nature portfolio

https://doi.org/10.1038/s43016-022-00536-5

Supplementary information

A systematic review of the definitions and interpretations in scientific literature of 'less but better' meat in high-income settings

In the format provided by the authors and unedited

Supplementary Material

A systematic review of the definitions and interpretations in scientific literature of 'less but better' meat in high-income settings

Kajsa Resare Sahlin[1] & Joanna Trewern[2]

1: Stockholm Resilience Centre at Stockholm University | kajsa.resare.sahlin@su.se

2: Centre for Environment & Sustainability, University of Surrey | j.trewern@surrey.ac.uk

*Table S1: Bibliometrics of research on 'less but better' meat and dairy: journals, authors, affiliations, countries, years of publication with more than one entry, and scope of entries. *first authors*

Journal	Author	Affiliation	Country	Year of publication	Scope
Appetite (4)	Joop de Boer* (4)	Vrije Universiteit (VU) Amsterdam (3)	UK (12)	2004 (1)	Production (1)
Sustainability (3)	Chrysostomos Apostolidis* (2)	University of Wisconsin-Milwaukee (2)	The Netherlands (5)	2011 (1)	Consumption (23)
Food Quality and Preference (2)	Linnea Laestadius* (2)	Northumbria University (2)	USA (4)	2014 (3)	Both (11)
Meat Science (2)	Hannah Schösler (3)	City University London (2)	Australia (2)	2015 (1)	-
-	R Neff (3)	-	France (2)	2016 (3)	-
-	Harry Aiking (3)	-	Germany (2)	2017 (2)	-
-	Elin Röös (2)	-	-	2018 (6)	-
-	Nicolas Treich (2)	-	-	2019 (9)	-
-	C Barry (2)	-	-	2020 (5)	-
-	S Frattaroli (2)	-	-	2021 (4)	-

Table S2: Consumption-based approaches for reducing meat consumption and which studies address or discuss these

Consumption-based approaches	Articles
Portion size	de Boer (2014) de Boer (2018) Neff (2018) Shimokawa (2015) Trewern (2021) Schösler (2018) Jurgilevich (2016) Laestadius (2014)
Meatless days	de Boer (2014) Neff (2018) Santini (2017) McEachern (2018) Laestadius (2016)

	Morrias (2014) Jurgilevich (2016) Sahakian (2020) Daly (2020)
Meat replacement or substitution	Apostolidis (2019) McGregor (2018) de Boer (2018) Neff (2018) de Boer (2014) Apostolidis (2016) Neff (2018) Daly (2020) Broad (2019)
Alignment with dietary guidelines	de Boer (2019) Klosse (2019) Treich (2021) Neff (2018) Shimokawa (2015) Trewern (2021) Hyland (2017) Santini (2017) van Zanten (2018)
Change ratio of animal:plant protein	de Boer (2019) de Boer (2018)
Stop overconsumption	Hyland (2017) Treich (2021) van Zanten (2018) Morris (2014) Neff (2018) Trewern (2021) de Boer (2014)
Cultural and habitual shift away from meat centered diets	Daly (2020) Schösler (2018) Caraher (2011) de Boer (2018) McGregor (2018) Laestadius (2014) de Boer (2014) Jurgilevich (2016)

16

17 *Table S3: Sustainability themes referenced in selected articles*

Sustainability theme	**Subtheme(s)**	**Articles**
Environmental sustainability (general)		Apostolidis (2016, 2019), Capper (2020), de Boer (2014), Elkins (2019), Laestadius (2014, 2016), Loeb (2019a), McEachern (2018), McGregor (2018), Neff (2018), Pais (2020), Santini (2017), Shimokawa (2015), Schösler (2018), Trewern (2021)
Climate	Reduced emissions intensity	Apostolidis (2016, 2019), Capper (2020, 2021), de Boer & Aiking (2018), Hyland (2017), Laestadius (2014, 2016), McEachern (2018), McGregor (2018), Neff (2018), van Zanten (2018)

