**Supplementary Table 1:** Study characteristics for 179 studies eligible for inclusion in a systematic review evaluating the efficacy of bacterial vaccines to prevent respiratory disease in swine.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Country** | **Setting** | **Year conducted** | **# farms** | **Reason for vaccinating** | **Outcomes** |
| Abs El-Osta and Youil, 2014 | Australia | Commercial | NR | 1 | Endemic disease | Lung lesions \*\*\*\* |
| Arsenakis et al., 2017 | Belgium | Commercial | 2013-2014 | 2 | Endemic disease | Cough index, lung lesions §, **mortality** |
| Baccaro et al., 2002 | Brazil | Commercial | 1999 | 1 | Endemic disease | Lung lesions §, **mortality** |
| Baccaro et al., 2006 | Brazil | Commercial | 2001-2002 | 1 | Endemic disease | Lung lesions §, **mortality** |
| Bak and Norregaard, 2011 | Sweden | Commercial | NR | 2 | Prevention of clinical disease | Lung lesions ‡‡, **mortality** |
| Beffort et al., 2017 | Germany | Commercial | NR | 1 | Endemic disease | Lung lesions §§, **mortality** |
| Berrocal et al., 2000 | Spain | Commercial | 1999-2000 | 4 | Prevention of clinical disease | Lung lesions § |
| Beskow et al., 1989\*\* | Sweden | Commercial | NR | 1 | Prevention of clinical disease | Lung lesions § |
| Beskow et al., 1989\*\* | Sweden | Commercial | NR | 1 | Prevention of clinical disease | Lung lesions § |
| Beskow et al., 1989\*\* | Sweden | Commercial | NR | 1 | Prevention of clinical disease | Lung lesions § |
| Beskow et al., 1989\*\* | Sweden | Commercial | NR | 1 | Prevention of clinical disease | Lung lesions § |
| Beskow et al., 1989\*\* | Sweden | Commercial | NR | 1 | Prevention of clinical disease | Lung lesions § |
| Beskow et al., 1989\*\* | Sweden | Commercial | NR | 1 | Prevention of clinical disease | Lung lesions § |
| Beskow et al., 1989\*\* | Sweden | Commercial | NR | 1 | Prevention of clinical disease | Lung lesions § |
| Beskow et al., 1993 | NR | Commercial | NR | 5 | Endemic disease | Lung lesions § |
| Bilic et al., 1996 | Croatia | Commercial | 1993-1994 | 1 | Endemic disease | **Clinical illness**, lung lesions § |
| Bloxham, 1987\*\* | NR | Commercial | NA | 1 | Endemic disease | Mortality \*\*\* |
| Bloxham, 1987\*\* | NR | Commercial | NA | 1 | Endemic disease | Mortality \*\*\* |
| Bordin et al., 2010 | Brazil | Commercial | NR | 1 | NR | **Lung lesions**, **mortality** |
| Bouwkamp et al., 2000 | Netherlands | Commercial | NR | 1 | Endemic disease | **Mortality** |
| Castaing et al., 2002 | France | University/Research | NR | 1 | Prevention of clinical disease | Lung lesions §§ |
| Charlier et al., 1994\*\* | France | Commercial | NR | 1 | Endemic disease | **Lung lesions** |
| Charlier et al., 1994\*\* | France | Commercial | NR | 1 | Endemic disease | **Lung lesions** |
| Charlier et al., 1994\*\* | France | Commercial | NR | 1 | Endemic disease | **Lung lesions** |
| Charlier et al., 1994\*\* | France | Commercial | NR | 1 | Endemic disease | **Lung lesions** |
| Chouet et al., 2014 | France | Commercial | NR | 4 | Endemic disease | **Lung lesions** |
| Clark et al., 1994 | USA | Commercial | NR | 1 | Prevention of clinical disease | Lung lesions\* |
| Costa et al., 2015 | Brazil | Commercial | 2013 | 3 | Endemic disease | Lung lesions § |
| Cvjetkovic et al., 2018 | Austria | Commercial | 2016-2017 | 1 | Endemic disease | **Clinical illness**, cough index, **lung lesions,** **mortality** |
| Dawson et al., 2002\*\* | Germany, England | Commercial | 1999-2000 | 12 | Endemic disease | **Mortality** |
| Dawson et al., 2002\*\* | England | Commercial | 1999-2000 | 1 | Endemic disease | Lung lesions §§ |
| Dawson et al., 2002\*\* | England | Commercial | 1999-2000 | 1 | Endemic disease | Lung lesions§§ |
| Dawson et al., 2002\*\* | England | Commercial | 1999-2000 | 1 | Endemic disease | Lung lesions§§ |
| Dawson et al., 2002\*\* | England | Commercial | 1999-2000 | 1 | Endemic disease | Lung lesions§§ |
| Dawson et al., 2002\*\* | England | Commercial | 1999-2000 | 1 | Endemic disease | Lung lesions§§ |
| Dawson et al., 2002\*\* | England | Commercial | 1999-2000 | 1 | Endemic disease | Lung lesions§§ |
| Dawson et al., 2002\*\* | Germany | Commercial | 1999-2000 | 1 | Endemic disease | Lung lesions§§ |
| Dawson et al., 2002\*\* | Germany | Commercial | 1999-2000 | 1 | Endemic disease | Lung lesions§§ |
| Dawson et al., 2002\*\* | Germany | Commercial | 1999-2000 | 1 | Endemic disease | Lung lesions§§ |
| Del Pozo Sacristan et al., 2014a | Belgium | Commercial | 2011 | 1 | Endemic disease | **Clinical illness,** lung lesions §, §§, **mortality**, total antibiotic use |
| Del Pozo Sacristan et al., 2014b\*\* | Belgium | Commercial | 2012 | 1 | Endemic disease | **Mortality**, total antibiotic use |
| Del Pozo Sacristan et al., 2014b\*\* | Belgium | Commercial | 2012 | 1 | Endemic disease | **Mortality**, total antibiotic use |
| Del Pozo Sacristan et al., 2014b\*\* | Belgium | Commercial | 2012 | 2 | Endemic disease | **Lung lesions** |
| Díaz et al., 2004a | Mexico | Commercial | 2002-2003 | 2 | NR | Lung lesions\* |
| Díaz et al., 2004b | Mexico | Commercial | NR | Multiple sites | NR | **Lung lesions** |
| Díaz et al., 2004c | Mexico | Commercial | NR | 2 | NR | Lung lesions\* |
| Dirven et al., 2006 | Netherlands | Commercial | NR | 2 | Endemic disease | **Mortality** |
| Docic and Bilkei, 2001 | NR | Commercial | NR | 1 | Endemic disease | Lung lesions§§ |
| Dohoo and Montgomery, 1996 | Canada | Commercial | NR | 1 (sow herd and grower pig barns on different farms) | Prevention of clinical disease | **Lung lesions** |
| Douglas and Ripley, 1984 | NR | Commercial | 1982-1983 | 1 | Prevention of clinical disease | Clinical illness\*\*\*\* |
| Duff et al., 2011 | USA | Commercial | NR | 1 | Endemic disease | **Mortality** |
| Duivon et al., 2018 | France | Commercial | NR | 1 | Endemic disease | Lung lesions\*\*\*\* |
| Etoré et al., 2005 | France | Commercial | 2003 | 2 | NR | Lung lesions\* |
| Fenwick et al., 1986 | NR | Commercial | NR | 3 | Endemic disease | **Clinical illness**, **mortality** |
| Földi et al., 2014 | Hungary | Commercial | NR | 1 | Endemic disease | **Clinical illness,** lung lesions §§, **mortality** |
| Garlaite et al., 2004 | Lithuania | Commercial | NR | 3 | Endemic disease | Lung lesions\* |
| Genzow et al., 2006 | Austria | Commercial | NR | 1 | Endemic disease | Lung lesions\* |
| Goman et al., 2014 | NR | Commercial | NR | 1 | Endemic disease | Lung lesions §, mortality ‡‡ |
| Goodnow et al., 1979 | USA | Commercial | NR | 2 | Endemic disease | Clinical illness \*\*\*\* |
| Gunther et al., 2000 | France | Commercial | NR | 3 | Endemic disease | Lung lesions §, **mortality** |
| Habrun et al., 2002 | Croatia | Commercial | 1999 | 1 | Endemic disease | Lung lesions §, **mortality** |
| Haruna et al., 2006 | Canada | Commercial | 2002 | 1 | Endemic disease | **Mortality** |
| Henninger and Morel-Saives, 2013\*\* | France | Commercial | 2011 | 3 | NR | Lung lesions \*\*\*\* |
| Henninger and Morel-Saives, 2013\*\* | France | Commercial | 2011 | 6 | NR | Lung lesions \*\*\*\* |
| Henninger and Morel-Saives, 2013\*\* | France | Commercial | 2011 | 1 | NR | Lung lesions \*\*\*\* |
| Herczeg et al., 2012a | South Africa | Commercial | 2012 | 1 | Prevention of clinical disease | Clinical illness ‡, mortality ‡ |
| Herczeg et al., 2012b | Mexico | NR | NR | 1 | Endemic disease | **Mortality** |
| Holyoake and Callinan, 2006 | Australia | Commercial | 2002 | 1 | Endemic disease | **Mortality** |
| Jin et al., 2013 | Korea | Commerical | NR | 1 | Endemic disease | Mortality \*\*\*\* |
| Jirawattanapong et al., 2008 | Netherlands | University/Research | NR | 1 | Endemic disease | **Clinical illness**, **lung lesions** |
| Joisel and Rice, 2000 | NR | Commercial | NR | 1 | NR | Lung lesions\* |
| Kaalberg et al., 2017 | Netherlands | Commercial | 2014-2015 | 1 | Endemic disease | **Lung lesions,** **mortality** |
| Kaeoket et al., 2006 | Thailand | Commercial | NR | 1 | Endemic disease | Cough index |
| Kessler and Lahrmann, 2004 | NR | Commercial | NR | 1 | Endemic disease | Lung lesions\* |
| Kongtes et al., 2013 | Thailand | Commercial | NR | 1 | Prevention of clinical disease | **Mortality** |
| Krejci et al., 2011a | Belarus | Commercial | NR | 1 | Endemic disease | Mortality \*\*\*\* |
| Krejci et al., 2011b | Belarus | Commercial | NR | 1 | Endemic disease | **Mortality** |
| Krejci et al., 2013 | NR | NR | NR | 1 | Endemic disease | Lung lesions §, mortality \*\*\*\* |
| Krejci and Revesz, 2013 | NR | Commercial | NR | 1 | Endemic disease | Lung lesions §, mortality ‡‡ |
| Kristensen et al., 2014\*\* | Denmark | Commercial | NR | 1 | Endemic disease | **Clinical illness**, lung lesions §, **mortality** |
| Kristensen et al., 2014\*\* | Denmark | Commercial | NR | 1 | Endemic disease | **Clinical illness**, lung lesions §, **mortality** |
| Kyriakis et al., 2001 | Greece | Commercial | NR | 1 | Endemic disease | Lung lesions §§ |
| Lara et al., 2014 | NR | Commercial | NR | 1 | Prevention of clinical disease | **Lung lesions** |
| Lee et al., 2004 | NR | University/Research | NR | 1 | NR | Lung lesions\* |
| Lillie et al., 2004 | NR | Commercial | NR | 1 | NR | Lung lesions\* |
| Lium et al., 1994 | NR | Commercial | NR | 4 | Endemic disease | Lung lesions § |
| Longtao and Hui, 2008 | China | Commercial | 2006 | 1 | Endemic disease | **Clinical illness**, **mortality** |
| Lopez and Jimenez, 2008 | Spain | Commercial | NR | 8 | NR | Lung lesions\* |
| Maes et al., 1998 | Belgium | Commercial | 1996 | 5 | Endemic disease | Lung lesions |
| Maes et al., 1999 | Belgium | Commercial | NR | 14 | Prevention of clinical disease | Lung lesions § |
| Marchioro et al., 2013 | Belgium | University/Research | NR | 1 | Prevention of clinical disease | Lung lesions § |
| Marco et al., 2004\*\* | Spain | Commercial | 2001-2002 | 1 | Endemic disease | Lung lesions §, mortality \*\*\*\* |
| Marco et al., 2004\*\* | Spain | Commercial | 2001-2002 | 1 | Endemic disease | Lung lesions §, mortality \*\*\*\* |
| Marco et al., 2010 | NR | Commercial | NR | 1 | Endemic disease | Lung lesions § |
| Mateusen et al., 2001 | Belgium | NR | NR | 1 | Endemic disease | Cough index, lung lesions §, **mortality** |
| Mateusen et al., 2002 | NR | Commercial | 1999 | 1 | Prevention of clinical disease | **Lung lesions mortality**, |
| Matsumoto et al., 2008 | Japan | Commercial | NR | 3 | Endemic disease | Lung lesions\* |
| Mefford et al., 1983 | USA | Commercial | NR | 1 | Endemic disease | Mortality \*\*\*\* |
| Mettler et al., 2008 | NR | Commercial | NR | 1 | Endemic disease | Lung lesions\* |
| Moore and Suprenant, 2014 | NR | Commercial | NR | 1 | Endemic disease | **Lung lesions,** **mortality** |
| Morales et al., 2012 | Spain | Commercial | NR | 1 | Prevention of clinical disease | Lung lesions \*\*\*\*, mortality \*\*\*\* |
| Moreau et al., 2000 | NR | Commercial | 1999 | 1 | Endemic disease | Lung lesions\*, mortality \*\*\*\* |
| Moreau et al., 2004 | USA | NR | NR | 1 | Endemic disease | Lung lesions\*, mortality\* |
| Morris and Sanford, 2001 | Canada | Commercial | NR | 4 | Prevention of clinical disease | **Lung lesions**, **mortality** |
| Naito, 2014 | Japan | Commercial | NR | 1 | Prevention of clinical disease | Mortality \*\*\*\* |
| Nigrelli et al., 2004 | Italy | Commercial | NA | 1 | Prevention of clinical disease | Lung lesions\* |
| Nilubol and Lengkayan, 2006 | NR | Commercial | NR | 1 | Endemic disease | Mortality\* |
| Nymark and Dahl, 2002 | Denmark | Commercial | NR | 2 | Endemic disease | Lung lesions\* |
| Oh et al., 2013 | Korea | Commercial | 2012 | 1 | Endemic disease | Mortality\* |
| Okada et al., 1999\*\* | Japan | Commercial | NR | 1 | Endemic disease | Lung lesions ‡ |
| Okada et al., 1999\*\* | Japan | Commercial | NR | 1 | Endemic disease | **Lung lesions** |
| Okada et al., 1999\*\* | Japan | Commercial | NR | 1 | Endemic disease | Lung lesions ‡ |
| Pabst and Beilage, 2004 | Germany | Commercial | NR | 2 | Endemic disease | **Mortality** |
| Pagot et al., 2017 | France | Commercial | NR | 1 | Endemic disease | **Lung lesions,** **mortality** |
| Pallares et al., 2000 | Spain | Commercial | NR | 8 | Prevention of clinical disease | Lung lesions § |
| Pallares et al., 2001 | Spain | Commercial | NR | 16 | Prevention of clinical disease | **Mortality** |
| Palomo and Fernandez, 2011 | Spain | Commercial | NR | 1 | Endemic disease | **Mortality** |
| Palzer et al., 2015 | NR | University/Research | NR | 1 | Endemic disease | **Mortality** |
| Paterson et al., 2000 | Australia | Commercial | NR | 1 | Endemic disease | Lung lesions\* |
| Pepovich et al., 2015 | Bulgaria | Commercial | NR | 1 | Endemic disease | Clinical illness \*\*\*\*, lung lesions \*\*\*\*, mortality \*\*\*\* |
| Pijoan et al., 1986 | USA | Commercial | NR | 1 | Endemic disease | Lung lesions ‡, mortality \*\*\*\* |
| Pillet et al., 2010 | France | Commercial | NR | 1 | Prevention of clinical disease | Lung lesions \*\*\*\*, mortality \*\*\*\* |
| Pommier et al., 2000a | France | Commercial | NR | 3 | Prevention of clinical disease | Lung lesions\*, mortality\* |
| Pommier et al., 2000b | France | Commercial | NR | 3 | Endemic disease | **Lung lesions**, **mortality** |
| Prevost et al., 1990 | NR | Commercial | NR | 3 | Endemic disease | Lung lesions\* |
| Procajlo et al., 2010a | Poland | Commercial | NR | 1 | Prevention of clinical disease | **Clinical illness,** lung lesions ‡, **mortality** |
| Procajło et al., 2010b | NR | Commercial | NR | 1 | Prevention of clinical disease | **Clinical illness**, **lung lesions,** **mortality** |
| Ridremont and Volant, 2006 | France | Commercial | NR | 4 | NR | Lung lesions\* |
| Riising, 1980\*\* | NR | Commercial | NR | 1 | Endemic disease | Lung lesions§ |
| Riising, 1980\*\* | NR | Commercial | NR | 1 | Endemic disease | **Clinical illness**, lung lesions § |
| Riising, 1980\*\* | NR | Commercial | NR | 1 | Endemic disease | **Clinical illness**, lung lesions § |
| Ristow et al., 2002 | Brazil | Commercial | NR | 1 | Endemic disease | Lung lesions \*\*\*\* |
| Rosales et al., 2008 | Mexico | Commercial | 2006-2007 | 1 | Endemic disease | **Mortality** |
| Rosseau et al., 1988 | Canada | Commercial | NR | 1 | Prevention of clinical disease | Mortality\* |
| Sala et al., 2002 | Italy | Commercial | 1999-2000 | 1 | Prevention of clinical disease | Lung lesions\* |
| Sanchez et al., 2014 | Spain | Commercial | 2012-2013 | 1 | Endemic disease | Lung lesions \*\*\*\* |
| Schimmel et al., 1990 | UK | Commercial | NR | 1 | NR | Lung lesions\* |
| Sibila et al., 2006a | NR | Commercial | NR | 1 | Endemic disease | Lung lesions\* |
| Sibila et al., 2006b | NR | Commercial | NR | 1 | Prevention of clinical disease | Lung lesions\* |
| Sibila et al., 2007 | NR | Commercial | NR | 1 | Endemic disease | Lung lesions § |
| Sibila et al., 2008 | NR | Commercial | NR | 1 | Endemic disease | Lung lesions\* |
| Silva et al., 2002\*\* | Brazil | Commercial | NR | 1 | Endemic disease | **Lung lesions** |
| Silva et al., 2002\*\* | Brazil | Commercial | NR | 1 | Endemic disease | Lung lesions \*\*\*\* |
| Silva et al., 2002\*\* | Brazil | Commercial | NR | 1 | Endemic disease | Lung lesions\* |
| Sitthicharoenchai et al., 2014 | NR | Commercial | NR | 1 | Endemic disease | Lung lesions\* |
| Siugzdaite and Garlaite, 2002 | Lithuania | Commercial | NR | 1 | NR | Lung lesions § |
| Siugzdaite et al., 2003 | Lithuania | Commercial | NR | 1 | Prevention of clinical disease | Lung lesions\* |
| Siugzdaite et al., 2005 | Lithuania | Commercial | NR | 1 | Endemic disease | Lung lesions\* |
| Šiugždaite et al., 2006 | Lithuania | Commercial | NR | 3 | Prevention of clinical disease | Lung lesions\* |
| Smith et al., 2002 | France | Commercial | NR | 6 | Endemic disease | Lung lesions\* |
| Stipkovits et al., 2003\*\* | NR | NR | NR | 1 | Endemic disease | **Lung lesions,** **mortality** |
| Stipkovits et al., 2003\*\* | NR | NR | NR | 1 | Endemic disease | **Lung lesions,** **mortality** |
| Straw et al., 1984 | USA | NR | 1981 | NR | Prevention of clinical disease | Lung lesions\* |
| Stricker et al., 2011 | Austria | Commercial | NR | 1 | Endemic disease | Lung lesions\* |
| Stricker et al., 2013 | Austria | Commercial | NR | 1 | Prevention of clinical disease | **Clinical illness**, lung lesions §, **mortality** |
| Sudeick et al., 2013 | Germany | Commercial | 2002 | 1 | NR | Lung lesions\*, mortality\* |
| Sun et al., 2014 | China | Commercial | 2012 | 1 | Endemic disease | **Mortality** |
| Tassis et al., 2010 | Greece | Commercial | NR | 1 | Endemic disease | **Clinical illness**, **lung lesions,** **mortality** |
| Tassis et al., 2012 | Greece | Commercial | NR | 1 | Endemic disease | **Clinical illness, lung lesions,** **mortality** |
| Tassis et al., 2017 | Greece | Commercial | 2010 | 1 | Endemic disease | **Clinical illness, lung lesions,** **mortality** |
| Thanawongnuwech et al., 2003 | Thailand | Commercial | NR | 2 | Endemic disease | Lung lesions\* |
| Tremblay and Moore, 2012 | Canada | Commercial | NR | 1 | Endemic disease | Lung lesions\*, **mortality** |
| Tzivara et al., 2007\*\* | Greece | Commercial | 2002-2003 | 1 | Endemic disease | **Clinical illness**, lung lesions §, **mortality** |
| Tzivara et al., 2007\*\* | Greece | Commercial | 2002-2003 | 1 | Endemic disease | **Clinical illness,** lung lesions §, **mortality** |
| Tzivara et al., 2010 | Greece | Commercial | NR | 2 | Endemic disease | Lung lesions\* |
| Utrera et al., 2000 | NR | Commercial | NA | 1 | Endemic disease | Lung lesions \*\*\*\*, mortality \*\*\*\* |
| Utrera et al., 2006 | NR | Commercial | NR | Multiple site | Endemic disease | Mortality \*\*\*\* |
| VanBuren et al., 2001 | Canada, Mexico | NR | NR | Multi-location | Endemic disease | **Mortality** |
| VanNes et al., 2000 | Netherlands | Commercial | NR | 16 | Endemic disease | Mortality\* |
| Villarreal et al., 2010 | Belgium | University/Research | NR | 1 | Prevention of clinical disease | Lung lesions\* |
| Villarreal et al., 2011 | Belgium | Commercial | 2008 | 1 | Endemic disease | Lung lesions §, §§ |
| Voisin et al., 2014 | France | Commercial | 2012-2013 | 3 | Prevention of clinical disease | **Clinical illness**, **mortality** |
| Vonderfecht, 1983 | USA | Commercial | NR | 2 | Endemic disease | Mortality\* |
| Vraa-Andersen et al., 1994 | Denmark | Commercial | NR | 5 | Endemic disease | Lung lesions\* |
| Wallgren et al., 2000 | NR | Commercial | NR | 1 | Endemic disease | **Lung lesions** |
| Wilson et al., 2012 | Germany | Commercial | NR | 1 | Endemic disease | **Lung lesions,** **mortality** |
| Wongnarkpet et al., 1999a | New Zealand | Commercial | 1993-1994 | 1 | Endemic disease | Lung lesions §, **mortality** |
| Wongnarkpet et al., 1999b | New Zealand | Commercial | 1993-1994 | 1 | Endemic disease | Lung lesions § |
| Zankl et al., 2012 | Germany | Commercial | NR | Multi-site | Endemic disease | Lung lesions\* |

*\* Reported eligible outcomes, but were not able to extract data for other reason*

\*\* Multiple trials or farms reported as separate trials within the same publication

\*\*\* Vaccination of sows

\*\*\*\* One or more treatment arms not described in sufficient detail to categorize into intervention group

‡ Zero cells (no events) or all animals experienced the event, precluding calculation of relative risk

‡‡ Does not link to network (no intervention arms common with intervention arms in another trial)

§ Provided lung lesions specific to a pathogen (NB: non-specific lung lesions used in NMA)

§§ Provided non-specific lung lesions as a continuous scale

**Supplementary table 2**. Risk ratio comparison for morbidity as an outcome for all vaccines assessed in a network meta-analysis of the efficacy of bacterial vaccines for respiratory disease in swine. The upper right hand section of the table represents the risk ratio between the numerator (upper left treatment) and denominator (lower right treatment). The lower left section of the table represents the 95% credibility interval for the comparison, with the rows and columns reversed.



**Supplementary table 3.** Mean ranking of vaccine interventions for morbidity as an outcome from a Bayesian network meta-analysis of the efficacy of bacterial vaccines for respiratory disease in swine. Mean rank, standard deviation and quartile rankings are shown.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Intervention | Mean rank | SD | 2.50% | 50% | 97.50% |
| Inglevac HP-1 | 1.77 | 1.68 | 1 | 1 | 7 |
| RepiSure One | 2.84 | 1.56 | 1 | 2 | 7 |
| Respisure and immune stimulant | 3.98 | 2.69 | 1 | 3 | 12 |
| Pleurinord | 5.47 | 3 | 1 | 5 | 13 |
| Porcilis M Hyo ID ONCE | 8.12 | 2.48 | 4 | 8 | 14 |
| Stellamune Mono Injection | 8.83 | 4.15 | 2 | 8 | 17 |
| Suvaxyn M Hyo mono | 11.03 | 4.17 | 3 | 11 | 18 |
| Pneuroguard | 11.27 | 4.51 | 3 | 12 | 18 |
| Porcilis PCV M Hyo | 11.65 | 4.42 | 3 | 12 | 18 |
| Porcillis M hyo and PRRS | 11.8 | 4.12 | 4 | 12 | 18 |
| Hyogen | 11.85 | 4.43 | 3 | 12 | 18 |
| Non-active control | 12.48 | 1.88 | 9 | 13 | 16 |
| Porcilis APP | 13.3 | 4.96 | 2 | 15 | 18 |
| Ingelvac M Hyo | 13.32 | 3.74 | 5 | 14 | 18 |
| ThoroVAX VET | 13.47 | 3.67 | 5 | 14 | 18 |

**Supplementary Table 4:** Results of the indirect comparisons for the consistency assumption for morbidity. Columns represent posterior means (d) and standard deviations (sd) of the log-odds ratio of vaccine effects calculated using direct evidence (d), all evidence (MTC), and indirect evidence (rest); w and sd\_w represent the inconsistency estimate and its standard deviation.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Comparison | d\_dir | sd\_dir | d\_MTC | sd\_MTC | d\_rest | sd\_rest | W | sd\_w | p\_value |
| PO vs POP | -0.19 | 2.86 | 0.48 | 0.58 | 0.51 | 0.59 | -0.71 | 2.92 | 0.81 |
| PO vs PP | -0.04 | 2.86 | 0.3 | 0.6 | 0.31 | 0.62 | -0.35 | 2.93 | 0.9 |
| PO vs SU | -0.39 | 2.88 | 0.37 | 0.57 | 0.4 | 0.58 | -0.8 | 2.94 | 0.79 |
| POP vs PP | 0.19 | 2.84 | -0.19 | 0.68 | -0.21 | 0.71 | 0.4 | 2.93 | 0.89 |
| RE vs REI | 0.16 | 1.92 | 0.22 | 0.58 | 0.23 | 0.61 | -0.07 | 2.02 | 0.97 |
| NAC vs PN | -0.09 | 2.88 | -0.1 | 0.78 | -0.1 | 0.81 | 0.02 | 2.99 | 1 |
| NAC vs PO | -0.54 | 0.26 | -0.52 | 0.33 | -0.56 | NA | 0.02 | NA | NA |
| NAC vs POP | 0.21 | 2.88 | -0.04 | 0.67 | -0.06 | 0.69 | 0.27 | 2.96 | 0.93 |
| NAC vs PP | -0.01 | 2.93 | -0.23 | 0.7 | -0.24 | 0.72 | 0.23 | 3.02 | 0.94 |
| NAC vs RE | -1.56 | 0.95 | -1.62 | 0.44 | -1.64 | 0.49 | 0.08 | 1.07 | 0.94 |
| NAC vs REI | -1.15 | 1.7 | -1.4 | 0.66 | -1.44 | 0.72 | 0.29 | 1.85 | 0.88 |
| NAC vs ST | 0.17 | 2.9 | -0.48 | 0.69 | -0.51 | 0.71 | 0.68 | 2.98 | 0.82 |
| NAC vs SU | -0.14 | 2.85 | -0.15 | 0.66 | -0.15 | 0.68 | 0.01 | 2.93 | 1 |
| NAC vs TH | 0.28 | 1.53 | 0.23 | 0.62 | 0.22 | 0.67 | 0.06 | 1.67 | 0.97 |
| NAC vs I | -0.4 | 1.62 | -0.67 | 0.64 | -0.72 | 0.69 | 0.32 | 1.77 | 0.86 |
| NAC vs IH | -2.26 | 2.88 | -2.25 | 0.73 | -2.25 | 0.75 | -0.01 | 2.97 | 1 |
| NAC vs IM | 0.2 | 1.97 | 0.2 | 0.62 | 0.2 | 0.66 | 0 | 2.08 | 1 |
| NAC vs J5 | -0.05 | 2.93 | -0.04 | 0.81 | -0.04 | 0.84 | -0.01 | 3.05 | 1 |
| NAC vs HY | -1 | 2.96 | -0.04 | 0.74 | 0.03 | 0.77 | -1.03 | 3.06 | 0.74 |
| NAC vs PAP | 0.34 | 3 | 0.35 | 1.05 | 0.35 | 1.12 | -0.01 | 3.2 | 1 |
| NAC vs PC | -0.06 | 2.88 | -0.05 | 0.74 | -0.05 | 0.76 | -0.01 | 2.98 | 1 |
| NAC vs PL | -1.03 | 1.42 | -1.03 | 0.55 | -1.03 | 0.6 | 0 | 1.54 | 1 |
| I vs RE | 0.59 | 1.8 | -0.95 | 0.57 | -1.12 | 0.6 | 1.71 | 1.9 | 0.37 |
| I vs REI | 0.75 | 1.79 | -0.73 | 0.65 | -0.96 | 0.7 | 1.71 | 1.92 | 0.37 |
| IM vs TH | -0.12 | 1.9 | 0.03 | 0.62 | 0.04 | 0.66 | -0.16 | 2.01 | 0.94 |
| J5 vs PN | 0.04 | 2.89 | -0.06 | 0.8 | -0.07 | 0.83 | 0.11 | 3.01 | 0.97 |
| HY vs ST | -1.04 | 2.9 | -0.44 | 0.72 | -0.4 | 0.74 | -0.64 | 2.99 | 0.83 |

**Supplementary table 5**. Risk ratio comparison for mortality as an outcome for all vaccines assessed in a network meta-analysis of the efficacy of bacterial vaccines for respiratory disease in swine. The upper right hand section of the table represents the risk ratio between the numerator (upper left treatment) and denominator (lower right treatment). The lower left section of the table represents the 95% credibility interval for the comparison, with the rows and columns reversed.



**Supplementary table 6.** Mean ranking of vaccine interventions for mortality as an outcome from a Bayesian network meta-analysis of the efficacy of bacterial vaccines for respiratory disease in swine. Mean rank, standard deviation and quartile rankings are shown.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Intervention | Mean rank | SD | 2.50% | 50% | 97.50% |
| Inglevac HP-1 | 2.08 | 1.42 | 1 | 2 | 6 |
| Porcilis APP | 3.98 | 1.98 | 1 | 4 | 9 |
| Respisure and immune stimulant | 5.64 | 4.49 | 1 | 4 | 18 |
| Coglapix | 8.35 | 5.06 | 2 | 7 | 21 |
| Porcillis M hyo and PRRS | 8.43 | 9.77 | 1 | 4 | 34 |
| Flexcombo and circovirus | 8.89 | 4.51 | 2 | 8 | 20 |
| Porcillus APP and Tiamulin | 9.93 | 4.38 | 3 | 9 | 20 |
| Porcilis Glasser and PRRS | 10.13 | 6.66 | 2 | 9 | 28 |
| Porcilis Glasser | 10.15 | 4.35 | 3 | 10 | 20 |
| Pneuroguard | 13.43 | 7.02 | 3 | 12 | 31 |
| Respisure and Tiamulin | 14.93 | 4.54 | 7 | 14 | 25 |
| Stellamune and lincomycin | 16.03 | 9.88 | 2 | 14 | 34 |
| Stellamune Mono Injection | 17.35 | 3.5 | 11 | 17 | 25 |
| Respisure and lincomycin | 19.58 | 8.61 | 5 | 19 | 34 |
| MycoFLEX and Circovirus | 19.8 | 5.9 | 9 | 19 | 32 |
| 3Flex | 20.28 | 7.42 | 7 | 20 | 34 |
| SPRINTVAC | 21.27 | 7.79 | 7 | 21 | 34 |
| Respisure and PCV vaccine (any) | 21.32 | 9.67 | 4 | 21 | 35 |
| Suvaxyn M hyo and lincomycin | 22.15 | 6.82 | 9 | 22 | 34 |
| Porcilis PCV M Hyo | 22.29 | 5.68 | 12 | 22 | 33 |
| RepiSure One | 22.76 | 4.83 | 14 | 23 | 32 |
| M+PAC | 25.55 | 8.75 | 7 | 28 | 35 |
| Porcilis M Hyo ID ONCE | 25.91 | 4.02 | 18 | 26 | 33 |
| Ingelvac M Hyo | 26.03 | 3.93 | 18 | 26 | 33 |
| Parasail | 26.18 | 5.57 | 14 | 27 | 34 |
| Hyogen | 27.26 | 5.14 | 16 | 28 | 34 |
| Non-active control | 27.37 | 2.34 | 22.975 | 27 | 32 |
| Suvaxyn M Hyo mono | 27.58 | 4.32 | 18 | 28 | 34 |
| ThoroVAX VET | 28.29 | 4.92 | 17 | 30 | 34 |

**Supplementary Table 7:** Results of the indirect comparisons for the consistency assumption for mortality. Columns represent posterior means (d) and standard deviations (sd) of the log-odds ratio of vaccine effects calculated using direct evidence (d), all evidence (MTC), and indirect evidence (rest); w and sd\_w represent the inconsistency estimate and its standard deviation.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Comparison | d\_dir | sd\_dir | d\_MTC | sd\_MTC | d\_rest | sd\_rest | w | sd\_w | p\_value |
| L vs RE | 0.01 | 2.88 | 0.56 | 0.43 | 0.57 | 0.43 | -0.56 | 2.91 | 0.85 |
| L vs REL | -0.43 | 2.94 | 0.38 | 0.52 | 0.4 | 0.53 | -0.83 | 2.99 | 0.78 |
| L vs ST | -0.54 | 2.98 | 0.29 | 0.43 | 0.31 | 0.44 | -0.85 | 3.01 | 0.78 |
| L vs STL | -0.03 | 2.97 | 0.11 | 0.64 | 0.12 | 0.66 | -0.14 | 3.04 | 0.96 |
| M vs ST | -0.49 | 2.91 | -0.49 | 0.54 | -0.5 | 0.55 | 0.01 | 2.97 | 1 |
| MP vs PO | -0.03 | 2.97 | -0.09 | 0.56 | -0.09 | 0.57 | 0.06 | 3.02 | 0.99 |
| MYC vs PC | -0.24 | 1.71 | 0.13 | 0.31 | 0.14 | 0.32 | -0.38 | 1.74 | 0.82 |
| MYC vs REP | 0.11 | 2.88 | 0.09 | 0.58 | 0.09 | 0.59 | 0.02 | 2.94 | 0.99 |
| NAC vs L | -0.6 | 1.68 | -0.75 | 0.49 | -0.77 | 0.51 | 0.17 | 1.76 | 0.92 |
| NAC vs MP | 0.2 | 2.94 | 0.04 | 0.62 | 0.03 | 0.64 | 0.18 | 3.01 | 0.95 |
| NAC vs MYC | -0.18 | 0.83 | -0.35 | 0.34 | -0.38 | 0.37 | 0.2 | 0.91 | 0.82 |
| NAC vs PA | 0 | 2.89 | -0.02 | 0.29 | -0.02 | 0.29 | 0.03 | 2.9 | 0.99 |
| NAC vs PAP | -1.44 | 0.93 | -1.6 | 0.27 | -1.61 | 0.28 | 0.18 | 0.98 | 0.86 |
| NAC vs PAT | -0.96 | 2.89 | -0.97 | 0.33 | -0.97 | 0.34 | 0.01 | 2.91 | 1 |
| NAC vs PC | -0.13 | 1.02 | -0.22 | 0.29 | -0.23 | 0.3 | 0.1 | 1.06 | 0.92 |
| NAC vs PG | -0.94 | 2.89 | -0.95 | 0.32 | -0.95 | 0.33 | 0.01 | 2.91 | 1 |
| NAC vs CO | -1.14 | 2.93 | -1.15 | 0.45 | -1.15 | 0.46 | 0.01 | 2.96 | 1 |
| NAC vs PGP | -1.03 | 2.88 | -1.03 | 0.54 | -1.03 | 0.55 | 0 | 2.93 | 1 |
| NAC vs PN | -0.73 | 2.92 | -0.77 | 0.48 | -0.77 | 0.49 | 0.04 | 2.97 | 0.99 |
| NAC vs PO | -0.06 | 0.31 | -0.05 | 0.16 | -0.05 | 0.19 | -0.01 | 0.36 | 0.97 |
| NAC vs POP | -0.66 | 3.23 | -1.55 | 1.19 | -1.69 | 1.28 | 1.03 | 3.48 | 0.77 |
| NAC vs RE | -0.29 | 0.3 | -0.2 | 0.23 | -0.06 | 0.37 | -0.23 | 0.47 | 0.63 |
| NAC vs REI | -1.54 | 2.93 | -1.49 | 0.55 | -1.49 | 0.56 | -0.05 | 2.98 | 0.99 |
| NAC vs REL | -0.66 | 2.92 | -0.38 | 0.54 | -0.37 | 0.55 | -0.29 | 2.97 | 0.92 |
| NAC vs RET | -0.63 | 1.34 | -0.62 | 0.26 | -0.62 | 0.27 | -0.01 | 1.37 | 1 |
| NAC vs ST | -0.38 | 0.45 | -0.46 | 0.17 | -0.47 | 0.19 | 0.09 | 0.49 | 0.86 |
| NAC vs STL | 0.02 | 2.99 | -0.64 | 0.73 | -0.68 | 0.75 | 0.7 | 3.08 | 0.82 |
| NAC vs SU | 0.03 | 0.57 | 0.03 | 0.2 | 0.03 | 0.21 | 0 | 0.6 | 1 |
| NAC vs T | -0.85 | 1.34 | -0.85 | 0.27 | -0.85 | 0.28 | -0.01 | 1.37 | 1 |
| NAC vs TH | 0 | 0.68 | 0.09 | 0.27 | 0.1 | 0.3 | -0.1 | 0.74 | 0.89 |
| NAC vs FLCI | -0.21 | 2.95 | -1.07 | 0.38 | -1.09 | 0.39 | 0.88 | 2.98 | 0.77 |
| NAC vs HY | 0.03 | 1.39 | 0.03 | 0.27 | 0.03 | 0.27 | 0 | 1.41 | 1 |
| NAC vs I | -0.1 | 0.92 | -0.09 | 0.29 | -0.08 | 0.31 | -0.02 | 0.97 | 0.99 |
| NAC vs IH | -2.06 | 2.87 | -2.05 | 0.36 | -2.05 | 0.37 | -0.01 | 2.9 | 1 |
| NAC vs IM | -0.05 | 0.15 | -0.05 | 0.16 | -0.06 | NA | 0.01 | NA | NA |
| NAC vs J5 | -1.06 | 3 | -1.09 | 0.63 | -1.1 | 0.64 | 0.03 | 3.07 | 0.99 |
| PO vs POP | 1.81 | 3.19 | -1.5 | 1.12 | -1.96 | 1.19 | 3.77 | 3.41 | 0.27 |
| PO vs SU | 0.17 | 2.85 | 0.08 | 0.18 | 0.08 | 0.18 | 0.09 | 2.86 | 0.97 |
| RE vs REI | 1.35 | 2.87 | -1.3 | 0.48 | -1.37 | 0.48 | 2.73 | 2.91 | 0.35 |
| RE vs REL | -0.42 | 2.96 | -0.18 | 0.47 | -0.18 | 0.47 | -0.25 | 2.99 | 0.93 |
| RE vs SP | -0.09 | 2.91 | -0.08 | 0.39 | -0.08 | 0.4 | -0.01 | 2.94 | 1 |
| RET vs T | 0.24 | 1.37 | -0.23 | 0.27 | -0.25 | 0.27 | 0.49 | 1.4 | 0.72 |
| ST vs STL | 0.53 | 2.98 | -0.18 | 0.66 | -0.22 | 0.67 | 0.75 | 3.06 | 0.81 |
| FL vs MYC | -0.01 | 2.87 | -0.02 | 0.4 | -0.02 | 0.4 | 0 | 2.9 | 1 |
| FLCI vs MYC | 0.02 | 2.98 | 0.72 | 0.36 | 0.73 | 0.36 | -0.71 | 3 | 0.81 |
| FLCI vs CF | 1.98 | 2.99 | 1.98 | 0.78 | 1.98 | 0.81 | 0.01 | 3.1 | 1 |
| FLCI vs IM | 1.27 | 2.87 | 1.03 | 0.33 | 1.02 | 0.33 | 0.25 | 2.89 | 0.93 |
| HY vs ST | -0.52 | 2.93 | -0.49 | 0.23 | -0.49 | 0.23 | -0.03 | 2.94 | 0.99 |
| I vs RE | 0.12 | 0.99 | -0.11 | 0.27 | -0.13 | 0.28 | 0.25 | 1.02 | 0.81 |
| I vs REI | 1.38 | 2.93 | -1.41 | 0.47 | -1.48 | 0.48 | 2.86 | 2.97 | 0.34 |
| IM vs RE | 0.16 | 1.65 | -0.15 | 0.21 | -0.15 | 0.21 | 0.32 | 1.67 | 0.85 |
| IM vs TH | -0.08 | 1.4 | 0.13 | 0.24 | 0.14 | 0.24 | -0.22 | 1.42 | 0.88 |
| J5 vs PN | -0.34 | 2.94 | 0.33 | 0.57 | 0.35 | 0.58 | -0.7 | 2.99 | 0.82 |

**Supplementary table 8**. Risk ratio comparison for mortality as an outcome for all vaccines assessed in a network meta-analysis of the efficacy of bacterial vaccines for respiratory disease in swine. The upper right hand section of the table represents the risk ratio between the numerator (upper left treatment) and denominator (lower right treatment). The lower left section of the table represents the 95% credibility interval for the comparison, with the rows and columns reversed.



**Supplementary table 9.** Mean ranking of vaccine interventions for non-specific lung lesions as an outcome from a Bayesian network meta-analysis of the efficacy of bacterial vaccines for respiratory disease in swine. Mean rank, standard deviation and quartile rankings are shown.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Intervention** | **Mean** | **SD** | **2.50%** | **50%** | **97.50%** |
| Respisure and Tiamulin | 1.88 | 1.63 | 1 | 1 | 7 |
| Ingelvac M Hyo | 3.65 | 2.8 | 1 | 3 | 12 |
| Respisure and immune stimulant | 6.55 | 3.83 | 1 | 6 | 16 |
| RepiSure One | 6.8 | 2.95 | 3 | 6 | 14 |
| SPRINTVAC | 9 | 5.52 | 1 | 8 | 21 |
| Mycobuster | 10.56 | 5.36 | 2 | 10 | 21 |
| Hyoresp | 10.61 | 5.99 | 1 | 10 | 22 |
| Hyogen | 10.98 | 5.22 | 2 | 10 | 21 |
| Suvaxyn M Hyo mono | 11.2 | 4.19 | 4 | 11 | 20 |
| Porcilis PCV M Hyo | 11.55 | 4.12 | 4 | 11 | 20 |
| Vaxsafe MHP | 11.57 | 5.14 | 3 | 11 | 21 |
| Porcilis M Hyo ID ONCE | 11.86 | 3.64 | 5 | 12 | 19 |
| Respisure and PCV vaccine (any) | 12.62 | 6.18 | 2 | 13 | 22 |
| MycoFLEX and Circovirus | 12.82 | 4.85 | 4 | 13 | 21 |
| Porcilis APP, MSD | 12.84 | 4.14 | 5 | 13 | 20 |
| Stellamune Mono Injection | 13.57 | 2.67 | 8 | 14 | 18 |
| Stellamune and lincomycin | 17.46 | 4.04 | 7 | 19 | 22 |
| Ingelvac APPX and Circovirus | 17.87 | 4.22 | 7 | 19 | 22 |
| Non-active control | 17.94 | 1.69 | 14 | 18 | 21 |

**Supplementary Table 10:** Results of the indirect comparisons for the consistency assumption for the presence / absence of non-specific lung lesions. Columns represent posterior means (d) and standard deviations (sd) of the log-odds ratio of vaccine effects calculated using direct evidence (d), all evidence (MTC), and indirect evidence (rest); w and sd\_w represent the inconsistency estimate and its standard deviation.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Comparison** | **d\_dir** | **sd\_dir** | **d\_MTC** | **sd\_MTC** | **d\_rest** | **sd\_rest** | **w** | **sd\_w** | **p\_value** |
| PO vs ST | -0.02 | 2.9 | 0.23 | 0.44 | 0.24 | 0.45 | -0.26 | 2.93 | 0.93 |
| RE vs REI | 0.03 | 1.71 | -0.09 | 0.75 | -0.12 | 0.84 | 0.15 | 1.91 | 0.94 |
| RE vs SP | 0.27 | 2.93 | 0.28 | 0.98 | 0.28 | 1.04 | -0.01 | 3.11 | 1 |
| RET vs T | -0.79 | 1.55 | 0.79 | 0.82 | 1.39 | 0.96 | -2.18 | 1.82 | 0.23 |
| ST vs STL | -0.53 | 2.94 | 0.7 | 0.69 | 0.77 | 0.71 | -1.3 | 3.03 | 0.67 |
| NAC vs PAP | -0.69 | 1.51 | -0.69 | 0.6 | -0.69 | 0.65 | -0.01 | 1.64 | 1 |
| NAC vs PC | -0.86 | 1.38 | -0.87 | 0.64 | -0.87 | 0.73 | 0.01 | 1.56 | 0.99 |
| NAC vs PO | -0.94 | 1.31 | -0.82 | 0.5 | -0.8 | 0.55 | -0.14 | 1.42 | 0.92 |
| NAC vs RE | -1.67 | 1.59 | -1.69 | 0.65 | -1.7 | 0.71 | 0.03 | 1.75 | 0.99 |
| NAC vs REI | -2.1 | 2.96 | -1.78 | 0.83 | -1.75 | 0.86 | -0.35 | 3.08 | 0.91 |
| NAC vs RET | -3.22 | 1.67 | -3.24 | 0.81 | -3.25 | 0.93 | 0.03 | 1.91 | 0.99 |
| NAC vs ST | -0.56 | 0.72 | -0.59 | 0.34 | -0.6 | 0.38 | 0.04 | 0.82 | 0.96 |
| NAC vs STL | 0.25 | 2.94 | 0.11 | 0.8 | 0.1 | 0.83 | 0.16 | 3.06 | 0.96 |
| NAC vs SU | -0.9 | 1.39 | -0.93 | 0.62 | -0.94 | 0.7 | 0.04 | 1.56 | 0.98 |
| NAC vs T | -2.47 | 1.63 | -2.46 | 0.82 | -2.45 | 0.94 | -0.02 | 1.89 | 0.99 |
| NAC vs VM | -0.91 | 2.9 | -0.89 | 0.86 | -0.89 | 0.9 | -0.02 | 3.03 | 0.99 |
| NAC vs I | 0.15 | 2.95 | 0.45 | 0.93 | 0.48 | 0.98 | -0.33 | 3.11 | 0.92 |
| NAC vs IAC | 0.22 | 2.92 | 0.22 | 0.9 | 0.22 | 0.95 | -0.01 | 3.07 | 1 |
| NAC vs L | 0.55 | 2.91 | 0.4 | 0.79 | 0.38 | 0.83 | 0.16 | 3.03 | 0.96 |
| NAC vs MY | -1.08 | 2.92 | -1.06 | 0.93 | -1.06 | 0.98 | -0.02 | 3.08 | 0.99 |
| NAC vs MYC | -0.66 | 2.91 | -0.69 | 0.85 | -0.69 | 0.89 | 0.03 | 3.05 | 0.99 |
| NAC vs HR | -1.07 | 2.99 | -1.08 | 1.12 | -1.08 | 1.21 | 0 | 3.22 | 1 |
| HY vs ST | 0.38 | 2.9 | 0.39 | 0.79 | 0.39 | 0.82 | -0.01 | 3.01 | 1 |
| I vs RE | 2.32 | 2.92 | -2.14 | 0.83 | -2.53 | 0.86 | 4.85 | 3.04 | 0.11 |
| I vs REI | 2.25 | 2.91 | -2.23 | 0.88 | -2.68 | 0.93 | 4.94 | 3.05 | 0.11 |
| IAC vs PC | 1.12 | 2.95 | -1.1 | 0.8 | -1.27 | 0.84 | 2.39 | 3.06 | 0.44 |
| IM vs RE | 0.81 | 1.75 | 0.81 | 0.8 | 0.81 | 0.9 | 0 | 1.97 | 1 |
| L vs ST | 0.86 | 2.93 | -0.99 | 0.69 | -1.1 | 0.71 | 1.95 | 3.02 | 0.52 |
| L vs STL | 0.29 | 2.91 | -0.29 | 0.8 | -0.34 | 0.83 | 0.63 | 3.03 | 0.84 |
| MYC vs PC | 0.16 | 2.89 | -0.18 | 0.77 | -0.21 | 0.8 | 0.37 | 3 | 0.9 |
| MYC vs REP | -0.01 | 2.91 | -0.02 | 1.09 | -0.02 | 1.17 | 0.02 | 3.14 | 1 |

**Supplementary table 11:** Grade summary of evidence for morbidity as an outcome in a network meta-analysis of bacterial vaccines to prevent respiratory disease in swine. The comparisons shown represent comparisons between eligible vaccines; comparisons where the number of contributing studies is equal to zero represent indirect evidence.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Comparison | # of studies | Randomization | Blinding | Imprecision | Heterogeneity |
| HY:ST | 1 | Major concerns | No concerns | Major concerns | No concerns |
| IM:TH | 2 | No concerns | Some concerns | Major concerns | No concerns |
| PO:POP | 1 | Major concerns | Some concerns | Some concerns | Some concerns |
| PO:SU | 1 | Some concerns | Some concerns | Some concerns | Some concerns |
| RE:REI | 2 | Major concerns | Major concerns | Major concerns | No concerns |
| HY:IH | 0 | Some concerns | Major concerns | No concerns | No concerns |
| HY:IM | 0 | No concerns | Some concerns | Major concerns | No concerns |
| HY:PAP | 0 | Some concerns | No concerns | Major concerns | No concerns |
| HY:PC | 0 | No concerns | No concerns | Major concerns | No concerns |
| HY:PL | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| HY:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| HY:PO | 0 | Some concerns | Some concerns | Some concerns | Some concerns |
| HY:POP | 0 | Major concerns | Some concerns | Major concerns | No concerns |
| HY:RE | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| HY:REI | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
| HY:SU | 0 | Some concerns | Some concerns | Major concerns | No concerns |
| HY:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| IH:IM | 0 | No concerns | Some concerns | No concerns | No concerns |
| IH:PAP | 0 | Some concerns | No concerns | No concerns | No concerns |
| IH:PC | 0 | No concerns | No concerns | No concerns | No concerns |
| IH:PL | 0 | Some concerns | Major concerns | No concerns | Some concerns |
| IH:PN | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:PO | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:POP | 0 | Major concerns | Some concerns | No concerns | No concerns |
| IH:RE | 0 | Major concerns | Major concerns | No concerns | Some concerns |
| IH:REI | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| IH:ST | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:SU | 0 | Some concerns | Some concerns | No concerns | No concerns |
| IH:TH | 0 | No concerns | Some concerns | No concerns | No concerns |
| IM:PAP | 0 | No concerns | Some concerns | Major concerns | No concerns |
| IM:PC | 0 | No concerns | Some concerns | Major concerns | No concerns |
| IM:PL | 0 | No concerns | Some concerns | Some concerns | Some concerns |
| IM:PN | 0 | No concerns | Some concerns | Major concerns | No concerns |
| IM:PO | 0 | No concerns | Some concerns | Major concerns | No concerns |
| IM:POP | 0 | No concerns | Some concerns | Major concerns | No concerns |
| IM:RE | 0 | No concerns | Some concerns | Some concerns | Some concerns |
| IM:REI | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| IM:ST | 0 | No concerns | Some concerns | Major concerns | No concerns |
| IM:SU | 0 | No concerns | Some concerns | Major concerns | No concerns |
| PAP:PC | 0 | No concerns | No concerns | Major concerns | No concerns |
| PAP:PL | 0 | Some concerns | No concerns | Major concerns | No concerns |
| PAP:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PAP:PO | 0 | Some concerns | No concerns | Major concerns | No concerns |
| PAP:POP | 0 | Major concerns | Some concerns | Major concerns | No concerns |
| PAP:RE | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PAP:REI | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PAP:ST | 0 | Some concerns | No concerns | Major concerns | No concerns |
| PAP:SU | 0 | Some concerns | Some concerns | Major concerns | No concerns |
| PAP:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| PC:PL | 0 | No concerns | No concerns | Some concerns | No concerns |
| PC:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PC:PO | 0 | No concerns | No concerns | Some concerns | Some concerns |
| PC:POP | 0 | Major concerns | Some concerns | Major concerns | No concerns |
| PC:RE | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| PC:REI | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
| PC:ST | 0 | Some concerns | No concerns | Major concerns | No concerns |
| PC:SU | 0 | Some concerns | Some concerns | Major concerns | No concerns |
| PC:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| PL:PN | 0 | Some concerns | Major concerns | Some concerns | Some concerns |
| PL:PO | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PL:POP | 0 | Major concerns | Some concerns | Some concerns | Some concerns |
| PL:RE | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PL:REI | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PL:ST | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PL:SU | 0 | Some concerns | Some concerns | Some concerns | Some concerns |
| PL:TH | 0 | No concerns | Some concerns | Some concerns | Some concerns |
| PN:PO | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:POP | 0 | Some concerns | Some concerns | Major concerns | No concerns |
| PN:RE | 0 | Some concerns | Major concerns | Some concerns | Some concerns |
| PN:REI | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
| PN:ST | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:SU | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| PO:RE | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PO:REI | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PO:ST | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PO:TH | 0 | No concerns | Some concerns | Some concerns | Some concerns |
| POP:RE | 0 | Major concerns | Some concerns | Some concerns | Some concerns |
| POP:REI | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
| POP:ST | 0 | Major concerns | Some concerns | Major concerns | No concerns |
| POP:SU | 0 | Major concerns | Some concerns | Major concerns | No concerns |
| POP:TH | 0 | Major concerns | Some concerns | Major concerns | No concerns |
| RE:ST | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| RE:SU | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
| RE:TH | 0 | No concerns | Some concerns | Some concerns | Some concerns |
| REI:ST | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| REI:SU | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
| REI:TH | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
| ST:SU | 0 | Some concerns | Some concerns | Major concerns | No concerns |
| ST:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| SU:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |

**Supplementary table 12:** Grade summary of evidence for mortality as an outcome in a network meta-analysis of bacterial vaccines to prevent respiratory disease in swine. The comparisons shown represent comparisons between eligible vaccines; comparisons where the number of contributing studies is equal to zero represent indirect evidence.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Comparison | # of studies | Randomization | Blinding | Imprecision | Heterogeneity |
| FL:MYC | 1 | Major concerns | Major concerns | Major concerns | No concerns |
| FLCI:IM | 1 | Some concerns | Major concerns | No concerns | Some concerns |
| FLCI:MYC | 1 | Some concerns | Major concerns | Some concerns | Some concerns |
| HY:ST | 1 | Major concerns | Some concerns | Some concerns | No concerns |
| IM:RE | 2 | Some concerns | Major concerns | Major concerns | No concerns |
| IM:TH | 2 | No concerns | Some concerns | Major concerns | No concerns |
| MP:PO | 1 | No concerns | No concerns | Major concerns | No concerns |
| MYC:PC | 2 | Some concerns | Major concerns | Major concerns | No concerns |
| MYC:REP | 1 | Some concerns | Major concerns | Major concerns | No concerns |
| PO:POP | 1 | No concerns | Major concerns | Major concerns | No concerns |
| PO:SU | 1 | Some concerns | Some concerns | Major concerns | No concerns |
| RE:REI | 1 | Major concerns | Major concerns | No concerns | Some concerns |
| RE:REL | 1 | No concerns | Some concerns | Major concerns | No concerns |
| RE:SP | 1 | Some concerns | Major concerns | Major concerns | No concerns |
| ST:STL | 1 | Some concerns | No concerns | Major concerns | No concerns |
| CO:FL | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| CO:FLCI | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| CO:HY | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| CO:IH | 0 | Some concerns | Major concerns | Some concerns | Some concerns |
| CO:IM | 0 | Major concerns | Major concerns | No concerns | Some concerns |
| CO:MP | 0 | Major concerns | No concerns | Major concerns | No concerns |
| CO:MYC | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| CO:PA | 0 | Some concerns | Major concerns | Some concerns | No concerns |
| CO:PAP | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| CO:PAT | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| CO:PC | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| CO:PG | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| CO:PGP | 0 | No concerns | No concerns | Major concerns | No concerns |
| CO:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| CO:PO | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| CO:POP | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| CO:RE | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| CO:REI | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| CO:REL | 0 | No concerns | Major concerns | Major concerns | No concerns |
| CO:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| CO:RET | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| CO:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| CO:ST | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
| CO:STL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| CO:SU | 0 | Major concerns | Major concerns | No concerns | Some concerns |
| CO:SUL | 0 | Some concerns | Major concerns | Some concerns | Some concerns |
| CO:TH | 0 | No concerns | Major concerns | No concerns | Some concerns |
| FL:FLCI | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| FL:HY | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| FL:IH | 0 | Some concerns | Major concerns | No concerns | No concerns |
| FL:IM | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| FL:MP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| FL:PA | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| FL:PAP | 0 | Major concerns | Major concerns | No concerns | No concerns |
| FL:PAT | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| FL:PC | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| FL:PG | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| FL:PGP | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| FL:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| FL:PO | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| FL:POP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| FL:RE | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| FL:REI | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
| FL:REL | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| FL:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| FL:RET | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| FL:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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| FL:STL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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| FL:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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| FLCI:HY | 0 | Some concerns | Major concerns | No concerns | Some concerns |
| FLCI:IH | 0 | Some concerns | Major concerns | Some concerns | No concerns |
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| FLCI:RET | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| FLCI:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| FLCI:ST | 0 | Some concerns | Major concerns | Some concerns | Some concerns |
| FLCI:STL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| FLCI:SU | 0 | Some concerns | Major concerns | No concerns | Some concerns |
| FLCI:SUL | 0 | Some concerns | Major concerns | Some concerns | No concerns |
| FLCI:TH | 0 | No concerns | Major concerns | No concerns | No concerns |
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| HY:MP | 0 | No concerns | No concerns | Major concerns | No concerns |
| HY:MYC | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| HY:PA | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| HY:PAP | 0 | Major concerns | Major concerns | No concerns | No concerns |
| HY:PAT | 0 | Major concerns | Major concerns | No concerns | Some concerns |
| HY:PC | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| HY:PG | 0 | Major concerns | Major concerns | No concerns | Some concerns |
| HY:PGP | 0 | No concerns | No concerns | Some concerns | No concerns |
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| HY:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| HY:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| IH:IM | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:MP | 0 | Some concerns | No concerns | No concerns | No concerns |
| IH:MYC | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:PA | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:PAP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| IH:PAT | 0 | Some concerns | Major concerns | Some concerns | No concerns |
| IH:PC | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:PG | 0 | Some concerns | Major concerns | No concerns | Some concerns |
| IH:PGP | 0 | No concerns | No concerns | Some concerns | Some concerns |
| IH:PN | 0 | Some concerns | Major concerns | Some concerns | No concerns |
| IH:PO | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:POP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| IH:RE | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:REI | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| IH:REL | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:REP | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:RET | 0 | Major concerns | Major concerns | No concerns | No concerns |
| IH:SP | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:ST | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:STL | 0 | Some concerns | Major concerns | Some concerns | Some concerns |
| IH:SU | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:SUL | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IH:TH | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IM:MP | 0 | No concerns | No concerns | Major concerns | No concerns |
| IM:MYC | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| IM:PA | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| IM:PAP | 0 | Some concerns | Major concerns | No concerns | No concerns |
| IM:PAT | 0 | Major concerns | Major concerns | No concerns | Some concerns |
| IM:PC | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| IM:PG | 0 | Major concerns | Major concerns | No concerns | Some concerns |
| IM:PGP | 0 | No concerns | No concerns | Some concerns | No concerns |
| IM:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| IM:PO | 0 | Some concerns | Some concerns | Major concerns | No concerns |
| IM:POP | 0 | No concerns | Major concerns | Major concerns | No concerns |
| IM:REI | 0 | Major concerns | Major concerns | No concerns | No concerns |
| IM:REL | 0 | No concerns | Some concerns | Major concerns | No concerns |
| IM:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| IM:RET | 0 | Major concerns | Major concerns | Some concerns | No concerns |
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| IM:ST | 0 | No concerns | Major concerns | Some concerns | No concerns |
| IM:STL | 0 | Some concerns | No concerns | Major concerns | No concerns |
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| MP:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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| MP:REL | 0 | No concerns | No concerns | Major concerns | No concerns |
| MP:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| MP:RET | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| MP:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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| MP:SU | 0 | No concerns | No concerns | Major concerns | No concerns |
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| MYC:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| MYC:PO | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| MYC:POP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| MYC:RE | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| MYC:REI | 0 | Some concerns | Major concerns | Some concerns | No concerns |
| MYC:REL | 0 | Some concerns | Some concerns | Major concerns | No concerns |
| MYC:RET | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| MYC:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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| MYC:SU | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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| MYC:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| PA:PAP | 0 | Some concerns | Major concerns | No concerns | No concerns |
| PA:PAT | 0 | Some concerns | Major concerns | Some concerns | No concerns |
| PA:PC | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PA:PG | 0 | Some concerns | Major concerns | Some concerns | No concerns |
| PA:PGP | 0 | No concerns | No concerns | Some concerns | No concerns |
| PA:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PA:PO | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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| PA:REI | 0 | Some concerns | Major concerns | No concerns | No concerns |
| PA:REL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PA:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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| PA:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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| PA:STL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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| PAP:PAT | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
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| PAP:PGP | 0 | No concerns | No concerns | Major concerns | No concerns |
| PAP:PN | 0 | Some concerns | Major concerns | Some concerns | Some concerns |
| PAP:PO | 0 | Some concerns | Major concerns | No concerns | No concerns |
| PAP:POP | 0 | No concerns | Major concerns | Major concerns | No concerns |
| PAP:RE | 0 | Some concerns | Major concerns | No concerns | No concerns |
| PAP:REI | 0 | Major concerns | Major concerns | Major concerns | No concerns |
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| PAP:RET | 0 | Major concerns | Major concerns | No concerns | Some concerns |
| PAP:SP | 0 | Some concerns | Major concerns | No concerns | No concerns |
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| PAP:STL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PAP:SU | 0 | Some concerns | Major concerns | No concerns | No concerns |
| PAP:SUL | 0 | Some concerns | Major concerns | No concerns | No concerns |
| PAP:TH | 0 | No concerns | Major concerns | No concerns | No concerns |
| PAT:PC | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| PAT:PG | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PAT:PGP | 0 | No concerns | No concerns | Major concerns | No concerns |
| PAT:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PAT:PO | 0 | Major concerns | Major concerns | No concerns | Some concerns |
| PAT:POP | 0 | Major concerns | Major concerns | Major concerns | No concerns |
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| PAT:REI | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PAT:REL | 0 | No concerns | Major concerns | Major concerns | No concerns |
| PAT:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PAT:RET | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PAT:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PAT:ST | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
| PAT:STL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PAT:SU | 0 | Major concerns | Major concerns | No concerns | Some concerns |
| PAT:SUL | 0 | Some concerns | Major concerns | Some concerns | Some concerns |
| PAT:TH | 0 | No concerns | Major concerns | No concerns | Some concerns |
| PC:PG | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| PC:PGP | 0 | No concerns | No concerns | Major concerns | No concerns |
| PC:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PC:PO | 0 | Some concerns | No concerns | Major concerns | No concerns |
| PC:POP | 0 | No concerns | Major concerns | Major concerns | No concerns |
| PC:RE | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PC:REI | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| PC:REL | 0 | No concerns | Some concerns | Major concerns | No concerns |
| PC:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PC:RET | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PC:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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| PC:SU | 0 | Some concerns | No concerns | Major concerns | No concerns |
| PC:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PC:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| PG:PGP | 0 | No concerns | No concerns | Major concerns | No concerns |
| PG:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PG:PO | 0 | Major concerns | Major concerns | No concerns | Some concerns |
| PG:POP | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PG:RE | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| PG:REI | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PG:REL | 0 | No concerns | Major concerns | Major concerns | No concerns |
| PG:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PG:RET | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PG:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PG:ST | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
| PG:STL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PG:SU | 0 | Major concerns | Major concerns | No concerns | Some concerns |
| PG:SUL | 0 | Some concerns | Major concerns | Some concerns | Some concerns |
| PG:TH | 0 | No concerns | Major concerns | No concerns | Some concerns |
| PGP:PN | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PGP:PO | 0 | No concerns | No concerns | Some concerns | No concerns |
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| PGP:RET | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PGP:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PGP:ST | 0 | No concerns | No concerns | Major concerns | No concerns |
| PGP:STL | 0 | No concerns | No concerns | Major concerns | No concerns |
| PGP:SU | 0 | No concerns | No concerns | Some concerns | No concerns |
| PGP:SUL | 0 | No concerns | No concerns | Major concerns | No concerns |
| PGP:TH | 0 | No concerns | Some concerns | Some concerns | No concerns |
| PN:PO | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:POP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:RE | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:REI | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:REL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:RET | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| PN:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:ST | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:STL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:SU | 0 | Some concerns | Major concerns | Some concerns | Some concerns |
| PN:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PN:TH | 0 | Some concerns | Major concerns | Some concerns | Some concerns |
| PO:RE | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PO:REI | 0 | Major concerns | Major concerns | No concerns | No concerns |
| PO:REL | 0 | No concerns | Some concerns | Major concerns | No concerns |
| PO:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PO:RET | 0 | Major concerns | Major concerns | Some concerns | No concerns |
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| PO:ST | 0 | Some concerns | Major concerns | Some concerns | No concerns |
| PO:STL | 0 | Some concerns | No concerns | Major concerns | No concerns |
| PO:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| PO:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| POP:RE | 0 | No concerns | Major concerns | Major concerns | No concerns |
| POP:REI | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| POP:REL | 0 | No concerns | Major concerns | Major concerns | No concerns |
| POP:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| POP:RET | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| POP:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| POP:ST | 0 | No concerns | Major concerns | Major concerns | No concerns |
| POP:STL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| POP:SU | 0 | No concerns | Major concerns | Major concerns | No concerns |
| POP:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| POP:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| RE:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| RE:RET | 0 | Major concerns | Major concerns | Some concerns | Some concerns |
| RE:ST | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| RE:STL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| RE:SU | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| RE:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| RE:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
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| REI:SP | 0 | Some concerns | Major concerns | Some concerns | No concerns |
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| REI:SU | 0 | Some concerns | Major concerns | No concerns | No concerns |
| REI:SUL | 0 | Some concerns | Major concerns | Some concerns | No concerns |
| REI:TH | 0 | No concerns | Major concerns | No concerns | No concerns |
| REL:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| REL:RET | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| REL:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| REL:ST | 0 | No concerns | Some concerns | Major concerns | No concerns |
| REL:STL | 0 | Some concerns | Some concerns | Major concerns | No concerns |
| REL:SU | 0 | No concerns | Some concerns | Major concerns | No concerns |
| REL:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| REL:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| REP:RET | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| REP:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| REP:ST | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| REP:STL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| REP:SU | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| REP:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| REP:TH | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| RET:SP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| RET:ST | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| RET:STL | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| RET:SU | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| RET:SUL | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| RET:TH | 0 | Major concerns | Major concerns | Some concerns | No concerns |
| SP:ST | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| SP:STL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| SP:SU | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| SP:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| SP:TH | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| ST:SU | 0 | Some concerns | Major concerns | Some concerns | No concerns |
| ST:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| ST:TH | 0 | No concerns | Some concerns | Some concerns | No concerns |
| STL:SU | 0 | Some concerns | No concerns | Major concerns | No concerns |
| STL:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| STL:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| SU:SUL | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| SU:TH | 0 | No concerns | Some concerns | Major concerns | No concerns |
| SUL:TH | 0 | Some concerns | Major concerns | Major concerns | No concerns |

Supplementary table 13: Grade summary of evidence for non-specific lung lesions as an outcome in a network meta-analysis of bacterial vaccines to prevent respiratory disease in swine. The comparisons shown represent comparisons between eligible vaccines; comparisons where the number of contributing studies is equal to zero represent indirect evidence.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Comparison** | **# of studies** | **Randomization** | **Blinding** | **Imprecision** | **Heterogeneity** |
| HR:NAC | 1 | Some concerns | Major concerns | Major concerns | No concerns |
| HY:ST | 1 | Major concerns | No concerns | Major concerns | No concerns |
| IAC:NAC | 1 | Some concerns | Major concerns | Major concerns | No concerns |
| IAC:PC | 1 | Some concerns | Major concerns | No concerns | Some concerns |
| IM:RE | 2 | Major concerns | Major concerns | No concerns | Some concerns |
| MY:NAC | 1 | Some concerns | Major concerns | No concerns | Some concerns |
| MYC:NAC | 1 | Some concerns | Major concerns | Some concerns | Some concerns |
| MYC:PC | 1 | Some concerns | Major concerns | Major concerns | No concerns |
| MYC:REP | 1 | Some concerns | Major concerns | Major concerns | No concerns |
| NAC:PAP | 2 | Some concerns | Major concerns | No concerns | Some concerns |
| NAC:PC | 2 | Some concerns | Major concerns | No concerns | Some concerns |
| NAC:PO | 2 | Some concerns | Some concerns | No concerns | No concerns |
| NAC:RE | 2 | Major concerns | Major concerns | No concerns | No concerns |
| NAC:REI | 1 | Major concerns | Major concerns | No concerns | No concerns |
| NAC:RET | 2 | Major concerns | Major concerns | No concerns | No concerns |
| NAC:ST | 6 | Major concerns | Some concerns | No concerns | No concerns |
| NAC:STL | 1 | Some concerns | No concerns | Major concerns | No concerns |
| NAC:SU | 2 | Some concerns | No concerns | No concerns | No concerns |
| NAC:VM | 1 | Major concerns | Major concerns | No concerns | Some concerns |
| PO:ST | 1 | Some concerns | Major concerns | Major concerns | No concerns |
| RE:REI | 1 | Major concerns | Major concerns | Major concerns | No concerns |
| RE:SP | 1 | Some concerns | Major concerns | Major concerns | No concerns |
| ST:STL | 1 | Some concerns | No concerns | No concerns | Some concerns |
| HR:HY | 0 | Major concerns | Some concerns | Major concerns | No concerns |
| HR:IAC | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| HR:IM | 0 | Major concerns | Major concerns | Major concerns | No concerns |
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| HR:PC | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| HR:PO | 0 | Some concerns | Major concerns | Major concerns | No concerns |
| HR:RE | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| HR:REI | 0 | Major concerns | Major concerns | Major concerns | No concerns |
| HR:REP | 0 | Some concerns | Major concerns | Major concerns | No concerns |
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**Figures**

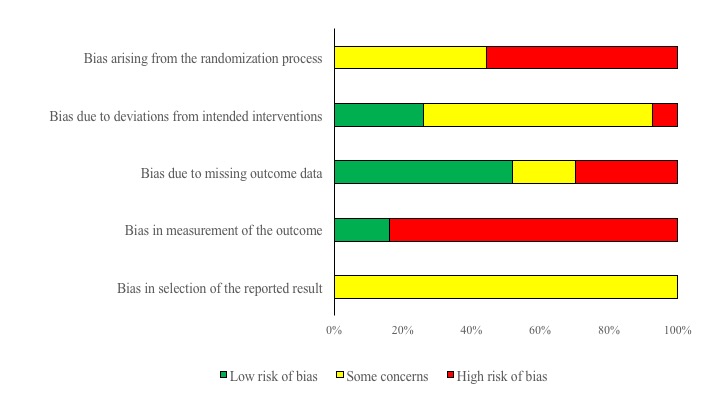
**Supplementary Figure 1.** Summary of individual trial risk of bias assessment for trials measuring morbidity as an outcome, and included in a network meta-analysis on the efficacy of bacterial vaccines for respiratory disease in swine.



**Supplementary** **Figure 2.** Summary of individual trial risk of bias assessment for trials measuring mortality as an outcome, and included in a network meta-analysis on the efficacy of bacterial vaccines for respiratory disease in swine.



**Supplementary** **Figure 3.** Summary of individual trial risk of bias assessment for trials measuring the presence / absence of non-specific lung lesions at slaughter as an outcome, and included in a network meta-analysis on the efficacy of bacterial vaccines for respiratory disease in swine.



**Supplementary Figure 4:** The distribution of the probability of failure (morbidity) for each eligible vaccine from a network meta-analysis of bacterial vaccines to prevent respiratory disease in swine.



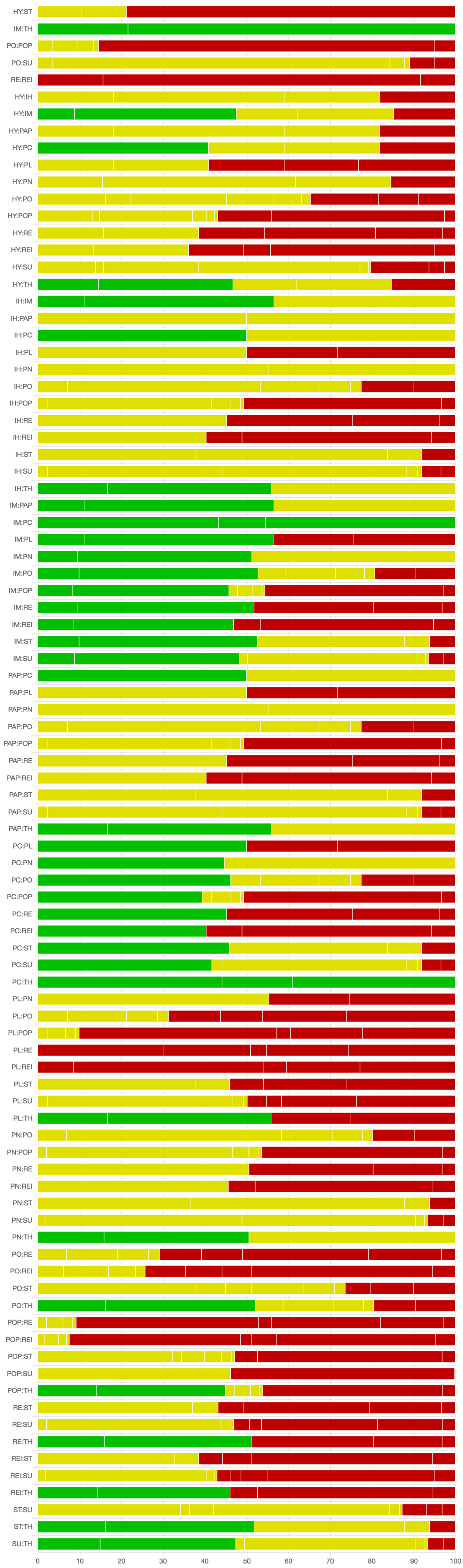
**Supplementary** **Figure 5:** The distribution of the probability of failure (mortality) for each eligible vaccine from a network meta-analysis of bacterial vaccines to prevent respiratory disease in swine.



**Supplementary** **Figure 6:** The distribution of the probability of failure (presence of non-specific lung lesions) for each eligible vaccine from a network meta-analysis of bacterial vaccines to prevent respiratory disease in swine.



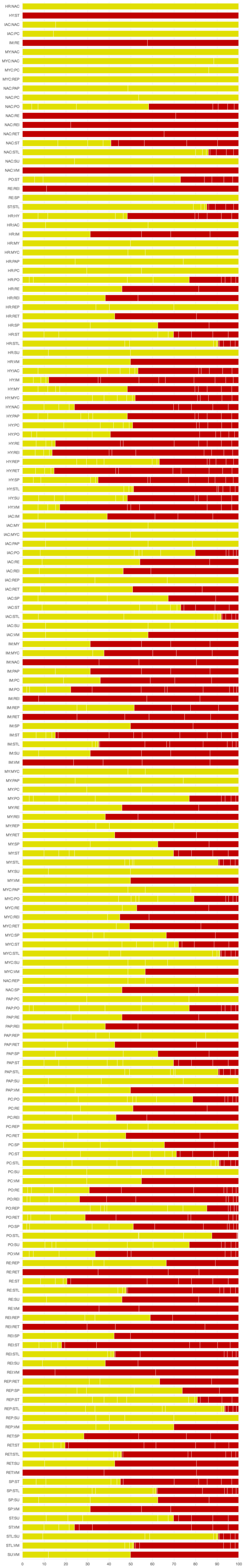
**Supplementary** **Figure 7:** The contribution of trials to the risk ratio estimates for morbidity as an outcome based on the approach to randomization; green indicates that allocation to intervention group was random and that the method of generating the random sequence was provided, yellow indicates that the authors stated that allocation was random but did not describe the method of generating the random allocation sequence, and red indicates that allocation to intervention group was not random or was not reported. White vertical lines indicate the percentage contribution of separate studies.



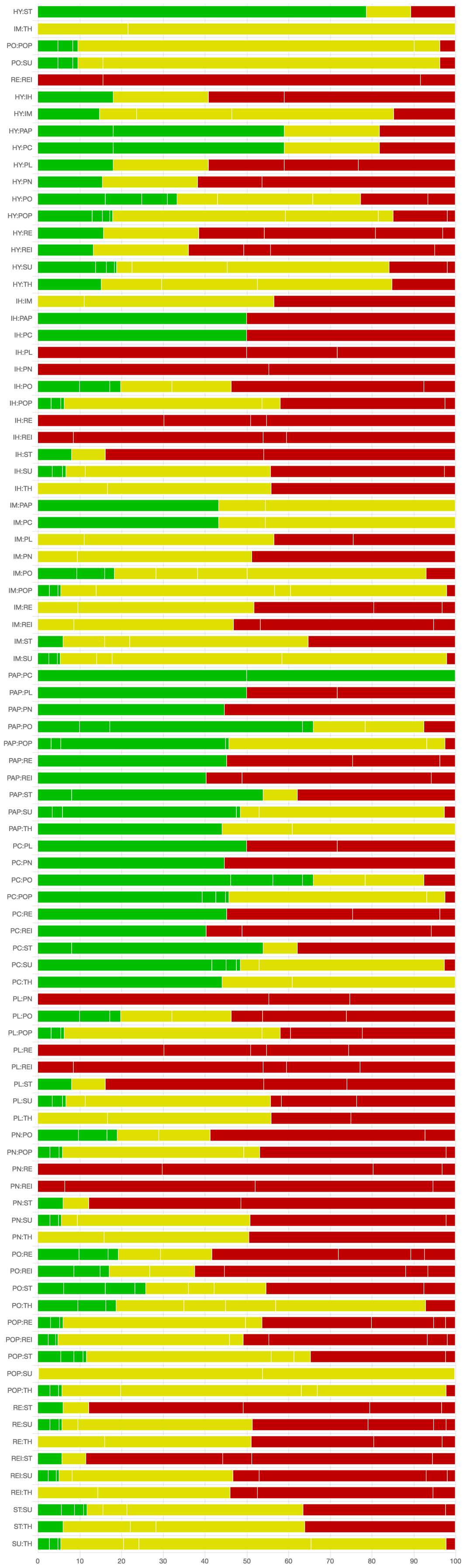
**Supplementary** **Figure 8**: The contribution of trials to the risk ratio estimates for mortality as an outcome based on the approach to randomization; green indicates that allocation to intervention group was random and that the method of generating the random sequence was provided, yellow indicates that the authors stated that allocation was random but did not describe the method of generating the random allocation sequence, and red indicates that allocation to intervention group was not random or was not reported. White vertical lines indicate the percentage contribution of separate studies.



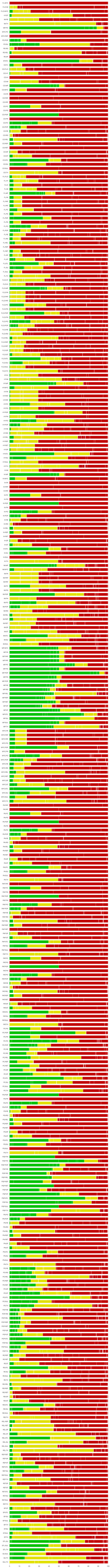
**Supplementary** **Figure 9:** The contribution of trials to the risk ratio estimates for non-specific lung lesions as an outcome based on the approach to randomization; green indicates that allocation to intervention group was random and that the method of generating the random sequence was provided, yellow indicates that the authors stated that allocation was random but did not describe the method of generating the random allocation sequence, and red indicates that allocation to intervention group was not random or was not reported. White vertical lines indicate the percentage contribution of separate studies.



**Supplementary** **Figure 10:** The contribution of trials to the risk ratio estimates for morbidity as an outcome based on the approach to blinding: green indicates that both outcome assessors and care-givers were blinded to intervention status, yellow indicates that one, but not both, of outcome assessors and care-givers was blinded, and red indicates that neither was blinded or that blinding was not reported. White vertical lines indicate the percentage contribution of separate studies.



**Supplementary** **Figure 11:** The contribution of trials to the risk ratio estimates for mortality as an outcome based on the approach to blinding: green indicates that both outcome assessors and care-givers were blinded to intervention status, yellow indicates that one, but not both, of outcome assessors and care-givers was blinded, and red indicates that neither was blinded or that blinding was not reported. White vertical lines indicate the percentage contribution of separate studies.



**Supplementary** **Figure 12:** The contribution of trials to the risk ratio estimates for non-specific lung lesions as an outcome based on the approach to blinding: green indicates that both outcome assessors and care-givers were blinded to intervention status, yellow indicates that one, but not both, of outcome assessors and care-givers was blinded, and red indicates that neither was blinded or that blinding was not reported. White vertical lines indicate the percentage contribution of separate studies.

