評価対象論文リスト(要因:低出生体重児で生まれた人、アウトカム:糖尿病)

評価判定日:2025/3/28

①既存の系統的レビュー・メタ解析・統合解析

1	Harder T, Rodekamp E, Schellong K, Dudenhausen JW, Plagemann A. Birth weight and subsequent risk of type 2 diabetes: a meta-analysis. Am J Epidemiol. 2007;165(8):849-857. doi:10.1093/aje/kwk071
2	Whincup PH, Kaye SJ, Owen CG, et al. Birth weight and risk of type 2 diabetes: a systematic review. JAMA. 2008;300(24):2886-2897.
3	Harder T, Roepke K, Diller N, Stechling Y, Dudenhausen JW, Plagemann A. Birth weight, early weight gain, and subsequent risk of type 1 diabetes: systematic review and meta-analysis. Am J Epidemiol. 2009;169(12):1428-1436. doi:10.1093/aje/kwp065
4	Cardwell CR, Stene LC, Joner G, et al. Birthweight and the risk of childhood-onset type 1 diabetes: a meta-analysis of observational studies using individual patient data. Diabetologia. 2010;53(4):641-651. doi:10.1007/s00125-009-1648-5
5	Knop MR, Geng TT, Gorny AW, et al. Birth Weight and Risk of Type 2 Diabetes Mellitus, Cardiovascular Disease, and Hypertension in Adults: A Meta-Analysis of 7 646 267 Participants From 135 Studies. J Am Heart Assoc. 2018;7(23):e008870. doi:10.1161/JAHA.118.008870
6	Zhao H, Song A, Zhang Y, Zhen Y, Song G, Ma H. The association between birth weight and the risk of type 2 diabetes mellitus: a systematic review and meta-analysis [published correction appears in Endocr J. 2018;65(10):1069. doi: 10.1507/endocrj.EJ65-10_Erratum.]. Endocr J. 2018;65(9):923-933.
7	Tian G, Guo C, Li Q, et al. Birth weight and risk of type 2 diabetes: A dose-response meta-analysis of cohort studies. Diabetes Metab Res Rev. 2019;35(5):e3144. doi:10.1002/dmrr.3144
8	Wang H, Zhang Z, Liu Y, et al. Pre-pregnancy body mass index in mothers, birth weight and the risk of type I diabetes in their offspring: A dose-response meta-analysis of cohort studies. J Gynecol Obstet Hum Reprod. 2021;50(2):101921. doi:10.1016/j.jogoh.2020.101921

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9	Oya J, Nakagami T, Kurita M, et al. Association of birthweight with diabetes and insulin sensitivity or secretion in the Japanese general population. J Diabetes Investig. 2015;6(4):430-435. doi:10.1111/jdi.12325
10	Katanoda K, Noda M, Goto A, Mizunuma H, Lee JS, Hayashi K. Impact of birth weight on adult-onset diabetes mellitus in relation to current body mass index: The Japan Nurses' Health Study. J Epidemiol. 2017;27(9):428-434. doi:10.1016/j.je.2016.08.016
11	Yokoyama M, Saito I, Ueno M, et al. Low birthweight is associated with type 2 diabetes mellitus in Japanese adults: The Toon Health Study. J Diabetes Investig. 2020;11(6):1643-1650. doi:10.1111/jdi.13274
12	Ogawa K, Morisaki N, Piedvache A, et al. Association Between Birth Weight and Risk of Pregnancy-Induced Hypertension and Gestational Diabetes in Japanese Women: JPHC-NEXT Study. J Epidemiol. 2022;32(4):168-173. doi:10.2188/jea.JE20200302

