

Smoking and sickness absence: a systematic review and meta-analysis¹

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Table S1. Search strategies in electronic databases.

Search	Query	Items found
PubMed		
#4	#1 AND #2 AND #3	1291
#3	"Cost of Illness"[Mesh] OR cost[tiab] OR costs[tiab] OR econom*[tiab] OR socioeconom*[tiab] OR productivity[tiab] OR social burden[tiab] OR occupational burden[tiab] OR long-term effect*[tiab] OR long-term implicat*[tiab]	790132
#2	"Workplace"[Mesh] OR "Occupational Health"[Mesh] OR "Absenteeism"[Mesh] OR "Sick Leave"[Mesh] OR "Work Capacity Evaluation"[Mesh] OR "Rehabilitation, Vocational"[Mesh] OR "Return to Work"[Mesh] OR "Sickness Impact Profile"[Mesh] OR "Work Performance"[Mesh] OR "Work Engagement"[Mesh] OR absenteeism[tiab] OR presenteeism[tiab] OR labor market[tiab] OR labour market[tiab] OR "loss of productivity"[tiab] OR "productivity loss"[tiab] OR work day[tiab] OR working day[tiab] OR work time[tiab] OR working time[tiab] OR work hour*[tiab] OR working hour*[tiab] OR "work productivity"[tiab] OR "working productivity"[tiab] OR work function*[tiab] OR "work participation"[tiab] OR work perform*[tiab] OR working perform*[tiab] OR "performance at work"[tiab] OR (early retirement*[tiab] AND disease[tiab]) OR work engage*[tiab] OR work inabilit*[tiab] OR working inabilit*[tiab] OR work abilit*[tiab] OR working abilit*[tiab] OR work	176143

disabilit*[tiab] OR working disabilit*[tiab] OR work absence*[tiab] OR sickness
 absence*[tiab] OR sick absence*[tiab] OR sickness leave*[tiab] OR sick leave*[tiab]
 OR activity impairment[tiab] OR "occupational health"[tiab] OR employee*[tiab] OR
 work break*[tiab] OR lost work time[tiab] OR lost working time[tiab] OR missed
 work time[tiab] OR productivity impairment[tiab] OR work impairment[tiab] OR
 workplace*[tiab] OR work-place*[tiab] OR worksite*[tiab] OR work-site*[tiab] OR
 job perform*[tiab] OR task perform*[tiab] OR work day loss*[tiab] OR work time
 loss*[tiab] OR sick day*[tiab] OR illness day*[tiab] OR work capacit*[tiab] OR
 working capacit*[tiab] OR work incapacit*[tiab] OR working incapacit*[tiab] OR work
 incapabilit*[tiab] OR medical leave*[tiab] OR disability leave*[tiab] OR disability
 absence*[tiab] OR time lost[tiab]

#1	"Smokers"[Mesh] OR "Smoking"[Mesh] OR "Tobacco Use"[Mesh] OR "Tobacco Use Disorder"[Mesh] OR smoke[tiab] OR smoker*[tiab] OR smoking*[tiab] OR tobacco[tiab] OR cigarette*[tiab] OR sigarete*[tiab] OR nicotine[tiab]	335284
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Embase

#4	#1 AND #2 AND #3	2345
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#3	'cost of illness'/exp OR cost:ab,ti,kw OR costs:ab,ti,kw OR econom*:ab,ti,kw OR socioeconom*:ab,ti,kw OR productivity:ab,ti,kw OR 'social burden':ab,ti,kw OR 'occupational burden':ab,ti,kw OR 'long-term effect*':ab,ti,kw OR 'long-term implicat*':ab,ti,kw	987200
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#2	'workplace'/exp OR 'occupational health'/exp OR 'absenteeism'/exp OR 'medical leave'/exp OR 'return to work'/exp OR 'sickness impact profile'/exp OR 'job performance'/exp OR 'work engagement'/exp OR absenteeism:ab,ti,kw OR presenteeism:ab,ti,kw OR 'labor market':ab,ti,kw OR 'labour market':ab,ti,kw OR 'loss of productivity':ab,ti,kw OR 'productivity loss':ab,ti,kw OR 'work day':ab,ti,kw OR 'working day':ab,ti,kw OR 'work time':ab,ti,kw OR 'working time':ab,ti,kw OR 'work hour*':ab,ti,kw OR 'working hour*':ab,ti,kw OR 'work productivity':ab,ti,kw OR 'working productivity':ab,ti,kw OR 'work function*':ab,ti,kw OR 'work	352034
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participation':ab,ti,kw OR 'work perform*':ab,ti,kw OR 'working perform*':ab,ti,kw
OR 'performance at work':ab,ti,kw OR (('early retirement*' NEAR/3 disease):ab,ti,kw)
OR 'work engage*':ab,ti,kw OR 'work inabilit*':ab,ti,kw OR 'working
inabilit*':ab,ti,kw OR 'work abilit*':ab,ti,kw OR 'working abilit*':ab,ti,kw OR 'work
disabilit*':ab,ti,kw OR 'working disabilit*':ab,ti,kw OR 'work absence*':ab,ti,kw OR
'sickness absence*':ab,ti,kw OR 'sick absence*':ab,ti,kw OR 'sickness leave*':ab,ti,kw
OR 'sick leave*':ab,ti,kw OR 'activity impairment':ab,ti,kw OR 'occupational
health':ab,ti,kw OR employee*':ab,ti,kw OR 'work break*':ab,ti,kw OR 'lost work
time':ab,ti,kw OR 'lost working time':ab,ti,kw OR 'missed work time':ab,ti,kw OR
'productivity impairment':ab,ti,kw OR 'work impairment':ab,ti,kw OR
workplace*':ab,ti,kw OR 'work-place*':ab,ti,kw OR worksite*':ab,ti,kw OR 'work-
site*':ab,ti,kw OR 'job perform*':ab,ti,kw OR 'task perform*':ab,ti,kw OR 'work day
loss*':ab,ti,kw OR 'work time loss*':ab,ti,kw OR 'sick day*':ab,ti,kw OR 'illness
day*':ab,ti,kw OR 'work capacit*':ab,ti,kw OR 'working capacit*':ab,ti,kw OR 'work
incapacit*':ab,ti,kw OR 'working incapacit*':ab,ti,kw OR 'work incapabilit*':ab,ti,kw
OR 'medical leave*':ab,ti,kw OR 'disability leave*':ab,ti,kw OR 'disability
absence*':ab,ti,kw OR 'time lost':ab,ti,kw

