**Diet during pregnancy and infancy, and risk of allergic or autoimmune disease: a systematic review and meta-analysis**

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# Table S1 Characteristics of included intervention trials of breastfeeding duration or solid food introduction and allergic outcomes

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Design** | **N Intervention/ Control** | **Country** | **Intervention** | **Disease risk** | **Age at outcome (years)** | **Outcomes reported**  **(method of assessment)** |
| Kramer, 2001 [[1](#_ENREF_1)]; Kramer, 2007 [[2](#_ENREF_2)] | cluster RCT | 8865/8181 | Belarus | TBF. Breastfeeding promotion program based on the WHO/UNICEF baby friendly hospital initiative, versus standard local breastfeeding policies | Normal | 1, 6.5 | AD (Hanifin and Rajka, ISAAC); Wheeze (ISAAC); AR (ISAAC); AS (SPT) |

AD: atopic dermatitis; AR: allergic rhinitis; AS: allergic sensitisation; DD doctor diagnosis; EBF: exclusive breastfeeding; FA: food allergy; ISAAC: International Study of Asthma and Allergies in Children; OFC: oral food challenge; RCT: randomised controlled trial; SPT: skin prick test

# Table S2 Characteristics of included observational studies of breastfeeding or solid food introduction, and risk of allergic outcomes

| **Study** | **Design** | **N/n cases** | **Country** | **Population** | **Exposures and method of assessment** | **Age at outcome (years)** | **Outcomes reported**  **(method of assessment)** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Alho, 1990 [[3](#_ENREF_3)] | PC | 2,130 | Finland | Birth cohort, population representative sample born 1985-1986 (normal risk of disease) | TBF, Q | 2 | Wheeze (DD Wheeze) |
| Allen, 2009 [[4](#_ENREF_4)]; Koplin, 2010 [[5](#_ENREF_5)] | PC | 310/50 | Australia | Part of the **HealthNUTS study**. Representative cohort of infants recruited from routine immunisation clinics 2008-2010 | TBF, Q | 1 | SPT to food; FA (OFC) |
| Alm, 2008[[6](#_ENREF_6)]; Goksor, 2009/11  [[7](#_ENREF_7),[8](#_ENREF_8)] | PC | 4,987 | Sweden | Infants of Western Sweden. Population birth cohort of infants born in 2003 | TBF, SFI, Q | 1, 1.4, 4.5 | Wheeze (ever; ≥3 episodes of wheeze in past year); FA (DD); AD (parent reported) |
| Bacopoulou, 2009 [[9](#_ENREF_9)] | PC | 6,643 | Greece | Population based sample of neonates born in 1983 | EBF, Q | 7 | Wheeze (DD) |
| Benn, 2004 [[10](#_ENREF_10)]; Linneberg 2006 [[11](#_ENREF_11)] | PC | 34,793 | Denmark | **DNBC study**. Population based birth cohort of children born between 1997-2002 | EBF, Q/I | 1.5 | AD (Physician assessment and parent report) |
| Bergmann, 2000 [[12](#_ENREF_12)]; Bergmann, 2002 [[13](#_ENREF_13)] Kulig, 2000 [[14](#_ENREF_14)] | PC | 1,314 | Germany | **MAS study**. Atopic risk enriched cohort of infants born in 1990 in 5 German cities | TBF, Q/I | 6, 7 | Wheeze (Physician assessment); RC (Physician assessment, Parent reported RC ever) |
| Berth-Jones, 1997 [[15](#_ENREF_15)] | PC | 413 | UK | Infants born in 1992 and registered with the two major Leicester obstetric units | TBF, Q | 1 | AD (Physician assessment) |
| Besednjak-Kocijancic, 2010 [[16](#_ENREF_16)] | PC | 408/24 | Slovenia | Infants with a positive history of parental allergy | EBF, Unclear | 1, 5 | FA (Infants with a positive history of parental allergy) |
| Bisgaard, 2009 [[17](#_ENREF_17)]; Giwercman, 2010 [[18](#_ENREF_18)] | PC | 354 | Denmark | **COPSAC study**. Infants of mothers with a history of doctor-diagnosed asthma, recruited from August 1998 to December 2001 | TBF, EBF, Q/I | 2, 3 | AD (Hanifin and Rajka criteria); Wheeze (Parent report) |
| Burr, 1989; Burr, 1993; Burr, 1993 (b) [[19-21](#_ENREF_19)]; Burr, 1997 [[22](#_ENREF_22)] | PC | 483 | UK | Infants with family history of allergic diseases in South Wales | TBF, D, Q | 1, 6.7, 7 | Wheeze (Parent reported wheeze; Wheeze ever, DD); AD (physician assessment); sIgE aero (any); RC (Parent reported) |
| Burgess, 2006 [[23](#_ENREF_23)] | PC | 4,964 | Australia | **Mater-University of Queensland Study of Pregnancy**. Population based birth cohort of infants born 1981-1984 | TBF, Q | 14 | Wheeze (Parent reported asthma) |
| Businco, 1987 [[24](#_ENREF_24)]; Bruno, 1995 [[25](#_ENREF_25)] | PC | 244 | Italy | Infants of atopic parents recruited from hospital and born in 1985-1988 | TBF, I | 0-2, 2, 8 | Wheeze DD asthma (≥3 episodes of wheeze); AD (physician assessment); RC (Physician assessment); sIgE to any, Total IgE |
| Cano Garcinuno, 2003 [[26](#_ENREF_26)] | PC | 234 | Spain | Children born in 1998-2002 attending primary health centre | EBF, Q | 3 | Wheeze (DD) |
| Caudri, 2013; Scholtens, 2009 [[27](#_ENREF_27),[28](#_ENREF_28)]; Kerkhof, 2003 [[29](#_ENREF_29)] | PC | 3,115 | Netherlands | **PIAMA**. Population-based study of children born in 1996-1997 (normal risk of disease) | EBF, TBF, Q | 1, 8 | Wheeze (Current wheeze; Parent reported current or ever wheeze (+/- sIgE); ISAAC; BHR: methacholine PC20); sIgE aero; AD (UK Working Party Criteria) |
| Cogswell, 1987 [[30](#_ENREF_30)] | PC | 73/32 | UK | Birth cohort of infants with family history of hay fever or asthma | EBF, D | 5 | SPT to any |
| Chuang, 2011[[31](#_ENREF_31)] | PC | 18,773 | Taiwan | **Taiwan Birth Cohort Study**. Population representative sample born in 1995 (normal risk of disease) | TBF, SFI, R/I | 1.5 | AD (Physician assessment) |
| da Costa Lima, 2003; Menezes, [[32](#_ENREF_32),[33](#_ENREF_33)] | PC | 4,297 | Brazil | **Pelotas Birth Cohort**. Population based birth cohort of infants born in 1982 in the city of Pelotas | EBF, TBF, Q/I | 18, 22 | Wheeze (ISAAC) |
| Dell, 2001; Midodzi, 2008 [[34](#_ENREF_34),[35](#_ENREF_35)]; Midodzi, 2010 [[36](#_ENREF_36)] | PC; CS | 2,711 | Canada | **National Longitudinal Survey of Children and Youth (NLSCY**) and the **Canadian Early Childhood Development Cohort Study** (part of NLSCY). First of longitudinal surveys of 12-24 months old children representative of the Canadian population | TBF, Q | 2, 5, 9 | Wheeze (≥2 episodes of wheeze; Preschool wheeze: <5 years but not beyond 6 years; Parent reported wheeze; DD) |
| Devereux, 2006 [[37](#_ENREF_37)] | PC | 1,704 | Scotland, UK | Population based birth cohort of infants born in 1998 | TBF, Q | 5 | Wheeze ; AD; RC (ISAAC); SPT aero |
| Dogaru, 2012 [[38](#_ENREF_38)] | PC | 1,458 | UK | Population based sample of children of white and south Asian ethnic origin born between 1993 and 1997, part of the Leicestershire cohorts | TBF, Q | 12 | Wheeze (Spirometry) |
| Elliott, 2008; Granell, 2012; Sherriff, 2001  [[39-41](#_ENREF_39)]; Abd, 2012 [[42](#_ENREF_42)]; Lack, 2003 [[43](#_ENREF_43)] | PC | 9,100 | UK | **ALSPAC study**. Population based cohort of children born 1991-1992 | EBF, TBF, Q | 3, 3.5, 7, 7.5 | Wheeze (DD asthma plus current wheeze; Parent reported wheeze; BHR: (methacholine PC20); SPT to any food; Visible flexural dermatitis; Parent reported AD; Parent report of food reaction (DBPCFC) |
| Eneli, 2006 [[44](#_ENREF_44)] | PC | 536 | Germany | **The Child Health and Environment Cohort Study**. community based in urban area, born 1994 (normal risk of disease) | TBF, Q | 10 | Wheeze (BHR hypertonic saline PC15) |
| Farooqi, 1998 [[45](#_ENREF_45)] | PC | 1,453 | UK | Representative sample of general practice born in 1975-84 | TBF, R | 16 | Wheeze (DD of recurrent episodes of wheeze after the age of two years); AD (DD); RC (DD) |
| Fergusson, 1983; Horwood, 1995  [[46](#_ENREF_46),[47](#_ENREF_47)] | PC | 1,110 | New Zealand | Christchurch Child Development Study. Population based cohort of infants born in 1977 in the Christchurch urban region | EBF, R/I |  | Wheeze (Parental report) |
| Fredriksson, 2007 [[48](#_ENREF_48)] | PC | 1,933 | Finland | Population-based study of children born between 1984 and 1989 | TBF, SFI, Q | 15 | Wheeze (ATS questionnaire: wheezing apart from colds or wheezing most days or nights during the past year; DD) |
| Forster, 1990[[49](#_ENREF_49)] | PC | 145 | Germany | Babies hospitalised in 1985 | TBF, Q | 1.5 | AD (Parental report) |
| Galbally, 2013 [[50](#_ENREF_50)] | PC | 4,507 | Australia | **Longitudinal Study of Australian Children**. Population based study of infants born between March 2003 and February 2004 and were enrolled in the Australian Medicare database | TBF, I | 1 | Wheeze (Parent reported wheezing ≥4 nights per week) |
| Gruber 2010 [[51](#_ENREF_51)] | PC | 167/15 | Central Europe | **MIPS-1 study**. Infants born in 2006 without family history of allergy, randomised to a prebiotic formula intervention if fully formula fed < 8 weeks | EBF, Q | 1 | sIgE CM, or egg; Total IgE |
| Gruskay 1982 [[52](#_ENREF_52)] | PC | 328 FH+/ 580 FH- | USA | Children born in 1961-1966 in a private paediatric practice | TBF, Unclear/Q | 3, 5, 15 | Wheeze (Physician assessment of recurrent wheezing); AD (Physician assessment); RC (parent reported) |
| Guida, 2009 [[53](#_ENREF_53)] | PC | 3,041 | France | Population based birth cohort of infants born in 2003 | TBF, Q | 1 | Wheeze (Parent reported) |
| Gustafsson, 2000 [[54](#_ENREF_54)] | PC | 94 | Sweden | Children with atopic dermatitis attending allergic clinic or referred by child welfare clinics | TBF, Q | 7, 8 | Wheeze (≥3 episodes of physician diagnosed wheezing); FA (Parent report of food reaction); SPT any |
| Halken, 1991[[55](#_ENREF_55)] | PC | 276 | Denmark | Population based birth cohort of children born in 1985 | TBF, Q | 1.5 | Wheeze (≥2 episodes of physician diagnosed wheeze) |
| Harris, 2001[[56](#_ENREF_56)]; Zutavern, 2004 [[57](#_ENREF_57)] | PC | 622 | UK | Population based birth cohort of children born between 1993 and 1995 in three general practices in Ashford | TBF, SFI, I | 2 | AD (UK Working Party Criteria) |
| Hagendorens, 2005 [[58](#_ENREF_58)]; Sariachvili, 2007 [[59](#_ENREF_59)]; Sariachvili 2010 [[60](#_ENREF_60)] | PC | 693 | Belgium | **PIPO study**. Recruited from university service, born 1997-2001 (normal risk of disease) | TBF, Q | 1 4 | Wheeze (Parent reported current wheeze); AD (Parent reported); sIgE any |
| Hesselmar, 2010 [[61](#_ENREF_61)] | PC | 184 | Sweden | **ALLERGYFLORA study**. Population based study of babies selected from antenatal clinics between 1998 and 2003 - mainly high risk of allergic disease | EBF, TBF, SFI, I | 0.5, 1.5 | Wheeze ( DD asthma; ≥3 episodes of wheeze); FA (Physician assessment: history +/- investigations); AD (UK Working Party Criteria); sIgE to food |
| Hetzner, 2009 [[62](#_ENREF_62)] | PC | 7,900 | USA | **Early Child Longitudinal Study Birth Cohort**. Nationally representative sample of children born during 2001 | EBF, I | 2 | Wheeze (DD) |
| Hide, 1981[[63](#_ENREF_63)]; Arshad, 1992 [[64](#_ENREF_64)] | PC | 843 | UK | **The Isle of Wight study**. Born in 1977-1978 (normal risk of disease) | EBF, TBF, SFI, D/Q | 1 | Wheeze (Wheeze ever; Parent reported wheeze); RC (Parent reported rhinitis symptoms); AD (DD); RC (Physician assessment), SPT to any, CM or egg |
| Hikino, 2001[[65](#_ENREF_65)] | PC | 21,766/2,381 | Japan | All children born in 1993-1995 attending well-baby check-ups funded by Fukuoka City | TBF, Q | 1.5 | FA (DD); AD (Physician assessment) |
| Hong, 2011 [[66](#_ENREF_66)] | PC | 970/361 | USA | **Boston Birth Cohort**. Predominantly African-American mother-infant pairs. | EBF, TBF, Q/I | 2.5 | sIgE to food |
| Hoppu, 2002 [[67](#_ENREF_67)] | PC | 114/27 | Finland | Birth cohort of infants with a family history of atopy | EBF, TBF, I | 1 | SPT to any |
| Host, 1991 [[68](#_ENREF_68)] | PC | 315/16 | Denmark | Population birth cohort of infants from the municipality of Odense born in 1985 | EBF, R/Q/I | 1 | FA (OFC) |
| Howie, 1990 [[69](#_ENREF_69)] | PC | 618 | UK | Population based birth cohort of infants born between 1983 and 1986 in Dundee | TBF, R/D | 1 | AD (Physician assessment) |
| Huang, 2013 [[70](#_ENREF_70)] | PC | 684 | China | Mother-infant pairs registered in Putuo District, Changzheng Town Community Health Service Center Child Health Clinic within the period from January to December, 2008 | EBF, Q | 2 | Wheeze (ISAAC) |
| Huurre, 2008 [[71](#_ENREF_71)] | PC | 98/29 | Finland | Cohort of infants whose mother participated in a nutritional intervention trial during pregnancy | EBF, TBF, I | 1 | SPT any |
| Joseph, 2011 [[72](#_ENREF_72)] | PC | 594/178 | USA | **WHEALS STUDY.** Recruited from hospital prenatal care and born in 2005 | SFI, I | 3 | sIgE CM, egg, PN |
| Juto, 1980 [[73](#_ENREF_73)] | PC | 56/NA | Sweden | Population based birth cohort of infants born in 1977 | TBF, Q | 0.25 | Total IgE |
| Kajosaari, 1991[[74](#_ENREF_74)] | PC | 135 | Finland | Exclusively breastfed infants with solid food introduction at 6 months versus 3 months | EBF, SFI, Unclear | 1, 5 | AD (Hanifin and Rajka) , FA (parental report), asthma (DD) |
| Karmaus, 2008 [[75](#_ENREF_75)]; Ogbuanu, 2009 [[76](#_ENREF_76)]; Soto-Ramırez, 2012 [[77](#_ENREF_77)] | PC | 1,336 | UK | **Isle of Wight Prevention Study**. Population based birth cohort of infants born in semi-rural areas between 1989 and 1990 | TBF, Q | 10, 18 | Wheeze (ISAAC and DD asthma, spirometry) |
| Kaufman, 1976 [[78](#_ENREF_78)] | PC | 94 | USA | Birth cohort of infants from allergic mothers | TBF, Unclear | 2 | Wheeze (DD) |
| Kellberger, 2012 [[79](#_ENREF_79)] | PC | 3,785/314 | Germany | **SOLAR.** Community based random sample of all pupils aged 9-11 years in 1995-1996 as part of ISAAC study, with follow-up survey 2002-2003 | EBF, Q | 9-18 | Ever AR (ISAAC) |
| Kemeny, 1991[[80](#_ENREF_80)] | PC | 180 | UK | Population based birth cohort of infants born at Dulwich and King’s College Hospitals in London | EBF, TBF, Unclear | 1 | Wheeze (≥2 episodes); FA (Parent report of ≥2 food reactions); AD (unclear); SPT and sIgE to CM, egg; Total IgE |
| Kerr, 1981[[81](#_ENREF_81)] | PC | 269 | New Zealand | Birth cohort hospital based, born 1977-1978 (normal risk of disease) | TBF, I | 0.5 | Wheeze (Parent reported) |
| Kim, 2011 [[82](#_ENREF_82)] | PC | 1177/61 | Korea | Population based birth cohort of infants born in Seoul between July 2006 and August 2007 | EBF, SFI, Q/I | 1 | FA (Parent report of ≥ 2 food reactions) |
| Kitz, 2006 [[83](#_ENREF_83)] | PC | 131 | Germany | Birth cohort of infants at increased risk for atopy participating in RCT on infant feeding intervention | EBF, D | 1 | AD (Hanifin and Rajka criteria) |
| Klinnert, 2001 [[84](#_ENREF_84)] | PC | 145 | USA | Birth cohort of infants at increased risk for atopy born between 1985 and 1987 | TBF, Q | 8 | Wheeze (DD) |
| Kramer, 2003; Kramer, 2009; Kramer, 2009 (b)  [[85-87](#_ENREF_85)] | PC | 13,889/455 | Belarus | **PROBIT**. Observational analysis of data from a cluster RCT of the UNICEF baby friendly initiative intervention. Infants born 1996-1997 | EBF, I | 6.5 | Current AR (ISAAC); SPT aero |
| Kull, 2002 [[88](#_ENREF_88)] | PC | 3,790 | Sweden | **BAMSE study**. Population based cohort of children born between 1994-1996 | EBF, TBF, Q | 2 | Wheeze (Self-reported wheeze; ≥3 episodes of wheeze OR inhaled corticosteroids); FA (DD); Parent reported OR DD AD; RC (Parent reported symptoms) |
| Kusel, 2005 [[89](#_ENREF_89)] | PC | 263/107 | Australia | Birth cohort of children at high risk of developing atopic disease born 1996-8 | TBF, Unclear | 5 | SPT any |
| Larsson, 2008 [[90](#_ENREF_90)] | PC | 4779 | Sweden | **DBH study**. Preschool children aged 1–6 years surveyed in 2000 and 2005 | TBF, SFI, Q | 9 | Wheeze (DD), AD (ISAAC); Current RC (DD, ISAAC) |
| Marini, 1996 [[91](#_ENREF_91)] | PC | Unclear | Italy | Infants with family history of allergy whose mothers were invited to participate in an allergy prevention program | EBF, TBF, SFI, Q | 3 | Wheeze (Physician assessment; ≥3 episodes of wheeze); AD and RC (Physician assessment) |
| Matheson, 2007 [[92](#_ENREF_92)] | PC | 5,729/2,610 | Australia | **Tasmanian Asthma Study.** Population based cohort born in 1961 | EBF, Q | 44 | RC (Physician assessment) |
| Midwinter, 1987 [[93](#_ENREF_93)] | PC | 453 | UK | Children born to parents with a family history of atopy in 1979-1981 | EBF, Unclear | 5 | Wheeze (DD asthma) |
| Mihrshahi, 2007 [[94](#_ENREF_94)] | PC | 516 | Australia | **CAPS study**. Observational analysis of participants from a RCT of omega-3 fatty acid supplementation. Infants born in 1997-1999 with family history of asthma or wheezing | EBF, TBF, SFI, I | 5 | Wheeze (DD plus current wheeze); AD (Visible flexural dermatitis or DD AD); SPT to any |
| Milner, 2004 [[95](#_ENREF_95)] | PC | 8,071 | USA | National Maternal and Infant Health Survey and Longitudinal Follow Up. Representative US population born in 1988. Black, low socioeconomic status, and premature infants intentionally overrepresented | TBF, Q | 3 | Wheeze (DD) |
| Miskelly, 1988 [[96](#_ENREF_96)] | PC | 482 | UK | Infants from antenatal clinics with family history of allergy randomised into a dietary intervention program | TBF, D | 1 | AD (Physician assessment) |
| Miyake, 2008 [[97](#_ENREF_97)]; Miyake, 2009 [[98](#_ENREF_98)] | PC | 763 | Japan | **OMCHS study**. Population based birth cohort of infants born in 2002-2003 | EBF, TBF, Q | 2 | Wheeze (ISAAC); AD (Physician assessment) |
| Morgan, 2004; Morgan, 2004 (b) [[99](#_ENREF_99),[100](#_ENREF_100)] | PC | 257 | UK | Infants from five prospective randomised dietary trials conducted in the UK between 1993 and 1997. One LBW, 2 premature and 2 appropriate weight/gestation cohorts | TBF, I | 0.25 | Parent reported AD; Physician assessment |
| Moore, 1985 [[101](#_ENREF_101)] | PC | 475 | UK | Infants born in a hospital in 1979-1980 with family history of AD or asthma, participating in a dietary intervention program | EBF, SFI, D/I | 0.25 | AD (Physician assessment) |
| Morales, 2012 [[102](#_ENREF_102)] | PC | 467 | Spain | **INMA project**. Population based birth cohort of infants born 2004-2006 | TBF, Q/I | 1 | Wheeze; AD (Parent reported) |
| Muiño, 2008 [[103](#_ENREF_103)] | PC | 897 | Brazil | Population based cohort of infants born in 1993 | TBF, Q | 12 | Wheeze (Parent reported current wheeze; Persistent wheeze: parent reported wheeze at 1, 4 and 8-10 year assessments; Early transient wheeze: parent reported) |
| Nielsen, 2013 [[104](#_ENREF_104)] | PC | 5429 | Demark | Population based birth cohort of infants born in 1995 | EBF, | 0.5 | Wheeze (unclear) |
| Nwaru, 2010 [[105](#_ENREF_105)]; Erkkola, 2012; Nwaru, 2013  [[106](#_ENREF_106),[107](#_ENREF_107)]; Virtanen, 2010 [[108](#_ENREF_108)] | PC | 3,675 | Finland | **DIPP study**. Infants at high risk (HLA) for TIDM born between 1996-2004 invited to the allergy study between 1998 and 2000 | EBF, TBF, D | 0.5, 5 | Wheeze (DD plus ISAAC; DD plus ISAAC (+/- sIgE)); AD (ISAAC); sIgE to aero, CM, egg or food; RC (Modified ISAAC questionnaire) |
| Oddy, 2003 [[109](#_ENREF_109)] | PC | 243 | USA | Birth cohort of infants participating in the Infant Immune Study in Tucson, Arizona. | EBF, TBF, Q | 1 | Wheeze (Parent reported wheeze ever) |
| Oddy, 1999; Oddy, 2003; Oddy, 2004  [[110-112](#_ENREF_110)] | PC, NCC | 2,456 | Australia | **Western Australia Pregnancy Cohort**. Recruited from antenatal clinics born in 1989-1992 (normal risk of disease) | EBF, TBF, D/I/Q | 1, 6, 8 | Wheeze (DD; parent reported current wheeze; DD asthma and ≥3 episodes of wheeze); SPT aero |
| Odelram, 1996 [[113](#_ENREF_113)] | PC | 70/23 | Sweden and Finland | Birth cohort of infant with family history and high cord blood IgE born in 1989-1990 | EBF, D | 1.5 | sIgE to CM, SPT to any, total IgE |
| Perez Tarazona, 2010 [[114](#_ENREF_114)] | PC | 620 | Spain | Population based birth cohort of infants born in 2007-2008 in Valencia | TBF, Q | 1 | Wheeze (Parent reported wheeze) |
| Pesonen, 2006 [[115](#_ENREF_115)] | PC | 160/19 | Finland | Population based birth cohort of infants born in 1981 | EBF, I | 5 | FA (Parent report of ≥ 2 food reactions) |
| Porch, 1998 [[116](#_ENREF_116)] | PC | 130 | USA | Infants recruited from prenatal services with family history of allergy (high risk of disease) | TBF, D | 1 | ISAAC - current AD |
| Poysa, 1990; Poysa, 1992 [[117](#_ENREF_117),[118](#_ENREF_118)] | PC | 120/41 | Finland | High risk of disease, born 1979-1980 | EBF, I | 5, 10 | Total IgE; SPT aero |
| Pratt, 1984 [[119](#_ENREF_119)] | PC | 198 | UK | Recruited in antenatal clinics, normal risk of disease | EBF, TBF, D/I | 4.5, 5 | AD (DD; Physician assessment) |
| Puig, 2010 [[120](#_ENREF_120)] | PC | 368 | Spain | **Part of AMICS**. Population based cohort of infants born in 1996-1998 in Barcelona | TBF, Q | 6 | Wheeze (DD) |
| Purvis, 2005 [[121](#_ENREF_121)] | PC | 550 | New Zealand | **Auckland Birth weight Collaborative study.** Birth cohort with representative sample of babies born in 1996-1997 | EBF, TBF, Q | 3.5 | AD (UK Working Party Criteria) |
| Rhodes, 2001[[122](#_ENREF_122)] | PC | 63 | UK | Hospital based, born 1976-1977, family history of allergy (high risk of disease) | TBF, Q | 22 | Wheeze (Current wheeze and BHR) |
