systematic review | family and outdoor recreation



what works wellbeing

A systematic review of outdoor recreation (in green space and blue space) for families to promote subjective wellbeing

Corresponding Author: Professor Louise Mansfield¹

Co-authors: Professor Tess Kay¹, Professor Catherine Meads², Dr Alistair John¹, Professor Norma Daykin³, Lily Grigsby Duffy¹, Jack Lane⁴, Professor Paul Dolan⁵, Stefano Testoni⁵, Professor Guy Julier⁴, Dr Annette Payne¹, Professor Alan Tomlinson⁴, Professor Christina Victor⁶

¹ Welfare, Health and Wellbeing, Institute for Environment, Health and Societies, Brunel University London

- ^{2.} Anglia Ruskin University
- ³ University of Winchester
- ⁴ University of Brighton
- ^{5.} The London School of Economics
- ⁶ Ageing Studies, Institute for Environment Health and Societies, Brunel University London





Summary

We know that doing activities outdoors can be good for our wellbeing. It can make us feel happier, and more satisfied with life, or less anxious and depressed. However, most of the evidence is about the individual wellbeing of adults, and a small amount is about the wellbeing of children – but very little is about adults and children together in families. This review was carried out to see if taking part in physical activity outdoors with your family affects subjective wellbeing. By subjective wellbeing we mean the good and bad feelings arising from what people do and how they think. By 'family', we mean two or more people living in any type of partnership, relationship or family context. For outdoor activity, we included land-based activities (green space) and waterbased (blue space). We also included spectating or watching outdoor activity. This review topic was agreed with a wide range of organisations who work on the national policy for community sport and physical activity in the UK, as well as those who manage, deliver and research it.

To start with, we looked at studies published worldwide from the past twenty years and found that three studies which included numerical measures found no effect of outdoor, family-based physical activity on improving wellbeing. From a small number of qualitative studies, ten in total, which looked at people's personal experiences, we found that some types of outdoor family-based activity can enhance wellbeing. These published studies were conducted on several types of outdoor activity including: exploring nature in national parks, hiking, gardening, beach or coastal visits, bush craft or other woodland activity, multi-activity camps (with activities like horse riding, canoeing and fishing), cycling, pram walking, and family camping. We put out a call for any reports produced by or for organisations since 2013 about the wellbeing benefits of outdoor activity that have not been published in academic journals. As a result, two evaluation reports were included in our review. Participants in the evaluations were taking part in UK-based programmes of outdoor physical activity with family members.

Overall, we have found that a range of outdoor physical activities have the potential to improve subjective wellbeing for diverse families by supporting the positive family interactions that occur when we connect with nature. The findings showed that, depending on the activity and type of delivery, taking part in outdoor activity with family members is associated with enhanced wellbeing through improvements in self-competence learning and identity, a sense of escapism, relaxation and sensory experience, and improving social bonding as a family.

The evidence is limited as there is little of it and the study methods have some weaknesses. The lack of evidence identified in this review does not necessarily mean that wellbeing benefits are not gained from taking part in outdoor physical activity with family members. There is an opportunity to build better evidence on wellbeing and outdoor recreation for families through well-designed evaluation methods and stronger approaches to making sense of the data collected.



Executive Summary

Introduction

The protocol for this review was registered on the PROSPERO International Prospective Register of Systematic Reviews (Registration number CRD42017080429 Available from: <u>http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42017080429</u>).

The review sought to address the questions: what are the wellbeing outcomes of participation in outdoor recreation in green and blue space for families and what are the processes by which wellbeing outcomes are achieved?

Review approach

The review included empirical research that assessed the relationship between outdoor recreation interventions for families and subjective wellbeing, published from 1997 – October 2017. Grey literature published from 2007-2017 was included.

Results

After duplicates were removed, the electronic searches returned 7, 762 published records for screening. Thirteen records were relevant studies of outdoor recreation, families and wellbeing.

Characteristics of included studies

This review reports on fifteen studies in total - thirteen peer reviewed published studies and two unpublished reports. Included in the published papers are two quantitative, one mixed methods (RCT and interviews), and ten qualitative studies. The two unpublished reports are project evaluations reporting qualitative data. The included studies investigated the effects of outdoor recreation for families for a range of wellbeing outcomes.

The review includes two randomised control trials (RCTs), one including qualitative interviews (defined as mixed methods above), and one cohort study. There were methodological challenges noted including small sample sizes, sample bias, limited analysis and poor reporting in some of the studies. The review includes qualitative data (from 11 published and two unpublished papers) variously employing interviews, observation, testimonial and video commentary methods. Limitations in the qualitative studies included limited discussion of



recruitment strategies, insufficiently rigorous data analysis, inadequate discussion of relationships between participants and researcher and a lack of detail regarding ethical issues.

The review includes published data from 826 participants from six countries – United Kingdom (England, Northern Ireland, Scotland, Wales), Norway, Canada, Thailand, Australia and Singapore.