#1	'tobacco use'/exp OR 'tobacco dependence'/exp OR smoke:ab,ti,kw OR smoker*':ab,ti,kw OR smoking*':ab,ti,kw OR tobacco:ab,ti,kw OR cigarette*':ab,ti,kw OR sigarette*':ab,ti,kw OR nicotine:ab,ti,kw	493021
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Cochrane

#4	#1 AND #2 AND #3	117
#3	cost:ab,ti,kw or costs:ab,ti,kw or econom*':ab,ti,kw or socioeconom*':ab,ti,kw or productivity:ab,ti,kw or "social burden":ab,ti,kw or "occupational burden":ab,ti,kw or "long-term effect*":ab,ti,kw or 'long-term implicat*':ab,ti,kw	77915
#2	absenteeism:ab,ti,kw or presenteeism:ab,ti,kw or "labor market":ab,ti,kw or "labour market":ab,ti,kw or "loss of productivity":ab,ti,kw or "productivity loss":ab,ti,kw or "work day":ab,ti,kw or "working day":ab,ti,kw or "work time":ab,ti,kw or "working	14455

time":ab,ti,kw or "work hour*":ab,ti,kw or "working hour*":ab,ti,kw or "work
productivity":ab,ti,kw or "working productivity":ab,ti,kw or "work
function*":ab,ti,kw or "work participation":ab,ti,kw or "work perform*":ab,ti,kw or
"working perform*":ab,ti,kw or "performance at work":ab,ti,kw or ("early
retirement*" near/3 disease):ab,ti,kw or "work engage*":ab,ti,kw or "work
inabilit*":ab,ti,kw or "working inabilit*":ab,ti,kw or "work abilit*":ab,ti,kw or
"working abilit*":ab,ti,kw or "work disabilit*":ab,ti,kw or "working
disabilit*":ab,ti,kw or "work absence*":ab,ti,kw or "sickness absence*":ab,ti,kw or
"sick absence*":ab,ti,kw or "sickness leave*":ab,ti,kw or "sick leave*":ab,ti,kw or
"activity impairment":ab,ti,kw or "occupational health":ab,ti,kw or
employee*:ab,ti,kw or "work break*":ab,ti,kw or "lost work time":ab,ti,kw or "lost
working time":ab,ti,kw or "missed work time":ab,ti,kw or "productivity
impairment":ab,ti,kw or "work impairment":ab,ti,kw or workplace*:ab,ti,kw or
"work-place*":ab,ti,kw or worksite*:ab,ti,kw or "work-site*":ab,ti,kw or "job
perform*":ab,ti,kw or "task perform*":ab,ti,kw or "work day loss*":ab,ti,kw or "work
time loss*":ab,ti,kw or "sick day*":ab,ti,kw or "illness day*":ab,ti,kw or "work
capacit*":ab,ti,kw or "working capacit*":ab,ti,kw or "work incapacit*":ab,ti,kw or
"working incapacit*":ab,ti,kw or "work incapabilit*":ab,ti,kw or "medical
leave*":ab,ti,kw or "disability leave*":ab,ti,kw or "disability absence*":ab,ti,kw or
"time lost":ab,ti,kw