| Rothenbacher, 2005 [[123](#_ENREF_123)] | PC | 803 | Germany | Recruited from university service, born in 2000-2001 (normal risk of disease) | EBF, TBF, Q/I | 2 | Wheeze (DD) |
| Rowntree, 1985 [[124](#_ENREF_124)] | PC | 80/20 | UK | Recruited from hospital and family history of atopy | TBF, I | 5 | sIgE to CM, egg |
| Rullo, 2007; Rullo, 2009; Rullo, 2009 (b); Rullo, 2010  [[125-128](#_ENREF_125)] | PC | 101 | Brazil | Recruited from hospital (high risk of asthma) | EBF, Q/I | 1.5, 2.5, 4, 5 | Wheeze (≥3 episodes of wheeze in past year; Persistent wheeze: ever wheezing treated with inhaled corticosteroids and beta-2 agonists in the past year) |
| Ruiz 1992 [[129](#_ENREF_129)] | PC | 39 | UK | Recruited from hospital and family history of atopy (high risk of disease) | TBF, SFI, Unclear | 1 | AD (Hanifin and Rajka criteria) |
| Saarinen, 1995 [[130](#_ENREF_130)] Saarinen, 1979 [[131](#_ENREF_131)] | PC | Unclear | Finland | Recruited from hospital and born in 1975 (normal risk of disease) | EBF, TBF, R | 0-1, 1, 5, 17 | Wheeze (Physician assessment); FA (Parent report of food reaction); AD (Parent reported or DD); sIgE to CM; Total IgE |
| Sears, 2002 [[132](#_ENREF_132)]; Mandhane 2007 [[133](#_ENREF_133)] | PC | 1,037 | New Zealand | **Dunedin Multidisciplinary Health and Development Research Study**. Population based cohort of infants born between 1972-1973 | TBF, EBF, R/I | 9, 26 | SPT aero; wheeze (Current wheeze plus BHR (methacholine PC20) |
| Shaheen, 1996 [[134](#_ENREF_134)] | PC | 395/44 | Guinea-Bissau | Young adults part of a cohort recruited for a survey of aged 0-6 year children in 1978-80 and living in a semi-rural district of Bissau | TBF, I | 21 | SPT aero |
| Shohet, 1985 [[135](#_ENREF_135)] | PC | 368 | Israel | Cohort born in 1980 | EBF, I | 0.5 | AD (Hanifin and Lobitz criteria) |
| Schoetzau, 2002 [[136](#_ENREF_136)] | PC | 829/92 | Germany | **GINI study**. Term newborn infants born 1995-8 from 2 regions of Germany who participated in an intervention program according to risk of allergy | EBF, D | 1 | sIgE CM |
| Schonberger, 2005 [[137](#_ENREF_137)] | PC | 443 | Netherlands | **PREVASC study**. Cohort analysis of participants in an intervention trial, born in 1997-2000 with a family history of asthma | TBF, D/Q | 2 | Wheeze (ISAAC) |
| Sicherer, 2010 [[138](#_ENREF_138)] | PC | 503/140 | USA | **The Consortium of Food Allergy Research.** Atopic children recruited from clinical services | TBF, SFI, I | 1 | sIgE to PN |
| Siltanen, 2003 [[139](#_ENREF_139)] | PC | 285/53 | Finland | Infants recruited from maternal hospital born in 1994-1995 | EBF, Q | 4 | RC (Physician assessment); sIgE any; SPT any, Total IgE |
| Silva, 2005 [[140](#_ENREF_140)] | PC | 73 | Brazil | Recruited from health services in urban area, born in 1998 (high risk of disease) | EBF, Q | 4 | Wheeze (Physician assessment of ≥3 episodes of wheeze) |
| Silvers, 2009; Silvers, 2011 [[141](#_ENREF_141),[142](#_ENREF_142)] | PC | 889/249 | New Zealand | **New Zealand Asthma and Allergy Cohort Study**. Population based birth cohort of infants born 1997-2001 | EBF, TBF, Q | 1, 5 | Wheeze (DD plus current wheeze; Parent reported wheeze); FA (DD); AD (parent reported); SPT any |
| Simon, 2008 [[143](#_ENREF_143)] ; Wang, 2007[[144](#_ENREF_144)]; Wegienka, 2006 [[145](#_ENREF_145)]; Salam, 2003 [[146](#_ENREF_146)] | PC | 372 | USA | **CAS study**. Middle class mother-infant pairs enrolled in a health maintenance organisation in 1987-89 | EBF, TBF, R/I | 0.5, 6, 7 | Wheeze (current DD; Transient wheezing: wheezing in the last 12 months at ages of 1,2 and/or 4 years but not at age of 6 years); SPT aero |
| Snijders, 2007; Snijders, 2008 [[147](#_ENREF_147),[148](#_ENREF_148)] | PC | 2,505 | Netherlands | **KOALA study**. Population based birth cohort of infants born between 2000-2002 (consisting of cohorts with conventional and alternative lifestyle) | TBF, SFI, Q | 2 | Wheeze (≥4 episodes); sIgE-to any, aero, CM, egg, PN; Total IgE; AD (parent reported) |
| Soto-Ramirez, 2013 [[149](#_ENREF_149)] | PC | 2,833 | USA | Population-based birth cohort selected from nationally distributed consumer opinion panel of 500,000 households (2005-2007) | TBF, Q | 1 | Wheeze (Parent reported current wheeze) |
| Strachan, 1997 [[150](#_ENREF_150)]; Strachan, 1996 [[151](#_ENREF_151)]; Lewis, 1995; Lewis, 1996 [[152](#_ENREF_152),[153](#_ENREF_153)]; Butland, 1997 [[154](#_ENREF_154)] | PC | 12,835 | UK | **British Cohort Studies**. Infants born in England, Wales, and Scotland in 1958 and 1970 | EBF, TBF, I | 5, 16, 35 | Wheeze (Parent reported); SPT aero; RC (DD); current AR (parent reported) |
| Strassburger, 2010 [[155](#_ENREF_155)] | PC | 325/94 | Brazil | Recruited from hospital, born 2001-2002 | EBF, I | 3.5 | SPT aero |
| Sunyer, 2006 [[156](#_ENREF_156)] | PC | 462 | Spain | Population representative sample born in 1997-1998 (normal risk of disease) | TBF, Q | 6.5 | Wheeze (DD) |
| Sunyer, 2001 [[157](#_ENREF_157)] | PC | 596 | Tanzania | Cohort born in 1995-1996 in urban area (normal risk of disease) | TBF, Q | 4 | Wheeze (ISAAC) |
| Taylor, 1983 [[158](#_ENREF_158)] ; Taylor, 1984 [[159](#_ENREF_159)] | PC | 12,608 | UK | **CHES study**. Population based cohort of children born in England, Scotland, and Wales in 1970 | TBF, I | 5, 6, 7 | Wheeze (Parent reported DD); AD and RC (Parent reported) |
| Tennant, 2008 [[160](#_ENREF_160)]  Tennant, 2010 [[161](#_ENREF_161)] | PC | 392 | UK | **Newcastle Thousand Families Study**. Population based sample of subject born in 1947 who were either traced through the National Health Service Central Register or contacted the study team in response to media publicity in the mid 1990 | TBF, I/Q | 14, 50, 51 | Wheeze (Spirometry) |
| Tian, 2009 [[162](#_ENREF_162)] | PC | 472 | China | Infants from urban areas born in 2004-2006 (normal risk of disease) | TBF, I | 2 | Wheeze (Physician assessment) |
| Van Asperen, 1983 [[163](#_ENREF_163)] | PC | 79/44 | Australia | Cohort recruited from medical service, born in 1980-1981 with family history of atopy | EBF, SFI, I | 1, 1.3 | RC (Physician assessment); SPT food |
| Van Beijstervelft, 2008 [[164](#_ENREF_164)] | PC | 24,018 | Netherlands | Netherlands Twin Register: born in 1987-2000 (normal risk of disease) | TBF, Q | 5 | Wheeze (DD) |
| van der Voort, 2012 [[165](#_ENREF_165)] | PC | 5,368 | Netherlands | **Generation R study**. Population-based multicultural birth cohort of infants born between 2002 and 2009 | EBF, TBF, Q | 1, 4 | Wheeze (ISAAC) |
| Vandenplas, 1988 [[166](#_ENREF_166)] | PC | 75/9 | Belgium | Infants with family history of atopy | EBF, Unclear | 0.33 | sIgE CM; SPT CM; Total IgE |
| van Merode, 2007 [[167](#_ENREF_167)] | PC | 222 | Netherlands | **PREVASC study**: cohort born in 2005 with family history of asthma (high risk of disease) | EBF, Q | 1 | Wheeze (ISAAC) |
| Venter, 2009 [[168](#_ENREF_168)] | PC | 891/58 | UK | Population based cohort recruited from antenatal clinics and born in 2001-2002 | EBF, TBF, SFI, Q | 1, 3 | FA (OFC); SPT to food |
| Watson,2013 [[169](#_ENREF_169)] | PC | 369 | New Zealand | Recruited from Polynesian women, non-random sample (high risk of disease) | EBF, Q/I | 1.5 | Wheeze (ISAAC) |
| Wetzig, 2000 [[170](#_ENREF_170)] | PC | 475 | Germany | **LARS study**. High allergy risk or low birth weight children born within one year in the City and District of Leipzig | TBF, Q | 1 | AD (Physician assessment) |
| Wilson, 1998 [[171](#_ENREF_171)] | PC | 545 | UK | **Dundee infant feeding study.** Population based cohort of infants born between 1983-1986 | EBF, TBF, Q | 7 | Wheeze (Self-reported wheeze; DD) |
| Wright, 2002 [[172](#_ENREF_172)] | PC | 499 | USA | Part of a metropolitan Boston prospective birth cohort study of infants born between 1994-1996 with family history of asthma or recruited from a Boston hospital | TBF, Q/I | 0-1 | Wheeze (Parent reported) |
| Wright, 1989; Wright, 1995 [[173](#_ENREF_173),[174](#_ENREF_174)]; Wright, 1999 [[175](#_ENREF_175)]; Wright, 1994 [[176](#_ENREF_176)] | PC | 988 | USA | **Tucson Children's Respiratory Study**. Healthy newborn infants recruited from local health maintenance organisation born in 1980-1984 (normal risk of disease) | TBF, SFI, Q/I | 1, 6 | Wheeze (DD; ≥4 episodes of wheeze in past year); Total IgE; RC (Parent reported) |
| Yamamoto, 2011 [[177](#_ENREF_177)] | PC | 1344 | Japan | **Tokyo Children's Health Illness and Development study (T-CHILD)** | TBF, Q | 3 | Wheeze (ISAAC) |
| Zutavern, 2006; Zutavern, 2008 [[178](#_ENREF_178),[179](#_ENREF_179)] | PC | 606 | UK | Cohort recruited from general practices and born in 1993-1995 (normal risk of disease) | EBF, TBF, SFI, Q/I | 2, 5.5, 6 | Wheeze (Parent reported current wheeze); AD (DD); SPT aero; sIgE any, food, aero, CM, egg, PN |
| Friday, 2000 [[180](#_ENREF_180)] | RC | 94 | Unclear | Unclear | TBF, Unclear | 10? | Wheeze (Physician assessed asthma); sIgE CM |
| McConnochie, 1986 [[181](#_ENREF_181)] | RC | 223 | USA | Historical cohort with subjects were drawn from the patient population of a five-paediatrician group practice in a suburb of Rochester, New York | TBF, R/I | 8 | Wheeze (ATS guideline: wheezing with and without colds or most days or nights; DD) |
| Monego, 1989 [[182](#_ENREF_182)] | RC | 144 | Italy | 144 Italian infants retrospectively followed to examine association between breastfeeding and allergic diseases | TBF, D | 4 | AD (DD) |
| Rona, 2005 [[183](#_ENREF_183)] | RC | 1,213 | Chile | Infants born in a hospital in 1974-1978 | TBF, R | 27 | Wheeze (ECRHS questionnaire, BHR (methacholine PC20);SPT aero |
| Mai, 2007 [[184](#_ENREF_184)] | NCC | 723 | Canada | Cases and controls selected from records of the Manitoba Health Services Insurance  Plan and all were born 1995 | EBF, Q | 10 | Wheeze (Canadian Asthma Consensus Guidelines: symptoms plus variable airway obstruction) |
| Martel, 2008 [[185](#_ENREF_185)] | NCC | 1,578 | Canada | Data originating from 3 interlinked administrative health databases on children health in the first 10 years of life | TBF, Q | <10 | Wheeze (DD plus asthma medication) |
| Maskell, 2010 [[186](#_ENREF_186)]; Oliver, 2010 [[187](#_ENREF_187)]; Munro, 2011 [[188](#_ENREF_188)] | NCC | 117/31 | UK | **EuroPrevall UK.** Cases and age-matched controls selected from a population based birth cohort of infants born in 2008 | EBF, SFI, D/R | 1 | Wheeze (Parent reported); FA (DBPCFC) |
| Ronmark, 1999 [[189](#_ENREF_189)] | NCC | 258 | Sweden | **Obstructive Lung Disease in Northern Sweden Study**. 7-8 years old children enrolled in school in 1996 in northern Sweden (born 1988-1989) | TBF, Q | 8 | Wheeze (DD plus ISAAC; Physician assessment (+/-sensitisation)) |
| Camara, 2003 [[190](#_ENREF_190)] | CC | 91 | Brazil | Cases and control were children who sought ED care | TBF, Q | 12 | Wheeze (wheezing that required therapy with inhaled β2-agonists as judged by the attending physician) |
| DesRoches, 2010 [[191](#_ENREF_191)] | CC | 403/202 | Canada | Hospital based cases and controls recruited 1998-2004 | TBF, SFI, Q | <1.5 | FA (Physician assessment: history +/- investigations) |
| Djenouhat, 2011 [[192](#_ENREF_192)] | CC | 450/150 | Algeria | Hospital based cases and family controls, born 1999-2005 | TBF, Unclear | 0.3 | FA (Physician assessment: history +/- investigations) |
| Fox, 2009 [[193](#_ENREF_193)] | CC | 283/133 | UK | Cases and controls were children referred for suspected FA to a large paediatric service | TBF, Q | <4 | FA (Physician assessment: history +/- investigations) |
| Ghaderi, 2014 [[194](#_ENREF_194)] | CC | 200 | Iran | Unclear source of population. Sex and age matched controls | TBF, I | 5 | AD (DD) |
| Haileamlak, 2005 [[195](#_ENREF_195)] | CC | 732 | Ethiopia | Children age 1- 5 years. Cases were defined according to the ISAAC criteria for AD and confirmed by clinical examination | TBF, SFI, I | 5 | AD (ISAAC) |
| Infante-Rivard, 1993 [[196](#_ENREF_196)] | CC | 914 | Canada | Cases were 3- and 4-year-old children with a first-time diagnosis of asthma made by a paediatrician 1988-90. Age and area matched controls chosen from computerized family allowance files for the target region | TBF, I | 3.5 | Wheeze (DD) |
| Juca, 2012 [[197](#_ENREF_197)] | CC | 590 | Brazil | Adolescents 13 to 14 years of age from Cuiabá, Mato Grosso State taking part in ISAAC | EBF, TBF, Q | 14 | Wheeze (ISAAC) |
| Karunasekera, 2001 [[198](#_ENREF_198)] | CC | 582 | Sri Lanka | Hospital-based cases aged 1-10 years old with age matched controls from inpatient clinics | TBF, SFI, Q | 10 | Wheeze (Physician assessment) |
| Kramer, 1981 [[199](#_ENREF_199)] | CC | 470 | Canada | Cases and controls were1 month to 20 years old children attending dermatology clinics visits | EBF, TBF, I | <20 | AD (Hanifin and Lobitz criteria) |
| Mavale-Manuel, 2003 [[200](#_ENREF_200)] | CC | 199 | Mozambique | Children aged 18 months to 8 years attending paediatrics clinic with history of asthma with age-match controls attending the clinic immediately after selection of the index case | TBF, Q/I | 8 | Wheeze (DD plus asthma medication) |
| Oliveti, 1995 [[201](#_ENREF_201)] | CC | 262 | USA | Cases and age matched controls were identified using rosters of patients followed during the previous year. he majority of children from each group were insured by Medicaid (low income) | TBF, Q | 9 | Wheeze (DD plus asthma medication) |
| Porro, 1993 [[202](#_ENREF_202)] | CC | 465 | Italy | Hospital based study with matched controls (normal risk of disease) | TBF, Q | <1.6 | Wheeze (Parent reported) |
| Ratageri, 2000 [[203](#_ENREF_203)] | CC | 180 | India | Hospital-based study (normal risk of disease) | EBF, Unclear | 9 | Wheeze (DD asthma using International Paediatric Consensus Group Criteria) |
| Rosas Vargas 2002 [[204](#_ENREF_204)] | CC | 148 | Mexico | Hospital-based study, cases born in 2000 (normal risk of disease) | TBF, Q | 3 | Wheeze (DD) |
| Rylander 1993 [[205](#_ENREF_205)] | CC | 550 | Sweden | Cases from a health service and control from population (normal risk of disease) | EBF, I | 4 | Wheeze (Physician assessment) |
| Ventura, 1988 [[206](#_ENREF_206)] | CC | 339/148 | Italy | Italian Working Group on CMPA. Cases selected from 15 paediatric centres and age and area matched controls from well-baby clinics | TBF, I | <1 | FA (Physician assessment: history +/- investigations) |
| Whu, 2007 [[207](#_ENREF_207)] | CC | 261 | USA | Hospital-based study cases born in 2000 | EBF, I | 2, 5.5 | Wheeze (Parent report, current) |
| Wickens, 2001 [[208](#_ENREF_208)] | CC | 474 | New Zealand | Population-based study | TBF, I | 6.5 | Wheeze (ISAAC) |
| Zhu, 2012 [[209](#_ENREF_209)] | CC | 542 | China | Population-based study | TBF, Q | 14 | Wheeze (DD) |
| Alper, 2006 [[210](#_ENREF_210)] | CS | 858 | Turkey | 7 years old children randomly selected from seven primary schools in Bursa in 1999 | TBF, Q | 7 | Wheeze (Parent reported wheeze classified using Martinez criteria) |
| Al-Kubaisy, 2005 [[211](#_ENREF_211)] | CS | 2,262 | Iraq | Primary school urban and rural children | TBF, Q | 12 | Wheeze (DD plus ISAAC) |
| Awasthi, 2004 [[212](#_ENREF_212)] Björkstén, 2011 [[213](#_ENREF_213)] ; Flohr, 2011 [[214](#_ENREF_214)] Nagel, 2009 [[215](#_ENREF_215)]; Kuyucu, 2004  [[216](#_ENREF_216)] | CS | 103,716 | Worldwide | **ISAAC Phase 2**. Schoolchildren aged 8–12 years from 27 centres in 21 affluent and non-affluent countries  **ISAAC Phase 3.** Schoolchildren aged 6-7 years from different countries and geographic regions  **ISAAC Phase 3-India.** Schoolchildren aged 6-7 and 13-14 years old from India | TBF, Q | 7, 12, 14 | Wheeze (Parent reported current wheeze; Parent reported asthma (+/- SPT); Spirometry; BHR hypertonic saline PC15); AD ever; RC (ISAAC) |
| Berjon, 1987 [[217](#_ENREF_217)] | CS | 2,690/148 | Spain | Patients attending a paediatric allergy clinic in Valladolid, Spain between 1970 and 1984, with and without diagnosed food allergy | TBF, Unclear | 14 | FA (DD) |
| Castro-Rodriguez, 2010 [[218](#_ENREF_218)]; Chong Neto, 2007 [[219](#_ENREF_219)] | CS | 3,003 | Brazil, Spain | **EISL study**. One-year old infants from urban and rural primary care health clinics born in 2004-2006 | EBF, Q | 1, 1.4 | Wheeze (ISAAC, parent reported wheeze ever) |
| Civelek, 2001[[220](#_ENREF_220)] | CS | 1,533 | Turkey | Representative sample of schoolchildren in 5 cities | EBF, TBF, Q | 11 | AD (ISAAC) |
| Ehlayel, 2008 [[221](#_ENREF_221)] | CS | 1,278 | Qatar | Children 0-5 years old attending primary healthcare centres for routine immunisation | EBF, Q | 5 | AR ever (ISAAC); FA (DD) |
| Ehrlich, 1996 [[222](#_ENREF_222)] | CS | 620 | South Africa | Second year black elementary school (7- 8 years) children. | TBF, Q/I | 9 | Wheeze (ISAAC) |
| Evenhouse, 2005 [[223](#_ENREF_223)] | CS | 16,903 | USA | **National Longitudinal Study of Adolescent Health (Add Health).** Nationally representative samples of adolescents from 80 school districts, 1994 | TBF, Q | 12-18 | Wheeze (Unclear) |
| Girolomoni, 2003 [[224](#_ENREF_224)] | CS | 1369 | Italy | Representative sample of children attending the fourth grade at elementary school | TBF, Q | 9 | AD (UK Working Party Criteria) |
| Han, 2009 [[225](#_ENREF_225)] | CS | 21,371 | Taiwan | Elementary and middle school children aged 6-15 years old in 2004 | TBF, Q | 15 | Wheeze (ISAAC) |
| Karino, 2008 [[226](#_ENREF_226)] | CS | 9615 | Japan | University students aged 18–19 years enrolled from 2003 through 2005. | TBF, Q | 18 | Wheeze (Self-reported asthma); AD (Self-reported); RC (DD) |
| Kucukosmanoglu, 2008 [[227](#_ENREF_227)] | CS | 1015/20 | Turkey | Hospital based selection of 8-18 months old Infants born in 2001-2002 | TBF, SFI, Q/I | 1 | SPT to egg |
| Kuehr, 1992 [[228](#_ENREF_228)] | CS | 1470/201 | Germany | Schoolchildren between 6 and 8 years of age | TBF, Q | 8 | SPT aero |
| Kurt, 2008 [[229](#_ENREF_229)]  Kurt, 2007 [[230](#_ENREF_230)] | CS | 25,843 | Turkey | **PARFAIT**. Prevalence and Risk Factors of Allergies in Turkey. Population representative sample of children aged 9-15 years old | TBF, Q | 15 | Wheeze; AD (Current; Parent reported); current RC (parent reported) |
| Liu 2012 [[231](#_ENREF_231)] | CS | 8733/397 | China | Sample of children from kindergarten and elementary schools in Shenyang | EBF, Q | 8 | RC (ATS questionnaire) |
| Miyake, 2003 [[232](#_ENREF_232)] | CS | 6845 | Japan | 12-15 years old children from all public junior high schools in Suita, Japan. | (EBF, TBF) Q | 15 | Wheeze; current RC (ISAAC) |
| Nakamura, 1999 [[233](#_ENREF_233)] | CS | 3850 | Japan | All 3 year old children participating in a health check-up in 1997 | TBF, Q | 3 | AD (DD) |
| Paton, 2012 [[234](#_ENREF_234)] | CS | 15,142/592 | Australia | Representative primary school entrants 2006-2009 | EBF, TBF, Q | 7 | FA (Parent-reported food reaction to any nut) |
| Prietsch, 2006 [[235](#_ENREF_235)] | CS | 685 | Brazil | Population representative sample of infants aged 12-15 months | EBF, Q | 13 | Wheeze (unclear) |
| Rusconi, 1999; Rusconi, 2005  [[236](#_ENREF_236),[237](#_ENREF_237)] | CS | 16933 | Italy | **SIDRIA** survey of a representative sample of children aged 6-7 years old | TBF, Q | 7 | Wheeze (Parent reported persistent wheezing≥1 in first 2 years, and in past 12 months); Transient early wheeze (wheeze in first 2 years but not past 12 months; ISAAC) |
| Rust, 2001 [[238](#_ENREF_238)] | CS | 6783 | USA | **NHANES III survey**. Children ages 2 months to 5 years from non-institutionalized U.S. population | TBF, I | <6 | Wheeze (DD; DD asthma ever) |
| Salem, 2002 [[239](#_ENREF_239)] | CS | 424 | Iraq | Population representative sample of children aged 0.16-2 years old | EBF, Q | 5 | Wheeze (Wheeze ever) |
| Selcuk, 1997 [[240](#_ENREF_240)] | CS | 5412 | Turkey | Children 7-12 years of 18 primary schools | TBF, Q | 12 | Wheeze (Parent reported wheeze ever; Parent reported current asthma); AD (parent reported current); r RC (Parent reported ever) |
| Suwanpromma, 2012 [[241](#_ENREF_241)] | CS | 215 | Thailand | Schoolchildren aged 6-18 years | TBF, Q | 18 | Wheeze (Spirometry; BHR hypertonic saline PC15) |
| Takemura, 2002 [[242](#_ENREF_242)] | CS | 23828 | Japan | **The Tokorozawa Childhood Asthma and Pollinosis Study.** Representative sample of children in public elementary schools (normal risk of disease) | EBF, TBF, Q | 15 | Wheeze (ATS questionnaire: DD asthma plus ≥2 episodes of wheeze) |
| Tanaka, 2009 [[243](#_ENREF_243)] | CS | 1957 | Japan | **Fukuoka Child Health Study.** All 3-year old children who had the examination at public health centres in Fukuoka city | EBF, TBF, Q | 3 | Wheeze (ISAAC); AD (ISAAC; current dermatitis) |
| Visser, 2010 [[244](#_ENREF_244)] | CS | 1115 | Netherlands | **EISL study**. One-year old infants from urban and rural primary care health clinics born in 2004-2006 | TBF, Q | 1 | Wheeze (Parent reported wheeze ever; ≥3 episodes of wheeze) |
| Wang, 2006 [[245](#_ENREF_245)] | CS | 8733 | China | Population representative sample of children in elementary schools and nurseries (normal risk of disease) | EBF, TBF, Q | 10 | Wheeze (ISAAC) |

