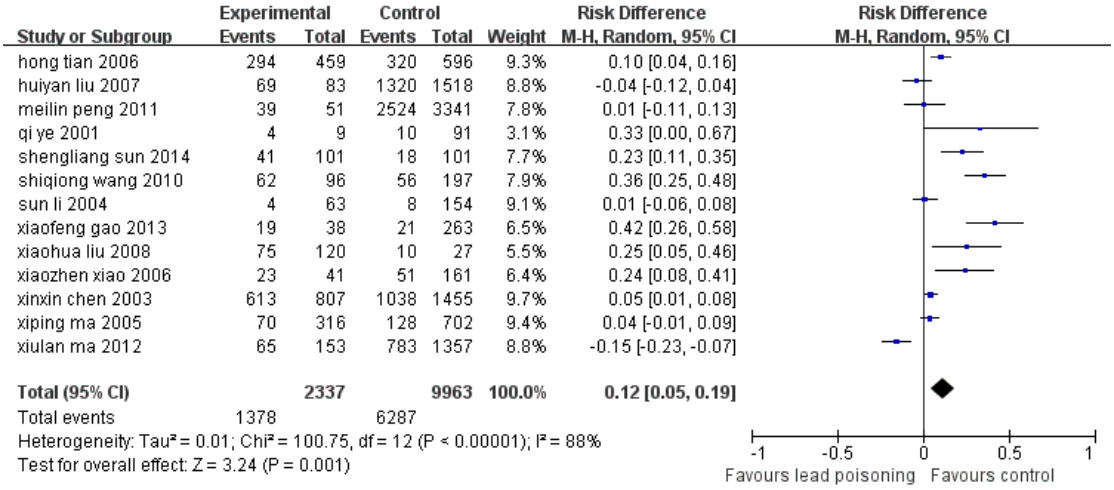
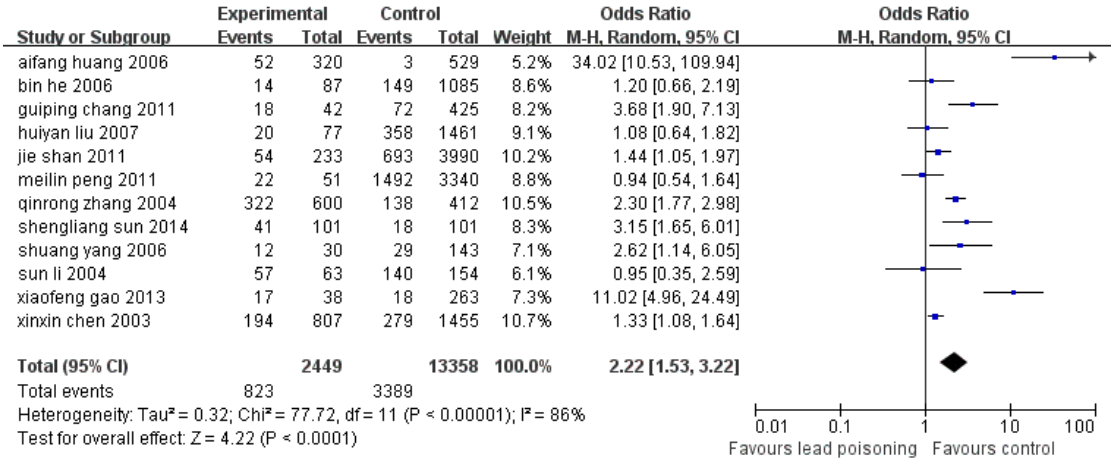
SupplementaryMaterials: The Risk Factors of Child Lead Poisoning in China: A Meta-Analysis

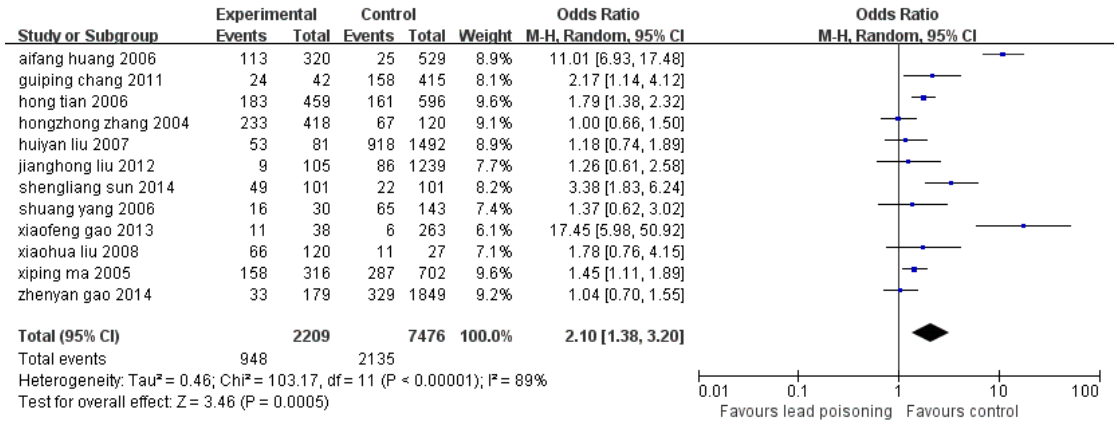
You Li, Jian Qin, Xiao Wei, Chunhong Li, Jian Wang, Meiyu Jiang, Xue Liang, Tianlong Xia and Zhiyong Zhang *



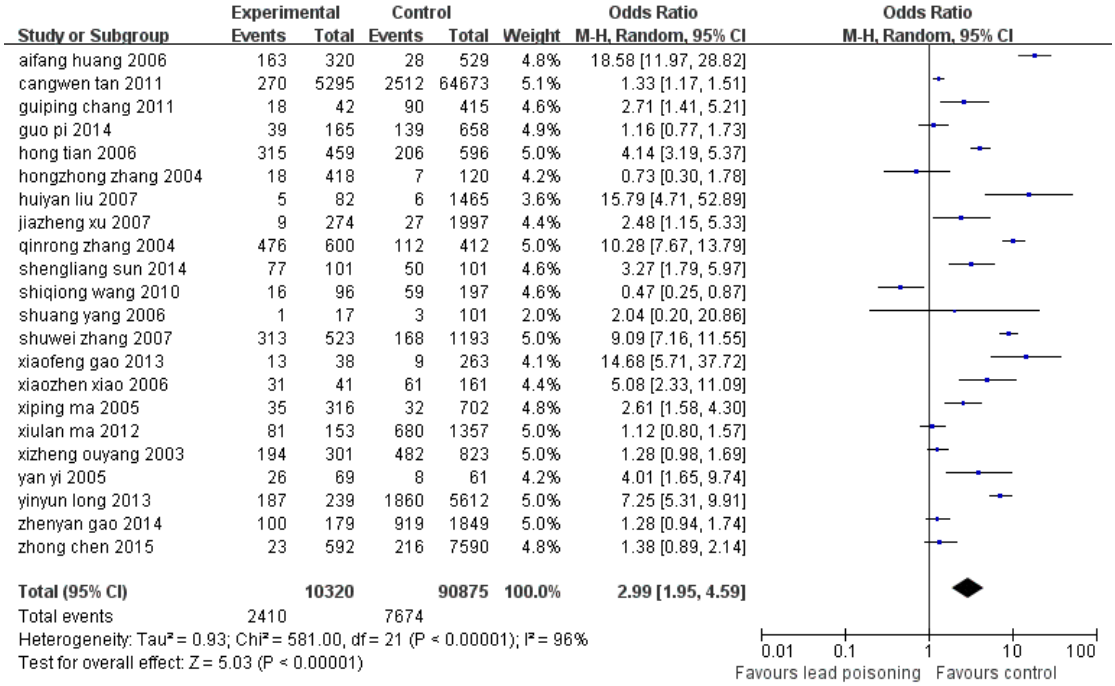
(**a**)