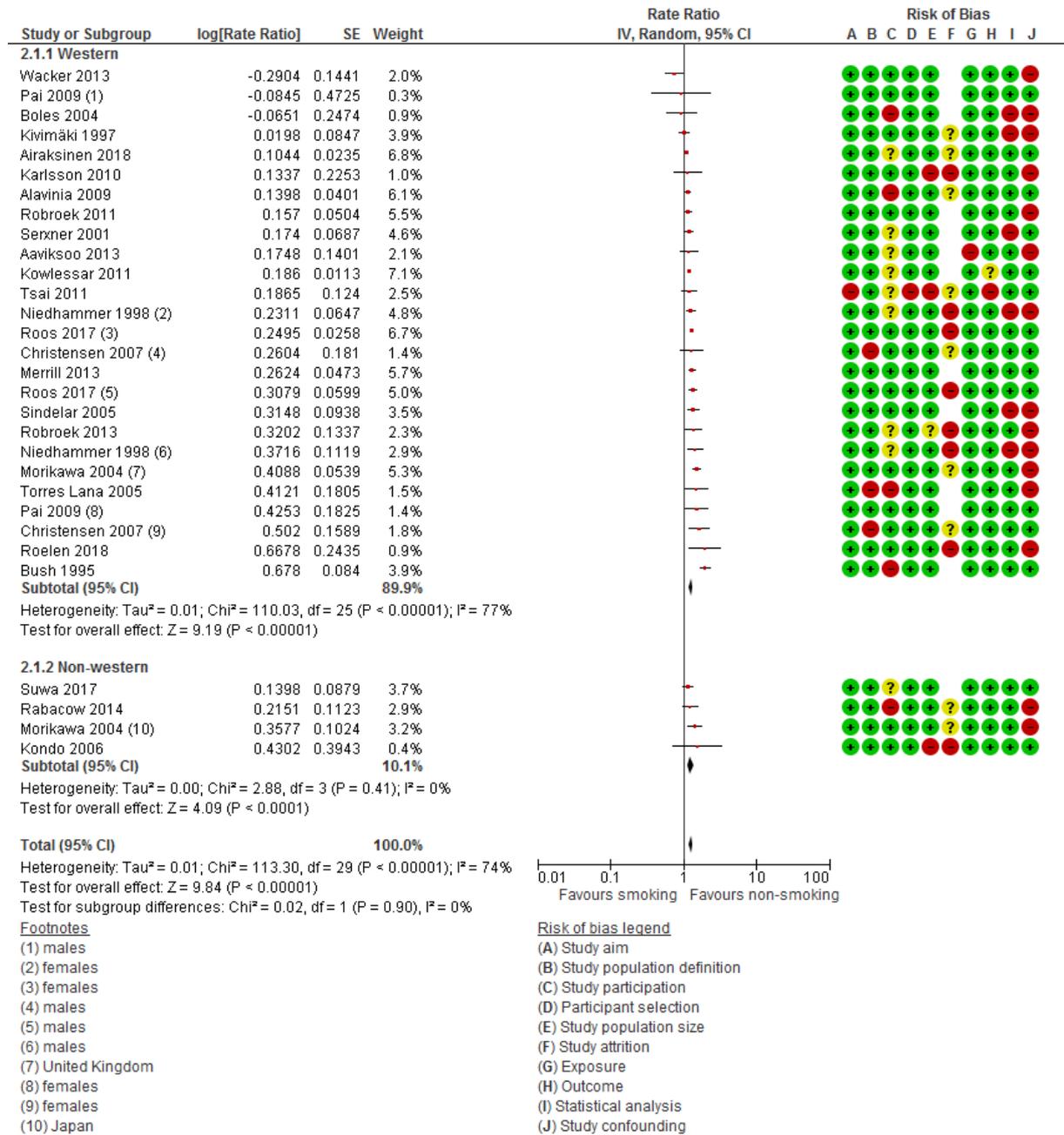
#1	smoke:ab,ti,kw or smoker*:ab,ti,kw or smoking*:ab,ti,kw or tobacco:ab,ti,kw or cigarette*:ab,ti,kw or sigarette*:ab,ti,kw or nicotine:ab,ti,kw	24915
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Table S2. Criteria list of assessment of methodological quality of studies. Criteria could be rated yes, no, or not applicable. *n* = sample size; CI = confidence interval; SE = standard error.

Criteria

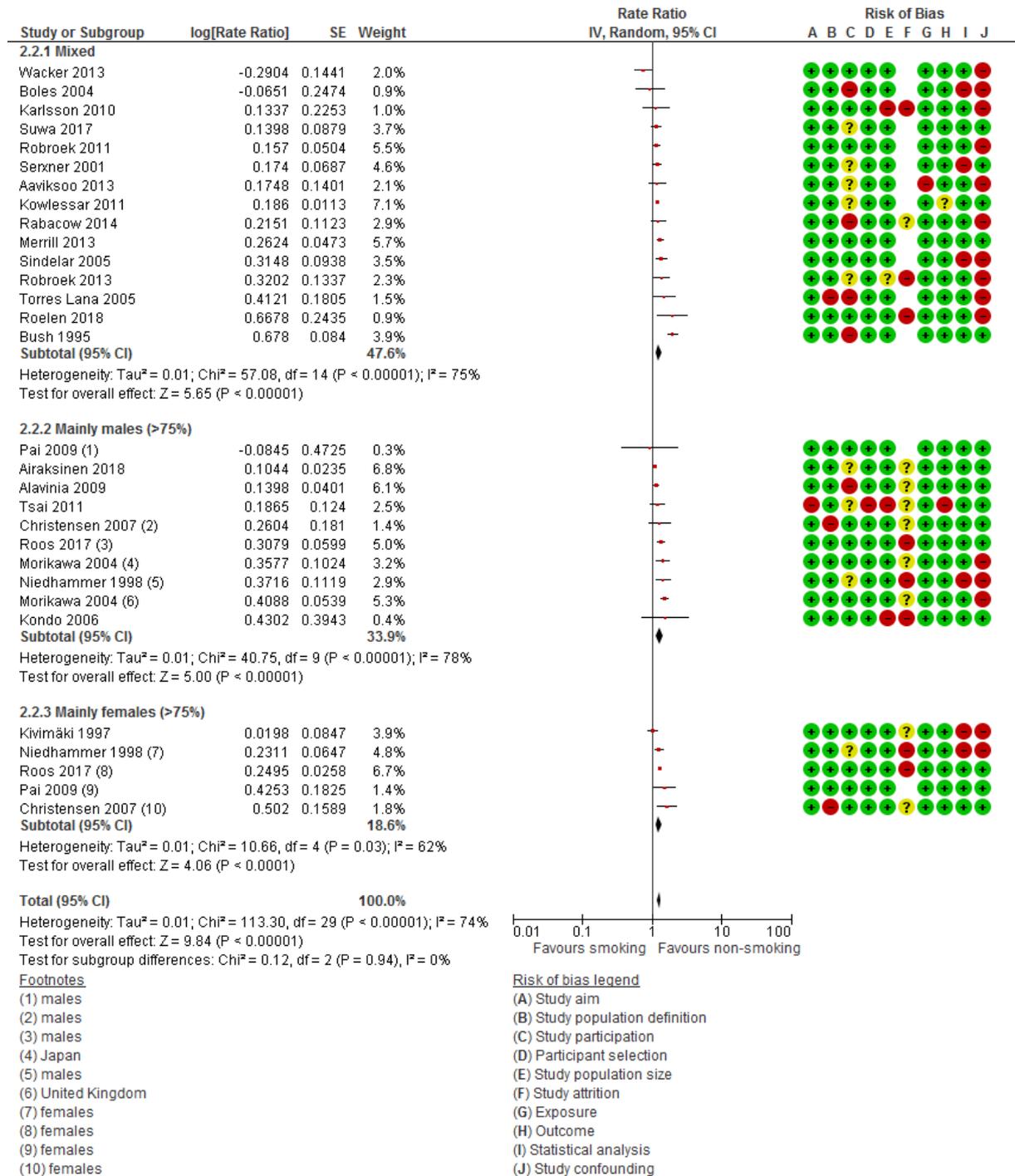
1. Was the research question or objective clearly stated?
 2. Was the study sample clearly specified and defined? (incl. clear in- and exclusion criteria)
 3. Was the participation rate of eligible persons at least 50%?
 4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)?
 5. Was the sample size suitable for answering the research question?
 6. For longitudinal studies: Was loss to follow-up after baseline 20% or less?
 7. Were the exposure measures clearly defined, valid, reliable, and implemented consistently across all study participants?
 8. Were the outcome measures clearly defined, valid, reliable, and implemented consistently across all study participants?
 9. Was the statistical model used appropriate and described with point estimates and measures of precision (i.e. CI or SE)?
 10. Were important confounding variables (i.e. age, gender, socioeconomic position (education, job, income)) measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?
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Figure S3. Study findings (i.e. effect sizes and risk of bias) stratified by study location (i.e. western and non-western countries), for articles reporting on the association of smoking and risk of sickness absence. Individual study as well as pooled effects are presented.