Interventions in the published literature varied; they included: open nature or national park multi-activity including hiking; gardening; beach or coastal visits; bush craft or other woodland craft activity; multi-activity camps (including horse riding, canoeing and fishing); and cycling, pram walking, and camping.

A wide variety of wellbeing measures were used and there was a great deal of heterogeneity across the studies. Meta-analysis was not appropriate in this systematic review.

Summary of study findings

Two quantitative studies showed that outdoor recreation (multi-activity) had no effect for families on quality of life, or on self-esteem for healthy children taking part with families or on self-esteem for children living with chronic disease taking part with their siblings. One mixed method study which included quantitative data showed no improvement in psychological wellbeing for postnatal women taking part in a pram walking intervention with their babies versus those receiving an NHS leaflet. The quality of the quantitative evidence was graded as low.

In relation to the review findings from qualitative evidence we can have low confidence that outdoor recreation leads to wellbeing enhancement through improvements in selfcompetence, learning and identity accrued when families connect to nature, or through improving social bonding as a family in nature settings. A low confidence rating is due to the major concerns with adequacy of evidence and moderate concerns with methodological limitations and coherence in the evidence. We can also have low confidence that outdoor recreation leads to wellbeing enhancement by enhancing escapism, relaxation and sensory experience due to the major concerns with adequacy of evidence and moderate concerns with coherence in the evidence.

Strengths and limitations of the review

The substantial number of citations following initial searches in systematic review work means that it is possible that some relevant evidence is not included. The focus on a specific target group (families) will have excluded evidence from studies that have not specifically



identified 'the family' as a context for their study but collected data on family members. However, we undertook a comprehensive search strategy to identify all existing eligible studies published prior to the search dates. The pre-publication of our protocol on PROSPERO ensures methodological transparency and mitigates against potential post-hoc decisionmaking which can introduce bias to the process. Dual screening of searches and data extraction and independent quality assessment using GRADE and CERQual criteria ensured a rigorous process.

Taking published studies as the sole evidence increases the potential risk of publication lag wherein possible important new evidence that has not yet been included in published reports is not identified and included. The grey literature review allowed recent unpublished data from evaluations completed in the last three years to be included.

The use of the GRADE and CERQual criteria introduces an element of subjective judgement. A consistent approach to judgements across the different interventions has been applied while recognising that these judgements are open to interpretation.

Implications for research policy and practice

Families are a crucial factor in determining levels of outdoor recreation. UK reports have identified that children are spending decreasing amounts of time outdoors. Reviewing and understanding the evidence on outdoor recreation and families is both timely and significant for environment policy-makers and service providers. There is established evidence on the wellbeing benefits of outdoor recreation which supports recent national policy agendas identifying wellbeing as an outcome in connecting with nature (e.g. Natural England, the Forestry Commission, the National Trust, the National Parks Association, English Heritage, Historic England). This policy focus needs to be accompanied by attention to agreeing definitions and developing relevant measures of wellbeing outcomes and evaluating what works to enhance wellbeing through outdoor recreation. National agencies may be influential in promoting this approach; conversely, a lack of national lead may discourage regional and local stakeholders from prioritising this.

There is very limited evidence about the effect or impact of outdoor recreation on the wellbeing of families. The lack of evidence identified in this review does not necessarily mean that wellbeing benefits are not accrued for families taking part in outdoor recreation. There is a need to build evidence on the wellbeing outcomes of families who participate in outdoor recreation, through well-designed, rigorous and appropriate research methods underpinned by relevant theory and using established methods of analysis. There is a need for such work to explore the relationship between wellbeing inequalities and families' participation in outdoor recreation, and to examine whether and how outdoor recreation



might support families with the lowest wellbeing. We do not know which outdoor activities might reinforce wellbeing inequalities, for example due to issues of access and accessibility.

The development of a programme of wellbeing evaluation training would support key personnel in the outdoor recreation sectors in ensuring a comprehensive programme of delivery includes appropriate and rigorous monitoring and evaluation.

There is a need for further studies of the wellbeing impacts of outdoor recreation for families to be conducted and to be made public through academic and non-academic dissemination.



Introduction

Background

There is an established body of research that shows contact with nature in outdoor environments benefits physical, mental and social health and wellbeing (Brymer, Cuddihy, Sharma-Brymer 2010). Being in outdoor settings has been found to improve mood, selfesteem, reduce anxiety and depression, and impact positively on social relations in those who are healthy (Pretty et al., 2007) and those diagnosed with mental health conditions (Volker and Kistemann, 2011; Rugel, 2015). It is well known that physical activity benefits physical and mental health. Further work has reported on taking part in physical activity in outdoor environments and found the outdoors to be more effective than other environments at enhancing physical and mental health and wellbeing (Bowler et al., 2010; Sharma-Brymer, Brymer and Davids 2015; Thompson Coon et al., 2011). Physical activity in outdoor spaces including countryside and urban green spaces (land-based) and those involving water (blue space) can impact positively on human health and wellbeing.