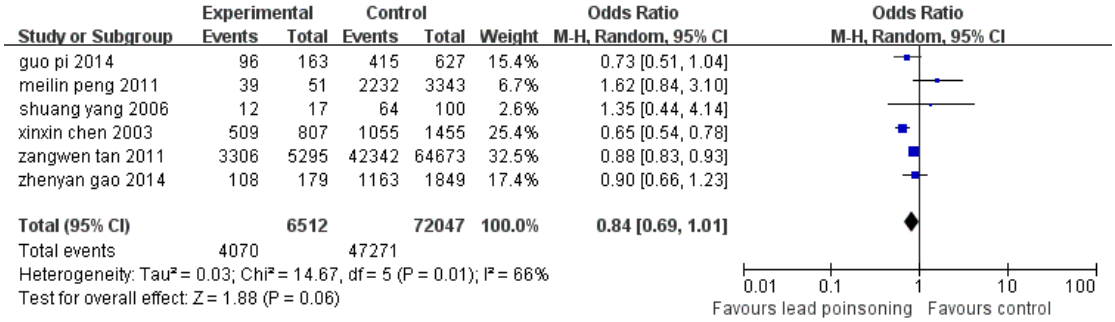
(**b**)



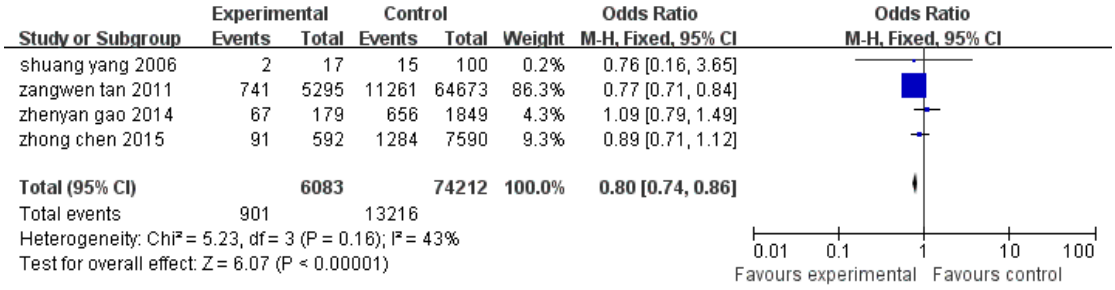
(**c**)


Experimental
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Random, 95% CI
M-H, Random, 95% CI
aifang huang 2006 163 320 28 529 4.8% 18.58 [11.97, 28.82]
cangwen tan 2011 270 5295 2512 64673 5.1% 1.33 [1.17, 1.51]
guiping chang 2011 18 42 90 415 4.6% 2.71 [1.41, 5.21]
guo pi 2014 39 165 139 658 4.9% 1.16 [0.77, 1.73]
hong tian 2006 315 459 206 596 5.0% 4.14 [3.19, 5.37]
hongzhong zhang 2004 18 418 7 120 4.2% 0.73 [0.30, 1.78]
huiyan liu 2007 5 82 6 1465 3.6% 15.79 [4.71, 52.89]
jiazheng xu 2007 9 274 27 1997 4.4% 2.48 [1.15, 5.33]
qinrong zhang 2004 476 600 112 412 5.0% 10.28 [7.67, 13.79]
shengliang sun 2014 77 101 50 101 4.6% 3.27 [1.79, 5.97]
shiqiong wang 2010 16 96 59 197 4.6% 0.47 [0.25, 0.87]
shuang yang 2006 1 17 3 101 2.0% 2.04 [0.20, 20.86]
shuwei zhang 2007 313 523 168 1193 5.0% 9.09 [7.16, 11.55]
xiaofeng gao 2013 13 38 9 263 4.1% 14.68 [5.71, 37.72]
xiaozhen xiao 2006 31 41 61 161 4.4% 5.08 [2.33, 11.09]
xiping ma 2005 35 316 32 702 4.8% 2.61 [1.58, 4.30]
xiulan ma 2012 81 153 680 1357 5.0% 1.12 [0.80, 1.57]
xizheng ouyang 2003 194 301 482 823 5.0% 1.28 [0.98, 1.69]
yan yi 2005 26 69 8 61 4.2% 4.01 [1.65, 9.74]
yinyun long 2013 187 239 1860 5612 5.0% 7.25 [5.31, 9.91]
zhenyan gao 2014 100 179 919 1849 5.0% 1.28 [0.94, 1.74]
zhong chen 2015 23 592 216 7590 4.8% 1.38 [0.89, 2.14]
Total (95% CI) 10320 90875 100.0% 2.99 [1.95, 4.59]
Total events 2410 7674
Heterogeneity: Tau² = 0.93; Chi² = 581.00, df = 21 (P < 0.00001); I² = 96%
Test for overall effect: Z = 5.03 (P < 0.00001)
0.01 0.1 1 10 100
Favours lead poisoning Favours control

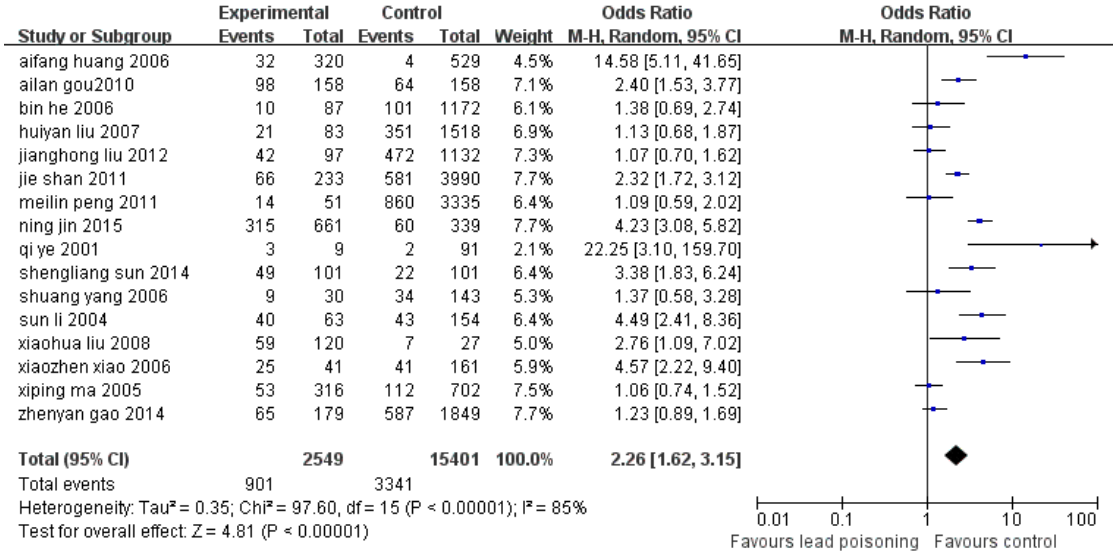
(**d**)