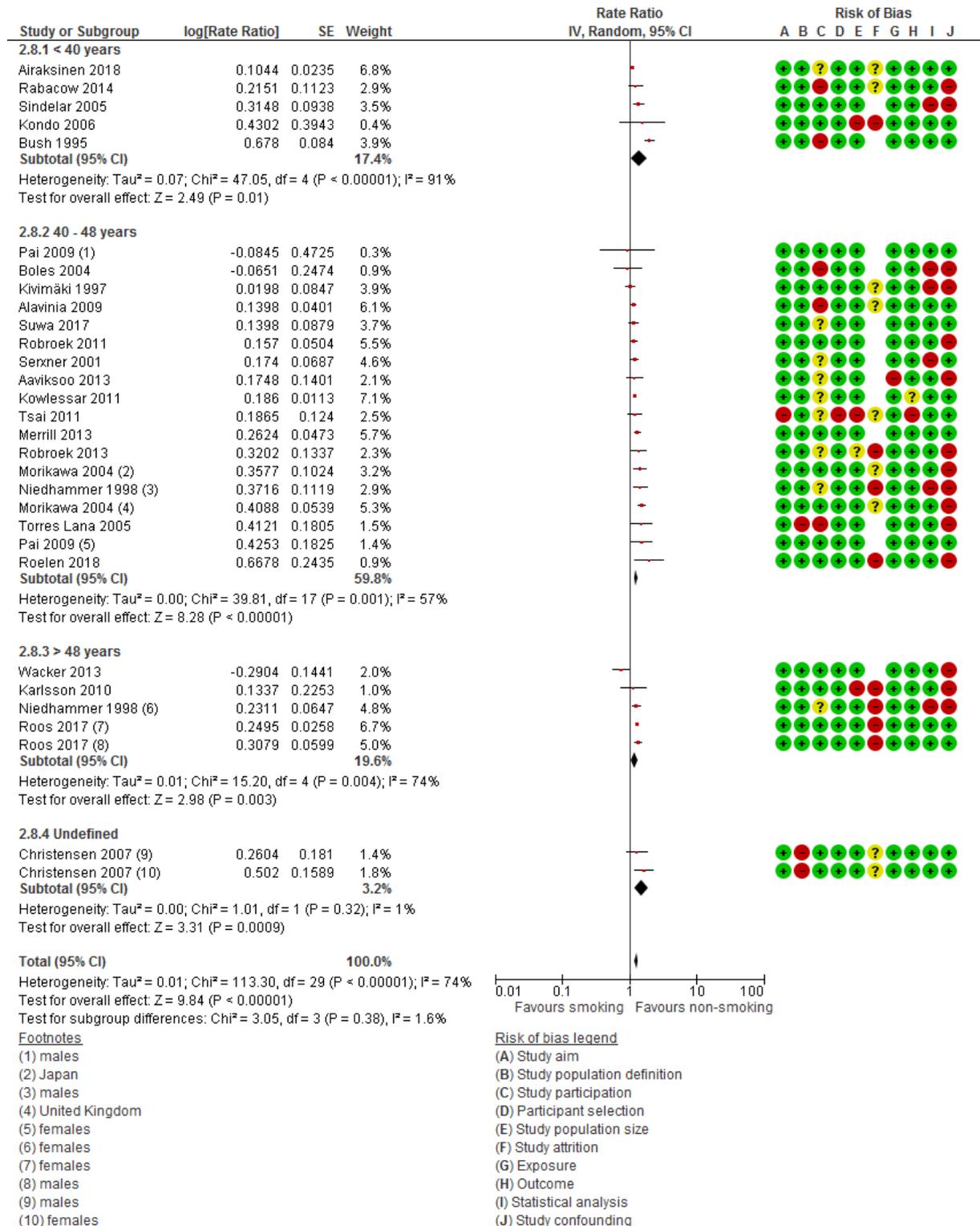
SE = standard error; CI = confidence interval; IV = Inverse variance.