Much of the research evidence on the physical and psychological benefits of outdoor physical activity has been focused on individual adults and some has considered individual children. Indeed, much reporting about the benefits of green space uses methods to evaluate the views of individuals albeit in community contexts. UK reports have recognised the extensive literature on the health and wellbeing benefits of green space identifying the value people place on green space for improving quality of life, community cohesion, trust, a sense of place and reducing loneliness (CABE, 2010a). Reports have also emphasised that there are barriers to accessing green space for some groups of people and unequal benefits are characterised by affluence, deprivation and ethnicity (CABE, 201b). One crucial factor in determining access to green and blue space, and levels and impact of physical activity and engagement in outdoor environments is the family. Families may support and extend engagement in sport, leisure and recreational pursuits and they may resist them (Kay, 2004; Kay and Spaaj, 2012). Parental influence has been reported to affect the types and intensities of physical activity in children and adolescents through mechanisms such as modelling, providing transport, and encouragement (Edwardson & Gorely, 2010). UK reports have identified that children are spending decreasing amounts of time outdoors (Moss, 2012). This growing disconnection with our natural environment and the developing research on the health and wellbeing impacts of outdoor physical activity makes a review of evidence on outdoor recreation and families both timely and significant for public health and environment policy-makers and service providers.

This topic of outdoor recreation was identified through stakeholder engagement activities including face-to-face workshops, telephone interviews and a Delphi consultation process (Daykin et al., 2017). Given the extensive evidence on the wellbeing benefits of being in



outdoor environments, the topic was further refined to focus on recreational activity and families through our stakeholder networks. The systematic review assessed all relevant evidence on the subjective wellbeing and outdoor recreation in family contexts and examined the processes by which wellbeing improvements are achieved.

The protocol for this review was registered on the PROSPERO International Prospective Register of Systematic Reviews (Registration number CRD CRD42017080429 Available from: http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42017080429).

Research Questions

What are the wellbeing outcomes of participation in outdoor recreation for families and what are the processes by which wellbeing outcomes are achieved?

Methodology

Types of studies

We included published studies that assessed the relationship between outdoor recreation (green and blue space) interventions for families and subjective wellbeing. We included empirical research: quantitative, qualitative or mixed methods, outcomes or process evaluations, published from 1997 – October 2017. We identified relevant systematic reviews published for the purposes of hand searching the reference lists. We hand searched the reference list of systematic reviews published 2013-2017. Grey literature published between 2007-2017 was also included.

Types of participants

The review included participants taking part in outdoor recreation in families defined as any intergenerational or intragenerational network of two or more people living in any type of partnership/relationship or family context participating in or watching outdoor physical activity (green and blue space) but not as paid professionals or training to be an elite or paid performer. We included studies from countries economically like the UK (i.e. other high-income countries with similar economic systems and in the same group as the UK in the OECD Development Assistance Committee categories. Countries in which the studies are based are listed in the table of included studies (Table 4).

Types of outcome measure or phenomenon of interest



To be included, studies needed to have measured subjective wellbeing using any recognised method or measure (quantitative studies) or for qualitative studies) identified wellbeing as the phenomenon or theme of interest. A summary of the wellbeing measures used in the studies included in this review can be found in Appendix 1. For the health economic component key outcomes were the outputs from cost, cost-utility, cost-effectiveness, cost-benefit and cost-consequence analyses. By agreement and in support of the wider work of the What Works Centre for Wellbeing, the review and synthesis of economic / cost evaluations will be reported separately.

Types of interventions or programmes

We included participatory family-based outdoor recreation interventions or programmes (for example walking, cycling, sailing) on land (green space) or water (blue space), in which family members were participating or watching and where the intervention or programme was designed to enhance wellbeing.

Comparison

No outdoor recreation i.e. inactive comparator or usual routine if it is without outdoor recreation, or historical/time-based comparator. This was applied to quantitative studies only.

Search methods for identification of reviews

Electronic searches

Electronic databases were searched using a combination of controlled vocabulary (MeSH) and free text terms. Search terms were incorporated to target empirical evidence outdoor recreation, families and wellbeing. We included specific filters to identify health economic evaluations. The OVID MEDLINE search strategy can be found below. All database searches were based on this strategy but were appropriately revised to suit each database. The following databases were searched from 1997-2017:

- PsychInfo
- OVID MEDLINE
- Eric
- Arts and Humanities Citation Index (Web of Science)
- Social Science Citation Index (Web of Science)
- Science Citation Index
- Scopus
- CINAHL
- SportDiscus



For the review of health economic evaluations, we will separately search the following databases:

- OVID MEDLINE
- Scopus
- CINAHL
- NHS EED (NHS Economic Evaluation Database)
- HTA Technology Assessment) database

Search Strategy (OVID MEDLINE)

An example search strategy for one database (Ovid Medline) is shown below:

- 1. MeSH descriptor: [well being]
- 2. well-being
- 3. wellbeing
- 4. family.mp.
- 5. sister.mp.
- 6. brother.mp.
- 7. sibling.mp.
- 8. child*.mp.
- 9. mother.mp.
- 10. father.mp.
- 11. parent.mp.
- 12. grandparent.mp.
- 13. daughter.mp.
- 14. son.mp.
- 15. cousin.mp.
- 16. niece.mp.
- 17. nephew.mp.
- 18. carer.mp.
- 19. adopt*.mp.
- 20. foster.mp.
- 21. (1 or 2 or 3) and (4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 15 or 16 or 17 or 18 or 19 or 20)
- 22. Sport.mp.
- 23. "Physical activity".mp.
- 24. Exercise*.mp.
- 25. "Physical exertion".mp.
- 26. Game*.mp.
- 27. "Work-out".mp.
- 28. "Pick-up game*".mp.
- 29. "Outdoor adventure".mp.
- 30. "Outdoor recreation".mp.
- 31. "Adventure activity".mp.
- 32. Mountain*.mp.
- 33. "Blue space".mp.
- 34. "Green space".mp.
- 35. Beach.mp.
- 36. Park.mp.



- 37. Shed.mp.
- 38. Allotment.mp.
- 39. Bike.mp.
- 40. Cycl*.mp.
- 41. Equestrian.mp.
- 42. Gym*.mp.
- 43. Bloodsport*.mp.
- 44. "Martial arts" .mp.
- 45. Parkour.mp.
- 46. Skateboard*.mp.
- 47. Ramble*.mp.
- 48. Orienteering.mp.
- 49. Hiking.mp.
- 50. Golf*.mp.
- 51. "Bird watching".mp.
- 52. Tennis.mp.
- 53. Walk*.mp.
- 54. Run*.mp.
- 55. Climb*.mp.
- 56. "Treasure hunt".mp.
- 57. Camping.mp.
- 58. Geocaching.mp.
- 59. Swim*.mp.
- 60. Sail*.mp.
- 61. Canoe*.mp.
- 62. Kayak*.mp.
- 63. Rowing.mp.
- 64. Angling.mp.
- 65. Surfing.mp.
- 66. Boat*.mp.
- 67. Paddle*.mp.
- 68. Skiing.mp.
- 69. Snowboarding.mp.
- 70. Snowshoe.mp.
- 71. "Nordic walking".mp.
- 72. Toboggan.mp.
- 73. Picnic.mp.
- 74. Canal.mp.
- 75. River.mp.
- 76. 21 and (22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74 or 75)
- 77. Quality of life.mp. or "quality of life"/Life
- 78. Anxiety/ or anxiety.mp.
- 79. Worthwhileness.mp.
- 80. "Life Satisfaction".mp.
- 81. Happiness.mp.
- 82. Loneliness/ or lonel.mp.
- 83. Self-esteem.mp.
- 84. Resilience.mp.



- 85. Coping.mp.
- 86. "Social capital".mp.
- 87. "Social engagement".mp.
- 88. Belonging.mp.
- 89. "Social bonding".mp.
- 90. Connectivity.mp.
- 91. "Mental health".mp.
- 92. 76 and (77 or 78 or 79 or 80 or 81 or 82 or 83 or 84 or 85 or 87 or 88 or 89 or 90 or 91)
- 93. limit to humans

Searching other sources

The reference lists of all relevant reviews from the last 5 years (2013-2017) were handsearched to attempt to identify additional relevant empirical evidence. Relevant reviews were identified at the initial title and abstract screening stage. A search of 'grey literature' was conducted via an online call for evidence, employment of expert input, review of key sector websites and a Google search (key word search and reviewing titles of first 100 hits). Grey literature was included if it was a final evaluation or report on empirical data, had the evaluation of outdoor recreation intervention as the central objective, was published between 2007-2017, and included details of authors (individuals, groups or organisations).

Identification of studies for inclusion

Search results were independently checked by two review authors. Initially the titles and abstracts of identified studies were reviewed. If it was clear from the title and abstract that the study did not meet the inclusion criteria it was excluded. Where it was not clear from the title and abstract whether a study was relevant the full article was checked to confirm its eligibility. The selection / eligibility or inclusion criteria were independently applied to the full papers of identified reviews by two review authors. Eligibility criteria are summarised in Table 1. Where two independent reviewers did not agree in their primary judgements they discussed the conflict and attempted to reach a consensus. If they could not agree then a third member of the review team considered the title and a majority decision was made. Studies in any language were included. A table of excluded studies can be found in Appendix 3.



