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Early View

Original article

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Take home message: Systematic review on patients' importance placed on COPD outcomes informs the tradeoff between benefits and harms.

Abstract

Our objective was to systematically summarize all research evidence related to how patients value outcomes in chronic obstructive pulmonary disease (COPD). We conducted a systematic review (Systematic review registration: CRD42015015206) by searching PubMed, Embase, PsycInfo, and CINAHL, and included reports that assessed the relative importance of outcomes from COPD patients' perspective. Two authors independently determined the eligibility of studies, abstracted the eligible studies and assessed risk of bias. We narratively summarized eligible studies, meta-analyzed utilities for individual outcomes and assessed the certainty of evidence using the GRADE approach.

We included 217 quantitative studies. Investigators most commonly used utility measurements of outcomes (n=136), discrete choice exercises (13), probability trade-off (n=4), and forced choice techniques (n=46). Patients rated adverse events as important, but on average less so than symptom relief. Exacerbation and hospitalization due to exacerbation are the outcomes that COPD patients rate as most important. This systematic review provides a comprehensive registry of related studies.

INTRODUCTION

Considering patient values and preferences regarding the benefits and harms of a health intervention is essential for clinical evidence-based decision-making [1-4]. The Grading of Recommendations Assessment, Development and Evaluation (GRADE) working group has recently operationalized patient values and preferences as "the relative importance patients place on outcomes" [3, 5]. Information about the relative importance of outcomes is critical to weigh health benefits and harms of interventions and test strategies [5], including those recommended in clinical practice guidelines. Indeed, numerous studies have addressed how patients value chronic obstructive pulmonary disease (COPD) outcomes but to appropriately inform practice and guidelines, this evidence should be summarized in systematic reviews that allow retrieving and summarizing the best evidence from individual studies on health outcomes [2, 6-9]. Considering the disease burden of COPD [10], such a review would inform decision-making for a large patient community globally.

We, therefore, conducted this systematic review to summarize all research evidence that addressed the question "what is the relative importance patients place on chronic obstructive pulmonary disease related outcomes [3, 5]."

METHODS

Protocol and registration

We conducted this systematic review of the literature in accordance with the Preferred Reporting in Systematic Reviews and Meta-Analyses (PRISMA) guidelines [11] and registered the review protocol on PROSPERO (registration number: CRD42015015206).

Information sources

We searched Medline (through PubMed), Embase, PsycInfo, and CINAHL from inception date to Oct 15th, 2017 using an extensive search strategy developed for retrieving this type of evidence (Appendix 1. Search strategy) [12], including reference lists of identified studies.

Study selection

Two authors independently determined the eligibility of studies by reviewing titles and abstracts and, for potentially eligible studies, through review of full text articles with a standardized and piloted screening form. Reviewers resolved disagreement by discussion or through third party adjudication. Eligible studies reported patient values and preferences of COPD patients, with no limits on the type of study design, language, or treatments. Studies with the following characteristics were eligible for reporting the relative importance of outcomes [4]:

1. **Patient utility and health state value studies:** Studies that examined how patients value alternative health states and experiences with treatment. The eligible measurement techniques were: standard gamble, time trade off, visual analogue scale, or mapping results based on either generic (EuroQol-5D, or SF-36) [13] or specific measurement (i.e. Chronic Respiratory Questionnaire) of health-related quality of life. We expected one major category of eligible studies to be "utility" studies. Utilities represent the strength of an individual's preferences for different outcomes. They are expressed on a scale from 0 indicating dead to 1 indicating perfect health (for some variations of the scale, the upper bound may be 100). The higher the utility is (the closer the estimate is to perfect health), the more value patients will place on the outcome.

2. **Direct choice studies:** Studies that examined patients' choice when they were presented with a description of hypothetical states or during decision making for their own actual health states (i.e., forced choice when presented with a decision aid, probabilistic trade off techniques, discrete choice, willingness to pay, RCTs for preferences, etc.).

3. **Other quantitative studies on outcome importance:** Studies that quantitatively examined the patients' views, attitudes or preferences on outcome importance through self-developed questionnaires or instruments that were not utility measurement techniques.

We included only quantitative studies reporting COPD as a comorbidity if they reported COPD relative importance of outcomes information separately. We excluded non-original studies such as clinical practice guidelines, reviews, commentaries, letters, or viewpoints. We also excluded case reports, case series, and health economic evaluation studies without original utility elicitation. Qualitative studies that explored patients' views, attitudes or preferences related to different treatment options were excluded from this review but included and reported in a subsequent review.

Data collection and certainty of evidence

Two authors independently recorded data: principal author, publication year, participant demographics (sample size, age, sex, etc.), survey techniques or methodologies used, relative importance of outcome results, and risk of bias assessments.

Since there is no accepted risk of bias or study quality assessment tool for value and preference studies, we used an approach that we developed, validated and reported in a separate project [14]. The key items to assess the risk of bias include sample selection, response rate (or attrition rate if participants were followed-up), choice and administration of the instrument, outcome (or health state) presentation, participants' understanding of the methodology, and data analysis (if applicable). We then used the GRADE approach to rate the certainty of the overall body of evidence for outcome importance [14, 15]. The GRADE approach classifies certainty of evidence as high, moderate, low, and very low

based on domains of risk of bias, inconsistency, indirectness, imprecision, publication bias, and upgrading domains.

Data analysis

A priori, we set the disease severity following the Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria, indicating the severity of airflow obstruction, as a potential subgroup factor to consider [16]. We used the severity of airflow obstruction categories of mild (FEV_1 predicted $\geq$ 80%), moderate (50% $\leq$ FEV_1 predicted < 80%), severe (30% $\leq$ FEV_1 predicted < 50%), and very severe (FEV_1 predicted < 30%) reported by authors to determine subgroups. Information on the relative importance of outcomes exists in a variety of formats, including the utility of outcomes or disease stages, proportion of choice, rankings or scores on a scale. For the sake of simplicity, we report all estimates using the descriptive term "utility" to indicate the health status values elicited from standard gamble, time trade off, visual analogue scale, and results from indirect utility measurements [17]. We conducted meta-analyses to synthesize the utility results for same outcomes using a random-effects inverse variance method in Stata 11.0 [18]. For consistency, we presented the results on a 0-1 scale even if they had been elicited on a 0-100 scale. For non-utility results regarding patient values and preferences, we narratively summarized the results.

RESULTS

Study selection and study characteristics

Of 54,598 records, after excluding duplicates, 41,781 titles and abstracts remained; 3,154 articles proved potentially eligible and underwent full-text screening. Of these, 217 quantitative studies reporting patient values and preferences on COPD outcomes proved eligible (Figure 1. Flow Diagram and Appendix 2. References of all included studies).

Of the 217 eligible studies, 136 reported utility or health state values for COPD outcomes of which 69 utilized the feeling thermometer or visual analogue scale (VAS), including the EQ-5D VAS; eight the standard gamble (SG); and six the time trade-off (TTO). For indirect measurements, 82 studies reported EQ-5D utilities, 14 SF-6D utilities, seven health utility index (HUI), seven 15D, and three quality of well-being (QWB) utilities. Of 65 direct choice studies, 46 used forced choice techniques, 13 discrete choice exercise/conjoint analysis or willingness to pay, four probability trade-off, and three ranking methods (Appendix 3. Supplementary Table 1).

Regarding the study design, 127 were cross-sectional studies, 21 cohort studies, 11 repeated surveys, 51 randomized controlled trials (RCTs) and 7 quasi-randomised trials.

The outcomes studied typically included exacerbation or hospitalization due to exacerbation, adverse events, symptom relief, and different severities of COPD. Table 1 presents the first summary of findings table summarizing this type of

evidence (also see Supplementary Table 1). Despite the large number of eligible

studies, few reported the relative importance of outcome information on the

same outcomes. Meta-analyses were restricted to studies focusing on

exacerbation, and different COPD severities measured with VAS and EQ-5D utility.

We found no compelling evidence of publication bias.

Supplementary Table 2 summarizes the risk of bias assessment. Studies suffered

from serious risk of bias related to limitations in the validity and reliability of the

measurement tools (68 studies directly asking participants to choose among a

set of options); and use of a convenience sampling strategy or a volunteer

sample (14 studies); response rates under 50% (32 studies). For other risk of bias

considerations, we classified most studies as low risk of bias (Appendix 3.

Supplementary Table 2).

Table 1. Summary of Findings Table

Question: What are the views about the relative value/importance of outcomes of interest in decision making for patients with chronic obstructive pulmonary disease?

BEST IMAGINABLE HEALTH STATE

Full health

1
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0

WORST IMAGINABLE HEALTH STATE
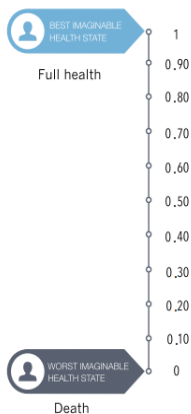
Death

*Utilities represent the value individuals place on different outcomes. They are measured on an interval scale, with zero reflecting states of health equivalent to death/worst imaginable health and one (or 100 in some cases) reflecting perfect health/ best imaginable health.

Health state/Outcome (Categories of values and preferences)	Estimates of outcome importance (range across studies /pooled mean, 95% CI)	No. of participants /studies	Certainty of evidence	Interpretation of findings
Exacerbation (Utility* measured with visual analogue scale [1])	range across studies: 0.259–0.580 pooled mean: 0.462 (95% CI: 0.453-0.471) [2]	1,991 participants 8 studies [2]	⊕⊕⊕◯ Moderate certainty due to inconsistency [2]	Most people find exacerbation of COPD probably has a large impact on their lives. There is likely no important variability for this assessment.
Exacerbation (EQ-5D Utility [3])	range across studies 0.430-0.683 pooled mean: 0.519 (95% CI: 0.502, 0.537) [4]	927 participants 3 studies [4]	⊕⊕◯◯ Low certainty due to inconsistency and indirectness [4,5]	Most people find exacerbation of COPD probably has a large impact on their lives. There is likely no important variability for this assessment.
Exacerbation (disutility) [6]	Visual analogue scale: One non-serious exacerbation: -0.037 (0.005) Two non-serious exacerbations: -0.068 (0.005) One serious exacerbation: -0.090 (0.007) One non-serious and one serious exacerbation: -0.130 (0.007)	239 participants 1 study	⊕⊕⊕⊕ High certainty	Most people find exacerbation of COPD has an impact on their lives, which grows larger as the severity of exacerbation progresses. There is likely no important variability for this assessment.

	Time trade off: One non-serious exacerbation: -0.010 (0.007) Two non-serious exacerbations: -0.021 (0.007) One serious exacerbation: -0.042 (0.009) One non-serious and one serious exacerbation: -0.088 (0.009)			
Level 1 of dyspnea/ breathlessness (utility measured with visual analogue scale) [7]	0.751	146 participants 1 study [7]	⊕⊕⊕⊕ High certainty [7]	Most people find level 1 of dyspnea has a small to moderate impact on lives. There is likely no important variability for this assessment.
Level 2 of dyspnea/ breathlessness (utility measured with visual analogue scale) [7]	0.656	45 participants 1 study [7]	⊕⊕⊕◯ Moderate certainty due to imprecision [7]	Most people find level 2 of dyspnea probably has a moderate impact on lives. There is likely no important variability for this assessment.
Level 3 of dyspnea/ breathlessness (utility measured with visual analogue scale) [7]	0.526	7 participants 1 study [7]	⊕⊕◯◯ Low certainty due to very serious imprecision [7]	Most people find level 3 of dyspnea probably has a large impact on lives. There is likely no important variability for this assessment.

Adverse events (discrete choice) [8]	Two studies suggested that patients consider adverse events as important outcomes. One study suggested adverse events were more important than onset time of medicine, ease of use, rescue medicine use. Another suggested adverse events were more important than costs of treatment, extent to which the patient sees the same doctor each time, and extent to which the doctor treats the patient as an entire person. Both studies concluded symptom relief to be more important than adverse events.	564 participants 2 studies	⊕⊕⊕◯ Moderate certainty due to risk of bias [8]	People probably consider adverse events as an important outcome. There is likely no important variability for this assessment
Extent of symptom relief (discrete choice) [8]	Two studies compared extend of symptom relief with other outcomes. Extent of symptom relief was considered the most important outcome in these two studies.	564 participants 2 studies	⊕⊕⊕◯ Moderate certainty due to risk of bias [8]	Most people probably find symptom relief as important outcome. There is likely no important variability for this assessment.
Extent of symptom relief (forced choice) [9]	In a survey on expectation of treatment greater symptomatic relief was chosen by 82.3% of the participants, thus the most important outcome. Extent of symptom relief was considered the second most important outcome in one cross-sectional study (less preferred to "Not to be kept alive on life support when there is little hope for a meaningful recovery"). Another study reported 58.0% of the participants would prefer treatment focusing on relieving pain and discomfort rather than extending life.	1,640 participants 3 studies	⊕⊕⊕◯ Moderate certainty due to risk of bias [9]	Most people probably find symptom relief as important outcome. There is likely no important variability for this assessment.

Very severe COPD (utility measured with visual analogue scale) [10]	range across studies: 0.321-0.651 pooled mean: 0.345 (0.335-0.354) [11]	746 participants 7 studies	⊕⊕◯◯ Low certainty due to risk of bias [12] and inconsistency [11]	Most people find very severe COPD seems to have a large impact on lives. There is likely important variability for this assessment.
Very severe COPD (EQ-5D utility) [13]	range across studies: 0.520-0.740 pooled mean: 0.681 (0.667-0.694) [14]	898 participants 10 studies	⊕⊕⊕◯ Moderate certainty due to inconsistency [14]	Most people find very severe COPD probably has a large impact on lives. There is likely important variability for this assessment.
Severe COPD (utility measured with visual analogue scale) [15]	range across studies: 0.446-0.689 pooled mean: 0.508 (0.501-0.515) [16]	4,683 participants 8 studies	⊕⊕◯◯ Low certainty due to risk of bias [12] and inconsistency [16]	Most people find severe COPD probably has a moderate to large impact on lives. There is likely important variability for this assessment.
Severe COPD (EQ-5D utility) [17]	range across studies: 0.620-0.810 pooled mean: 0.741 (95% CI: 0.734-0.749) [18]	4,352 participants 11 studies	⊕⊕⊕◯ Moderate certainty due to inconsistency [18]	Most people find severe COPD probably has a moderate to large impact on lives. There is likely important variability for this assessment.

Moderate COPD (utility measured with visual analogue scale) [19]	range across studies: 0.589-0.726 pooled mean: 0.639 (95% CI: 0.635-0.642) [20]	9,664 participants 10 studies	⊕⊕◯◯ Low certainty due to risk of bias [12] and inconsistency [20]	Most people find moderate COPD probably has a moderate impact on lives. There is likely important variability for this assessment.
Moderate COPD (EQ-5D utility) [21]	range across studies: 0.680-0.890 pooled mean: 0.821 (95% CI: 0.815-0.826) [22]	4,620 participants 9 studies	⊕⊕⊕◯ Moderate certainty due to inconsistency [22]	Most people find moderate COPD probably has a moderate impact on lives. There is likely important variability for this assessment.
Mild COPD (utility measured with visual analogue scale) [23]	range across studies: 0.680-0.811 pooled mean: 0.738 (95% CI: 0.732-0.746) [24]	3,623 participants 8 studies	⊕⊕◯◯ Low certainty due to risk of bias [12] and inconsistency [24]	Most people find moderate COPD probably has a small to moderate impact on lives. There is likely important variability for this assessment.
Mild COPD (EQ-5D utility) [25]	range across studies: 0.770-0.900 pooled mean: 0.873 ((95% CI: 0.863-0.883) [26]	2,067 participants 7 studies	⊕⊕⊕◯ Moderate certainty due to inconsistency [26]	Most people find moderate COPD probably has a small to moderate impact on lives. There is likely important variability for this assessment.

GRADE Working Group grades of evidence: here we assess the certainty of evidence on mean outcome importance. We use "certainty of evidence", "certainty in estimates", "quality of evidence" and "strength of evidence" interchangeably.

High certainty: We are very confident that the true value of outcome importance lies close to that of the estimate.

Moderate certainty: We are moderately confident in the estimate: The true value of outcome importance is likely to be close to the estimate, but there is a possibility that it is substantially different

Low certainty: Our confidence in the estimate is limited: The true value of outcome importance may be substantially different from the estimate

Very low certainty: We have very little confidence in the estimate: The true value of outcome importance is likely to be substantially different from the estimate

CI: Confidence interval; COPD: chronic obstructive pulmonary disease; EQ-5D: EuroQual-5-dimension (a quality of life measurement tool); IQR: interquartile range; SD: standard deviation; SG: Standard Gamble; TTO: Time Trade Off; VAS: Visual Analogue Scale.

Footnotes:

1. Eight studies including Alcazar 2012, Antoniu 2014, Cross 2010, Goossens 2011, Miravitlles 2011a, O'Reilly 2007, Seymour 2010, and Wildman 2009 used EQ-5D visual analogue scale to elicit health state values on exacerbation of COPD.
2. Across eight included studies, the point estimates range from 0.259 to 0.580. Using inverse-variance method to pool the estimates, the I^2 (95.5%) and statistical test (<0.001) suggest potential heterogeneity across studies. The difference in study populations cannot explain the source of heterogeneity (the participants in the studies were exacerbation patients, exacerbation patients not needing hospitalization, ambulatory patients, and hospitalized patients due to exacerbation).
3. Three studies including Cross 2010, Goossens 2011, Miravitlles 2011a used EQ-5D utility to elicit the importance of outcome.
4. Across three included studies, the point estimates range from 0.430 to 0.683. Using inverse-variance method to pool the estimates, the I^2 (95.5%) and statistical test (<0.001) suggest potential heterogeneity across studies. The difference in study populations cannot explain the source of heterogeneity (the participants in the three studies were exacerbation patients, exacerbation patients not needing hospitalization, and ambulatory patients).
5. We rated down the quality of evidence for indirectness because an indirect measurement tool (EQ-5D) was used to elicit the utility of outcomes.
6. Rutten van Molken 2009 reported the disutility due to the exacerbations. The measurement tools included visual analogue scale and time trade off. The researchers estimated the disutility due to exacerbation using random effects regression analysis.
7. Kim 2014 reported the utility of dyspnea, according to the levels of breathlessness (Level 1, short of breath during strenuous activities; level 2, stopping to catch breath after a few minutes walking; level 3, breathless when dressing or washing). In a total sample of 200, the numbers of

participants experiencing level 1, level 2, and level 3 breathlessness were 146, 45, and 7. Due to small sample size, we downgraded the certainty of evidence by one level for the estimates of level 2 breathlessness, and two levels for level 3 of breathlessness.

8. Bulcun 2014 compared extent of symptom relief with extent to which the doctor gives sufficient time to listen to the patient, possibility of experiencing adverse effects from treatment, costs of treatment, extent to which the patient sees the same doctor each time, and extent to which the doctor treats the patient as an entire person. Kawata 2014 recruited 515 patients for an online voluntary survey on the comparison of importance of symptom relief, speed of symptom relief, rescue medicine use, and side effects. Participants' eligibility and their answers were considered as having serious risk of bias.

9. Three studies (Rocker 2013, Claessens 2000, and Kuyucu 2011) asked directly what participants would prefer in facing a COPD treatment decision. The questions included expectation of treatment, reasons to continue or not continue with treatment, and preferred treatment characteristics. The assessment was in risk of bias due to unclear reliability and validity features.

10. The studies reported utility of very severe COPD include Boros 2012, Kim 2014, Lin 2014, Pickard 2011, Rutten van Molken 2006, and Stahl 2005.

11. The point estimates range from 0.321 to 0.651. Using inverse-variance method to pool the estimates, the I^2 (98.5%) and statistical test (<0.001) suggest potential heterogeneity across studies. The difference in study population cannot explain the source of heterogeneity.

12. We downgrade the certainty in evidence because of low response rate observed in Lin 2014, as well as the potential biased sampling strategy by asking physicians to provided recruited patients in Boros 2012.

13. The studies reported EQ-5D utility of very severe COPD patients include Chen 2014, Kim 2014, Lin 2014, Menn 2010, Pickard 2011, Rutten van Molken 2006, Solem 2013, Stahl 2005, Starkie 2011, Szende 2009.

14. The point estimates range from 0.520 to 0.740. Using inverse-variance method to pool the estimates, the I^2 (80.2%) and statistical test (<0.001) suggest potential heterogeneity across studies. The difference in study population cannot explain the source of heterogeneity.

15. The studies reported utility of severe COPD include Boros 2012, Kim 2014, Lin 2014, Pickard 2011, Punekar 2007, Rutten van Molken 2006, Rutten van Molken 2009, and Stahl 2005.

16. The point estimates range from 0.446 to 0.689. Using inverse-variance method to pool the estimates, the I^2 (98.8%) and statistical test (<0.001) suggest potential heterogeneity across studies. The difference in study population cannot explain the source of heterogeneity.

17. The studies reported EQ-5D utility of severe COPD include Chen 2014, Kim 2014, Lin 2014, Menn 2010, Pickard 2011, Punekar 2007, Rutten van Molken 2006, Solem 2013, Stahl 2005, Starkie 2011, and Szende 2009.

18. The point estimates range from 0.620 to 0.810. Using inverse-variance method to pool the estimates, the I^2 (94.5%) and statistical test (<0.001) suggest potential heterogeneity across studies. The difference in study population cannot explain the source of heterogeneity.

19. The studies reported EQ-5D visual analogue scale results for moderate COPD include Boros 2012, Hong 2015, Kim 2014, Lin 2014, Pickard 2011, Punekar 2007, Rodriguez Gonzalez-Moro 2009, Rutten van Molken 2006, Rutten van Molken 2009, and Stahl 2005.

20. The point estimates range from 0.589 to 0.726. Using inverse-variance method to pool the estimates, the I^2 (97.9%) and statistical test (<0.001) suggest potential heterogeneity across studies. The difference in study population cannot explain the source of heterogeneity.

21. The studies reported EQ-5D utility of moderate COPD patients include Hong 2015, Kim 2014, Lin 2014, Pickard 2011, Punekar 2007, Rutten van Molken 2006, Stahl 2005, Starkie 2011, and Szende 2009.
22. The point estimates range from 0.680 to 0.890. Using inverse-variance method to pool the estimates, the I^2 (97.8%) and statistical test (<0.001) suggest potential heterogeneity across studies. The difference in study population cannot explain the source of heterogeneity.
23. The studies reported EQ-5D visual analogue scale include Boros 2012, Hong 2015, Kim 2014, Lin 2014, Pickard 2011, Punekar 2007, Rutten van Molken 2009, and Stahl 2005.
24. The point estimates range from 0.680 to 0.811. Using inverse-variance method to pool the estimates, the I^2 (88.0%) and statistical test (<0.001) suggest potential heterogeneity across studies. The difference in study population cannot explain the 91.3%) and statistical test (<0.001) suggest potential heterogeneity across studies. The difference in study population cannot explain the source of heterogeneity.
25. The studies reported EQ-5D utility of mild COPD include Hong 2015, Kim 2014, Lin 2014, Pickard 2011, Punekar 2007, Stahl 2005, and Szende 2009.
26. The point estimates range from 0.770 to 0.900. Using inverse-variance method to pool the estimates, the I^2 (91.3%) and statistical test (<0.001) suggest potential heterogeneity across studies. The difference in study population cannot explain the source of heterogeneity.