Figure S4. Study findings (i.e. effect sizes and risk of bias) stratified by gender of the study sample (i.e. mixed, mainly males (>75%) and mainly females (>75%)), for articles reporting on the association of smoking and risk of sickness absence. Individual study as well as pooled effects are presented.



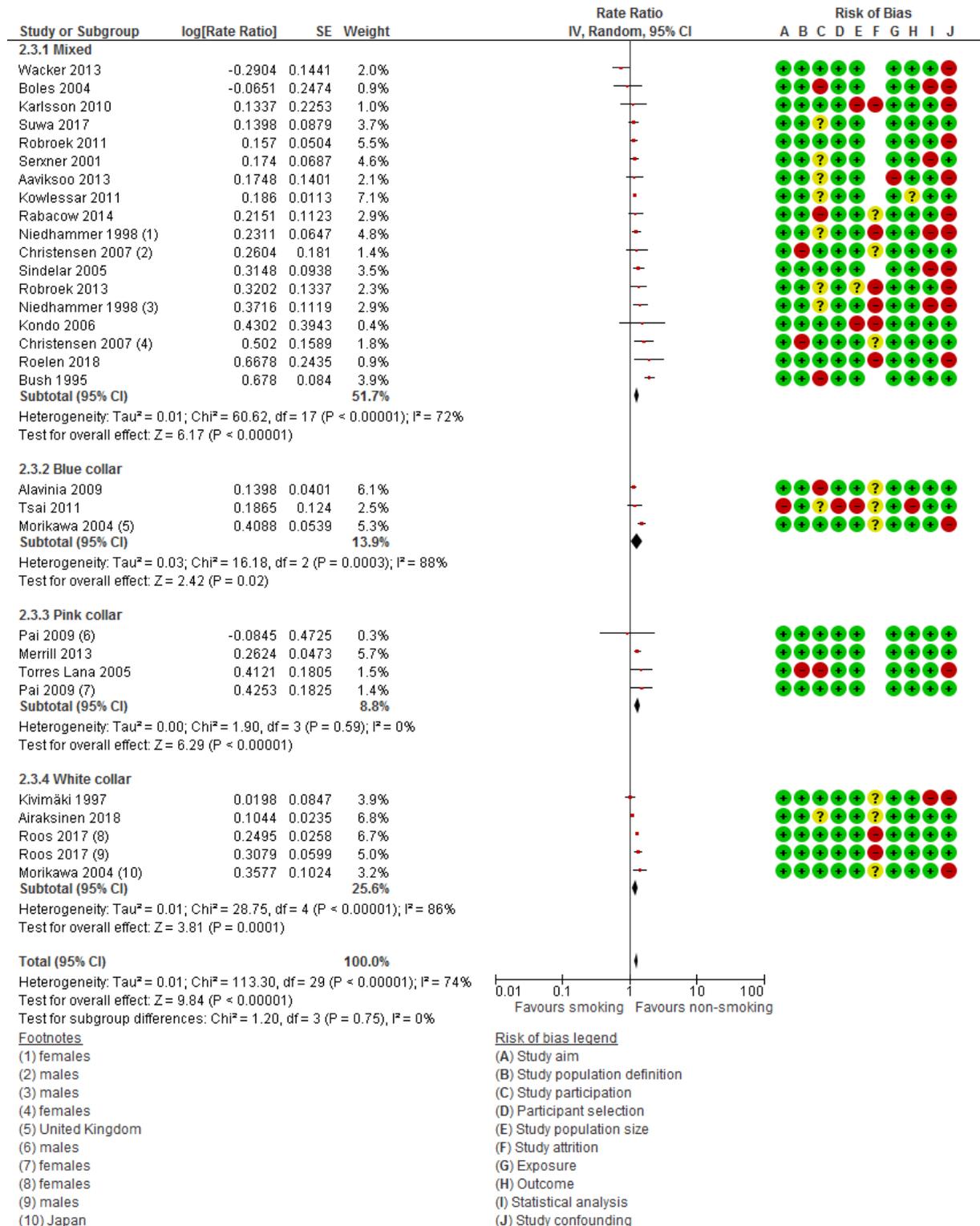
SE = standard error; CI = confidence interval; IV = Inverse variance.

Figure S5. Study findings (i.e. effect sizes and risk of bias) stratified by mean age of the study sample (i.e. <40 years, 40 to 48 years and >48 years), for articles reporting on the association of smoking and risk of sickness absence. Individual study as well as pooled effects are presented.



SE = standard error; CI = confidence interval; IV = Inverse variance.