■系統的レビュー・メタ解析・統合解析

No	Author	Title	Year	First author	Year	Study period	Study location	Event (*Definition)	Design	Category	Relative risk (95% CI)	Weight	Magnitude of association
1	Harder, T., et al	Birth weight and subsequent risk of type 2 diabetes: a meta-analysis.	2007	Curhan	1996	NA	US	T2DM	Cohort	<2,500 g vs ≥2,500 g	1.73 (1.21–2.48)	NA	↑
				Dyck	2001		Canada		Case-control		1.09 (0.70–1.70)		
				Dyck	2001		Canada		Case-control		1.09 (0.81–1.47)		
				Fall	1998		India		Cohort		0.52 (0.28–0.97)		
				Forsen	2000		Finland		Cohort		1.42 (0.97–2.08)		
				Hales	1991		UK		Cohort		1.44 (0.32–6.58)		
				McCance	1994		US		Cohort		1.71 (0.87–3.37)		
				Rich-Edwards	1999		US		Cohort		1.65 (1.47–1.86)		
				Wei	2003		Taiwan		Case-control		1.95 (1.03–3.71)		
				Young	2002		Canada		Case-contorl		1.43 (0.38–5.37)		
				Overall							**1.32 (1.06–1.64)**		
				Curhan	1996	NA	US	T2DM	Cohort	<2,500 g vs 2,500-4,000 g	1.73 (1.21–2.48)	NA	↑
				Dyck	2001		Canada		Case-control		1.09 (0.70–1.70)		
				Dyck	2001		Canada		Case-control		1.09 (0.81–1.47)		
				Forsen	2000		Finland		Cohort		1.42 (0.97–2.08)		
				McCance	1994		US		Cohort		1.71 (0.87–3.37)		
				Rich-Edwards	1999		US		Cohort		1.65 (1.47–1.86)		
				Wei	2003		Taiwan		Case-control		1.95 (1.03–3.71)		
				Young	2002		Canada		Case-contorl		1.43 (0.38–5.37)		
				Overall							**1.47 (1.26–1.72)**		
2	Whincup, PH., et al	Birthweight and risk of type 2 diabetes: a systematic review.	2008	Forsén	2000	NA	Finland	T2DM	Cohort	per 1-kg increase in birth weight	0.72 (0.60–0.87)	5.93	↓
				Lawlor	2003		UK		Cross-sectional		0.87 (0.72–1.04)	5.90	
				Yarbrough	1998		Canada		Cohort		0.84 (0.56–1.25)	3.53	
				Hales	1991		England		Cohort		0.75 (0.53–1.06)	4.01	
				Barker	1993								
				Jeffreys	2006		Scotland		Cohort		0.84 (0.59–1.20)	3.95	
				Curhan	1996		US		Longitudinal		0.78 (0.67–0.91)	6.24	
				Eriksson	2003		Finland		Cohort		0.72 (0.57–0.92)	5.19	
				Lithell	1996		Sweden		Longitudinal		0.66 (0.41–1.06)	2.86	
				De Rooij	2006		Dutch		Cohort		0.57 (0.26–1.23)	1.46	
				Rich-Edwards	1999		US		Longitudinal		0.82 (0.77–0.89)	7.00	
				Huxley and Neil	2004		England		Cohort		1.36 (0.24–7.55)	0.35	
				Wadsworth	2005		UK				0.66 (0.39–1.12)	2.57	
				Martyn	1998		England		Cohort		2.03 (0.79–5.19)	1.05	
				Phipps	1993		England		Cohort		0.39 (0.13–1.17)	0.81	
				Eriksson	2004		Sweden		Cohort		0.57 (0.37–0.88)	3.16	
				Anazawa	2003		Japan		Case-control		0.65 (0.38–1.09)	2.52	
				Birgisdottir	2002		Iceland		Cohort		0.75 (0.53–1.05)	4.02	
				Lawlor	2006		Scotland		Cohort		0.48 (0.34–0.68)	3.95	
				Vanhala	1999		Finland		Cohort		0.51 (0.28–0.94)	2.06	
				Fall	1998		South India		Cohort		1.24 (0.69–2.25)	2.17	
				Tian	2006		China		Cross-sectional		0.44 (0.25–0.77)	2.31	
				Carlsson	1999		Sweden		Cross-sectional		0.68 (0.50–0.94)	4.32	
				Mi	2000		China		Cohort		1.11 (0.48–2.59)	1.24	
				Shiell	2000		Scotland		Cohort		0.14 (0.01–2.87)	0.12	
				Hyppönen	2003		UK		Cohort		0.71 (0.47–1.08)	3.41	
				Dyck	2001		Canada		Case-control		1.35 (1.13–1.62)	5.94	
				Dyck	2001		Canada		Case-control		1.17 (1.00–1.38)	6.18	
				McCance	1994		US		Cohort		1.06 (0.84–1.35)	5.25	
				Hulman	1998		US		Cohort		2.41 (0.06–89.31)	0.08	
				Bhargava	2004		India		Cohort		0.92 (0.49–1.76)	1.93	
				Suzuki	2000		Japan		Cross-sectional		0.83 (0.21–3.34)	0.52	
				Overall							**0.80 (0.72–0.89)**	**100**	
				All studies excluding native North American populations							0.77 (0.70–0.84)		
				All studies excluding native North Americans and another population of young adults							0.75 (0.70–0.81)		
				Exclusion of macrosomia (birth weight 4 kg)							0.80 (0.72–0.90)		
				Exclusion of macrosomia (birth weight 4 kg)and maternal diabetes							0.81 (0.77–0.86)		
				Adjustment for body mass index							0.76 (0.70–0.82)		
				Adjustment for socioeconomic status							0.77 (0.70–0.84)		