Experimental
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Random, 95% CI
M-H, Random, 95% CI
guo pi 2014 96 163 415 627 15.4% 0.73 [0.51, 1.04]
meilin peng 2011 39 51 2232 3343 6.7% 1.62 [0.84, 3.10]
shuang yang 2006 12 17 64 100 2.6% 1.35 [0.44, 4.14]
xinxin chen 2003 509 807 1055 1455 25.4% 0.65 [0.54, 0.78]
zangwen tan 2011 3306 5295 42342 64673 32.5% 0.88 [0.83, 0.93]
zhenyan gao 2014 108 179 1163 1849 17.4% 0.90 [0.66, 1.23]
Total (95% CI) 6512 72047 100.0% 0.84 [0.69, 1.01]
Total events 4070 47271
Heterogeneity: Tau² = 0.03; Chi² = 14.67, df = 5 (P = 0.01); I² = 66%
Test for overall effect: Z = 1.88 (P = 0.06)
0.01 0.1 1 10 100
Favours lead poinsoning Favours control

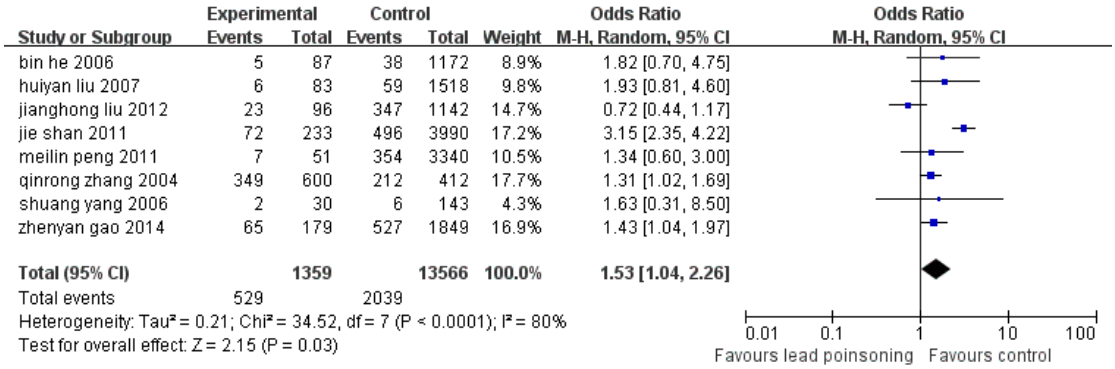
(**e**)


Experimental
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Fixed, 95% CI
M-H, Fixed, 95% CI
shuang yang 2006 2 17 15 100 0.2% 0.76 [0.16, 3.65]
zangwen tan 2011 741 5295 11261 64673 86.3% 0.77 [0.71, 0.84]
zhenyan gao 2014 67 179 656 1849 4.3% 1.09 [0.79, 1.49]
zhong chen 2015 91 592 1284 7590 9.3% 0.89 [0.71, 1.12]
Total (95% CI) 6083 74212 100.0% 0.80 [0.74, 0.86]
Total events 901 13216
Heterogeneity: Chi² = 5.23, df = 3 (P = 0.16); I² = 43%
Test for overall effect: Z = 6.07 (P < 0.00001)
0.01 0.1 1 10 100
Favours experimental Favours control

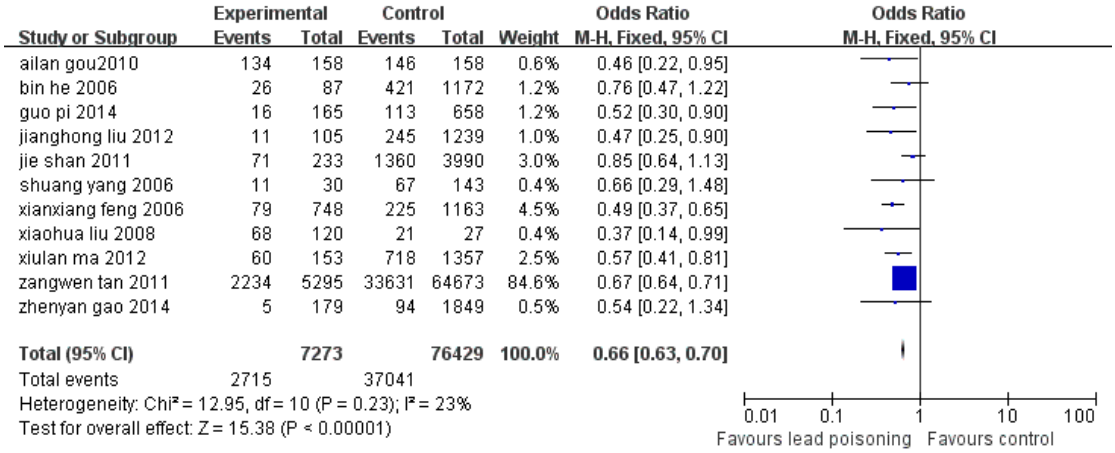
(**f**)


Experimental
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Random, 95% CI
M-H, Random, 95% CI
aifang huang 2006 32 320 4 529 4.5% 14.58 [5.11, 41.65]
ailan gou2010 98 158 64 158 7.1% 2.40 [1.53, 3.77]
bin he 2006 10 87 101 1172 6.1% 1.38 [0.69, 2.74]
huiyan liu 2007 21 83 351 1518 6.9% 1.13 [0.68, 1.87]
jianghong liu 2012 42 97 472 1132 7.3% 1.07 [0.70, 1.62]
jie shan 2011 66 233 581 3990 7.7% 2.32 [1.72, 3.12]
meilin peng 2011 14 51 860 3335 6.4% 1.09 [0.59, 2.02]
ning jin 2015 315 661 60 339 7.7% 4.23 [3.08, 5.82]
qi ye 2001 3 9 2 91 2.1% 22.25 [3.10, 159.70]
shengliang sun 2014 49 101 22 101 6.4% 3.38 [1.83, 6.24]
shuang yang 2006 9 30 34 143 5.3% 1.37 [0.58, 3.28]
sun li 2004 40 63 43 154 6.4% 4.49 [2.41, 8.36]
xiaohua liu 2008 59 120 7 27 5.0% 2.76 [1.09, 7.02]
xiaozhen xiao 2006 25 41 41 161 5.9% 4.57 [2.22, 9.40]
xiping ma 2005 53 316 112 702 7.5% 1.06 [0.74, 1.52]
zhenyan gao 2014 65 179 587 1849 7.7% 1.23 [0.89, 1.69]
Total (95% CI) 2549 15401 100.0% 2.26 [1.62, 3.15]
Total events 901 3341
Heterogeneity: Tau² = 0.35; Chi² = 97.60, df = 15 (P < 0.00001); I² = 85%
Test for overall effect: Z = 4.81 (P < 0.00001)
0.01 0.1 1 10 100
Favours lead poisoning Favours control

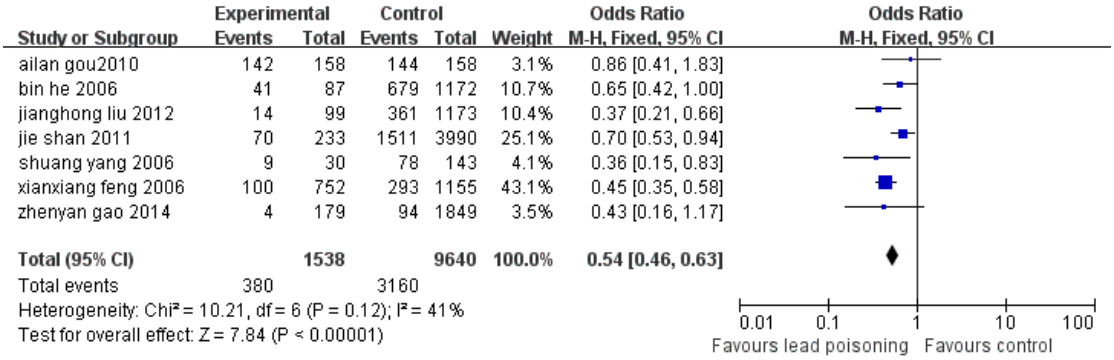
(**g**)