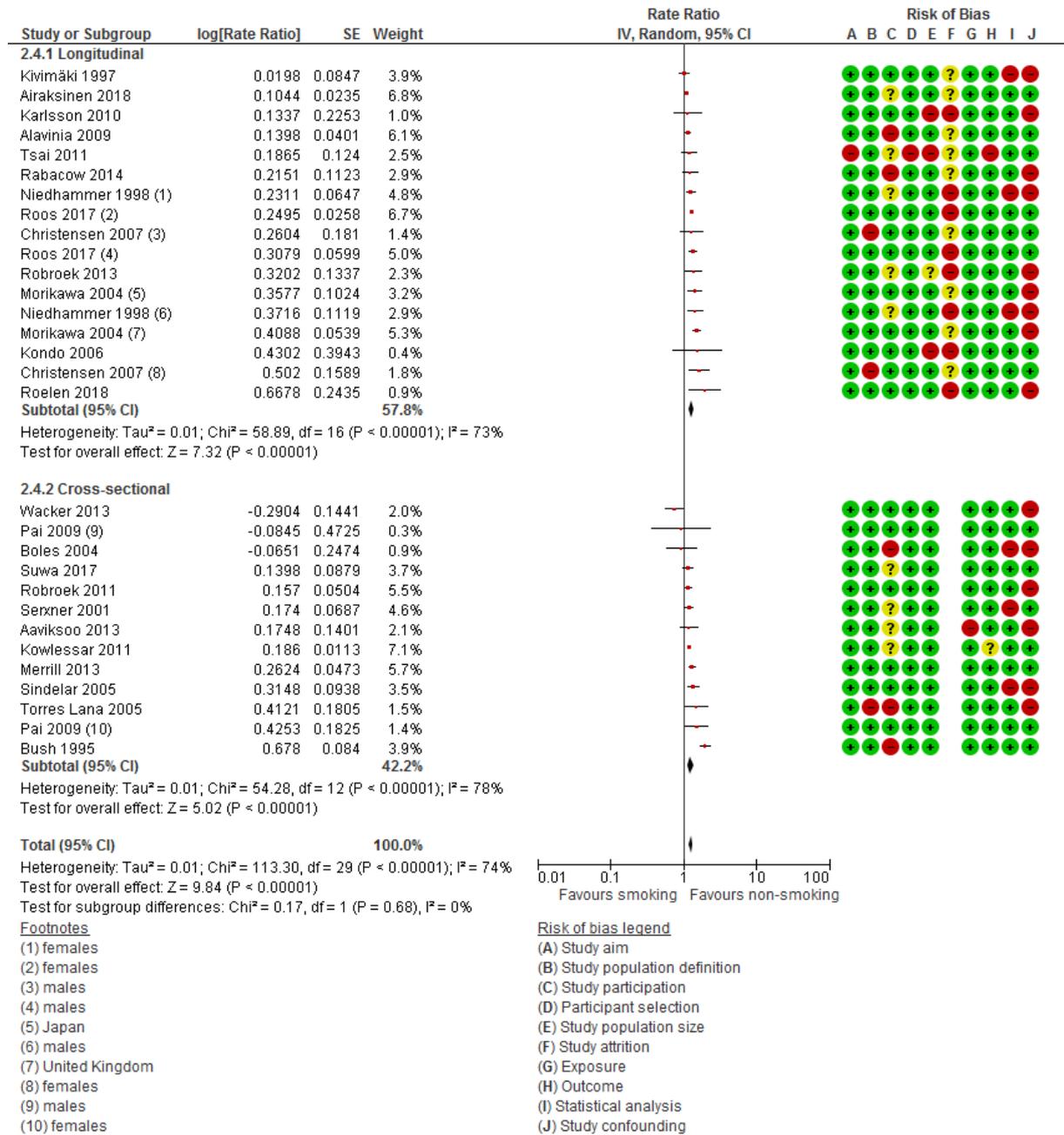
Figure S6. Study findings (i.e. effect sizes and risk of bias) stratified by occupational class (i.e. mixed, blue collar, pink collar and white collar), for articles reporting on the association of smoking and risk of sickness absence. Individual study as well as pooled effects are presented.



SE = standard error; CI = confidence interval; IV = Inverse variance.