Table 1 Eligibility criteria

PICOS criteria	Inclusion	Exclusion
Participants	 Families: any intergenerational or intragenerational network of 2 or more people living in any type of partnership/relationship or family context Studies from countries economically like the LW (i.e. other high income 	 Participants who are paid professionals or training to be an elite athlete or paid performer
	countries with similar economic systems) or with study populations that have similar socioeconomic status to UK.	
Intervention	 Participatory family-based outdoor recreation interventions (e.g. walking, cycling, and group and individual sports), including watching and performing Interventions designed to enhance 	
	wellbeing	
Comparison	 No outdoor recreation i.e. usual routine, inactive comparator or historical/time-based comparator (applied to quantitative data only) 	 No between group or within group comparison data (applied to quantitative data only)
Outcomes	 Subjective wellbeing using any recognised method or measure 	
Study design	 Empirical research: either quantitative, qualitative, or mixed methods, outcomes, or process evaluations Grey literature: if it is a final evaluation or report on empirical data, evaluation family-based outdoor recreation interventions as the central objective, and included details of authors (individuals, groups, or organisations) 	 Discussion articles, commentaries or opinion pieces not presenting empirical or theoretical research Grey literature if it does not have details of authorship
	 Published studies published between 1997-2017 Grey literature and practice surveys published between 2007-2017 	



Data collection and analysis

Data extraction and management

Data were extracted independently by two review authors using a standardised form (Appendix 4). Discrepancies were resolved by consensus. Where agreement could not be reached a third review author considered the paper and a majority decision was reached.

For quantitative evidence of intervention effectiveness, the data extraction form included the following details:

- evaluation design and objectives (the interventions studied, and control conditions used, including detail where available on the intervention content, dose and adherence, ethics)
- sample (size, representativeness, reporting on drop-out, attrition and details of participants including demographics and protected characteristics where reported)
- the outcome measures (the scales used and the collection time-points, independence, validity, reliability, appropriateness to wellbeing impact questions)
- analysis (assessment of the methodological quality/risk of bias)
- results and conclusions
- the presence of possible conflicts of interest for authors

For qualitative evidence of intervention effectiveness, the data extraction form included the following details:

- research design and objectives (interpretive, examining subjective experiences of participants, ethics)
- data collection (type/form, appropriateness, recording, theoretical justification)
- participants (numbers and details including demographic, recruitment strategy, theoretical justification)
- analysis (rigor, assessment of methodological quality, identification of bias/involvement of researcher, attribution of data to respondents, theoretical justification, relevance to wellbeing impact question)

For grey literature the data extraction form included the following details:

- project description
- aims and objectives
- evaluation design
- data collection
- ethics and consent
- data analysis
- costs and budget



• key findings

Health economic studies will be extracted when there is agreement by WWCW evidence review programmes regarding methods. We do not report on health economic studies here. Our approach would be to extract the following additional information:

- Included study designs, analytic methods, perspective, time horizon, discount rate
- type of sensitivity analysis undertaken
- type and sources of data use for resource use and costs, reporting figures for costs;
- methods of preference elicitation (e.g. contingent valuation, revealed preferences, trade-off methods), reporting estimates of preference values
- main results including specified types of ICERs (e.g. health service or societal perspective)
- main health economic conclusions of the review

Our protocol allowed us to contact the authors of articles if the required information could not be extracted from the studies and if this was essential for interpretation of their results. We contacted Professor Finkelstein (Finkelstein et al., 2013) to confirm if their study intervention involved families taking part together. The author confirmed.

Assessment of methodological quality of included studies

To assess the methodological quality of the included published studies, two review authors independently applied the quality checklist for quantitative or qualitative studies detailed in the What Works Centre for Wellbeing methods guide (Appendix 4). The checklists were used to indicate if a specific study had been well designed, appropriately carried out and properly analysed. A summary of quality scores is presented in table 2 (quantitative studies) and table 3 (qualitative studies).

We then employed the Grading of Recommendations Assessment, Development and Evaluation working group methodology (GRADE) schema for judging strength and quality of quantitative evidence or the CERQual schema (Confidence in the Evidence of Reviews of Qualitative Research) for judging how much confidence could be placed in the identified findings for the qualitative synthesis of evidence.

Four categories of evidence are used in GRADE; high, moderate, low, or very low. Applying GRADE, RCT studies were initially judged as high quality and sound observational studies as low quality. Evidence was downgraded for methodological limitations, inconsistent findings, sparse data, indirect evidence and reporting bias. Evidence was graded upwards if there was a large magnitude of effect or a dose-response gradient.



Four components are used in the CERqual approach to assess confidence in the evidence for individual review findings; methodological limitations, relevance, coherence, and adequacy of data (Lewin et al. 2015). Categories of confidence in CERQual are high, moderate, low and very low. Table 6 identifies the review findings for qualitative research in this report and provides a qualitative evidence profile. Confidence was decreased if there were serious or very serious limitations in design or conduct of the study, evidence was not relevant to the study objectives, findings/conclusions were not supported by the evidence, or data was inferior quality and inadequate in supporting findings. Confidence was increased if the study was well designed with few limitations, evidence was applicable to context (perspective or population, phenomenon of interest, setting) specified in objectives, findings/conclusions were supported by evidence and provided convincing explanation for patterns found, or data supporting findings was rich and high quality.