3	Harder, T., et al	Birth weight, early weight gain, and subsequent risk of type 1 diabetes: systematic review and meta-analysis.	2009	Dahlquist Jones McKinney Metcalfe and Baum Patterson Patterson Stene Stene **Overall** <2,500 g vs 2500-4000 kg per 1-kg increase in birth weight	1999 1998 1999 1992 1994 1994 2001 2004	NA	Austria UK UK UK UK UK Norway Norway	T1DM	Case-control Case-control Case-control Case-control Case-control Case-control Cohort Case-control	<2,500 g vs ≥2,500 g	0.44 (0.40–0.49) 0.98 (0.47–2.02) 0.79 (0.37–1.65) 1.28 (1.00–1.64) 0.97 (0.53–1.78) 0.66 (0.34–1.27) 0.71 (0.54–0.92) 1.15 (0.69–1.91) **0.82 (0.54–1.23)** 1.02 (0.71–1.46) 1.07 (0.99–1.15)	NA	 - - -
4	Cardwell, CR., et al	Birthweight and the risk of childhood-onset type 1 diabetes: a meta-analysis of observational studies using individual patient data.	2010	Stene Cardwell Haynes Levens Waldhoer Subtotal Patterson Bock Wadsworth Gimeno McKinney Rami ED Bulgaria ED Latvia ED Lithuania ED L'bourg ED Romania Visalli Stene SK Sweden SK Lithuania Marshall Šipetic Svensson Malcova Polanska Wei Borras Perez Rosenbauer Subtotal **Overall**	2001 2005 2007 2007 2008 1994 1994 1997 1997 1999 1999 1999 2003 2004 2004 2004 2005 2005 2006 2006 2006 2007 2008 	NA	Norway UK Austr. UK Austria UK Denmark UK Brazil UK Austria Bulgaria Latvia Lithuania L'bourg Romania Italy Norway Sweden Lithuania UK Serbia Denmark Cz. Rep. Poland Taiwan Spain Germany	Childhood T1DM Childhood T1DM 	Cohort Case-control 	<2500 kg vs 3,000-3,500 kg <2500 kg vs 3,000-3,500 kg 	0.76 0.72 0.84 0.65 1.02 0.79 (0.67–0.92) 0.88 1.25 1.42 0.89 1.01 1.11 1.64 1.1 1 1.42 0.8 1.3 1.11 1.32 1.3 0.74 0.66 0.99 1.06 0.97 1.05 0.85 1.21 1.06 (0.97–1.15) **1.01 (0.94–1.08)**	NA NA 	 ↓ - -
5	Knop, MR., et al	Birth Weight and Risk of Type 2 Diabetes Mellitus, Cardiovascular Disease, and Hypertension in Adults: A Meta-Analysis of 7 646 267 Participants From 135 Studies.	2018	**Overall**	2018	NA	NA	T2DM	NA	per 1-kg increase in birth weight	**0.78 (0.70–0.87)**	**100**	↓

6	Zhao, H., et al	The association between birth weight and the risk of type 2 diabetes mellitus: a systematic review and meta- analysis.	2018	Dyck (I)	2001		Canada		Case-control study		0.80 (0.51–1.25)	2	
				Dyck (II)	2001		Canada		Case-control study		1.05 (0.78–1.42)	3.9	
				Fall	1998		India		Cohort Study		0.52 (0.28–0.97)	1.5	
				Forśen	2000		Finland		Cohort Study		1.45 (0.99–2.13)	1.8	
				Guillain	2010		France		Cohort Study		1.80 (1.28–2.57)	1.8	
				Johansson	2008		Sweden		Cohort Study		1.64 (1.39–1.93)	10	
				Jornayvaz	2016		Switzerland		Cohort Study		2.14 (1.29–3.53)	0.8	
				Li (I)	2015		America		Cohort Study	<2,500 g	1.48 (1.20–1.82)	5.9	
				Li (II)	2015	NA	America	T2DM	Cohort Study	vs	1.45 (1.33–1.57)	38.9	
				Li (III)	2015		America		Cohort Study	≥2,500 g	1.59 (1.45–1.75)	27.6	
				Maahs	2008		America		Cohort Study		2.89 (2.10–3.98)	1.5	
				McCane	1994		America		Cohort Study		1.67 (0.85–3.28)	0.5	
				Veena (I)	2007		India		Cohort Study		2.68 (1.09–6.65)	0.2	
				Veena (II)	2009		India		Cohort Study		0.64 (0.31–1.29)	1	
				Wei	2003		China		Case-control study		1.77 (0.93–3.36)	0.7	
				Xiao	2008		China		Case-control study		1.80 (1.25–2.57)	1.8	
				Young	2002		China		Case-control study		1.37 (0.37–5.10)	0.2	
				Overall							**1.51 (1.43–1.58)**	**100**	↑↑
				Dyck (I)	2001		Canada		Case-control study		1.09 (0.70–1.70)	7.8	
				Dyck (II)	2001		Canada		Case-control study		1.09 (0.81–1.47)	17.3	
				Forśen	2000		Finland		Cohort Study	<2,500 g	1.42 (0.97–2.08)	8.1	
				Guillain	2010	NA	France	T2DM	Cohort Study	vs	1.48 (1.29–1.70)	60.1	
				Jornayvaz	2016		Switzerland		Cohort Study	2,500-4,000 g	2.27 (1.36–3.78)	3.2	
				Wei	2003		China		Case-control study		1.95 (1.03–3.71)	2.8	
				Young	2002		China		Case-control study		1.43 (0.38–5.37)	0.7	
				Overall							**1.41 (1.26–1.58)**	**100**	↑
7	Tian, G., et al	Birth weight and risk of type 2 diabetes: A dose-response meta-analysis of cohort studies.	2019	Li	2015		US		Cohort		0.88 (0.87–0.90)	9.52	
				Blandine	2010		France		Cohort		0.89 (0.86–0.93)	8.6	
				Esther	2015		NA		NA		0.90 (0.88–0.93)	9.15	
				Esther	2015		NA		NA		0.92 (0.90–0.94)	9.37	
				Katanoda	2016		Japan		Cohort		0.68 (0.58–0.79)	3.15	
				Eriksson	2004		Sweden		Cohort		0.75 (0.63–0.90)	2.57	
				Curhan	1996		US		Cohort		0.86 (0.79–0.94)	5.86	
				Forse	2000		Finland		Cohort		0.90 (0.82–0.98)	5.74	
				Fall	1997		NA		Cohort		1.19 (0.77–1.84)	0.55	
				Eriksson	2003		NA		Cohort		0.87 (0.76–0.99)	3.84	
				Carlsson	1999	NA	Sweden	T2DM	Cross-sectional	per 500-g increase in birth weight	0.54 (0.37–0.77)	0.76	
				McCance	1994		US		Cohort		0.84 (0.72–0.97)	3.3	
				Rich-Edwards	1999		NA		NA		0.85 (0.82–0.88)	8.8	
				Tian	2006		China		Cross-sectional		0.66 (0.50–0.86)	1.31	
				Xiao	2008		China		Cohort		0.94 (0.79–1.13)	2.55	
				Johansson	2008		NA		NA		0.77 (0.71–0.84)	6.02	
				Edward	2014		NA		NA		0.92 (0.90–0.95)	9.17	
				Wadsworth	2005		UK		Cohort		1.02 (0.80–1.30)	1.58	
				Johnsson	2014		NA		NA		1.50 (1.29–1.73)	3.37	
				Johnsson	2014		NA		NA		0.94 (0.82–1.09)	3.51	
				Lithell	1996		NA		NA		0.80 (0.61–1.06)	1.26	
				Overall							**0.88 (0.85–0.91)**	**100**	↓
8	Wang, H., et al	Pre-pregnancy body mass index in mothers, birth weight and the risk of type I diabetes in their offspring: A dose-response meta-analysis of cohort studies.	2021	Goldacre	2018	1998-2012	UK	Childhood T1DM	Cohort	<2500 kg vs 2500-4000 kg	0.81 (0.67–0.98)	39.74	
				Khashan	2015	1973−2009	Sweden		Cohort		0.81 (0.57–1.16)	11.38	
				Algert	2009	2000−2005	Australia		Cohort/ a matched case-		0.74 (0.38–1.44)	3.24	
				Haynes	2007	1980−2002	Australia		Cohort		0.79 (0.64–0.98)	31.66	
				Cardwell	2005	1971−2001	UK		Cohort		0.71 (0.47–1.07)	8.58	
				Stene	2001	1974−1998	Norway		Cohort		0.60 (0.36–1.00)	5.4	
				Overall							**0.78 (0.69–0.88)**	**100**	↓