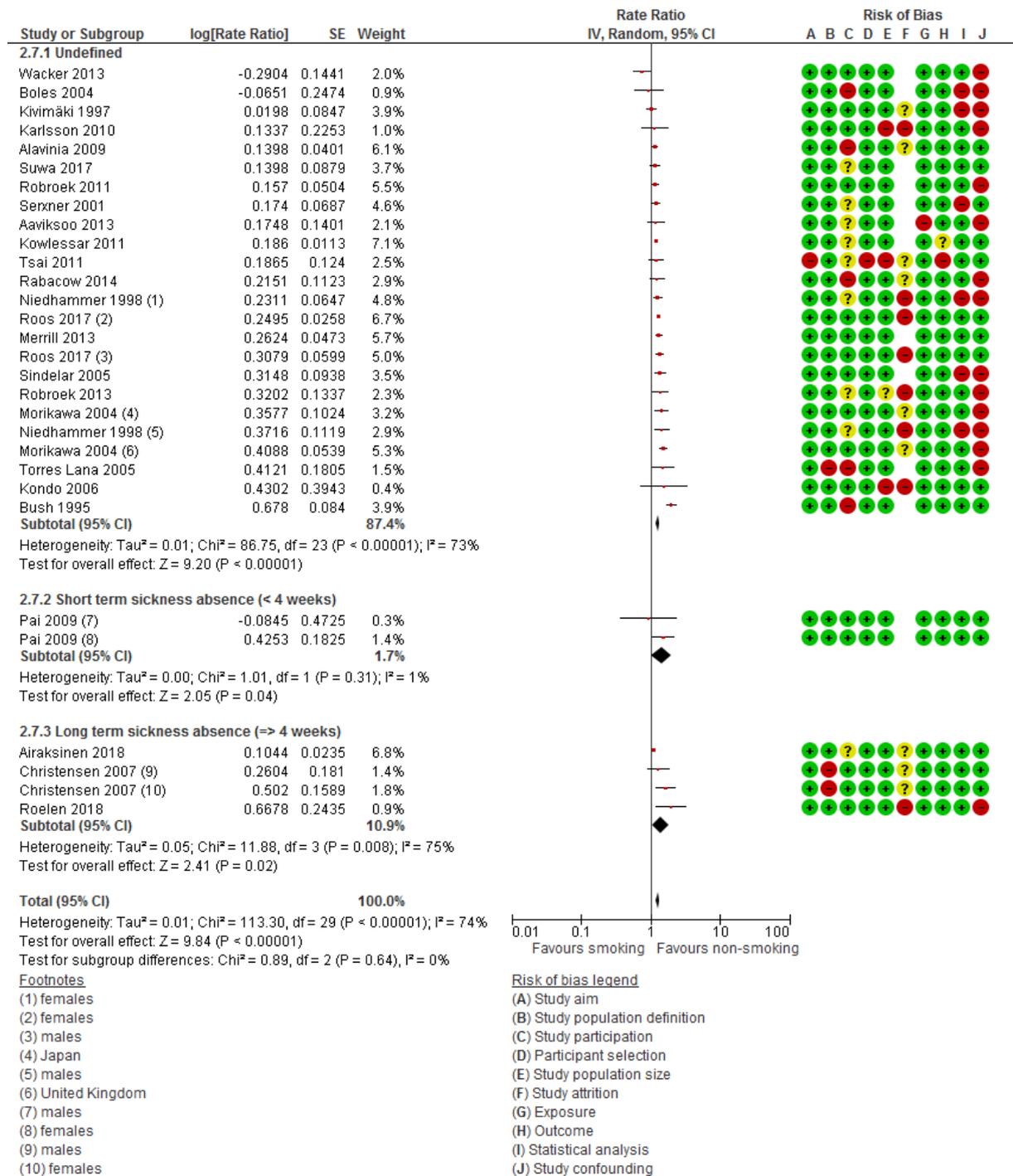
Figure S7. Study findings (i.e. effect sizes and risk of bias) stratified by study design (i.e. longitudinal and cross-sectional) for articles reporting on the association of smoking and risk of sickness absence.

Individual study as well as pooled effects are presented.



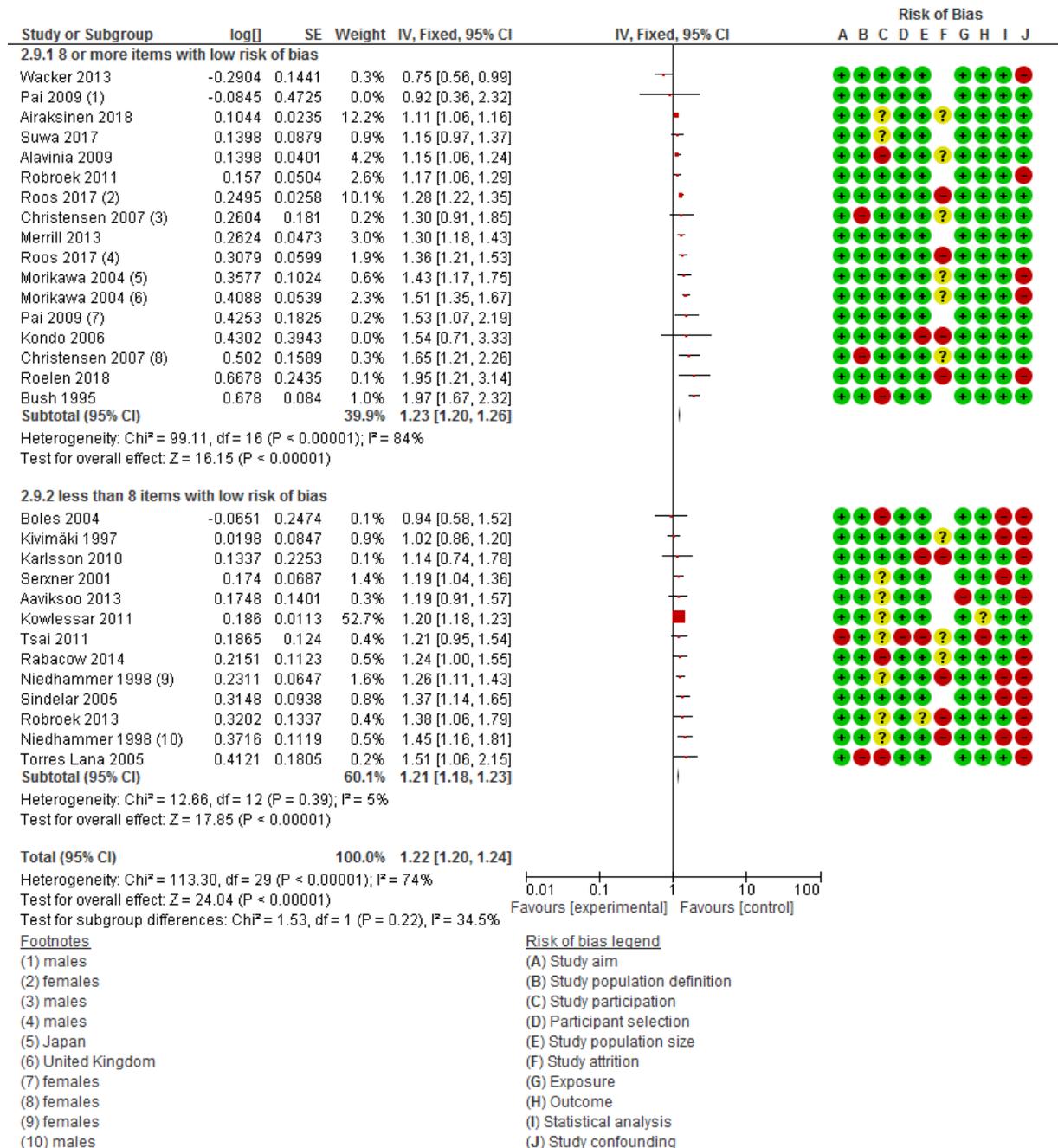
SE = standard error; CI = confidence interval; IV = Inverse variance.