The PHE Arts for Health and Wellbeing Evaluation Framework (Daykin and Joss, 2016) allows for both data extraction and a judgement of quality. It was used to judge the quality of the grey literature in terms of the appropriateness of the evaluation design, the rigour of the data collection and analysis and precision of reporting which is reported narratively

Data synthesis

There are a wide range of wellbeing measures and themes and interventions or programmes included in the published studies in this review. Due to heterogeneity of interventions and wellbeing outcomes between quantitative studies, a meta-analysis was not appropriate. We report the numerical findings narratively. We synthesise the data in terms of wellbeing outcomes from the quantitative data and provide commentary on study participants, research design and intervention type. We synthesise the qualitative data according to identified themes or wellbeing phenomenon of interest and report the findings narratively in terms of study participants, programmes and research design. Grey literature is also included in the synthesis of qualitative evidence.



Table 2 Quality checklist scores for quantitative studies (published)

	Evaluation Design												Sample	е						Evidence consistency			y	An	alysis	T O
Author (date)	The extent to which the intervention was delivered with fidelity is clear	Measures appropriate for outcomes & population	Participants completed the same set of measures before and after intervention	An intent-to-treat design was used	Group assignment was at the appropriate level (e.g. individual, community)	Appropriate random assignment to treatment and control conditions	The treatment and comparison conditions are thoroughly described	The sample is representative of the target population and characteristics stated	Baseline equivalence between treatment and comparison groups	The sample is sufficiently large to test for the desired impact (min 20 per group)	Overall study attrition no higher than 65%	There is a clear process for determining and reporting drop-out and dose	The study assessed & reported overall & differential attrition	Confounding factors controlled for	Participants blinded to group assignment	Consistent and equivalent measurement	Measures used were valid and reliable	Measurement independent of treatment measures	Included assessment information independent of the participants e.g. independent observer	Findings made explicit	Adequate discussion for and against argument	Credibility of findings discussed	Findings discussed in relation to original question	Appropriate methods used to analyse results	Appropriate methods used for the treatment of missing data	T A L S C O R E M A X 25
Finkelst ein et al (2013)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Ν	Y	СТ	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	21
Kiernan et al (2004)	Y	Y	Y	Y	Y	N	Ν	Y	Y	N	N	Y	Y	NA	N	NA	Y	Y	Ν	Y	Y	Y	Y	Y	СТ	16
Lee et al (2016)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	СТ	Y	Y	Y	N	Y	Y	Y	Y	Y	СТ	22

Key:

Y= yes; N= no; CT= can't tell



Table 3 Quality checklist scores for qualitative studies (published)

Authors (date)	litative dology riate?	esearch design riate for sing the aims of earch?	: a clear ent of findings?	e data collected y that addressed earch issue?	e recruitment y appropriate to s of the h?	e data analysis ntly rigorous?	: relationship ın researcher ticipants been tely considered?	thical issues Iken into sration?	ution of the h to wellbeing questions?	ore um = 9
	ls a qua methoc approp	ls the re approp address the res	Is there statem	Was th in a wa the res	Was th strateg the aim researc	Was th sufficie	Has the betwee and pai adequa	Have et been ta conside	Contrib researc impact	Total sc Maxim
Ashbullby et al (2013)	Y	Y	Y	Y	Y	Y	СТ	Y	Y	8
Baklien et al (2016)	Y	Y	Y	Y	Y	Y	СТ	Ν	Y	7
Bell et al (2015 & 2017)	Y	Y	Y	Y	Y	СТ	Y	Y	Y	8
Goodenough et al (2015)	Y	Y	Y	Y	СТ	Y	Ν	СТ	N	5
Jakubec et al (2014)	Y	Y	Y	N	Y	Ν	Ν	Y	Y	6
Lee et al (2016)	Y	Y	Y	Y	Y	Y	Y	Y	N	8
Mason et al (2012)	Y	Y	Y	Y	Y	Y	Y	Y	Y	9
Morrow et al (2014)	Y	Y	Y	Y	N	Ν	Ν	Y	Y	6
Pickering et al (2013)	Y	Y	Y	Y	Y	Ν	Y	СТ	N	6
Van der Riet et al (2017)	Y	Y	Y	Y	N	Ν	Y	Y	Y	7
Wolf et al (2015)	Y	Y	Y	Y	Ν	Ν	Ν	Ν	Y	5

Key: Y= yes; N= no; CT= can't tell



Results

Results of the searches (published literature)

After removal of duplicates the electronic searches returned 7,762 records for screening. Of these, 112 were retained after abstract and title screening and 1 additional paper was also identified through other sources (hand searching of systematic review reference lists). 113 full texts were assessed for eligibility against the inclusion criteria. The full text screening process identified thirteen published studies on outdoor recreation, families and wellbeing; ten qualitative studies and two quantitative studies (one RCT; one cohort study), and one mixed methods study (RCT and interviews). The search screening process is illustrated in Figure 1.

