

**Table S3. Study quality**

Study, year	Concealed allocation	ITT analysis	Blinding	Incomplete Outcome Data Addressed	Free of Selective Outcome Reporting
Buhl 2015 [19]	Yes	Yes	Yes	Unclear	Yes
Celli 2014 [20]	Yes	Yes	Yes	Yes	Yes
Decramer 2014 a&b [21]	Yes	Yes	Yes	Yes	Yes
D'Urzo 2014 [22]	Yes	Yes	Yes	Yes	Yes
Maleki-Yazdi 2014 [23]	Yes	Yes	Yes	Yes	Yes
Singh 2014 [24]	Yes	Yes	Yes	Yes	Yes
ZuWallack 2014 [26]	Yes	Yes <sup>§</sup>	Yes	Yes	Yes
Donohue 2013 [29]	Yes	Yes	Yes	Yes	Yes
Donohue 2014 [31]	Yes	Yes	Yes	Unclear	Yes
DB2114417 2012 [32]	Yes	Yes	Yes	Unclear	Yes
DB2114418 2012 [33]	Yes	Yes	Yes	Unclear	Yes
Vincken 2014 [25]	Yes	Yes	Yes	Yes	Yes
Bateman 2013 [27]	Yes	Yes	Yes	Yes	Yes
Dahl 2013 [28]	Unclear	Yes	Yes	Unclear	Yes
Wedzicha 2013 [30]	Yes	Yes	Yes <sup>¶</sup>	Yes	Yes
Novartis A1301 2012 [35]	No	Yes	No	Yes	Unclear
Mahler 2012 a&b [34]	Yes	Yes	Yes	Yes	Yes
Tashkin 2009 [36]	Unclear	Yes	Yes	Unclear	Unclear
Vogelmeier 2008 [37]	Unclear	Yes	Yes <sup>¶</sup>	Unclear	Unclear
Aaron 2007 [38]	Yes	Yes	Yes	Unclear	Yes

¶ Except for tiotropium which was open-label §Treated set (TS) was used, which included all randomized patients who receive at least one dose of double-blind study treatment. Two patients out of 1134 and 1137 patients did not receive study treatment in each trial. ITT= intention-to-treat.