Importance of exacerbation

The measurements used to elicit the importance of exacerbation, or hospitalization due to exacerbations include visual analogue scale (including the EQ-5D VAS) (ten studies [19-28]); time trade-off (one study [26]); and the EQ-5D utility (seven studies [22-25, 29-31]). We observed variations in the description of "exacerbation." Three studies utilized clinical diagnoses, without a specific definition of an exacerbation [21, 25, 30]. All remaining studies defined exacerbation as worsened symptoms [19-32]. Of these, three of the studies explicitly reported a category for exacerbation, with one using the definition of the British Thoracic Society[22], and two others the American Thoracic Society/European Respiratory Society definition [24, 31]. The other reports varied in defining "exacerbation," with three reports focusing on exacerbations needing hospitalization [19, 20, 28], and another one specifying the length of symptoms [23]. The estimates varied from 0.259 to 0.580 on the VAS, and 0.430 to 0.740 with EQ-5D utility. We conducted meta-analysis using the inverse variance method to pool the estimates based on VAS and EQ-5D, yielding utility of exacerbation of 0.462 (95% CI: 0.453- 0.471, I^2 = 98.2%, $P < 0.001$ for the test of heterogeneity) on the VAS, and 0.519 (95% CI: 0.502-0.537, I^2 = 95.5%, $P <$ 0.001 for the test of heterogeneity) with the EQ-5D utility. Of the eight studies included in the meta-analysis, six recruited patient populations with a mean age between 66 to 69 [19, 20, 22, 25, 27, 28]; of those, four were from the UK [22, 25, 27, 28], two from other European countries [19, 20], one from the USA [23], and

another was a multicenter study conducted in countries including the USA, UK, and other countries [24]. The study populations were similar across the studies regarding age and setting. We could not explain the large degree of inconsistency and, thus, rated down the certainty of evidence to moderate (Table 1). For studies that used the EQ-5D utility measurement, we further rated down for indirectness given the indirect measurement tool used (i.e. the patients participating did not themselves place a value on exacerbations, but merely reported the consequences on EQ-5D items). One study used a more granular approach to addressing the importance of exacerbations: Rutten van Molken and colleagues reported the values of different severities of exacerbations. The authors described serious and non-serious exacerbations according to the severity of increase in respiratory symptoms and non-respiratory symptoms, impact on daily activities, and response to treatment. To briefly summarize, for a non-serious exacerbation, patients will experience mild-to-moderate worsening of breathlessness and cough, and the symptoms interfere with daily activities; while patients with a serious exacerbation will experience severe-to-very severe worsening of breathlessness and cough, and the symptoms will completely disrupt daily activities. Based on VAS and time trade off measurements, respectively, the disutility (defined as a reduction in utility) for one non-serious exacerbation was 0.037 (VAS) and 0.010 (TTO); for two non-serious exacerbations 0.068 and 0.021; for one serious exacerbation as 0.090 and 0.042; for one serious exacerbation and one non-serious as 0.130 and 0.088 (Table 2)

[26]. The certainty of this evidence is high. Other studies suggested patients have

lower utility as the exacerbations became more frequent or more severe [30, 31].

Table 2. Utility of exacerbation, or hospitalization due to exacerbations

Study ID	Instrument	Report format	Results
Alcazar 2012 [19]	EQ-5D VAS	Mean (SD)	Hospitalized patients: 0.551 (0.197)
Antoniu 2014 [20]	EQ-5D VAS	Mean (SD)	Hospitalized patients: 0.279 (0.252)
Bourbeau 2007 [21]	EQ-5D VAS	Mean (SD)	Change from baseline: -0.126 (0.190)
Cross 2010 [22]	EQ-5D VAS	Mean (SD)	Exacerbation of COPD: manual chest physiotherapy arm 0.450 (0.210), no manual chest physiotherapy arm 0.466 (0.214)
	EQ-5D utility	Mean (SD)	Exacerbation of COPD: manual chest physiotherapy arm 0.450 (0.320), no manual chest physiotherapy arm 0.430 (0.360)
Goossens 2011 [23]	EQ-5D VAS	Mean (SD)	Exacerbation (at enrollment): 0.367 (0.252)
	EQ-5D utility	Mean (SD)	Exacerbation (at enrollment): 0.683 (0.209)
Menn 2010 [29]	EQ-5D utility	Mean (SD)	EQ-5D Admission Stage III: 0.620 (0.260)
			EQ-5D Admission Stage IV: 0.600 (0.260)
	SF-6D utility	Mean (SD)	SF-12-SF-6D Admission Stage III: 0.610 (0.130)
			SF-12-SF-6D Admission Stage IV: 0.540 (0.080)
Miravitlles 2011a [24]	EQ-5D utility	Mean (SD)	EQ-5D index baseline (exacerbation): 0.540 (0.230)
	EQ-5D VAS	Mean (SD)	EQ VAS baseline (exacerbation): 0.344 (0.274)
O'Reilly 2007 [25]	EQ-5D utility	Mean (SD)	Hospital admission: -0.077 (0.397)
	EQ-5D VAS		Hospital admission: 0.259 (0.170)
Punekar 2007 [30]	EQ-5D utility	Mean (95% CI)	1-2 exacerbations in primary care physician setting: 0.740 (0.720- 0.770)
			Moe than 3 exacerbations in primary care physician setting: 0.610 (0.590-0.640)
			1-2 exacerbations in respiratory specialist setting: 0.730 (0.710-0.760)
			More than 3 exacerbations in respiratory specialist setting: 0.570 (0.540-0.600)

Rutten van Molken 2009 [26]	VAS TTO	regression coefficients (SEM)	One non-serious exacerbation: -0.037 (0.005); Two non-serious exacerbations: -0.068 (0.005); One serious exacerbation: -0.090 (0.007); One non-serious and one serious exacerbation: -0.130 (0.007)
			One non-serious exacerbation: -0.010 (0.007); Two non-serious exacerbations: -0.021 (0.007); One serious exacerbation: -0.042 (0.009); One non-serious and one serious exacerbation: -0.088 (0.009)
Seymour 2010 [27]	EQ-5D VAS	Mean (SD)	COPD baseline in usual care group: 0.540 (0.170) COPD baseline in post exacerbation pulmonary rehabilitation group: 0.580 (0.180)
Solem 2013 [31]	EQ-5D utility	Mean (SD)	Patients recently experiencing a severe exacerbation: 0.627 (0.210) Patients recently experiencing a moderate exacerbation. 0.698 (0.197) Patients who had experienced three or more exacerbations in the previous year: 0.638 (0.212) Patients who had experienced two exacerbations in the previous year: 0.684 (0.204) Patients who had experienced one exacerbation in the previous year: 0.727 (0.175) Current health (last exacerbation): 0.552 (0.283) Thought back, patients experiencing a severe exacerbation (last exacerbation): 0.471 (0.313) Thought back, patients experiencing a moderate exacerbation (last exacerbation): 0.595 (0.257) Very severe COPD (last exacerbation): 0.494 (0.312) Severe COPD (last exacerbation): 0.590 (0.256) Patients who had experienced three or more exacerbations in the previous year (last exacerbation): 0.520 (0.282) Patients who had experienced two exacerbations in the previous year (last exacerbation): 0.552 (0.306) Patients who had experienced one exacerbation in the previous year (last exacerbation): 0.610 (0.254)
Torrance 1999 [32]	HUI	Mean (SD)	For the first acute exacerbation of chronic bronchitis, for Ciprofloxacn group: 0.720 (0.200), usual care group: 0.680 (0.190)

			For the remaining acute exacerbation of chronic bronchitis, Ciprofloxacn group: 0.740 (0.180), usual care group: 0.690 (0.220)
Wildman 2009 [28]	EQ-5D VAS	Mean (SD)	0.549(0.195)
		Median (IQR)	0.500 (0.400, 0.700)

CI: confidence interval; COPD: Chronic Obstructive Pulmonary Disease; EQ-5D: EuroQual-5-dimension; HUI: health utility index; IQR: interquartile range; SD: Standard deviation; SEM: standard error of means; SF-6D: Short-form 6-dimension; TTO: time trade off; VAS: visual analogue scales

Importance on dyspnea

Few studies explored the importance that patients place on dyspnea. Three studies reported utilities related to dyspnea. Kim et al. reported the utilities measured by VAS by levels of breathlessness: 0.751, 0.656, and 0.526 for level 1 (short of breath during strenuous activities), level 2 (stopping to catch breath after a few minutes walking) and level 3 (breathless when dressing or washing) breathlessness, respectively. The estimates were based on a small sample, so we downgraded the certainty for the estimates by one level for level 2 and two levels for level 3 breathlessness due to concerns about imprecision [33]. Two other reports corroborated that the more severe the dyspnea symptom is, the lower utility patients place on their health, though the specific levels of breathlessness were described differently (Table 3) [30, 34]. Other structured surveys, without reporting utility values, also suggested dyspnea as burdensome and a very important consideration in COPD related decision-making [35-44].

Table 3. Importance on breathlessness, shortness of breath, or dyspnea

Study ID	Instrument	Report format	Results
Gruenberger 2017 [34]	SF-6D utility	Mean	SF-6D health utilities were 0.060 points lower in higher dyspnea patients (modified Medical Research Council score ≥2) than in lower dyspnea patients
Kim 2014 [33]	EQ-5D VAS	Mean (SEM)	EQ-5D utility Level 1 breathlessness (short of breath during strenuous activities): 0.870 (0.020) Level 2 breathlessness (stopping to catch breath after a few minutes walking): 0.740 (0.030) Level 3 breathlessness (breathless when dressing or washing): 0.540 (0.060)
	EQ-5D utility	Mean (SEM)	EQ-VAS Level 1 breathlessness (short of breath during strenuous activities): 0.751 (0.026) Level 2 breathlessness (stopping to catch breath after a few minutes walking): 0.656 (0.035) Level 3 breathlessness (breathless when dressing or washing): 0.526 (0.071)
Punekar 2007 [30]	EQ-5D Utility	Mean (95% CI)	All in primary care physician setting: 0.700 (0.680-0.710) Breathlessness after exercising heavily in primary care physician setting: 0.880 (0.860-0.900) Breathlessness when hurrying on level ground in primary care physician: 0.790 (0.770-0.810) Too breathless to leave house in primary care physician: 0.170 (0.110-0.240) All in respiratory specialist setting: 0.680 (0.660-0.690) Breathlessness after exercising heavily in respiratory specialist setting: 0.880 (0.850-0.900) Breathlessness when hurrying on level ground in respiratory specialist setting: 0.790 (0.770-0.810) Too breathless to leave house in respiratory specialist setting: 0.290 (0.220-0.350)

Braido 2016 [35]	Uncategorized survey	Choice or proportion of choice	Breathlessness as most troublesome symptom: 64.6% (ranking first, chronic cough: 13.9%, sputum production: 11.0%, and exacerbation: 8.3%)
Downey 2009 [36]	Uncategorized survey: End of life Priority Score (the highest priority aspect of the end-of-life period)	Mean (SD)	In a survey on end-of-life priority score measured by rank order (out of 5), breathing comfort was considered as priority: 1.27 (1.83) (ranking third, only after time with family and friends, and pain under control).
Haughney 2005 [37]	Conjoint analysis/Discrete choice analysis	Mean	Breathlessness was considered important for patients. Of all the attributes, it was after "impact on everyday life," "need for medical care," "number of future attacks." It is more important than speed of recovery, productive cough, social impact, sleep disturbance, and impact on mood.
Hernández 2013 [38]	Impact of shortness of breath	Choice or proportion of choice	Shortness of breath is an important outcome, because 6.0% of participants stated the impact on activities of daily living was extreme, 29.0% stated the symptom impacting daily living "very much", while 24.0% for "a little" and 13.0% for "not at all".
Miravitlles 2007 [39]	Ideal characteristics of a COPD therapy	Choice or proportion of choice	37.0% of the participants chose "increased shortness of breath" as the symptom has a high impact on wellbeing (ranking second: increased coughing: 42.0%, increased fatigue: 37.0%, increased production of sputum: 35.0%, increased frequency of chest pains: 20.0%, and fevers: 13.0%)
Pisa 2013 [40]	Direct choice: relative importance of COPD attributes (%, higher proportion indicating more importance)	Choice or proportion of choice	Dyspnea was considered the most important COPD attribute. Relative importance of COPD attributes Dyspnea: 36.0% Performance capability (bodily resilience) due to COPD: 19.0% Sleep quality due to COPD: 19.0% Onset of action of the medication: 3.0% Frequency of administration of the medication: 6.0% Health state after awakening (day start) due to COPD: 13.0% Emotional state due to COPD base medication: 4.0% Effect of attribute levels on health state preference: part-worth utilities (higher

			value indicating more importance): Dyspnea 1. Never dyspnea, except on strong exertion: 115.80 2. Dyspnea on exertion: 38.20 3. Dyspnea at normal walking pace: -6.60 4. Dyspnea on slight effort: -10.10 5. Dyspnea even at rest: -137.40
Polati 2012 [41]	Uncategorized survey: expectation of treatment	Choice or proportion of choice	120 (24.1%) patients would like to have more ease with "breathing" due to treatment; if they were doctors, 215 patients (43.3%) would like to first heal shortness of breath. For both questions, breathing problems were considered most important compared with other symptoms.
Reinke 2013 [42]	Forced choice: treatment	Choice or proportion of choice	Preferences about death and dying questionnaire 52.6% of 357 patients chose "being able to breath comfortably in the last 7 days of life" as preferred characteristics of treatment.
Rocker 2013 [43]	Uncategorized survey: Reasons to continue (or not) with opioids	Choice or proportion of choice	I would strongly prefer when followed up at 2 months, 8 (23.5%) and 1 (2.9%) patient claimed would "strongly prefer" and "prefer" to continue on opioids because they provide significant relief from dyspnea; while at 4 to 6 months, 12 (29.3%) and 7 (17.1%) patients claimed would "strongly prefer" and "prefer" to continue on opioids because they provide significant relief from dyspnea.
Wilson 2005 [44]	Importance of mechanical ventilation: scales for the specific questions about mechanical ventilation	Median (IQR)	On a scale of 1 to 4 (0–Not at all important; 1–a little; 2–quite a bit; 3–very much; 4–extremely important), the score for easing breathlessness was 2.5 (1.8–3.0) for those forego mechanical ventilation, and 3.0 (2.8–4.0) for those uncertain/accept mechanical ventilation.

CI: confidence interval; COPD: Chronic Obstructive Pulmonary Disease; EQ-5D: EuroQual-5-dimension; IQR: interquartile range; SD: Standard deviation; SEM: standard error of means; SF-6D: Short-form 6-dimension; VAS: visual analogue scales

Adverse events

Table 4 summarizes the results related to the importance of adverse events. One of the two included discrete-choice studies compared the "possibility of adverse effects" with "the extent to which treatment seems to relieve symptoms", "the extent to which the doctor gives sufficient time to listen to the patient", "costs of treatment", "the extent to which the patient sees the same doctor each time", and "the extent to which the doctor treats the patient as an entire person [45]." The extent of symptom relief was deemed to be more important than adverse effects, but the possibility of adverse effects was more important than other outcomes. Another discrete choice study suggested symptom relief to be the most important outcome, while the possibility of adverse events was considered more important than the timing and use of (rescue) medicine [46]. The latter study was an online voluntary study in 515 participants, which we rated as having serious risk of bias due to selection bias and limited validity of the instrument. None of the studies explicitly described the outcome of "adverse events." The overall certainty of evidence about the importance of adverse events, based on these two discrete choice studies, is moderate due to serious risk of bias.

Table 4. Importance of adverse events

Study ID	Instrument	Reported format	Results
Bulcun 2014 [45]	Conjoint analysis/Discrete choice analysis	Influence or contribution or weight of certain aspects/attributes	Possibility of experiencing adverse effects from treatment 20%: -0.90 10%: -0.06 4%: 1.00 Difference between highest and lowest utility levels: 8.20 The sequence of attributes from most important to least important: extent to which the doctor gives sufficient time to listen to the patient, possibility of experiencing adverse effects from treatment, costs of treatment, extent to which the patient sees the same doctor each time, and extent to which the doctor treats the patient as an entire person.
Kawata 2014 [46]	Willingness to pay, Conjoint analysis/Discrete choice analysis	Mean (95% CI)	Utility score Mild side effects (no side effects as reference): -0.29 (-0.33, -0.24) Moderate to severe side effects (no side effects as reference): -1.13 (-1.18, -1.09) Willingness to pay Mild side effects (no side effects as reference): $14.81 (12.40–17.22) Moderate to severe side effects (no side effects as reference): $58.69 (56.28–61.11) Adverse event was considered important for COPD treatment. It was the second most important, only after "complete symptom relief," and more important than "rarely use rescue medication," "quick and easy to use inhaler," and "feeling medication work quickly."
Miravitlles 2007 [39]	Ideal characteristics of a COPD therapy	Choice or proportion of choice	Ideal characteristics of a COPD therapy as listed by survey respondents Fewer side effects 36.0% The sequence of ideal characteristics from most important to least important: quick symptom relief, longer intervals between flare-ups, fewer side effects, better ability to cope with daily chores again, lower costs of treatment, better doses

Patridge 2011 [47]	Uncategorized survey: perception of disease severity	Choice or proportion of choice	30.6% of participants expressed concern regarding potential medication side effects, and on average, patients considered that explaining clearly what are the possible side effects and risks of the products was very important (9.0 of 10 on a scale with 1 indicating not at all important and 10 indicating extremely important)
Sharafkhaneh 2013 [48]	Primary disadvantages of nebulization therapy	Choice or proportion of choice	Question: what do you see as the main negatives or disadvantages of nebulization? No negatives: 86 (21.5%) Side effects: 46 (11.5%) The sequence of disadvantages from most important to least important: device immobile/bulky/cumbersome, time-consuming, side effects, inconvenient, don't like doing it, having to use it several times a day, care and cleanup after use, too expensive

CI: confidence interval; COPD: Chronic Obstructive Pulmonary Disease

Symptom relief

In general, patients considered symptom relief important. In one survey, 46.6% of patients considered relief of symptoms (i.e., chest pain due to coughing, shortness of breath, nausea, etc.) as extremely important (ranking second after "not to be kept alive on life support when there is little hope for a meaningful recovery") [49]. For the extent of symptom relief, two discrete-choice studies suggested the extent of symptom relief as more important than adverse effects, the doctor giving sufficient time to listen to the patient, costs of treatment, seeing the same doctor each time, being treated as an entire person, onset time of medication, ease of medication use, and use of rescue medication [45, 46]. A large proportion of the study participants were recruited through an online survey, and the eligibility of the participants and the accuracy of their answers were in question. For these reasons, we classified this study at high risk of bias and downgraded the certainty of evidence as moderate (Table 1). Three other forced-choice studies corroborated this result [43, 50, 51]. For example, in a survey addressing expectation of treatment, 82.3% of the respondents chose greater symptomatic relief as the most important outcome [51]. Because the instruments in these surveys lacked evidence of validity, we rated down the certainty of evidence for risk of bias (moderate certainty evidence).

Utility of COPD

Most studies addressing the utility of the experience of COPD itself were based on EQ-5D, HUI and 15D. Table 5 summarizes the utilities based on various instruments across the airflow obstruction levels. Based on the EQ-5D only, we observed a gradient of disutility across GOLD stages: pooled estimates for EQ-5D measurements of mild COPD 0.873 (95% CI: 0.863-0.883, I^2 = 91.3%, P < 0.001 for heterogeneity) [30, 33, 52-56]; moderate 0.821 (95% CI: 0.815-0.826, I^2 = 97.8%, P < 0.001 for heterogeneity) [30, 33, 52-58]; severe 0.741 (95% CI: 0.734-0.749, I^2 = 94.5%, P < 0.001 for heterogeneity) [29, 31, 33, 52-54, 56-58]; and very severe 0.681 (95% CI: 0.667-0.694, I^2 = 80.2%, P < 0.001 for heterogeneity) [29, 31, 33, 52-54, 56-58], (Figure 2. Forest plots for EQ-5D utilities of different airflow obstruction levels) respectively. We rated down the certainty of evidence for these utilities due to unexplained inconsistency and for indirectness of the measurement tool (EQ-5D) (low certainty evidence); we also observed the similar trend with visual analogue scale results (Table 1).

Table 5. Utility of different COPD severities

Study ID	Instrument	Reported format	GOLD classifications			
			Mild COPD (FEV$_1$ predicted ≥ 80%)	Moderate COPD (50% ≤ FEV$_1$ predicted < 80%)	Severe COPD (30% ≤ FEV$_1$ predicted < 50%)	Very severe COPD (FEV$_1$ predicted ≤ 30%)
Boros 2012 [59]	VAS	Mean (95% CI, SD)	0.730 (95% CI: 0.722–0.739; SD: 0.164)	0.626 (95% CI: 0.621–0.630; SD: 0.164)	0.446 (95% CI: 0.439-0.452; SD 0.161)	0.321 (95% CI: 0.302-0.339; SD: 0.171)
Chen 2014 [60]	EQ-5D utility	Mean			0.686	0.565
	SF-6D utility (Hongkong value set)	Mean			0.646	0.597
Hong 2015 [55]	EQ-5D utility	Mean (SD)	0.900 (0.140)	0.890 (0.140)	0.840 (0.150)	
	EQ-5D VAS	Mean (SD)	0.730 (0.186)	0.708 (0.191)	0.609 (0.234)	
Kim 2014 [33]	EQ-5D utility	Mean (SD), Adjusted mean (SEM)	0.830 (0.170), adjusted 0.830, SE: 0.040	0.880 (0.120), adjusted 0.880 (0.020)	0.820 (0.160), adjusted 0.810 (0.030)	0.610 (0.260), adjusted 0.600, SE (0.040)
	EQ-VAS	Mean (SD), Adjusted mean (SEM)	0.719 (0.189) adjusted 0.739, SE: 0.054	0.719 (0.178) adjusted 0.751, SE: 0.029	0.650 (0.206) adjusted 0.689, SE: 0.033	0.609 (0.139) adjusted 0.651, SE: 0.056
Lin 2014 [52]	EQ-5D utility	Mean (SD)	0.810 (0.140)	0.810 (0.140)	0.760 (0.170)	0.740 (0.150)
	EQ-5D VAS	Mean (SD)	0.766 (0.175)	0.726 (0.191)	0.657 (201)	0.611 (0.197)
Menn 2010 [29]	EQ-5D utility	Mean (SD)			0.620 (0.260)	0.600 (0.260)
	SF-6D utility	Mean (SD)			0.610 (0.130)	0.540 (0.080)
Pickard 2011 [56]	EQ-5D utility (United States value set)	Mean (SD)	0.800 (0.130)	0.700 (0.210)	0.720 (0.190)	0.720 (0.160)
	EQ-5D utility (United Kingdom value set)	Mean (SD)	0.730 (0.190)	0.590 (0.320)	0.630 (0.250)	0.630 (0.240)
	EQ-5D VAS	Mean (SD)	0.743 (0.163)	0.662 (0.200)	0.601 (0.184)	0.587 (0.158)
Punekar 2007 [30]	EQ-5D utility	Mean (95% CI)	0.770 (0.730-0.810) in primary care setting	0.680 (0.620-0.740)	0.620 (0.560-0.680)	
	EQ-5D utility	Mean (95% CI)	0.680 (0.640-0.720) in respiratory	0.720 (0.690-0.750)	0.640 (0.610-0.720)	

			specialist care setting			
Rodriguez Gonzalez-Moro 2009 [61]	EQ-5D VAS	Mean (95% CI)		0.589 (0.581-0.599)	0.459 (0.449-0.467)	
Rutten van Molken 2006 [57]	EQ-5D VAS	Mean (SD) or Mean (95% CI)		0.677 (0.665-0.690)	0.625 (0.610-0.639)	0.578 (0.545-0.612)
	EQ-5D utility United Kingdom value set	Mean (SD) or Mean (95% CI)		0.787 (0.771-0.802)	0.750 (0.731–0.768)	0.647 (0.598–0.695)
	EQ-5D utility US value set	Mean (SD) or Mean (95% CI)		0.832 (0.821–0.843)	0.803 (0.790–0.816)	0.731 (0.699–0.762)
Rutten van Molken 2009 [26]	VAS	Mean (SEM)	Mild COPD: 0.811 (0.011)	disutility of moderate COPD in relation to mild COPD: -0.133 (0.006)	disutility of severe COPD in relation to mild COPD: -0.354 (0.006)	disutility of very severe COPD in relation to mild COPD: -0.508 (0.006)
	TTO	Mean (SEM)	Mild COPD: 0.974 (0.017)	disutility of moderate COPD in relation to mild COPD: -0.045 (0.008)	disutility of severe COPD in relation to mild COPD: -0.257 (0.008)	disutility of very severe COPD in relation to mild COPD: -0.452 (0.008)
Scharf 2011 [62]	HUI utility	Mean (SD); Median, IQR	0.400 (0.330)	0.580 (0.360)	0.530 (0.350)	0.390 (0.510)
Solem 2013 [31]	EQ-5D utility	Mean (SD)			0.707 (0.174)	0.623 (0.234)
Stahl 2005 [53]	EQ-5D VAS	Mean (SD)	0.730 (0.210)	0.650 (0.240)	0.620 (0.210)	0.370 (0.280)
	EQ-5D utility	Mean (SD)	0.840 (0.150)	0.730 (0.230)	0.740 (0.250)	0.520 (0.260)
Starkie 2011 [58]	EQ-5D utility	Mean (SD)		Observed utility for moderate COPD 0.752 (0.220)	Observed utility for severe COPD 0.708 (0.230)	Observed utility for very severe COPD 0.672 (0.220)
Szende 2009 [54]	EQ-5D utility	Mean (SD); Median, Range	0.850 (0.160)	0.730 (0.210)	0.740 (0.240)	0.530 (0.280)
	SF-6D utility	Mean (SD); Median, Range	0.800 (0.130)	0.730 (0.130)	0.730 (0.140)	0.620 (0.150)

CI: confidence interval; COPD: Chronic Obstructive Pulmonary Disease; EQ-5D: EuroQual-5-dimension; GOLD: Global Initiative for Chronic Obstructive Lung Disease; IQR: interquartile range; SD: Standard deviation; SEM: standard error of means; SF-6D: Short-form 6-dimension; TTO: time trade off; VAS: visual analogue scales

Other results

We also identified studies reporting importance on other outcomes (Appendix 3.

Supplementary Table 3), for example, intubation and speed of symptom relief.

DISCUSSION

We have conducted the most comprehensive systematic review to date of how COPD patients

value outcomes. The identified studies were highly variable in their designs, measurement

instruments used, and outcomes addressed. Patients rated exacerbations of COPD or

hospitalization due to exacerbations as very important. Studies, primarily using the EQ-5D,

consistently reported that the utility associated with living with COPD decreases as the disease

progresses. Patients considered symptom relief important, and more important than adverse

events from treatment.

Several aspects distinguish our work from previous published literature reviews [63-67]. Our

work yielded more studies because of the broad definition focusing on the importance of

outcomes and including all types of relevant studies and measurement tools. For example, our

work is more comprehensive than the work Moayeri and colleagues who evaluated EQ-5D

utilities of COPD stages, though the results of our pooled EQ-5D utilities proved similar [63].

Two other reviews included only multi-attribute utility results [63, 64]. Brooker and colleagues

identified ten studies on patient preferences for mechanical ventilation in COPD, most of them

cross-sectional surveys with forced choice questions [67]. A second aspect in which our work

differs is the critical assessment, both on the individual study level for risk of bias and on the

body of evidence level with the GRADE approach and the associated summary of findings table [68].

Our study has some limitations. First, because of the paucity of evidence based on standard gamble and time trade-off, we were only able to conduct meta-analysis across severity levels of EQ-5D utility and VAS measurements. For the same reason, we were unable to quantitatively explore the study population characteristics as potential sources of inconsistency through approaches such as meta-regression. Second, we identified a relatively small number of discrete choice and probability trade-off studies. These studies could provide information on the threshold for a change in decision [69], and have the merit of allowing customization of the methodology according to the study objectives. The few probability trade-off and discrete choice exercise studies reported only a limited range of attributes and levels of attributes [70-72]. Lastly, given the lack of empirical knowledge in what manner and to what extent publication bias may affect our systematic review results, our assessment of publication bias is limited.

Given the breadth of findings, this systematic review has implications for healthcare providers, researchers including systematic review authors and guideline developers. This systematic review summarizes current evidence to inform guideline developers about how important the benefits and harms of COPD treatment strategies are from the patients' perspective. The results will inform clinicians who make decisions with COPD patients. This systematic review provides empirical evidence to support using the relative importance of outcomes to inform values and preferences, and the methods can be used by systematic review authors who are interested in other disease topics. The utilities summarized serve as the parameter inputs for

cost analyses. When guideline developers determine the balance between benefits and harms, they can take into consideration both the probability and the importance of benefits (e.g. symptom relief) and harms (e.g. adverse events) from this review. Additionally, the results of this review also help researchers identify research gaps for designing new studies.

Research gaps exist when there is no evidence, or the certainty of evidence is low or very low. For example, although there is evidence about the importance of adverse events, guideline developers need to know the exact types and probabilities of adverse events considered by patients. Researchers can use standard gamble, discrete choice and probability trade-off techniques to address the levels of adverse events, with the severities or probabilities directly relevant to the research questions [45]. Additionally, for better understanding and application of the findings, researchers also need to further explore the socioeconomic, cultural, and disease-specific characteristics that influence patient values on the COPD outcomes.

There are still unanswered challenges related to the optimal strategy to elicit the outcome importance evidence. For considering the risk of bias, one concern is the merits of measurement tools involving a valuation of hypothetical scenarios in relation to measurements of an actual outcome that participants experience. If the participants are valuing a health state specified by the investigators, barring only different interpretations or limited understanding, they are valuing the same outcome. But if for example, participants are asked to evaluate the outcome "shortness of breath" they are experiencing, or having experienced in the past, the degree of shortness may vary a lot across participants. Further studies are also necessary to validate the search strategy for these types of studies. Our strategy - sensitive but not specific -

led to a large number of hits [12], replication of which would place a substantial burden for systematic review authors and guideline panels (as it did for us).

CONCLUSION

Our systematic review showed that patients value the outcome of exacerbation or hospitalization due to exacerbation as very important. We observed large variability in the utility associated with COPD severity across studies. We identified a gradient of disutility as the disease progresses, from both direct utility instrument visual analogue scale and indirect utility instrument EQ-5D utility. Quantitative approaches, including direct and indirect utility measurement of outcomes, discrete choice exercise, probability trade-off, and forced choice represent the predominant measurement instruments investigators have used to address the importance patients place on outcomes.

Although further studies are necessary to explore the unsolved methodological questions, through this systematic review process we demonstrated the usefulness of systematic reviews as a potential strategy for summarizing evidence in this field and informing decision makers, both in the context of health technology assessments and guidelines.

Abbreviations

CINAHL: Cumulative Index to Nursing and Allied Health Literature

CI: confidence interval

COPD: Chronic Obstructive Pulmonary Disease

DCE: discrete choice experiment

EQ-5D: EuroQual-5-dimension (a quality of life measurement tool)

GRADE: Grading of Recommendations Assessment, Development and Evaluation

GOLD: Global Initiative for Chronic Obstructive Lung Disease

HUI: health utility index

IQR: interquartile range

PRISMA: Preferred Reporting in Systematic Reviews and Meta-Analyses

QWB: quality of wellbeing

RCT: randomized controlled trial

SD: standard deviation

SEM: standard error of means

SF-6D: Short-form 6-dimension (a quality of life measurement tool)

SG: standard gamble

TTO: time trade off

VAS: visual analogue scales

Data sharing: The datasets supporting the conclusions of this article are included within the article and its additional file.

Transparency: The lead authors affirm that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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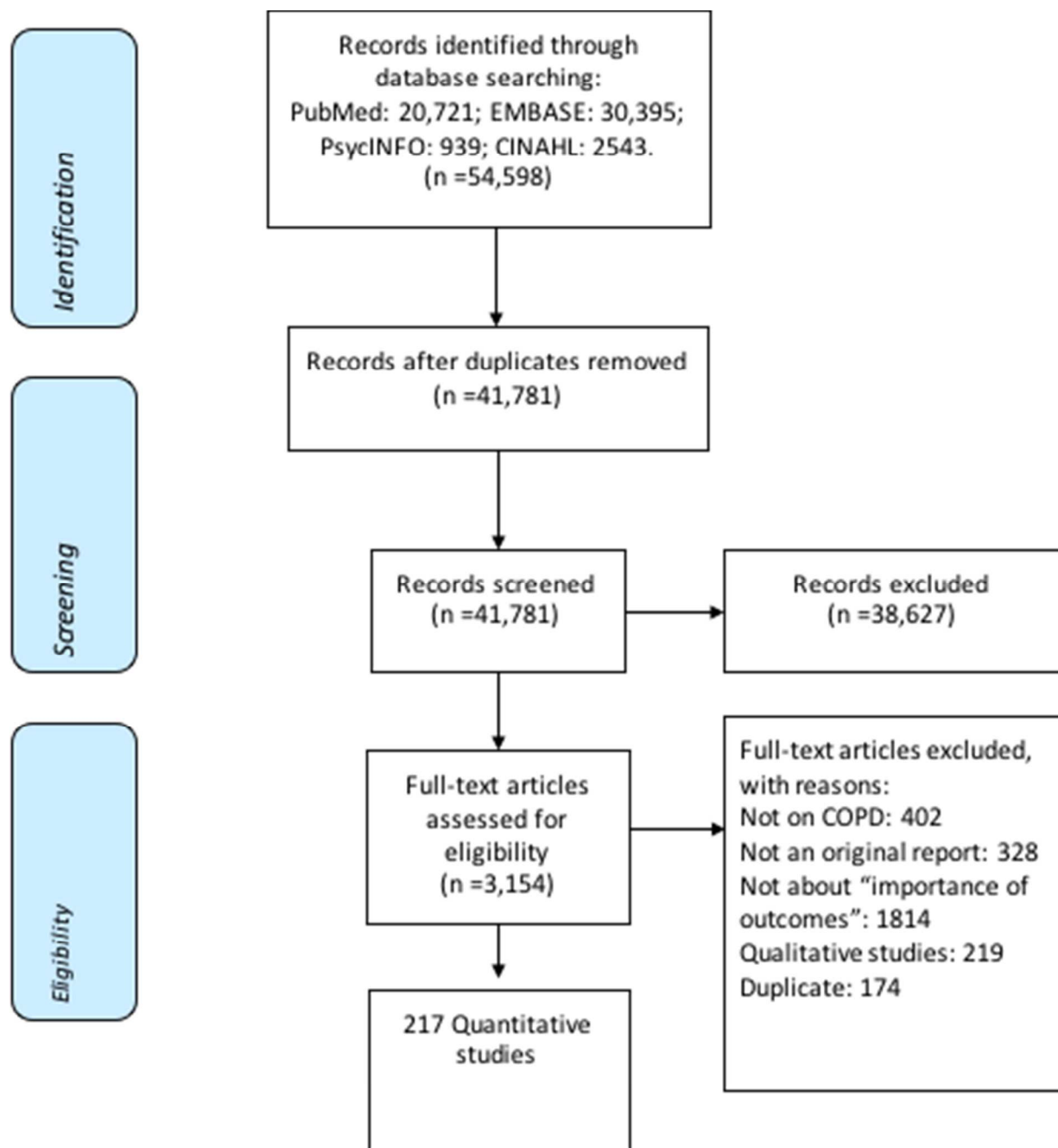
Figure 1. Flow Diagram for systematic review on chronic obstructive pulmonary disease patients' values and preferences
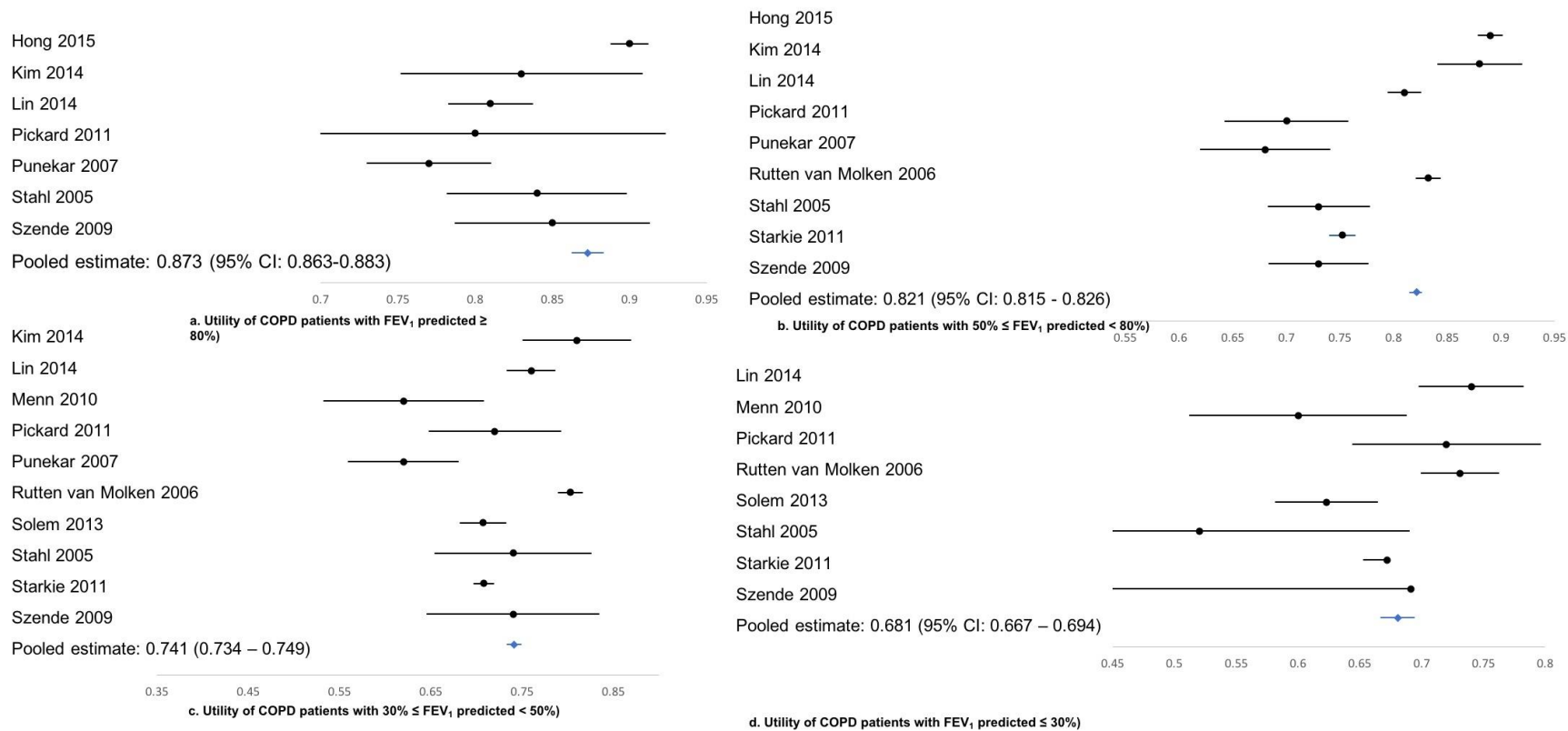
Figure 2. Forest plots for EQ-5D utility of different airflow obstruction levels

CI: confidence interval.

Appendix 1. Search strategy

1. PubMed

Search   Query
#12   Search #6 and #7
#11   Search #5 and #7
#10   Search #4 and #7
#9   Search #3 and #7
#8   Search #2 and #7
#7   Search ("Lung Diseases, Obstructive"[Mesh]) OR ("Pulmonary Disease, Chronic Obstructive"[Mesh]) OR (chronic pulmonary obstructive disease[tiab]) OR (COPD[TIAB]) OR (Obstructive Lung Disease[TIAB]) OR (Obstructive Lung Diseases[TIAB]) OR (Obstructive Pulmonary Disease[TIAB]) OR (Obstructive Pulmonary Diseases[TIAB]) OR (chronic pulmonary obstructive diseases[tiAB]) OR (Acute exacerbation of COPD) OR (acute exacerbation of chronic obstructive pulmonary disease) OR (AECB[TIAB]) OR (AECB) OR (COAD) OR (Restrictive Lung Disease[TIAB])
#6   Search (SF36[tiab]) OR (SF 36[tiab]) OR (SF 12[tiab]) OR (SF12[tiab]) OR (HRQoL[tiab]) OR (QoL[tiab]) OR (Quality of life[tiab]) OR ("Quality of Life"[MeSH])
#5   Search (preference based[tiab]) OR (preference score*[tiab]) OR (multiattribute[tiab]) OR (multi attribute[tiab]) OR (EuroQol 5D[tiab]) OR (EuroQol5D[tiab]) OR (EQ5D[tiab]) OR (EQ 5D[tiab]) OR (SF6D[tiab]) OR (SF 6D[tiab]) OR (HUI[tiab]) OR (15D[tiab])
#4   Search (health[ti] AND utilit*[ti]) OR ("Decision Support Techniques"[MeSH]) OR (gamble*[tiab]) OR (prospect theory[tiab]) OR (preference score[tiab]) OR (preference elicitation[tiab]) OR (health utilit*[tiab]) OR (utility value*[tiab]) OR (Utility score*[tiab]) OR (Utility estimate*[tiab]) OR (health state utilit*[tiab]) OR (health state[tiab]) OR (feeling thermometer*[tiab]) OR (best-worst scaling[tiab]) OR (standard gamble[tiab]) OR (time trade-off[tiab]) OR (TTO[tiab]) OR (probability trade-off[tiab]) OR (utility score[tiab])
#3   Search (((decision*[ti] AND mak*[ti]) OR (decision mak*[tiab]) OR (decisions mak*[tiab])) AND (patient*[tiab] OR user*[tiab] OR men[tiab] OR women[tiab])) OR (discrete choice*[tiab]) OR (decision board*[tiab]) OR (decision analy*[tiab]) OR (decision-support[tiab]) OR (decision tool*[tiab]) OR (decision aid*[tiab]) OR (discrete-choice*[tiab]) OR (decision*[tiab] AND (patient*[ti] OR user*[ti] OR men[ti] OR women[ti]) OR (Decision Making[MAJR] AND (patient*[ti] OR user*[ti] OR men[ti] OR women[ti])))
#2   Search ("Attitude to Health"[MAJR]) OR ("Patient Participation"[MAJR]) OR (preference*[tiab]) OR ("Patient Preference"[MAJR]) OR (choice[ti]) OR (choices[ti]) OR (value*[ti]) OR (health state values[tiab]) OR (valuation*[ti]) OR (expectation*[tiab]) OR (attitude*[tiab]) OR (acceptab*[tiab]) OR (knowledge[tiab]) OR (point of view[tiab]) OR (user participation[tiab]) OR (users participation[tiab]) OR (users' participation[tiab]) OR (user's participation[tiab]) OR (patient participation[tiab]) OR (patients' participation[tiab]) OR (patients' participation[tiab]) OR (patient's participation[tiab]) OR (patient perspective*[tiab]) OR (patients perspective*[tiab]) OR (patients' perspective*[tiab]) OR (patient's perspective*[tiab]) OR (patient perce*[tiab]) OR (patients perce*[tiab]) OR (patients' perce*[tiab]) OR (patient's perce*[tiab]) OR (health perception*[tiab]) OR (user view*[tiab]) OR (users view*[tiab]) OR (users' view*[tiab]) OR (user's view*[tiab]) OR (patient view*[tiab]) OR (patients view*[tiab]) OR (patients' view*[tiab]) OR (patient's view*[tiab])

2. Embase

1   preference.mp. or exp patient preference/
2   choice*.ti.
3   value*.ti.
4   health state value*.mp.
5   valuation*.ti.
6   expectation*.mp.
7   attitude*.mp. or exp patient attitude/ or exp attitude to health/
8   acceptab*.mp.
9   knowledge.mp.

10	point of view.mp.
11	user* participation.mp.
12	patient* participation.mp. or exp patient participation/ or exp patient satisfaction/
13	patient* perspective.mp.
14	patient* perce*.mp.
15	health perception*.mp.
16	user* view*.mp.
17	patient* view*.mp.
18	(decision* and mak*).ti.
19	decision* mak*.mp.
20	(patient* or user* or men or women or man or woman).mp. and (18 or 19)
21	(discrete-choice* or discrete choice*).mp.
22	decision board*.mp.
23	decision analy*.mp.
24	(decision-support* or decision support*).mp.
25	exp decision support system/
26	decision tool*.mp. or exp medical decision making/ or exp patient decision making/
27	decision aid*.mp.
28	prospect theory.mp.
29	("preference score " or "preference elicitation").mp.
30	health utilit*.mp.
31	("utility value*" or "Utility score*" or "Utility estimate*").mp.
32	health state utilit*.mp. or exp health status indicator/
33	(health and utilit*).ti.
34	health state*.mp.
35	feeling thermometer*.mp. or exp visual analog scale/
36	best-worst scaling.mp.
37	standard gamble.mp.
38	time trade-off.mp.
39	TTO.mp.
40	probability trade-off.mp.
41	utility score*.mp.
42	preference based.mp.
43	preference score*.mp.
44	multiattribute.mp.
45	multi attribute.mp.
46	EuroQol.mp.
47	EQ5D.mp.
48	EQ 5D.mp.
49	(SF-36 or SF 36).mp.
50	SF 6D.mp.
51	SF6D.mp.
52	SF 12.mp.
53	SF12.mp.
54	15 D.mp.
55	HUI.mp.
56	Health Utilit* Index.mp.
57	HRQoL.mp.
58	health related quality of life.mp.
59	quality of life.mp. or exp "quality of life"/
60	or/1-17
61	or/20-27
62	or/28-41
63	(or/42-56) or 29
64	(or/49-54) or (or/57-59)
65	or/60-64

66	exp chronic obstructive lung disease/
67	emphysema$.mp.
68	(chronic$ adj3 bronchiti$).mp.
69	(obstruct$ adj3 (pulmonary or lung$ or airway$ or airflow$ or bronch$ or respirat$)).mp.
70	COPD.mp.
71	COAD.mp.
72	COBD.mp.
73	AECB.mp.
74	or/66-73
75	60 and 74
76	61 and 74
77	62 and 74
78	63 and 74
79	64 and 74
80	65 and 74

3. PsychInfo

1	preference.mp. or exp Preferences/
2	choice*.ti.
3	value*.ti.
4	health state value*.mp.
5	valuation*.ti.
6	expectation*.mp.
7	attitude*.mp. or attitudes/ or exp consumer attitudes/ or exp health attitudes/ or exp "physical illness (attitudes toward)"/ or exp attitude measurement/ or exp attitude measures/ or exp Client Attitudes/
8	acceptab*.mp.
9	knowledge.mp.
10	point of view.mp.
11	user* participation.mp.
12	patient* participation.mp. or exp Client Participation/ or exp Client Satisfaction/
13	patient* perspective.mp.
14	patient* perce*.mp.
15	health perception*.mp.
16	user* view*.mp.
17	patient* view*.mp.
18	(decision* and mak*).ti.
19	decision* mak*.mp.
20	(patient* or user* or men or women or man or woman).mp. and (18 or 19)
21	(discrete-choice* or discrete choice*).mp.
22	decision board*.mp.
23	decision analy*.mp.
24	decision-support.mp.
25	decision support*.mp. or exp Decision Support Systems/
26	decision tool*.mp. or exp Decision Making/
27	decision aid*.mp.
28	prospect theory.mp.
29	("preference score " or "preference elicitation").mp.
30	health utilit*.mp.
31	("utility value*" or "Utility score*" or "Utility estimate*").mp.
32	health state utilit*.mp. or exp psychometrics/ or exp Utility Theory/
33	(health and utilit*).ti.
34	health state*.mp.
35	feeling thermometer*.mp. or exp Rating Scales/
36	best-worst scaling.mp.

37	standard gamble.mp.
38	time trade-off.mp.
39	TTO.mp.
40	probability trade-off.mp.
41	utility score*.mp.
42	preference based.mp.
43	preference score*.mp.
44	multiattribute.mp.
45	multi attribute.mp.
46	EuroQol.mp.
47	EQ5D.mp.
48	EQ 5D.mp.
49	(SF-36 or SF 36).mp.
50	SF 6D.mp.
51	SF6D.mp.
52	SF 12.mp.
53	SF12.mp.
54	15 D.mp.
55	HUI.mp.
56	Health Utilit* Index.mp.
57	HRQoL.mp.
58	health related quality of life.mp.
59	quality of life.mp. or exp "quality of life"/
60	or/1-17
61	or/20-27
62	or/28-41
63	(or/42-56) or 29
64	(or/49-54) or (or/57-59)
65	or/60-64
66	exp chronic obstructive lung disease/
67	emphysema$.mp.
68	(chronic$ adj3 bronchiti$).mp.
69	(obstruct$ adj3 (pulmonary or lung$ or airway$ or airflow$ or bronch$ or respirat$)).mp.
70	COPD.mp.
71	COAD.mp.
72	COBD.mp.
73	AECB.mp.
74	66 or 67 or 68 or 69 or 70 or 71 or 72 or 73
75	60 and 74
76	61 and 74
77	62 and 74
78	63 and 74
79	64 and 74
80	65 and 74

4. CINAHL

S99	S94 OR S95 OR S96 OR S97 OR S98
S98	S10 AND S93
S97	S10 AND S87
S96	S10 AND S78
S95	S10 AND S61

S94　　S10 AND S49
S93　　S88 OR S89 OR S90 OR S91 OR S92
S92　　(MH "Quality of Life") OR (MH "Quality of Life (Iowa NOC)") OR (MH "Health and Life Quality (Iowa NOC) (Non-Cinahl)")
S91　　TI health related quality of life OR AB health related quality of life
S90　　TI HRQol OR AB HRQol
S89　　TI SF6D OR AB SF6D OR TI SF12 OR AB SF12 OR TI SF 12 OR AB SF 12
S88　　TI SF-36 OR AB SF-36 OR TI SF 36 OR AB SF 36 OR TI SF 6D OR AB SF 6D
S87　　S79 OR S80 OR S81 OR S82 OR S83 OR S84 OR S85 OR S86
S86　　TI HUI OR AB HUI OR TI Health utilities index OR AB Health utilities index
S85　　TI SF6D OR AB SF6D OR TI SF12 OR AB SF12 OR TI SF 12 OR AB SF 12
S84　　TI EuroQol OR AB EuroQol OR TI EQ5D OR AB EQ5D OR TI EQ 5D OR AB EQ 5D OR TI SF-36 OR AB SF-36 OR TI SF 36 OR AB SF 36 OR TI SF 6D OR AB SF 6D
S83　　TI multi-attribute utility theory OR AB multi-attribute utility theory
S82　　TI multi attribute OR AB multi attribute
S81　　TI multiattribute OR AB multiattribute
S80　　TI preference score* OR AB preference score*
S79　　TI preference based OR AB preference based
S78　　S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77
S77　　(MH "Visual Analog Scaling") OR (MH "Behavior Rating Scales")
S76　　(MH "Health Status Indicators") OR (MH "Acceptance: Health Status (Iowa NOC)")
S75　　TI utility score* OR AB utility score* OR TI utility scale* OR AB utility scale*
S74　　TI probability trade off OR AB probability trade off
S73　　TI TTO OR AB TTO
S72　　TI time trade off OR AB time trade off
S71　　TI standard gamble OR AB standard gamble
S70　　TI best-worst scaling OR AB best-worst scaling
S69　　TI feeling thermometer OR AB feeling thermometer
S68　　TI health AND TI utilit*
S67　　TI health state utilit* OR AB health state utilit*
S66　　TI utility value* OR AB utility value* OR TI utility score* OR AB utility score* OR TI utility estimate* OR AB utility estimate*
S65　　TI health utilit* OR AB health utilit*
S64　　TI preference elicitation OR AB preference elicitation
S63　　TI preference score* OR AB preference score*
S62　　TI prospect theory OR AB prospect theory
S61　　S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60
S60　　(MH "Decision Making") OR (MH "Decision Making, Organizational") OR (MH "Decision Making, Computer Assisted") OR (MH "Decision Making, Patient") OR (MH "Decision Making, Family") OR (MH "Decision Making, Ethical") OR (MH "Decision Making, Clinical")
S59　　(MH "Decision Support Systems, Clinical") OR (MH "Decision Support Systems, Management") OR (MH "Decision-Making Support (Iowa NIC)") OR (MH "Decision Support Techniques")
S58　　TI decision tool* OR AB decision tool*
S57　　TI decision support* OR AB decision support*
S56　　TI decision analys* OR AB decision analys*
S55　　TI decision aid* OR AB decision aid*
S54　　TI decision board* OR AB decision board*
S53　　TI discrete choice* OR AB discrete choice*
S52　　S50 AND S51
S51　　TI patient* OR AB patient* OR TI user* OR AB user* OR TI men OR AB men OR TI women OR AB women OR TI man OR AB man OR TI woman OR AB woman
S50　　TI decision* mak* OR AB decision* mak*
S49　　S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48

S48   (MH "Consumer Participation")
S47   "patients views or experiences or perceptions" OR (MH "Patient Attitudes")
S46   (MH "Patient Attitudes") OR (MH "Patient Satisfaction")
S45   "patient preference"
S44   TI patient* view* OR AB patient* view*
S43   TI user view* OR AB user view*
S42   TI health perception* OR AB health perception*
S41   TI patient* perception* OR AB patient* perception*
S40   TI patient* perspective OR AB patient* perspective
S39   TI patient* participation OR AB patient* participation
S38   TI user* participation OR AB user* participation
S37   TI point of view OR AB point of view
S36   TI knowledge OR AB knowledge
S35   TI acceptabilit* OR AB acceptabilit*
S34   TI attitude* OR AB attitude*
S33   TI expectation* OR AB expectation*
S32   TI valuation* OR AB valuation*
S31   TI health state value OR AB health state value
S30   TI value*
S29   TI choice
S28   TI preference*
S27   TI patient* view* OR AB patient* view*
S26   TI user view* OR AB user view*
S25   TI health perception* OR AB health perception*
S24   TI patient* perception* OR AB patient* perception*
S23   TI patient* perspective OR AB patient* perspective
S22   TI patient* participation OR AB patient* participation
S21   TI user* participation OR AB user* participation
S20   TI point of view OR AB point of view
S19   TI knowledge OR AB knowledge
S18   TI acceptabilit* OR AB acceptabilit*
S17   TI attitude* OR AB attitude*
S16   TI expectation* OR AB expectation*
S15   TI valuation* OR AB valuation*
S14   TI health state value OR AB health state value
S13   TI value*
S12   TI choice
S11   TI preference*
S10   S1 OR S4 OR S7 OR S8 OR S9
S9   TI emphysema OR AB emphysema
S8   (MH "Emphysema")
S7   S5 AND S6
S6   TI (pulmonary* or lung* or airway* or airflow* or bronch* or respirat*) OR AB (pulmonary* or lung* or airway* or airflow* or bronch* or respirat*)
S5   TI obstruct* OR AB obstruct*
S4   S2 AND S3
S3   TI bronchiti* OR AB bronchiti*
S2   TI chronic* OR AB chronic*
S1   TI COPD OR AB COPD OR TI COAD OR AB COAD OR TI COBD OR AB COBD OR TI AECB OR AB AECB OR TI chronic obstructive pulmonary disease OR AB chronic obstructive pulmonary disease

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Appendix 3. Supplementary tables
Supplementary Table 1. Study characteristics

Study ID	Values and preferences category	Instrument	Study design	Description of health states	Age: Mean (SD) or other format	Country or countries of Origin	Setting	Gender (Male/Female)	Sample size	Sampling Strategy	Response rate	Funding Sources
Agh 2011	Utility	Time trade off	Cross-sectional survey	EQ-5D	63.83 years (SD 11.24); 40–50 years 16 (9.5%) 51–60 years 57 (33.5%) 61–70 years 48 (28.2%) ≥71 years 49 (28.8%)	Hungary	outpatient	Males 71 (41.8%) Females 99 (58.2%)	170	Consecutive	77.50%	Not reported
Alcazar 2012	Utility	VAS	Cross-sectional survey	EQ-5D	67.3 (8.7)	Spain	hospital centres	119(93.7%)/8(6.3%)	127	Not reported	NR	industry (GlaxoSmithKline)
Allen-Ramey 2012	Utility	SF-6D	Cross-sectional survey	SF-6D	63.24 (10.90)	USA	self-reported survey	559 (57.63)/411 (42.37)	970	Random	NR	industry
Antoniu 2014	Utility	VAS	Cohort study	EQ-5D	67.03 (10.12)	Romania	inpatient, the Pulmonary Disease Universtiy Hospital in Iasi, Romania	62/18 (77.5%/22.5%)	80	Consecutive	unclear	The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript.
Arne 2009	Utility	EQ-5D	Cross-sectional survey	EQ-5D	69.1 (95% CI 68.3 69.9)	Sweden	self-reported survey	55.7%/44.3% (95% CI 40.0 48.9)	526	Random	64.00%	the Swedish Heart-Lung Foundation, the Swedish Heart and Lung Association and the County Council of Va¨rmland
Berkius 2013	Utility	VAS, EQ-5D	Cohort study	EQ-5D	69.7 (8.7) completed; dead or lost 70.7 (9.0)	Sweden	secondary	12/19 completed; dead or lost 6/14		Consecutive	61% followed	not reported

Study	Category	Measure	Study design	Instrument	Age	Country	Setting	Sex	N	Sampling	Response rate	Funding
Boland 2014	Utility	VAS, EQ-5D	Cross-sectional survey	EQ-5D	68 (11) - average	the Netherlands	primary	Men 56%/Women 44%	611	Other: based on a database	43% (611 out of 1431)	Stichting Achmea, a Dutch Healthcare Insurance Company, and the Netherlands Organisation for Health Research and Development (Zon-MW), subprogramme Effects & Costs (project number 171002203)
Boland 2015	Utility	EQ-5D, mapping	Cross-sectional survey (data from 3 cllinical trials)	EQ-5D	68 (11)	the Netherlands	primary, secondary	men 55.0; women 45%	1303	Other: trial based	NR	Not reported
Boland 2016	Utility	EQ-5D utility	Randomized controlled trial	EQ-5D	Mean (SD) RECODE Group: 68.2 (11.3), Usual care Group: 68.4 (11.1)	The Netherlands	primary care	Male/female in Number (percentage) RECODE Group: 280 (50.5%)/274 (49.5%) Usual care group: 305 (57.3%)/227 (42.3%)	1086	not reported	not reported	private for profit and governmental: grants from Stichting Achmea Gezondheidszorg (SAG), a research fund of a Dutch Healthcare insurance company, and the Netherlands Organisation for Health Research and Development (Zon-MW)(171002203)
Borge 2014	Uncategorized survey	Illness perception scale	Cross-sectional survey	Booklet/card	64.6 (10.2); in 36, max 87	Norway	outpatient	male 79 (51.3) Female 75 (48.7)	154	Consecutive	40.00%	Not reported
Boros 2012	Utility	VAS	Cross-sectional survey	EQ-5D, VAS	64.41 (9.86)	Poland	primary, secondary	men 64%; women 36%	8537	Other: asking physicians to provide enrolled patients	92.00%	industry support
Bourbeau 2007	Utility	VAS	Cohort study	EQ-5D	mean 66 (range 41–88)	Canada	primary, secondary	male: 239 (57)/female 182 (43%)	421	Not reported	NR	Not reported
Braido 2016	Uncategorized survey	syptoms patients would like to be improved most	Cross-sectional study	no description	Mean (SD) 73.88 (8.33)	Italy	University hospitals	90 (62.5%)/54 (37.5%)	144	consecutive	89.3% (150 of 168)	not reported
Bratas 2010	Direct choice	forced choice: treatment	Cross-sectional survey	Narrative explained by interviewer, Booklet/card	rehab 65.0 (9.1)/outpatients 67.2 (10.2)	Norway	secondary	male 110/female 95	205	Consecutive	57.00%	Not reported

Brophy 2008	Direct choice	forced choice: inhaler	Randomized controlled trial	No description	68 (SD 7)	UK	secondary	male 13/female 12	25	Not reported	89% completed	Not reported
Bulcun 2014	Direct choice	Conjoint analysis/Discrete choice analysis	Cross-sectional survey	Booklet/card	60.8 (SD 8.6)	Turkey	secondary	male 45/female 3	49	Consecutive	NR	Not reported
Burns 2016	Utility	EQ-5D utility	Randomized controlled trial	EQ-5D	Mean (SD) intervention group: 67.3 (15.1), control group: 69.3 (8.9)	UK	Primary and secondary care	male/female number (percentage): 41 (56.2%)/32 (43.8%) 50 (66.7%)/25 (33.3%)	148	not reported	62.4% (148 of 237) completed at least 60% of the program	Governmental (funded by the National Institute for Health Research (NIHR) under its Research for Patient Benefit (RfPB) Programme (Grant Reference No. PB-PG-0408-16225))
Carlucci 2016	Direct choice	Forced choice: treatment	Cross-sectional study	book/card	median [IQR]: 72 [65-78]	Italy	Inpatient; three Respiratory Units in Italy (two Rehabilitation Centres and one Respiratory Critical Care Unit)	46 (82%)/9 (18%)	55	not reported	60.4 (55 of 91)	not reported
Chakrabarti 2009	Direct choice	forced choice: treatment	Cross-sectional survey	Narrative explained by interviewer, Decision aid	Median 69, IQR: 14 years	UK	Hospitalized patients	34/16 68%/32%	50	Consecutive	82.0% (50/61)	Not reported
Chapman 1993	Direct choice	forced choice: inhaler	Cross-sectional survey	Narrative explained by interviewer	70.8 (SD 5.4); range 63-85	Canada	outpatients	men 41; women 39	80	Voluntary sample	NR	Asthma Society of Canada and by educational grants from Claxo Canada and 3M Pharmaceuticals, United States.
Chapman 2011	Direct choice	forced choice: inhaler	Randomized controlled trial	Narrative explained by interviewer, Booklet/card	63.9 (SD 9.21)	Canada, USA	NR	male 60%, female 40%	82	Not reported	NR	Industry - Novartis
Chen 2014	Utility	VAS, EQ-5D, and SF-6D	Cross-sectional survey	EQ-5D, SF-12/SF-36	72.9 (8.1)	China	outpatient	male 152(98.7%)/female 2 (1.3%)	154	Consecutive	9277.00%	University of Hong Kong Technology and Innovation seed funding

Study	Outcome type	Measure	Study design	Instrument	Age	Country	Setting	Gender (M/F)	N	Sampling	Response rate	Funding
Chen 2016	Utility, Direct choice	EQ-5D utility, willingness to pay	Cross-sectional study	EQ-5D	Mean (SD) Whole sample 73.11 (9.99 mild 75.94 (9.54) moderate 71.11 (9.78) severe 74.88 (9.72) very severe 69.00 (9.96)	Taiwan	Outpatient	112 (86%)/30 (14%)	142	not reported	57.25% (142/248)	Governmental and private not for profit: Taiwan's Ministry of Science and Technology for providing research grant. Other support included a grant from Buddhist Tzu-Chi General Hospital and from National Taiwan Normal University
Chou 2017	Uncateogrized survey	Palliative Care Willingness Survey (PCWS) score	Cross-sectional study	Not reported	Mean 72.66 (SD, 10.34) years	Taiwan	outpatient	101/0	101	Purposive sampling	71.00%	not reported
Chrystyn 2014	Utility	EQ-5D	Cross-sectional survey	EQ-5D	65.2 (range 40-90)	France, Germany, Italy, Spain and the UK	primary, outpatients	male 1035 (71.8%)/408 (28.2)	1443	Other: "pragmatic"	49.00%	Almirall S.A., Barcelona, Spain
Claessens 2000	Direct choice	Forced choice: treatment	Cohort study	no description	median 70	USA	Hospitalization	517/491 (51.3%/48.7%)	1008	Consecutive	Unclear, for both lung cancer and COPD/ Response rates for patient interviews were 87% for Week 1 and 72% for Week 2 interviews for the 56% and 67% of patients, respectively, who were not comatose, intubated, or otherwise incapable of response.	SUPPORT was made possible by grants from the Robert Wood Johnson Foundation. Dr. Claessens was supported by a Veterans Administration Ambulatory Care Fellowship, White River Junction, Vermont, and a Fellowship in Palliative Medicine, Ottawa, Ontario.
Cleland 2007	Utility	VAS	Cross-sectional survey	EQ-5D, VAS	67.80 (SD 10.59)	UK	primary	Male 57 (51.8)/ Female 53 (48.2)	110	Consecutive	31.00%	Aberdeen City Collective, Grampian Primary Care Trust and by an unconditional educational grant from Glaxo Smith Kline
Collado-Mateo 2017	Utility	SF-6D utility	Cross-sectional study	SF-6D	Age group: n (%) 40-49: 36 (19.05%) 50-59: 43 (22.75%) 60-69: 52 (27.51%) 70-79: 27 (14.29%) 80-89: 28 (14.81%) 90+: 3 (1.59%)	Chile	general population (COPD subsample)	69/120	189	Diagnosed patients from a random sample	not reported	The author DCM is receiving a grant from the Spanish Ministry of Education, Culture and Sports (FPU14 / 01283). The author was previously granted a scholarship Predoctoral by the Tatiana Foundation Pérez de Guzmán the Good.

Cross 2010	Utility	VAS, EQ-5D	Randomized controlled trial	EQ-5D	Mean (SD) MCP arm 69.08 (9.85); No MCP arm 69.58 (9.51)/ 34–91 years	UK (4 centers in the UK)	All participants hospitalized at the beginning. But within the follow-up duration of 6 months, the study included both inpatient and outpatient	MCP arm, 143/115 55.43%/ 44.57%; no MCP arm, 155/109, 58.71% / 41.29%)	522 (MCP arm 258, no MCP arm 264)/ 526 enrolled	Consecutive	70.5%, 527 recruited, 748 consent requested. 83.1% followed up (99 participants without response); 70.7% followed up, out of 526, 372 participants provided evaluable data.	Governmental/ NHS Health Technology Assessment (HTA) research funding
Dacosta Dibonaventura 2012	Utility	SF-6D	Cross-sectional survey	SF-12/SF-36	all participants 65 to 69 years 2269/70 to 74 years 770/75 to 79 years 239/80 years or older 80	USA	web-based consumer panel	male 1851	all 3358/COPD 297	Random	NR	industry
Dal Negro 2016	Direct choice	Forced choice: inhaler	Cross-sectional study	Verbal	68 years	Italy	outpatient	unclear for COPD subgroup, 47% males in the entire sample, not reported for COPD only	157 (47% of 333 patients had COPD, the rest had asthma)	Consecutive	not reported	not reported

Study					Age	Country	Setting	Sex	N	Sampling	Response rate	Funding
Dales 1999	Direct choice	Probability trade off	Repeated surveys	Narrative explained by interviewer, Decision aid, Audiobooklet	66 years (range, 42 to 84 years; quartile 57-74)	Canada	outpatient (pulmonary function laboratory, as well as ambulatory respiratory and general medicine clinics of the Ottawa General Hospital, affiliated with the University of Ottawa, Canada)	10men/10 women	20	Consecutive	90.00%	Ontario Thoracic Society
Decramer 2001	Utility	VAS	Randomized controlled trial	EQ-5D, Pictorial descriptions of risk (pictogram)	63 (SD 8)	10 Europen Countries	unclear	male 413 (78%)/female110 (22%)	523	Not reported	NR	Not reported
DiBonaventura 2012	Utility	SF-6D	Cross-sectional survey	SF-12/SF-36	40–64 years	USA	NR	male 53.4%	(COPD 1112)	Random	18.50%	Kantar Health, Pfizer
Ding 2017	Utility	SF-6D utility	Cross-sectional study	SF-6D	5 European countries: mean±SD 57.6±13.2 years; USA: mean±SD 62.0±12.2 years	France, Germany, Italy, Spain, UK (5EU) and USA	outpatient	5EU: 54,3%/45,7%; USA: 58,8%/41,2%	3672 (5EU: 2006; USA: 1666)	Online survey respondents	USA: 13,53%; 5EU 2011 period: 19,69%; 5EU 2013 period: 15,95	AstraZeneca

Study	Type	Instrument	Design	Method	Value	Country	Setting	Gender	N	Sampling	Response	Funding
Doñate-Martínez 2016	Utility	EQ-5D utility	Cohort study	EQ-5D	67.95 (11.14) - whole sample, not reported for COPD only	Spain	outpatient	49 (66.22%)/25 (33.78%) - whole sample, not reported for COPD only	74 (12 COPD patients)	Random	74% ("dropout in the sample of 26 non-responders in the case of the EQ-5D tool and 27 for the satisfaction and usefulness perception's questionnaire" for the whole sample), not reported for COPD only	financing from the Agencia Valenciana de Salud of Ministry of Health of Valencia (2011) and from the Valencian Government through the project Prometeo-OpDepTec Fase II (Project reference: PROMETEUII/2014/074); A. Doñate-Martínez is supported by a predoctoral FPU fellowship of the Spanish Ministry of Education (AP2010-5354
Downey 2009	Uncategorized survey	End of life Priority Score	Cross-sectional survey (9 - interview with quantitative survey	No description	(mean (SD)) 1. Total COPD sample (n=156): 62.4 (13.4) 2. COPD patient sample (n=96): 66.7 (9.2) 3. COPD nonpatient sample (family member or friend from subset of the COPD patients) (n=60): 55.5 (16.0)	United States	Outpatient/hospitalized (not specified) for COPD patients; community for nonpatients	(% - female) 1. Total COPD sample (n=156): 45.5% 2. COPD patient sample (n=96): 28.1% 3. COPD nonpatient sample (family member or friend from subset of the COPD patients) (n=60): 73.3%	1. Total COPD sample (n=156) 2. COPD patient sample (n=96) 3. COPD nonpatient sample (family member or friend from subset of the COPD patients) (n=60)	Not reported	NR	National Institutes of Health, National Cancer Institute grant #5 R01 CA106204; an American Lung Association Career Investigator Award; the Robert Wood Johnson Foundation; and the Lotte & John Hecht Memorial Foundation.
Downey 2013	Uncategorized survey	Preference Rating (from 1 definitely no to 4 definitely yes)	Cross-sectional survey	Booklet/card	68.6 (9.6)	USA	primary	male 100%	196	Not reported	93.00%	Not reported
Dowson 2004	Direct choice	ranking: treatment	Cross-sectional survey	Narrative explained by interviewer	Mean (SD): 71.3 (7.2)	New Zealand	inpatients	16/23	39	Consecutive	83.0% 39/47	Not reported

Study	Category	Instrument	Study design	Outcome measure	Age	Country	Setting	Sex	N	Sampling	Response rate	Funding
Eakin 1997	Uncategorized survey	The perceived importance of COPD self-care on a 5-point scale	Cross-sectional survey	Narrative explained by interviewer Other: perceived importance of COPD self-care (1 = not important, 5 = extremely important)	66.3 (10.6)	USA	research institute	female 43.0%	65	Voluntary sample	70.00%	not reported
Egan 2012	Utility	EQ-5D	Trial, non-randomized or non-controlled	EQ-5D	NR	Ireland, the Netherlands	secondary	NR	47	Consecutive	72.00%	Not reported
Eskander 2011	Utility	EQ-5D, VAS, Standard gamble	Cohort study	EQ-5D, Computer program or Software	BODE 0-4: 58 (7) BODE 5-6: 57 (8) BODE 7-10: 57 (8)	Canada	utpatients at the Toronto General Hospital and St. Michael's Hospital in Toronto	male/female: n, percentage BODE 0-4: 7/2 78%/22% BODE 5-6: 24/34 42%/58% BODE 7-10: 28/32 47%/53%	112	Consecutive	93.30%	Governmental, Private not for profit/ Canadian Institutes of Health Research, Physicians of Ontario through the PSI Foundation, Canadian Lung Transplant Study Group, University of Toronto–Comprehensive Research Experience for Medical Students (CREMS) and the Nelson Arthur Hyland Foundation
Farmer 2017	Utility	EQ-5D	Randomized controlled trial	EQ-5D	mean (SD): 69.8 (9.1) in EDGE intervention group and 69.8 (10.6) in the standard care group	the UK	a variety of settings encompassing primary and secondary care as well as community services	68/42 (61.8%/38.2%) in the EDGE intervention group and 34/22 (60.7%/39/3%) in the usual care group	166	voluntary sample		Governmental: This publication presents independent research supported from the Department of Health and Wellcome Trust through the Health Innovation Challenge (HIC) Fund commissioned by the Health Innovation Challenge Fund (HICF-1010-032), a parallel funding partnership between the Wellcome Trust and the Department of Health
Ferreira 2014	Utility	EQ-5D, and SF-6D	Cross-sectional survey	EQ-5D, SF-12/SF-36	68.6 (9.5)	Portugal	secondary	Female 2.8%	72	Consecutive	NR	not reported

Study	Type	Method	Design	Format	Age	Country	Setting	Sex	N	Sampling	Response	Funding
Fishwick 2014	Utility	EQ-5D	Cross-sectional survey	EQ-5D	69.4 (8.2)	UK	primary, comunit care	male 92 (62.2)	148	Random	NR	not reported
Fletcher 2011	Utility	EQ-5D, VAS	Cross-sectional survey	EQ-5D	number [percentage]: 45-54: 1029 [42]; 55-64: 971 [40]; 65-67: 426 [18]	Brazil, China, Germany, Turkey, US, UK	community	male 49%	2426	Random	80% of those eigible and willing to take part	not reported
Fox 1999	Direct choice	Forced choice: treatment	Cross-sectional survey	Narrative explained by interviewer	nr	USA	hospitalized	nr	1016	Consecutive	89% (11% died)	Robert Wood Johnson Foundation
Fried 2002	Direct choice	Probability trade off	Cross-sectional survey	Narrative explained by interviewer, Pictorial descriptions of risk (pictogram)	72.2±7.0	USA	inpatients and outpatients	male 49%	81	Consecutive	82% participation rate	not reported
Fried 2007	Direct choice	Probability trade off	Repeated surveys	Narrative explained by interviewer, Pictorial descriptions of risk (pictogram)	NR for COPD	USA	hospitalized	NR for COPD	64	Consecutive	81% participation rate	grants from the Department of Veterans Affairs Health Services Research and Development Service, from the National Institute on Aging (NIA), from the Claude D. Pepper Older Americans Independence Center at Yale and a Paul Beeson Physician Faculty Scholars Award, from the National Institute of Arthritis and Musculoskeletal and Skin Diseases.
Gaber 2004	Direct choice	Forced choice: treatment	Repeated surveys	Narrative explained by interviewer	Mean (range) 74.1 (48-92)	UK	outpatients	41/59	100	Not reported	Not reported	not reported

Study	Type	Instrument	Study design	Measure	Age	Country	Population	Sex	N	Sampling	Notes	Funding
Galaznik 2013	Utility	SF-6D	Cross-sectional survey	SF-12/SF-36	Current smokers (n = 1685) 57.18 (9.66) Quit 0–5 years (n = 923) 61.74 (9.88) Quit 6–10 years (n = 649) 64.19 (9.21) Quit >11 years (n = 1932) 66.71 (9.30)	USA	self-report of a physician diagnosis of COPD in a random population of adults in USA	Current smokers (n = 1685): 689/996 (40.9%/59.1%) Quit 0–5 years (n = 923): 458/465 (49.6%/50.4%) Quit 6–10 years (n = 649): 332/317 (51.2%/48.8%) Quit >11 years (n = 1932): 996/936 (51.6%/48.4%)	5189	Random	unclear	Pfizer, Inc
Garcia-Gordillo 2017	Utility	EQ-5D, VAS	Cross-sectional study	EQ-5D	Age group: n (%) 15-39: 129 (11.42%) 40-65: 397 (35.13%) 66-102: 604 (53.45%)	Spain	general population (COPD subsample)	550/580 (48.67%/51.33%)	1130	Diagnosed patients from a random sample	not reported	The author DCM was supported by a grant from the Spanish Ministry of Education, Culture and Sport (FPU14/01283).
García-Polo 2012	Utility	EQ-5D, VAS	cross-sectional survey	Narrative explained by interviewer, EQ-5D	Mean (SD) 66.9 (8.7)	Spain	Not reported	107/8	115	Consecutive	137 patients were recruited and 115 completed the necessary data to be included in the study	not reported
Gillespie 2013	Utility	EQ-5D	Randomized controlled trial	EQ-5D	Unclear	Ireland	general practices	unclear	350	Not reported	Not reported	Governmental and Private for Profit/ This project was funded by the Health Research Board of Ireland (grant number NMRPS/07/01) and by an unconditional educational grant from Pfizer.
Goossens 2011	Utility	EQ-5D, VAS	Cohort study	EQ-5D	Mean age 61.1 (10.4)	USA	outpatients	67.8%/32.2%, 40/19	59 (65 in total)	Not reported	unclear how many participants seeked, 65 enrolled and 59 followed. 90.8%	Governmental/Netherlands Organisation for Health Research and Development

Study	Type	Measure	Design	Instrument	Age	Country	Setting	Gender	n	Sampling	Response rate	Funding
Goossens 2014	Direct choice	Willingness to pay, Conjoint analysis/Discrete choice analysis	Cross-sectional survey	Other: Discrete choice experiment questionnaire	Mean 68.1	Neitherland	inpatient (hospitalization as usual vs early discharge)	66/41 62%/38%	107	Other: Trial based	77.0% 107 of 139	Governmantal/ Netherlands Organisation for Health Research and Development
Gruenberger 2017	Utility	SF-6D utility	Cross-sectional study	SF-6D	Mean (SD) lower dyspnea 61.39 (9.78) Higher dyspnea 62.65(9.03)	France, Germany, Italy, Spain, UK (5EU) and USA	outpatient	lower dyspnea 58.9%/41.1% Higher dyspnea 57.6%/42.4%	lower dyspnea (n=523) Higher dyspnea (n=245)	Online survey respondents	USA: 13,53%; 5EU 2011 period: 19,69%; 5EU 2013 period: 15,95	AstraZeneca
Guyatt 1999	Utility	Standard gamble, QWB	Randomized controlled trial	Decision board, Quality of Well-Being	Mean (SD) 66 (7)	Canada	rehabilitation or conventional community care	44/45 49.4%/50.6%	89	Consecutive	70.6% (89/126); and for the follow up, 87.6% finished the follow up (78/89)	Governmental and Private not for profit/ West Park Hospital Foundation, Ontario Ministry of Health grant 02196, and the Respiratory Health Network of Centres of Excellence
Gvozdenovic 2007	Utility	15D	Cross-sectional survey	Narrative explained by interviewer	Mean (SD) 58 (12)	Serbia	outopatients	46/39	85	Not reported		not reported
Hanada 2015	Direct choice	Forced choice: treatment	Repeated surveys	no description	First survey: 73.6 (7.1) range: 53-87 Second survey: 73.1 (7.3)	Japan	Department of Respiratory Medicine and Allergology at Nara Hospital, Kinki University Faculty of Medicine, Ikoma, Japan between August 2010 and May 2011	First survey: 52/5, 91.2%/8.8% Second survey: 37/2, 94.9%/5.1%	First survey: 57 Second survey: 39	Not reported	Not reported	Private/ Department of Respiratory Medicine and Allergology, Nara Hospital, Kinki University Faculty of Medicine

Study	Elicitation type	Method	Study design	Mode	Age	Country	Setting	Sex (M/F)	N	Sampling	Follow-up	Funding
Hansen 1990	Direct choice	Forced choice: treatment	Randomized controlled trial	no description	Mean (range) 66 (45-83)	Denmark	outpatients	24/24	48	Random		not reported
Hansen 1994	Utility, Direct choice	VAS, Forced choice: inhaler	Trial, non-randomized or non-controlled	no description	Mean (range) 66 (54-81)	Denmark	outpatients		25	Random		not reported
Harper 1997	Utility	VAS	Cross-sectional survey	EQ-5D	Mean (SD) 67 (10,4)	UK	outpatients	76/80	156	Not reported	First follow-up 128 patients	not reported
Haughney 2005	Direct choice	Conjoint analysis/Discrete choice analysis	Cross-sectional survey (A fractional factorial design)	Booklet/card	66	France, Germany, Spain, Sweden and the UK	outpatients	82/43	125	Consecutive	Not reported	not reported
Hawken 2017	Direct choice	Conjoint analysis/Discrete choice analysis, willingness to pay	Cross-sectional study	Other: Discrete choice experiment questionnaire	Mean (SD): 48.48 (15.16)	France	unclear	42/51 (45.16%/54.84%)	93	convenience sample	not reported	private for profit: This study was sponsored by Teva Pharmaceuticals Inc.
Hernández 2013	Uncategorized survey	Impact of shortness of breath	Cross-sectional survey	Narrative explained by interviewer, Booklet/card	Mean 68,7	Canada	outpatients	491/440	931	Consecutive		not reported
Heyworth 2009	Utility	EQ-5D, VAS	Cross-sectional survey	EQ-5D	Age not reported exclusively for COPD	UK	outpatients	Not reported exclusively for COPD	280	Not reported		not reported
Hohmeier 2016	Direct choice	patient perception survey	Cohort study	No description	64 years (range 42-76 years)	USA	outpatient	Male: 5/ femaile: 7	12	not reported	55% (of the 22 individuals who were identified by study personnel as eligible to participate in the survey, 12 completed the survey)	not reported

Study	Type	Method	Study design	Instrument	Age	Country	Setting	Gender	Sample	Sampling	Completion	Funding
Hong 2015	Utility	VAS, EQ-5D utility	Cross-sectional study	EQ-5D	Mean (SD) 63.7 (9.5)	South Korea	outpatient	817 (69%)/361 (31%)	1178 (mild COPD = 497, moderate COPD = 612, severe COPD = 69)	stratified multistage probability sampling	not reported (among the 33,829 subjects who completed the question- naire and underwent the medical examination in the na- tional survey from 2007 to 2010, 16,703 were aged C40 years and 12,562 performed PFT. Of these, 9789 performed acceptable and reproducible spirometry; 1188 subjects with a restrictive spirometry pattern and 31 sub- jects without EQ-5D scores were excluded. Among the 8570 subjects, there were 7301 non-COPD subjects and 1269 COPD subjects. After an age- and sex-matching process, 1178 subjects in both the COPD and non-COPD groups were selected and compared in the analysis)	not reported
Hoogendoorn 2010	Utility	EQ-5D	Randomized controlled trial	EQ-5D	Mean (SD) Intercom 66 (9); Usual care 67 (9)	Neitherland	outpatient	Intercom 30/72, 29%, 71%; Control 28/69 29%/71%	199	Not reported	Unclear, of the 199 participants, 158 completed the 2-yr study period. 79%	Governmental and Private for profit/ the Netherlands Asthma Foundation (NAF; 3.4.01.63; Leusden, the Netherlands), the "Stichting Astma Bestrijding" (SAB; Amsterdam, the Netherlands), Nutricia Netherlands and Pfizer and Partners in Care Solutions (PICASSO) for COPD (Capelle aan den IJssel, the Netherlands)
Hoyle 2016	Utility	CAT mapping	Randomized	COPD assessme	Mean (SD) Male: 64.5	USA, France,	not reporte	68.8%/31.2 %	1658	not reported	80.1% during follow up (1447 in visit 1, 1341 in visit 2, 1658	Funding for this study, the development of the
Hwang 2011	Direct choice	Forced choice: treatment	Cross-sectional survey	no description	Age group: Percentage 40~49: 2.3% 50~59: 13.3% 60~69: 35.3% 70~79: 40.0% ≥80: 9.0%	Korean	university-affiliated hospital	256/44 85.3%/14.7 %	300	Unclear	unclear	not reported
Hyland 2016	Uncateogrized survey	ranking: treatment	Cross-sectional study	Verbal	67 years (range 47–84)	UK	Inpatient	7 (35%)/13 (65%)	20	not reported	not reported	Royal Devon & Exeter NHS Foundation Trust

Jakobsen 2015	Utility	VAS, EQ-5D utility	Randomized controlled trial	EQ-5D	5 patients <60 years in control group 5 patients <60 years in intervention group 8 patients 60-70 years in control group 8 patients 60-70 years in intervention group 9 patients 70-80 years in control group 10 patients 70-80 years in intervention group 6 patients >80 years in control group 6 patients >80 years in intervention group	Denmark	Inpatient	[n (%)] of females: control (n=28) - 17 (60.7); intervention (n=29) - 18 (62.1); [n (%)] of males: control (n=28) - 11 (39.3); intervention (n=29) - 11 (37.9)	57 (28 control, 29 intervention)	Consecutive	49.1% (57/116) (646 assessed for eligibility, 116 met criteria, 59 declined to participate; of the 57 who were randomized 15 were lost to follow-up (8 unavaliable for contact, 7 died))	The Philanthropic Foundation TrygFonden (grant 7561-08), The Health Insurance Foundation (grant 2011B003), The Danish Lung Association, The Toyota Foundation (grant OH/BG 7003), The Frederiksberg Foundation (grant 2010-88), and a Lykfeldt's grant.
Janssen 2011	Utility	EQ-5D, VAS	Cross-sectional survey	EQ-5D	Mean (SD) 66.3 (9.2)	Neitherland	outpatient	65/40, 61.9%/38.1%	105	Not reported	Not reported	Governmental/ Proteion Thuis, Horn, The Netherlands; CIRO+, Horn, The Netherlands; Grant 3.4.06.082 of the Netherlands Asthma Foundation, Leusden, The Netherlands; Stichting Wetenschapsbevordering Verpleeghuiszorg (SWBV), Utrecht, The Netherlands.
Janssen 2011b	Direct choice	Probability trade off	Cross-sectional survey	Other: questionnaire with description of scenarios	Mean (SD) 66.3 (9.2)	Neitherland	outpatient	65/40, 61.9%/38.1%	105	Not reported		not reported

Janssen 2011c	Direct choice	Forced choice: treatment	Cross-sectional survey	no description	Dutch patients: 66.7 (9.3) US patients: 68.7 (10.0)	Dutch, US	outpatient	Dutch patients: 75/47, 61.5%/38.5% US patients: 360/31 92.1%/7.9%	Dutch patients: 122 US patients: 391	Consecutive and other	not reported	
Janssen 2014	Utility	EQ-5D	Cohort study (baseline infromation of a cohort)	EQ-5D	66.3 (9.2)	Dutch	outpatient	65/40 61.9%/38.1%	105	convenience sample	not reported	
Jarvis 2007	Direct choice	Forced choice: inhaler	Cross-sectional survey	Narrative explained by interviewer	Mean (range) 73,5 (65-89)	UK	outpatients	36/17	53	Random		not reported

Jia 2016	Utility	EQ-5D utility	Cross-sectional study	EQ-5D	age 65 years and older (not reported for COPD only)	USA	general population (COPD subsample)	not reported for COPD only	140	random	not reported	not reported
Jordan 2014	Direct choice	Forced choice: Preferences of Information	Cross-sectional survey	Other: questionnaires on patient preference regarding information desired from their doctors	Mean (SD) 60 (1.16)	Argentina	outpatient	19/25 43.2%/56.8%	44	Random	unclear	not reported
Katajisto 2012	Utility	15D	Cross-sectional survey (cross-sectional study in a cohort)	Other: 15 D questionaire	Mean 63.4 (7.0)	Finland	both inpatient and outpatient	419/280 60%/40%	719	Other: Cohort based sampling (all cohort participants)	87% (719/827)	not reported
Katula 2004	Uncategorized survey	physical function and perceived importance items	Randomized controlled trial	Other: questionnaire	Mean/95% CI short term group 66.9(65.5-68.3), long-term group 68.4 (67.0-69.8)	USA	outpatient	short term group: 39/31, 55.7%, 44.3%; long term group: 39/31, 55.7/44.3%	142	Consecutive	84.3% 118/140 completed the study	not reported
Kawata 2014	Direct choice,	Willingness to pay, Conjoint analysis/Discrete choice analysis	Cross-sectional survey	decision aid on the Discrete Choice Experiment Questionnaires	Mean (SD) 62.3 (9.99); Range 40-88		Unclear / reached through emails to patients diagnosed with COPD	230/285 44.66% 55.34%	515	Other: voluntary online survey	57% respondes (n=2930); 24% eligible; while the majority of these 74% (n=515, 74%) completed the survey	not reported
Kessler 2006	Uncategorized survey	Impact of exacerbation	Cross-sectional survey	Narrative explained by interviewer	Mean (SD) 664, (8,5)	France, Germany, Spain, Sweden and UK (Europe)	outpatients	82/43	125	Consecutive		not reported

Study	Type	Measure	Study design	Instrument	Age	Country	Setting	Sex	N	Sampling	Response	Funding
Khdour 2011	Utility	EQ-5D	Randomized controlled trial	EQ-5D	Mean (SD) education self-management 66.2 (9.8); usual care 66.6 (9.1)	UK	outpatient	Education self-management group 27/37 42.2%/57.8%; Usual care group 28/35, 45%/55%	127: 64 in education self-management group, 63 in usual care group	Consecutive	73.4% (127/173)	not reported
Kim 2014	Utility	EQ-5D,VAS	Cross-sectional survey	EQ-5D	Mean (SD) 68.5 (9.1); Number (proportion): less than 60, 25 (12.5%); 60-69, 74 (37.0%); 70-79, 85 (42.5%), 80 and more, 16 (8%)	Korea	outpatient	183/17 (91.5% / 8.5%)	200	Consecutive	Not reported	not reported
Kim 2015	Utility	EQ-5D utility	Cross-sectional study	EQ-5D	age for male 19-64: 49.3%, 65- : 50.7%; age for female 19-64: 37.5%, and 65- : 62.5%	South Korea	general population (COPD subsample)	556/195	751	rolling survey sampling	not reported	not reported
Koehorst-ter Huurne 2016	Utility	VAS	Cohort study	EQ-5D	ICS users - 67.1 (9.7); Tiotropium users - 65.5 (9.7)	Netherlands	both hospitalized patients and outpatients	377/258 ICS, 269/169 tiotropium	795 (635 ICS, 438 tiotropium)	consecutive	not reported	GlaxoSmithKline
Kontodimopoulos 2012	Utility	EQ-5D, SF-6D, 15D	Cross-sectional survey	EQ-5D, SF-6D and SF-15D	unclear	Greece	Outpatients		29	Consecutive	unclear (319 out of 354)	Not reported
Koskela 2014	Utility	15D	Cohort study	15D	Mean (SD): 64 (7)	Finland	All patients with COPD	473/266 (64%/36%)	739	Other: consecutive	Not reported	not reported
Koskela 2014b	Utility	15D	Cohort study	15D	Mean (SD): 64 (7)	Finland	All patients with COPD	473/266 (64%/36%)	739	Other: consecutive	Not reported	not reported

Kotz 2009	Utility	EQ-5D	Randomized controlled trial	EQ-5D	Mean (SD): 53.7 (7.0) in the experimental group and 54.9 (8.0) in the control group	Dutch and Belgian Limburg	primary care	71/45 (61.2%/38.8%) in the experimental group and 74/38 (66.1%/33.9%) in the control group	228	Consecutive	unclear	University/Education: University Maastricht (UM), CAPHRI Research Institute (The Netherlands)
Kruis 2013	Utility	EQ-5D, VAS	Randomized controlled trial	EQ-5D	68.3 (11.2)	Netherlands	general practices	585/501 (53.9%/46.1%)	1086	Consecutive	unclear	Governmental and Private for profit/ Netherlands Organisation for Health Research and Development (Zon-MW), subprogram Effects & Costs (project number 171002203), and Stichting Achmea, a Dutch Healthcare insurance company
Kuyucu 2011	Uncategorized survey	Expectation of treatment	Cross-sectional survey	No description	(mean (SD) (range)): 64.1 (9.5) (41-92)	Turkey	Secondary and tertiary care centres; primary physician offices	91% male; 9% female	514	Not reported	NR	Astra-Zeneca Turkey
Kwon 2016	Utility	EQ-5D utility	Cross-sectional study	EQ-5D	60.37 (SE 0.34)	South Korea	general population (COPD subsample)	72.36% (SE 0.12) males	2734 with COPD	stratified multistage probability sampling	not reported	no external funding sources for the study
Lacasse 2015	Utility	SF-6D utility	Cross-sectional	SF-6D	71 (7) - cases; 68 (8) - controls	Canada	outpatient	42 (62%) - male cases; 84 (62%) - male controls	Cases (n = 68); Controls (n = 136)	not reported	One hundred and seventy-six (176) patients with oxy-gen-dependent COPD were registered at the Quebec City area respiratory home care program. Of those, 74 did not fill in the SF-36	Groupe de recherche en santé respiratoire de lUniversité Laval (GESER)
Lemmens 2008	Utility	VAS	Cross-sectional survey	EQ-5D	Mean (SD) 63 (11)	Neitherland	general practice / home care	156/122 56%/44%	278	Not reported	Not reported	Private for profit and Private not for profit /an unrestricted grant from PICASSO for COPD, an initiative of Pfizer B.V. and Boehringer Ingelheim B.V. in cooperation with research institute Caphri (Care and Public Health Research Institute) of Maastricht University

Study	Type	Method	Study design	Instrument	Age	Country	Setting	Sample/Gender	N	Sampling	Response rate	Funding
Lemmens 2010	Utility	VAS	Trial, non-randomized or non-controlled	EQ-5D	Mean (SD) 66 (11)	Neitherland	general practice / home care	122/67 65%/35%	189	Not reported	79.4% 150/189	Private for profit and Private not for profit /an unrestricted grant from PICASSO for COPD, an initiative of Pfizer B.V. and Boehringer Ingelheim B.V. in cooperation with research institute Caphri (Care and Public Health Research Institute) of Maastricht University
Lewis 2010	Utility	EQ-5D	Randomized controlled trial	EQ-5D	median interquartile range telemonitoring group 70 (61, 73); control 73 (63, 79)	UK	outpatient	in both group: 10/10 50%/50%	40	Consecutive	51.9% 40/77	Governmental/ EU grant (C046225)
Lin 2014	Utility	EQ-5D, VAS	Cross-sectional survey	EQ-5D	Mean (SD) Total sample 68.5 (10.4);	USA (seven sites)	Not reported	387/283 57.8%/42.2%	670	Random	26.2% (1293/4935)	Governmental/National Heart, Lung, and Blood Institute (NHLBI RC2 HL101618).
Lynn 2000	Direct choice	Forced choice: treatment	Cohort study	no description	Median (25th, 75th percentile) Died during index hospitalization (n=116) 73 (68, 80) Died after index hospitalization (n=300) 72 (66, 79) Alive at 1 year (n=600) 69 (61, 76)	USA	Hospitalization for exacerbation of COPD at five US teaching hospitals	Died during index hospitalization (n=116) 64/52, 55%/45% Died after index hospitalization (n=300) 150/150, 50%/50% Alive at 1 year (n=600) 309/291, 52%/48%	416 died among 1016 enrolled	Other: cohort based	unclear	SUPPORT was made possible by grants from the Robert Wood Johnson Foundation. Dr. Claessens was supported by a Veterans Administration Ambulatory Care Fellowship, White River Junction, Vermont, and a Fellowship in Palliative Medicine, Ottawa, Ontario.
Mahler 2014	Direct choice	Forced choice: treatment	Randomized controlled trial	no description	71.6 (7.4)	UK	unclear	5/15 25%/75%	20	Not reported	unclear	Boehringer Ingelheim, GlaxoSmithKline, Novartis, and Sunovion
Manca 2014	Utility	VAS, EQ-5D utility	Cross-sectional study	EQ-5D	AATD COPD - 56.5 (10.6); Non-AATD COPD - 70.3 (9.2)	Spain	not reported	AATD COPD - 57.1% males; Non-AATD COPD - 80.3% males	96 (35 were AATD patients and 61 non-AATD COPD)	not reported	not reported	Grifols

Martínez 2012	Direct choice	Forced choice: treatment	Cross-sectional survey	Narrative explained by interviewer, Booklet/card	Males Mean (SD) at time of survey 73,1 (8,3)	USA	outpatients	273/295		568	Random		not reported
Martinez Rivera 2016	Utility	VAS, EQ-5D utility	Cross-sectional study	EQ-5D	66.9 (8.8)	Spain	outpatient	93%/7%		115	consecutive	not reported	No data provided.
McDowell 2015	Utility, Direct choice	VAS, EQ-5D utility, forced choice: treatment	Randomized controlled trial	EQ-5D	Telemonitoring with usual care: 69.8 (SD: 7.1); Usual care: 70.2 (SD: 7.4)	Northern Ireland	patients treated at home	Telemonitoring with usual care: 58.2% females Usual care: 54.5% females		110	consecutive	94.0% (117 assessed for eligibility and 110 recruited); 90.9% (110 recruited/ 100 finished study)	The study was funded by a grant from the European Centre for Connected Health. The researchers were independent from the funders.
McNamara 2015	Direct choice	Forced choice: place of treatment	Randomized controlled trial	No description	mean: 72 (SD: 10)	Australia	outpatient	uncertain		53	not reported	100% during follow up	Supported by a research grant from the Physiotherapy Research Foundation. The research funding body had no involvement in the study design, collection, analysis and interpretation of data; writing of the manuscript; or in the decision to submit the manuscript for publication.
Menn 2010	Utility	EQ-5D, and SF-6D	Cross-sectional survey	Narrative explained by interviewer, EQ-5D, SF-12/SF-36	Stage III Mean (SD) 67 (8)	Germany	Hospitalized	Stage III 59%/41%		34	Not reported		not reported
Miller 1999	Utility	HUI	Cross-sectional survey	HUI	Mean (SD): 62.8 (7.5)	Canada	university-affiliated hospital	M/F: 17/7		24	Consecutive	unclear	Governmental and Private for profit: Ontario Thoracic Society, Toronto, Onatrio, Autosuture Company Canada, St Laurent, Quebec and Bio-Vascular Inc. St Paul, Minnesota
Milne 2014	Utility	EQ-5D, Mapping	Randomized controlled trial	Narrative explained by interviewer, Health state utility	Not reported	New Zealand	Not reported	Not reported		87	Random		not reported

Miravitlles 2007	Uncategorized survey	Ideal characteristics of a COPD therapy	Cross-sectional survey	Narrative explained by interviewer, Computer program or Software, Audiobooklet	%Patients age >51= 51%	Germany, France, Italy, Spain and UK and USA	Outpatients	39%/61%	1100	Random		not reported
Miravitlles 2009	Utility	EQ-5D, VAS	Cross-sectional survey	EQ-5D	Mean (SD) 69 (10)	Spain	General practice	715/112 86.5%/13.5 %	827	Other (randomly selected GPs. Participants were requested to include the first five consecutive unselected COPD patients)	68% (248 in 360 GPs)	Not reported
Miravitlles 2011a	Utility	EQ-5D, VAS	Cross-sectional survey	Narrative explained by interviewer, EQ-5D	Mean (SD) 68,5 (9,5)	Spain	Ambulatory patients	90,7%/9,3 %	346	Consecutive		not reported
Miravitlles 2011b	Utility	EQ-5D, VAS	Cross-sectional survey	Narrative explained by interviewer, EQ-5D	Mean (SD) 67,06 (10,04)	Spain	Ambulatory	3802(83,79 %)/772(16. 3%)	4574	Random		not reported
Miravitlles 2014a	Utility	EQ-5D, VAS	Cross-sectional survey	Narrative explained by interviewer, EQ-5D	Mean (SD) 68,3 (9,3)	Spain	Ambulatory	713(83%)/1 33(17%)	846	Not reported		not reported
Miravitlles 2014b	Utility	EQ-5D, VAS	Cross-sectional survey	Narrative explained by interviewer, EQ-5D	Mean (SD) 67,9 (9,7)	Spain	Outpatient	296(85,5%) /50(14,5%)	346	Consecutive		not reported
Miravitlles 2015	Utility	EQ-5D utility	Cross-sectional study	EQ-5D	67.9 (SD: 9.7)	Spain	outpatient	85.5%: males	346	consecutive	No data provided	This study was funded by GlaxoSmithKline (study HZC116842).

Study					Age	Country	Setting		Sample size	Sampling	Notes	Funding
Mittmann 1999	Utility	HUI	Cross-sectional survey	HUI	age group, number and frequency: 12 to 19: 1847, 10.5% 20 to 29: 2982, 16.9% 30 to 39: 3704, 21.0% 40 to 49: 2891, 16.4% 50 to 59: 2116, 12.0% 60 to 69: 1904, 10.8% 70 to 79: 1547, 8.8% 80: 635, 3.6%	Canada	community	8058/9568 457.7%/54.3%	17626	Random	83.00%	Governmental/ Statistics Canada.
Mittmann 2001	Utility	HUI	Cross-sectional survey	HUI	unclear	Canada	community		274	Random	The longitudinal response rate for cycle 2 was 93.6%. For cross-sectional purposes, the response rate for the health component was 93.1% for the longitudinal respondents and 75.8% for the RDD portion among respondents aged 12 or older, for an overall response rate of 79.0%.	Governmental/ Statistics Canada.
Mo 2004	Utility	HUI	Cross-sectional survey	HUI	unclear	Canada	Community	653/722 47.5%/52.5%	1375	Random	80% (20% non-response, but not only for COPD)	Not reported
Molimard 2005	Direct choice	Conjoint analysis/Discrete choice analysis	Cross-sectional survey	Computer program or Software, Sawtooth Software's adaptive choice based conjoint analysis and choice-based conjoint analysis product	Mean 60.7	US, UK, Germany, France	Unclear	Unclear	245	Not reported	unclear	Private for profit/ Novartis Pharma

Moore 2004	Direct choice	Forced choice: inhaler	Cross-sectional survey	question naire	Mean: German 58, Dutch 61	German and Dutch	Outpati ents	120/136 46.9%/53.1%	256	Not reported	Not reported	not reported
Mutterlein 1990	Direct choice	Forced choice: device	Cross-over study	question naire	Unclear	Germany	Ambula tory patients	Unclear	60	Unclear	unclear	Unclear
Naberan 2012	Utility	EQ-5D, VAS	Cross-sectional survey	EQ-5D, EQ-5D VAS	Mean (SD) 67.1 (10)	Spain	not reporte d	3792/740; 83.3%/16.7%	4552	Consecutiv e	4891 were recruited, 317 (6.5%) were excluded because they met one or more exclusion criteria	not reported
Nakken 2017	Utility	VAS, EQ-5D utility, AQoL-8D utility	Cross-sectional study	EQ-5D	63.3 (8.0) for female patients and 68.7 (8.3) for male patients	The Netherland s	outpati ent	45.2%/54.8%	188 patient-partner couples	consecutive		This project is financially supported by Lung Foundation Netherlands, Leusden, the Netherlands, Grant 3.4.12.024 and by a research grant from Boehringer-Ingelheim, the Netherlands. The authors report no conflicts of interest in this work.
Nilsson 2007	Utility	VAS	Repeated surveys	EQ-5D, SF-12/SF-36	Age >65 56%, no mean was reported	Sweden	outpati ents	women 54%/ men 46%	70 before /60 after measurem ents in project; 61 before/ 51 after measurem ents in study	Not reported	70 patients included in the study with COPD, 60 patient that fulfilled questionnaries before and after the interventions	not reported
Nishimura 2008	Utility	QWB	Cross-sectional survey	Narrative explained by interview er	Mean age 70±6 years	Japan	not reporte d	100% male	161	Not reported	not reported	not reported
Nolan 2016	Utility	VAS, EQ-5D utility	Cohort study	EQ-5D	Mean SD: 70.4 (9.3) for study 1; Mean (95% CI): 70.2 (69.2 to 71.2) for study 2	UK	respirat ory clinics at Harefiel d Hospital	59.7%/40.3% for study 1 and 59.3%/40.7% for study 2	616 for study 1 and 324 for study 2	consecutive	98.6% for study 1 and 81% for study 2	This work was funded through a National Institute for Health Research (NIHR) Clinical Scientist award (CS/7/007), NIHR Clinical Trials Fellowship (NIHR-CTF-01-12-04) and Medical Research Council (MRC) New Investigator Grant (G1002113) awarded to WD-CM.
Norris 2005	Direct choice	Forced choice: treatment	Cross-sectional survey	question naire	Mean (SD) 67.2 (9.5)	US	outpati ent	81/30 73.0%/27.0%	111	Consecutiv e	40% (118/295)	Private not for profit and Governmental/ Clinical Research Trainee Award in Critical Care from the CHEST Foundation/K24 Award from the National Heart Lung and Blood Institute (K24 HL68593)

Nyman 2007	Utility	Time trade off	Cross-sectional survey	not reported	not reported	USA	study on population of USA	not reported	39751 (597 diagnosed with emphysema)	Not reported	not reported	University grant
O'Reilly 2007	Utility	EQ-5D, VAS	Repeated surveys	Narrative explained by interviewer, EQ-5D	69,89 (SD=8,59)	UK	hospitalized patients	Female 81 (54%), male (46%)	149	Consecutive	follow up sample n=39	not reported
Ohno 2014	Direct choice	Forced choice: treatment	Trial, non-randomized or non-controlled	Narrative explained by interviewer	75,7±7,0	Japan	outpatients	male/female = 26/2	28	Not reported	29 included/ 28 completed follow up	not reported
Ojoo 2002	Direct choice	Forced choice: treatment	Randomized controlled trial	no description	Mean 70.1 in conventional arm and 69.7 in domiciliary arm	UK	inpatient at the beginning, either hospital or at home after	31/29 51.6%/48.4% in total; 15/15 50%/50% in conventional arm and 16/15 53.3%/47.7% in the domiciliary arm	61	Other (Recruitment into the study was carried out from Monday to Thursday.)	Not reported response rate. 88.5% (54/61, six patients failed to complete the trial, one patient did not provide preference information)	Governmental and unclear/ Part of the funding of this study was obtained from East Yorkshire Hospitals NHS Trust.
Oliver 1997	Direct choice	Ranking: treatment	Cross-over study	unclear	unclear	UK	unclear	Unclear	20	unclear	Unclear	unclear
Olszanecka-Glinianowicz 2014	Uncategorized survey	Brief Illness Perception Questionnaire	Cross-sectional survey	No description	Mean (SD) 60.0 (13.5)	Poland	general practice	1491/1111 57.3%/42.7%	2602	Consecutive	Not reported	Not reported
Osman 2008	Utility	VAS	Cross-sectional survey	EQ-5D	69 (SD - 8,2)	UK	patients living in home	Male 67 (45%), female (55%)	206	Not reported	534 invited, 148 after initial survey	Funded by Eaga Partnership Charitable Trust
Pallin 2012	Direct choice	Willingness to pay, Forced choice: treatment	Cross-sectional survey	Narrative explained by interviewer	64,4 ±6,7	Ireland	outpatient, or hospitalizaed on the day of discharge	male 26 (46,4%), female (53,6%)	146 patient approached/ 142 completed survey	Consecutive	no follow up	not reported
Park 2015	Utility	VAS, EQ-5D utility	Cross-sectional study	EQ-5D	64.7 (0.4)	South Korea	general population (COPD subsample)	Male: 72.5% (SD: 1.8%)	1302	stratified multistage probability sampling	not applicable	The authors have no support or funding to report.

Study	Type	Method	Design	Description	Age	Country	Setting	Gender	N	Sampling	Follow-up	Funding
Pascual 2015	Direct choice	Forced choice: inhaler	Cross-over study	no description	67.6 (8.0)	Germany, Spain, the UK	outpatient	males: 91, 71.7%/28.3%	127	not reported	not reported	The study was funded by Almirall S.A., Barcelona, Spain, and Forest Laboratories LLC, a subsidiary of Actavis PLC, New York, USA. Medical writing support was funded by Almirall S.A., Barcelona, Spain.
Paterson 2000	Utility	EQ-5D, VAS	Repeated surveys	Narrative explained by interviewer, EQ-5D	61	Scotland, UK	outpatients	male/female - 37(46%)/43 (53%)	81	Consecutive	80; 1 missing	Funding by Glaxo Wellcome Research and Development
Patridge 2011	Uncategorized survey	perception of disease severity	Cross-sectional survey	No description	Mean (SD) 62.4 (8.6)	UK, Germany, France, Italy and Spain	Unclear	406/313 56.5%/43.5%	719	Random	Exact data on response rates following random selection (from among the asthma and COPD patients listed in each country as part of the pre-recruited panel of 1,835,000 individuals) and invitation to participate are unavailable... Approximately 50%	Private not for profit/ Chiesi Foundation
Persson 2005	Uncategorized survey	Importance of life values	Cohort study	Narrative explained by interviewer	64,7 (min-max – 54-71)	Sweden	hospitalized and outpatients	Male 43 (63%)/ Female 22 (37%)	65	Consecutive	46 (29% drop out rate)	Financially supported by the Medical Faculty, University of Goteborg
Peters 2014a	Utility	EQ-5D, VAS	Repeated surveys	EQ-5D	not reported	UK	outpatients	not reported	279 (response rate 49,2%).	Not reported	187 (response rate 71,4%)	Funded by the Department of Health (England)
Pickard 2011	Utility	EQ-5D, VAS	Cross-sectional survey	Narrative explained by interviewer, EQ-5D	71,2 (SD - 10,3)	UK	outpatients and hospitalized patients	Male - 118 (98,3)/ Female 2 (1,7%)	120	Not reported	no follow-up	not reported
Pisa 2013	Direct choice	Conjoint analysis/Discrete choice analysis	Cross-sectional survey	Narrative explained by interviewer	years: 1. 40-50 - 32%; 2. 51-60 - 43%; 3. 61-70 - 25%; Agerage age - 55,3 years	Germany	not reported	Male/ female: 63%/37%	300	Not reported	no follow-up	funded by Novartis Pharma GmbH
Polati 2012	Uncategorized survey	Expectation of treatment	Cross-sectional survey	Narrative explained by interviewer	63,3 (SD - 9,3)	Turkey	outpatients	male/ female - 89,9%/10,1%	497	Not reported	no follow-up	Funded by AstraZeneca Turkey

Study	Type	Method	Study design	Description	Age	Country	Setting	Gender	N	Sampling	Response	Funding
Price 2013a	Utility	EQ-5D	Cross-sectional	EQ-5D	65.7 (10.5)	France, Germany, Italy, Spain, UK	outpatients	Male/ female - 69,9%/ 30,1%	2807	consecutive	not reported	not reported
Price 2013b	Direct choice	Forced choice: treatment	Cohort study	no description	Mean (SD) 70.4 (9.8)	UK (England or Scotland)	general practice	1058/980 54.2%/45.8%	2138	Other: based on a database	28.3% (2138/7559)	Private for profit
Puente-Maestu 2016	Utility	EQ-5D utility	Cross-sectional study	EQ-5D	68.0 (9.0)	Spain	not reported	Males: 79.7% (SE: 2.3%); Females: 20.3% (SE: 2.3%)	296	consecutive	not reported	This study was financed in full by Ferrer International.
Puhan 2004	Utility	VAS	Cross-sectional survey	Narrative explained by interviewer	69,0 (7,2)	Switzerland, Germany, Austria		Male/ Female - 43 (65,5%)/18 (34,5%)	80	Consecutive	6100.00%	not reported
Puhan 2007	Utility	Standard gamble, VAS, HUI	Cross-sectional survey	Narrative explained by interviewer, EQ-5D	69,0 (8,7)	Canada, USA	hospitalized	males/ females - 59%/41%	281	Not reported	17700.00%	not reported
Punekar 2007	Utility	EQ-5D	Cross-sectional survey	Narrative explained by interviewer, EQ-5D	66 (SE 0,29)	USA, France, Germany, Italy, Spain, UK	outpatients	Male/ female - 66/ 34%	1381	Random		not reported
Reinke 2011	Direct choice	Forced choice: treatment	Cross-sectional survey	Narrative explained by interviewer, In-person contact with someone who has experienced the health event	69,4 (sd=10,0)	USA	outpatient	male/female – 96,8%(333) /3,2%	1292 invited but 376 meet the inclusion criteria	Consecutive		not reported
Reinke 2013	Uncategorized survey	Forced choice: treatment	Cross-sectional survey	No description	Mean (SD) 69.4 (10.0	USA	Not reported	97%/3%	376	Other: Trial based sample	Not reported	not reported

Rhee 2017	Utility	EQ-5D utility	Cross-sectional study	EQ-5D	63.5 (11.9)	South Korea	general population (COPD subsample)	Male: 1692 (70.6%)	2397	stratified multistage probability sampling	not applicable	This study was supported by a grant (2014P3300300) from the Korea Centers for Disease Control and Prevention. This study was supported by COPD cohort data of HIRA
Riley 2016	Direct choice	Forced choice: inhaler	Randomized controlled trial	No description	Not reported	Not reported	not reported	not reported	618	not reported	not reported	Development of the CDPQ, these clinical studies, and analyses were funded by GlaxoSmithKline. All medical writing and editorial support was funded by GlaxoSmithKline
Ringbaek 2008	Utility	EQ-5D, VAS	Repeated surveys	Narrative explained by interviewer, EQ-5D	69,1 (8,1)	Denmark	not reported	male/female – 31,9%/68,1%	229	Not reported		not reported
Rinnenburger 2012	Direct choice	Preferences of decision making mode	Repeated surveys	Narrative explained by interviewer	not reported	Italy	hospitalized	not reported	84 (what was the 84% of whole population with other ilnesses)		not reported	not reported
Rocker 2008	Uncategorized survey	Questionnaire with 28 elements that addressed importance of five domains	Cross-sectional survey	HUI, questionnaire	Mean (SD) 73.27 (7.84)	Canada	tertiary referral teaching hospitals	62/54/2 mising, 52.5%/45.8%/1.7%	118	Not reported	Not reported	Governmental/the National Health Research and Development Program of Canada.
Rocker 2013	Uncategorized survey	Reasons to continue (or not) with opioids	Cohort study	no description	74 (51-89 YEARS)	Canada	not reported	Male/female – 19 (42%)/26 (58%)	55 enrolled/32 finished the study	Not reported	45 patients, 31 finished study	This study was funded by the Canadian Institutes of Health Research
Rodriguez Gonzalez-Moro 2009	Utility, Uncategorized survey	VAS, importance of family habits changes because of COPD	Cross-sectional survey	Narrative explained by interviewer, EQ-5D	67,8 (67,3-68,3)	Spain	outpatient	Male/female – 88%/12%	1596	Not reported		not reported

Study		Instruments	Study design	Valuation	Age	Country	Setting	Gender	Sample size	Sampling	Response rate	Funding
Rutten van Molken 2006	Utility	EQ-5D, VAS	Cross-sectional survey	EQ-5D	64,5 (8,4)	USA, Czech Republic, Spain, Denmark, Germany, Poland, the Netherlands, Italy, France, Hungary, Russia, Belgium, Australia		Male/female – 902 (73%)/333 (27%)	1235	Consecutive		not reported
Rutten van Molken 2009	Utility	VAS, Time trade off	Cross-over study	Narrative explained by interviewer	45 (16)	The Netherlands		Male/Female – 48%/52%	239	Not reported		Financial support for this study was provided by Boehringer Ingelheim International and Pfizer Global Pharmaceuticals
Sassi-Dambron 1995	Utility	QWB	Randomized controlled trial	Other:Health-Related Quality of Well-Being Scale	(mean (SD)) 1. Treatment: 67.5 (8.0) 2. Control: 67.3 (8.0)	United States	Community; primary (community physicians and clinics)	Total: 49M/40F 1. Treatment: 26M/20F 2. Control: 23M/20F	Initial: 98 subjects (47 treatment, 51 control). After dropout: 89 (46 treatment; 43 control)	Voluntary sample	NR for response rate. Drop-out: 98 subjects randomized; 9 drop-outs; final = 89 subjects (90.82%). Of the 98 subjects randomly assigned to treatment (n= 47)and control(n= 51)groups,ninedropped out before treatment, one from the treatment and eight from the control group.Reasons for dropping included ilnes(treatment= 1,control= 1),time conflict(control= 4),and lack ofi nterest (control=3).	grant 2RT0268 from the University of California Tobacco Related Disease Research Program and grant R01 HL34732 from the National Heart, Lung & Blood Institute.
Scharf 2011	Utility	HUI	Cross-sectional survey	Narrative explained by interviewer	65,9 (11,7)	Israel	hospitalized	male/female - 140 (77,8%)/ 40 (22,2%)	180	Not reported		The study was funded by a grant from the Dean's office, Faculty of Health Sciences, Ben-Gurion University of the Negev, Beersheba, Israel
Schunemann 2003	Utility	Standard gamble, VAS	Randomized controlled trial	HUI, other: marker states	66 (7) With marker states 66.8 (7.6); without marker states 64.7 (7.5)	Canada	rehabilitation or conventional community care	46/38 54.8%/45.2%	84	Consecutive	84/130=64.6%	Governmental/ Medical Research Council of Canada

Schunemann 2007	Utility	Standard gamble, VAS	Cross-sectional survey	HUI, other: clinical marker states	68.2 (8.1)	Canada, the US	respiratory rehabilitation programs at four centers in Canada and the United States	54/37 (59.3%/40.7%)	91	Consecutive	Unclear	Private for profit/ an unrestricted grant from AstraZeneca, Inc.
Seymour 2010	Utility	VAS	Randomized controlled trial	EQ-5D	UC group 65 (10); PEPR 67 (10)	UK	Hospitalization patients and 3-month follow up	UC group: 14/16 46.7%/53.3%; PEPR group: 13/17 43.3%/56.7%	60	Not reported	unclear; 60 of 61 randomized	Governmental/ JMS was funded by a British Lung Foundation Project Grant (P04/8). CJJ was funded by the Medical Research Council UK. JSS was funded by the European Respiratory Society. WDCM was funded by the Medical Research Council UK and the National Institute for Health.
Sharafkhaneh 2013	Uncategorized survey	Primary disadvantages of nebulization therapy	Cross-sectional survey	no description	Age group: n(%) 18–24: 4 (1) 25–34: 5 (1) 35–44: 23 (6) 45–64: 168 (42) ≥65: 200 (50)	USA	COPD households compiled from a variety of sources (i.e., direct outreach, magazine, and publication subscriptions)	140/260 (35%/65%)	400	Random	10.4% (800 of 7691)	Private for profit/ Mylan Specialty L.P.
Siler 2014	Direct choice	Patient's expectation of treatment adherence	Randomized controlled trial	no description	Overall: 61.5 (8.68) Indacaterol/placebo: 62.2 (10.29) Placebo/indacaterol: 60.8 (6.90)	USA	unclear	Overall: 27/13 68%/32% Indacaterol/placebo: 11/9 55%/45% Placebo/indacaterol: 16/4 80%/20%	40	Not reported	unclear	Private for profit

Simon 2013	Uncategorized survey	A 5-point scale, on behaviour and own efforts that the patient is willing to mobilize in order to achieve greater health)	Cross-sectional survey	no description	Age group: number (%) -40 years: 4 (2.7%) 41-60 years: 71 (48.3%) 61- years: 72 (49.0%)	Hungary	six out of the seven pulmonary centers of Hungary	74/73 50.3%/49.7%		147	convenience sample	unclear	Unclear/ The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.
Small 2015	Utility	EQ-5D utility	Cross-sectional study	EQ-5D	<65 years: 307 (38.1%) 65 year and older: 498 (61.9%)	USA	routine care	Male: 443 (55.0%) Female: 360 (44.7%) Missing: 2 (0.3%)		805	consecutive	not reported	Novartis Pharmaceuticals Corporation provided funding for the analysis of these data and medical writing support
Solem 2013	Utility	EQ-5D	Cross-sectional survey	EQ-5D	68.0 (9.6), severe COPD: 67.4 (9.8), very severe COPD: 68.8 (9.2)	US	Practice of pulmonologist and primary care physicians: A stratified random quota sample of 100 physicians (with a target of equal representation by pulmonologists and primary care physicians drawn in equal proportions from the	161/153 (51.3%/ 48.7%) severe COPD: 94/96 (49.5%/50.5%) very severe COPD: 67/57 (54.0%/46.0%)		314	Random	unclear	Private not for profit/ Forest Research Institute

Sorensen 2016	Utility	EQ-5D utility	Randomized controlled trial	EQ-5D	Usual care: 69.7 (8.6), case management: 69.0 (8.4)	Denmark	community based case management	Usual care: 27/47 (36.5%/63.5%); case management: 36/38 (48.7%/51.3%)	150	not reported	62.8% (150 of 239 enrolled), 148 of 150 followed up	The research project received support from The North Denmark Region, Denmark. The sponsors of the study had no role in data analysis, data interpretation, or writing of the paper.
Spencer 2013	Uncategorized survey	importance of exercise and support, and the importance of seeing the same person each time	Randomized controlled trial	no description	IG: 65 (8); CG: 66 (8)	Australia	Outpatients	IG: 9/10; CG: 10/7	48	Not reported	36/48	Not reported
Stahl 2005	Utility	EQ-5D, VAS	Cross-sectional survey	EQ-5D	Mean (range): 64.3 (28-80)	Sweden	subjects with COPD from the general population in Northern Sweden	98/70 58.3%/41.7%	168	Not reported	unclear	Private for profit (Astra Zeneca)

Stapleton 2005	Direct choice	Forced choice: treatment	Cross-sectional survey	Booklet/card	Median (interquartile range): 67.4 (59.4–74.3)	USA	End of life care/ ambulatory pulmonary clinics in three hospitals (university, county, and Veterans Affairs Medical Center) and through an oxygen delivery company	78/23	101	Consecutive	34.2% (101/295)	not reported
Starkie 2011	Utility	EQ-5D, mapping	Cross-sectional survey	EQ-5D	Mean (SD) 64.7 (8.4)	444 centers in 42 countries	Unclear	2586/1054 (71%/29%)	3640	Not reported	Unclear for the response rate, and for the response rate of the EQ-5D from TORCH trial: 59.6% (3640/6112)	not reported
Stavem 1999	Utility	Standard gamble, Time trade off, 15D	Cross-sectional survey	Narrative explained by interviewer	Mean (SD) 57 (9.1)	Norway	outpatients	34/25	59	Consecutive	76.6% (59 in 77)	not reported
Stavem 2002a	Utility	Time trade off	Cross-sectional survey	Decision board	Mean (SD) 57 (10)	Norway	outpatients, identified the Central Hospital of Akershus, Norway	34/25 57.6%/42.4%	59	Consecutive	29.8% (59/198)	Not reported

Stavem 2002b	Utility, Direct choice	Time trade off, Standard gamble, VAS, 15 D, willingness to pay	Cross-sectional survey	EQ-5D, a script and a payment card with a range of 13 amounts	Mean (SD) 57 (10)	Norway	outpatients, identified the Central Hospital of Akershus, Norway	34/25 57.6%/42.4%	59	Consecutive	29.8% (59/198)	Not reported
Stein 2009	Utility	Standard gamble	Cross-sectional survey	Booklet/card (The COPD vignettes were based on the Chronic Respiratory Disease Questionnaire (CRDQ), as used in a trial of community-based pulmonary rehabilitation)	Mean (SD) 48.2(13.3)	UK	General population	54/58 48.2%/51.2%	112	Random	2.1% (Overall, 5,320 people were contacted through the electoral roll. Only 1215 (23%) of those approached responded to the initial invitation letter. Of this group, 286 (23.6%) expressed willingness to participate in the project and 112 (39% of those who agreed) attended a training session. Only people who attended a training session were considered part of the panel. Thus, the net final recruitment was 2.1% of those initially approached.)	Governmental/ NHS R&D Programme; National Institute for Health and Clinical Excellence (NICE); NHS Quality Improvement Scotland (NHSQIS)
Steuten 2006	Utility	VAS	Trial, non-randomized or non-controlled	EQ-5D	mean (SD) 61 (14)	Netherlands	university hospital and 16 general practices	56/44%	317 (1062 in total)	Consecutive	Unclear 685/1062 (317 are COPD)	Not reported
Stoddart 2015	Utility	EQ-5D utility	Randomized controlled trial	EQ-5D	telemonitoring sample: 69.4 (8.8) controls: 68.4 (8.4)	UK (Scotland)	primary care	telemonitoring sample: 53/75 (41%/59%), controls: 63/65 (49%/51%)	256	consecutive	not reported	The work was funded by a grant from the Chief Scientist's Office of the Scottish Government (ARPG/07/03).
Sundh 2015	Utility	VAS, EQ-5D utility	Cross-sectional study	EQ-5D	male: 72.2 (8.11), female: 70.5 (7.58)	Sweden	Secondary care respiratory units	165/208 (44.2%/55.8%)	373	consecutive	not reported	he study was supported by an unrestricted grant from Takeda Pharma AB, Sweden.

Study	Type	Measure	Study design	Outcome measure	Age	Country	Setting	Sex	N	Sampling	Response rate	Funding
Sutherland 2009	Direct choice	Forced choice: device	Randomized controlled trial	Narrative explained by interviewer	Mean (SD) 62 (10)	USA	outpatients	49/50 50%/50%	99/ 109	Not reported	93/109	Private for profit/ Dey LP
Svedsater 2013	Direct choice	Forced choice: inhaler	Cross-sectional survey	Narrative explained by interviewer	Mean: 61	USA	Unclear	Unclear	42	Other: Trial based	unclear	Private for profit/ GlaxoSmithKline
Szende 2009	Utility	EQ-5D, SF-6D	Cross-sectional survey	EQ-5D, SF-12/SF-36	Mean (SD) 64 (12.3)	Sweden	Unclear	74/102 (42%/58%)	176	Other: based on two cross-sectional surveys	unclear	Not reported
Tabak 2014	Utility	EQ-5D, VAS	Randomized controlled trial	EQ-5D	Mean (SD) Telehealth group 64.1 (9.0); Usual care 62.8 (7.4)	Netherlands	Outpatients	All: 12/12, 50%/50% Telehealth: 6/6 50%/50%, Usual care: 6/6, 50%/50%	24	Not reported	not reported for response rate, while 24/29 finished the follow up	Governmental/ NL Agency, a division of the Dutch Ministry of Economic Affairs (grant CALLOP9089)
Taylor 2012	Utility	EQ-5D	Randomized controlled trial	EQ-5D	Mean (SD) Intervention: 69.0 (9.8); control: 70.5 (10.0)	UK	10 primary care teams or from a community respiratory clinic	Intervention: 40/38, 51.3%/48.7%; Control: 13/25, 34.2%/65.8%	116	Consecutive	116/507	the National Institute for Health Research (NIHR)
Torrance 1999	Utility, Direct choice	HUI, willingness to pay	Randomized controlled trial	HUI	Mean (SE) ciprofloxacin: 54.9 (1.46); Usual care: 55.8 (1.36)	Canada	outpatients	ciprofloxacin: 44/71 38%/62%; Usual care: 53/54 50%/50%	222 in 240	Not reported	not reported	Private for profit/ Bayer Inc.
Torres-Sánchez 2016	Utility	VAS	Randomized controlled trial	EQ-5D	Intervention group: 72.36 (8.91) Control group: 73.7 (7.1)	Spain	Inpatient	Men: 47; women: 2	49	consecutive	unclear response rate, 100% follow up (i.e. no patients were lost to follow-up)	This work was supported by the Professional association of physiotherapists of Andalusia,Spain (Colegio Profesional de Fisioterapeutas deAndalucía). [number SG/0300/13CO];and the Spanish society of Pneumology and thoracic surgery (SEPAR)and Spanish Foundation of the lung(Fundación Respira). (Beca Becario SEPAR 2013) [Grant numberProyectα 061/2013].

Study	Type	Method	Design	Instrument	Age	Country	Setting	Sex	N	Sampling	Response	Funding
Travaline 1995	Direct choice	Forced choice: treatment	Cross-sectional survey	Narrative explained by interviewer	median (range): 67 (43-81)	USA	University Health Center of thE Universtiy of Maryland Hospital and the Baltimore Veterans Administration Hosptial	29/8 78.4%/21.6%	37	Consecutive	not reported, while 37 of the 40 finished the survey	Not reported
Turner 2014	Utility	EQ-5D, VAS	Repeated surveys	EQ-5D	Mean (SD) 68.3 (9.3)	UK	primary and secondary care	90/115 44.1%/55.9%	205	Consecutive	65.7% 205/312 who contacted the recruiment helpline	Private not for profit/ Health Foundation (UK)
Utens 2012	Utility	EQ-5D	Randomized controlled trial	EQ-5D	Mean (SD) usual hospital group 67.8 (11.3); early assisted discharge 68.31 (10.34)	Netherlands	hospitalized patients first and discharge later	usual hospital: 38/31 55.1%/44.9%, early assisted discharge: 48/22 68.6%/31.4%	139	Consecutive	139 of 479 (29.0%) randomized, 115 of 139 finished the survey	Governmental/ Netherlands Organization for Health Research and Development (945-50-7730)
Utens 2013	Direct choice	Forced choice: place of treatment	Randomized controlled trial	no description	Mean (SD) usual hospital group 67.8 (11.3); early assisted discharge 68.31 (10.34)	Netherlands	hospitalized patients first and discharge later	usual hospital: 38/31 55.1%/44.9%, early assisted discharge: 48/22 68.6%/31.4%	139	Consecutive	139 of 479 (29.0%)	Governmental/ Netherlands Organization for Health Research and Development (945-50-7730)
Utens 2014	Direct choice	Forced choice: place of treatment	Randomized controlled trial	no description	Not reported	Netherlands	hospitalized patients first and discharge later	usual hospital: 38/31 55.1%/44.9%, early assisted discharge: 48/22 68.6%/31.4%	124 (62 caregivers each in either groups)	Consecutive	not reported	Governmental/ Netherlands Organization for Health Research and Development (945-50-7730)

van Boven 2016	Utility	VAS, EQ-5D utility	Pre-test/post-test design	EQ-5D	68.8 (7.8)	The Netherlands	primary care	52.2%/47.8%	88	not reported	88/94 = 93.6%	For the implementation of the study the authors' institution (University of Groningen) received an unrestricted educational grant from AstraZeneca Ltd.
van den Bemt 2009	Utility	EQ-5D	Randomized controlled trial	EQ-5D	monitoring group: 62(10.5); usual care group 64 (10.5)	Netherlands	general practice	monitoring group: 56/26 68.3%/31.7%; usual care: 47/41, 53.4%/46.6%	170	Consecutive	170/286	Private not for profit/"Partners in Care Solutions for COPD" (PICASSO)
van der Palen 2013a	Direct choice, Uncategorized survey	Forced choice: inhaler , willingness to continue inhaler use scale, importance core of inhaler attributes	Randomized controlled trial	No description	Mean (SD) 65.9 (8.6) for the safety population, 65.7 (8.5) for the ITT population	Germany and Netherlands	Not reported	87/42 67.4%/32.6% for the safety population, and 75/30 (71.4%/28.6%) for the ITT population	129	Not reported	response rate unclear, 70.5% 91/105 patients indicating the preference	Private for profit/ Almirall, S.A., Barcelona, Spain, and Forest Laboratories, Inc., New York, USA
van der Palen 2013b	Direct choice, Uncategorized survey	Forced choice: inhaler , willingness to continue inhaler use scale, importance core of inhaler attributes	Randomized controlled trial	Narrative explained by interviewer	Mean (SD) 65.3 (9.8) for overall (both asthma and COPD)	Netherlands	unclear / Medisch Spectrum Twente Hospital at Enschede, and Gelre Hospital at Zutphen, the Netherlands	52/61 46%/56% for overall study population	113, while 82 for COPD	Not reported	UNCLEAR	Private for profit/ Glaxo Smith Kline, Zeist, the Netherlands.
van der Palen 2016	Direct choice	Forced choice: inhaler	Cross-over study	No description	67.3 (8.3)	Netherlands, UK	not reported	342/ 225 (60%/40%)	567	not reported	not reported	These studies were funded by GSK (GSK study numbers, 200301 and 200330; clinical trials.gov number, NCT02184624 and NCT02195284).

Study	Type	Measure	Design	Instrument	Age	Country	Setting	Sex	N	Sampling	Response	Funding
van der Valk 2002	Utility	VAS	Randomized controlled trial	EQ-5D	Mean (SD) Flluticasone propionate group: 64.1 (6.8); placebo: 64.0 (7.7)	USA	outpatient	84.0% 205/39, Fluticasone propionate: 104/19; placebo: 101/20	244	Not reported	47.9% 244 of 509	Governmental and Private for Profit/ Netherlands Asthma Foundation, Amicon Health Insurance Co., Boehringer Ingelheim, and GlaxoSmithKline BV.
Vestbo 2014	Utility	EQ-5D	Cross-sectional survey	EQ-5D	(mean) 1. GOLD category A (n=152): 62.0 2. GOLD category B (n=739): 63.5 3. GOLD category C (n=13): 60.2 4. GOLD category D (n=604): 67.3	Five European countries (France, Germany, Italy, Spain and UK) and United States	Primary (primary care physician and pulmonogist-referred). Outpatient clinics	NR	1508 patients 1. GOLD category A (n=152) 2. GOLD category B (n=739) 3. GOLD category C (n=13) 4. GOLD category D (n=604)	Consecutive	1508/3813 = 39.55%	Writing support was funded by Novartis.
Villar Balboa 2014	Utility	VAS	Cross-sectional survey	EQ-5D	71 (10.6)	Spain	unclear	82/16	98	random	96.1% (98 of 102)	not reported
Vogelmeier 2016	Direct choice	Forced choice: inhaler	randomized controlled trial	No description	Aclidinium/ formoterol 400/12 µg twice daily: 63.5 (8.1) Salmeterol/ fluticasone 50/500 µg twice daily: 63.3 (7.5)	Austria, Bulgaria, Canada, Czech Republic, France, Germany, Hungary, Italy, Lithuania, Netherlands, Poland, South Africa, Spain, United Kingdom	not reported	Aclidinium/ formoterol 400/12 µg twice daily: 65.7%/34.3 % Salmeterol /fluticasone 50/500 µg twice daily: 64.4%/35.6 %	933	not reported	82.90%	This study was supported by Almirall SA, Barcelona, Spain. Medical writing support was provided by David Finch, Jessica Oliver-Bell and Jennifer Higginson of Complete Medical Communications (Macclesfield, UK), funded by AstraZeneca
Walters 2003	Utility	SF-6D	Cohort study	SF-12/SF-36	NR	NR	NR	NR	60	Not reported	NR	Not reported
Wildman 2009	Utility, Direct choice	VAS, forced choice: treatment	Cohort study	EQ-5D	unclear 66.2 (9.9) from patient recruited in CMP	UK	hospitalized patients first and discharge later	316/332 48.8%/51.2 % overall (both asthma and COPD)	752 COPD (832 in total)	Consecutive	39.4% (648 of 1644) in CMP	Governmental/ MRC Health Services Research Fellowship

Study	Type	Measure	Study design	Instrument	Age	Country	Setting	Gender	N	Sampling	Response rate	Funding
Wilke 2012	Utility	EQ-5D, VAS	Cohort study	EQ-5D, SF-12/SF-36	(mean (SD)): 1. Total sample (n=105): 66.3 (9.2) 2. Study completed (n=86): 65.7 (9.3) 3. Dropout (n=19): 68.8 (8.2)	Netherlands	Outpatient clinic	(male - n (%)): 1. Total sample (n=105): 65 (61.9%) 2. Study completed (n=86): 54 (62.8%) 3. Dropout (n=19): 11 (57.9%)	105	Consecutive	Response rate NR. Follow-up complete for 86 (81.90%) patients in the total sample.	Proteion Thuis, Horn, The Netherlands; CIRO+, Horn, The Netherlands; Grants 3.4.10.015 (S. Wilke) and 3.4.06.082 (D.J.A. Janssen) of the Netherlands Asthma Foundation, Leusden, The Netherlands; Stichting Wetenschapsbevordering Verpleeghuiszorg (SWBV), Utrecht, The Netherlands.
Wilson 2005	Direct choice, Uncategorized survey	Forced choice: treatment, importance of mechanical ventilation	Trial, non-randomized or non-controlled	SF-12/SF-36, Decision aid	Mean 68.4, range: 37-68 years Mean (SD) Forego MV (n=23) 71.0 (8.6); uncertain/Accpet MV (n=10): 62.4 (15.4)	Canada	Outpatients who participated in a pulmonary rehabilitation program	15/8 (65%/35%) for those forego MV, and 3/7 (30%/70%) for those uncertain/accept MV	33	Consecutive	93 of 120 was contacted, 78%; 38 of the 93 agreed, 41%	Governmental/Research Development Fund of The Rehabilitation Centre and by an Ontario Thoracic Society Block Term grant.
Wilson 2007	Direct choice	Forced choice: device	Randomized controlled trial	no description	unclear (>50 years old)	UK	secondary care	Unclear	30	Not reported	unclear	Private for profit/ Glaxo Smith Kline, Zeist, the Netherlands.
Wu 2015	Utility	VAS, EQ-5D utility	Cross-sectional study	EQ-5D	Median, Mean (SD): 71.8, 70.4 (10.1)	China	community	494/184 (72.9%/21.1%)	678	not reported	94% (678 of 721)	This study was sponsored by Norvatis (China) Investment Co. Ltd and supported by Shanghai Leading Academic Discipline Project of Public Health (Project Number: 12GWZX0101)
Youngmi-2011	Utility	EQ-5D	Cross-sectional	EQ-5D	UNCLEAR for COPD	Korea	Unclear	UNCLEAR	217	stratified multistage clustered probability design	unclear	Unclear
Yun Kirby 2016	Direct choice	Forced choice: inhaler	Cross-over study	no description	mean: 64.7 (SD: 9.74), range: 39–89	US	not reported	53%/47% (153/134)	287	not reported	283/287 = 98,6%	This study was funded by GSK (study number RLV116669; ClinicalTrials.gov number NCT01868009).

Zanaboni 2017	Utility	VAS, EQ-5D utility	Cohort study	EQ-5D	mean: 55.2 (SD: 6.1), range: 48–69	Norway	the Norwegian Centre for Integrated Care and Telemedicine (NST), University Hospital of North Norway (UNN) and the rehabilitation centre LHL-klinikkene Skibotn	Males: 5, Females: 5	10	not reported	100% (a pilot study)	The study was funded by the Northern Norway Regional Health Authority (grant number HST1014-11).
Zanini 2014	Utility	VAS	cross-sectional survey	EQ-5D	71 (8)	Italy	in-patient, rehabilitation center	364/75 (82.9%/17.1%)	439	Consecutive	unclear/ retrospective analysis, not sure about the exclusion	No extramural funding was used to support this study

Supplementary Table 2. Summary of risk of bias

Study ID	Measurement tool selection	Participatants' understanding of the measurement tool	Description of health states	Sampling Strategy	Response rate (if follow up involved, please also record the completion rate of follow up)	Statistical analysis
Agh 2011	Low risk of bias	Moderate risk of bias	low risk of bias	Low risk of bias	Low risk of bias	NA/ Low risk of bias
Alcazar 2012	Low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Allen-Ramey 2012	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Antoniu 2014	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Arne 2009	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Low risk of bias	NA/ Low risk of bias
Berkius 2013	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Boland 2014	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Serious risk of bias	NA/ Low risk of bias
Boland 2015	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Boland 2016	Low risk of bias	Moderate risk of bias	Low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Borge 2014	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Boros 2012	low risk of bias	Moderate risk of bias	low risk of bias	Serious risk of bias	low risk of bias	NA/ Low risk of bias
Bourbeau 2007	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Braido 2016	Serious risk of bias	Moderate risk of bias	Moderate risk of	Low risk of bias	Low risk of bias	NA/ Low risk of bias
Bratas 2010	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Brophy 2008	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Bulcun 2014	Low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias
Burns 2016	Low risk of bias	Moderate risk of bias	Low risk of bias	Moderate risk of bias	Low risk of bias	NA/ Low risk of bias
Carlucci 2016	Serious risk of bias	Moderate risk of bias	Low risk of bias	Moderate risk of bias	Low risk of bias	NA/ Low risk of bias
Chakrabarti 2009	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Chapman 1993	Serious risk of bias	Moderate risk of bias	low risk of bias	Serious risk of bias	Moderate risk of bias	NA/ Low risk of bias
Chapman 2011	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Chen 2014	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Chen 2016	Low risk of bias	Moderate risk of bias	Low risk of bias	Moderate risk of bias	Low risk of bias	NA/ Low risk of bias
Chou 2017	Serious risk of bias	Moderate risk of bias	Moderate risk of	Serious risk of bias	Low risk of bias	NA/ Low risk of bias
Chrystyn 2014	low risk of bias	Moderate risk of bias	low risk of bias	Serious risk of bias	Serious risk of bias	NA/ Low risk of bias
Claessens 2000	Serious risk of bias	Moderate risk of bias	Moderate risk of	low risk of bias	low risk of bias	NA/ Low risk of bias
Cleland 2007	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Collado-Mateo 20	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Cross 2010	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Dacosta Dibonave	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Dal Negro 2016	Serious risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Dales 1999	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Decramer 2001	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
DiBonaventura 20	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Ding 2017	Low risk of bias	Moderate risk of bias	Low risk of bias	Serious risk of bias	Serious risk of bias	NA/ Low risk of bias
Doñate-Martínez	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Low risk of bias	NA/ Low risk of bias
Downey 2009	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Downey 2013	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Dowson 2004	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias

Study						
Eakin 1997	Serious risk of bias	low risk of bias	low risk of bias	Serious risk of bias	low risk of bias	NA/ Low risk of bias
Egan 2012	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Eskander 2011	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Farmer 2017	low risk of bias	Moderate risk of bias	low risk of bias	Serious risk of bias	low risk of bias	NA/ Low risk of bias
Ferreira 2014	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Fishwick 2014	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Fletcher 2011	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Fox 1999	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Fried 2002	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Fried 2007	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Gaber 2004	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Galaznik 2013	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Garcia-Gordillo 20	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
García-Polo 2012	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Gillespie 2013	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Goossens 2011	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Goossens 2014	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	Low risk of bias
Gruenberger 2011	Low risk of bias	Moderate risk of bias	Low risk of bias	Serious risk of bias	Serious risk of bias	NA/ Low risk of bias
Guyatt 1999	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Gvozdenovic 2007	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Hanada 2015	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Hansen 1990	Serious risk of bias	Moderate risk of bias	Moderate risk of	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Hansen 1994	low risk of bias	Moderate risk of bias	Moderate risk of	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Harper 1997	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Haughney 2005	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	low risk of bias
Hawken 2017	low risk of bias	Moderate risk of bias	low risk of bias	Serious risk of bias	Moderate risk of bias	low risk of bias
Hernández 2013	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Heyworth 2009	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Serious risk of bias	NA/ Low risk of bias
Hohmeier 2016	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Low risk of bias	NA/ Low risk of bias
Hong 2015	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Hoogendoorn 201	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Hoyle 2016	Low risk of bias	Moderate risk of bias	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias
Hwang 2011	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Hyland 2016	Serious risk of bias	Moderate risk of bias	Low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Jakobsen 2015	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Serious risk of bias	NA/ Low risk of bias
Janssen 2011a	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Janssen 2011c	Serious risk of bias	Moderate risk of bias	Moderate risk of	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Janssen 2014	low risk of bias	Moderate risk of bias	low risk of bias	Serious risk of bias	low risk of bias	NA/ Low risk of bias
Jarvis 2007	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Jassen 2011b	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Jia 2016	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Jordan 2014	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Katajisto 2012	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Katula 2004	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Kawata 2014	low risk of bias	Moderate risk of bias	low risk of bias	Serious risk of bias	low risk of bias	low risk of bias

Study						
Kessler 2006	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Khdour 2011	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Kim 2014	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Kim 2015	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Koehorst-ter Huu	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Kontodimopoulos	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Koskela 2014a	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Koskela 2014b	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Kotz 2009	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Kruis 2013	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Kuyucu 2011	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Kwon 2016	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Lacasse 2015	Low risk of bias	Moderate risk of bias	Low risk of bias	Moderate risk of bias	Low risk of bias	NA/ Low risk of bias
Lemmens 2008	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Lemmens 2010	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Lewis 2010	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Lin 2014	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Lynn 2000	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Mahler 2014	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Manca 2014	Low risk of bias	Moderate risk of bias	Low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Martínez 2012	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Martinez Rivera 2	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
McDowell 2015	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Low risk of bias	NA/ Low risk of bias
McNamara 2015	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Low risk of bias	NA/ Low risk of bias
Menn 2010	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Miller 1999	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Milne 2014	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Miravitlles 2007	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Miravitlles 2009	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Miravitlles 2011a	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Miravitlles 2011b	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Miravitlles 2014a	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Miravitlles 2014b	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Miravitlles 2015	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Mittmann 1999	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Mittmann 2001	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Mo 2004	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Molimard 2005	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	Moderate risk of bias
Moore 2004	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Mutterlei 1990	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Naberan 2012	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Nakken 2017	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Nilsson 2007	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Nishimura 2008	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Nolan 2016	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Low risk of bias	NA/ Low risk of bias

Study						
Norris 2005	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Nyman 2007	low risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
O'Reilly 2007	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Ohno 2014	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Ojoo 2002	Serious risk of bias	Moderate risk of bias	Moderate risk of	Serious risk of bias	low risk of bias	NA/ Low risk of bias
Oliver 1997	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Olszanecka-Glinia	Serious risk of bias	Moderate risk of bias	Moderate risk of	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Osman 2008	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Serious risk of bias	NA/ Low risk of bias
Pallin 2012	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Park 2015	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Pascual 2015	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Paterson 2000	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Patridge 2011	Serious risk of bias	Moderate risk of bias	Moderate risk of	low risk of bias	low risk of bias	NA/ Low risk of bias
Persson 2005	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Peters 2014a	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Serious risk of bias	NA/ Low risk of bias
Pickard 2011	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Pisa 2013	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	low risk of bias
Polati 2012	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Price 2013a	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Price 2013b	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Serious risk of bias	NA/ Low risk of bias
Puente-Maestu 2	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Puhan 2004	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Puhan 2007	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Punekar 2007	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Reinke 2011	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Reinke 2013	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Serious risk of bias	NA/ Low risk of bias
Rhee 2017	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Riley 2016	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Ringbaek 2008	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Rinnenburger 201	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Rocker 2008	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Rocker 2013	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Rodriguez Gonzal	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Rutten van Molke	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Rutten van Molke	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Sassi-Dambron 19	low risk of bias	Moderate risk of bias	low risk of bias	Serious risk of bias	Moderate risk of bias	NA/ Low risk of bias
Scharf 2011	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Schunemann 200	low risk of bias	low risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Schunemann 200	low risk of bias	Serious risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Seymour 2010	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Sharafkhaneh 201	Serious risk of bias	Moderate risk of bias	Moderate risk of	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Siler 2014	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Simon 2013	Serious risk of bias	Moderate risk of bias	Moderate risk of	Serious risk of bias	Moderate risk of bias	NA/ Low risk of bias
Small 2015	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Solem 2013	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias

Sorensen 2016	Low risk of bias	Moderate risk of bias	Low risk of bias	Moderate risk of bias	Low risk of bias	NA/ Low risk of bias
Spencer 2013	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Stahl 2005	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Stapleton 2005	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Starkie 2011	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Stavem 1999	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Stavem 2002a	low risk of bias	low risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Stavem 2002b	low risk of bias	low risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Stein 2009	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Steuten 2006	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Stoddart 2015	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Sundh 2015	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Sutherland 2009	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	low risk of bias	NA/ Low risk of bias
Svedsater 2013	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Szende 2009	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Tabak 2014	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Serious risk of bias	NA/ Low risk of bias
Taylor 2012	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Torrance 1999	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Serious risk of bias	NA/ Low risk of bias
Torres-Sánchez 2	Low risk of bias	Moderate risk of bias	Low risk of bias	Low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Travaline 1995	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Turner 2014	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
Utens 2012	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Utens 2013	Serious risk of bias	Moderate risk of bias	Moderate risk of	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Utens 2014	Serious risk of bias	Moderate risk of bias	Moderate risk of	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
van Boven 2016	Low risk of bias	Moderate risk of bias	Low risk of bias	Moderate risk of bias	Low risk of bias	NA/ Low risk of bias
van den Bemt 200	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	low risk of bias	NA/ Low risk of bias
van der Palen 201	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
van der Palen 201	Serious risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
van der Palen 201	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
van der Valk 2002	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Serious risk of bias	NA/ Low risk of bias
Vestbo 2014	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Villar Balboa 2014	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Low risk of bias	NA/ Low risk of bias
Vogelmeier 2016	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Low risk of bias	NA/ Low risk of bias
Walters 2003	low risk of bias	Moderate risk of bias	low risk of bias	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Wildman 2009	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Wilke 2012	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Wilson 2005	Serious risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Serious risk of bias	NA/ Low risk of bias
Wilson 2007	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Moderate risk of bias	NA/ Low risk of bias
Wu 2015	Low risk of bias	Moderate risk of bias	Low risk of bias	Moderate risk of bias	Low risk of bias	NA/ Low risk of bias
Yong-Mi 2011	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias
Yun Kirby 2016	Serious risk of bias	Moderate risk of bias	Moderate risk of	Moderate risk of bias	Low risk of bias	NA/ Low risk of bias
Zanaboni 2017	Low risk of bias	Moderate risk of bias	Low risk of bias	Moderate risk of bias	Low risk of bias	NA/ Low risk of bias
Zanini 2014	low risk of bias	Moderate risk of bias	low risk of bias	low risk of bias	Moderate risk of bias	NA/ Low risk of bias

Supplementary Table 3. Quantitative results

Study ID	Instrument	Study design	Sample size	Reported format	Result
Bratas 2010	forced choice: treatment	Cross-sectional survey	205	Choice or proportion of choice	A total of 161 patients chose inpatient rehabilitation and 44 chose outpatient clinics. The decision to choose rehabilitation may be determined by impaired health-related quality of life, psychological distress and lack of psychological support from a significant other.
Brophy 2008	forced choice: inhaler	Randomized controlled trial	25	Choice or proportion of choice	Preference for bronchodilator treatment nebulizer vs MDI and spacer : 15 patients vs 10 patients
Bulcun 2014	Conjoint analysis/Discrete choice	Cross-sectional survey	49	Influence or contribution or weight of certain	Extent to which the doctor gives sufficient time to listen to the patient RARELY: -1.5 SOMETIME: -0.5
Carlucci 2016	Forced choice: treatment	Cross-sectional study	55	Odds ratio and 95% CI	OR of choice of NIV as a 'ceiling' treatment for a current use of NIV: OR = 4.93, 95% CI = 1.17–23.54 OR of choice of NIV as a 'ceiling' treatment for a recent family bereavement: OR = 4.77, 95% CI = 1.12–22.95, p = 0.026
Chakrabarti 2009	forced choice: treatment	Cross-sectional survey	50	Choice or proportion of choice	Willingness to accept a IMV during an exacerbation after stage 4: 60% (30/50) willing, 30% (15/50) unwilling.
Chapman 1993	forced choice: inhaler	Cross-sectional survey	80	Choice or proportion of choice	preference for breath actuated device vs conventional MDI: 71.3% vs 18.8% vs 10% no preference MDI familiaar group: 72.5% vs 15% vs 12.5% no preference MDI unfamiliar group: 70% vs 22.5% vs 7.5% no difference
Chapman 2011	forced choice: inhaler	Randomized controlled trial	82	Choice or proportion of choice	overall preference for Breezehaler vs Handihaler vs no preference: 60.5% vs 30.9% vs 8.6% Remove/open cap: 58.0% vs 19.8% vs 22.2% Open mouthpiece: 64.2% vs 9.9% vs 25.9%
Chen 2016	EQ-5D utility, willingness to pay	Cross-sectional study	142	Mean (SD), Mean (SE)	COPD: 0.84 (0.21) mild COPD: 0.88 (0.20) moderate COPD: 0.89 (0.16) severe COPD: 0.79 (0.20)
Claessens 2000	Forced choice: treatment	Cohort study	1008	Choice or proportion of choice	Preference for treatment focusing on relieving pain and discomfort rather than extending life : 58% Preference for Do Not Resuscitate order : 37% "Very unwilling" or "Would rather die" than be attached to a ventilator "all the time" :
Dal Negro 2016	Forced choice: inhaler	Cross-sectional study	157 (47% of 333 patients had COPD, the rest had	Choice or proportion of choice	preference device C (the Respimat SMI): 47% COPD patients
Dales 1999	Probability trade off	Repeated surveys	20	Choice or proportion of choice	Baseline Choice ventilation Choice After Decision Aid-yes: 5 (71%), strengh of preference for MV (mean): 0.89 Choice After Decision Aid-no: 2 (29%), strengh of preference for MV (mean): 0.01 Baseline Choice no ventilation
Dowson 2004	ranking: treatment	Cross-sectional survey	39	Choice or proportion of choice	1. Phone GP or after hours practice 2.6% 2. Take (extra) prednisone 0%
Fox 1999	Forced choice: treatment	Cross-sectional survey	1016	Choice or proportion of choice	preference for paliative care: 33.6%
Fried 2002	Probability trade off	Cross-sectional survey	81	Choice or proportion of choice	treatment preferences (proportion of wanting the treatment under certain circumstance) SCENARIO 1 —LOW BURDEN, RESTORATION OF
Fried 2007	Probability trade off	Repeated surveys	64	Choice or proportion of choice	Willingness to Undergo High-Burden Therapy to Avoid Death: 32 (50%) Willingness to Risk Physical Disability to Avoid Death: 41 (64%) Willingness to Risk Cognitive Disability to Avoid Death: 44 (69%)

Gaber 2004	Forced choice: treatment	Repeated surveys	100	Choice or proportion of choice	Number of patients: Patient's views towards "yes" CPR, IV and NIV: 48 Patient's views towards "yes" IV and NIV: 19 Patient's views towards "yes" IV: 10
Goossens 2014	Willingness to pay, Conjoint analysis/Di	Cross-sectional survey	107	Choice or proportion of choice Mean	always usual hospital care: 29 (25%) always early assisted discharge: 5 (46%) Both: 33 (29%) Willingness to pay
Hanada 2015	Forced choice: treatment	Repeated surveys	First survey: 57 Second survey: 39	Choice or proportion of choice	First survey Preference of Respimat or HandiHaler Preferring Respimat: 45.6% (Respimat is much better 3.5%; Respimat is better: 42.1%); Second survey Preference of Respimat or HandiHaler
Hansen 1990	Forced choice: treatment	Randomized controlled trial	48	Choice or proportion of choice	Number of patients Patients preferred turbutaline: 23 Patients preferred placebo: 9 Patients indicated not difference between treatments: 16
Hansen 1994	VAS, Forced choice: inhaler	Trial, non-randomized or non-controlled	25	Median (Range) Choice or proportion of	VAS 2 weeks after treatment: 67 (1-100) for turbuhaler and 48 (7-99) for pari-inhalier boy Number of patients
Haughney 2005	Conjoint analysis/Di screte choice	Cross-sectional survey (A fractional	125	Mean	Impact on everyday life Little impact on activities, able to go for a short walk: 7.6; Able to wash and dress and move around the house: 4.4; Able to wash and dress, walking almost impossible : 3
Hohmeier 2016	patient perception survey	Cohort study	12	Choice or proportion of choice	I would participate in a research study even if it was inconvenient for me but it concluded with an improvement in my COPD management and improvement in my overall health and quality of life strongly agree: 4
Hwang 2011	Forced choice: treatment	Cross-sectional survey	300		
Janssen 2011b	Probability trade off	Cross-sectional survey		Choice or proportion of choice	COPD patients preferring CPR: 70.50% COPD patients preferring MV: 70.50% Low-burden likelihood of death 0%: 95.2%
Janssen 2011c	Forced choice: treatment	Cross-sectional survey	Dutch patients: 122 US patients:	Choice or proportion of choice	Patients' preferences in their current health state for MV: 70.5% of Dutch population and 58.2% of US patients reported they would accept Patients' preferences in their current health state for CPR: 69.7% of Dutch and 70.2% of US patients
Jarvis 2007	Forced choice: inhaler	Cross-sectional survey	53	Choice or proportion of choice	Patients pMDI device difficult to use: 46% Patients DPI use device difficult to use: 17% Patients using a pMDI alone felt able to indentify a "clinical benefit": 58% Patients using a DPI alone felt able to indentify a "clinical benefit": 33%
Jordan 2014	Forced choice: Preferences of	Cross-sectional survey	44	Choice or proportion of choice	Preference of information What are all possible side effects of treatment: absolutely want 80 (80.8%); would like 16 (16.2%); do not want 3 (3%) What effect can I expect from this treatment: absolutely want 85 (85.9%); would like 9
Kawata 2014	Willingness to pay, Conjoint analysis/Di	Cross-sectional survey	515	Mean (95% CI)	Utility score Little or no reliefe (complete relief as reference) : -1.23 (-1.33, -1.12) some reliefe (complete relief as reference) : -0.54 (-0.64, -0.43) Feel medicine start to work within 20 min (within 5 min as reference) : -0.19 (-0.24, -
Lynn 2000	Forced choice: treatment	Cohort study	416 died among 1016 enrolled	Choice or proportion of choice	preference for Do-Not-Resuscitate (DNR) 29% of patients who were long-term survivors 43% of those who survived to leave the hospital but lived less than a year 42% of those who died during the first hospitalization
Mahler 2014	Forced choice: treatment	Randomized controlled trial	20	Choice or proportion of choice	Preferences of treatment: Eight patients preferred salmeterol Diskus, seven patients preferred arformoterol solution, and five patients had no preference.
Martínez 2012	Forced choice: treatment	Cross-sectional survey	568	Choice or proportion of choice	Males prefers dry-powdered inhalers: 62.30% Females prefers dry-powdered inhalers: 54.60% Males prefers metered dose inhalers: 57.5 Females prefers metered dose inhalers: 54.20%

McDowell 2015	VAS, EQ-5D utility, forced choice:	Randomized controlled trial	110	Mean (SD), Mean (95% CI), choice or proportion of	Telemonitoring with usual care (EQ-5D scores at baseline) 0.49 (0.35) Usual care (EQ-5D scores at baseline) 0.52 (0.30) Telemonitoring with usual care (EQ-5D VAS scores at baseline) 50.1 (18.0) Usual care (EQ-5D VAS scores at baseline) 45.5 (23.1)
McNamara 2015	Forced choice: place of treatment	Randomized controlled trial	53	Choice or proportion of choice	28 of the 53 participants (53%) indicated the pool as their preferred environment, 23/53 (43%)the gym and 2/53 (4%) reported no preference for either environment. Of the 18 water-based exercise training participants, 16/18 (89%) indicated they would prefer to continue exercise training in the pool, whilst 2/18 (11%) indicated they would
Molimard 2005	Conjoint analysis/Discrete choice	Cross-sectional survey	245	Mean Choice or proportion of	I am extremely satisfied with my main inhaler: 5.5 The three main inhaler attributes that the patients considered to be most important were ease of use/convenience, efficacy, and inhaler size which were given primary importance by 66%, 29%, and 27% patients, respectively.
Moore 2004	Forced choice: inhaler	Cross-sectional survey	256	Choice or proportion of choice	Proportion of patients considering following attributes "very important" Overall ease of using: 86% Being quick to use when you need it: 84% Ease of holding or gripping: 79%
Mutterlein 1990	Forced choice: device	Cross-over study	60		
Norris 2005	Forced choice: treatment	Cross-sectional survey	111	Choice or proportion of choice	Current health (No ventilation): 39.60% Current health (No CPR): 38.40% Permanent coma (No ventilation): 93.60% Permanent coma (No CPR): 91.00%
Ohno 2014	Forced choice: treatment	Trial, non-randomized or non-controlled	28	Choice or proportion of choice	continuation of Onbrez Definitely want to continue: 2 (7.7%) Want to continue: 14 (53.8%) Equivocal: 10 (38.5%)
Ojoo 2002	Forced choice: treatment	Randomized controlled trial	61	Choice or proportion of choice	treatment preferences Sixteen of the 27 patients (59.3%) in the conventional arm and 26 of the 27 (96.3%) in the domiciliary arm would have preferred domiciliary management. Thirty four carers completed the questionnaires and the respective carer preference
Oliver 1997	Ranking: treatment	Cross-over study	20		
Pallin 2012	Willingness to pay, Forced choice:	Cross-sectional survey	146 patient approached/142 completed	Choice or proportion of choice	In making a decision to be screened, screening convenience is important Former smoker: 64% Current smoker: 71.4% total: 66.9%
Pascual 2015	Forced choice: inhaler	Cross-over study	127	Choice or proportion of choice, Mean (SE)	Proportion of patients preferring Genuair to Breezhaler (after 2 weeks): 72.7% vs. 27.3% Willingness to continue using each inhaler (Genuair vs. Breezlaher; on a scale of 0–100): 79.6 (2.60) vs. 63.6 (2.60)
Pisa 2013	Conjoint analysis/Discrete choice	Cross-sectional survey	300	Choice or proportion of choice	Relative importance of the COPD attributes (%): Total Dyspnea: 36% Performance capability (bodily resilience) due to COPD: 19%
Price 2013b	Forced choice: treatment	Cohort study	2138	Choice or proportion of choice	agreement of preference for once-daily therapy Strongly agree: 12% Agree: 32.6% Not sure: 24.9%
Reinke 2011	Forced choice: treatment	Cross-sectional survey	1292 invited but 376 meet the inclusion	Choice or proportion of choice	Preferences on CPR Total: 266 (77.8%) history of depression: 97 (75.2%) no history of depression: 169 (79.3%)
Riley 2016	Forced choice: inhaler	Randomized controlled trial	618	Choice or proportion of choice	In the attribute of "the number of steps" preference for Ellipta™ DPI: 59%, HandiHaler®: 17%, no preferences: 24% "time taken to use" preference for Ellipta™ DPI: 62%, HandiHaler®: 14%, no preference:
Rinnenburger 2012	Preferences of decision making mode	Repeated surveys	84 (what was the 84% of whole	Choice or proportion of choice	Therapeutic or care choices affecting you may have to be made during the treatment (decisions about hospital admission. medical tests. therapies). Would you like to be involved in the decision making process. alongside doctors. or would you rather delegate decisions to others?

Siler 2014	Patient's expectation of treatment	Randomized controlled trial	40	Least squares mean (SEM)	Patient's expectation of treatment adherence Indacterol group: 2.1 (0.21) ; placebo 2.3 (0.21)
Stapleton 2005	Forced choice: treatment	Cross-sectional survey	101	Choice or proportion of choice	want mechanical ventilation: 62.20% want CPR: 63.60%
Stavem 2002b	Time trade off, Standard gamble,	Cross-sectional survey		Median (95% CI, Range) Median (95% CI)	SG 0.95 (0.88-0.97) range: 0.05-1 TTO 0.91 (0.70-0.93) range: 0.05-1 EQ-VAS 0.54 (0.50-0.65) range: 0.05-0.95 15D 0.80 (0.77-0.83) range: 0.54-1
Sutherland 2009	Forced choice: device	Randomized controlled trial	99/ 109	Choice or proportion of choice	for all participants: 40.3% for IPR-ALB MDI and 50% for FFIS Nebulizer, 9.9% no difference; for severe patients: 28.3% for IPR-ALB MDI and 63.0% for FFIS Nebulizer,8.7% no difference
Svedsater 2013	Forced choice: inhaler	Cross-sectional survey	42	Choice or proportion of choice	No (%) of patients expressing preference for the ELLIPTA DPI For patients using DISKUS as comparator device: 18 (86%); For patients using MDI/HFA as comparator device: 17 (85%); For patients using HandiHaler as comparator device: 19 (95%).
Torrance 1999	HUI, willingness to pay	Randomized controlled trial	222 in 240	Mean (SD) Median	HUI first AECB Ciprofloxacn 0.72 (0.20), usual care: 0.68 (0.19) At regular visit no.1 Ciprofloxacn: 0.78 (0.21), usual care: 0.77 (0.19) At regular visit no.2 Ciprofloxacn: 0.80 (0.20), usual care: 0.78 (0.18)
Travaline 1995	Forced choice: treatment	Cross-sectional survey	37	Choice or proportion of choice	decision to use MV yes 15 (40%); no 8 (22%); unsure: 14 (38%)
Utens 2013	Forced choice: place of treatment	Randomized controlled trial	139	Choice or proportion of choice	Preference to be treated at home at T+4 days 25(42%) in the usual hospital treatment group and 56 (86%) in the early assisted group Preference to be treated at home at T+90 days 17 (35%) in the usual hospital treatment group and 33 (59%) in the home treatment
Utens 2014	Forced choice: place of treatment	Randomized controlled trial	124 (62 caregivers each in either	Choice or proportion of choice	Preference to be treated at home at the end of the 7-day treatment 15 (33.3%) of informal caregivers of patients allocated to usual hospital care and 37 (71.2%) of informal caregivers allocated to hospital-at-home Preference to be treated at home at the end of the follow up
van der Palen 2013a	Forced choice: inhaler , willingness	Randomized controlled trial	129	Mean (SD) Choice or proportion of choice	willingness to continue inhaler use (scale 0 = not willing to 100 = definitely willing) 84.0 (3.2) for Genuair and 62.5 (3.2) for HandiHaler more patients preferred Genuair than HandiHaler (79.1 vs 20.9%; p < 0.0001)
van der Palen 2013b	Forced choice: inhaler , willingness	Randomized controlled trial	113, while 82 for COPD	Choice or proportion of choice Mean (SD)	COPD inhaler preference 52 (72.2%) for Diskus, 20 (27.8%) for Elpenhaler willingness to continue inhaler use (scale 0 = not willing to 100 = definitely willing)
van der Palen 2016	Forced choice: inhaler	Cross-over study	567	Choice or proportion of choice	patients preferred the ELLIPTA inhaler overall compared with the comparator devices (Figure 2). The majority of patients also preferred the ELLIPTA inhaler for most individual criteria (number of steps for correct use, time taken to use, size of the device, dose counter, comfort of mouthpiece and ease of opening; P<0.001) with some exceptions
Vogelmeier 2016	Forced choice: inhaler	randomized controlled trial	933	Choice or proportion of choice	Overall, a significantly greater proportion of patients preferred Genuair (73.7%) than Accuhaler (26.3%) (p<0.0001), with similar proportions of patients preferring Genuair over Accuhaler for each of the device attributes assessed (all p<0.0001). The willingness of patients to continue using each device was greater for Genuair (78.6%) than
Wildman 2009	VAS, forced choice: treatment	Cohort study	752 COPD (832 in total)	Mean (SD) Median (IQR) Choice or proportion of	COPD Intubation not needed 53.9 (19.8) COPD Intubation not needed 50 (40, 66) COPD Intubation not needed 52.3 (32.5) COPD Intubation not needed 62 (36, 74)
Wilson 2005	Forced choice: treatment, importance	Trial, non-randomized or non-controlled	33	Choice or proportion of choice Median (IQR)	MV choices after the decision aid After reviewing the decision aid, 31 participants (94%) reported that they had reached a decision about whether they personally would accept or forego MV in the event of a serious exacerbation: only two individuals remained completely uncertain. Of those
Wilson 2007	Forced choice: device	Randomized controlled trial	30	Ranking	Preference for Accuhaler 2 people ranked it as the first, 13 as the second, 8 as the third, and 7 as the fourth Preference for Aerolizer 5 people ranked it as the first, 7 as the second, 13 as the third, and 5 as the fourth

| Yun Kirby 2016 | Forced choice: inhaler | Cross-over study | | 287 | Choice or proportion of choice | Inhaler attribute 1: size of the numbers on the dose counter (primary endpoint) 193 patients (68%) preferred ELLIPTA; 57 individuals (20%) preferred DISKUS; 35 participants (12%) expressed no preferences between the treatment options. Inhaler attribute 2: number of steps to take the COPD medication, 190 patients (67%) |