

Supplementary information tables 1: Moose checklist

Recommendation	Reported on (page no. of published paper)
Reporting of background should include	
Problem definition	1; Introduction
Hypothesis statement	1; Introduction
Description of study outcome(s)	2; Studies considered and search strategy
Type of exposure or intervention used	2; Studies considered and search strategy
Type of study designs used	2; Studies considered and search strategy
Study population	2; Studies considered and search strategy
Reporting of search strategy should include	
Qualifications of searchers (e.g., librarians and investigators)	2; Studies considered and search strategy
Search strategy, including time period included in the synthesis and keywords	2; Studies considered and search strategy
Effort to include all available studies, including contact with authors	2; Studies considered and search strategy
Databases and registries searched	2; Studies considered and search strategy
Search software used, name and version, including special features used (e.g., explosion)	NA
Use of hand searching (e.g., reference lists of obtained articles)	2; Studies considered and search strategy
List of citations located and those excluded, including justification	3; Figure 1
Method of addressing articles published in languages other than English	NA
Method of handling abstracts and unpublished studies	2; Studies considered and search strategy
Description of any contact with authors	2; Studies considered and search strategy
Reporting of methods should include	
Description of relevance or appropriateness of studies assembled for assessing the hypothesis to be tested	2; Studies considered and search strategy, study quality
Rationale for the selection and coding of data (e.g., sound clinical principles or convenience)	NA
Documentation of how data were classified and coded (e.g., multiple raters, blinding, and interrater reliability)	2; Study quality
Assessment of confounding (e.g., comparability of cases and controls in studies where appropriate)	2; Study quality

Assessment of study quality, including blinding of quality assessors; stratification or regression on possible predictors of study results	2; Study quality
Assessment of heterogeneity	2; Statistical analyses
Description of statistical methods (e.g., complete description of fixed or random effects models, justification of whether the chosen models account for predictors of study results, dose-response models, or cumulative meta-analysis) in sufficient detail to be replicated	2; Statistical analyses
Provision of appropriate tables and graphics	3-11; Results
Reporting of results should include	
Graphic summarizing individual study estimates and overall estimate	3-11; Results
Table giving descriptive information for each study included	4-5; Table 1
Results of sensitivity testing (e.g., subgroup analysis)	19; Sensitivity analyses, supplementary table 5
Indication of statistical uncertainty of findings	Yes, presented as CIs in all results and figures
Reporting of discussion should include	
Quantitative assessment of bias (e.g., publication bias)	10-11; Discussion: Statistical analysis & Methodological issues
Justification for exclusion (e.g., exclusion of non-English-language citations)	Not reported
Assessment of quality of included studies	11-12; Discussion: Methodological issues
Reporting of conclusions should include	
Consideration of alternative explanations for observed results	11-12; Methodological issues & Causality
Generalization of the conclusions (i.e., appropriate for the data presented and within the domain of the literature review)	13; Clinical implications
Guidelines for future research	13; Clinical implications
Disclosure of funding source	14; Funding

From: Stroup DF, Berlin JA, Morton SC, et al. (2000) Meta-analysis of observational studies in epidemiology: a proposal for reporting. Meta-analysis Of Observational Studies in Epidemiology (MOOSE) group. JAMA 283: 2008-2012.

Supplementary information tables 2 – 6

Supplementary information table 2: Risk of pneumonia with individual antipsychotic drugs compared to no exposure

Antipsychotic	No of studies	RR (95% Confidence Intervals)	Weight (%)	I ² (%)
Amisulpride	1	1.14 (0.79 to 1.65)	5.6	NA
Chlorpromazine	1	1.10 (0.68 to 1.78)	4.8	NA
Clozapine	2	3.12 (2.59 to 3.74)	11	0
Haloperidol	2	2.75 (1.48 to 5.12)	10.7	78
Olanzapine	3	2.16 (1.51 to 3.09)	13.5	45.1
Pipamperone	1	1.55 (0.99 to 2.42)	5.07	NA
Quetiapine	2	1.79 (1.40 to 2.29)	12.3	33.2
Risperidone	3	1.86 (1.17 to 2.96)	16.6	81.3
Sulpiride	1	1.29 (0.94 to 1.77)	6	NA
Zotepine	2	1.50 (1.20 to 1.90)	11.5	0
Zuclopenthixol	1	2.25 (1.00 to 5.07)	2.9	NA
Overall	3	1.88 (1.57 to 2.25)	100	81.2

Supplementary information table 3: Consensus Newcastle-Ottawa Scale (NOS) Case controlled studies

Case controlled studies	Case definition	Selection			Comparability		Exposure		
		Representativeness	Selection of controls	Definition of controls	Comparability (a)	Comparability (b)	Ascertainment	Method	Non-response rate
Kuo et al (2013)	0	1	1	0	1	1	0	1	1
Yang et al (2013)	0	1	1	0	1	1	0	1	1
Gau et al (2010)	1	1	1	1	1	1	0	1	1
Trifirò et al (2010)	1	1	1	1	1	1	0	1	1

Jackson et al (2015)	1	1	0	0	1	1	1	1	0
----------------------	---	---	---	---	---	---	---	---	---

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Outcome categories. A maximum of two stars can be given for Comparability.