Figure S9. Study findings (i.e. effect sizes and risk of bias) stratified by duration of sickness absence (i.e. undefined, short-term sickness absence (<4 weeks) and long-term sickness absence (≥4 weeks)), for articles reporting on the association of smoking and risk of sickness absence. Individual study as well as pooled effects are presented.



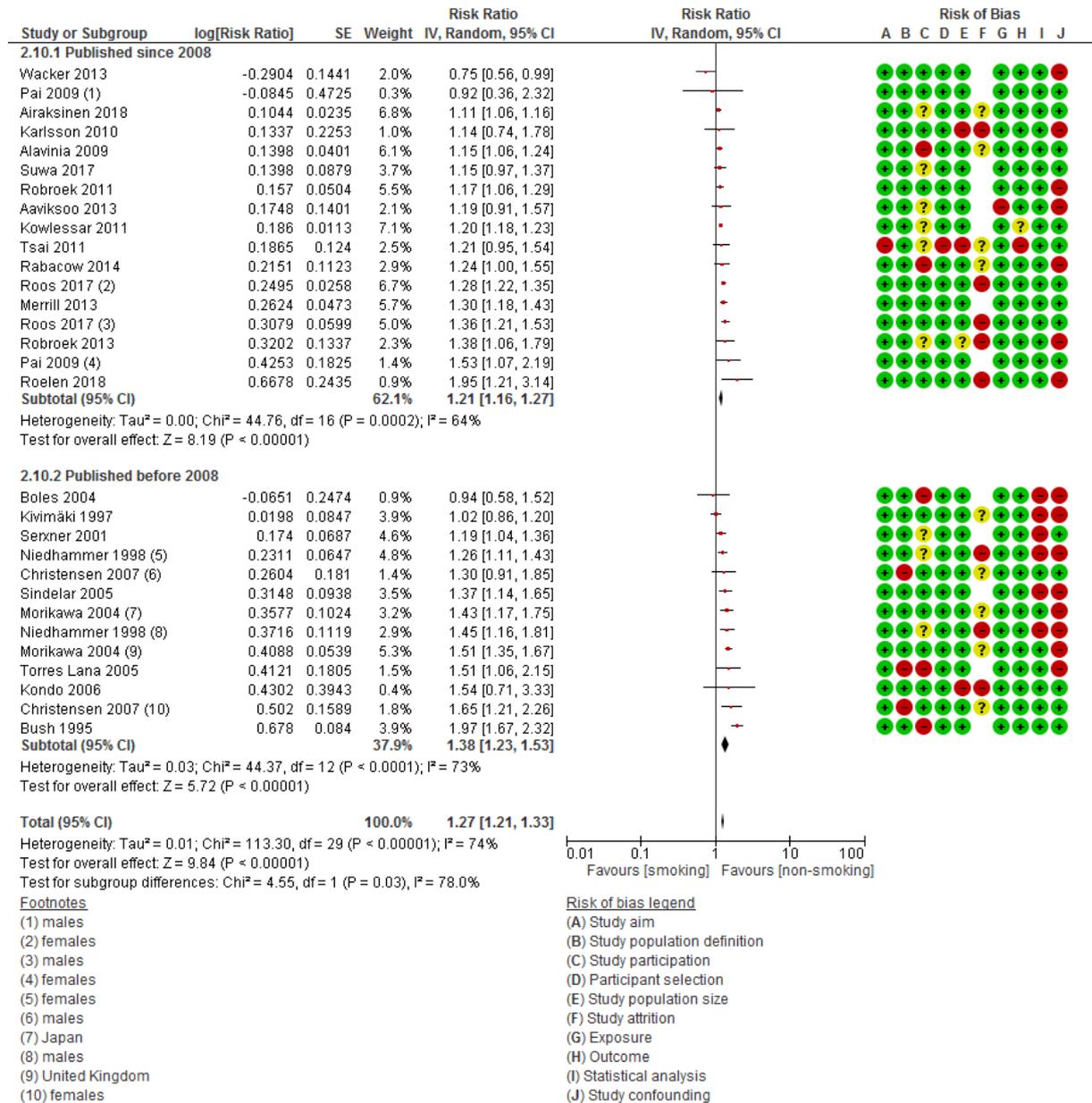
SE = standard error; CI = confidence interval; IV = Inverse variance.

Figure S11. Study findings (i.e. effect sizes and risk of bias) stratified by risk of bias (i.e. 8 or more items with low risk of bias or less than 8 items with low risk of bias), for articles reporting on the association of smoking and risk of sickness absence. Individual study as well as pooled effects are presented.



SE = standard error; CI = confidence interval; IV = Inverse variance.

Figure S12. Study findings (i.e. effect sizes and risk of bias) stratified by year of publication (i.e. published after 2008 or before 2008), for articles reporting on the association of smoking and risk of sickness absence. Individual study as well as pooled effects are presented.



SE = standard error; CI = confidence interval; IV = Inverse variance.