Experimental
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Random, 95% CI
M-H, Random, 95% CI
bin he 2006 5 87 38 1172 8.9% 1.82 [0.70, 4.75]
huiyan liu 2007 6 83 59 1518 9.8% 1.93 [0.81, 4.60]
jianghong liu 2012 23 96 347 1142 14.7% 0.72 [0.44, 1.17]
jie shan 2011 72 233 496 3990 17.2% 3.15 [2.35, 4.22]
meilin peng 2011 7 51 354 3340 10.5% 1.34 [0.60, 3.00]
qinrong zhang 2004 349 600 212 412 17.7% 1.31 [1.02, 1.69]
shuang yang 2006 2 30 6 143 4.3% 1.63 [0.31, 8.50]
zhenyan gao 2014 65 179 527 1849 16.9% 1.43 [1.04, 1.97]
Total (95% CI) 1359 13566 100.0% 1.53 [1.04, 2.26]
Total events 529 2039
Heterogeneity: Tau² = 0.21; Chi² = 34.52, df = 7 (P < 0.0001); I² = 80%
Test for overall effect: Z = 2.15 (P = 0.03)
0.01 0.1 1 10 100
Favours lead poinsoning Favours control

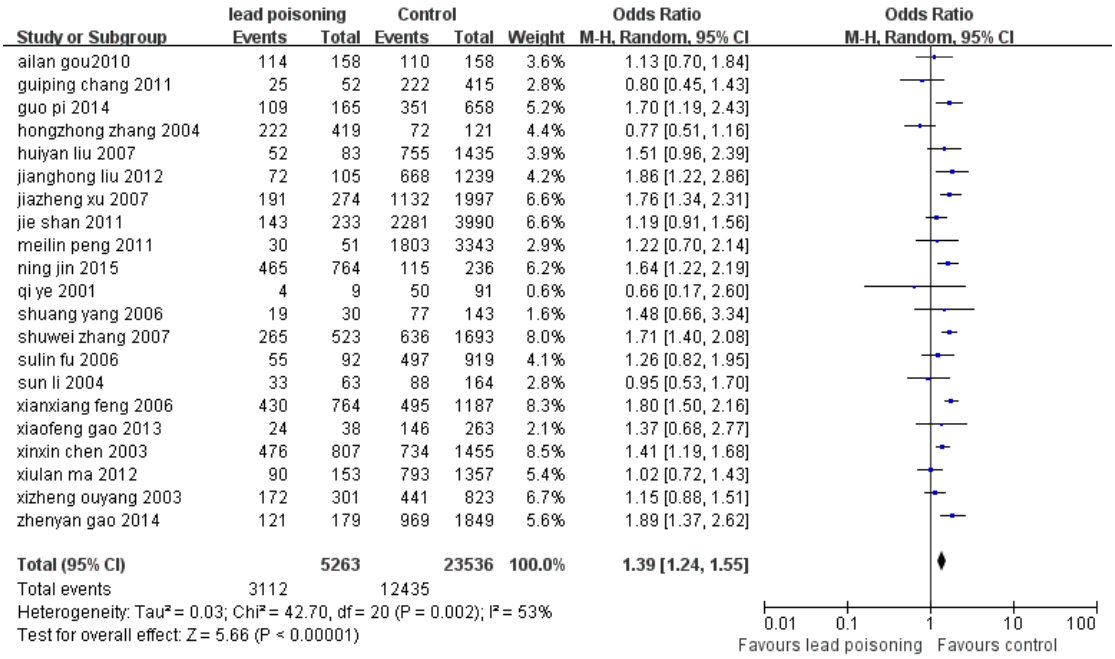
(**h**)


Experimental
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Fixed, 95% CI
M-H, Fixed, 95% CI
ailan gou2010 134 158 146 158 0.6% 0.46 [0.22, 0.95]
bin he 2006 26 87 421 1172 1.2% 0.76 [0.47, 1.22]
guo pi 2014 16 165 113 658 1.2% 0.52 [0.30, 0.90]
jianghong liu 2012 11 105 245 1239 1.0% 0.47 [0.25, 0.90]
jie shan 2011 71 233 1360 3990 3.0% 0.85 [0.64, 1.13]
shuang yang 2006 11 30 67 143 0.4% 0.66 [0.29, 1.48]
xianxiang feng 2006 79 748 225 1163 4.5% 0.49 [0.37, 0.65]
xiaohua liu 2008 68 120 21 27 0.4% 0.37 [0.14, 0.99]
xiulan ma 2012 60 153 718 1357 2.5% 0.57 [0.41, 0.81]
zangwen tan 2011 2234 5295 33631 64673 84.6% 0.67 [0.64, 0.71]
zhenyan gao 2014 5 179 94 1849 0.5% 0.54 [0.22, 1.34]
Total (95% CI) 7273 76429 100.0% 0.66 [0.63, 0.70]
Total events 2715 37041
Heterogeneity: Chi² = 12.95, df = 10 (P = 0.23); I² = 23%
Test for overall effect: Z = 15.38 (P < 0.00001)
0.01 0.1 1 10 100
Favours lead poisoning Favours control

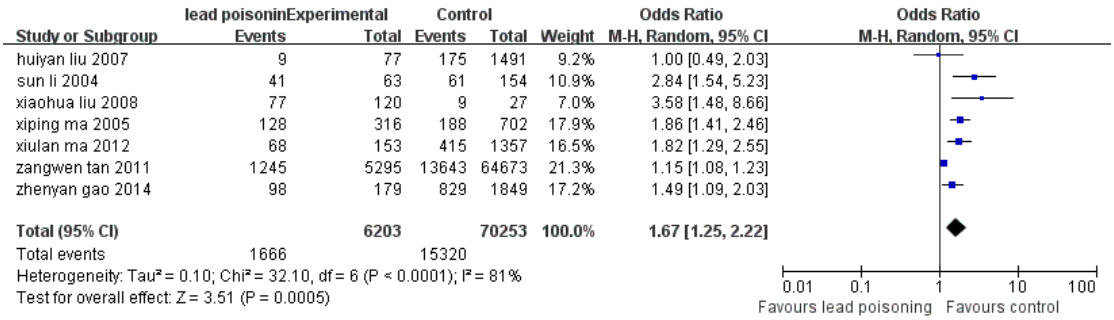
(**i**)


Experimental
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Fixed, 95% CI
M-H, Fixed, 95% CI
ailan gou2010 142 158 144 158 3.1% 0.86 [0.41, 1.83]
bin he 2006 41 87 679 1172 10.7% 0.65 [0.42, 1.00]
jianghong liu 2012 14 99 361 1173 10.4% 0.37 [0.21, 0.66]
jie shan 2011 70 233 1511 3990 25.1% 0.70 [0.53, 0.94]
shuang yang 2006 9 30 78 143 4.1% 0.36 [0.15, 0.83]
xianxiang feng 2006 100 752 293 1155 43.1% 0.45 [0.35, 0.58]
zhenyan gao 2014 4 179 94 1849 3.5% 0.43 [0.16, 1.17]
Total (95% CI) 1538 9640 100.0% 0.54 [0.46, 0.63]
Total events 380 3160
Heterogeneity: Chi² = 10.21, df = 6 (P = 0.12); I² = 41%
Test for overall effect: Z = 7.84 (P < 0.00001)
0.01 0.1 1 10 100
Favours lead poisoning Favours control