Characteristics of included studies (published literature)

The included studies investigated the effects of several types of outdoor recreation for a wide-range of wellbeing outcomes. Outdoor recreation is defined broadly in this evidence review and includes all forms of physical activity taken outdoors in greenspace (on land) or bluespace (on / in water). Outdoor recreation was both formally and informally organised and involved participation by families reflecting diverse compositions.

A summary of the characteristics of the included papers is presented in Table 4 and the references section. The list of excluded studies and reasons for exclusion can be found in Appendix 5.

Grey literature searches and results

The grey literature search was undertaken concurrently with the Culture and Sport systematic review on outdoor recreation, families and wellbeing. A call for UK grey literature evidence of wellbeing impacts of outdoor recreation on families and wellbeing was advertised between November and December 2017. The call requested evaluation reports completed between 2007 and 2017. Additionally, we conducted an extended systematic search of grey literature by employing expert input that assisted in identifying sources of grey literature that might not be readily available in searching peer-reviewed literature (Benzies et al., 2006). Specifically, we (i) contacted known experts in the field for recommendations of outdoor recreation sector repositories (ii) reviewed websites of outdoor recreation organisations (iii) searched the EThOS website for unpublished PhD



dissertations and (iv) conducted a Google search with key words 'wellbeing', 'outdoor recreation', 'sport', 'family' and 'evaluation' and reviewing titles of the first 100 results.

A total of forty-eight submissions were screened by the research team, of which two met the inclusion criteria. Submissions reviewed for eligibility included nineteen received through the call for evidence, and twenty-nine obtained via the extended search for grey literature. Reasons for exclusion were 'not outdoor intervention', 'not families', 'not published between 2007-2017, and / or 'not wellbeing related'. A summary of the grey literature included in this review can be found in the table of included studies (Table 4).

To capture project details, we used an adapted version of the Public Health England Arts and Health Evaluation Framework (Daykin and Joss, 2016) to record information such as project activity, aims, location, setting, timescale, population, costs and reported outcomes. We also recorded evaluation details where reported including rationale, method, costs, data collection and analysis techniques, and findings.

One project reported in the grey literature used a woodland activity intervention programme (in Scotland, UK) for people with early stage dementia. Another unpublished report employed a cycling intervention for new Mums and their children in Devon (England, UK). Evaluation approaches used in the woodland activity intervention report included interviews. In this report, evaluation approaches and methods of analysis were discussed in detail and with reference to theoretical concepts. The report included rich data and provided in-depth analysis. The quality of the evaluation and its focus on context specific processes and outcomes give it a high degree of credibility. The report on the cycling intervention represented a local authority impact report with little reporting on the detail of the evaluation data collection methods and analysis but relevant insights into the wellbeing benefits that new mothers and their children gain when taking part in organised cycling programmes.



Figure 1: PRISMA flow diagram of the search screening process





Table 4 Characteristics of included studies (published studies and grey literature on healthy outdoor recreation, families and wellbeing)

Authors (date, country)	No of Participants	Participant Description	Intervention & Comparison	Methods: Outcomes or Themes	Study Design	Results/Conclusions
PUBLISHED I	LITERATURE					
Ashbullby et al (2013, UK England)	N=15 families	Gender: parents 9 male, 15 female; children 10 male, 10 female. Age: parents not identified, children 8-11 years Socio-economic status: 7/15 families included a parent with a higher education degree; 14/15 families owned a car.	Intervention; participants interviewed and asked to reflect on a normal family visit to the beach. Control: no control	Method: Two semi-structured interviews; one for children and one for parents. Key themes identified through thematic analysis: (i) physical activity and active play as key features of family beach visits; (ii) perceived health related benefits (psychological, social and family, and physical); (iii) barriers to beach visits; and (iv) enablers to beach visits.	Qualitative	Beach visits result in a perceived wide range of psychological, social and physical health benefits for children aged 8-11 and their parents. More research gaining objective and experiential measures of family members' enjoyment and wellbeing before, during and after beach trips required.
Baklien et al (2016, Norway)	N=not specified 22 conversation s (some conversation s involved more than 1 family) and 2 families interviewed in more detail	Families in this study consisted of mothers and fathers with one or more children. No detailed description	Intervention, participant families asked about hiking in Norwegian forest Control: no control	Method: observations, conversations and in-depth interviews with families during a hiking trip Mental health & wellbeing outcomes (constituents) identified though Giorgi's descriptive phenomenological research method: (i) creating a space in everyday life to cultivate the family as a social institution; (ii) generating a different existence with a sense of here-and- now presences; (iii) passing down experiences that can be realized by future generations.	Qualitative	Nature rather represents a peaceful background that allows for the perpetuation of the family as a social institution and the recreation of cohesion in everyday life.