Any: a panel of aero and food allergens; AD: atopic dermatitis; ATS: American Thoracic Society; BHR: bronchial hyper-responsiveness; CM: cow’s milk; CC: Case Control; CS: Cross-sectional; D: diary; DBPCFC: double blind placebo controlled food challenge; DD: doctor diagnosed; EBF: exclusive breastfeeding; ECRHS: European Community Respiratory Health Survey; FA: food allergy; I: interview; ISAAC: International Study of Asthma and Allergies in Children; OFC: open food challenge; PC: prospective cohort; PC15: provocative concentration to reduce by 15% a measure of lung function (usually forced expiratory volume in 1 second [FEV1]); PN: peanut; aero: aeroallergen; Q: questionnaire; R: medical records, Re-C: retrospective cohort; RC: rhino-conjunctivitis; SFI: solid food introduction; SPT: allergen skin prick test; sIgE: allergen-specific IgE; TBF: total breastfeeding.

# Table S3 Characteristics of included observational studies of breastfeeding or solid food introduction, and risk of autoimmune diseases

| **Study** | **Design** | **N/n cases** | **Country** | | **Population** | **Exposures and method of assessment** | **Age at outcome (years)** | **Outcomes reported**  **(method of assessment)** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Couper, 1999 [[246](#_ENREF_246)]; Couper, 2009 [[247](#_ENREF_247)] | PC | 548/~30 | Australia | | **BABYDIAB study.** First degree relatives of diabetic children | TBF, EBF, D/Q/I | 2 | TIDM (serology) |
| Frederikson, 2012 (abstract) [[248](#_ENREF_248)]; Fronczak, 2003 [[249](#_ENREF_249)]; Lamb, 2013 [[250](#_ENREF_250)]; Norris, 2003 [[251](#_ENREF_251)]; Lamb 2008 [[252](#_ENREF_252)] | PC, NCC | 1,698 | USA | | **DAISY study**. High risk children via HLA screening, or Colorado register | TBF, EBF, SFI, Q/I | 4, <7, 9, 13 | TIDM (serology; DD) |
| Holmberg, 2007 [[253](#_ENREF_253)]; Karlen, 2012 [[254](#_ENREF_254)]; Wahlberg, 2006 [[255](#_ENREF_255)] | PC | 3,788/~51 | Sweden | | **ABIS study.** General population in Southeast Sweden | TBF, EBF, Q | 1, 2, 6 | TIDM (serology) |
| Ludvigsson, 2003 [[256](#_ENREF_256)] | PC | 205 | Sweden | | Relatives of diabetics | TBF, Q | 2 | TIDM (serology) |
| Viner, 2008 [[257](#_ENREF_257)] | PC | 11,211/61 | UK | | Unclear | TBF, Q | >10 | TIDM (DD) |
| Virtanen, 1992 [[258](#_ENREF_258)]; Virtanen, 1998 [[259](#_ENREF_259)]; Hypponen, 1999 [[260](#_ENREF_260)]; Virtanen, 2000 [[261](#_ENREF_261)] | PC, NCC | 697/43 | Finland | | **Childhood Diabetes in Finland Study**. Siblings of diabetic children | TBF, Q | 7, <25 | TIDM (serology; DD) |
| Virtanen, 2011 [[262](#_ENREF_262)] | PC | ~4,000/ ~160 | Finland | | Odu and Tampere University Hospitals | TBF, EBF, Q | 5 | TIDM (serology; DD) |
| Jones, 1998 [[263](#_ENREF_263)] | NCC | 518/60 | UK | | Hospital admission | TBF, R | 5.0-9 | TIDM (DD) |
| Kimpimaki, 2001 [[264](#_ENREF_264)] | NCC | 455/65 | Finland | | Turku, Oulu and Tampere Hospital births | TBF, EBF, Q | <4 | TIDM (DD) |
| Kyvik, 1992 [[265](#_ENREF_265)] | NCC | 228/76 | Denmark | | National Service Conscript records | TBF, R | <20 | TIDM (DD) |
| Norris, 1996 [[266](#_ENREF_266)]; | NCC | 171/18 | USA | | Siblings or offspring of Barbara Davies Centre Diabetics | TBF, Q/R | <7 | TIDM (DD) |
| Robertson, 2010 [[267](#_ENREF_267)] | NCC | 1444/361 | UK | | AMND and SSG register, hospital births | TBF, R | <15 | TIDM (DD) |
| Savilahti, 2009 [[268](#_ENREF_268)] | NCC | 6209/45 | Finland | | NHI database | TBF, SFI, R | 12 | TIDM (DD) |
| Ahadi, 2011 [[269](#_ENREF_269)] | CC | 202/101 | Iran | | Hospital admission | TBF, Q/I | 7 | TIDM (DD) |
| Alves, 2012 [[270](#_ENREF_270)] | CC | 246/123 | Brazil | | Siblings | TBF, EBF, SFI, I | 7 | TIDM (DD) |
| Ashraf, 2010 [[271](#_ENREF_271)] | CC | 195/128 | USA | | Children's hospital | TBF, Q | <10 | TIDM (DD) |
| Baruah, 2011 [[272](#_ENREF_272)] | CC | 86/43 | India | | Endocrinology ward | TBF, EBF, I | <18 | TIDM (DD) |
| Bener, 2009 [[273](#_ENREF_273)] | CC | 340 | Qatar | | Endocrinology clinic and community | TBF, I | <16 | TIDM (DD) |
| Blom, 1989 [[274](#_ENREF_274)] | CC | 867/339 | Sweden | | Paediatric referral and population register | TBF, Q | 7 | TIDM (DD) |
| Bodington, 1994 [[275](#_ENREF_275)] | CC | 393/209 | UK | | Independent sources and population register | TBF, Q | <15 | TIDM (DD) |
| Borras, 2011 [[276](#_ENREF_276)] | CC | 1,530/306 | Spain | | Diabetes register and Catalonia birth register | TBF, R | Not reported | TIDM (DD) |
| Dahlquist, 2002 [[277](#_ENREF_277)] | CC | 2,226/610 | Austria, Latvia, Lithuania, Luxembourg and UK | | **EURODIAB**. Diabetes register and population register | TBF, SFI, Q/I | <15 | TIDM (DD) |
| Esfarjani, 2001 [[278](#_ENREF_278)] | CC | 104/52 | Iran | | Endocrine clinic and paediatric OPD attendance | TBF, EBF, SFI, Q | <14 | TIDM (DD) |
| Gimeno, 1997 [[279](#_ENREF_279)] | CC | 626/313 | Brazil | | Juvenile Diabetes Association or hospital records | TBF, EBF, Q | <18 | TIDM (DD) |
| Hathout, 2006 [[280](#_ENREF_280)] | CC | 402/102 | USA | | Diabetes hospital care and Hospital Well Child clinics | TBF, Q/I | 7 | TIDM (DD) |
| Kostraba, 1992 [[281](#_ENREF_281)]; Kostraba, 1993 [[282](#_ENREF_282)] | CC | 264/132-white  108/54-black | USA | | Alleghany Hospital diabetes register Colorado IDDM Registry and motor vehicle driver register | TBF, EBF, Q/I | 10, <18 | TIDM (DD) |
| Liese, 2012 [[283](#_ENREF_283)] | CC | 709/505 | USA | | SEARCH surveillance (Colorado and South Carolina research centres) | EBF, SFI, I | <20 | TIDM (DD) |
| Majeed, 2011 [[284](#_ENREF_284)] | CC | 310/96 | Iraq | | Hospital admission or OPD | TBF, SFI, Q | <17 | TIDM (DD) |
| Malcova, 2006 [[285](#_ENREF_285)] | CC | 2,334/868 | Czech Republic | | Czech Childhood Diabetes Register and diabetes clinic | TBF, Q | <15 | TIDM (DD) |
| Marshall, 2004 [[286](#_ENREF_286)] | CC | 577/196 | UK | | Paediatric clinic and Local Health Authority Register | TBF, I | <16 | TIDM (DD) |
| Mayer, 1988 [[287](#_ENREF_287)] | CC | 747/268 | USA | | Colorado IDDM Registry or Barbara Davies Centre | TBF, Q/I | <18 | TIDM (DD) |
| McKinney, 1999 [[288](#_ENREF_288)] | CC | 521/196 | UK | | Yorkshire Childhood Diabetes Register and Family Health Service Authority Register | TBF, I | <16 | TIDM (DD) |
| Meloni, 1997 [[289](#_ENREF_289)] | CC | 200/100 | Italy | | Paediatric clinic or hospital admission | TBF, SFI, Q | <17 | TIDM (DD) |
| Patterson, 1994 [[290](#_ENREF_290)] | CC | 1,548/258 | UK | | Diabetes register, hospital discharge, Health Service records | TBF, EBF, R | <15 | TIDM (DD) |
| Perez-Bravo, 1996 [[291](#_ENREF_291)] | CC | 165/80 | Chile | | Santiago de Chile registry | TBF, SFI, Q/I | <15 | TIDM (DD) |
| Perez-Bravo, 2003 [[292](#_ENREF_292)] | CC | 250/143 | Chile | | School volunteers | TBF, Q | 8 | TIDM (DD) |
| Rabiei 2011 [[293](#_ENREF_293)] | CC | 300/100 | Iran | | Diabetes register | EBF, SFI, Q | 11 | TIDM (DD) |
| Rami, 1999 [[294](#_ENREF_294)] | CC | 609/114 | Austria | | Austrian diabetes register | TBF, EBF, Q | <15 | TIDM (DD) |
| Rosenbauer, 2008 [[295](#_ENREF_295)] | CC | 2631/760 | Germany | | Hospital based surveillance system ESPD and local registration office records | TBF, SFI, Q/I | <5 | TIDM (DD) |
| Sadauskaite-Kuehne, 2004 [[296](#_ENREF_296)]; Skrodeniene, 2010 [[297](#_ENREF_297)] | CC | 1,944/803 | Sweden/ Lithuania | | Population register and outpatients | TBF, EBF, Q | 7, 9 | TIDM (DD) |
| Samuelsson, 1993 [[298](#_ENREF_298)] | CC | 1,089/297 | Sweden | | Paediatric department and population register | TBF, EBF, Q/R | <15 | TIDM (DD) |
| Siemiatycki, 1989 [[299](#_ENREF_299)] | CC | 482/161 | Canada | | Hospital admission | TBF, I | <17 | TIDM (DD) |
| Sipetic, 2005 [[300](#_ENREF_300)] | CC | 315/105 | Serbia | | Hospital admission | TBF, I | <16 | TIDM (DD) |
| Soltesz, 1994 [[301](#_ENREF_301)] | CC | 305/130 | Hungary | | Incidence register | TBF, EBF, Q | <14 | TIDM (DD) |
| Stene, 2000 [[302](#_ENREF_302)] | CC | 1156/85 | Norway | | National Childhood Diabetes register | EBF, Q | <15 | TIDM (DD) |
| Stene, 2003 [[303](#_ENREF_303)] | CC | 2213/545 | Norway | | Diabetes register | EBF, SFI, Q | 9 | TIDM (DD) |
| Strotmeyer, 2004 [[304](#_ENREF_304)] | CC | 485/247 | China | | Diabetes register and population register | TBF, SFI, Q | 10 | TIDM (DD) |
| Tai, 1998 [[305](#_ENREF_305)] | CC | 310/117 | Taiwan | | Taipei City | TBF, I | 8 | TIDM (DD) |
| Telahun, 1994 [[306](#_ENREF_306)] | CC | 129/55 | Ethiopia | | Ethio-Swedish Children's Hospital Diabetic Clinic | TBF, Q | <15 | TIDM (DD) |
| Tenconi, 2007 [[307](#_ENREF_307)] | CC | 477/159 | Italy | | Diabetes register or paediatric admissions | TBF, R/I/Q | 16 | TIDM (DD) |
| Thorsdottir, 2000 [[308](#_ENREF_308)] | CC | 220/55 | Iceland | | Statistical Bureau of Iceland | TBF, EBF, I | 12 | TIDM (DD) |
| Verge, 1994 [[309](#_ENREF_309)] | CC | 475/217 | Australia | | New South Wales diabetes register and school records | TBF, Q | <15 | TIDM (DD) |
| Virtanen, 1993 [[310](#_ENREF_310)] | CC | 1,380/690 | Finland | | Finnish National Population Registry | TBF, EBF, Q | 14 | TIDM (DD) |
| Visalli, 2003 [[311](#_ENREF_311)] | CC | 900/150 | Italy | | **EURODIAB study** register and school records | TBF, SFI, Q | 6-18 | TIDM (DD) |
| Wadsworth, 1997 [[312](#_ENREF_312)] | CC | 639/276 | UK | | **BPASU** reporting system and District Health Authority Immunisation Register | TBF, Q | <5 | TIDM (DD) |
| Glatthaar, 1988 [[313](#_ENREF_313)] | CS | 946/~200 | Australia | | School register | TBF, Q | <18 | TIDM (DD) |
| Hummel, 2000 [[314](#_ENREF_314)]; Hummel, 2007 [[315](#_ENREF_315)]; Ziegler, 2003 [[316](#_ENREF_316)] | PC | 1460/~68 | Germany | | **German BABYDIAB study**. Offspring of mothers and/or fathers with TIDM born in Germany between 1989 and 2000 | EBF, TBF, SFI, Q | 2, 5, 8 | TIDM (serology), CD (IgA-tTG ) |
| Norris, 2005 [[317](#_ENREF_317)] | PC | 1560 | USA | | **DAISY study**. Children at increased risk for TIDM were enrolled at birth from 1993 to 2006 and/or identified by newborn screening for HLA genotype | TBF, Q/I | <5 | CD (IgA-tTG) |
| Welander, 2010 [[318](#_ENREF_318)] | PC | 9,414/ ~29 | Sweden | | **ABIS study**. Population based study of babies born between Oct 1997 and Oct 1999. | TBF, D/I | 8.4 | CD (IgA-tTG and biopsy) |
| Ascher, 1997 [[319](#_ENREF_319)] | CC | 81/8 | Sweden | | Cases of coeliac disease were compared with siblings at high genetic risk (DQA1\*0501-DQB1\*02), in whom the diagnosis was excluded | TBF, I | <18 | CD (ESPGHAN criteria) |
| Auricchio, 1983 [[320](#_ENREF_320)] | CC | 437/190 | Italy | | Source of cases unknown, controls unaffected siblings | TBF, R/I | <18 | CD (ESPGHAN criteria) |
| Baron, 2005 [[321](#_ENREF_321)] | CC | 444/222 | France | | Cases from EPIMAD registry (1988-97) with community-based sex, age, region matched controls | TBF, EBF, I | <17 | IBD (DD) |
| Bergstrand, 1983 [[322](#_ENREF_322)] | CC | 616/308 | Sweden | | Cases were residents of Stockholm County diagnosed with Crohn's disease between 1955 and 1974 with sex, age, residence matched controls from population registry in Stockholm County | TBF, Q/I | 20 | IBD (Unclear) |
| Castiglione, 2011 [[323](#_ENREF_323)] | CC | 1,030/ 468 | Italy | | Cases from gastroenterology units; controls comprised from physicians, nurses, and support services professionals from the participating sites | TBF, Q | 16-66 | IBD (ECCO guideline) |
| Corrao, 1997 [[324](#_ENREF_324)] | CC | 1,252/ 626 | Italy | | Cases identified in clinics with controls sex and age matched hospital-based control | TBF, I | 18-65 | IBD (DD including histology) |
| Decker 2010 [[325](#_ENREF_325)] | CC | 866/123 | Germany | | Cases from paediatric gastroenterology clinics; controls from ophthalmology and dental clinics | TBF, Q | <18 | CD (DD); IBD (DD) |
| Ellis, 2012 [[326](#_ENREF_326)] | CC | 655/246 | Australia | | **CLARITY**. Cases from paediatric rheumatology clinic; controls from paediatric surgery unit born in the same area | TBF; SFI, Q/I | 18 | JRA (DD) |
| Falth-Magnusson, 1996 [[327](#_ENREF_327)] | CC | 336/72 | Sweden | | Cases from paediatric department records, born in 1987-1989. Reference children were age matched from same county. | TBF, EBF, R/Q | <2 | CD (ESPGHAN criteria) |
| Fort, 1990 [[328](#_ENREF_328)] | CC | 189/59 | USA | | Cases being followed up in clinics with sibling or other controls | TBF, SFI, I | 15 | Autoimmune thyroid Disease (DD) |
| Gearry, 2010 [[329](#_ENREF_329)] | CC | 1,253/ 653 | | New Zealand | Canterbury Inflammatory Bowel Disease Project. Cases selected from patient advertising, letters to patients from their doctor, patient support groups; Community based (Electoral Roll) controls | TBF, R/Q | >20 | IBD (DD) |
| Gilat, 1987 [[330](#_ENREF_330)] | CC | 1,497/ 499 | 9 countries: USA, Canada, UK, Sweden, Denmark, Holland, France, Italy, Israel | | The International IBD Study Group: Cases and matched controls from several health centres (normal risk of disease) | TBF, Q/I | <25 | IBD (DD) |
| Greco, 1988 [[331](#_ENREF_331)] | CC | 2,150/ 201 | Italy | | Hospital-based cases born in 1976-1983 with age and area matched controls | EBF, R/Q | 2 | CD (ESPGHAN criteria) |
| Gruber, 1996 [[332](#_ENREF_332)] | CC | 144/54 | USA | | Children diagnosed with Crohn's disease with mothers who were volunteers from the Western New York Chapter of the Crohn's and Colitis Foundation of America, Inc. with age matched unrelated controls | EBF, TBF, Q | <22 | IBD (Unclear) |
| Hansen, 2011[[333](#_ENREF_333)] | CC | 534/  267 | Denmark | | All patients diagnosed with IBD in Copenhagen City and County (private and public sector) in 2003-4 with age, sex, ethnicity and area matched control with orthopaedic problems | TBF, Q | 38 | IBD (Copenhagen Diagnostic Criteria) |
| Ivarsson, 2002 [[334](#_ENREF_334)] | CC | 1,272/ 392 | Sweden | | Cases selected from CD Register born in 1992-1996 and sex age and area matched controls from the national population register | TBF, SFI, Q | 2, 15 | CD (ESPGHAN criteria) |
| Koletzko, 1991 [[335](#_ENREF_335)] | CC | 231/93 | Unclear | | Source of cases unclear. Sibling controls | EBF, TBF, SFI, Q | 15 | IBD (DD including histology) |
| Mason, 1995 [[336](#_ENREF_336)] | CC | 133/54 | USA | | Children seen at the outpatient paediatric rheumatology clinics with playmates matched for age and race as controls | TBF, SFI, I | 6 | JRA (DD) |
| Pacilio, 2010 [[337](#_ENREF_337)] | CC | 278/139 | Unclear | | Unclear source of cases and controls. Cases aged 0.5-2 years old with age matched healthy controls | TBF, Unclear | 2 | CD (Unclear) |
| Peters, 2001 [[338](#_ENREF_338)] | CC | 270/133 | Germany | | All newly diagnosed patients aged <10 years old were identified from paediatricians and a biannual meeting of the German Coeliac Disease Society in 1985–1995. Sex and aged matched control selected from population registry | TBF, Q | < 10 | CD (ESPGHAN criteria) |
| Roberts 2009 [[339](#_ENREF_339)] | CC | 248,521/ 90 | UK | | Cases identified from hospital admission codes, controls the rest of the population with linked record data | TBF, R | <24 | CD (ICD codes 269.0 (ICD-8) or 579.0 (ICD-9) or K90.0 (ICD-10)) |
| Rosenberg, 1996 [[340](#_ENREF_340)] | CC | 468/ 137 | Canada | | Cases from a health service and matched control from population | TBF, SFI, Q | <18 | JRA (American College of Rheumatology criteria) |
| Sonntag, 2007 [[341](#_ENREF_341)] | CC | 1,974/ 1,096 | Germany | | Cases identified from different sources and controls from partners (normal risk of disease) | TBF, Q | 40 | IBD (DD including histology) |
| Thompson, 1999 [[342](#_ENREF_342)] | NCC | 243/27 | UK | | Cases and matched for gender and social class controls were selected from the 1946 National Survey of Health & Development (NSHD) and the 1958 National Child Development Study (NCDS), two on-going, longitudinal birth cohort studies in UK. | TBF, R/I | 33-43 | IBD (DD) |
| Wang, 2013 [[343](#_ENREF_343)] | CC | 2,616/ 1,308 | China | | Cases from several health centres and matched controls from friends or neighbours (normal risk of disease) | TBF, I | <70 | IBD (Chinese diagnostic guideline including histology) |

CC: case control; CD: coeliac disease; CS: Cross-sectional; DD: doctor diagnosis; EBF: exclusive breastfeeding; IA: Islet autoantibodies; IBD: Inflammatory bowel disease; I: interview ; NCC: nested case control; PC: prospective cohort; Q: questionnaire; R: medical records; SFI: solid food introduction; TBF: total breastfeeding

# Table S4 Characteristics of included intervention trials of other maternal or infant dietary exposures and allergic outcomes