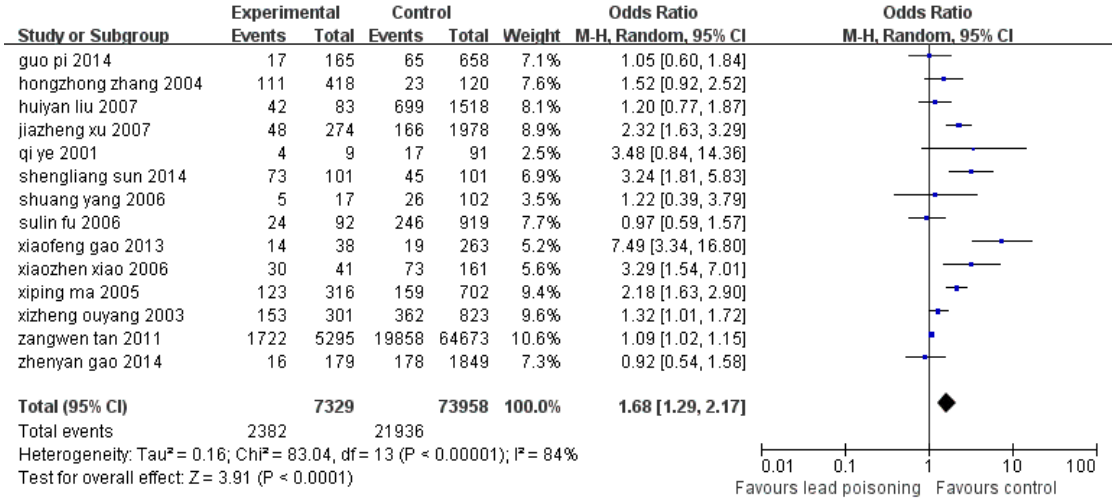
(**j**)


lead poisoning
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Random, 95% CI
M-H, Random, 95% CI
ailan gou2010 114 158 110 158 3.6% 1.13 [0.70, 1.84]
guiping chang 2011 25 52 222 415 2.8% 0.80 [0.45, 1.43]
guo pi 2014 109 165 351 658 5.2% 1.70 [1.19, 2.43]
hongzhong zhang 2004 222 419 72 121 4.4% 0.77 [0.51, 1.16]
huiyan liu 2007 52 83 755 1435 3.9% 1.51 [0.96, 2.39]
jianghong liu 2012 72 105 668 1239 4.2% 1.86 [1.22, 2.86]
jiazheng xu 2007 191 274 1132 1997 6.6% 1.76 [1.34, 2.31]
jie shan 2011 143 233 2281 3990 6.6% 1.19 [0.91, 1.56]
meilin peng 2011 30 51 1803 3343 2.9% 1.22 [0.70, 2.14]
ning jin 2015 465 764 115 236 6.2% 1.64 [1.22, 2.19]
qi ye 2001 4 9 50 91 0.6% 0.66 [0.17, 2.60]
shuang yang 2006 19 30 77 143 1.6% 1.48 [0.66, 3.34]
shuwei zhang 2007 265 523 636 1693 8.0% 1.71 [1.40, 2.08]
sulin fu 2006 55 92 497 919 4.1% 1.26 [0.82, 1.95]
sun li 2004 33 63 88 164 2.8% 0.95 [0.53, 1.70]
xianxiang feng 2006 430 764 495 1187 8.3% 1.80 [1.50, 2.16]
xiaofeng gao 2013 24 38 146 263 2.1% 1.37 [0.68, 2.77]
xinxin chen 2003 476 807 734 1455 8.5% 1.41 [1.19, 1.68]
xiulan ma 2012 90 153 793 1357 5.4% 1.02 [0.72, 1.43]
xizheng ouyang 2003 172 301 441 823 6.7% 1.15 [0.88, 1.51]
zhenyan gao 2014 121 179 969 1849 5.6% 1.89 [1.37, 2.62]
Total (95% CI) 5263 23536 100.0% 1.39 [1.24, 1.55]
Total events 3112 12435
Heterogeneity: Tau² = 0.03; Chi² = 42.70, df = 20 (P = 0.002); I² = 53%
Test for overall effect: Z = 5.66 (P < 0.00001)
0.01 0.1 1 10 100
Favours lead poisoning Favours control

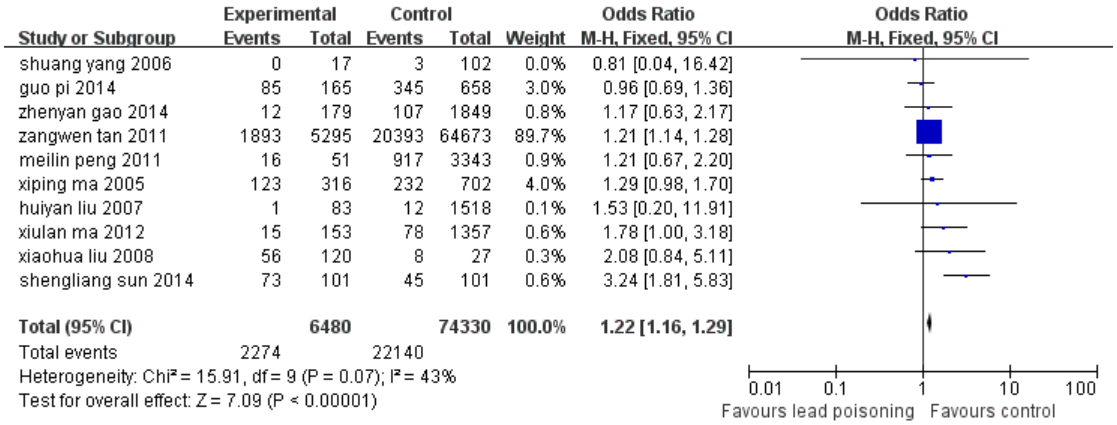
(**k**)


lead poisoninExperimental
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Random, 95% CI
M-H, Random, 95% CI
huiyan liu 2007 9 77 175 1491 9.2% 1.00 [0.49, 2.03]
sun li 2004 41 63 61 154 10.9% 2.84 [1.54, 5.23]
xiaohua liu 2008 77 120 9 27 7.0% 3.58 [1.48, 8.66]
xiping ma 2005 128 316 188 702 17.9% 1.86 [1.41, 2.46]
xiulan ma 2012 68 153 415 1357 16.5% 1.82 [1.29, 2.55]
zangwen tan 2011 1245 5295 13643 64673 21.3% 1.15 [1.08, 1.23]
zhenyan gao 2014 98 179 829 1849 17.2% 1.49 [1.09, 2.03]
Total (95% CI) 6203 70253 100.0% 1.67 [1.25, 2.22]
Total events 1666 15320
Heterogeneity: Tau² = 0.10; Chi² = 32.10, df = 6 (P < 0.0001); I² = 81%
Test for overall effect: Z = 3.51 (P = 0.0005)
0.01 0.1 1 10 100
Favours lead poisoning Favours control

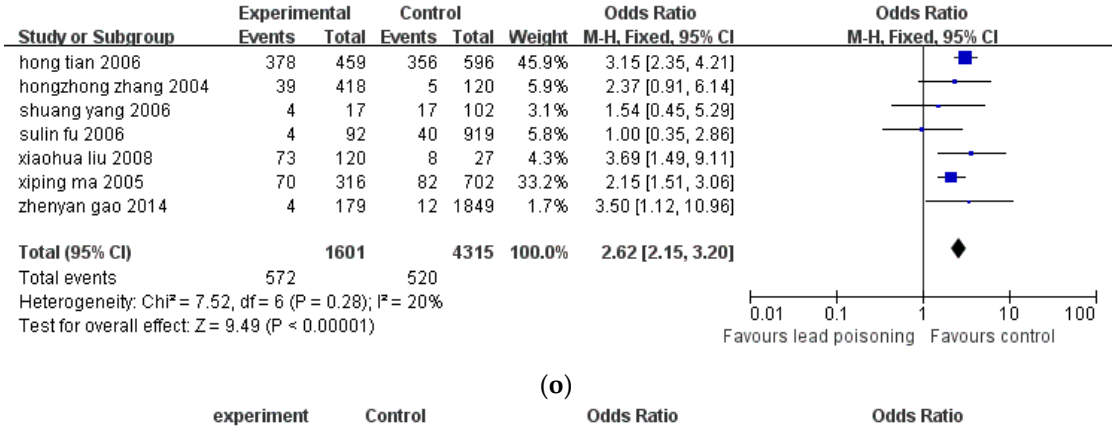
(**l**)


Experimental
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Random, 95% CI
M-H, Random, 95% CI
guo pi 2014 17 165 65 658 7.1% 1.05 [0.60, 1.84]
hongzhong zhang 2004 111 418 23 120 7.6% 1.52 [0.92, 2.52]
huiyan liu 2007 42 83 699 1518 8.1% 1.20 [0.77, 1.87]
jiazheng xu 2007 48 274 166 1978 8.9% 2.32 [1.63, 3.29]
qi ye 2001 4 9 17 91 2.5% 3.48 [0.84, 14.36]
shengliang sun 2014 73 101 45 101 6.9% 3.24 [1.81, 5.83]
shuang yang 2006 5 17 26 102 3.5% 1.22 [0.39, 3.79]
sulin fu 2006 24 92 246 919 7.7% 0.97 [0.59, 1.57]
xiaofeng gao 2013 14 38 19 263 5.2% 7.49 [3.34, 16.80]
xiaozhen xiao 2006 30 41 73 161 5.6% 3.29 [1.54, 7.01]
xiping ma 2005 123 316 159 702 9.4% 2.18 [1.63, 2.90]
xizheng ouyang 2003 153 301 362 823 9.6% 1.32 [1.01, 1.72]
zangwen tan 2011 1722 5295 19858 64673 10.6% 1.09 [1.02, 1.15]
zhenyan gao 2014 16 179 178 1849 7.3% 0.92 [0.54, 1.58]
Total (95% CI) 7329 73958 100.0% 1.68 [1.29, 2.17]
Total events 2382 21936
Heterogeneity: Tau² = 0.16; Chi² = 83.04, df = 13 (P < 0.00001); I² = 84%
Test for overall effect: Z = 3.91 (P < 0.0001)
0.01 0.1 1 10 100
Favours lead poisoning Favours control

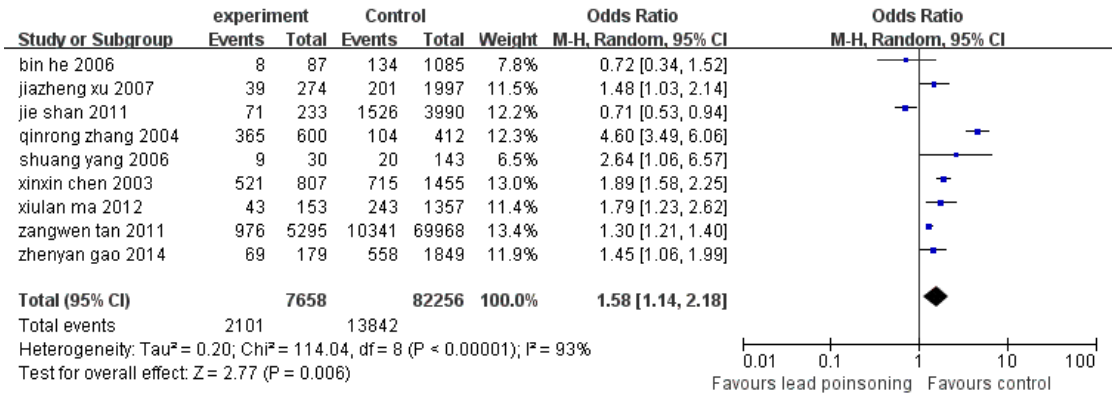
(**m**)


Experimental
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Fixed, 95% CI
M-H, Fixed, 95% CI
shuang yang 2006 0 17 3 102 0.0% 0.81 [0.04, 16.42]
guo pi 2014 85 165 345 658 3.0% 0.96 [0.69, 1.36]
zhenyan gao 2014 12 179 107 1849 0.8% 1.17 [0.63, 2.17]
zangwen tan 2011 1893 5295 20393 64673 89.7% 1.21 [1.14, 1.28]
meilin peng 2011 16 51 917 3343 0.9% 1.21 [0.67, 2.20]
xiping ma 2005 123 316 232 702 4.0% 1.29 [0.98, 1.70]
huiyan liu 2007 1 83 12 1518 0.1% 1.53 [0.20, 11.91]
xiulan ma 2012 15 153 78 1357 0.6% 1.78 [1.00, 3.18]
xiaohua liu 2008 56 120 8 27 0.3% 2.08 [0.84, 5.11]
shengliang sun 2014 73 101 45 101 0.6% 3.24 [1.81, 5.83]
Total (95% CI) 6480 74330 100.0% 1.22 [1.16, 1.29]
Total events 2274 22140
Heterogeneity: Chi² = 15.91, df = 9 (P = 0.07); I² = 43%
Test for overall effect: Z = 7.09 (P < 0.00001)
0.01 0.1 1 10 100
Favours lead poisoning Favours control

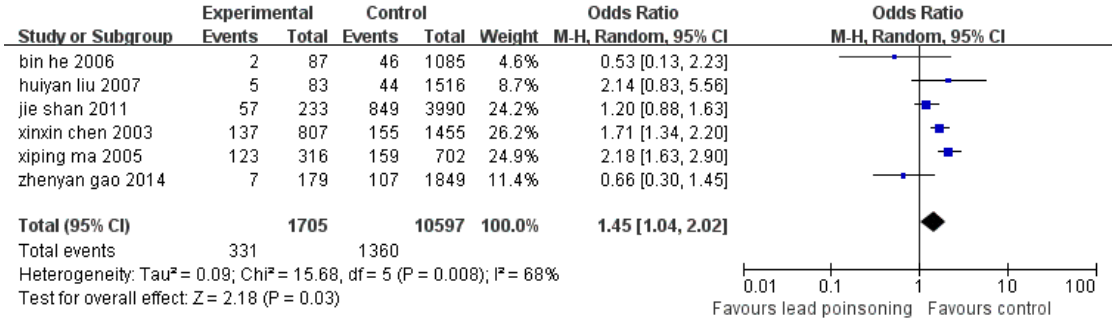
(**n**)