	Reduced stocking density	Hölker, von Meyer-Höfer & Spiller (2019), Lang & Millstone (2019), Loeb (2019a), McGregor (2018), Santini (2017), van Zanten (2018)
	Carbon sequestration	Capper (2021), Hyland (2017), Klosse (2019), Laestadius (2016), McGregor (2018), van Zanten (2018)
Land	Land use intensity	Capper (2020), McGregor (2018), Trewern (2021)
	Feed-food competition	Capper (2020, 2021), de Boer (2014), Hyland (2017), Jurgilevich (2016), Klosse (2019), Laestadius (2016), Lang & Millstone (2019), McGregor (2018), Morris (2014), Pais (2020), Schösler (2018), Trewern (2021), van Zanten (2018)
Biodiversity		Capper (2021), Jurgilevich (2016), Klosse (2019), Laestadius (2016)
Freshwater use		Capper (2020), de Boer (2014), Schösler (2018)
Eutrophication		Jurgilevich (2016), van Zanten (2018)
Energy use		de Boer (2014), Schösler (2018)
Animal welfare		Apostolidis (2019), Capper (2020, 2021), Daly (2020), de Boer (2014), Elkins (2019), Espinosa & Treich (2021), Hyland (2017), Laestadius (2016), Loeb (2019a), McEachern (2018), McGregor (2018), Morris (2014), Neff (2018), Sahakian (2020), Santini (2017), Schösler (2018), Trewern (2021)
Technology use	GMOs	Apostolidis (2016, 2019), Capper (2020), Guzek (2020), Loeb (2019b), McGregor (2018), Morris (2014)
	Hormones	Lang & Millstone (2019), McGregor (2018)
	Antimicrobials	Laestadius (2016), Sahakian (2020)
Livestock as land managers		Capper (2021), McGregor (2018)
Local		Jurgilevich (2016), Klosse (2019), McEachern (2018), McGregor (2018), Sahakian (2020), Trewern (2021), Verbeke & Vackier (2004)
Farmer livelihoods		Laestadius (2016)
Certified		Apostolidis (2016, 2019), Capper (2020), de Boer & Aiking (2018), Guzek (2020), McEachern (2018), McGregor (2018), Santini (2017), Trewern (2021), Verbeke & Vackier (2004)
Public health		De Boer (2014), Guzek (2020), Jurgilevich (2016), Laestadius (2014), McEachern (2018), Morris (2014), Neff (2018), Pais (2020), Santini (2017), Trewern (2021)
Nutritional quality	General	Capper (2020), Caraher (2011), Guzek (2020)
	Fat content	Apostolidis (2016, 2019), Guzek (2020)
Eating quality		Apostolidis (2016, 2019), de Boer & Aiking (2018, 2019), Daly (2020), Sahakian (2020), Schösler (2018), Verbeke & Vackier (2004)

Figure S1: Production systems referenced in selected articles. Figure shows the number of articles that production systems were mentioned in.

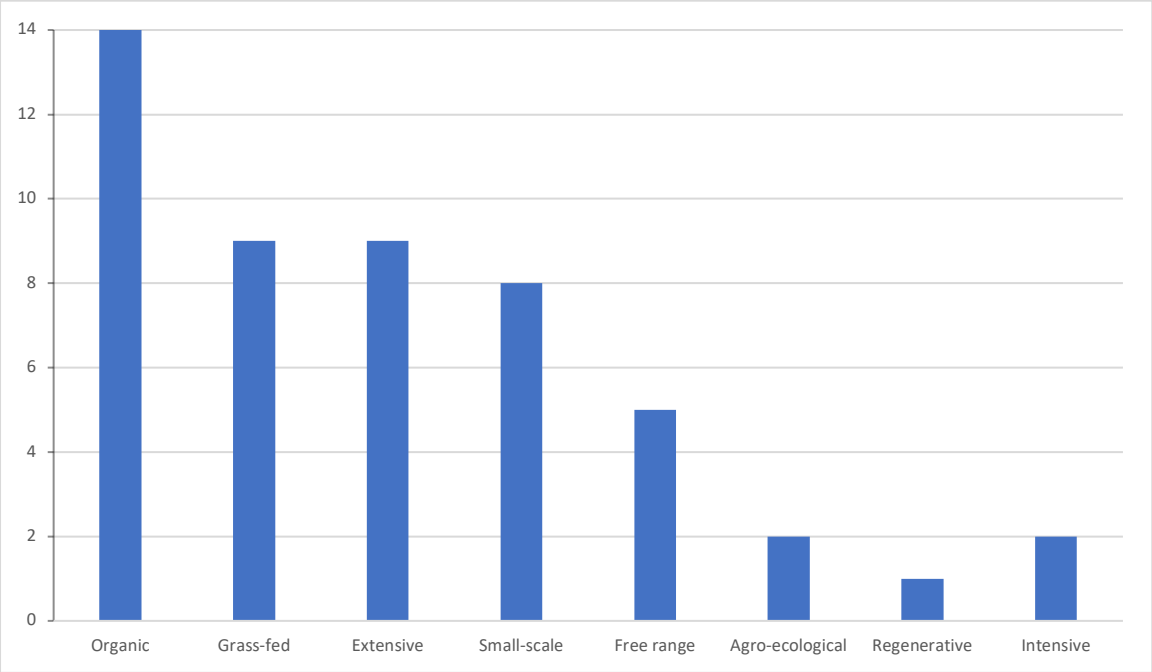

Table S4: Overview of uses, definitions and interpretations of 'less and better' in selected studies

Author, year	Country of first author	Scope	Definition of 'less but better'	Sustainability themes	Farming systems
Apostolidis & McLeay, 2016	UK	Consumption	"more sustainable meat consumption patterns" Metrics used for 'better' - carbon footprint, origin of production, method of production (through certification), fat content	-Environmental sustainability -Climate -Nutritional quality -Eating quality -Technology use -Certified	-Organic -Small-scale
Apostolidis & McLeay, 2019	UK	Consumption	"Consumer empowerment' can refer to 'meat eaters',who purposefully purchase more sustainable meat, as well as 'meat reducers' who decide to consume 'less but better' meat products." Metrics used for 'better' - carbon footprint, origin of production, method of production (through certification), fat content	-Environmental sustainability -Climate -Animal welfare -Nutritional quality -Eating quality -Technology use -Certified	-Organic -Small-scale
Broad, 2019	USA	Both	"produced through agro-ecological and smallholder farming methods"		-Agro-ecological -Small-scale
Capper, 2020	UK	Both	"Improved animal welfare, environmental impacts, or nutritional quality."	-Environmental sustainability -Climate -Land use -Freshwater use -Animal welfare -Nutritional quality -Technology	-Organic -Pasture/grass-fed -Sustainable intensification

				use -Certified	
Capper, 2021	UK	Consumption	"British meat, milk and eggs, and ensuring high standards of animal welfare, low carbon footprints and excellent traceability"	-Climate -Biodiversity -Land use -Livestock as land managers -Animal welfare	-Organic
Caraher, 2011	UK	Consumption	"If you do eat flesh (fish or meat), choose that which has run/swum as wild /free-range as possible; the nutrients are different"	-Nutritional quality	-Extensive
Daly, 2020	Australia	Consumption	"ameliorative productivity...exemplified by civil society campaigns that encourage "Less But Better" meat"	-Animal welfare -Eating quality	
de Boer & Aiking, 2018	The Netherlands	Consumption	"eating less meat but of a certified origin and replacing beef or pork with poultry or fish"	-Climate -Certified	-Small-scale
de Boer & Aiking, 2019	The Netherlands	Consumption	"reduce total protein intake as well as the dietary ratio of animal over plant protein (from 60:40 via 50:50 to 40:60)"	-Eating quality	
De Boer, Schösler & Aiking, 2014	The Netherlands	Consumption	"smaller portions using meat raised in a more sustainable manner...it favors extensively produced meat, such as organic and free-range meat, over intensively produced meat. As Dutch consumers had no shopping-aid to distinguish grass-fed meat at the time, ‘‘better’’ meat was defined as ‘‘organic or free range meat’’"	-Environmental sustainability -Energy use -Land use -Freshwater use -Animal welfare -Public health -Eating quality	-Organic -Pasture/grass-fed -Extensive
Elkins, 2019	UK	Consumption	"Maintaining proportional spend on meat, but paying a higher price per unit where welfare and environmental stability is exceptional"	-Environmental sustainability -Animal welfare	
Espinosa & Treich, 2021	France	Consumption	"whether farm animals' lives are worth living"	-Animal welfare	
Guzek et al., 2020	Poland	Consumption	"adding more health-promoting components to meat-based food products and improving their nutritional value"	-Nutritional quality -Public health -Eating quality -Technology use -Certified	-Organic -Small-scale
Hölker, von Meyer-Höfer & Spiller, 2019	Germany	Consumption	"the significant reduction of farm animal production by each farm and in total in order to improve the production standards for the remaining animals"	-Climate	
Hyland et al., 2017	Republic of Ireland	Both	"Meat can be defined as ‘better’ if it achieves a spectrum of outcomes for climate change, the environment, animal welfare, human health, livelihoods, social justice and social values."	-Climate -Land use -Animal welfare	-Extensive -Sustainable intensification
Jurgilevich et al., 2016	Finland	Both	"consuming smaller portions of meat obtained from extensive production, such as organic or free-range."	-Biodiversity -Land use -Eutrophication -Local -Public health	-Circular -Organic -Pasture/grass-fed -Small-scale -Mixed -CSA -Game meat
Klosse, 2019	The Netherlands	Both	"Animals are a part of a well-balanced agricultural system. This implies that we need to consume less, but better meat and animal products. We want to conclude our discussion on products with the question of whether there will still be meat on the menu in the future. The answer is a big “yes”. It should not even be a question because animals are essential in a regenerative, circular agricultural system."	-Climate -Biodiversity -Land use -Local	-Circular -Organic -Regenerative -Mixed
Laestadius et al., 2014	USA	Consumption	"meat from extensive livestock operations (with potentially higher GHG emissions per unit of meat, but better outcomes across other environmental metrics."	-Environmental sustainability -Climate -Public health	-Pasture/grass-fed
Laestadius et al., 2016	USA	Consumption	"encouraging consumers to switch to meat from ruminant grass-fed animals"	-Environmental sustainability	-Organic -Extensive

				-Climate -Biodiversity -Land use -Farmer livelihoods -Animal welfare -Technology use	-Pasture/grass-fed -Small-scale
Lang & Millstone, 2019	UK	Both	"We need fewer cattle, not more...and livestock back into their ecological niches"	-Climate -Land use -Technology use	
Loeb, 2019 (a)	UK	Both	"fewer healthier and happier animals with better productivity have less of an impact at all levels compared to numerous animals with poorer health and welfare outcomes. Considering sustainable consumption and production together can therefore have a positive impact on animal welfare and provide an opportunity to drive consumer demand for high animal welfare products."	-Environmental sustainability -Climate -Animal welfare	
Loeb, 2019 (b)	UK	Consumption	"'some citizens' would maintain a similar weekly spend on their groceries but would...consume animal-derived products less frequently and, when you do, opt for more expensive products associated with higher health and welfare. Also, minimise waste–so use the whole carcase when cooking a chicken"	-Technology use	
McEachern, 2018	UK	Consumption	"calls for consumers to eat less meat and support farming systems that benefit the environment, health and animal welfare"	-Environmental sustainability -Climate -Local -Animal welfare -Public health -Certified	-Small-scale
McGregor & Houston, 2018	Australia	Both	"People are encouraged to "eat environmentally", which means eating less, but better quality and more humanely produced cattle products. Caring translates in practice to eating products from grass-fed organic farms and avoiding feedlots."	-Environmental sustainability -Climate -Land use -Livestock as land managers -Local -Animal welfare -Technology use -Certified	-Organic -Extensive -Pasture/grass-fed -Small-scale -Mixed -Game meat
Morris, Kirwan & Lally, 2014	UK	Consumption	"preferably free range meat products. Eliminating meat from your diet for one day a week will result in a saving…That saving can be used to buy healthier and more humane free-range meat. reduce our reliance on large scale industrial farming systems and instead give our support to the farmers who are operating on a less industrial scale. If we all eat less meat, but choose better quality meat when we do buy it, rather than cheap imported meat, we will be supporting our own farmers and helping to promote good animal welfare'"	-Land use -Animal welfare -Public health -Technology use	-Extensive -Pasture/grass-fed -Small-scale
Neff et al., 2018	USA	Consumption	"'better meats' promoted as sustainable or animal-friendly. These products may still have negative effects, because marketing can be misleading and because environmental impacts are often mixed. For example, despite the many environmental benefits of grass-fed beef, the greenhouse gas emissions differ little from feedlot beef"	-Environmental sustainability -Climate -Animal welfare -Public health	-Pasture/grass-fed
Pais et al., 2020	Portugal	Consumption	"The meat sector, including farmers, should specialize in high-quality meat products that are highly efficient in terms of resources (more sustainable) and with minimized health consequences (healthier)...limiting livestock to pasture could be an efficient option in terms of resources."	-Environmental sustainability -Land use -Public health	-Organic -Small-scale
Sahakian, 2020	Switzerland	Consumption	"ideas of national culture and traditions, of family values, and of authentic lifestyles are also present, but are	-Land use -Local	-Organic -Small-scale

			second to the relationship between animals and humans, which is presented both in a negative and a positive way...Entrails and giblets [are] often linked to the idea of 'less and better meat' as they are understood as reducing food waste"	-Animal welfare -Eating quality -Technology use	
Santini et al., 2017	Spain	Both	"oriented towards a reduction of individual meat consumption but jointly with purchases favouring meat proceeding from more extensive farming systems and/or of higher quality"	-Environmental sustainability -Climate -Animal welfare -Public health -Certified	-Extensive
Schösler & de Boer, 2018	Germany	Consumption	"the world's future protein supply can only be ensured by making a transition to 1) a diet lower in meat, accompanied by 2) a shift away from industrially produced meat (grainfed livestock) to extensive meat production based on grazing livestock. The latter do not compete with humans for arable land, water and energy, and their meat is considered much less problematic from health and sustainability perspectives."	-Environmental sustainability -Energy use -Land use -Freshwater use -Animal welfare -Eating quality	-Organic -Extensive -Small-scale
Shimokawa, 2015	Hong Kong	Consumption	"a reduction in the quantity of meat consumed ("less meat approach"), and the enhancing of environmental and ethical quality attributes of meat ("better meat approach"). Chinese consumers prefer industrial large-size farming, compared to traditional small family farming, because they believe that industrial farming can provide safe and lean meat with a consistent quality...the finding indicates that a key driving factor is safety rather than the production system itself"	-Environmental sustainability	-Small-scale
Treich, 2021	France	Both	"produced through agro-ecological and smallholder farming methods"		-Agro-ecological -Small-scale
Trewern et al., 2021	UK	Both	"In the UK, 'less' is interpreted as a 50% reduction in average per capita meat and dairy consumption, while 'better' reflects meat and dairy production in "healthy ecosystems, favouring more natural diets from sustainable sources, in well managed farms that deliver high standards of animal welfare""	-Environmental sustainability -Land use -Local -Animal welfare -Public health -Certified	-Organic -Extensive -Small-scale
van Zanten et al., 2018	The Netherlands	Production	"livestock raised under the circular economy concept could provide a significant, nonnegligible part (9–23 g/per capita) of our daily protein needs (~50–60 g/per capita). decoupling of pro-duction of livestock feed from the use of arable land. Livestock then mainly convert leftovers from arable land and grass resources into food. Global production of ASF is thereby limited by the quantity and quality of these biomass streams. Thus, the availability of these biomass streams for livestock determines the boundary of livestock production and consumption."	-Climate -Land use -Eutrophication	-Circular -Pasture/grass-fed
Verbeke & Vackier, 2004	Belgium	Consumption	"consumers who strongly reduced their meat consumption frequency (from daily to several times a week) since the meat safety crises of previous years. They report high levels of concern related to meat safety and have the strongest intention to further decrease fresh meat consumption...Their preference for butchers as suppliers of fresh meat fits with their search for better (perceived) quality meat and personal reassurance."	-Local -Eating quality -Certified	

NB. ***Climate*** *refers to either reduced emissions intensities, reduced stocking densities or carbon sequestration.* ***Land use*** *refers to either land use intensity or feed-food competition.* ***Public health*** *refers to general statements on 'healthier' meat and links between meat consumption and non-communicable diet related diseases.* ***Technology use*** *refers to the use of hormones, GMOs or antimicrobials in livestock production.*

25 *Table S5: Original data and conversions of quantifications of 'less' meat,*

					CONVERSIONS		
					Meat	**Meat protein** *Assuming 20 % protein content in meat*	
Source	**Concerns**	**Context**	**Number**	**Unit**	g/capita/day	g/capita/day	**Notes**
FAOSTAT, Food balance sheet for 2018, World	Food supply quantity, Meat (Total)	Global	43	kg/capita/year	120		Meat (Total) includes: Bovine, poultry, pigment, mutton, goat & other Slaughther weight
FAOSTAT, Food balance sheet for 2018, World	Protein supply quantity, Meat (Total)	HIC average	29	g/capita/day		29.4	HIC: (see next tab). According to World Bank List of Economies (2018)
FAOSTAT, Food balance sheet for 2018, World	Protein supply quantity, Meat (Total)	Global	14.5	g/capita/day		14.5	Meat (Total) includes: Bovine, poultry, pigment, mutton, goat & other
van Zanten et al. 2018	"Sustainable" total output of protein from ecological leftovers.	Global	0-19 NB! Incl. Milk & eggs, 9-23	g/capita/day		0 - 19	
van Zanten et al. 2018	"Sustainable" total output of animal-source foods from ecological leftovers.	Global	7– 135 g of pork 2–55 g of beef 2–14 g of chicken 138–519 g of milk 2–24 g of eggs	g/capita/day	11-70		
de Boer & Aiking (2019)	Meat protein	Netherlands	14-21	g/capita/day	70-100	14-21	"In units that are comparable to those of Table 1, the maximum is 14–21 g meat protein per person/day (assuming that 100 g fresh meat contains 20–30 g protein). This calls for a one-third reduction of the amounts in Table 1."
Apostolidis et al. (2016)	Meat consumption	UK	70	g/capita/day	70	14	Apostolidis et al., 2016 suggests a 70 % reduction, equalling: "from an average 226 g/day for men and 163 g/day for women today, to about 70 g per person/day". UK figures.
Pais et al. (2020)	Meat consumption	Global	90, with no more than 50 of red meat	g/capita/day	90 (50)	18 (10)	Analyses a 50 % reduction as suggested by Westhoek et al. (2014), but assess their results against the 90 g limit suggested by McMichael (2007) Westhoek, H., et al. (2014). Food choices, health and envi- ronment: effects ofcutting Europe's meat and dairy intake. Global Environmental Change, 26(1), 196–205. McMichael, A. J. et al (2007). Food, livestock production, energy, climate change, and health. Lancet, 370(9594), 1253–1263.

Neff et al. (2018)	Meat, poultry, eggs	US	737 105	g/capita/week g/capita/day			State that there is a 20-60 % excess consumption among US consumers of total meat consumption compared to the US dietary guidelines: protein foods should be limited to 5.5 oz/day & 'meats, poultry, eggs' to 26 oz/week" https://health.gov/sites/default/files/2019-09/2015-2020_Dietary_Guidelines.pdf
Hölker et al. (2019)	Animal source foods	Global	50-75	% reduction			Uses figure from EAT-Lancet
Trewern et al. (2021)	Meat	UK	50	% reduction	110	22	"In the UK, 'less' is interpreted as a 50% reduction in average per capita meat and dairy consumption". Which would be equivalent to reducing meat consumption by 40 kilos per person per year from a 2017 baseline of 80 kg (slaughter weight)
EAT-Lancet (for reference)	Meat	Global	0-86	g/capita/day		17	

PRISMA 2020 CHECKLIST

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Line 1-2
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Line 13-24
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Line 40-44
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Line 44-47
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Line 52, Table 2
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Line 250-251
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Line 254-256, Table 2
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Line 259-266
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Line 269-281
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Line 278-281, Table 2

Section and Topic	Item #	Checklist item	Location where item is reported
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Figure 4
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Line 284-293
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	N/A
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Line 259-266
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Line 275-281
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Line 278, Tables S3-5
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	N/A
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/A
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/A
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Line 284-293
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	N/A
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Figure 1
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	
Study characteristics	17	Cite each included study and present its characteristics.	Table 2
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Line 284-293
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	N/A
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Line 284-293
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	N/A

Section and Topic	Item #	Checklist item	Location where item is reported
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Line 284-293
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	N/A
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Line 172-202
	23b	Discuss any limitations of the evidence included in the review.	Line 172-202
	23c	Discuss any limitations of the review processes used.	Line 212-218
	23d	Discuss implications of the results for practice, policy, and future research.	Line 202-231
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Line 238-241
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Line 238-241
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Line 302-306
Competing interests	26	Declare any competing interests of review authors.	Line 310
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Line 296-297

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: http://www.prisma-statement.org/