| Study | Design | N Intervention/ Control | Country | Intervention | Study Details | Disease risk | Age at outcome (years) | Outcomes reported  (method of assessment) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Falth-Magnusson, [1987](#_bookmark21) [[344](#_ENREF_344)]  Falth-Magnusson[, 1992](#_bookmark22) [[345](#_ENREF_345)]  Ludvigsson, 2003 [[346](#_ENREF_346)] | RCT | 108/104 | Sweden | **Allergenic food avoidance** (maternal) | Pregnant women. Cow's milk and egg exclusion from 28 weeks gestation to delivery. | High | 1.5, 5 | AR  (physician assessment); Asthma  (≥3 episodes of  wheeze); AD (Hanifin and Lobitz); AS (SPT); FA (history); Total IgE; TIDM (serology) |
| Jirapinyo, 2013 [[347](#_ENREF_347)] | RCT | 30/32 | Thailand | **Allergenic food avoidance** (maternal) | Lactating women.  Cow's milk exclusion during lactation up to 4  months postpartum | High | <0.5 | AD (unclear) |
| Lilja, 1989 [[348](#_ENREF_348)] | RCT | 84/87 | Sweden | **Allergenic food avoidance** (maternal) | Pregnant women.  Milk and egg  exclusion during third trimester, versus 1 litre milk and 1 egg per day | High | 1.5 | Asthma (physician  assessment); AS (SPT); Allergic rhinitis (physician assessment); AD (physician assessment); FA (history) |
| Hattevig, 1990 [[349](#_ENREF_349)]; Paronen, 2000 [[350](#_ENREF_350)]; Hattevig, 1999 [[351](#_ENREF_351)]; Hattevig, 1989 [[352](#_ENREF_352)]; Sigurs, 1992 [[353](#_ENREF_353)] | CCT | 54/67 | Sweden | **Allergenic food avoidance** (maternal) | Lactating women. Cow's milk, egg and fish exclusion during first 3 months post- partum | High | 0.25,  1.5, 4,  10 | AS (SPT);  TIDM (serology), AD, Asthma, Wheeze; AR; FA (history), Total IgE |
| Herrmann, 1996 [[354](#_ENREF_354)] | CCT | 50/50 | Germany | **Allergenic food avoidance** (maternal) | Pregnant/lactating women. Cow's milk and egg exclusion from 28 weeks gestation through lactation, versus 1 litre cow's milk and 1 egg/day | High | 1 | AD (DD); AS (sIgE) |
| Kilburn, 1998 [[355](#_ENREF_355)] | CCT | 15/96 | UK | **Allergenic food avoidance** (maternal) | Lactating women.  Milk, egg, fish and nuts exclusion throughout lactation | High | 1.5 | AD (Hanifin and Rajka), AS (SPT) |
| Metcalfe, 2016 [[356](#_ENREF_356)] | RCT | 40, 44, 36 | Australia | **Allergenic food avoidance** (maternal) | First 6 weeks of lactation. Randomised to high-egg diet (>4 eggs per week), low-egg diet (1-3 eggs per week) and egg-free diet | High | 0.33 | AS (sIgE egg) |
| Becker, 2004 [[357](#_ENREF_357)]  Chan-  Yeung, 2000 [[358](#_ENREF_358)] & 2005 [[359](#_ENREF_359)];Wong, 2013 [[360](#_ENREF_360)] Protudjer, 2011 [[361](#_ENREF_361)]; Carlsten, 2013 [[362](#_ENREF_362)] | RCT | 281/268 | Canada | **Multifaceted including maternal allergenic food avoidance** | **CAPPS Study.** Pregnant/lactating women. BF encouraged for 4 months, allergenic food exclusion during pregnancy/lactation, delayed solid (6 months) and allergenic (12 months) food, whey pHF if necessary, environmental control | High | 1, 7, 15 | Asthma; Recurrent wheeze (ISAAC and modified ECRHS); AS (SPT); AR (DD); AD (DD); BHR (PC20); Lung function (FEV1) |
| Hide, 1994 [[363](#_ENREF_363)]  Hide, 1996,[[364](#_ENREF_364)]  Arshad, 1992 [[365](#_ENREF_365)]  Arshad, 2003 [[366](#_ENREF_366)]  Arshad, 2007 [[367](#_ENREF_367)]  Scott, 2012 [[368](#_ENREF_368)] | RCT | 71/68 | UK | **Multifaceted including maternal allergenic food avoidance** | **Isle of Wight Study.** Lactating women. Allergenic food exclusion during lactation, delayed allergenic (9-11 months) food, soya hydrolysate if necessary, environmental control. | High | 1, 2, 4, 8, 18 | Recurrent wheeze (≥3 episodes); BHR (PC20); AD (Physician assessment); FA (OFC; Physician assessment); AS (SPT, total IgE); AR (physician assessment); Total IgE |
| Lovegrove, 1994 [[369](#_ENREF_369)] | RCT | 12/14 | UK | **Multifaceted including maternal allergenic food avoidance** | CM exclusion during pregnancy and lactation with hydrolysed milk if necessary. BF encouraged for 6 months and EHF if needed | High | 1 | AD (DD) |
| Shao, 2006 [[370](#_ENREF_370)] | RCT | 23/23 | China | **Multifaceted including maternal allergenic food avoidance** | Lactating women. EBF encouraged for 4 months, allergenic food exclusion during lactation, delayed solid (4 months) and allergenic (6-12 months) food, pHF if necessary | High | 1.5 | AD (Wolkerstorfer score); AS (SPT) |
| Zeiger, 1992 [[371](#_ENREF_371)]  Zeiger, 1989, [[372](#_ENREF_372)] Zeiger 1994 [[373](#_ENREF_373)] | RCT | 103/185 [seen at 4 months] | USA | **Multifaceted including maternal allergenic food avoidance** | Pregnant/lactating women. Allergenic food exclusion during pregnancy/lactation, delayed allergenic (1-3 years) food, casein eHF if necessary | High | 1, 4, 7 | AD (Hanifin and Rajka Criteria); AR (DD); FA - Any (DD), Wheeze ( ≥2 physician diagnosed episodes); AS (SPT) |
| Halmerbauer, 2002, 2003 [[374](#_ENREF_374),[375](#_ENREF_375)] | RCT | 349/347 | UK, Germany, Austria | **Multifaceted** | **SPACE Study.** EBF encouraged beyond 3 months, delayed solid (6 months) and allergenic (1-3 years) food, environmental control | High | 1 | AD (DD); AS (SPT, sIgE); Wheeze (Parent reported wheeze ever), Asthma (≥3 episodes of wheeze); FA (DD) |
| Matthew, 1977 [[376](#_ENREF_376)] | RCT | 27/35 | UK | **Multifaceted** | BF encouraged for 6 months, delayed solid food (3 months) and allergenic food (6 months), soy milk if necessary, environmental control | High | 1 | AD (Physician assessment); AS (Total IgE) |
| Poysa, 1991 [[377](#_ENREF_377)]  Poysa 1989 [[378](#_ENREF_378)]  Kuikka 1985 [[379](#_ENREF_379)] | RCT | Unclear - outcome reported in 35/33 | Finland | **Multifaceted** | EBF encouraged for 3 months, solid food and cow's milk formula after 3 months plus environmental control | High | 5, 10 | Asthma (≥3 episodes of wheeze); AR (Physician assessment); AS (SPT, total IgE); FA (oral food challenge); AD (Hanifin and Rajka) |
| Schonberger,  2005 [[137](#_ENREF_137)] | RCT | 222/221 | The Netherlands | **Multifaceted** | **PREVASC study.** BF encouraged to ≥6 months, delayed solid and allergenic (6 months) food, eHF if formula introduced, environmental control | High | 2 | AD (ICHPPC); Wheeze (Dutch Guideline ‘‘Asthma in Children’’ and ISAAC); AS (sIgE) |
| Boyle 2015 [[380](#_ENREF_380)] [[381](#_ENREF_381)]  Boyle 2016 [[382](#_ENREF_382)] | RCT | 432/431 | Australia, Singapore, England and Ireland | **Prebiotic**  Immunofortis  GOS/FOS + AOS | **PATCH Study**. Term infants with  ≥one parent with allergic disease, and formula introduction <18 weeks. Intervention until 6 months. Co- intervention with partially hydrolysed formula | High | 1 | AD (Hanifin and Rajka)  AS (total IgE, sIgE milk, sIgE egg) |
| Gruber 2010 [[383](#_ENREF_383)]  Gruber 2015 [[384](#_ENREF_384)] | RCT | 414/ 416 | Netherlands,  Austria, Switzerland, Italy, Germany | **Prebiotic** Immunofortis GOS/FOS + AOS | **MIPS-1 Study.** Full formula feeds  <8 weeks | Low | 1, 5 | AS (sIgE to CM or egg; total IgE); AD (UKWPC), AD (DD); Wheeze (DD); AR (DD); FA (DD) |
| Ivakhnenko 2013 [[385](#_ENREF_385)] | RCT | 80/ 80 | Ukraine | **Prebiotic** GOS/FOS | Fully formula fed – no breastfeeding at all. Intervention until 2 months. | Normal | 1.5 | AD (Harrigan and Rabinowitz); FA (unclear) |
| Moro 2006 [[386](#_ENREF_386)], van Hoffen 2009 [[387](#_ENREF_387)], Arslanoglu 2008 [[388](#_ENREF_388)] Arslanoglu 2012 [[389](#_ENREF_389)] | RCT | 129/ 130 | Italy | **Prebiotic** Immunofortis | Formula commenced <2 weeks, and full formula feeds  <6 weeks | High | 0.5, 2, 5 | Allergic sensitisation (sIgE to CM; total IgE), AD (Harrigan and Rabinowitz), Wheeze (≥3 episodes), Allergic rhinoconjunctivitis (physician assessment) |
| Sierra, 2015 [[390](#_ENREF_390)] | RCT | 188/ 177 | Spain | **Prebiotic** Nutradefense. GOS | Infants aged <2 months, exclusively formula fed for ≥15 days. Intervention until 1 year. | Normal | 1 | AD (physician assessment); Wheeze (physician assessment); AS (SPT); FA (unclear) |
| Ziegler 2007[[391](#_ENREF_391)] | RCT | 150/ 76 | USA | **Prebiotic** GOS/Polydextrose +/- lactulose | Full formula feeds  <2 weeks | Normal | 0.3 | AD (unclear) |
| Chien, 2016 [[392](#_ENREF_392)] | RCT | Unclear – outcome reported in 45 (synbiotic), 39 (prebiotic), 45 (control) | Singapore | **Prebiotic & Synbiotic**  B. breve  scGOS/lcGOS | Mixed fed infants born by elective Caesarean. Infant formula supplemented with scGOS/lcFOS (0.8g/100ml) and B. breve M-16V (7.5x108CFU/100ml), or formula with scGOS/lcFOS (0.8g/100ml), or control formula from birth until 4 months. | Unclear | 0.4 | AD (unclear) |
| Kukkonen 2007 [[393](#_ENREF_393)] Kuitunen 2009 [[394](#_ENREF_394)] Kukkonen 2011[[395](#_ENREF_395)] | RCT | 610/ 613 | Finland | **Synbiotic**  L. rhamnosus, B. breve, P. freudenreichii; GOS | Pregnant women (2-4 weeks before delivery) and infants up to 6 months. Representative population | High | 2, 5 | AD (UK Working party criteria), Wheeze (≥2 episodes + interval symptoms), ARC (symptoms + sensitisation), Allergic sensitisation (Total IgE and SPT/sIgE to common allergens) |
| Roze 2012 [[396](#_ENREF_396)] | RCT | 48/ 49 | France | **Synbiotic**  L. rhamnosus; GOS/FOS | Infants (first 6 months). Full formula feeds until randomised (up to day 3) | Normal | 0.5 | AD (UK Working party criteria) |
| Van der Aa 2010 [[397](#_ENREF_397)] | RCT | 46/ 44 | Netherlands | **Synbiotic**  B. breve; GOS/FOS | Whey-based formula combined with Synbiotic, for 3 months. Infants who already had AD, with SCORAD >15 | High | 1 | Wheeze (≥3 episodes),  Allergic sensitisation (Total IgE) |
| Abrahamsson 2007 [[398](#_ENREF_398)]  Abrahamsson 2013 [[399](#_ENREF_399)] | RCT | 117/ 115 | Sweden | **Probiotic**  L.reuteri | Pregnant women (week 36) and infants (for 12 months) | High | 2, 7 | AD (Seymour), Wheeze (single, or ≥2 episodes), ARC (watery discharge ≥2 times with same allergen), Allergic sensitisation (SPT common allergens) |
| Allen 2012 [[400](#_ENREF_400)]  Allen 2014 [[401](#_ENREF_401)] | RCT | 220/ 234 | UK | **Probiotic**  L. salivarius, L. paracasei, B. animalis, B. bifidum | Pregnant women (week 36) and infants (for 6 months) | High | 2 | AD (DD), Allergic sensitisation (SPT common allergens, CM, Egg), Wheeze (unclear), ARC (unclear), Food Allergy (parent report) |
| Boyle 2011 [[402](#_ENREF_402)] | RCT | 125/ 125 | Australia | **Probiotic**  L. rhamnosus | Pregnant women (week 36) | High | 1 | AD (UK Working party criteria), Wheeze (wheeze + loose API), Allergic sensitisation (SPT common allergens) |
| Cabana, 2015 [[403](#_ENREF_403)] | RCT | 93/ 92 | USA | **Probiotic**  Lactobacillus GG | Birth to 6 months to infants daily | High | 2 | Wheeze (unclear); AD (unclear) |
| De Leon 2007 [[404](#_ENREF_404)] Simon 2007 [[405](#_ENREF_405)] | RCT | Total = 33 | Philippines | **Probiotic** Lactobacillus Bifidobacterium | Birth to 4 months to infants, or to their breastfeeding mothers | High | 0.5 | AD (unclear)  Allergic sensitisation (Total IgE) |
| Dotterud 2010 [[406](#_ENREF_406)]  Simpson, 2015 [[407](#_ENREF_407)] | RCT | 211/ 204 | Norway | **Probiotic**  L. rhamnosus, B. animalis, L. acidophilus | Mothers only (36 weeks gestation to 3 months after birth) | Normal | 2, 6 | AD (UKWPC), Wheeze (≥3 episodes + ICS, parent report), ARC (DD, parent report), Allergic sensitisation (SPT common allergens, sIgE) |
| Enomoto 2014 [[408](#_ENREF_408)] | CCT | 130/36 | Japan | **Probiotic**  B. longum, B. breve | Pregnant women (week 36) and infants (for 6 months) | Normal | 1.5 | AD (Hanifin and Rajka), Wheeze (physician assessment), ARC (physician assessment) |
| Huurre 2008 [[409](#_ENREF_409)] | RCT | 72/ 68 | Finland | **Probiotic**  L. rhamnosus, B. animalis | Infants (for 6 months) | High | 1 | AD (Hanifin and Rajka),  Allergic sensitisation (SPT common allergens) |
| Kalliomaki 2001 [[410](#_ENREF_410)] Kalliomaki 2003 [[411](#_ENREF_411)] Kalliomaki 2007 [[412](#_ENREF_412)]  Rautava 2002 [[413](#_ENREF_413)] | RCT | 77/ 82 | Finland | **Probiotic**  L. rhamnosus | Mothers and infants; from 2–4 weeks before expected delivery and 6 months of age | High | 2 | AD (relapsing itchy lesions with typical location), Wheeze (symptoms + ICS), ARC (symptoms with allergen exposure), Food Allergy (CMA by DBPCFC), Allergic sensitisation (Total IgE and SPT/sIgE to common allergens) |
| Kim 2010 [[414](#_ENREF_414)] | RCT | 57/ 55 | Korea | **Probiotic**  B. bifidum, B. animalis, L. acidophilus | Pregnant women and infants from 4 to 6 months | High | 1 | AD (Hanifin and Rajka),  Allergic sensitisation (Total IgE and sIgE to common allergens) |
| Kopp 2008 [[415](#_ENREF_415)] | RCT | 54/ 51 | Germany | **Probiotic**  L. rhamnosus | Mothers (2-4 weeks before birth until 3 months post birth) and infants (months 4-6) | High | 2 | AD (UK Working party criteria), Wheeze (≥5 episodes),  Allergic sensitisation (Total IgE and sIgE to common allergens) |
| Lau 2012 [[416](#_ENREF_416)] | RCT | 303/ 303 | Germany | **Probiotic**  E. coli, E. faecalis | Infant from 5 weeks up to 7 months age | High | 2 | AD (Hanifin and Rajka), Allergic sensitisation (Total IgE and sIgE) |
| Lodinová-Žádníková 2010 [[417](#_ENREF_417)] | RCT | 56/ 57 | Czech Republic | **Probiotic**  E. coli | Infants - birth to age 4 weeks | High | 1 | AD (unclear), Food allergy (unclear), Wheeze (unclear)  Allergic sensitisation (Total IgE and sIgE to common allergens) |
| Lundelin, 2016 [[418](#_ENREF_418)]  Luoto, 2014 [[419](#_ENREF_419)] | RCT | 31, 31, 32 | Finland | **Probiotic**  L. rhamnosus GG, B. lactis, L. paracasei ST11, B.longum BL999 | Perinatal administration of probiotic to preterm infants (32-36 weeks gestation) | Normal | 1 | Wheeze (ISAAC); ARC ISAAC); AD (ISAAC); FA (unclear) |
| Morisset 2008 [[420](#_ENREF_420)] | RCT | 59/ 56 | France | **Probiotic**  Fermented formula without live bacteria | Infant – from birth or weaning, to age 1 year | High | 1 | Food allergy (CMA by physician assessment)  Allergic sensitisation (sIgE to cow’s milk) |
| Niers 2009 [[421](#_ENREF_421)]  Gorissen, 2014 [[422](#_ENREF_422)] | RCT | 78/ 78 | Netherlands | **Probiotic**  B. bifidum, B. animalis, Lc. lactis | **PANDA study.** Pregnant women during the last 6 weeks of pregnancy and their infants until age 1 year | High | 2, 6 | AD (modified ECRHS, UKWPC), Wheeze (physician assessment),  AS (Total IgE and SPT/sIgE to common allergens), Food allergy (physician assessment); ARC (ISAAC); Lung function (FEV1) |
| Ou 2012 [[423](#_ENREF_423)] | RCT | 95/ 96 | Taiwan | **Probiotic**  L. rhamnosus | Pregnant women (third trimester) and then breastfeeding mothers, or directly to infants, until age 6 months | High | 3 | AD (ISAAC), Wheeze (ISAAC), ARC (ISAAC), Allergic sensitisation (sIgE to common allergens) |
| Taylor 2007 [[424](#_ENREF_424)], Prescott 2008 [[425](#_ENREF_425)] Jensen 2012 [[426](#_ENREF_426)] | RCT | 115/ 111 | Australia | **Probiotic**  L. acidophilus | Infants until 6 months | High | 1, 2.5, 5 | AD (DD), Food allergy (any food - physician assessment), Wheeze (DD), ARC (symptoms + sensitisation), Allergic sensitisation (SPT common allergens) |
| Rautava 2006 [[427](#_ENREF_427)] | RCT | 38/ 43 | Finland | **Probiotic**  B. animalis, L. rhamnosus | Infant formula; infants until age 1 year | Normal | 1 | AD (Hanifin and Rajka), Food allergy (CMA by DBPCFC)  Allergic sensitisation (SPT food allergens) |
| Rautava 2012 [[428](#_ENREF_428)] | RCT | 82/ 78 | Finland | **Probiotic**  B. longum, L. rhamnosus | Infants fed daily until age 1 year | High | 2 | AD (Hanifin and Rajka),  Allergic sensitisation (SPT common allergens) |
| Scalabrin 2009 [[429](#_ENREF_429)]  Scalabrin 2014 [[430](#_ENREF_430)]  Scalabrin 2017 [[431](#_ENREF_431)] | RCT | 95/ 95 | USA | **Probiotic**  L. rhamnosus | Infants (first 12 months) fed extensively hydrolysed formula from 14 days | Normal | 0.4, 3, 5 | Allergic sensitisation (sIgE to common allergens), AD (unclear), Wheeze (unclear), ARC (unclear), Food Allergy (unclear) |
| Soh 2009 [[432](#_ENREF_432)]  Loo 2014 [[433](#_ENREF_433)] | RCT | 127/ 126 | Singapore | **Probiotic**  L. rhamnosus, B. longum | Cow’s milk-based infant formula supplemented with Probiotic; infants up to 6 months of age | High | 1 | AD (Seymour),  Allergic sensitisation (Total IgE and SPT/sIgE to common allergens) Food allergy (physician assessment), ARC (physician assessment) |
| West 2009 [[434](#_ENREF_434)]  West 2013 [[435](#_ENREF_435)] | RCT | 89/ 90 | Sweden | **Probiotic**  L paracasei | To infant from 4 until 13 months | Normal | 1, 8-9 | AD (itchy rash with typical distribution, or DD), Wheeze (DD), ARC (DD), Allergic sensitisation (Total IgE and sIgE to common allergens) Food allergy (physician assessment) |
| Wickens 2008 [[436](#_ENREF_436)]  Wickens 2012 [[437](#_ENREF_437)]  Wickens 2013 [[438](#_ENREF_438)] | RCT | 341/ 171 | New Zealand | **Probiotic**  L. rhamnosus, B. animalis | To pregnant women (35 weeks gestation to end up of BF or 6 months post-partum) and infants from 2-16 days of birth to 2 years | High | 2, 4, 6 | AD (UKWPC); Wheeze (ISAAC); ARC (ISAAC); Allergic sensitisation (SPT common allergens) |
| Berman, 2015 [[439](#_ENREF_439)] | RCT | Unclear – total 114 | USA | **Fatty acids**  Ω-3 | DHA (Ω -3) or EPA (Ω -3) rich fish oil prenatal supplementation, or soy oil | Unclear | 3 | Wheeze (parent report); AD (parent report) |
| Birch, 2010 [[440](#_ENREF_440)]  Foiles, 2015 [[441](#_ENREF_441)] | RCT | 88/ 90 | USA | **Fatty acids**  Ω-3  and Ω-6 | **DIAMOND study.** DHA (Ω-3) and arachidonic acid Ω -6) supplemented formula for first year | Normal | 3, 4 | Wheeze (DD); AD (DD); ARC (DD); FA (DD) |
| Bisgaard, 2016 [[442](#_ENREF_442)] | RCT | 365/371 | Denmark | **Fatty acids**  Ω-3 | **COPSAC trial.** Fish oil (2.4g/d Ω -3 LCPUFA), or olive oil to pregnant women 24 weeks gestation until 1 week post-partum | Normal | 5 | Wheeze (physician assessment); AD (Hanifin and Rajka); AS (SPT, sIgE); ARC (DD);  Lung function (FEV1) |
| Harslof, 2014 [[443](#_ENREF_443)] | RCT | 61/ 60 | The  Netherlands | **Fatty acids**  Ω-6 | **EFATOP trial.** Borage oil (100 mg GLA) daily from 1-2 weeks to 6 months age, or sunflower oil | High | 1 | AD (UKWPC); AS (sIgE); Total IgE |
| Lucas, 1999 [[444](#_ENREF_444)] | RCT | 75/ 79 | Denmark | **Fatty acids**  Ω-3 | Fish oil (1.2g/d Ω-3 PUFA), or sunflower oil to infants from 9 to 18 months | Normal | 1.5 | AS (total IgE) |
| van Gool, 2003 [[445](#_ENREF_445)] | RCT | 55/ 76 | Germany | **Fatty acids**  Ω-6 | 100mg/day GLA supplementation of mothers during lactation, or infant formula (160mg/day) in first 5 months | High | 1 | AD (Hanifin); Total IgE |
| Kitz, 2006 [[83](#_ENREF_83)] | RCT | 154/155 | UK | **Fatty acids**  Ω-3  and Ω-6 | 0.3% arachidonic acid (Ω -6), 0.32% DHA (Ω -3) supplemented formula from birth to 6 months | Normal | 0.75 | AD (parent report); Wheeze/Asthma (parent report, DD) |
| Linnamaa, 2010 [[446](#_ENREF_446)] | RCT | 151/162 | Finland | **Fatty acids**  Ω-6 | 3g/day blackcurrant seed oil (essential fatty acid) during pregnancy and exclusive breastfeeding, 1ml/day to infant to age 2, or olive oil | Normal | 1 | AD (H&R); AS (SPT); Total IgE |
| Mihrshahi, 2003 [[447](#_ENREF_447)]  Peat, 2004 [[448](#_ENREF_448)]  Marks, 2006 [[449](#_ENREF_449)] | RCT | 312/304 | Australia | **Fatty acids**  Ω-3 | **CAPS trial.** 500mg fish oil (=184mg n-3 PUFA) daily from 6 months, or in formula if introduced before then, plus canola oil (high in n-3 PUFA) for family, plus environmental control, until 5 y age | High | 1.5,  3, 5 | Asthma (ISAAC/ parent report), FEV1; AD (ISAAC, UKWPC);  AR (ISAAC); AS (SPT); Total IgE |
| Damsgaard, 2007 [[450](#_ENREF_450)] | RCT | 45/ 49 | Denmark | **Fatty acids**  Ω-3 | Fish oil ~3.4mls/day (571mg  EPA, 381mg DHA) from 9 to 12 months | Normal | 1 | Total IgE |
| Palmer, 2012  & 2013 [[451](#_ENREF_451),[452](#_ENREF_452)]  Best, 2015 & 2016 [[453](#_ENREF_453),[454](#_ENREF_454)] | RCT | 368/338 | Australia | **Fatty acids**  Ω-3 | **DOMINO trial.** Fish oil capsules with 800mg DHA, 100mg EPA daily from 21 weeks gestation to delivery, or vegetable oil | High | 1, 3, 6 | AD (physician assessment, ISAAC); Wheeze (physician assessment, ISAAC), FA (physician assessment); AR (physician assessment, ISAAC); AS (SPT) |
| Dunstan, 2003 [[455](#_ENREF_455)] | RCT | 52/ 46 | Australia | **Fatty acids**  Ω-3 | Fish oil 4g daily  from 20 weeks gestation to delivery, containing 2.07g DHA, 1.02g EPA, from 20 week of gestation until delivery or olive oil | High | 1 | FA (history), Asthma (≥2 episodes of wheeze), AD (DD); AS (SPT) |
| D'Vaz, 2012 [[456](#_ENREF_456)] | RCT | 218/202 | Australia | **Fatty acids**  Ω-3 | Daily fish oil with 280mg DHA and 110mg EPA (changed to 250/60 part way through trial) from birth to 6 months, or 650mg olive oil | High | 1 | AD (´typical skin lesions´); AS (SPT); FA (parent report + SPT); Wheeze (unclear) |
| Furuhjelm, 2009 [[457](#_ENREF_457)]  Furuhjelm, 2011 [[458](#_ENREF_458)] | RCT | 70/ 75 | Sweden | **Fatty acids**  Ω-3 | Daily fish oil (1.6 g EPA, 1.1 g DHA) from 25 weeks gestation to end of lactation (or through 3.5 months of breastfeeding), or soy oil | High | 1, 2 | AS (SPT and sIgE);  FA (parent report + SPT/sIgE); AR (seasonal symptoms); Wheeze (DD, 3 episodes of wheezing), AD (parent report, Seymour criteria) |
| Lauritzen, 2005 [[459](#_ENREF_459)] | RCT | 62/ 60 | Denmark | **Fatty acids**  Ω-3 | **Lactation**. 4.5 g fish oil daily (=~1.5 g/d of n-3 LCPUFA) from 1-2 week to 4 months, or olive oil | Normal | 2.5 | Wheeze (parent report), FA  (parent report); AD (DD); Total IgE |
| Olsen, 2008 [[460](#_ENREF_460)]  Hansen, 2017 [[461](#_ENREF_461)] | RCT | 266/267 | Denmark | **Fatty acids**  Ω-3 | **Pregnant women**. Fish oil 4g/day (1.28g EPA, 920mg DHA) from 30 weeks of gestation to delivery | Normal | 16, 24 | Asthma (DD, ISAAC, physician assessment); AS (sIgE); AR (DD, ISAAC); Lung function (FEV1); |
| Dotterud, 2013 [[462](#_ENREF_462)] | CCT | 2,860/5,743 | Norway | **Fatty acids**  Ω-3 | **PACT trial.**  Oily fish twice/week and 5ml cod liver oil (1.2 g n-3 PUFA) daily through pregnancy and to infant from 4–6 weeks with oily fish twice/ week from 6 months | Normal | 2 | Wheeze/Asthma (parent report; DD); AD (Parent report) |
| Imhoff- Kunsch, 2011 [[463](#_ENREF_463)] | RCT | 547/547 | Mexico | **Fatty acids**  Ω-3 | 400 mg DHA daily from ~20 weeks gestation to delivery, or corn/soy oil | Normal | 0.5 | Wheeze  (parent report) |
| Noakes, 2012 [[464](#_ENREF_464)] | RCT | 62/ 61 | USA | **Fatty acids**  Ω-3 | **SiPS trial**. 2 x 150g portions/week of farmed salmon (~163mg EPA, 331mg DHA per day) from 20 weeks gestation to delivery | High | 0.5 | Wheeze (study assessment); AD (Physician assessment); AS (SPT) |
| Aage, 2015 [[465](#_ENREF_465)] | RCT | 2145/ 2200 | Guinea-Bissau | **Vitamins** | Neonates supplemented with Vitamin A 50,000 IU plus 10IU vitamin E, or 10IU vitamin E alone, at time of BCG vaccination. Population at high risk of vitamin A deficiency. | Normal | 10 | AS (SPT); Wheeze (ISAAC); AD (ISAAC) |
| Chawes, 2016 [[442](#_ENREF_442)] | RCT | 315/308 | Denmark | **Vitamins** | **COPSAC** Vitamin D3 (2400 IU/d) to pregnant women 24 weeks gestation to 1 week post-partum, or placebo. All women also took 400 IU/day of vitamin D3. | Normal | 3 | Wheeze (physician assessment); AD (Hanifin and Rajka); AS (SPT, sIgE) |
| Checkley, 2010 [[466](#_ENREF_466)]  Checkley, 2011 [[467](#_ENREF_467)] | cluster RCT | 803, 885, 771 | Nepal | **Vitamins** | **NIPPS 2 study.** Vitamin A (23,300 IU) or Beta Carotene (42mg) versus peanut oil placebo weekly from preconception through lactation, in married women at high risk of vitamin A deficiency | Normal | 11 | Wheeze (ISAAC, DD); LF (FEV1; FVC; PEF) |
| Czeizel, 1994 [[468](#_ENREF_468)]; Dobo, 1998 [[469](#_ENREF_469)] | RCT | 2090/2032 | Hungary | **Vitamins** | **Hungarian Optimal Family Planning Programme**. Multivitamins from preconception to second missed period, in women who wanted to become pregnant | Normal | 1, 6 | Wheeze (physician assessment); Recurrent wheeze (physician assessment); AD (physician assessment); FA (unclear) |
| Devakumar, 2015 [[470](#_ENREF_470)] | RCT | 600/600 | Nepal | **Vitamins** | Micronutrient daily supplement (800g Vit A, 10mg Vit E, 5g Vit D, 1.4mg Vit B1, 1.4mg Vit B2, 18mg Niacin, 1.9mg Vit B6, 2.6g Vit B12, 400g Folic acid, 70mg Vit C, 30mg Iron, 15mg Zinc, 2mg Copper, Selenium 65g, Iodine 150g) versus iron 60mg and folic acid 400g, to pregnant women in the second and third trimester. Population at risk of micronutrient deficiencies. | Normal | 8 | Lung function (FEV1, FVC); Wheeze (ISAAC); AR (ISAAC) |
| Grant, 2016 [[471](#_ENREF_471)] | RCT | 87, 86, 87 | New Zealand | **Vitamins** | Vitamin D daily from 27 weeks gestation to birth (pregnant women) and birth to 6 months (infants) at 1000 IU/ 400 IU, or 2000 IU/ 800 IU, versus placebo | Normal | 1.5 | Wheeze (DD); AS (SPT, sIgE) |
| Greenough, 2010 [[472](#_ENREF_472)] | RCT | 1199/1205 | UK | **Vitamins** | **Vitamins in Pre-eclampsia trial.** Vitamin C (100mg) and Vitamin E (400IU) from 14-21 weeks to delivery, in women with clinical risk factors for pre-eclampsia. | Normal | 1 | Wheeze (parent-reported); Recurrent wheeze (parent-reported); AD (parent-reported) |
| Goldring, 2013 [[473](#_ENREF_473)] | RCT | 120/60 | UK | **Vitamins** | Vitamin D 200,000 IU bolus at 27 weeks or 800IU daily from 27 weeks to delivery, versus no treatment Ethnically stratified as Asian, Middle Eastern, Black, White. | Normal | 3 | Wheeze (ISAAC); Recurrent wheeze (≥episodes); AR (ISAAC); AS (SPT); AD (ISAAC); FA (physician assessment); total IgE |
| Kiraly, 2013 [[474](#_ENREF_474)] | RCT | 227/235 | Guinea-Bissau | **Vitamins** | Vitamin A 100,000-200,000 IU at 6-9 months age, versus no supplement, in infants with no history of measles or vitamin A supplementation. Population at risk of vitamin A deficiency. | Normal | 7 | AS (SPT) |
| Litonjua, 2016 [[475](#_ENREF_475)] | RCT | Unclear – 881 total | USA | **Vitamins** | Vitamin D (4000 IU/d) versus placebo from 10-18 weeks gestation to delivery. All women also received 400 IU/d vitamin D as part of a multivitamin supplement. | High | 3 | Wheeze (physician assessment); AD (DD); AS (total IgE, sIgE) |
| McEvoy, 2014[[476](#_ENREF_476)] | RCT | 89/90 | USA | **Vitamins** | **Vitamin C** 500mg daily from ≤22 weeks gestation to delivery versus corn starch, in women aged ≥15 years old who reported being current smokers (≥1 cigarette per day) randomised at 22 weeks of gestation | Normal | 1 | Wheeze (unclear); LF (spirometry) |

AD: atopic dermatitis; AOS acidic oligosaccharides; API Asthma Predictive Index; AR: Allergic Rhinitis; ARC: Allergic Rhinoconjunctivis; AS: allergic sensitisation; B. Bifidobacterium; BF: breastfeeding; BHR: bronchial hyper-responsiveness; CM: cow’s milk; CCT controlled clinical trial; DBPCFC: double blind placebo-controlled food challenge; DD doctor’s diagnosis in the community (Physician assessment refers to assessment by a study physician); DHA: docosahexanoic acid; E. Escherichia; ECRHS European Community Respiratory Health Survey; eHF extensively hydrolysed formula; EPA: eicosapentaenoic acid; FA: food allergy; FEV1 forced expiratory volume in one second; FOS long-chain fructo-oligosaccharides; FVC; forced vital capacity; GLA gamma linolenic acid; GOS galacto-oligosaccharides; ICHPPC: International Classification of Health Problems in Primary Care; ICS inhaled corticosteroids; ISAAC International Study of Asthma and Allergies in Childhood; IU International Units; L. Lactobacillus; Lc. Lactococcus; LCPUFA: long chain polyunsaturated fatty acid; LF: lung function; OFCs oral food challenges; PEF: peak expiratory flow; pHF: partially hydrolysed formula; RCT randomised controlled trial; SPT skin prick test; sIgE allergen-specific Immunoglobulin E sensitisation; TIDM: type 1 diabetes mellitus UKWPC: the UK Working Party Criteria (to define AD; Seymour criteria and UKWPC are both modifications of the Hanifin and Rajka criteria).