Bell et al (2015 & 2017, UK England)	N=33 participants	Recruited from two coastal towns in Cornwall, south west of England (Two socio- economically distinct areas per town were selected) Gender: 20 female, 13 male Age: 25 - 85 years old (median: 46 - 55) Employment status: mix of full/part-time employment or retired Income: range - households earning less than £20,000/year to over £70,000. Family dynamic: with or without children	Intervention, descriptive study looking at the relative contribution of varied green and blue space experiences to individual wellbeing through the life course. Control: no control	Method: Used accelerometers, in- depth interviews and walk along interviews to collect data. Personal maps from GPS data were used as interview prompts. Key therapeutic experience dimensions identified through thematic analysis ²⁰¹⁵ : (i) Symbolic therapeutic experiences at the coast; (ii) 'Achieving' therapeutic experiences at the coast; (iii) Immersive therapeutic experiences at the coast; (iv) Social therapeutic experiences at the coast In-depth narrative thematic analysis concepts ²⁰¹⁷ : "fleeting time", "restorative time" and "biographical time"	Qualitative Interpretive, mixed method approach - GPS data used to guide in-depth geo-narrative interviews	The diversity of the local coastline seemed to provide opportunities for a broad range of therapeutic experiences, at multiple scales and intensities. Different stretches were able to cater for those looking for emotional, active, immersive, tranquil, and/or social (be it with strangers, friends, partners or family) experiences. Particular green and blue settings served to shift participants' focus from the "tyranny" of pressured or fleeting time, to slower more restorative and self-nourishing rhythms. Participants were able to perform important "emotion work", proactively regulating and trying to dissipate negative emotions before they escalate or spill over into other spheres of their everyday lives e.g. challenges of early parenthood.
Finkelstein et al (2013, Singapore)	Intervention Recruited N=147 (106 families), Completed N= 138 (147 in analysis) Control Recruited N= 138 (106 families), Completed	Intervention: Ethnicity (% of families): Chinese (82.08%); Malay (3.77%); Indian (8.49%); other (5.66%) Household income (% families): <sgd2999 (5.55%);<br="">SGD3000-4999 (14.15%); SGD5000+ (75.47%); undisclosed (4.72%) Children age (mean (SD)): 8.22 (1.53)</sgd2999>	Intervention: PA pamphlet. An incentive-based pedometer step program and encouragement to attend structured weekend outdoor activities at least twice a month. The step goal was set at 8000 steps per day for each child. Control: PA pamphlet. Continued with usual daily activities and offered the pedometer-	QoL: parent-administered Paediatric Quality of Life Inventory (PedsQL 4.0) Taken at baseline and follow up (9 months [range 6-10m])	RCT	Compared with controls, children in the intervention group exhibited small increases in wellbeing outcomes related to post PedsQL physical health and psychosocial health, but the differences were not statistically significant and the study found no effect.



Goodenou	N= 113 (138 in analysis)	Sex (% of children): male (56.46%); female (43.54%) Comparator: Ethnicity (% of families): Chinese (90.57%); Malay (4.72%); Indian (2.83%); other (1.89%) Household income (% families): <sgd2999 (8.49%);<br="">SGD3000-4999 (21.7%); SGD5000+ (66.98%); undisclosed (2.83%) Children age (mean (SD)): 8.2 (1.49) Sex (% of children): male (51.45%); female (48.55%) Eamily dynamic: parent (any</sgd2999>	incentive scheme for 3months after the final clinic visit.	Method: Five minute walking or	Qualitative	Eamily leigure in natural woodland
gh et al (2015, UK England)	parents	adult accompanying the child. The majority were mothers and fathers, but children were sometimes taken by grandparents or a childminder) and child. Gender: 23 female, 9 male (38 children under 4 years of age [21f, 17m] and 6 children aged 5-11 years old [2f, 4m]). Ethnicity: All participants white British. 10 families were identified as coming from areas of known social deprivation and there were a range of rural and	study looking at parents and children visiting National Trust woodlands and participating in Trust organized forest school and bush craft styles of recreation that encouraged engagement with the outdoor, natural environment. Control: no control	activity-centred, snapshot (semi- structured) interviews with adult respondents and semi-participatory observation. Key concepts identified through a guided analytical framework: (i) guilt trips ('Good' parenting and feeling good; making a 'good' choice on behalf on the child); (ii) bonding moments; (iii) potential springboards; (iv) Engaging with or witnessing moments in nature: critiquing shared experience.	case study	settings can make a positive difference to parents and their children, firstly in terms of psychological and emotional well- being through meeting perceived shortfalls in their 'good' parenting and secondly, by supporting cohesion within the family through shared bonding moments.



	urban backgrounds amon them.	zst			
Jakubec et Pha al (2014, 8 Canada) Pha 27	ase 1 N =Phase 1: 4 adults, 2 men a women, with developmen cognitive or physical disabilities; and 4 adult caregivers, 2 men and 2 women, including volunta family member and paid caregivers.Phase 2: 27 participants (66 years old, 60% female, with 66% under the age o	nd 2 Intervention, observational study looking at individual day trips facilitated by the Push to Open Nature Society, and week-end and week-long backcountry trips of the Alberta Adaptive Nature Challenge 18- Control: no control f 35	Method: semi-structured interviews and reflective writing Key themes identified through thematic analysis: 'