Interventions to prevent obesity in children aged 2 to 4 years old
(based on a Cochrane systematic review protocol)

Review team:

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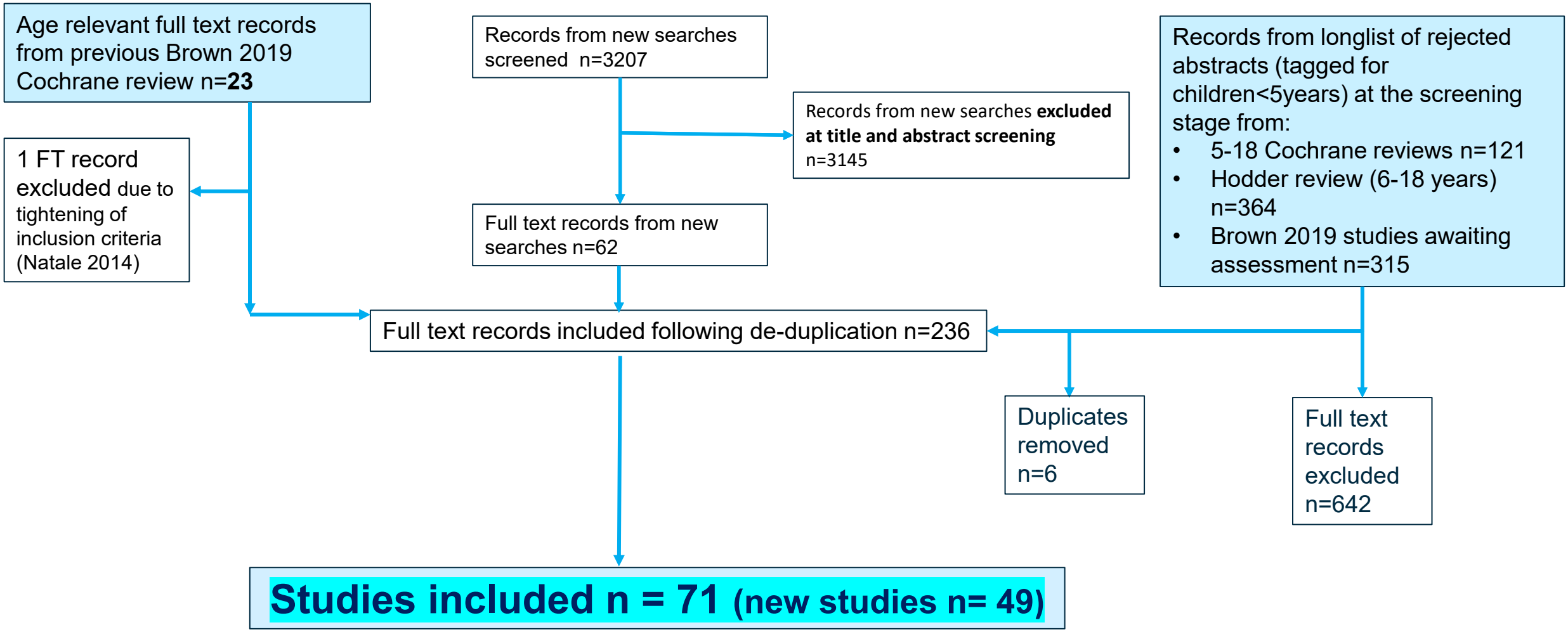
Population	• Children with mean age of 2 years and above, but less than 4 years • General population • Excluded studies that were restricted to children with overweight or obesity

Intervention	• Main aim to help prevent obesity by changing *at least one* factor from:
	  • Diet
	  • Activity (physical activity, sedentary behaviour, sleep, play or structured exercise)

Comparators	No intervention OR usual care OR another eligible intervention
Outcomes	BMI or **zBMI**
Setting	**Pre-school/Nursery/Childcare centre (including Head Start Centres in US)** OR Home OR Primary Care OR Community

RCT or cRCT with at least 3 clusters in each arm

For meta-analysis presented here, only included studies in Pre-school setting reporting useable zBMI outcome data


Age relevant full text records from previous Brown 2019 Cochrane review n=23
1 FT record excluded due to tightening of inclusion criteria (Natale 2014)
Records from new searches screened n=3207
Records from new searches excluded at title and abstract screening n=3145
Full text records from new searches n=62
Records from longlist of rejected abstracts (tagged for children<5years) at the screening stage from:
• 5-18 Cochrane reviews n=121
• Hodder review (6-18 years) n=364
• Brown 2019 studies awaiting assessment n=315
Full text records included following de-duplication n=236
Duplicates removed n=6
Full text records excluded n=642
Studies included n = 71 (new studies n= 49)

Summary characteristics of all INCLUDED studies (n=71)

Study design
- 44% (31/71) Individual RCT
- 56% (40/71) Cluster RCT

Country
- **49% (35/71) USA**
- 11% (8/71) Australia
- 7% (5/71) Canada
- 7% (5/71) UK (3 in Scotland)
- 6% (4/71) Germany
- 3% (2/71) Spain
- 3% (2/71) Sweden

And 1 each in: China, Denmark, France, Italy, Malaysia, Switzerland, Thailand, Turkey, UAE and one* in a multi-EU country study.

Intervention type
- 66% (47/71) Diet + Activity
- 21% (15/71) Activity
- 13% (9/71) Diet

- *1% (1/71) Digital/online*

Setting/Target population
- **56% (40/71) Childcare/Preschool/Nursery**
- 31% (22/71) Home
- 7% (5/71) Primary care
- 6% (4/71) Community

N of participants:
- Smallest n= 16
- Largest n= 7541*

Summary characteristics of all INCLUDED studies (n=71)

- **39% (28/71) of trials targeted disadvantaged (low income) participants and/or those living in disadvantaged communities**

- 14% (10/71) of trials had an inclusion criteria where only those children deemed to be 'at risk' of developing obesity were allowed to participate.
-
- 11% (8/71) of trials had a inclusion criteria where only those children with a minimum BMI* were allowed to participate *(French, Hammersley, Hawkins, Heerman, Morshed, Natale 2021, Slusser, Sun)*

  **this cut-off point was below that for overweight, e.g. 50%*
- 3% (2/71) had a inclusion criteria where only those children who had a mother living with overweight or obesity were allowed to participate *(Olsen, Ostbye)*

Summary characteristics of all INCLUDED studies (n=71)

Outcome data

Studies in Pre-school setting n= 40

Studies in Pre-school setting reporting zBMI outcome data = 22
(including Lumeng & Stookey)

Studies in Preschool setting reporting zBMI outcome data that could be included in a Meta-analysis n=16

Of the 18 Studies in Pre-school setting that did not report zBMI, 9 reported BMI
Of the 9 studies in Pre-school setting that did not report zBMI or BMI:

- 7 reported BMI percentile
- 2 reported weight for height or by weight category

Summary of studies in Preschool setting reporting zBMI outcome data that could be included in a Meta-analysis n=16

D: Diet; DPA: Diet and physical activity; PA: Physical activity

Study	Setting	Population	Intervention	Comparator	Outcomes
Alkon 2014 cRCT	Childcare centres USA	Children aged 3-5 (N not reported)	**DPA**: Nutrition And Physical Activity Self Assessment for Child Care intervention	No intervention	BMIz 7m follow up
Barber 2016 cRCT	Preschools UK	164 children	**PA**: Physical activity intervention for pre-school children	No intervention	BMIz 12m follow up
Davis 2016 cRCT	Head start centres USA	1816 children (2-5 years)	**DPA**: Child Health Initiative for Lifelong Eating and Exercise	Standard curriculum	BMIz 7, 12 and 19 months follow up
Dennison 2004 cRCT	Preschools USA	176 children (2.6-5.5g years)	**PA**: 'Brocodile the Crocodile' health promotion programme	Safety and injury prevention program	BMI/BMIz 6m follow up
Fitzgibbon 2005 cRCT	Preschools USA	409 children	**DPA**: Hip Hop to Health Junior	General health concepts	BMI/BMIz 14 weeks, 12m & 24m follow up
Fitzgibbon 2006 cRCT	Head start centres USA	401 children	**DPA**: Hip Hop to Health Junior	General health concepts	BMI/BMIz 14 weeks, 12m & 24m follow up
Fitzgibbon 2011/Kong 2016 cRCT	Head start centres USA	729 children (3-5 years)	**DPA**: Hip Hop to Health Junior	General health session	BMI/BMIz 14 weeks, 16m follow up
Goldfield 2016 cRCT	Childcare centres Canada	83 children (3-5 years)	**PA**: Healthy Opportunities for Preschoolers.	No intervention	BMI/BMIz 6m follow up

Study	Setting	Population	Intervention	Comparator	Outcomes
Iaia 2017 cRCT	Childcare centres Italy	425 children (3 year olds)	**DPA**: Motivational interviews with parents	Usual care	BMI/BMIz 12m & 24m follow up
Malden 2019 cRCT	Preschools Scotland, UK	42 children (3-5 years)	**DPA**: ToyBox-Scotland	Usual care: standard curriculum	BMIz 15-17 weeks follow up
Reilly 2006 cRCT	Nursery and home Scotland, UK	545 children	**PA**: Movement and Activity in Glasgow intervention in children	Usual curriculum	BMI/BMIz 6m & 12m months follow up
Slusser 2012 **RCT**	Clinics, pre-schools, Head Start centres. USA	160 children (2-4 years). **Only include child if >50th percentile**	**DPA**: Paediatrics Overweight Prevention through Parent Training Programme	Waitlist, no intervention	BMI/BMIz 12m follow up
Vaughn 2021 cRCT	Nursery/childcare and home USA	853 children (3-4 years)	**DPA**: HMHW Healthy Me, Healthy We	Usual care	BMI/BMIz 8m follow up
Yoong 2020 cRCT	Nursery/childcare Australia	522 children (2-6 years)	**D**: dietary guideline implementation	Usual care	BMIz 12m follow up
Zask 2012 cRCT	Preschools Australia	498 children (29-73 months)	**DPA**: Tooty Fruity Vegie	Usual care	BMIz 10m follow up
Hodgkinson 2019 cRCT	Childcare centres UK	81 children (2 year olds)	**DPA**: Be Active, Eat Healthy resources.	No intervention	BMIz 24m follow up

Overview of forest plots / meta-analyses

- By outcome:
  - z-BMI (BMI-z) only
- By setting:
  - Childcare/Pre-school/Nursery only (includes Head Start sites in USA)

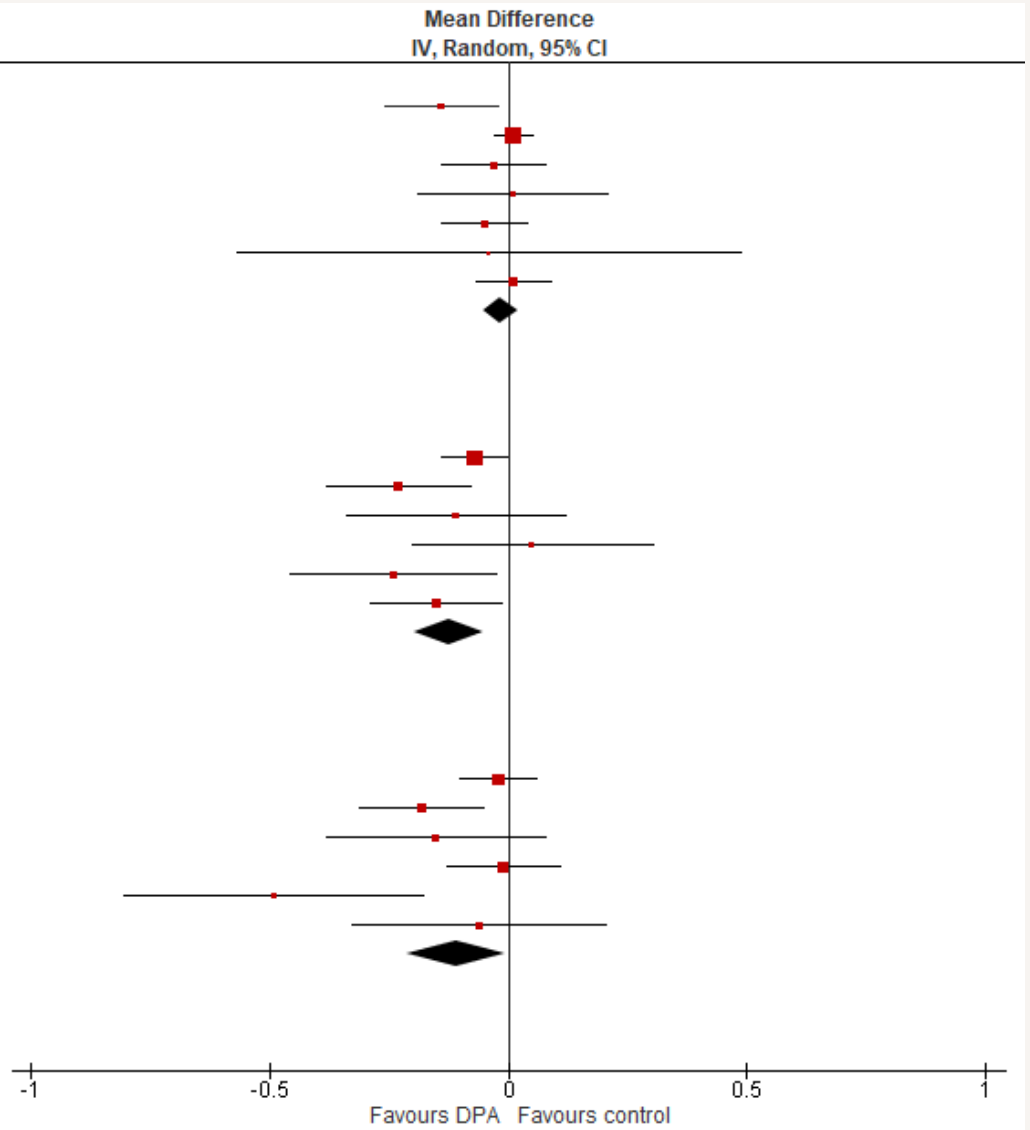
- By follow up time where data reported:
  - Short term: 3 to 9 months (within school year)
  - Mid term: 9 to 15 months (approx. one year)
  - Long term: over 15 months (more than a year)
  - By longest study timepoint

- By comparison
  - Dietary and Activity interventions vs Control (n=11; S, M, L, Longest)
  - Physical Activity interventions vs Control (n=4; S, M, Longest)
  - Dietary interventions vs Control (n=1; M)

DPA vs control

Low/Moderate confidence

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
1.1.1 Short-term (12 weeks to 9 months)				
Alkon 2014	-0.14	0.06	8.7%	-0.14 [-0.26, -0.02]
Davis 2016	0.01	0.0204	46.2%	0.01 [-0.03, 0.05]
Fitzgibbon 2005	-0.03	0.0561	9.8%	-0.03 [-0.14, 0.08]
Fitzgibbon 2006	0.01	0.102	3.2%	0.01 [-0.19, 0.21]
Fitzgibbon 2011	-0.05	0.0459	14.0%	-0.05 [-0.14, 0.04]
Malden 2019 (1)	-0.04	0.2687	0.5%	-0.04 [-0.57, 0.49]
Vaughn 2021	0.01	0.04	17.7%	0.01 [-0.07, 0.09]
Subtotal (95% CI)			**100.0%**	**-0.02 [-0.05, 0.02]**
Heterogeneity: Tau² = 0.00; Chi² = 6.84, df = 6 (P = 0.34); I² = 12%				
Test for overall effect: Z = 0.84 (P = 0.40)				
1.1.2 Medium-term (9 to 15 months)				
Davis 2016	-0.07	0.0357	38.5%	-0.07 [-0.14, -0.00]
Fitzgibbon 2005	-0.23	0.0765	16.9%	-0.23 [-0.38, -0.08]
Fitzgibbon 2006	-0.11	0.1173	8.6%	-0.11 [-0.34, 0.12]
Iaia 2017 (2)	0.05	0.1286	7.3%	0.05 [-0.20, 0.30]
Slusser 2012	-0.24	0.11	9.6%	-0.24 [-0.46, -0.02]
Zask 2012	-0.15	0.07	19.1%	-0.15 [-0.29, -0.01]
Subtotal (95% CI)			**100.0%**	**-0.12 [-0.20, -0.05]**
Heterogeneity: Tau² = 0.00; Chi² = 6.99, df = 5 (P = 0.22); I² = 28%				
Test for overall effect: Z = 3.32 (P = 0.0009)				
1.1.3 Long-term (15 months +)				
Davis 2016 (3)	-0.02	0.0408	26.5%	-0.02 [-0.10, 0.06]
Fitzgibbon 2005	-0.18	0.0663	20.9%	-0.18 [-0.31, -0.05]
Fitzgibbon 2006	-0.15	0.1173	12.2%	-0.15 [-0.38, 0.08]
Fitzgibbon 2011	-0.01	0.06	22.3%	-0.01 [-0.13, 0.11]
Hodgkinson 2019	-0.49	0.16	8.0%	-0.49 [-0.80, -0.18]
Iaia 2017 (4)	-0.06	0.1357	10.1%	-0.06 [-0.33, 0.21]
Subtotal (95% CI)			**100.0%**	**-0.11 [-0.21, -0.01]**
Heterogeneity: Tau² = 0.01; Chi² = 12.62, df = 5 (P = 0.03); I² = 60%				
Test for overall effect: Z = 2.08 (P = 0.04)				



Test for subgroup differences: Chi² = 8.47, df = 2 (P = 0.01), I² = 76.4%

NICE

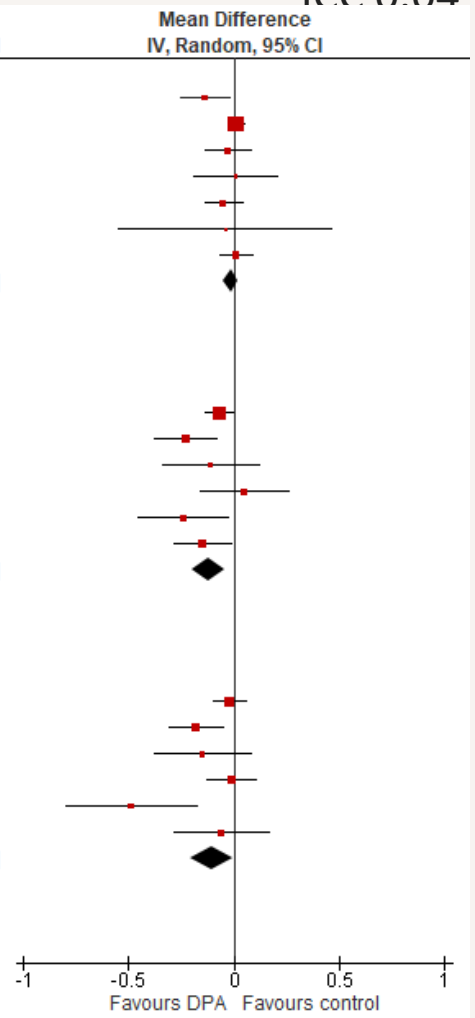
Sensitivity analysis - DPA vs control

Low confidence

ICC 0.0

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
6.1.1 Short-term (12 weeks to 9 months)				
Alkon 2014	-0.14	0.06	8.7%	-0.14 [-0.26, -0.02]
Davis 2016	0.01	0.0204	46.2%	0.01 [-0.03, 0.05]
Fitzgibbon 2005	-0.03	0.0561	9.8%	-0.03 [-0.14, 0.08]
Fitzgibbon 2006	0.01	0.102	3.2%	0.01 [-0.19, 0.21]
Fitzgibbon 2011	-0.05	0.0459	14.0%	-0.05 [-0.14, 0.04]
Malden 2019 (1)	-0.04	0.2587	0.5%	-0.04 [-0.55, 0.47]
Vaughn 2021	0.01	0.04	17.7%	0.01 [-0.07, 0.09]
Subtotal (95% CI)			**100.0%**	**-0.02 [-0.05, 0.02]**
Heterogeneity: Tau² = 0.00; Chi² = 6.84, df = 6 (P = 0.34); I² = 12%				
Test for overall effect: Z = 0.84 (P = 0.40)				
6.1.2 Medium-term (9 to 15 months)				
Davis 2016	-0.07	0.0357	35.2%	-0.07 [-0.14, -0.00]
Fitzgibbon 2005	-0.23	0.0765	16.9%	-0.23 [-0.38, -0.08]
Fitzgibbon 2006	-0.11	0.1173	8.9%	-0.11 [-0.34, 0.12]
Iaia 2017 (2)	0.05	0.1075	10.2%	0.05 [-0.16, 0.26]
Slusser 2012	-0.24	0.11	9.9%	-0.24 [-0.46, -0.02]
Zask 2012	-0.15	0.07	18.9%	-0.15 [-0.29, -0.01]
Subtotal (95% CI)			**100.0%**	**-0.12 [-0.20, -0.04]**
Heterogeneity: Tau² = 0.00; Chi² = 7.63, df = 5 (P = 0.18); I² = 34%				
Test for overall effect: Z = 3.12 (P = 0.002)				
6.1.3 Long-term (15 months +)				
Davis 2016 (3)	-0.02	0.0408	26.0%	-0.02 [-0.10, 0.06]
Fitzgibbon 2005	-0.18	0.0663	20.5%	-0.18 [-0.31, -0.05]
Fitzgibbon 2006	-0.15	0.1173	11.8%	-0.15 [-0.38, 0.08]
Fitzgibbon 2011	-0.01	0.06	21.8%	-0.01 [-0.13, 0.11]
Hodgkinson 2019	-0.49	0.16	7.7%	-0.49 [-0.80, -0.18]
Iaia 2017 (4)	-0.06	0.1145	12.2%	-0.06 [-0.28, 0.16]
Subtotal (95% CI)			**100.0%**	**-0.11 [-0.21, -0.01]**
Heterogeneity: Tau² = 0.01; Chi² = 12.62, df = 5 (P = 0.03); I² = 60%				
Test for overall effect: Z = 2.09 (P = 0.04)				

Test for subgroup differences: Chi² = 7.80, df = 2 (P = 0.02), I² = 74.3%

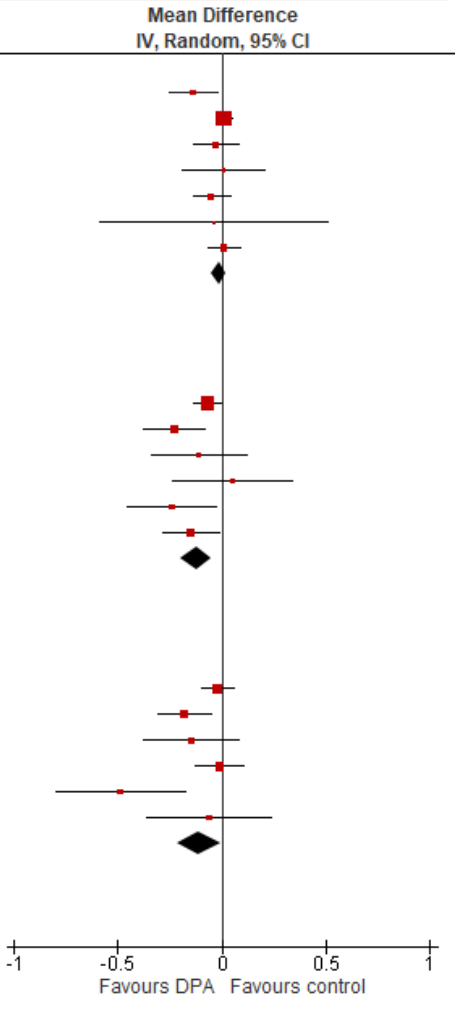


Low confidence

ICC 0.04

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
10.1.1 Short-term (12 weeks to 9 months)				
Alkon 2014	-0.14	0.06	8.7%	-0.14 [-0.26, -0.02]
Davis 2016	0.01	0.0204	46.2%	0.01 [-0.03, 0.05]
Fitzgibbon 2005	-0.03	0.0561	9.8%	-0.03 [-0.14, 0.08]
Fitzgibbon 2006	0.01	0.102	3.2%	0.01 [-0.19, 0.21]
Fitzgibbon 2011	-0.05	0.0459	14.0%	-0.05 [-0.14, 0.04]
Malden 2019 (1)	-0.04	0.2798	0.4%	-0.04 [-0.59, 0.51]
Vaughn 2021	0.01	0.04	17.7%	0.01 [-0.07, 0.09]
Subtotal (95% CI)			**100.0%**	**-0.02 [-0.05, 0.02]**
Heterogeneity: Tau² = 0.00; Chi² = 6.84, df = 6 (P = 0.34); I² = 12%				
Test for overall effect: Z = 0.84 (P = 0.40)				
10.1.2 Medium-term (9 to 15 months)				
Davis 2016	-0.07	0.0357	40.9%	-0.07 [-0.14, -0.00]
Fitzgibbon 2005	-0.23	0.0765	16.8%	-0.23 [-0.38, -0.08]
Fitzgibbon 2006	-0.11	0.1173	8.3%	-0.11 [-0.34, 0.12]
Iaia 2017 (2)	0.05	0.147	5.5%	0.05 [-0.24, 0.34]
Slusser 2012	-0.24	0.11	9.3%	-0.24 [-0.46, -0.02]
Zask 2012	-0.15	0.07	19.1%	-0.15 [-0.29, -0.01]
Subtotal (95% CI)			**100.0%**	**-0.12 [-0.20, -0.05]**
Heterogeneity: Tau² = 0.00; Chi² = 6.62, df = 5 (P = 0.25); I² = 25%				
Test for overall effect: Z = 3.45 (P = 0.0006)				
10.1.3 Long-term (15 months +)				
Davis 2016 (3)	-0.02	0.0408	26.8%	-0.02 [-0.10, 0.06]
Fitzgibbon 2005	-0.18	0.0663	21.3%	-0.18 [-0.31, -0.05]
Fitzgibbon 2006	-0.15	0.1173	12.4%	-0.15 [-0.38, 0.08]
Fitzgibbon 2011	-0.01	0.06	22.6%	-0.01 [-0.13, 0.11]
Hodgkinson 2019	-0.49	0.16	8.2%	-0.49 [-0.80, -0.18]
Iaia 2017 (4)	-0.06	0.154	8.6%	-0.06 [-0.36, 0.24]
Subtotal (95% CI)			**100.0%**	**-0.11 [-0.21, -0.01]**
Heterogeneity: Tau² = 0.01; Chi² = 12.61, df = 5 (P = 0.03); I² = 60%				
Test for overall effect: Z = 2.07 (P = 0.04)				

Test for subgroup differences: Chi² = 8.91, df = 2 (P = 0.01), I² = 77.6%



DPA vs control

analysis of longest study timepoint

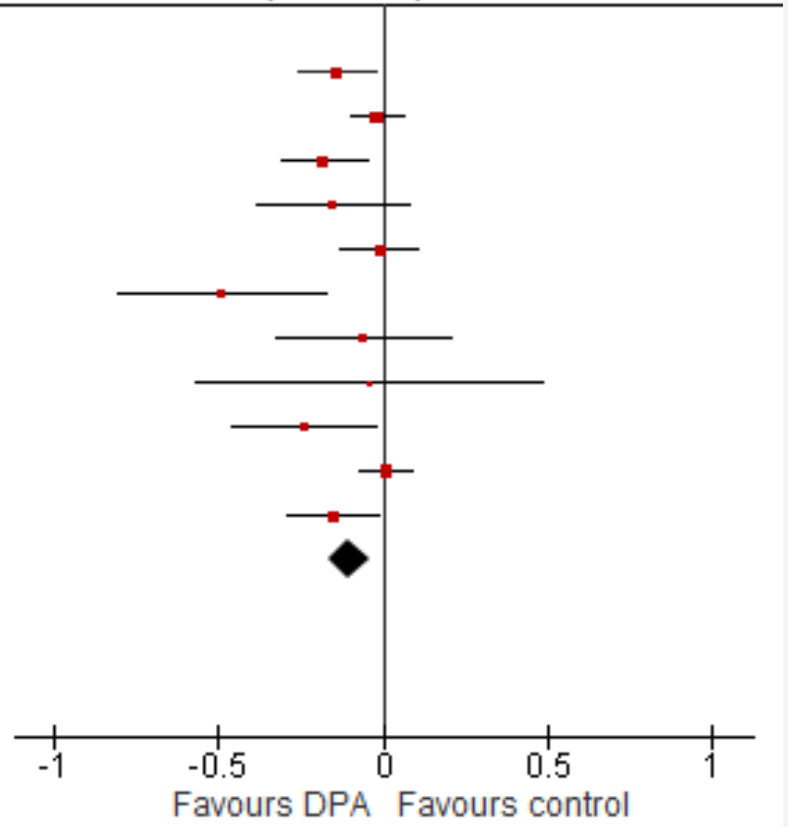
Low/Moderate confidence

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
2.1.3 Longest timepoint in study				
Alkon 2014	-0.14	0.06	12.3%	-0.14 [-0.26, -0.02]
Davis 2016 (1)	-0.02	0.0408	15.5%	-0.02 [-0.10, 0.06]
Fitzgibbon 2005	-0.18	0.0663	11.3%	-0.18 [-0.31, -0.05]
Fitzgibbon 2006	-0.15	0.1173	5.9%	-0.15 [-0.38, 0.08]
Fitzgibbon 2011	-0.01	0.06	12.3%	-0.01 [-0.13, 0.11]
Hodgkinson 2019	-0.49	0.16	3.6%	-0.49 [-0.80, -0.18]
Iaia 2017 (2)	-0.06	0.1357	4.7%	-0.06 [-0.33, 0.21]
Malden 2019 (3)	-0.04	0.2687	1.5%	-0.04 [-0.57, 0.49]
Slusser 2012	-0.24	0.11	6.4%	-0.24 [-0.46, -0.02]
Vaughn 2021	0.01	0.04	15.7%	0.01 [-0.07, 0.09]
Zask 2012	-0.15	0.07	10.8%	-0.15 [-0.29, -0.01]
Subtotal (95% CI)			**100.0%**	**-0.10 [-0.17, -0.04]**

Heterogeneity: $Tau^2 = 0.01$; $Chi^2 = 21.68$, $df = 10$ ($P = 0.02$); $I^2 = 54\%$

Test for overall effect: $Z = 3.02$ ($P = 0.003$)

Test for subgroup differences: Not applicable



NICE

Sensitivity analysis - DPA vs control

analysis of longest study timepoint

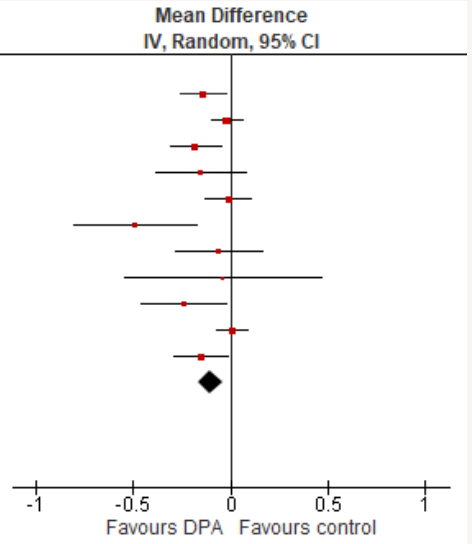
ICC 0.0

Low confidence

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
7.1.3 Longest timepoint in study				
Alkon 2014	-0.14	0.06	12.1%	-0.14 [-0.26, -0.02]
Davis 2016 (1)	-0.02	0.0408	15.4%	-0.02 [-0.10, 0.06]
Fitzgibbon 2005	-0.18	0.0663	11.2%	-0.18 [-0.31, -0.05]
Fitzgibbon 2006	-0.15	0.1173	5.8%	-0.15 [-0.38, 0.08]
Fitzgibbon 2011	-0.01	0.06	12.1%	-0.01 [-0.13, 0.11]
Hodgkinson 2019	-0.49	0.16	3.6%	-0.49 [-0.80, -0.18]
Iaia 2017 (2)	-0.06	0.1145	6.0%	-0.06 [-0.28, 0.16]
Malden 2019 (3)	-0.04	0.2587	1.5%	-0.04 [-0.55, 0.47]
Slusser 2012	-0.24	0.11	6.3%	-0.24 [-0.46, -0.02]
Vaughn 2021	0.01	0.04	15.5%	0.01 [-0.07, 0.09]
Zask 2012	-0.15	0.07	10.6%	-0.15 [-0.29, -0.01]
Subtotal (95% CI)			**100.0%**	**-0.10 [-0.17, -0.04]**

Heterogeneity: Tau² = 0.01; Chi² = 21.69, df = 10 (P = 0.02); I² = 54%

Test for overall effect: Z = 3.03 (P = 0.002)



Test for subgroup differences: Not applicable

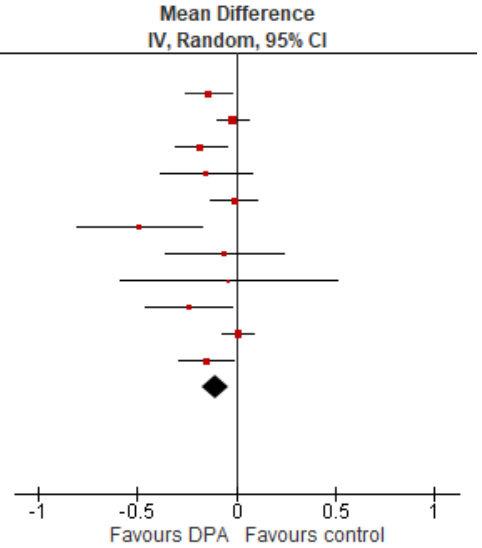
ICC 0.04

Low confidence

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
11.1.3 Longest timepoint in study				
Alkon 2014	-0.14	0.06	12.4%	-0.14 [-0.26, -0.02]
Davis 2016 (1)	-0.02	0.0408	15.7%	-0.02 [-0.10, 0.06]
Fitzgibbon 2005	-0.18	0.0663	11.4%	-0.18 [-0.31, -0.05]
Fitzgibbon 2006	-0.15	0.1173	5.9%	-0.15 [-0.38, 0.08]
Fitzgibbon 2011	-0.01	0.06	12.4%	-0.01 [-0.13, 0.11]
Hodgkinson 2019	-0.49	0.16	3.7%	-0.49 [-0.80, -0.18]
Iaia 2017 (2)	-0.06	0.154	3.9%	-0.06 [-0.36, 0.24]
Malden 2019 (3)	-0.04	0.2798	1.4%	-0.04 [-0.59, 0.51]
Slusser 2012	-0.24	0.11	6.5%	-0.24 [-0.46, -0.02]
Vaughn 2021	0.01	0.04	15.8%	0.01 [-0.07, 0.09]
Zask 2012	-0.15	0.07	10.9%	-0.15 [-0.29, -0.01]
Subtotal (95% CI)			**100.0%**	**-0.10 [-0.17, -0.04]**

Heterogeneity: Tau² = 0.01; Chi² = 21.68, df = 10 (P = 0.02); I² = 54%

Test for overall effect: Z = 3.02 (P = 0.003)



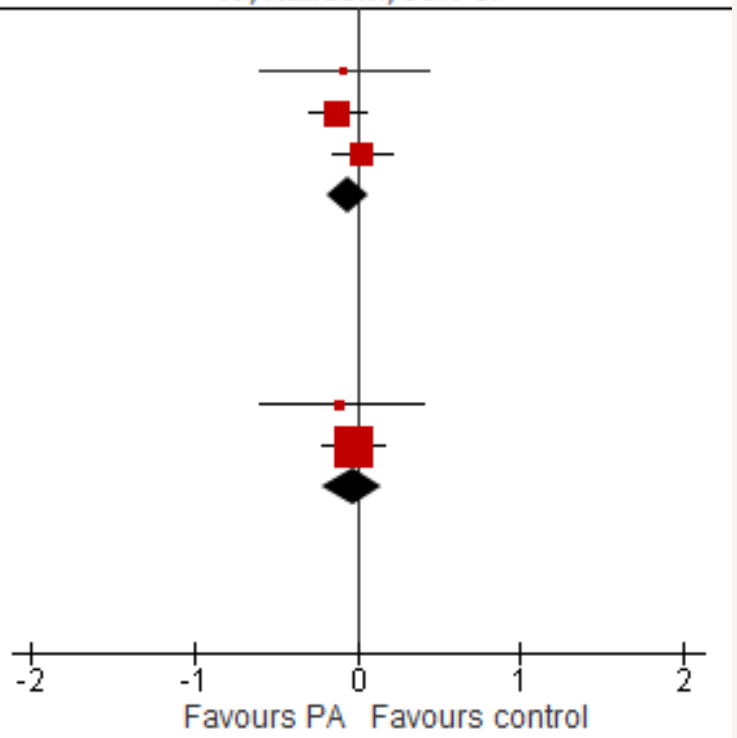
Test for subgroup differences: Not applicable

NICE

PA vs control

Moderate confidence

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
3.1.1 Short-term (12 weeks to 9 months)				
Dennison 2004 (1)	-0.08	0.2652	5.9%	-0.08 [-0.60, 0.44]
Goldfield 2016	-0.12	0.0918	49.3%	-0.12 [-0.30, 0.06]
Reilly 2006	0.03	0.0962	44.8%	0.03 [-0.16, 0.22]
Subtotal (95% CI)			**100.0%**	**-0.05 [-0.18, 0.08]**
Heterogeneity: Tau² = 0.00; Chi² = 1.29, df = 2 (P = 0.53); I² = 0%				
Test for overall effect: Z = 0.78 (P = 0.43)				
3.1.2 Medium-term (9 months to 15 months)				
Barber 2016 (2)	-0.1	0.2544	12.9%	-0.10 [-0.60, 0.40]
Reilly 2006	-0.02	0.098	87.1%	-0.02 [-0.21, 0.17]
Subtotal (95% CI)			**100.0%**	**-0.03 [-0.21, 0.15]**
Heterogeneity: Tau² = 0.00; Chi² = 0.09, df = 1 (P = 0.77); I² = 0%				
Test for overall effect: Z = 0.33 (P = 0.74)				
Test for subgroup differences: Chi² = 0.03, df = 1 (P = 0.86), I² = 0%				

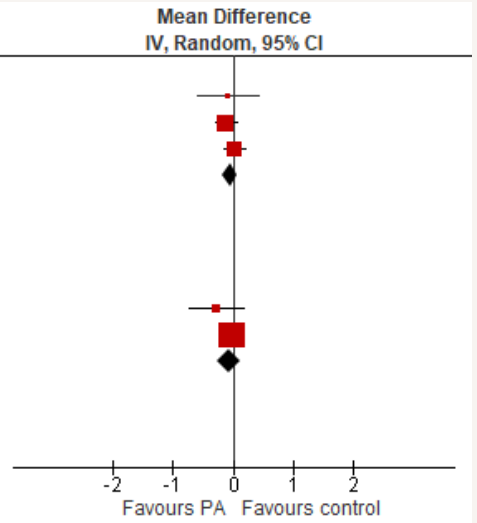


Sensitivity analysis - PA vs control

ICC 0.0

Moderate confidence

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
8.1.1 Short-term (12 weeks to 9 months)				
Dennison 2004 (1)	-0.08	0.2567	6.3%	-0.08 [-0.58, 0.42]
Goldfield 2016	-0.12	0.0918	49.1%	-0.12 [-0.30, 0.06]
Reilly 2006	0.03	0.0962	44.7%	0.03 [-0.16, 0.22]
Subtotal (95% CI)			**100.0%**	**-0.05 [-0.18, 0.08]**
Heterogeneity: Tau² = 0.00; Chi² = 1.29, df = 2 (P = 0.53); I² = 0%				
Test for overall effect: Z = 0.79 (P = 0.43)				
8.1.2 Medium-term (9 months to 15 months)				
Barber 2016 (2)	-0.28	0.232	17.3%	-0.28 [-0.73, 0.17]
Reilly 2006	-0.02	0.098	82.7%	-0.02 [-0.21, 0.17]
Subtotal (95% CI)			**100.0%**	**-0.06 [-0.26, 0.13]**
Heterogeneity: Tau² = 0.00; Chi² = 1.07, df = 1 (P = 0.30); I² = 6%				
Test for overall effect: Z = 0.66 (P = 0.51)				

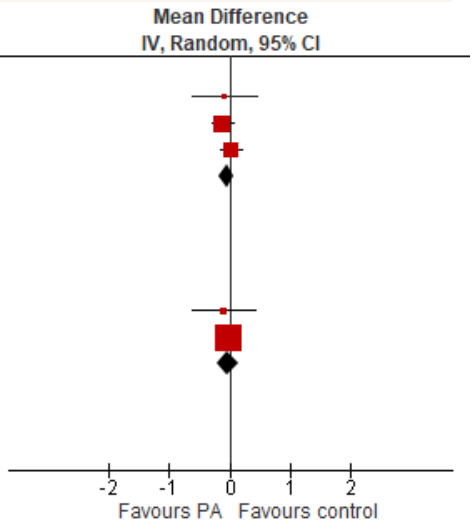


Test for subgroup differences: Chi² = 0.02, df = 1 (P = 0.90), I² = 0%

ICC 0.04

Moderate confidence

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
12.1.1 Short-term (12 weeks to 9 months)				
Dennison 2004 (1)	-0.08	0.2746	5.5%	-0.08 [-0.62, 0.46]
Goldfield 2016	-0.12	0.0918	49.4%	-0.12 [-0.30, 0.06]
Reilly 2006	0.03	0.0962	45.0%	0.03 [-0.16, 0.22]
Subtotal (95% CI)			**100.0%**	**-0.05 [-0.18, 0.08]**
Heterogeneity: Tau² = 0.00; Chi² = 1.28, df = 2 (P = 0.53); I² = 0%				
Test for overall effect: Z = 0.78 (P = 0.44)				
12.1.2 Medium-term (9 months to 15 months)				
Barber 2016 (2)	-0.1	0.2735	11.4%	-0.10 [-0.64, 0.44]
Reilly 2006	-0.02	0.098	88.6%	-0.02 [-0.21, 0.17]
Subtotal (95% CI)			**100.0%**	**-0.03 [-0.21, 0.15]**
Heterogeneity: Tau² = 0.00; Chi² = 0.08, df = 1 (P = 0.78); I² = 0%				
Test for overall effect: Z = 0.32 (P = 0.75)				

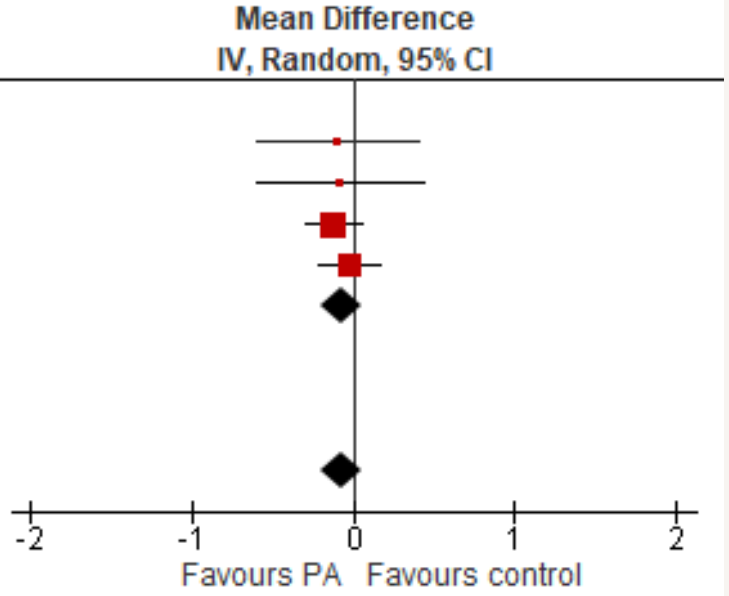


Test for subgroup differences: Chi² = 0.04, df = 1 (P = 0.85), I² = 0%

PA vs control - analysis of longest study timepoint

Moderate confidence

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
4.1.2 Longest timepoint in study				
Barber 2016 (1)	-0.1	0.2544	6.1%	-0.10 [-0.60, 0.40]
Dennison 2004 (2)	-0.08	0.2652	5.6%	-0.08 [-0.60, 0.44]
Goldfield 2016	-0.12	0.0918	47.0%	-0.12 [-0.30, 0.06]
Reilly 2006	-0.02	0.098	41.2%	-0.02 [-0.21, 0.17]
Subtotal (95% CI)			**100.0%**	**-0.08 [-0.20, 0.05]**
Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 0.57$, df = 3 (P = 0.90); $I^2 = 0\%$				
Test for overall effect: Z = 1.20 (P = 0.23)				
Total (95% CI)			**100.0%**	**-0.08 [-0.20, 0.05]**
Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 0.57$, df = 3 (P = 0.90); $I^2 = 0\%$				
Test for overall effect: Z = 1.20 (P = 0.23)				
Test for subgroup differences: Not applicable				



NICE

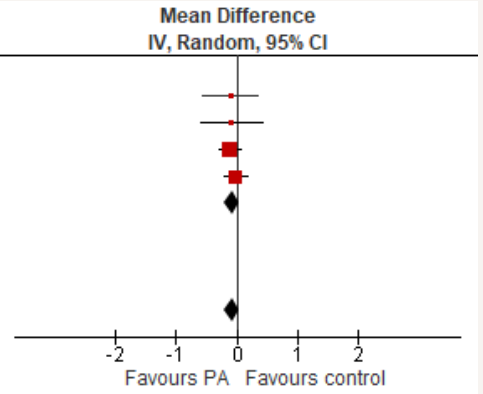
Sensitivity analysis - PA vs control

analysis of longest study timepoint

ICC 0.0

Moderate confidence

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
9.1.2 Longest timepoint in study				
Barber 2016 (1)	-0.1	0.232	7.2%	-0.10 [-0.55, 0.35]
Dennison 2004 (2)	-0.08	0.2567	5.9%	-0.08 [-0.58, 0.42]
Goldfield 2016	-0.12	0.0918	46.3%	-0.12 [-0.30, 0.06]
Reilly 2006	-0.02	0.098	40.6%	-0.02 [-0.21, 0.17]
Subtotal (95% CI)			**100.0%**	**-0.08 [-0.20, 0.05]**
Heterogeneity: Tau² = 0.00; Chi² = 0.57, df = 3 (P = 0.90); I² = 0%				
Test for overall effect: Z = 1.21 (P = 0.23)				
Total (95% CI)			**100.0%**	**-0.08 [-0.20, 0.05]**
Heterogeneity: Tau² = 0.00; Chi² = 0.57, df = 3 (P = 0.90); I² = 0%				
Test for overall effect: Z = 1.21 (P = 0.23)				
Test for subgroup differences: Not applicable				



Footnotes

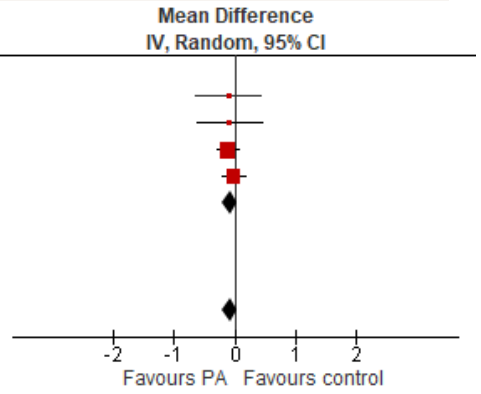
(1) Unadjusted for clustering

(2) Unadjusted for clustering

ICC 0.04

Moderate confidence

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
13.1.2 Longest timepoint in study				
Barber 2016 (1)	-0.1	0.2735	5.4%	-0.10 [-0.64, 0.44]
Dennison 2004 (2)	-0.08	0.2746	5.3%	-0.08 [-0.62, 0.46]
Goldfield 2016	-0.12	0.0918	47.6%	-0.12 [-0.30, 0.06]
Reilly 2006	-0.02	0.098	41.7%	-0.02 [-0.21, 0.17]
Subtotal (95% CI)			**100.0%**	**-0.08 [-0.20, 0.05]**
Heterogeneity: Tau² = 0.00; Chi² = 0.56, df = 3 (P = 0.90); I² = 0%				
Test for overall effect: Z = 1.19 (P = 0.24)				
Total (95% CI)			**100.0%**	**-0.08 [-0.20, 0.05]**
Heterogeneity: Tau² = 0.00; Chi² = 0.56, df = 3 (P = 0.90); I² = 0%				
Test for overall effect: Z = 1.19 (P = 0.24)				
Test for subgroup differences: Not applicable				



Footnotes

(1) Adjusted using an ICC of 0.04

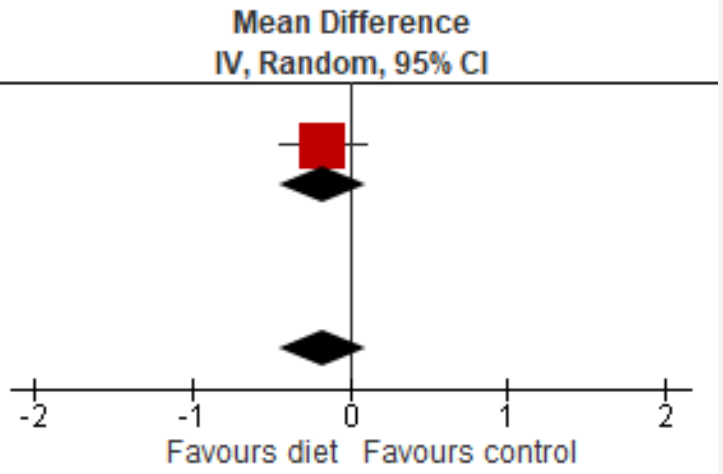
(2) Adjusted using an ICC of 0.04

NICE

D vs control

Low/Moderate confidence

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
5.1.1 Medium-term (9 to 15 months)				
Yoong 2020	-0.17	0.1429	100.0%	-0.17 [-0.45, 0.11]
Subtotal (95% CI)			**100.0%**	**-0.17 [-0.45, 0.11]**
Heterogeneity: Not applicable				
Test for overall effect: Z = 1.19 (P = 0.23)				
Total (95% CI)			**100.0%**	**-0.17 [-0.45, 0.11]**
Heterogeneity: Not applicable				
Test for overall effect: Z = 1.19 (P = 0.23)				
Test for subgroup differences: Not applicable				



Serious adverse events

- No serious adverse events were reported in the 16 studies included in the meta-analysis
- One of the 71 studies (Barkins 2018, not included in the meta-analysis) reported *"One parent fractured an ankle while roller-skating during an event at a local community center".*

Funding

- All 16 studies included in the meta-analysis reported the source of their funding. 15 received no funding from industry, and one (Iaia) received Euros10,000 from a leading frozen veg company in Italy (a Co-operative)
- Of the other 55 studies, 4 did not report their source of funding (one was a PhD), one reported simply 'no external funding, one (Walton) was funded by Danone, and one received some funding from the Safeway Foundation.

Closing remarks

- Interventions in childcare settings which aim to improve **diet and physical activity** behaviours appear to be effective for zBMI in the medium and long term (6 studies each; Low/moderate confidence), but not in the short-term (7 studies). Sensitivity analysis did not change this overall result.

- Interventions in childcare settings which aim to improve **physical activity** behaviours appear to be ineffective for zBMI in the short (3 studies) and medium term (2 studies) (moderate confidence). Sensitivity analysis did not change this overall result.

- An intervention in a childcare setting which aimed to improve **diet** behaviours appears to be ineffective for zBMI in the medium term (Low/moderate confidence).