# Table S5 Characteristics of included observational studies of other maternal or infant dietary exposures and risk of allergic outcomes

| **Study** | **Design** | **N/n cases** | **Country** | **Population** | **Exposures and method of assessment** | **Age at outcome (years)** | **Outcomes reported**  **(method of assessment)** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Alm, 2009 [[6](#_ENREF_6)]; Goksor, 2011; [[477](#_ENREF_477)] Alm, 2012;[[478](#_ENREF_478)] | PC | 4,941 | Sweden | **Infants of Western Sweden**: Population based birth cohort of infants born in the region in 2003 | Infant vitamin intake [any]; infant fish, fat intake; Dietary Pattern; vegetarianism in the family, gluten, type of fat on bread, lactic acid (yoghurt, fermented vegetables); vegetables; alcohol, Q | 1 | AD (parent reported); FA (DD) |
| Andreasyan, 2007; [[479](#_ENREF_479)] | PC | 498 | Australia | **CARHS.** Some of the participants at high risk for sudden infant death syndrome born in 1988-1989 were identified in the northern region of Tasmania through school records | Fruit syrup; fruit juice (orange); honey, Q | 9 | AD, wheeze and RC (ISAAC Q); SPT any |
| Back, 2009 [[480](#_ENREF_480)] | PC | 123 | Sweden | The first 206 babies born in 1998 recruited at University Hospital of Umea. All children were prescribed vitamin A&D supplements from 6 weeks to 24 months of age | Infant vitamin  intake [any], Q | 6 | AD, wheeze and rec wheeze (ISAAC Q) |
| Baiz, 2013[[481](#_ENREF_481)] | PC | 239 | France | **EDEN.** Population based birth cohort with pregnant women recruited from prenatal clinics in Nancy and Poitiers,  < 24th weeks of gestation in 2003 | Vitamin D cord blood, S | 1, 2, 3, 5 | AD (DD); RC (ISAAC Q); Rec wheeze (DD asthma plus medication and/or current symptoms) |
| Bekkers, 2012 [[482](#_ENREF_482)]; Willers, 2008 [[483](#_ENREF_483)] | PC | 3,786 | The Netherlands | **PIAMA.** Population based birth cohort of children born in 1996/97 recruited prenatally, Netherlands. The children were allocated to an intervention study or natural history study depending on their family risk for allergy | Maternal vitamin supplement [any] and Vitamin D cord blood, Q | 2, 8 | AD (DD); LF (BHR, spirometry); sIgE any; Wheeze (ISAAC); Rec wheeze (DD asthma plus ≥4 episodes of wheeze); Total IgE; sIgE-aero; sIgE to food |
| ;Bertelsen, 2013 [[484](#_ENREF_484)] | PC | 54,740 | Norway | **MoBa study.** Population birth cohort with pregnant women recruited at ~17 weeks of pregnancy with children born between 2000 and 2005 in Denmark | Probiotics (milk based), Q | 0.5, 3 | AD (parent reported); Rec wheeze (parent reported asthma) |
| Bisgaard, 2009 [[17](#_ENREF_17)] | PC | 354 | Denmark | **COPSAC study.** Healthy newborns of mothers with a history of doctor-diagnosed asthma recruited in Copenhagen, Denmark between 1998 and 2001 | Alcohol, Q | 3 | Rec wheeze (physician assessment) |
| Carmargo, 2010 [[485](#_ENREF_485)] | PC | 823 | New Zealand | **The New Zealand Asthma and Allergy Cohort study.** Population based birth cohort with pregnant women recruited at maternity care centres in Wellington and Christchurch 1997-2001 | Vitamin D cord blood, S | 1.25, 3, 5 | Wheeze (parent reported wheeze); Rec wheeze (DD asthma plus medication and/or current symptoms) |
| Romieu, 2007; [[486](#_ENREF_486)]  Chatzi, 2008 [[487](#_ENREF_487)] | PC | 468 | Spain | **Menorca birth cohort.** Population based birth cohort with women recruited from antenatal care at all general practices in Menorca between 1997-1998 | Fruits, legumes, nuts, vegetables; Dietary Pattern-adherence to Mediterranean diet; cereal; dairy; meat; white meat; maternal fish intake, Q | 4.6; 6.5 | SPT-aero; Atopic wheeze (parent reported wheeze plus positive SPT); Rec wheeze (parent reported ≥1 episodes of wheeze) AD (DD, parent reported); AS (any, food, aeroallergen by sIgE) |
| de Jong, 2012 [[488](#_ENREF_488)]; De Jong, 2012 [[489](#_ENREF_489)]; Leermakers, 2013; [[490](#_ENREF_490)] | PC | 8742 | The Netherlands | **GENERATION R.** Population based birth cohort , with pregnant women recruited < 25 weeks gestation in Rotterdam | Maternal vitamin supplement [any]; maternal fish intake, Q | 4 | AD and wheeze (ISAAC Q) |
| Dubakiene, 2012 [[491](#_ENREF_491)]; Butiene, 2011[[492](#_ENREF_492)];  Oliver, 2010; [[187](#_ENREF_187)] Grimshaw, 2012 [[493](#_ENREF_493)] | PC  NCC | 1158  123/41 | Lithuania;  UK | **EuroPrevall birth cohort.** Over 12,000 newborns in 9 European countries 2005–2009 using a standardised approach across 9 European countries.  Lithuanian birth cohort compared cases with age-matched controls; UK birth cohort compared each case with two controls | Maternal allergenic food avoidance to milk or egg;  Infant mineral intake; infant fat intake; maternal fish oil supplement; Dietary carbohydrates; Wheat; dietary energy; dietary protein, Q | 1, 2 | AD (parent reported)  SPT to food;  FA any (DD with DBPCFC) |
| Dunlop, 2006 [[494](#_ENREF_494)] | PC | 1326 | Slovakia | **Slovak birth cohort.** The 1st 250 pregnant women delivering at maternity hospitals in the selected study sites were recruited between 1997 and 1999 | Citrus fruits, Q | 1 | AD (physician assessment) |
| Fergusson, 1990 [[495](#_ENREF_495)] | PC | 1,067 | New Zealand | **Christchurch child development study.** A cohort of children born in the Christchurch urban region New Zealand during mid1977 | Fruits, vegetables, cereal, meat, R/D | 10 | AD (Physician assessment; DD , duration of > 3years and use of regular medication) |
| Fitzsimon, 2007 [[496](#_ENREF_496)] | PC | 631 | Ireland | **LIFE-WAYS.** cohort of children born in 2002 whose mother had completed FFQ during pregnancy were followed up from birth through general practice records | Maternal fat, fruit and vegetable intakes, Q | 3 | Rec wheeze (physician assessment of asthma) |
| Gale, 2008 [[497](#_ENREF_497)] | PC | 440 | UK | Population based birth cohort with pregnant women recruited on their first visit to midwives' antenatal booking clinic in 1991 | Maternal plasma Vitamin D, S | 0.75, 9 | AD (UKWPC, visible AD on examination, parent reported); Rec wheeze (Parent reported asthma) |
| Harris, 2001; [[56](#_ENREF_56)] Zutavern, 2004 [[57](#_ENREF_57)] | PC | 604/ 622 | UK | Population based birth cohort of newly pregnant women who presented at one of three general practices in Ashford, Kent UK between 1993 and 1995 | Rice; cereal; meat | 2, 5.5 | AD ( DD; visible AD on examination); SPT aero; Rec wheeze (Parent reported) |
| Hesselmar, 2010 [[61](#_ENREF_61)] | PC | 184 | Sweden | **ALLERGYFLORA.** Birth cohort in Sweden enriched with children with family history of allergies | Fruits, I/Q | 0.5/1.5 | AD (physician assessment, and full-filling Williams’ criteria); FA CM (physician assessment plus OFC); sIgE any |
| Hypponen, 2004; [[498](#_ENREF_498)]  Hypponen, 2001 [[499](#_ENREF_499)] | PC | 10,366/81 | Finland | **Northern Finland Birth Cohort.**  Population based birth cohort with women recruited between the 24th and 28th week of gestation in Oulu and Lapland in 1995-1966 | Infant vitamin intake [any], Q | 31, 2 | SPT aero; rec wheeze (self-reported asthma plus medication and/or symptoms) |
| Hoppu, 2000 [[67](#_ENREF_67)] | PC | 115 | Finland | Birth cohort of infants of breastfeeding mothers (for at least 3 months) with a positive family history of atopic disease | Maternal intake of vitamins, fats, R | 1 | AS (SPT to any) |
| Jedrychowski, 2008 [[500](#_ENREF_500)]; Jedrychowski 2011 [[501](#_ENREF_501)] | PC | 469 | USA and Poland | Prospective birth cohort of infants from non-smoking healthy mothers who gave birth at 29 - 43 weeks of gestation between 2001 and 2004 | Maternal fish intake, Q | 1, 2 | AD (physician assessment); Wheeze (parent reported) |
| Kemp, 2011 [[502](#_ENREF_502)] | PC | 310 | Tasmania | **THIS.** Cohort of infants at high risk for sudden infant death syndrome born in 1988-1989 were identified in the northern region of Tasmania through school records | Maternal allergenic food avoidance (peanut), Q | 3.5 | sIgE to peanut |
| Kull, 2006; [[503](#_ENREF_503)] Magnusson, 2013 [[504](#_ENREF_504)]; | PC | 3230 | Sweden | **BAMSE.**  Prospective birth cohort of newborns in a predefined area of Stockholm, between 1994 and 1997 | Infant fish intake, infant vitamin intake, Q | 4, 12 | Wheeze (Self-reported wheeze; ≥3 episodes of wheeze OR inhaled corticosteroids); FA (DD); Parent reported OR DD AD; RC (Parent reported symptoms); AS (sIgE) |
| Martindale, 2005; [[505](#_ENREF_505)] Devereux, 2006; [[37](#_ENREF_37)] Devereux, 2007 [[506](#_ENREF_506)]; Willers, 2007[[507](#_ENREF_507)] | PC | 3230 | Scotland | **Aberdeen birth cohort**. Population based birth cohort with pregnant women recruited 1997-99 while attending a hospital antenatal clinic at ~12weeks gestation | Infant fish intake; maternal vitamin intake and mineral intake; Fruits; citrus fruits; fruit juice; vegetables; green leafy vegetables; apples; Maternal fat intake from different sources; whole grain products, Q | 2, 4, 5, 12 | AR (DD); AS-any (sIgE); Rec wheeze (≥ 3 episodes in past year); AD (ISAAC, UKWPC); LF (Spirometry); RC and wheeze (ISAAC Q) |
| Lack, 2003 [[43](#_ENREF_43)];  Shaheen, 2009 [[508](#_ENREF_508)]; Wills, 2013[[509](#_ENREF_509)]; Granell, 2008 [[510](#_ENREF_510)] | PC; NCC | 11,352 | UK | **ALSPAC.** The study enrolled pregnant women living in the Avon Health Authority are, UK, expected to delivery between 1991 and 1992. Cases and controls, who did and did not develop food allergy respectively, were not matched | Allergenic food avoidance (peanuts/nuts); allergenic food avoidance (soybean meat); peanut; Dietary Patterns: 'Traditional'; 'Health Conscious'; 'Processed'; 'Confectionery'; 'Vegetarian'; 'Processed'; 'Vegetarian'; maternal plasma vitamin and vitamin supplement [any], Q | 0.5, 2.5, 3.5, 7, 7.5, 8, 8.7 | FA peanut (DD); Rec wheeze (parent reported persistent wheeze, DD asthma); AD (parent reported); LF (BHR slope, FEV1); RC (parent reported); SPT aero; Total IgE |
| Laitinen, 2005 [[511](#_ENREF_511)] | PC | 95 | Finland | Children with a family history of AD (mother, father and/or older sibling with AD, AR or asthma), who participated in a prospective allergy prevention study (probiotic intervention trial) | Infant fat, mineral, and vitamin intake [any]; Dietary carbohydrates; dietary energy; dietary protein, D | 0.5, 1 | AD (physician assessment); FA cow’s milk (physician assessment) |
| Lange, 2010 [[512](#_ENREF_512)];  Litonjua, 2006; [[513](#_ENREF_513)] Camargo, 2007 [[514](#_ENREF_514)] | PC | 1376 | USA | **Project Viva study**. Population based birth cohort with pregnant women at <22 weeks of gestation recruited from 8 obstetric offices of a large multispecialty suburban/urban group practice in eastern Massachusetts US between 1999 and 2002 | Dietary Pattern derived from Principal Component Analysis -Alternate Healthy Eating Index for pregnancy (AHEI-P); Adherence to intake of Mediterranean foods; maternal vitamin and mineral intake; infant vitamin and vitamin supplement [any]; fruits and vegetables, Q | 2, 3 | AD (DD); Wheeze (parent reported); Rec wheeze (parent reported in at least one questionnaire at 1,2,3 years old, ≥2 episodes of wheeze plus medication and/or current symptoms) |
| Liu, 2011 [[515](#_ENREF_515)] | PC | 649 | USA | **Boston Birth Cohort.** Mother-infant pairs recruited at birth at Boston Medical Centre | Vitamin D cord blood, S | 2 | sIgE cow’s milk; sIgE egg; sIgE food; sIgE peanut |
| Marini, 1996 [[91](#_ENREF_91)] | PC | 68 | Italy | Infants with family history of allergy born in maternity wards of 3 hospitals from 1989 whose mothers were refused to participate in an allergy prevention intervention program | Citrus fruit; meat, Q | 1, 3 | AD (DD; parent reported); RC (Physician assessment + parent reported); Rec wheeze (physician assessment > 3 episodes of wheeze); sIgE to food; sIgE aero; sIgE any |
| Mommers, 2009; [[516](#_ENREF_516)] Magdelijn, 2011; [[517](#_ENREF_517)] Cremers, 2011[[518](#_ENREF_518)] | PC | 2465 | The Netherlands | **KOALA.** Population based birth cohort with healthy pregnant women recruited in week 10 -14 of their pregnancy from an ongoing PC study on pregnancy-related pelvic girdle pain and through posters in organic food shops, anthroposophical, physician offices, and midwives | Maternal plasma vitamin D and vitamin supplement [any], S, Q | 2, 5, 6.5 , 7 | AD (UKWPC, (ISAAC); LF (spirometry); sIgE any; Total IgE; Wheeze (ISAAC Q); Rec wheeze (DD asthma plus medication) |
| Maslova, 2012 [[519](#_ENREF_519)]; Maslova, 2013 [[520](#_ENREF_520)] [[521](#_ENREF_521)]; Linneberg, 2004; [[522](#_ENREF_522)] | PC | 28,758 | Denmark | **DNBC.** Population based birth cohort with pregnant women recruited between 1996 and 2002 at ~12weeks gestation | Maternal vitamin intake; maternal intake of peanut and pistachio; tree nuts alcohol; artificially-sweetened non-carbonated soft drinks, Q | 1.5, 7 | AD (parent reported + DD); ARC ( DD + Medication registry); RC (DD); Rec wheeze (DD asthma plus ≥1 episode of wheeze in the last year) |
| Magnus, 2013 [[523](#_ENREF_523)] Haberg, 2009 [[524](#_ENREF_524)] | NCC, PC | 32,077 | Norway | Cases with asthma & non asthmatic controls were recruited from the participants of the Norwegian Mother and Child Cohort Study | Maternal plasma vitamin d and vitamin supplement [any] S, R | 1.5, 3 | Rec wheeze (DD or asthma medication); Wheeze (parent reported) |
| Milner, 2004 [[95](#_ENREF_95)] | PC | 8,073 | USA | **NMIH.** Survey of mothers who gave birth in 1988 with a follow-up survey conducted in 1991. Blacks, individuals with low socioeconomic status, and premature infants were intentionally overrepresented in the survey sample | Infant vitamin intake [any], Q | 3 | FA any (DD); Rec wheeze (DD asthma) |
| Miskelly, 1988 [[96](#_ENREF_96)] | PC | 482 | UK | Infant recruited through two antenatal clinics in South Wales born to mothers with positive allergy history in at least one member of family, whose mothers were asked to participate in allergy preventive program | Fruits; meat; meat other than beef, D | 1 | AD (Physician assessment and parent reported); Wheeze (parent reported) |
| Miyake, 2009 [[525](#_ENREF_525)] and 2010 [[526-528](#_ENREF_526)] and 2011 [[529](#_ENREF_529),[530](#_ENREF_530)]; Satio, 2010 [[526](#_ENREF_526)] | PC | 763 | Japan | **OMCHS.** Population birth cohort with pregnant women between the 5-39th week of pregnancy recruited from a university hospital and three obstetric hospitals in municipalities of Osaka between 2001 and 2003 | Maternal mineral, fat, fish, and vitamin intake; fruits; apples; citrus fruits; vegetables; green and yellow vegetables; Dietary patterns derived from Factor Analysis; dairy; cheese; milk; egg; meat; yoghurt, Q | 0.33, 2 | AD and wheeze (parent reported DD, ISAAC) |
| Morales, 2012 [[531](#_ENREF_531)] | PC | 1,724 | Spain | **INMA Project**. Population based birth cohort study with pregnant women attending their first routine specialized antenatal care visit in 4 study areas: Menorca (1997-98), Valencia (2003-05), Sabadell (2004-06), Gipuzkoa (2006-08) | Maternal plasma Vitamin D, S | 1, 4, 5 | Wheeze (parent reported); Rec wheeze (DD asthma plus medication and/or current symptoms) |
| Morgan, 2004 [[100](#_ENREF_100)] | PC | 257 | UK | Healthy preterm births (<37 weeks gestational) from 3 hospitals in southeast England | Fruits, vegetables; Cereal; rice; rusks; desserts; meat; meat with vegetables, I | 1 | AD (Physician assessment and parent reported) |
| Narita, 2011; [[532](#_ENREF_532)] Ohya, 2011 [[533](#_ENREF_533)] | PC | 1,463 | Japan | **T-CHILD.** Population based birth cohort of Japanese mother-infant pairs with women recruited ~ second trimester in Tokyo | Maternal vitamin, mineral, fish intake; total energy intake, Q | 0.6, 1.5, 3 | AD (parent reported ISAAC Q); Wheeze (parent reported ISAAC Q); Rec wheeze (DD asthma) |
| Nwaru, 2010, 2011, 2012 and 2013 [[105](#_ENREF_105),[106](#_ENREF_106),[534](#_ENREF_534),[535](#_ENREF_535)] [[536](#_ENREF_536),[537](#_ENREF_537)];  Niinisto, 2012 [[538](#_ENREF_538)]; Lumia, 2011; [[539](#_ENREF_539)] Erkkola, 2012; [[107](#_ENREF_107)]; Maijaliisa, 2011; [[540](#_ENREF_540)]; Uusitalo 2008 [[541](#_ENREF_541)]  Erkkola, 2009; [[542](#_ENREF_542)] Marjamaki, 2010; [[543](#_ENREF_543)] | PC | 5,619 | Finland | **DIPP**. Prospective birth cohort of children at high risk of TIDM (HLA genotype conferred susceptibility) born between 1997 and 2004 in Oulu and Tampere University Hospital Finland | Maternal vitamin D, maternal fish and margarine intake; infant fish intake; malaceous fruits; green leafy vegetables; berries; citrus fruits; fruit juice; fruits; vegetables and roots; nuts and pulses; potatoes; fruits and berries; root vegetables; fruits and vegetables; vegetables; cabbage; carrots; Various cereals, dairy products, meat, egg, alcohol, rice, tea, coffee, chocolate, sweets, Q | 0.5, 5, <10 | AD and RC (DD, parent reported ISAAC); sIgE aero; sIgE cm; sIgE egg; sIgE food; Rec atopic wheeze (DD asthma + positive IgE); Rec wheeze (DD asthma); Wheeze (ISAAC); Rec wheeze (DD asthma plus medication and/or current symptoms) |
| Oien, 2010 [[544](#_ENREF_544)] | PC | 3,067 | Norway | **PACT**. A controlled primary intervention study on allergic diseases conducted in the central part of Norway in the city of Trondheim. Inclusion in the control cohort began in September 2000, and the interventional programme started in a separate cohort in July 2002 | Maternal fish/ fish oil; vegetable intake, Q | 2 | AD (ISAAC); Rec wheeze (DD asthma) |
| Pike, 2012 [[545](#_ENREF_545)] | PC | 739 | UK | **SWS**. Population birth cohort with 20-34 year old women recruited pre-conception from general practitioners in Southampton between 1998 and 2002 and subsequently become pregnant | Maternal plasma vitamin D and vitamin intake, S, Q | 1, 3, 6 | LF (EV1, FVC,BHR slope); SPT any; Wheeze (parent reported ISAAC Q); Rec wheeze (DD asthma) |
| Roduit, 2012 [[546](#_ENREF_546)] | PC | 1,041 | Austria, Finland, France, Germany, and Switzerland | **PASTURE**. Population based birth cohort with women recruited in third trimester of pregnancy from rural areas in 5 European countries (Austria, Finland, France, Germany, and Switzerland) and divided into 2 groups: those who lived or worked on family run farms and those not living on a farm from the same area | Infant fat source introduction; fruits and vegetables; Cereal; bread; chocolate; cake; Farm milk' - either boiled or not boiled; meat, D | 1, 4 | AD (DD) |
| Rothers, 2011 [[547](#_ENREF_547)] | PC | 208 | US | **IIS.** Prospective birth cohort study of healthy children born to pregnant women who planned to obtain care for their new-borns from collaborating paediatricians | Vitamin D cord blood, S | 1, 2, 3, 5 | RC (DD); sIgE aero; SPT aero: Total IgE; Rec wheeze (DD asthma) |
| Sausenthaler, 2007 [[548](#_ENREF_548)]; Zutavern, 2006; [[178](#_ENREF_178)] Zutavern, 2008; [[179](#_ENREF_179)] | PC | 2,540 | Germany | **LISA.** Population based cohort study of newborns recruited between 1997 and1999 from 4 German cities: Munich, Leipzig, Wesel, and Bad Honnef | Maternal fat intake; maternal fish intake; fruits; vegetables; apples; bananas; strawberries; citrus fruits; fruit juice; cabbage; salad; celery; sweet peppers; spinach; nuts; carrots; seeds; tomatoes; cereal, milk, cheese; yoghurt, Q | 1, 2, 6 | AD (DD, parent reported), AS (any, food, aeroallergen by sIgE) |
| Sicherer, 2010 [[138](#_ENREF_138)] | PC | 503 | USA | **The Consortium of Food Allergy Research** enrolled infants at 3 to 15 months of age with likely egg or milk allergy but without previously known peanut allergy | Peanut, Q | 1 | sIgE to peanut |
| Strassburger, 2010 [[155](#_ENREF_155)] | PC | 338 | Brazil | Birth cohort study nested in a dietary intervention randomized field trial in the city of São Leopoldo, southern Brazil in 2002 | Salty pureed food; fruit juice, R | 3.5 | SPT aero; Wheeze (parent reported) |
| Venter, 2009; [[168](#_ENREF_168)] Dean, 2007 [[549](#_ENREF_549)] | PC | 937 | UK | **The Isle of Wight cohort.** Population based birth cohort recruited through antenatal clinics and included all babies born on the Isle of Wight UK between 2001 and 2002 | Maternal allergenic food avoidance, Q | 2 | AS peanut (SPT) |
| Wang, 2007 [[144](#_ENREF_144)] | PC | 1,760 | Taiwan | **Taiwan National Birth Cohort Study** (Pilot study). Representative samples recruited post-natally using the national birth registration data in 2003 | Maternal mineral supplement; maternal seafood intake/ fish oil supplementation ; gingseng, Q | 0.5 | AD (DD) |
| Weisse, 2012 [[550](#_ENREF_550)] | PC | 272 | Germany | **LINA.** Population based birth cohort with mother–child pairs recruited between 2006 and 2008 in Leipzig | Maternal plasma Vitamin D and Vitamin D cord blood, S | 1, 2 | AD (DD, parent reported); FA any (DD, Total IgE; sIgE) |
| West, 2012 [[551](#_ENREF_551)] | PC | 319 | Australia | Mother-infant pairs from a pregnancy cohort, recruited in Perth, Western Australia from 2005 to 2008. Pregnant women with a family history of allergic diseases recruited to participate in a postnatal infant dietary intervention study | Maternal mineral and vitamin intake, Q | 1 | AD (DD); FA any (history of reaction to food plus positive SPT-food; SPT any) Wheeze (DD) |
| Whitrow, 2009 [[552](#_ENREF_552)] | PC | 490 | Australia | **Generation 1.** Population based birth cohort of women and their children recruited in the first 16 weeks of pregnancy between 1998 and 2000 from 4 antenatal clinics in Adelaide | Maternal vitamin intake, Q | 3.5, 5.5 | Rec wheeze (DD asthma) |
| Calvani, 2006 [[553](#_ENREF_553)] | RC | 988 | Italy | **APAL**. Children attending outpatients allergy clinic in Rome between 2001-2002 | Maternal fat intake, Q |  | AS aero, food, cow’s milk, egg (SPT) |
| Jones, 2012 [[554](#_ENREF_554)] | RC | 231 | Western Australia | Children with family history of atopy derived from a larger birth cohort in 2002-2009 | Maternal vitamin supplement [any] and Vit D cord blood, S, Q | 1 | AD (DD or evidence of typical skin lesions) ; FA any (history of reaction to food plus positive SPT-food); Rec wheeze (unclear) |
| Allen, 2013 [[555](#_ENREF_555)] | NCC | 2,758/240 | Australia | **HealthNUTS.** Cases & controls recruited from population-based sampling from governmental immunisation clinics in Melbourne | Infant plasma Vitamin D, S, Q | 1 | AD (DD); FA any, egg, peanut (DD with OFCs) |
| Sariachvili, 2010 [[60](#_ENREF_60)] | NCC | 557/ 252 | Belgium | **PIPO Cohort.** cases and controls with data regarding development of AD and timing of introduction of solid foods were identified from this PC | Fruits, fruit juice, vegetables; cereal meat, Q | 4 | AD (parent reported, ISAAC Q) |
| Binkley, 2011 [[556](#_ENREF_556)] | CC | 1,413/1,300 | Canada | Cases & controls were anaphylaxis registry's previous survey respondents, all having had previous anaphylactic food allergy reactions, although only cases to peanuts | Maternal vitamin supplement [any]; maternal allergenic food avoidance, Q | <18 | FA peanut (DD) |
| Dai, 1993 [[557](#_ENREF_557)] | CC | 70 | China | Children from the community and they had to reside there the last year | Maternal allergenic food avoidance [more than one food group]: any, Q | 0.5 | Rec wheeze (unclear) |
| DesRoches, 2010 [[191](#_ENREF_191)] | CC | 401/ 202 | Canada | Cases and controls were recruited from the Paediatric University Centre between 1998-2004 | Allergenic food avoidance (nut); allergenic food avoidance (soya); allergenic food avoidance (peanut), Q | <1.5 | FA peanut (history of a clinical reaction within 60 minutes of exposure to peanuts, combined with positive IgE and/or SPT to peanut) |
| Fox, 2009 [[193](#_ENREF_193)] | CC | 293/ 133 | UK | Cases and controls from specialist food allergy clinics, with cases sensitised to peanut and controls sensitised to egg but not peanut | Peanut, Q | <4 | FA peanut (DD DBPCFC) |
| Lopez Campos, 2001 [[558](#_ENREF_558)] | CC | 75/58 | Mexico | Asthmatic patients were recruited from Allergy clinics and control patients from familial medicine clinics of Hospital de Especialidades, Mexico | Chocolate; mango, Q | 6-10 | Rec wheeze (DDA asthma) |
| Mullins, 2012 [[559](#_ENREF_559)] | CC | 115/ 115 | Australia | Cases were peanut allergic patients born in Australian Capital Territory and population matched-controls: Australia | Infant plasma vitamin D, S | 6 | FA peanut (history of acute systemic allergic reaction within 2 hours of known food exposure, combined with a SPT to the relevant food) |
| Oliveti, 1995 [[201](#_ENREF_201)] | CC | 263/ 131 | USA | Cases & controls were identified from rosters of patients followed up at the Rainbow Babies & Children's Hospital continuity care clinic, Ohio | Alcohol, R | 4-9 | Rec wheeze (DD asthma) |
| Salam, 2005 [[560](#_ENREF_560)] | CC | 691/ 279 | USA | Children's Health Study: cases and controls selected from school-children who participated in a population-based study: USA | Maternal fat intake, Q | 9-16 | Re wheeze (DD asthma) |
| Castro-Rodriguez, 2010 [[218](#_ENREF_218)] | CS | 1,409/  594 | Spain | **EISL**: Spanish population attending primary healthcare clinics, cases with wheeze in first year of life and controls without: Spain | Maternal fat intake; Mediterranean diet; ‘industrial food’, Q | 1.4 | Wheeze (SAAC) |
| de Batlle, 2008 [[561](#_ENREF_561)] | CS | 1,476/402 | Mexico | Participants were recruited from a random sample of children in primary school in the Mexicali province, Mexico | Dietary pattern intake in pregnant mothers, Q | 6-7 | Wheeze and rec wheeze (parent reported); RC (parent reported) |
| Dela Bianca, 2012 [[562](#_ENREF_562)] | CS | 467 | Brazil | Participants were infants aged from 12 to 15 months who attended 9 selected health centres for routine immunisations. | Processed food, Q | 1 | Rec wheeze (parent reported ≥1 episode of wheezing in the past year) |
| Riedler, 2001 [[563](#_ENREF_563)] | CS | 812/ unclear | Austria, Germany, and Switzerland | **ALEX STUDY TEAM**: cases were children of farming families and controls of non-farming families from the study schools: Austria, Germany, & Switzerland | Farm milk/environment, I | 9 | AD (DD); RC (parent reported); sIgE aero; Rec wheeze ( DD asthma; asthma ≥1 episode of wheezing in the past year) |

AD: atopic dermatitis; AS: allergic sensitisation; AR: allergic rhinitis; ARC: allergic rhinoconjunctivitis; BHR bronchial hyper-responsiveness; CC: case-control study; CS: cross-sectional study; DBPCFC: double blind placebo-controlled food challenge; DD: Doctor diagnosis (community); FA: food allergy; FEV1: forced expiratory volume in 1 second; ISAAC International Study of Allergy and Asthma in Children; LF lung function; OFCs oral food challenges; PC: Prospective cohort study; PEF: peak expiratory flow; Physician assessment is assessment by study physician; Q: questionnaire; SPT: skin prick test, sIgE specific IgE.

# Table S6 Characteristics of included observational studies of other maternal or infant dietary exposures and risk of autoimmune disease

| **Study** | **Design** | **N/n cases** | **Country** | **Population** | **Exposures and method of assessment** | **Age at outcome (years)** | **Outcomes reported**  **(method of assessment)** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Brekke, 2007 [[564](#_ENREF_564)]  Brekke, 2010 [[565](#_ENREF_565)]; Wahlberg, 2006; [[566](#_ENREF_566)] | PC | 8,694 | Sweden | **ABIS:** Population based birth cohort of children born in Southeast Sweden between 1997 and 1999 | Infant vitamin intake [any] and maternal vitamin supplement [any]; potatoes and root vegetables; other vegetables; coffee, Q | 1, 2.5, 8.4, 17 | TIDM (serology); CD (DD + IgA-tTG +symptoms) |
| Fronczak, 2003 [[249](#_ENREF_249)]; Lamb 2008 [[252](#_ENREF_252)]; Simpson, 2011[[567](#_ENREF_567)]; Norris, 1996 [[568](#_ENREF_568)]; Frederikson, 2012 [[248](#_ENREF_248)]; Lamb, 2013; [[250](#_ENREF_250)] | PC; NCC | 222,222/  16  1698/49 | USA | **DAISY**: Prospective birth cohort of children at increased risk for TIDM recruited 1993 to 2004 in Denver, Colorado. Cases & their non-diabetic siblings, as controls, taken from diabetes care clinics & Colorado IDDM registry | Maternal vitamin intake; maternal fish intake; infant plasma vitamin D;  fruits; vegetables; potatoes; root vegetables, Q | 4, 9, 15 | CD (positive IgA-tTG on 2 visits or a positive small bowel biopsy and one tTG-positive); TIDM (serology) |
| Hypponen, 2004 [[498](#_ENREF_498)]  Hypponen, 2001 [[499](#_ENREF_499)] | PC | 10,366/81 | Finland | **Northern Finland Birth Cohort:** Population based birth cohort with women recruited between the 24th and 28th week of gestation in Oulu and Lapland in 1995-1966 | Infant vitamin intake [any], Q | 31, 2 | TIDM (DD) |
| Nwaru, 2010, 2011, 2012 and 2013 [[105](#_ENREF_105),[535](#_ENREF_535),[537](#_ENREF_537)] [[534](#_ENREF_534)] [[106](#_ENREF_106)]; Niinisto, 2012 [[538](#_ENREF_538)]; Lumia, 2011 [[539](#_ENREF_539)] ; Erkkola, 2012 [[107](#_ENREF_107)]; Virtanen, 2006 and 2011 [[569](#_ENREF_569),[570](#_ENREF_570)]; Uusitalo, 2008; [[541](#_ENREF_541)] | PC | 3,730 | Finland | **DIPP**: Prospective birth cohort of children at high risk of TIDM (HLA genotype conferred susceptibility) born between 1997 and 2004 in Oulu and Tampere University Hospital Finland | Maternal fish and margarine intake; infant fish intake; Wheat , Rye, Oats, Barley, Other cereals (maize, rice, millet, and buckwheat); cereal; Other cereals (maize, rice, millet, and buckwheat); milk; milk and dairy; cheese; meat; egg; alcohol; rice; tea; coffee; chocolate; chocolate and  sweets; dairy, Q | 0.5, 5, <10 | TIDM (serology; DD WHO criteria)) |
| Harsunen, 2012 [[571](#_ENREF_571)] | NCC | 33/33 | Germany | **BABYDIET study**: cases were study children who developed islet autoantibodies and TIDM during BABYDIET study follow-up and controls were children from the same original study cohort who did not: Germany | Dietary energy intake, D | <18 | TIDM (DD) |
| Miettinen, 2012 [[572](#_ENREF_572)] | NCC | 686/343 | Finland | All selected from the Finnish Maternity Cohort, with cases identified from the Finnish Diabetes Register | Maternal plasma Vitamin D, I | 3.4 | TIDM (DD) |
| Savilahti, 2009 [[268](#_ENREF_268)] | NCC | 6,209/45 | Finland | Cases and controls taken from the NHI database, Finland | Vegetables, R/D | 11.5 | TIDM (DD) |
| Sørensen, 2012 [[573](#_ENREF_573)] | NCC | 328/109 | Norway | Cases and controls selected from a population birth cohort linked to Norwegian Childhood Diabetes Registry | Maternal plasma Vitamin D, S | <15 | TIDM (DD) |
| Ahadi, 2011 [[269](#_ENREF_269)] | CC | 202/101 | Iran | Cases were diagnoses of TIDM referred to Children's Medical Centre Hospital and matched controls | Infant vitamin intake [any], Q | 6.7 | TIDM (DD) |
| Ashraf, 2010 [[271](#_ENREF_271)] | CC | 195 | USA | Cases and controls selected from electronic medical records | Infant mineral intake, Q | 10 | TIDM (DD) |
| Baron, 2005 [[321](#_ENREF_321)] | CC | 444/222 | France | Cases with Crohn's disease were identified from the **EPIMAD** registry with matched controls from the same area identified by random digit dialling: France; Cases with ulcerative colitis were identified from the EPIMAD registry with matched controls from the same area | Vegetables ; flour meat, I | <17 | IBD-CR (DD); IBD-UC (DD) |
| Ellis, 2012 [[326](#_ENREF_326)] | CC | 655/246 | Australia | **CLARITY:** cases were recruited during a clinic visit to Royal Children's Hospital, with diagnosed JIA using ILAR criteria: controls were patients in for elective surgery, also at the Royal Children's Hospital Day Surgery Unit | Maternal iron, multivitamin, folate, calcium, fish oil, vitamin D supplement; alcohol; coffee, Q | 0-18 | JIA (DD; ILAR criteria) |
| Bener, 2009 [[273](#_ENREF_273)] | CC | 340/170 | Qatar | Cases were insulin dependent or had a venous blood glucose >6.7mmol/L on 2 occasions with matched healthy controls selected from the community | Infant vitamin intake [any], I/Q | <16 | TIDM (DD) |
| EURODIAB substudy 2 study group, 1999 [[574](#_ENREF_574)] | CC | 2,934/746 | Luxembourg, N. Ireland, Romania, Lithuania, Bulgaria and Australia | **EURODIAB**: cases were <15years at TIDM diagnosis and matched with population-based controls. | Infant vitamin intake [any], I/Q | <15 | TIDM (DD; WHO criteria) |
| Gilat, 1987 [[330](#_ENREF_330)] | CC | 504/167 | 9 countries: USA, Canada, UK, Sweden, Denmark, Holland, France, Italy, Israel | **The International IBD Study Group**: cases were patients with proven Crohn's Disease in 14 centres across 9 countries with 2 controls per case, one with a different minor GI disease and the other with minor non-GI disease taken from hospitals or clinics. | Maternal vitamin supplement [any], Q | <25 | IBD-CR (DD); IBD-UC (DD) |
| Majeed, 2011 [[284](#_ENREF_284)] | CC | 395/96 | Iraq | Cases were TIDM patients admitted to hospitals or primary health centres in Basrah and controls were attendees to outpatients of the same institutions for non-diabetic complaints | Coffee; tea, Q | 15-17 | TIDM (DD) |
| Malcova, 2005 [[285](#_ENREF_285)] | CC | 2,334/868 | Czech Republic | Cases were identified from the Czech Childhood Diabetes Register, with unrelated aged-match controls selected from among the schoolmates of cases | Infant vitamin intake [any], Q | 7 | TIDM (DD) |
| Rosenbauer, 2007 and 2008 [[295](#_ENREF_295),[575](#_ENREF_575)] | CC | 2,631/760 | Germany | German study of newly diagnosed TIDM cases selected from a hospital-based surveillance system ESPED and controls from local registration office records | Coffee, Q | <5 | TIDM (DD) |
| Sipetic, 2003 [[576](#_ENREF_576)]; Sipetic, 2005 [[577](#_ENREF_577)] | CC | 315/105 | Serbia | Cases and controls were children admitted to hospital due to allergic conditions 1994-97 | Alcohol; coca cola, nitrosamine-rich foods, coffee, Q | 1-16 | TIDM (maternal report; DD WHO criteria) |
| Stene, 2003 [[578](#_ENREF_578)], Stene, 2008 [[579](#_ENREF_579)] | CC | 2213/545 | Norway | **Norwegian Childhood Diabetes Study Group**: cases were all children on the diabetes registry diagnosed 1997-2000 and controls were matched from the national population registry | Infant vitamin intake [any]; infant oil supplement; maternal vitamin/fish supplement [any], Q | 8.8 | TIDM (DD; WHO criteria) |
| Stene, 2000 [[302](#_ENREF_302)] | CC | 1131/84 | Norway | Cases were TIDM patients in Vest-Agder & on the National Childhood Diabetes Register 1982-98 and controls were selected randomly from the population register for the same age and period | Maternal vitamin supplement [any] ; maternal fish oil supplement, Q | <15 | TIDM (DD) |
| Svensson, 2005 [[580](#_ENREF_580)] | CC | 1152/475 | Denmark | Cases identified from the Danish National Register of incident cases diagnosed 1996-99 and matched controls from the Danish Population Register | Infant vitamin intake [any], Q | 8.4 | TIDM (DD) |
| Strotmeyer, 2004; [[304](#_ENREF_304)] | CC | 688/ 247 | China | **DiaMond:** WHO Multinational Project; cases selected from TIDM incidence registries 1985-98 and matched controls from local population | Vegetables; fruits; steamed bread; rice; noodles; meat, Q | 9.7 | TIDM (DD; WHO criteria) |
| Tenconi, 2007 [[307](#_ENREF_307)] | CC | 429/131 | Italy | Cases identified from TIDM population registry 1988-2000 and matched controls selected from hospitalised patients, not affected by metabolic disease or cancer | Maternal vitamin supplement [any], Q | 15.5 | TIDM (DD) |
| Virtanen, 1994 [[581](#_ENREF_581)] | CC | 1136/600 | Finland | **Childhood Diabetes in Finland**: cases were newly diagnosed TIDM with matched controls selected from the general population | Coffee, Q |  | TIDM (DD) |
| Visalli, 2003 [[311](#_ENREF_311)] | CC | 900/150 | Italy | **EURODIAB Italy**: Cases with TIDM selected from within the EURODIAB study, born 1977-89, with controls selected from school records for the same period | Infant vitamin intake [any]; fruits, vegetables; meat; tea; coffee, Q | 12 | TIDM (DD; WHO criteria) |

AR: allergic rhinitis; CC: case-control study; CD Coeliac disease; CR Crohn’s disease; DD: Doctor diagnosis (community); FA: food allergy; GADA: Glutamic acid decarboxylase antibodies; GI: gastro-intestinal; IA2A: tyrosine phosphatase IA2 antibodies; IAA: insulin autoantibodies; ILAR: International League of Associations for Rheumatology; IBD: inflammatory bowel disease; JIA: juvenile idiopathic arthritis; NCC: nested case-control study; PC: Prospective cohort study; Physician assessment is assessment by study physician; Q: questionnaire; RC: retrospective cohort; SPT: skin prick test; sIgE specific IgE; TIDM: type 1 diabetes mellitus; tTG: Antibodies to tissue transglutaminase; UC: ulcerative colitis ; WHO: World Health Organisation

# Table S7 Risk of bias in intervention trials of breastfeeding promotion or solid food introduction and allergic outcomes

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Design** | **N Intervention/ Control** | **Assessment** | **Selection** | **Attrition** | **Overall Bias** | **Conflict of Interest** |
| Kramer, 2001 [[1](#_ENREF_1)]; Kramer, 2007 [[2](#_ENREF_2)] | cluster RCT | 8865/8181 | Low | Low | Low | Low | Low |

RCT randomised controlled trial

# Table S8 Risk of bias in observational studies of breastfeeding or solid food introduction, and risk of allergic outcomes

| **Study** | **Design** | **N/n cases** | **Assessment** | **Selection** | **Confounding** | **Overall Bias** | **Conflict of interest** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Alho, 1990 [[3](#_ENREF_3)] | PC | 2,130 | Unclear | Low | High | High | Low |
| Allen, 2009 [[4](#_ENREF_4)]; Koplin, 2010 [[5](#_ENREF_5)] | PC | 310/50 | Low | Low | Low | Low | Low |
| Alm, 2008[[6](#_ENREF_6)]; Goksor, 2009/11  [[7](#_ENREF_7),[8](#_ENREF_8)] | PC | 4,987 | Unclear | Unclear | High | High | Low |
| Bacopoulou, 2009 [[9](#_ENREF_9)] | PC | 6,643 | Unclear | Unclear | High | High | Unclear |
| Benn, 2004 [[10](#_ENREF_10)]; Linneberg 2006 [[11](#_ENREF_11)] | PC | 34,793 | Low | Low | Low | Low | Low |
| Bergmann, 2000 [[12](#_ENREF_12)]; Bergmann, 2002 [[13](#_ENREF_13)] Kulig, 2000 [[14](#_ENREF_14)] | PC | 1,314 | Low | High | Low | High | Low |
| Berth-Jones, 1997 [[15](#_ENREF_15)] | PC | 413 | Unclear | Low | High | High | Low |
| Besednjak-Kocijancic, 2010 [[16](#_ENREF_16)] | PC | 408/24 | Unclear | Unclear | High | High | Unclear |
| Bisgaard, 2009 [[17](#_ENREF_17)]; Giwercman, 2010 [[18](#_ENREF_18)] | PC | 354 | Low | Low | Low | Low | Low |
| Burr, 1989; Burr, 1993; Burr, 1993 (b) [[19-21](#_ENREF_19)]; Burr, 1997 [[22](#_ENREF_22)] | PC | 483 | Low | Low | Low | Low | Low |
| Burgess, 2006 [[23](#_ENREF_23)] | PC | 4,964 | Low | Low | Low | Low | Low |
| Businco, 1987 [[24](#_ENREF_24)]; Bruno, 1995 [[25](#_ENREF_25)] | PC | 244 | Low | Low | Low | Low | Low |
| Cano Garcinuno, 2003 [[26](#_ENREF_26)] | PC | 234 | Unclear | Low | Low | Unclear | Low |
| Caudri, 2013; Scholtens, 2009 [[27](#_ENREF_27),[28](#_ENREF_28)]; Kerkhof, 2003 [[29](#_ENREF_29)] | PC | 3,115 | Low | Low | Low | Low | Low |
| Cogswell, 1987 [[30](#_ENREF_30)] | PC | 73/32 | Unclear | Low | High | High | Low |
| Chuang, 2011[[31](#_ENREF_31)] | PC | 18,773 | Low | Low | Low | Low | Low |
| da Costa Lima, 2003; Menezes, [[32](#_ENREF_32),[33](#_ENREF_33)] | PC | 4,297 | Low | High | Low | High | Low |
| Dell, 2001; Midodzi, 2008 [[34](#_ENREF_34),[35](#_ENREF_35)]; Midodzi, 2010 [[36](#_ENREF_36)] | PC; CS | 2,711 | Unclear | Low | Low | Unclear | Low |
| Devereux, 2006 [[37](#_ENREF_37)] | PC | 1,704 | Low | Low | Low | Low | Unclear |
| Dogaru, 2012 [[38](#_ENREF_38)] | PC | 1,458 | Low | Low | Low | Low | Low |
| Elliott, 2008; Granell, 2012; Sherriff, 2001  [[39-41](#_ENREF_39)]; Abd, 2012 [[42](#_ENREF_42)]; Lack, 2003 [[43](#_ENREF_43)] | PC | 9,100 | Low | Low | Low | Low | Low |
| Eneli, 2006 [[44](#_ENREF_44)] | PC | 536 | Low | Low | Low | Low | Unclear |
| Farooqi, 1998 [[45](#_ENREF_45)] | PC | 1,453 | Low | High | Low | High | Low |
| Fergusson, 1983; Horwood, 1995  [[46](#_ENREF_46),[47](#_ENREF_47)] | PC | 1,110 | Low | Low | Low | Low | Low |
| Fredriksson, 2007 [[48](#_ENREF_48)] | PC | 1,933 | Low | Low | Low | Unclear | Low |
| Forster, 1990[[49](#_ENREF_49)] | PC | 145 | Unclear | Low | Unclear | Unclear | Low |
| Galbally, 2013 [[50](#_ENREF_50)] | PC | 4,507 | Low | Low | Low | Low | Low |
| Gruber 2010 [[51](#_ENREF_51)] | PC | 167/15 | Low | Low | High | High | High |
| Gruskay 1982 [[52](#_ENREF_52)] | PC | 328 FH+/ 580 FH- | Unclear | High | High | High | Low |
| Guida, 2009 [[53](#_ENREF_53)] | PC | 3,041 | Unclear | Unclear | Low | Unclear | Low |
| Gustafsson, 2000 [[54](#_ENREF_54)] | PC | 94 | Unclear | Low | Low | Unclear | Low |
| Halken, 1991[[55](#_ENREF_55)] | PC | 276 | Low | Low | Low | Low | Low |
| Harris, 2001[[56](#_ENREF_56)]; Zutavern, 2004 [[57](#_ENREF_57)] | PC | 622 | Low | Low | Low | Low | Low |
| Hagendorens, 2005 [[58](#_ENREF_58)]; Sariachvili, 2007 [[59](#_ENREF_59)]; Sariachvili 2010 [[60](#_ENREF_60)] | PC | 693 | Unclear | Low | Low | Unclear | Low |
| Hesselmar, 2010 [[61](#_ENREF_61)] | PC | 184 | Low | Low | High | High | Low |
| Hetzner, 2009 [[62](#_ENREF_62)] | PC | 7,900 | Unclear | Low | High | High | Low |
| Hide, 1981[[63](#_ENREF_63)]; Arshad, 1992 [[64](#_ENREF_64)] | PC | 843 | Low | Low | Low | Low | Low |
| Hikino, 2001[[65](#_ENREF_65)] | PC | 21,766/2,381 | Unclear | Low | Low | Unclear | Low |
| Hong, 2011 [[66](#_ENREF_66)] | PC | 970/361 | Low | Unclear | Low | Unclear | Low |
| Hoppu, 2002 [[67](#_ENREF_67)] | PC | 114/27 | Low | Low | High | High | Low |
| Host, 1991 [[68](#_ENREF_68)] | PC | 315/16 | Unclear | Low | High | High | Unclear |
| Howie, 1990 [[69](#_ENREF_69)] | PC | 618 | Low | Low | Low | Low | Low |
| Huang, 2013 [[70](#_ENREF_70)] | PC | 684 | Unclear | Low | High | High | Low |
| Huurre, 2008 [[71](#_ENREF_71)] | PC | 98/29 | Low | Low | Low | Low | Unclear |
| Joseph, 2011 [[72](#_ENREF_72)] | PC | 594/178 | Unclear | Low | Low | Unclear | Low |
| Juto, 1980 [[73](#_ENREF_73)] | PC | 56/NA | Unclear | Low | High | High | Unclear |
| Kajosaari, 1991[[74](#_ENREF_74)] | PC | 135 | Low | Unclear | High | High | Low |
| Karmaus, 2008 [[75](#_ENREF_75)]; Ogbuanu, 2009 [[76](#_ENREF_76)]; Soto-Ramırez, 2012 [[77](#_ENREF_77)] | PC | 1,336 | Low | Low | Low | Low | Low |
| Kaufman, 1976 [[78](#_ENREF_78)] | PC | 94 | Unclear | Low | High | High | Low |
| Kellberger, 2012 [[79](#_ENREF_79)] | PC | 594/178 | Unclear | Low | Low | Unclear | High |
| Kemeny, 1991[[80](#_ENREF_80)] | PC | 180 | Unclear | Low | High | High | Unclear |
| Kerr, 1981[[81](#_ENREF_81)] | PC | 269 | Unclear | Low | High | High | Low |
| Kim, 2011 [[82](#_ENREF_82)] | PC | 1,177/61 | Unclear | Low | Low | Unclear | Low |
| Kitz, 2006 [[83](#_ENREF_83)] | PC | 131 | Unclear | Low | High | High | Unclear |
| Klinnert, 2001 [[84](#_ENREF_84)] | PC | 145 | Low | Low | Low | Low | Low |
| Kramer, 2003; Kramer, 2009; Kramer, 2009 (b)  [[85-87](#_ENREF_85)] | PC | 13,889/455 | Unclear | Low | Low | Unclear | Low |
| Kull, 2002 [[88](#_ENREF_88)] | PC | 3790 | Low | Low | Low | Low | Low |
| Kusel, 2005 [[89](#_ENREF_89)] | PC | 263/107 | Unclear | Low | Low | Unclear | Unclear |
| Larsson, 2008 [[90](#_ENREF_90)] | PC | 4779 | Low | Low | Low | Low | Low |
| Marini, 1996 [[91](#_ENREF_91)] | PC | Unclear | Unclear | Low | Low | Unclear | Unclear |
| Matheson, 2007 [[92](#_ENREF_92)] | PC | 5,729/2,610 | Unclear | Low | Low | Unclear | High |
| Midwinter, 1987 [[93](#_ENREF_93)] | PC | 453 | Unclear | Low | Low | Unclear | Unclear |
| Mihrshahi, 2007 [[94](#_ENREF_94)] | PC | 516 | Low | Low | Low | Low | Low |
| Milner, 2004 [[95](#_ENREF_95)] | PC | 8,071 | Low | Unclear | Low | Unclear | Low |
| Miskelly, 1988 [[96](#_ENREF_96)] | PC | 482 | Low | Low | High | High | Low |
| Miyake, 2008 [[97](#_ENREF_97)]; Miyake, 2009 [[98](#_ENREF_98)] | PC | 763 | Low | High | Low | High | Low |
| Morgan, 2004; Morgan, 2004 (b) [[99](#_ENREF_99),[100](#_ENREF_100)] | PC | 257 | Low | Low | Low | Low | Low |
| Moore, 1985 [[101](#_ENREF_101)] | PC | 475 | Low | Low | Low | Low | Low |
| Morales, 2012 [[102](#_ENREF_102)] | PC | 467 | Unclear | Low | Low | Unclear | Low |
| Muiño, 2008 [[103](#_ENREF_103)] | PC | 897 | Low | Low | High | High | Low |
| Nielsen, 2013 [[104](#_ENREF_104)] | PC | 5,429 | Low | Low | Low | Low | Low |
| Nwaru, 2010 [[105](#_ENREF_105)]; Erkkola, 2012; Nwaru, 2013  [[106](#_ENREF_106),[107](#_ENREF_107)]; Virtanen, 2010 [[108](#_ENREF_108)] | PC | 3,675 | Low | Low | Low | Low | Low |
| Oddy, 2003 [[109](#_ENREF_109)] | PC | 243 | Low | Unclear | High | High | Low |
| Oddy, 1999; Oddy, 2003; Oddy, 2004  [[110-112](#_ENREF_110)] | PC, NCC | 2,456 | Low | Low | Low | Low | Low |
| Odelram, 1996 [[113](#_ENREF_113)] | PC | 70/23 | Unclear | Low | High | High | Unclear |
| Perez Tarazona, 2010 [[114](#_ENREF_114)] | PC | 620 | Unclear | Low | High | High | Low |
| Pesonen, 2006 [[115](#_ENREF_115)] | PC | 160 | Low | Low | Low | Low | Low |
| Porch, 1998 [[116](#_ENREF_116)] | PC | 130 | Low | Low | High | High | Low |
| Poysa, 1990; Poysa, 1992 [[117](#_ENREF_117),[118](#_ENREF_118)] | PC | 68 | Unclear | Low | High | High | Unclear |
| Pratt, 1984 [[119](#_ENREF_119)] | PC | 198 | Low | Low | High | High | Low |
| Puig, 2010 [[120](#_ENREF_120)] | PC | 368 | Low | Low | Low | Low | Low |
| Purvis, 2005 [[121](#_ENREF_121)] | PC | 550 | Unclear | High | Low | High | Low |
| Rhodes, 2001[[122](#_ENREF_122)] | PC | 63 | Unclear | High | High | High | Low |
| Rothenbacher, 2005 [[123](#_ENREF_123)] | PC | 803 | Low | Low | Low | Low | Low |
| Rowntree, 1985 [[124](#_ENREF_124)] | PC | 80/20 | Unclear | Low | High | High | Unclear |
| Rullo, 2007; Rullo, 2009; Rullo, 2009 (b); Rullo, 2010  [[125-128](#_ENREF_125)] | PC | 101 | Low | Low | Low | Low | Low |
| Ruiz 1992 [[129](#_ENREF_129)] | PC | 39 | Unclear | High | High | High | Low |
| Saarinen, 1995 [[130](#_ENREF_130)] Saarinen, 1979 [[131](#_ENREF_131)] | PC | Unclear | Unclear | Low | High | High | Unclear |
| Sears, 2002 [[132](#_ENREF_132)]; Mandhane 2007 [[133](#_ENREF_133)] | PC | 1,037 | Low | Low | High | High | Low |
| Shaheen, 1996 [[134](#_ENREF_134)] | PC | 395/44 | Unclear | Unclear | Low | Unclear | Low |
| Shohet, 1985 [[135](#_ENREF_135)] | PC | 368 | Unclear | Low | High | High | Unclear |
| Schoetzau, 2002 [[136](#_ENREF_136)] | PC | 829 | Low | High | Low | High | Low |
| Schonberger, 2005 [[137](#_ENREF_137)] | PC | 443 | Low | Low | Low | Low | Low |
| Sicherer, 2010 [[138](#_ENREF_138)] | PC | 503/140 | Unclear | Low | High | High | Low |
| Siltanen, 2003 [[139](#_ENREF_139)] | PC | 285/53 | Unclear | Low | High | High | High |
| Silva, 2005 [[140](#_ENREF_140)] | PC | 73 | Unclear | Unclear | High | High | Unclear |
| Silvers, 2009; Silvers, 2011 [[141](#_ENREF_141),[142](#_ENREF_142)] | PC | 889/249 | Low | Low | Low | Low | Low |
| Simon, 2008 [[143](#_ENREF_143)] ; Wang, 2007[[144](#_ENREF_144)]; Wegienka, 2006 [[145](#_ENREF_145)]; Salam, 2003 [[146](#_ENREF_146)] | PC | 372 | Low | Low | Low | Low | Low |
| Snijders, 2007; Snijders, 2008 [[147](#_ENREF_147),[148](#_ENREF_148)] | PC | 2,505 | Low | Low | Low | Low | Low |
| Soto-Ramirez, 2013 [[149](#_ENREF_149)] | PC | 2,833 | Low | High | Low | High | Low |
| Strachan, 1997 [[150](#_ENREF_150)]; Strachan, 1996 [[151](#_ENREF_151)]; Lewis, 1995; Lewis, 1996 [[152](#_ENREF_152),[153](#_ENREF_153)]; Butland, 1997 [[154](#_ENREF_154)] | PC | 1,369/730 | Low | Low | Low | Low | Unclear |
| Strassburger, 2010 [[155](#_ENREF_155)] | PC | 325/94 | Unclear | Low | Low | Unclear | Low |
| Sunyer, 2006 [[156](#_ENREF_156)] | PC | 462 | Low | Low | Low | Low | Low |
| Sunyer, 2001 [[157](#_ENREF_157)] | PC | 596 | Low | Unclear | Low | Unclear | Low |
| Taylor, 1983 [[158](#_ENREF_158)] ; Taylor, 1984 [[159](#_ENREF_159)] | PC | 12,608 | Low | Low | Low | Low | Low |
| Tennant, 2008 [[160](#_ENREF_160)]  Tennant, 2010 [[161](#_ENREF_161)] | PC | 392 | Low | Low | Low | Low | Low |
| Tian, 2009 [[162](#_ENREF_162)] | PC | 472 | Unclear | Low | Low | Unclear | Low |
| Van Asperen, 1983 [[163](#_ENREF_163)] | PC | 79/44 | Unclear | Low | High | High | Low |
| Van Beijstervelft, 2008 [[164](#_ENREF_164)] | PC | 24,018 | Low | Low | Low | Low | Low |
| van der Voort, 2012 [[165](#_ENREF_165)] | PC | 5,368 | Low | Low | Low | Low | Low |
| Vandenplas, 1988 [[166](#_ENREF_166)] | PC | 75 | Unclear | Low | High | High | Unclear |
| van Merode, 2007 [[167](#_ENREF_167)] | PC | 222 | Low | Low | Low | Low | Low |
| Venter, 2009 [[168](#_ENREF_168)] | PC | 891/58 | Unclear | Low | High | High | Low |
| Watson,2013 [[169](#_ENREF_169)] | PC | 369 | Low | Low | High | High | Low |
| Wetzig, 2000 [[170](#_ENREF_170)] | PC | 475 | Low | Low | High | High | Low |
| Wilson, 1998 [[171](#_ENREF_171)] | PC | 545 | Low | Low | High | High | Low |
| Wright, 2002 [[172](#_ENREF_172)] | PC | 499 | Low | Low | Low | Low | Low |
| Wright, 1989; Wright, 1995 [[173](#_ENREF_173),[174](#_ENREF_174)]; Wright, 1999 [[175](#_ENREF_175)]; Wright, 1994 [[176](#_ENREF_176)] | PC | 988 | Unclear | Low | Low | Unclear | Low |
| Yamamoto, 2011 [[177](#_ENREF_177)] | PC | 1,344 | Unclear | Low | High | High | Low |
| Zutavern, 2006; Zutavern, 2008 [[178](#_ENREF_178),[179](#_ENREF_179)] | PC | 606 | Low | Low | Low | Low | Low |
| Friday, 2000 [[180](#_ENREF_180)] | RC | 94 | Unclear | Low | High | High | Low |
| McConnochie, 1986 [[181](#_ENREF_181)] | RC | 223 | Low | Low | Low | Low | Low |
| Monego, 1989 [[182](#_ENREF_182)] | RC | 144 | Low | Low | High | High | Low |
| Rona, 2005 [[183](#_ENREF_183)] | RC | 1,213 | Unclear | Low | Low | Unclear | Low |
| Mai, 2007 [[184](#_ENREF_184)] | NCC | 723 | Low | Low | Low | Low | Low |
| Martel, 2008 [[185](#_ENREF_185)] | NCC | 1,578 | Unclear | High | Low | High | Low |
| Maskell, 2010 [[186](#_ENREF_186)]; Oliver, 2010 [[187](#_ENREF_187)]; Munro, 2011 [[188](#_ENREF_188)] | PC; NCC | 700 | Low | Unclear | Unclear | Unclear | Low |
| Ronmark, 1999 [[189](#_ENREF_189)] | NCC | 258 | Unclear | Low | Low | Unclear | Low |
| Camara, 2003 [[190](#_ENREF_190)] | CC | 91 | Unclear | Low | High | High | Low |
| DesRoches, 2010 [[191](#_ENREF_191)] | CC | 403/202 | Unclear | Low | Unclear | Unclear | Low |
| Djenouhat, 2011 [[192](#_ENREF_192)] | CC | 450 | Unclear | Unclear | Unclear | Unclear | Low |
| Fox, 2009 [[193](#_ENREF_193)] | CC | 283/133 | Low | Unclear | High | High | Low |
| Ghaderi, 2014 [[194](#_ENREF_194)] | CC | 200 | Low | Unclear | High | High | Low |
| Haileamlak, 2005 [[195](#_ENREF_195)] | CC | 732 | Unclear | High | Low | High | Low |
| Infante-Rivard, 1993 [[196](#_ENREF_196)] | CC | 914 | Unclear | Low | Low | Unclear | Low |
| Juca, 2012 [[197](#_ENREF_197)] | CC | 590 | Low | Low | High | High | Low |
| Karunasekera, 2001 [[198](#_ENREF_198)] | CC | 582 | Unclear | Unclear | Low | Unclear | Low |
| Kramer, 1981 [[199](#_ENREF_199)] | CC | 470 | Low | Low | High | High | Low |
| Mavale-Manuel, 2003 [[200](#_ENREF_200)] | CC | 199 | High | Unclear | High | High | Low |
| Oliveti, 1995 [[201](#_ENREF_201)] | CC | 262 | Low | Unclear | High | High | Low |
| Porro, 1993 [[202](#_ENREF_202)] | CC | 465 | Unclear | Low | High | High | Low |
| Ratageri, 2000 [[203](#_ENREF_203)] | CC | 180 | Low | Low | Low | Low | Low |
| Rosas Vargas 2002 [[204](#_ENREF_204)] | CC | 148 | Unclear | Low | High | High | Low |
| Rylander 1993 [[205](#_ENREF_205)] | CC | 550 | Unclear | Low | Low | Unclear | Unclear |
| Ventura, 1988 [[206](#_ENREF_206)] | CC | 339/148 | Unclear | Unclear | High | High | Low |
| Whu, 2007 [[207](#_ENREF_207)] | CC | 261 | Low | Low | Low | Low | Unclear |
| Wickens, 2001 [[208](#_ENREF_208)] | CC | 474 | Low | Low | Low | Low | Low |
| Zhu, 2012 [[209](#_ENREF_209)] | CC | 542 | Unclear | High | High | High | Low |
| Alper, 2006 [[210](#_ENREF_210)] | CS | 858 | Unclear | Low | Low | Unclear | Low |
| Al-Kubaisy, 2005 [[211](#_ENREF_211)] | CS | 2,262 | Unclear | Low | High | High | Unclear |
| Awasthi, 2004 [[212](#_ENREF_212)] Björkstén, 2011 [[213](#_ENREF_213)] ; Flohr, 2011 [[214](#_ENREF_214)] Nagel, 2009 [[215](#_ENREF_215)]; Kuyucu, 2004  [[216](#_ENREF_216)] | CS | 2,471 | Unclear | Unclear | Low | Unclear | Low |
| Berjon, 1987 [[217](#_ENREF_217)] | CS | 2,690/148 | Unclear | Unclear | High | High | Low |
| Castro-Rodriguez, 2010 [[218](#_ENREF_218)]; Chong Neto, 2007 [[219](#_ENREF_219)] | CS | 3,003 | Low | Low | Low | Low | Low |
| Civelek, 2001[[220](#_ENREF_220)] | CS | 1533 | Unclear | Low | Low | Unclear | High |
| Ehlayel, 2008 [[221](#_ENREF_221)] | CS | 1,278 | Low | Low | Low | Low | Low |
| Ehrlich, 1996 [[222](#_ENREF_222)] | CS | 620 | Unclear | Low | Low | Unclear | Low |
| Evenhouse, 2005 [[223](#_ENREF_223)] | CS | 16,903 | Unclear | Low | Low | Unclear | Low |
| Girolomoni, 2003 [[224](#_ENREF_224)] | CS | 1,369 | Unclear | High | High | High | Low |
| Han, 2009 [[225](#_ENREF_225)] | CS | 21,371 | Unclear | High | Low | High | Low |
| Karino, 2008 [[226](#_ENREF_226)] | CS | 9,615 | Unclear | Low | Low | Unclear | Low |
| Kucukosmanoglu, 2008 [[227](#_ENREF_227)] | CS | 1,015/20 | Unclear | High | High | High | Low |
| Kuehr, 1992 [[228](#_ENREF_228)] | CS | 1,470/201 | Unclear | High | High | High | Unclear |
| Kurt, 2008 [[229](#_ENREF_229)]  Kurt, 2007 [[230](#_ENREF_230)] | CS | 25,843 | Low | Low | Low | Low | Low |
| Liu 2012 [[231](#_ENREF_231)] | CS | 8733 | Unclear | Unclear | High | High | Unclear |
| Miyake, 2003 [[232](#_ENREF_232)] | CS | 6,845 | Unclear | High | Low | High | Low |
| Nakamura, 1999 [[233](#_ENREF_233)] | CS | 3,850 | Unclear | Low | Low | Unclear | Low |
| Paton, 2012 [[234](#_ENREF_234)] | CS | 15,142/592 | Low | Unclear | High | High | Low |
| Prietsch, 2006 [[235](#_ENREF_235)] | CS | 685 | Unclear | Unclear | High | High | Unclear |
| Rusconi, 1999; Rusconi, 2005  [[236](#_ENREF_236),[237](#_ENREF_237)] | CS | 16,933 | Unclear | Low | High | High | Low |
| Rust, 2001 [[238](#_ENREF_238)] | CS | 6,783 | Unclear | Low | Low | Unclear | Low |
| Salem, 2002 [[239](#_ENREF_239)] | CS | 424 | Low | High | High | High | Low |
| Selcuk, 1997 [[240](#_ENREF_240)] | CS | 5,412 | Low | Low | Low | Low | Low |
| Suwanpromma, 2012 [[241](#_ENREF_241)] | CS | 215 | Unclear | Low | High | High | Low |
| Takemura, 2002 [[242](#_ENREF_242)] | CS | 23828 | Unclear | Low | Low | Unclear | Low |
| Tanaka, 2009 [[243](#_ENREF_243)] | CS | 1957 | Unclear | Unclear | Unclear | Unclear | Unclear |
| Visser, 2010 [[244](#_ENREF_244)] | CS | 1115 | Unclear | Low | Low | Unclear | Low |
| Wang, 2006 [[245](#_ENREF_245)] | CS | 8733 | Low | Low | High | High | Low |

CC Case Control study; CS Cross-sectional study; NCC Nested Case Control study; PC Prospective Cohort; RC Retrospective Cohort

# Table S9 Risk of bias in observational studies of breastfeeding or solid food introduction, and risk of autoimmune diseases

| **Study** | **Design** | **N/n cases** | **Assessment** | **Selection** | **Confounding** | **Overall Bias** | **Conflict of interest** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Couper, 1999 [[246](#_ENREF_246)]; Couper, 2009 [[247](#_ENREF_247)] | PC | 317/70 | Unclear | Unclear | High | High | Low |
| Frederikson, 2012 (abstract) [[248](#_ENREF_248)]; Fronczak, 2003 [[249](#_ENREF_249)]; Lamb, 2013 [[250](#_ENREF_250)]; Norris, 2003 [[251](#_ENREF_251)]; Lamb 2008 [[252](#_ENREF_252)] | PC | 1,698 | Low | Low | Low | Low | Low |
| Holmberg, 2007 [[253](#_ENREF_253)]; Karlen, 2012 [[254](#_ENREF_254)]; Wahlberg, 2006 [[255](#_ENREF_255)] | PC | 3788/~51 | Low | Low | Low | Low | Low |
| Ludvigsson, 2003 [[256](#_ENREF_256)] | PC | 205 | Unclear | Low | Low | Unclear | Unclear |
| Viner, 2008 [[257](#_ENREF_257)] | PC | 11211/61 | Unclear | High | Low | High | Low |
| Virtanen, 1992 [[258](#_ENREF_258)]; Virtanen, 1998 [[259](#_ENREF_259)]; Hypponen, 1999 [[260](#_ENREF_260)]; Virtanen, 2000 [[261](#_ENREF_261)] | PC, NCC | 697/43 | Low | Low | Low | Low | Low |
| Virtanen, 2011 [[262](#_ENREF_262)] | PC | ~4000/~160 | Unclear | Low | High | High | Low |
| Jones, 1998 [[263](#_ENREF_263)] | NCC | 518/60 | Low | High | High | High | Low |
| Kimpimaki, 2001 [[264](#_ENREF_264)] | NCC | 455/65 | Unclear | High | Low | High | Low |
| Kyvik, 1992 [[265](#_ENREF_265)] | NCC | 228/76 | Low | Unclear | High | High | Low |
| Norris, 1996 [[266](#_ENREF_266)]; | NCC | 171/18 | Low | Low | Low | Low | Low |
| Robertson, 2010 [[267](#_ENREF_267)] | NCC | 1444/361 | Low | Unclear | Low | Unclear | Low |
| Savilahti, 2009 [[268](#_ENREF_268)] | NCC | 6209/45 | Low | High | High | High | Low |
| Ahadi, 2011 [[269](#_ENREF_269)] | CC | 202/101 | Unclear | Unclear | Low | Unclear | Low |
| Alves, 2012 [[270](#_ENREF_270)] | CC | 246/123 | Unclear | Unclear | Low | Unclear | Low |
| Ashraf, 2010 [[271](#_ENREF_271)] | CC | 195/128 | Unclear | High | High | High | Low |
| Baruah, 2011 [[272](#_ENREF_272)] | CC | 86/43 | Unclear | Unclear | High | High | Low |
| Bener, 2009 [[273](#_ENREF_273)] | CC | 340 | Unclear | Unclear | High | High | Low |
| Blom, 1989 [[274](#_ENREF_274)] | CC | 867/339 | Unclear | Low | High | High | Low |
| Bodington, 1994 [[275](#_ENREF_275)] | CC | 393/209 | Unclear | High | High | High | Low |
| Borras, 2011 [[276](#_ENREF_276)] | CC | 1530/306 | Unclear | Unclear | High | High | Low |
| Dahlquist, 2002 [[277](#_ENREF_277)] | CC | 2226/610 | Unclear | Low | Low | Unclear | Low |
| Esfarjani, 2001 [[278](#_ENREF_278)] | CC | 104/52 | Low | Unclear | High | High | Low |
| Gimeno, 1997 [[279](#_ENREF_279)] | CC | 626/313 | Low | Low | Low | Low | Low |
| Hathout, 2006 [[280](#_ENREF_280)] | CC | 402/102 | Unclear | Unclear | Unclear | Unclear | Low |
| Kostraba, 1992 [[281](#_ENREF_281)]; Kostraba, 1993 [[282](#_ENREF_282)] | CC | 264/132- white; 108/54-black | Unclear | Low | High | High | Low |
| Liese, 2012 [[283](#_ENREF_283)] | CC | 709/505 | Unclear | Low | High | High | Low |
| Majeed, 2011 [[284](#_ENREF_284)] | CC | 310/96 | Low | Unclear | Low | Unclear | Low |
| Malcova, 2006 [[285](#_ENREF_285)] | CC | 2334/868 | Unclear | High | Low | High | Low |
| Marshall, 2004 [[286](#_ENREF_286)] | CC | 577/196 | Unclear | Low | High | High | Low |
| Mayer, 1988 [[287](#_ENREF_287)] | CC | 747/268 | Unclear | High | Low | High | Low |
| McKinney, 1999 [[288](#_ENREF_288)] | CC | 521/196 | Unclear | Low | Low | Unclear | Low |
| Meloni, 1997 [[289](#_ENREF_289)] | CC | 200/100 | Unclear | Unclear | Low | Unclear | Low |
| Patterson, 1994 [[290](#_ENREF_290)] | CC | 1548/258 | Low | Unclear | Low | Unclear | Low |
| Perez-Bravo, 1996 [[291](#_ENREF_291)] | CC | 165/80 | Unclear | Unclear | High | High | Low |
| Perez-Bravo, 2003 [[292](#_ENREF_292)] | CC | 250/143 | Unclear | Unclear | High | High | Low |
| Rabiei 2011 [[293](#_ENREF_293)] | CC | 300/100 | Low | Unclear | Low | Unclear | Low |
| Rami, 1999 [[294](#_ENREF_294)] | CC | 609/114 | Unclear | Unclear | High | High | Low |
| Rosenbauer, 2008 [[295](#_ENREF_295)] | CC | 2631/760 | Unclear | High | Low | High | Low |
| Sadauskaite-Kuehne, 2004 [[296](#_ENREF_296)]; Skrodeniene, 2010 [[297](#_ENREF_297)] | CC | 1944/803 | Low | Unclear | Low | Unclear | Low |
| Samuelsson, 1993 [[298](#_ENREF_298)] | CC | 1089/297 | Unclear | Low | Low | Unclear | Low |
| Siemiatycki, 1989 [[299](#_ENREF_299)] | CC | 482/161 | Unclear | Low | Low | Unclear | Low |
| Sipetic, 2005 [[300](#_ENREF_300)] | CC | 315/105 | Unclear | Low | Low | Unclear | Low |
| Soltesz, 1994 [[301](#_ENREF_301)] | CC | 305/130 | Unclear | Low | Low | Unclear | Low |
| Stene, 2000 [[302](#_ENREF_302)] | CC | 1156/85 | Low | High | Low | High | Low |
| Stene, 2003 [[303](#_ENREF_303)] | CC | 2213/545 | Unclear | Low | Low | Unclear | Low |
| Strotmeyer, 2004 [[304](#_ENREF_304)] | CC | 485/247 | Unclear | Unclear | Low | Unclear | Low |
| Tai, 1998 [[305](#_ENREF_305)] | CC | 310/117 | Unclear | Low | Low | Unclear | Low |
| Telahun, 1994 [[306](#_ENREF_306)] | CC | 129/55 | Low | Unclear | High | High | Low |
| Tenconi, 2007 [[307](#_ENREF_307)] | CC | 477/159 | Unclear | Unclear | Low | Unclear | Low |
| Thorsdottir, 2000 [[308](#_ENREF_308)] | CC | 220/55 | Low | Low | Low | Low | Low |
| Verge, 1994 [[309](#_ENREF_309)] | CC | 475/217 | Unclear | Unclear | High | High | Low |
| Virtanen, 1993 [[310](#_ENREF_310)] | CC | 1380/690 | Low | Low | Low | Low | Low |
| Visalli, 2003 [[311](#_ENREF_311)] | CC | 900/150 | Unclear | Low | Low | Unclear | Low |
| Wadsworth, 1997 [[312](#_ENREF_312)] | CC | 639/276 | Unclear | Low | Low | Unclear | Low |
| Glatthaar, 1988 [[313](#_ENREF_313)] | CS | 946/~200 | Unclear | Unclear | Low | Unclear | Low |
| Hummel, 2000 [[314](#_ENREF_314)]; Hummel, 2007 [[315](#_ENREF_315)]; Ziegler, 2003 [[316](#_ENREF_316)] | PC | 1460/~68 | Low | Low | Low | Low | Low |
| Norris, 2005 [[317](#_ENREF_317)] | PC | 1560 | Low | High | High | High | Low |
| Welander, 2010 [[318](#_ENREF_318)] | PC | 9414/~29 | Unclear | High | High | High | Low |
| Ascher, 1997 [[319](#_ENREF_319)] | CC | 81/8 | Unclear | Low | High | High | Low |
| Auricchio, 1983 [[320](#_ENREF_320)] | CC | 437/190 | Low | Unclear | High | High | Low |
| Baron, 2005 [[321](#_ENREF_321)] | CC | 444/222 | Unclear | Low | Low | Unclear | Low |
| Bergstrand, 1983 [[322](#_ENREF_322)] | CC | 616/308 | Unclear | High | High | High | Low |
| Castiglione, 2011 [[323](#_ENREF_323)] | CC | 1030/468 | Unclear | Unclear | High | High | Low |
| Corrao, 1997 [[324](#_ENREF_324)] | CC | 1252/626 | Unclear | Unclear | Low | Unclear | Low |
| Decker 2010 [[325](#_ENREF_325)] | CC | 866/123 | Unclear | Low | Low | Unclear | Low |
| Ellis, 2012 [[326](#_ENREF_326)] | CC | 655/246 | Unclear | High | Low | Unclear | Low |
| Falth-Magnusson, 1996 [[327](#_ENREF_327)] | CC | 336/72 | Low | Low | High | High | Unclear |
| Fort, 1990 [[328](#_ENREF_328)] | CC | 189/59 | Unclear | Unclear | High | High | Low |
| Gearry, 2010 [[329](#_ENREF_329)] | CC | 1253/653 | Low | High | Low | High | Low |
| Gilat, 1987 [[330](#_ENREF_330)] | CC | 1497/499 | Unclear | Unclear | Unclear | Unclear | Low |
| Greco, 1988 [[331](#_ENREF_331)] | CC | 2150/201 | Low | Low | High | High | High |
| Gruber, 1996 [[332](#_ENREF_332)] | CC | 144/54 | Low | Unclear | Low | Unclear | High |
| Hansen, 2011[[333](#_ENREF_333)] | CC | 534/267 | Unclear | High | Low | High | Low |
| Ivarsson, 2002 [[334](#_ENREF_334)] | CC | 1272/392 | Low | High | High | High | Low |
| Koletzko, 1991 [[335](#_ENREF_335)] | CC | 231/93 | Low | Low | Low | Low | Low |
| Mason, 1995 [[336](#_ENREF_336)] | CC | 133/54 | Unclear | Low | High | High | Low |
| Pacilio, 2010 [[337](#_ENREF_337)] | CC | 278/139 | Unclear | Unclear | High | High | Low |
| Peters, 2001 [[338](#_ENREF_338)] | CC | 270/133 | Low | High | Low | High | Low |
| Roberts 2009 [[339](#_ENREF_339)] | CC | 248521/ 90 | High | Unclear | High | High | Low |
| Rosenberg, 1996 [[340](#_ENREF_340)] | CC | 468/137 | Unclear | Unclear | High | High | Low |
| Sonntag, 2007 [[341](#_ENREF_341)] | CC | 1974/1096 | Low | High | High | High | Low |
| Thompson, 1999 [[342](#_ENREF_342)] | NCC | 243/27 | Low | Unclear | High | High | Low |
| Wang, 2013 [[343](#_ENREF_343)] | CC | 2616/1308 | Unclear | Unclear | High | High | Low |

CC Case Control study; CS Cross-sectional study; NCC Nested Case Control study; PC Prospective Cohort

# Table S10 Risk of bias in intervention trials of other interventions and allergic or autoimmune outcomes

| **Study** | **Design** | **N Intervention/ Control** | **Assessment** | **Selection** | **Attrition** | **Overall** | **Conflict of interest** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Falth-Magnusson, [1987](#_bookmark21) [[344](#_ENREF_344)]  Falth-Magnusson[, 1992](#_bookmark22) [[345](#_ENREF_345)]  Ludvigsson, 2003 [[346](#_ENREF_346)] | RCT | 108/104 | High | Unclear | Low | High | Low |
| Jirapinyo, 2013 [[347](#_ENREF_347)] | RCT | 30/32 | Unclear | Unclear | Low | Unclear | Low |
| Lilja, 1989 [[348](#_ENREF_348)] | RCT | 84/87 | Low | Unclear | Low | Unclear | Low |
| Hattevig, 1990 [[349](#_ENREF_349)]; Paronen, 2000 [[350](#_ENREF_350)]; Hattevig, 1999 [[351](#_ENREF_351)]; Hattevig, 1989 [[352](#_ENREF_352)]; Sigurs, 1992 [[353](#_ENREF_353)] | CCT | 54/67 | Unclear | Unclear | Low | Unclear | Unclear |
| Herrmann, 1996 [[354](#_ENREF_354)] | CCT | 50/50 | Unclear | High | Unclear | High | Low |
| Kilburn, 1998 [[355](#_ENREF_355)] | CCT | 15/96 | Unclear | High | Low | High | Low |
| Metcalfe, 2016 [[582](#_ENREF_582)] | RCT | 40, 44, 36 | Low | Low | High | High | Low |
| Becker, 2004 [[357](#_ENREF_357)]  Chan-  Yeung, 2000 [[358](#_ENREF_358)] & 2005 [[359](#_ENREF_359)];Wong, 2013 [[360](#_ENREF_360)] Protudjer, 2011 [[361](#_ENREF_361)]; Carlsten, 2013 [[362](#_ENREF_362)] | RCT | 281/268 | Low | Low | Low | Low | Low |
| Hide, 1994 [[363](#_ENREF_363)]  Hide, 1996,[[364](#_ENREF_364)]  Arshad, 1992 [[365](#_ENREF_365)]  Arshad, 2003 [[366](#_ENREF_366)]  Arshad, 2007 [[367](#_ENREF_367)]  Scott, 2012 [[368](#_ENREF_368)] | RCT | 71/68 | Low | Low | Low | Low | Low |
| Lovegrove, 1994 [[369](#_ENREF_369)] | RCT | 12/14 | Unclear | Unclear | Low | Unclear | Low |
| Shao, 2006 [[370](#_ENREF_370)] | RCT | 23/23 | Low | Unclear | Low | Unclear | Low |
| Zeiger, 1992 [[371](#_ENREF_371)]  Zeiger, 1989, [[372](#_ENREF_372)] Zeiger 1994 [[373](#_ENREF_373)] | RCT | 103/185 | Low | Low | High | High | Low |
| Halmerbauer, 2002, 2003 [[374](#_ENREF_374),[375](#_ENREF_375)] | RCT | 349/347 | Low | Unclear | Low | Unclear | Low |
| Matthew, 1977 [[376](#_ENREF_376)] | RCT | 27/35 | Low | Unclear | Low | Unclear | High |
| Poysa, 1991 [[377](#_ENREF_377)]  Poysa 1989 [[378](#_ENREF_378)]  Kuikka 1985 [[379](#_ENREF_379)] | RCT | 35/33 | Low | Unclear | Low | Unclear | Low |
| Schonberger,  2005 [[137](#_ENREF_137)] | RCT | 222/221 | Unclear | Unclear | Low | Unclear | Unclear |
| Boyle 2015 [[380](#_ENREF_380)] [[381](#_ENREF_381)]  Boyle 2016 [[382](#_ENREF_382)] | RCT | 432/431 | Low | Low | Low | Low | High |
| Gruber 2010 [[383](#_ENREF_383)]  Gruber 2015 [[384](#_ENREF_384)] | RCT | 414/ 416 | Low | Low | Unclear | Unclear | High |
| Ivakhnenko 2013 [[385](#_ENREF_385)] | RCT | 129/ 130 | Low | Low | High | High | High |
| Moro 2006 [[386](#_ENREF_386)], van Hoffen 2009 [[387](#_ENREF_387)], Arslanoglu 2008 [[388](#_ENREF_388)] Arslanoglu 2012 [[389](#_ENREF_389)] | RCT | 80/80 | Unclear | Low | High | High | Unclear |
| Sierra, 2015 [[390](#_ENREF_390)] | RCT | 188/ 177 | Low | Unclear | High | High | High |
| Ziegler 2007[[391](#_ENREF_391)] | RCT | 150/ 76 | Unclear | Unclear | Low | Unclear | High |
| Chien, 2016 [[392](#_ENREF_392)] | RCT | Unclear – outcome reported in 45 (synbiotic), 39 (prebiotic) / 45 (control) | Unclear | Unclear | Unclear | Unclear | Unclear |
| Kukkonen 2007 [[393](#_ENREF_393)] Kuitunen 2009 [[394](#_ENREF_394)] Kukkonen 2011[[395](#_ENREF_395)] | RCT | 610/ 613 | Low | Unclear | Low | Unclear | Unclear |
| Roze 2012 [[396](#_ENREF_396)] | RCT | 48/ 49 | Low | Low | Low | Low | High |
| Van der Aa 2010 [[397](#_ENREF_397)] | RCT | 46/ 44 | Low | Low | Unclear | Unclear | High |
| Abrahamsson 2007 [[398](#_ENREF_398)]  Abrahamsson 2013 [[399](#_ENREF_399)] | RCT | 117/ 115 | Unclear | Low | Low | Unclear | High |
| Allen 2012 [[400](#_ENREF_400)]  Allen 2014 [[401](#_ENREF_401)] | RCT | 220/ 234 | Unclear | Unclear | Low | Unclear | Unclear |
| Boyle 2011 [[402](#_ENREF_402)] | RCT | 125/ 125 | Low | Low | Low | Low | Low |
| Cabana, 2015 [[403](#_ENREF_403)] | RCT | 93/92 | Unclear | Unclear | Low | Unclear | Unclear |
| De Leon 2007 [[404](#_ENREF_404)] Simon 2007 [[405](#_ENREF_405)] | RCT | Total = 33 | Low | Unclear | Unclear | Unclear | Unclear |
| Dotterud 2010 [[406](#_ENREF_406)]  Simpson, 2015 [[407](#_ENREF_407)] | RCT | 211/ 204 | Low | Low | High | High | Unclear |
| Enomoto 2014 [[408](#_ENREF_408)] | CCT | 130/36 | Unclear | High | High | High | High |
| Huurre 2008 [[409](#_ENREF_409)] | RCT | 72/ 68 | Low | Unclear | Unclear | Unclear | Low |
| Kalliomaki 2001 [[410](#_ENREF_410)] Kalliomaki 2003 [[411](#_ENREF_411)] Kalliomaki 2007 [[412](#_ENREF_412)]  Rautava 2002 [[413](#_ENREF_413)] | RCT | 77/ 82 | Low | Low | Unclear | Unclear | Unclear |
| Kim 2010 [[414](#_ENREF_414)] | RCT | 57/ 55 | Low | Low | Low | Low | Unclear |
| Kopp 2008 [[415](#_ENREF_415)] | RCT | 54/ 51 | Low | Low | Low | Low | Unclear |
| Lau 2012 [[416](#_ENREF_416)] | RCT | 303/ 303 | Low | Low | Low | Low | High |
| Lodinová-Žádníková 2010 [[417](#_ENREF_417)] | RCT | 56/57 | Unclear | Unclear | Low | Unclear | Unclear |
| Lundelin, 2016 [[418](#_ENREF_418)]  Luoto, 2014 [[419](#_ENREF_419)] | RCT | 31 (prebiotic), 31 (probiotic)/ 32 (placebo) | Low | Low | Unclear | Unclear | High |
| Morisset 2008 [[420](#_ENREF_420)] | RCT | 59/ 56 | Unclear | Low | Low | Unclear | Unclear |
| Niers 2009 [[421](#_ENREF_421)]  Gorissen, 2014 [[422](#_ENREF_422)] | RCT | 78/ 78 | Low | Unclear | High | High | High |
| Ou 2012 [[423](#_ENREF_423)] | RCT | 95/ 96 | Low | Unclear | Low | Unclear | Unclear |
| Taylor 2007 [[424](#_ENREF_424)], Prescott 2008 [[425](#_ENREF_425)] Jensen 2012 [[426](#_ENREF_426)] | RCT | 115/ 111 | Low | Low | Unclear | Unclear | Low |
| Rautava 2006 [[427](#_ENREF_427)] | RCT | 38/ 43 | Unclear | Unclear | Low | Unclear | Low |
| Rautava 2012 [[428](#_ENREF_428)] | RCT | 82/ 78 | Low | Low | Low | Low | Low |
| Scalabrin 2009 [[429](#_ENREF_429)]  Scalabrin 2014 [[430](#_ENREF_430)]  Scalabrin 2017 [[431](#_ENREF_431)] | RCT | 95/ 95 | Low | Low | High | High | High |
| Soh 2009 [[432](#_ENREF_432)]  Loo 2014 [[433](#_ENREF_433)] | RCT | 127/ 126 | Low | Unclear | Low | Unclear | Unclear |
| West 2009 [[434](#_ENREF_434)]  West 2013 [[435](#_ENREF_435)] | RCT | 89/ 90 | Low | Unclear | Low | Unclear | Low |
| Wickens 2008 [[436](#_ENREF_436)]  Wickens 2012 [[437](#_ENREF_437)]  Wickens 2013 [[438](#_ENREF_438)] | RCT | 341/ 171 | Low | Low | Low | Low | Low |
| Berman, 2015 [[583](#_ENREF_583)] | RCT | Unclear – total 114 | Unclear | Unclear | Unclear | Unclear | Unclear |
| Birch, 2010 [[440](#_ENREF_440)]  Foiles, 2015 [[441](#_ENREF_441)] | RCT | 88/ 90 | Low | Unclear | High | High | High |
| Bisgaard, 2016 [[584](#_ENREF_584)] | RCT | 365/371 | Low | Low | Low | Low | Low |
| Harslof, 2014 [[443](#_ENREF_443)] | RCT | 75/ 79 | Low | Low | High | High | Low |
| Lucas, 1999 [[444](#_ENREF_444)] | RCT | 154/155 | Unclear | Low | Low | Unclear | High |
| van Gool, 2003 [[445](#_ENREF_445)] | RCT | 61/ 60 | Low | Unclear | Low | Unclear | High |
| Kitz, 2006 [[83](#_ENREF_83)] | RCT | 55/ 76 | Low | Unclear | Low | Unclear | Unclear |
| Linnamaa, 2010 [[446](#_ENREF_446)] | RCT | 151/162 | Unclear | Low | Low | Unclear | Low |
| Mihrshahi, 2003 [[447](#_ENREF_447)]  Peat, 2004 [[448](#_ENREF_448)]  Marks, 2006 [[449](#_ENREF_449)] | RCT | 312/304 | Low | Low | Low | Low | Low |
| Damsgaard, 2007 [[450](#_ENREF_450)] | RCT | 45/ 49 | Low | Low | High | High | Low |
| Palmer, 2012  & 2013 [[451](#_ENREF_451),[452](#_ENREF_452)]  Best, 2015 & 2016 [[453](#_ENREF_453),[454](#_ENREF_454)] | RCT | 368/338 | Low | Low | Low | Low | Low |
| Dunstan, 2003 [[455](#_ENREF_455)] | RCT | 52/ 46 | Low | Low | Low | Low | Low |
| D'Vaz, 2012 [[456](#_ENREF_456)] | RCT | 218/202 | High | Low | Unclear | High | Low |
| Furuhjelm, 2009 [[457](#_ENREF_457)]  Furuhjelm, 2011 [[458](#_ENREF_458)] | RCT | 70/ 75 | Low | Low | Low | Low | Unclear |
| Lauritzen, 2005 [[459](#_ENREF_459)] | RCT | 62/ 60 | Unclear | Unclear | High | High | Low |
| Olsen, 2008 [[460](#_ENREF_460)]  Hansen, 2017 [[461](#_ENREF_461)] | RCT | 266/267 | Unclear | Unclear | Low | Unclear | Low |
| Dotterud, 2013 [[462](#_ENREF_462)] | RCT | 2,860/5,743 | Low | High | Unclear | High | Low |
| Imhoff- Kunsch, 2011 [[463](#_ENREF_463)] | RCT | 547/547 | Low | Low | Low | Low | Low |
| Noakes, 2012 [[464](#_ENREF_464)] | RCT | 62/61 | Low | Low | Unclear | Unclear | Low |
| Aage, 2015 [[465](#_ENREF_465)] | RCT | 2145/ 2200 | Low | Low | High | High | Low |
| Chawes, 2016 [[442](#_ENREF_442)] | RCT | 315/308 | Low | Low | Low | Low | Low |
| Checkley, 2010 [[466](#_ENREF_466)]  Checkley, 2011 [[467](#_ENREF_467)] | cluster  RCT | 803, 885, 771 | Low | Unclear | High | High | Low |
| Czeizel, 1994 [[468](#_ENREF_468)]; Dobo, 1998 [[469](#_ENREF_469)] | RCT | 2090/2032 | Low | Unclear | Low | Unclear | Low |
| Devakumar, 2015 [[470](#_ENREF_470)] | RCT | 600/600 | Low | Low | High | High | Unclear |
| Grant, 2016 [[471](#_ENREF_471)] | RCT | 173/ 87 | Low | Low | Low | Low | Low |
| Greenough, 2010 [[472](#_ENREF_472)] | RCT | 1199/1205 | Unclear | Unclear | High | High | Low |
| Goldring, 2013 [[473](#_ENREF_473)] | RCT | 120/60 | Low | Low | Low | Low | Low |
| Kiraly, 2013 [[474](#_ENREF_474)] | RCT | 227/235 | Unclear | Low | High | High | Low |
| Litonjua, 2016 [[475](#_ENREF_475)] | RCT | Unclear – 881 total | Low | Low | Low | Low | Low |
| McEvoy, 2014[[476](#_ENREF_476)] | RCT | 89/90 | Low | Low | Low | Low | Low |

RCT Randomised Controlled Trial; CCT Controlled Clinical Trial

# Table S11 Risk of bias in observational studies of other maternal or infant dietary exposures and risk of allergic outcomes

| **Study** | **Design** | **N/n cases** | **Assessment** | **Selection** | **Confounding** | **Overall Bias** | **Conflict of interest** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Alm, 2009 [[6](#_ENREF_6)]; Goksor, 2011; [[477](#_ENREF_477)] Alm, 2012;[[478](#_ENREF_478)] | PC | 4941 | Low | High | Low | High | Low |
| Andreasyan, 2007; [[479](#_ENREF_479)] | PC | 498 | Unclear | Low | Unclear | Unclear | Low |
| Back, 2009 [[480](#_ENREF_480)] | PC | 123 | Low | High | Low | High | Unclear |
| Baiz, 2013[[481](#_ENREF_481)] | PC | 239 | Low | Low | Low | Low | Unclear |
| Bekkers, 2012 [[482](#_ENREF_482)]; Willers, 2008 [[483](#_ENREF_483)] | PC | 3786 | Unclear | Low | Low | Unclear | Low |
| ;Bertelsen, 2013 [[484](#_ENREF_484)] | PC | 54,740 | Unclear | Unclear | Low | Unclear | Unclear |
| Bisgaard, 2009 [[17](#_ENREF_17)] | PC | 354 | Low | Low | Low | Low | Low |
| Carmargo, 2010 [[485](#_ENREF_485)] | PC | 823 | Low | Low | Low | Low | Low |
| Romieu, 2007; [[486](#_ENREF_486)]  Chatzi, 2008 [[487](#_ENREF_487)] | PC | 468 | Low | Low | Low | Low | Low |
| de Jong, 2012 [[488](#_ENREF_488)]; De Jong, 2012 [[489](#_ENREF_489)]; Leermakers, 2013; [[490](#_ENREF_490)] | PC | 7,210 | Low | Low | Low | Low | Low |
| Dubakiene, 2012 [[491](#_ENREF_491)]; Butiene, 2011[[492](#_ENREF_492)];  Oliver, 2010; [[187](#_ENREF_187)] Grimshaw, 2012 [[493](#_ENREF_493)] | PC, NCC | 128 | Low | Low | Unclear | Unclear | Low |
| Dunlop, 2006 [[494](#_ENREF_494)] | PC | 1326 | Low | High | Low | High | Low |
| Fergusson, 1990 [[495](#_ENREF_495)] | PC | 1,067 | Low | Low | High | High | Low |
| Fitzsimon, 2007 [[496](#_ENREF_496)] | PC | 631 | Low | Low | Low | Low | Low |
| Gale, 2008 [[497](#_ENREF_497)] | PC | 440 | Low | Low | Unclear | Unclear | Low |
| Harris, 2001; [[56](#_ENREF_56)] Zutavern, 2004 [[57](#_ENREF_57)] | PC | 604,622 | Low | Low | Low | Low | Low |
| Hesselmar, 2010 [[61](#_ENREF_61)] | PC | 184 | Low | Low | High | High | Low |
| Hypponen, 2004; [[498](#_ENREF_498)]  Hypponen, 2001 [[499](#_ENREF_499)] | PC | 10,366/81 | Unclear | Unclear | Low | Unclear | Low |
| Hoppu, 2000 [[67](#_ENREF_67)] | PC | 115 | Low | Low | Unclear | Unclear | Low |
| Jedrychowski, 2008 [[500](#_ENREF_500)]; Jedrychowski 2011 [[501](#_ENREF_501)] | PC | 469 | Low | Low | Low | Low | Low |
| Kemp, 2011 [[502](#_ENREF_502)] | PC | 310 | Unclear | High | Low | High | Low |
| Kull, 2006; [[503](#_ENREF_503)] Magnusson, 2013 [[504](#_ENREF_504)]; | PC | 3,230 | Low | Low | Low | Low | Low |
| Martindale, 2005; [[505](#_ENREF_505)] Devereux, 2006; [[37](#_ENREF_37)] Devereux, 2007 [[506](#_ENREF_506)]; Willers, 2007[[507](#_ENREF_507)] | PC | 3,230 | Low | Low | Low | Low | Low |
| Lack, 2003 [[43](#_ENREF_43)];  Shaheen, 2009 [[508](#_ENREF_508)]; Wills, 2013[[509](#_ENREF_509)]; Granell, 2008 [[510](#_ENREF_510)] | PC; NCC | 11,352 | Low | Low | Low | Low | Low |
| Laitinen, 2005 [[511](#_ENREF_511)] | PC | 95 | Unclear | Unclear | Low | Unclear | Low |
| Lange, 2010 [[512](#_ENREF_512)];  Litonjua, 2006; [[513](#_ENREF_513)] Camargo, 2007 [[514](#_ENREF_514)] | PC | 1,376 | Low | Low | Low | Low | Low |
| Liu, 2011 [[515](#_ENREF_515)] | PC | 649 | Low | Unclear | Low | Unclear | Low |
| Marini, 1996 [[91](#_ENREF_91)] | PC | 68 | Unclear | Low | Low | Unclear | Unclear |
| Mommers, 2009; [[516](#_ENREF_516)] Magdelijn, 2011; [[517](#_ENREF_517)] Cremers, 2011[[518](#_ENREF_518)] | PC | 2,465 | Low | Low | Low | Low | Low |
| Maslova, 2012 [[519](#_ENREF_519)]; Maslova, 2013 [[520](#_ENREF_520)] [[521](#_ENREF_521)]; Linneberg, 2004; [[522](#_ENREF_522)] | PC | 28,758 | Low | Low | Low | Low | Low |
| Magnus, 2013 [[523](#_ENREF_523)] Haberg, 2009 [[524](#_ENREF_524)] | NCC, PC | 32,077 | Low | Unclear | Low | Unclear | Low |
| Milner, 2004 [[95](#_ENREF_95)] | PC | 8,073 | Low | Unclear | Low | Unclear | Low |
| Miskelly, 1988 [[96](#_ENREF_96)] | PC | 482 | Low | Low | High | High | Unclear |
| Miyake, 2009 [[525](#_ENREF_525)] and 2010 [[526-528](#_ENREF_526)] and 2011 [[529](#_ENREF_529),[530](#_ENREF_530)]; Satio, 2010 [[526](#_ENREF_526)] | PC | 763 | Low | Low | Low | Low | Low |
| Morales, 2012 [[531](#_ENREF_531)] | PC | 1,724 | Unclear | Low | Low | Unclear | Low |
| Morgan, 2004 [[100](#_ENREF_100)] | PC | 257 | Unclear | Low | Low | Unclear | Unclear |
| Narita, 2011; [[532](#_ENREF_532)] Ohya, 2011 [[533](#_ENREF_533)] | PC | 1,463 | Unclear | Unclear | Unclear | Unclear | Low |
| Nwaru, 2010, 2011, 2012 and 2013 [[105](#_ENREF_105),[106](#_ENREF_106),[534](#_ENREF_534),[535](#_ENREF_535)] [[536](#_ENREF_536),[537](#_ENREF_537)];  Niinisto, 2012 [[538](#_ENREF_538)]; Lumia, 2011; [[539](#_ENREF_539)] Erkkola, 2012; [[107](#_ENREF_107)]; Maijaliisa, 2011; [[540](#_ENREF_540)]; Uusitalo 2008 [[541](#_ENREF_541)]  Erkkola, 2009; [[542](#_ENREF_542)] Marjamaki, 2010; [[543](#_ENREF_543)] | PC | 5,619 | Low | Low | Low | Low | Low |
| Oien, 2010 [[544](#_ENREF_544)] | PC | 3,067 | Low | Low | Low | Low | Low |
| Pike, 2012 [[545](#_ENREF_545)] | PC | 739 | Low | Low | Low | Low | Low |
| Roduit, 2012 [[546](#_ENREF_546)] | PC | 1,041 | Low | Low | Low | Low | Unclear |
| Rothers, 2011 [[547](#_ENREF_547)] | PC | 208 | Low | Low | Low | Low | Low |
| Sausenthaler, 2007 [[548](#_ENREF_548)]; Zutavern, 2006; [[178](#_ENREF_178)] Zutavern, 2008; [[179](#_ENREF_179)] | PC | 2,540 | Low | Low | Low | Low | Low |
| Sicherer, 2010 [[138](#_ENREF_138)] | PC | 503 | Low | Low | Low | Low | Unclear |
| Strassburger, 2010 [[155](#_ENREF_155)] | PC | 338 | Low | Low | Low | Low | Low |
| Venter, 2009; [[168](#_ENREF_168)] Dean, 2007 [[549](#_ENREF_549)] | PC | 937 | Low | Low | High | High | Low |
| Wang, 2007 [[144](#_ENREF_144)] | PC | 1,760 | Low | Low | Low | Low | Low |
| Weisse, 2012 [[550](#_ENREF_550)] | PC | 272 | Low | High | Low | High | Low |
| West, 2012 [[551](#_ENREF_551)] | PC | 319 | Low | High | Low | High | Low |
| Whitrow, 2009 [[552](#_ENREF_552)] | PC | 490 | Low | Low | Low | Low | Low |
| Calvani, 2006 [[553](#_ENREF_553)] | RC | 988 | Unclear | Low | Low | Unclear | Low |
| Jones, 2012 [[554](#_ENREF_554)] | RC | 231 | Unclear | Low | Low | Unclear | Low |
| Allen, 2013 [[555](#_ENREF_555)] | NCC | 2,758/240 | Low | Low | Low | Low | Low |
| Sariachvili, 2010 [[60](#_ENREF_60)] | NCC | 557/252 | Low | Low | Low | Low | Unclear |
| Binkley, 2011 [[556](#_ENREF_556)] | CC | 1,413/1,300 | Unclear | Unclear | High | High | Low |
| Dai, 1993 [[557](#_ENREF_557)] | CC | 70 | Unclear | Unclear | High | High | Unclear |
| DesRoches, 2010 [[191](#_ENREF_191)] | CC | 401/202 | Low | Low | Low | Low | Low |
| Fox, 2009 [[193](#_ENREF_193)] | CC | 293/133 | Low | Unclear | Unclear | Unclear | Unclear |
| Lopez Campos, 2001 [[558](#_ENREF_558)] | CC | 75/58 | Unclear | Unclear | Unclear | Unclear | Unclear |
| Mullins, 2012 [[559](#_ENREF_559)] | CC | 115/115 | Low | Unclear | Low | Unclear | Low |
| Oliveti, 1995 [[201](#_ENREF_201)] | CC | 263/131 | Low | Unclear | Low | Unclear | Low |
| Salam, 2005 [[560](#_ENREF_560)] | CC | 691/ 279 | Unclear | Unclear | Low | Unclear | Low |
| Castro-Rodriguez, 2010 [[218](#_ENREF_218)] | CS | 1,409/ 594 | Unclear | High | Low | High | Low |
| de Batlle, 2008 [[561](#_ENREF_561)] | CS | 1,476/402 | Unclear | High | Low | High | Low |
| Dela Bianca, 2012 [[562](#_ENREF_562)] | CS | 467 | Low | Unclear | Low | Unclear | Low |
| Riedler, 2001 [[563](#_ENREF_563)] | CS | 812 | Unclear | High | Low | High | Low |

CC Case Control study; CS Cross-sectional study; NCC Nested Case Control study; PC Prospective Cohort; RC Retrospective Cohort

# Table S12 Risk of bias in observational studies of other maternal or infant dietary exposures and risk of autoimmune disease

| **Study** | **Design** | **N/n cases** | **Assessment** | **Selection** | **Confounding** | **Overall Bias** | **Conflict of interest** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Brekke, 2007 [[564](#_ENREF_564)]  Brekke, 2010 [[565](#_ENREF_565)]; Wahlberg, 2006; [[566](#_ENREF_566)] | PC | 8694 | Low | Low | Low | Low | Low |
| Fronczak, 2003 [[249](#_ENREF_249)]; Lamb 2008 [[252](#_ENREF_252)]; Simpson, 2011[[567](#_ENREF_567)]; Norris, 1996 [[568](#_ENREF_568)]; Frederikson, 2012 [[248](#_ENREF_248)]; Lamb, 2013; [[250](#_ENREF_250)] | PC; NCC | 222,222/  16  1698/49 | Low | Low | Low | Low | Low |
| Hypponen, 2004 [[498](#_ENREF_498)]  Hypponen, 2001 [[499](#_ENREF_499)] | PC | 10,366/81 | Unclear | Low | Low | Unclear | Low |
| Nwaru, 2010, 2011, 2012 and 2013 [[105](#_ENREF_105),[535](#_ENREF_535),[537](#_ENREF_537)] [[534](#_ENREF_534)] [[106](#_ENREF_106)]; Niinisto, 2012 [[538](#_ENREF_538)]; Lumia, 2011 [[539](#_ENREF_539)] ; Erkkola, 2012 [[107](#_ENREF_107)]; Virtanen, 2006 and 2011 [[569](#_ENREF_569),[570](#_ENREF_570)]; Uusitalo, 2008; [[541](#_ENREF_541)] | PC | 3730 | Low | Low | Low | Low | Low |
| Harsunen, 2012 [[571](#_ENREF_571)] | NCC | 33/33 | Unclear | Unclear | Low | Unclear | Low |
| Miettinen, 2012 [[572](#_ENREF_572)] | NCC | 686/343 | Low | Unclear | Low | Unclear | Low |
| Savilahti, 2009 [[268](#_ENREF_268)] | NCC | 6209/45 | Low | Unclear | High | High | Low |
| Sørensen, 2012 [[573](#_ENREF_573)] | NCC | 328/109 | Low | Low | Low | Low | Low |
| Ahadi, 2011 [[269](#_ENREF_269)] | CC | 202/101 | Unclear | Unclear | Low | Unclear | Low |
| Ashraf, 2010 [[271](#_ENREF_271)] | CC | 195 | Unclear | High | Unclear | High | Low |
| Baron, 2005 [[321](#_ENREF_321)] | CC | 444/222 | Unclear | Low | Low | Unclear | Low |
| Ellis, 2012 [[326](#_ENREF_326)] | CC | 655/246 | Unclear | Unclear | Low | Unclear | Low |
| Bener, 2009 [[273](#_ENREF_273)] | CC | 340/170 | Unclear | Low | Low | Unclear | Low |
| EURODIAB substudy 2 study group, 1999 [[574](#_ENREF_574)] | CC | 2934/746 | Low | Low | Low | Low | Low |
| Gilat, 1987 [[330](#_ENREF_330)] | CC | 504/167 | Low | Unclear | Low | Unclear | Low |
| Majeed, 2011 [[284](#_ENREF_284)] | CC | 395/96 | Unclear | Unclear | Unclear | Unclear | Unclear |
| Malcova, 2005 [[285](#_ENREF_285)] | CC | 2334/868 | Unclear | Low | Unclear | Unclear | Low |
| Rosenbauer, 2007 and 2008 [[295](#_ENREF_295),[575](#_ENREF_575)] | CC | 2631/760 | Low | Unclear | Low | Unclear | Low |
| Sipetic, 2003 [[576](#_ENREF_576)]; Sipetic, 2005 [[577](#_ENREF_577)] | CC | 315/105 | Low | Unclear | High | High | Low |
| Stene, 2003 [[578](#_ENREF_578)], Stene, 2008 [[579](#_ENREF_579)] | CC | 2213/545 | Unclear | High | Low | High | Unclear |
| Stene, 2000 [[302](#_ENREF_302)] | CC | 1131/84 | Unclear | High | Low | High | Low |
| Svensson, 2005 [[580](#_ENREF_580)] | CC | 1152/475 | Low | Low | Low | Low | Low |
| Strotmeyer, 2004; [[304](#_ENREF_304)] | CC | 688/247 | Unclear | Unclear | Low | Unclear | Low |
| Tenconi, 2007 [[307](#_ENREF_307)] | CC | 429/131 | Unclear | Unclear | Low | Unclear | Unclear |
| Virtanen, 1994 [[581](#_ENREF_581)] | CC | 1136/600 | Unclear | Low | High | High | Low |
| Visalli, 2003 [[311](#_ENREF_311)] | CC | 900/150 | Unclear | Low | Low | Unclear | Low |

CC Case Control study; NCC Nested Case Control study; PC Prospective Cohort; RC Retrospective Cohort

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