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No	Author	Title	Year	Study period	Number of subjects	Source of subjects	Event	Number of incident cases or	Participant's race	Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	Magnitude of association
9	Oya, J., et al	Association of birthweight with diabetes and insulin sensitivity or secretion in the Japanese general population	2015	2006-2007	847	Those who underwent general health examinations at Saitama-ken Saiseikai Kurihashi Hospital	DM (self-reports or FPG ≥126mg/dL)	40 (4.7%)	Japanese	<2,500 g 2,500–3,000 g 3,001–3,200 g >3,200 g	4 (9.1%) 20 (8.1%) 9 (2.8%) 7 (3.0%)	OR=3.52 (1.04–11.96) OR=3.10 (1.39–6.94) Ref. OR=1.11 (0.41–3.01)	0.0002	Age, sex, current body mass index a nd family history of diabetes	↑↑↑ ↑↑↑ –
10	Katanoda, K., et al	Impact of birth weight on adult-onset diabetes mellitus in relation to current body mass index: The Japan Nurses' Health Study.	2017	2001-2007	26,949 female	Japanese Nurses' Health Study cohort (female nurses)	DM (self-reports)	0.8%	Japanese	<2,500 g 2,500–2,999 g 3,000–3,499 g 3,500 g 100 g increase in birth weight	1.6% 1.0% 0.7% 0.6%	OR=2.34 (1.56–3.52) OR=1.73 (1.26–2.37) Ref. OR=0.94 (0.58–1.50) OR=0.93 (0.90–0.96)	<0.001	Age, BMI, parental DM history	↑↑↑ ↑↑ – ↓
11	Yokoyama, M., et al	Low birthweight is associated with type 2 diabetes mellitus in Japanese adults: The Toon Health Study.	2020	2009-2018	1,135	Toon Health Study (residents in Toon City)	T2DM (FPG ≥126 mg/dL, 2-h postprandial glucose ≥200 mg/dL or current use of antihyperglycemic agents, and fasting insulin ≥0.6 μU/mL)	9.3%	Japanese	<2,500g 2,500–3,999g 4,000g	26 (17.6%) 76 (7.9%) 4 (14.8%)	OR=2.38 (1.41–4.00) Ref. OR=3.10 (0.87–11.12)	NA	Age, sex, BMI, family history of diabetes, smoking status, and drinking statu	↑↑↑ ↑↑
12	Ogawa, K., et al	Association Between Birth Weight and Risk of Pregnancy-Induced Hypertension and Gestational Diabetes in Japanese Women: JPHC-NEXT Study.	2022	NA	46,365 female	JPHC-NEXT	Gestational Diabetes (self-reports)	1,867 (4.0%)	Japanese	<1,500g 1,500–2,499 g 2,500–2,999 g 3,000–3,999 g >4,000 g	10 (2.7%) 211 (4.1%) 945 (3.6%) 678 (4.7%) 23 (7.3%)	OR=0.80 (0.42–1.52) OR=1.20 (1.02–1.42) OR=1.04 (0.94–1.16) Ref. OR=1.24 (0.80–1.93)	NA	Birth year, education, family history, passive smoking at 10 years old, height, older sibling, age at first pregnancy, (age at first pregnancy × birth year), smoking status, BMI at 20 years old	– ↑ – –