head Neck Surg. 2019; 161(4): 551-60. https://doi.org/10.1177/0194599819852604.*
8. *Piccirillo JF, Merritt MG Jr, Richards ML. Psychometric and clinimetric validity of the 20-Item Sino-Nasal Outcome Test (SNOT-20). Otolaryngol Head Neck Surg. 2002; 126(1): 41-7. https://doi.org/10.1067/mhn.2002.121022.*
9. *Hopkins C, Gillett S, Slack R et al. Psychometric validity of the 22-item Sinonasal Outcome Test. Clin Otolaryngol. 2009; 34(5): 447-54. https://doi.org/10.1111/j.1749-4486.2009.01995.x.*
10. *Dejaco D, Riedl D, Huber A et al. The SNOT-22 factorial structure in European patients with chronic rhinosinusitis: new clinical insights. Eur Arch Otorhinolaryngol. 2019; 276(5): 1355-65. https://doi.org/10.1007/s00405-019-05320-z.*
11. *Phillips KM, Hoehle LP, Caradonna DS et al. Determinants of noticeable symptom improvement despite sub-MCID change in SNOT-22 score after treatment for chronic rhinosinusitis. Int Forum Allergy Rhinol. 2019; 9(5): 508-13. https://doi.org/10.1002/alr.22269.*
12. *Chowdhury NI, Mace JC, Bodner TE et al. Investigating the minimal clinically important difference for SNOT-22 symptom domains in surgically managed chronic rhinosinusitis. Int Forum Allergy Rhinol. 2017; 7(12): 1149-55. https://doi.org/10.1002/alr.22028.*
13. *Toma S, Hopkins C. Stratification of SNOT-22 scores into mild, moderate or severe and relationship with other subjective instruments. Rhinology. 2016; 54(2): 129-33. https://doi.org/10.4193/Rhino15.072.*
14. *Morawska J, Jeruzal-Świątecka J, Politański P et al. Sino-Nasal Outcome Test-22: translation, cross-cultural adaptation, and validation in Polish-speaking patients. Eur Arch Otorhinolaryngol. 2024; 281(12): 6431-43. https://doi.org/10.1007/s00405-024-08919-z.*
15. *Ghadersohi S, Price CPE, Jensen SE et al. Development and preliminary validation of a new patient-reported outcome measure for chronic rhinosinusitis (CRS-PRO). J Allergy Clin Immunol Pract. 2020; 8(7): 2341-50. https://doi.org/10.1016/j.jaip.2020.04.048.*
16. *Lin KA, Price CPE, Huang JH et al. Responsiveness and convergent validity of the chronic rhinosinusitis patient-reported outcome (CRS-PRO) measure in CRS patients undergoing endoscopic sinus surgery. Int Forum Allergy Rhinol. 2021; 11(9): 1308-20. https://doi.org/10.1002/alr.22782.*
17. *Zhang C, Zhang Q, Chen J et al. Patient-reported outcome measures as predictive tools for disease control in chronic rhinosinusitis with nasal polyps: a prospective study. Clin Transl Allergy. 2025; 15(11): e70119. https://doi.org/10.1002/clt2.70119.*
18. *Misirovs R, Chan R, Lipworth B. 5-Item sino-nasal outcome test and 22-item sino-nasal outcome test relationship with endoscopic and radiologic scores in chronic rhinosinusitis with nasal polyps. Ann Allergy Asthma Immunol. 2024; 132(3): 363-7. https://doi.org/10.1016/j.anai.2023.11.011.*
19. *Rudmik L, Hopkins C, Peters A et al. Patient-reported outcome measures for adult chronic rhinosinusitis: a systematic review and quality assessment. J Allergy Clin Immunol. 2015; 136(6): 1532-40.e2. https://doi.org/10.1016/j.jaci.2015.10.012.*
20. *Stewart MG, Witsell DL, Smith TL et al. Development and validation of the Nasal Obstruction Symptom Evaluation (NOSE) scale. Otolaryngol Head Neck Surg. 2004; 130(2): 157-63. https://doi.org/10.1016/j.otohns.2003.09.016.*
21. *Rhee JS, Sullivan CD, Frank DO et al. A systematic review of patient-reported nasal obstruction scores: defining normative and symptomatic ranges in surgical patients. JAMA Facial Plast Surg. 2014; 16(3): 219-25. https://doi.org/10.1001/jamafacial.2013.2473.*
22. *Kandathil CK, Saltychev M, Abdelwahab M et al. Minimal clinically important difference of the Standardized Cosmesis*

and Health Nasal Outcomes Survey. Aesthet Surg J. 2019; 39(8): 837-40. https://doi.org/10.1093/asj/sjz070.

23. *Dąbrowska-Bień J, Skarżyński H, Gos E et al. Clinical evaluation of a Polish translation and cross-cultural adaptation of the Nasal Obstruction Symptom Evaluation (NOSE) scale. Med Sci Monit. 2018; 24: 7958-64. https://doi.org/10.12659/MSM.909934.*
24. *Moubayed SP, Ioannidis JPA, Saltychev M et al. The 10--item Standardized Cosmesis and Health Nasal Outcomes Survey (SCHNOS) for functional and cosmetic rhinoplasty. JAMA Facial Plast Surg. 2018; 20(1): 37-42. https://doi.org/10.1001/jamafacial.2017.1083.*
25. *Jadczak M, Krzywdzińska S, Jurkiewicz D. Polish translation and validation of the SCHNOS (Standardized Cosmesis and Health Nasal Outcomes Survey) questionnaire. Otolaryngol Pol. 2024; 78(4): 16-20. https://doi.org/10.5604/01.3001.0054.4820.*
26. *Velasquez N, Thamboo A, Habib ARR et al. The Empty Nose Syndrome 6-Item Questionnaire (ENS6Q): a validated 6-item questionnaire as a diagnostic aid for empty nose syndrome patients. Int Forum Allergy Rhinol. 2017; 7(1): 64-71. https://doi.org/10.1002/alr.21842.*
27. *Pfaar O, Demoly P, Gerth van Wijk R et al. Recommendations for the standardization of clinical outcomes used in allergen immunotherapy trials for allergic rhinoconjunctivitis: an EAACI Position Paper. Allergy. 2014; 69(7): 854-67. https://doi.org/10.1111/all.12383.*
28. *Pfaar O, Mösges R, Blaiss MS et al. The minimal clinically important difference in allergen immunotherapy: an evidence-based approach. Allergy. 2025; 80(12): 3369-76. https://doi.org/10.1111/all.16654.*
29. *Juniper EF, Guyatt GH. Development and testing of a new measure of health status for clinical trials in rhinoconjunctivitis. Clin Exp Allergy. 1991; 21(1): 77-83. https://doi.org/10.1111/j.1365-2222.1991.tb00807.x.*
30. *Juniper EF, Thompson AK, Ferrie PJ et al. Development and validation of the mini Rhinoconjunctivitis Quality of Life Questionnaire. Clin Exp Allergy. 2000; 30(1): 132-40. https://doi.org/10.1046/j.1365-2222.2000.00668.x.*
31. *Bousquet J, Schünemann HJ, Togias A et al. Next-generation ARIA care pathways for rhinitis and asthma: a model for multimorbid chronic diseases. Clin Transl Allergy. 2019; 9: 44. https://doi.org/10.1186/s13601-019-0279-2.*
32. *Schatz M, Meltzer EO, Nathan R et al. Psychometric validation of the Rhinitis Control Assessment Test: a brief patient-completed instrument for evaluating rhinitis symptom control. Ann Allergy Asthma Immunol. 2010; 104(2): 118-24. https://doi.org/10.1016/j.anai.2009.11.063.*
33. *Bousquet J, Anto JM, Bachert C et al. ARIA digital anamorphosis: digital transformation of health and care in airway diseases from research to practice. Allergy. 2021; 76(1): 168-90. https://doi.org/10.1111/all.14422.*
34. *Husain Q, Hoehle L, Phillips K et al. The 22-item Sinonasal Outcome Test as a tool for the assessment of quality of life and symptom control in allergic rhinitis. Am J Rhinol Allergy. 2020; 34(2): 209-16. https://doi.org/10.1177/1945892419884789.*
35. *Mattos JL, Edwards C, Schlosser RJ et al. A brief version of the questionnaire of olfactory disorders in patients with chronic rhinosinusitis. Int Forum Allergy Rhinol. 2019; 9(10): 1144-50. https://doi.org/10.1002/alr.22392.*
36. *Mattos JL, Bodner TE, Mace JC et al. Psychometric properties of the brief version of the questionnaire of olfactory disorders in patients with chronic rhinosinusitis. Int Forum Allergy Rhinol. 2021; 11(10): 1436-42. https://doi.org/10.1002/alr.22800.*
37. *Kay DJ, Rosenfeld RM. Quality of life for children with persistent sinonasal symptoms. Otolaryngol Head Neck Surg. 2003; 128(1): 17-26. https://doi.org/10.1067/mhn.2003.41.*
38. *Williams E, Rotimi O, Burrows L et al. Content validity of patient-reported outcome measures developed for assessing disease-specific quality of life in children with sinonasal disease: a systematic review. Int Forum Allergy Rhinol. 2025; 15(3): 317-27. https://doi.org/10.1002/alr.23539.*

ORCID:
Jakub Nicer – ID – http://orcid.org/0000-0002-7314-2910
Antonina Nicer – ID – http://orcid.org/0009-0009-3095-4749
Dariusz Jurkiewicz – ID – http://orcid.org/0000-0003-3729-2679
Piotr A. Rot – ID – http://orcid.org/0000-0002-7949-1046

Authors contribution:
JN – study design, methodology, literature search and analysis, drafting of the initial version, critical revision; AN – study design, methodology, literature search and analysis; PAR – study design, methodology, literature search and analysis, drafting of the initial version; DJ – study design, scientific supervision, critical revision. All authors have read and approved the final version of the manuscript and accept responsibility for the work as a whole.
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Correspondence:
Jakub Nicer, MD
Clinic of Otolaryngology and Laryngological Oncology with Clinical Department of Cranio-Maxillofacial Surgery at the Military Institute of Medicine – National Research Institute (WIM-PIB), Warsaw
04-141 Warszawa, ul. Szaserów 128
e-mail: nicer35@gmail.com