Supplementary information table 5: Sensitivity analyses

A: Sensitivity analysis on variations of the primary analysis

Comparison	No of studies	RR	95% Confidence Interval	I² (%)
<i>DerSimonian & Laird CIs in studies of pneumonia</i>				
SGA vs no SGA	6	1.93	1.65 to 2.26	44.7
FGA vs no FGA	5	1.70	1.44 to 2.00	45.8
FGA vs SGA	7	1.07	0.90 to 1.28	50.2
Antipsychotic exposure vs no exposures	2	2.02	1.08 to 3.77	63.2
Individual antipsychotic	11*	1.88	1.57 to 2.25	81.2
<i>Excluding self-control case series</i>				
SGA vs no SGA excluding SCCS	5	2.11	1.54 to 2.88	46.5
<i>DerSimonian & Laird CIs in studies of mortality</i>				
Antipsychotic exposure vs no exposure	4 [§]	1.50	1.05 to 2.14	51.0

*Number of Individual antipsychotic from 3 studies; [§] Number of comparisons from 2 studies

B: Sensitivity analysis removing each study in turn in SGA vs no SGA analysis

Study omitted	Estimate	95% Confidence interval	
Kuo et al (2013)	2.10	1.69	2.63
Yang et al (2013)	1.92	1.60	2.31
Gau et al (2010)	1.92	1.63	2.28
Trifiro et al (2010)	1.88	1.61	2.20
Knol et al (2008)	1.79	1.61	1.98
Pratt et al (2011)	2.11	1.69	2.62
Combined	1.93	1.65	2.26

C: Sensitivity analysis removing each study in turn in FGA vs no FGA analysis

Study omitted	Estimate	95% Confidence interval	
Kuo et al (2013)	1.75	1.45	2.09
Yang et al (2013)	1.57	1.39	1.78
Trifiro et al (2010)	1.68	1.38	2.06
Knol et al (2008)	1.76	1.43	2.16
Pratt et al (2011)	1.72	1.36	2.19
Combined	1.69	1.44	2.00

D: Sensitivity analysis removing each study in turn in FGA vs SGA analysis

Study omitted	Estimate	95% Confidence interval	
Aparasu et al (2013)	1.04	0.85	1.28
Huybrechts et al (2012)	1.05	0.86	1.27
Wang et al (2007)	1.14	0.96	1.36
Trifiro et al (2010)	1.11	0.93	1.32
Huybrechts et al (2011)	1.08	0.88	1.32
Dharmarajan et al (2011)	1.08	0.86	1.37
Jackson et al (2015)	1.02	0.87	1.20
Combined	1.07	0.90	1.28

Supplementary information table 6: Database searches

Database: Embase <1974 to 2016 Week 18>

Search Strategy:

- 1 *pneumonia/ (43195)
- 2 *neuroleptic agent/ (28232)
- 3 1 and 2 (28)
- 4 exp pneumonia/ (229474)
- 5 2 and 4 (105)
- 6 from 5 keep 1,3-6,8,11-13,16,19-20,22,24-25,27-29,33,38,40-41,43,45,47,50,54,57-58,61,67,69 (32)

Database: Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) <1946 to April 2016>

Search Strategy:

- 1 *Antipsychotic Agents/ (33153)
- 2 exp Pneumonia/ (80258)
- 3 1 and 2 (43)
- 4 from 3 keep 1,4-7,9-14,17-23,26-28,31,41 (23)

Database: PubMed, Inception to April 2016

Search	Query	Items found
#1	("Antipsychotic Agents"[Mesh]) AND "Pneumonia, Aspiration"[Mesh]	13
#2	("Pneumonia, Bacterial"[Mesh]) AND "Antipsychotic Agents"[Mesh]	5
#3	(#1 or #2)	18
#4	Antipsychotic and pneumonia Filters: Observational Study	0
#5	Antipsychotic and pneumonia Schema: all filters: Observational Study	0
#6	Antipsychotic and pneumonia	199
#7	(#3 or #6)	199
#8	From #7 Select 19 document(s)	19