Experimental
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Fixed, 95% CI
M-H, Fixed, 95% CI
hong tian 2006 378 459 356 596 45.9% 3.15 [2.35, 4.21]
hongzhong zhang 2004 39 418 5 120 5.9% 2.37 [0.91, 6.14]
shuang yang 2006 4 17 17 102 3.1% 1.54 [0.45, 5.29]
sulin fu 2006 4 92 40 919 5.8% 1.00 [0.35, 2.86]
xiaohua liu 2008 73 120 8 27 4.3% 3.69 [1.49, 9.11]
xiping ma 2005 70 316 82 702 33.2% 2.15 [1.51, 3.06]
zhenyan gao 2014 4 179 12 1849 1.7% 3.50 [1.12, 10.96]
Total (95% CI) 1601 4315 100.0% 2.62 [2.15, 3.20]
Total events 572 520
Heterogeneity: Chi² = 7.52, df = 6 (P = 0.28); I² = 20%
Test for overall effect: Z = 9.49 (P < 0.00001)
0.01 0.1 1 10 100
Favours lead poisoning Favours control

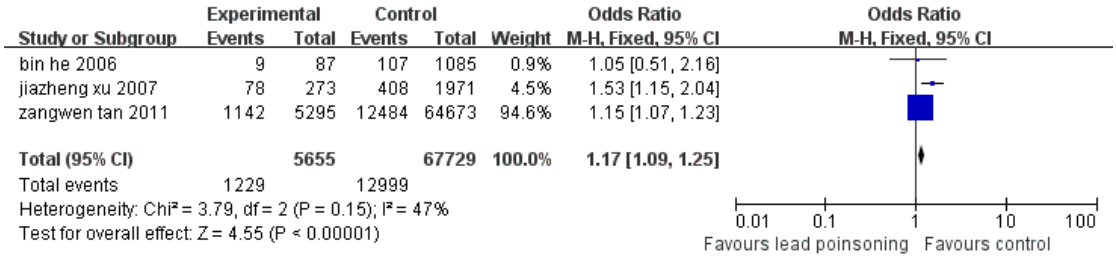
(**o**)


experiment
Control
Odds Ratio
Odds Ratio
Study or Subgroup Events Total Events Total Weight M-H, Random, 95% CI
M-H, Random, 95% CI
bin he 2006 8 87 134 1085 7.8% 0.72 [0.34, 1.52]
jiazheng xu 2007 39 274 201 1997 11.5% 1.48 [1.03, 2.14]
jie shan 2011 71 233 1526 3990 12.2% 0.71 [0.53, 0.94]
qinrong zhang 2004 365 600 104 412 12.3% 4.60 [3.49, 6.06]
shuang yang 2006 9 30 20 143 6.5% 2.64 [1.06, 6.57]
xinxin chen 2003 521 807 715 1455 13.0% 1.89 [1.58, 2.25]
xiulan ma 2012 43 153 243 1357 11.4% 1.79 [1.23, 2.62]
zangwen tan 2011 976 5295 10341 69968 13.4% 1.30 [1.21, 1.40]
zhenyan gao 2014 69 179 558 1849 11.9% 1.45 [1.06, 1.99]
Total (95% CI) 7658 82256 100.0% 1.58 [1.14, 2.18]
Total events 2101 13842
Heterogeneity: Tau² = 0.20; Chi² = 114.04, df = 8 (P < 0.00001); I² = 93%
Test for overall effect: Z = 2.77 (P = 0.006)
0.01 0.1 1 10 100
Favours lead poinsoning Favours control

(**p**)

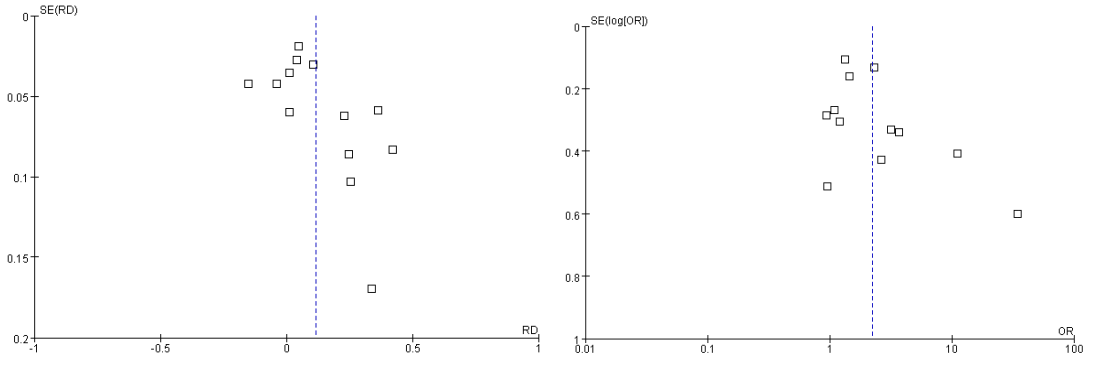


(**q**)

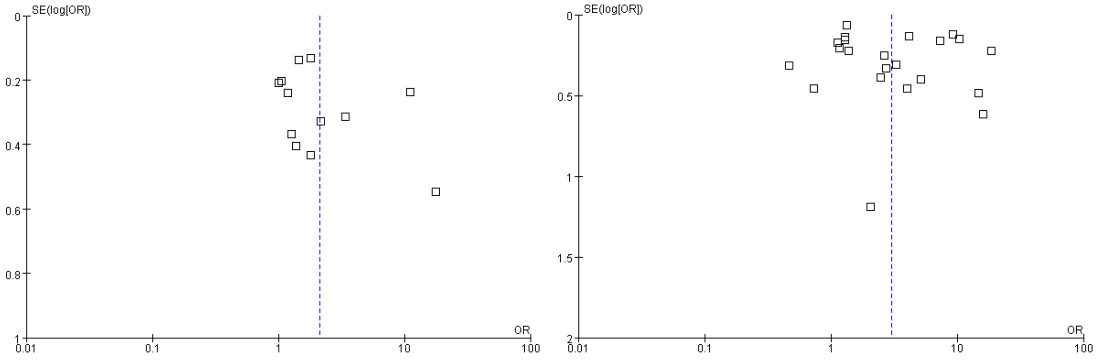


(**r**)

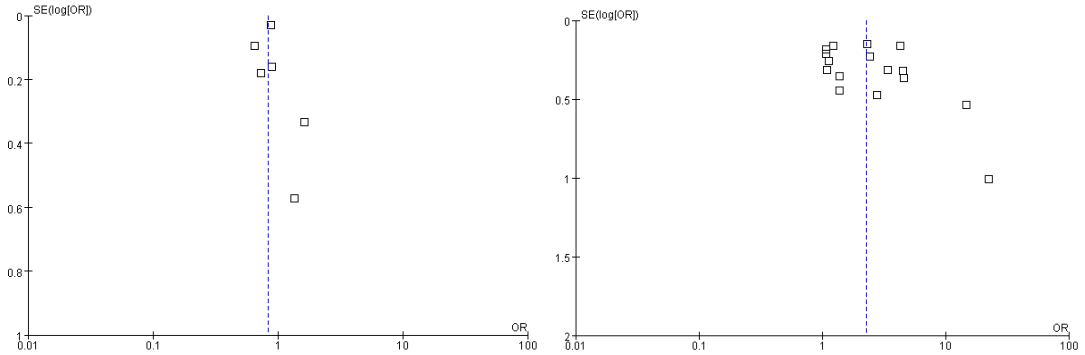
Figure S1: Forest plots for risk factors of child lead poisoning;.(**a**) home painting; (**b**) living near main roads; (**c**) passive smoking; (**d**) often eating foods containing lead; (**e**) frequent consumption of dairy products; (**f**) daily intake of calcium, iron, and/or zinc supplements; (**g**) potential for father's occupational exposure to lead; (**h**) potential for mother's occupational exposure to lead; (**i**) mother's educational level; (**j**) father's educational level;(**k**) sex; (**l**) industry around the home; (**m**) hand-to-mouth activity; (**n**) no often washing hands at keytimes; (**o**) picky eating; (**p**) living on the ground floor; (**q**) coalburning; (**r**) peeling walls.



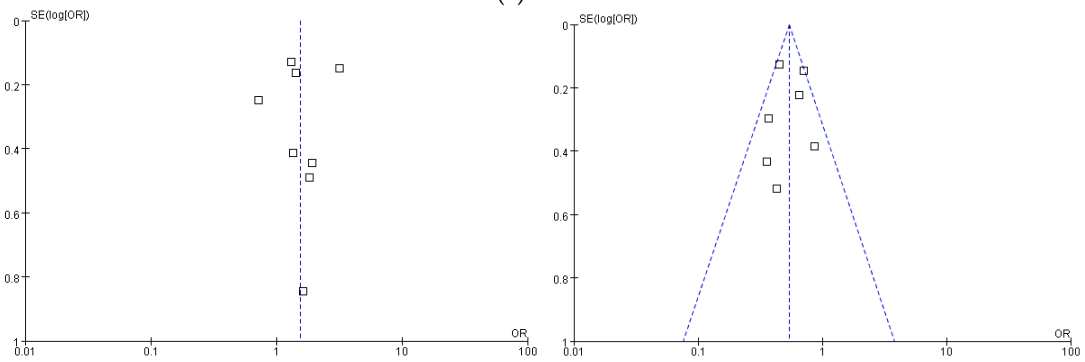
(**a**)



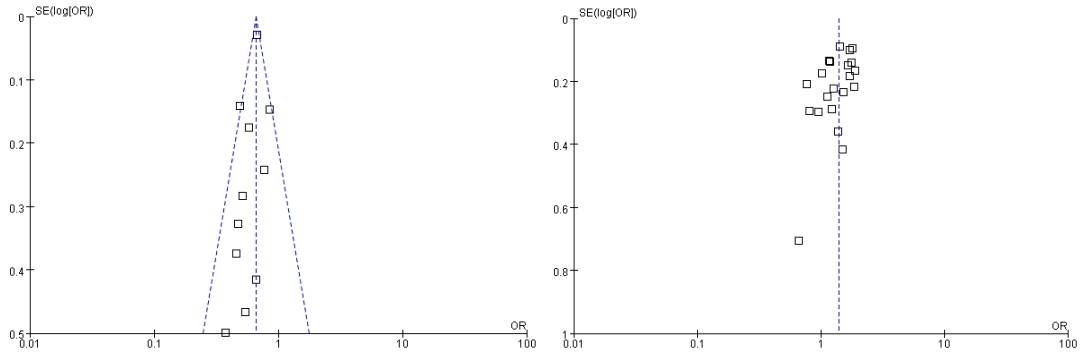
(**b**)


SE(log[OR])
OR
SE(log[OR])
OR

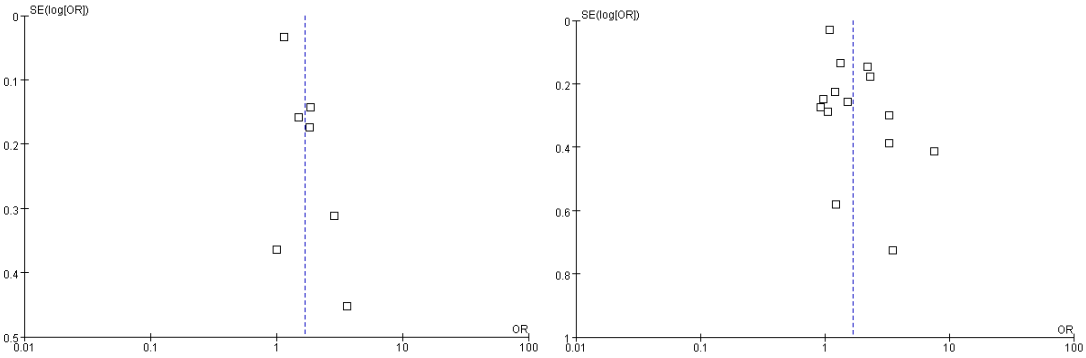
(**c**)


SE(log[OR])
OR
SE(log[OR])
OR

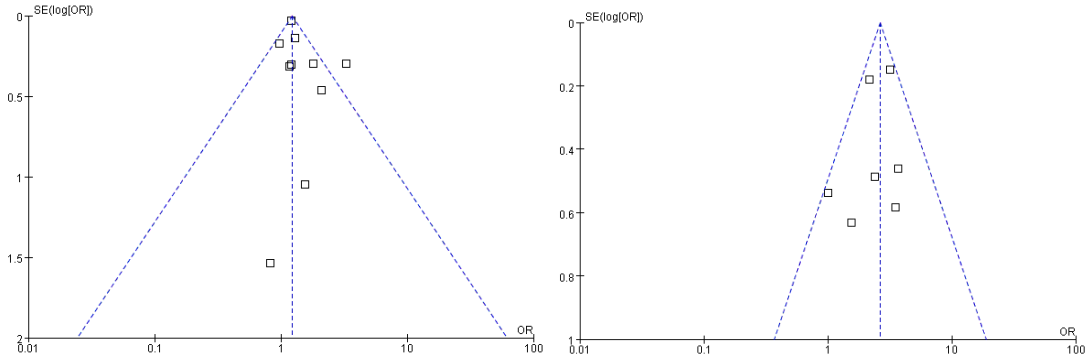
(**d**)


SE(log[OR])
OR
SE(log[OR])
OR

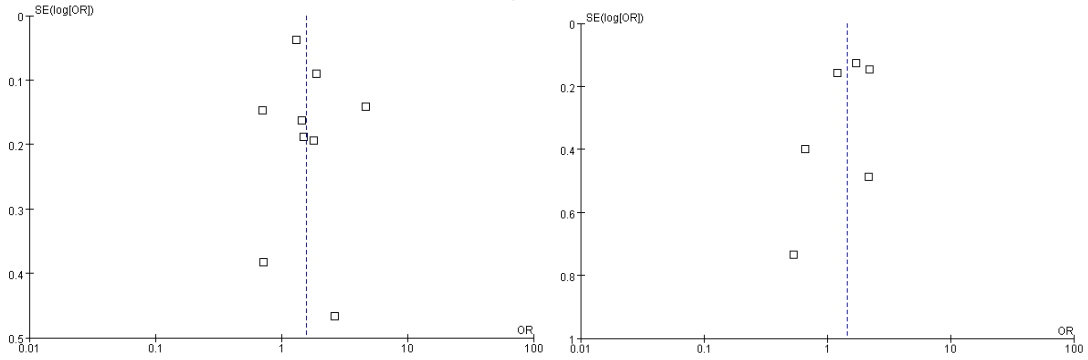
(**e**)


SE(log[OR])
OR
SE(log[OR])
OR

(**f**)



(**g**)



(**h**)

Figure S2. Funnel plots of risk factors for child lead poisoning. (**a**) home painting—living near main roads; (**b**) passive smoking—often eating foods containing lead; (**c**) frequent consumption of dairy products—potential for father's occupational exposure to lead; (**d**) potential for mother's occupational exposure to lead—father's educational level; (**e**) mother's educational level—sex; (**f**) industry around the home—hand-to-mouth activity; (**g**) no often washing hands at keytimes—picky eating; (**h**) living on the ground floor—coalburning.

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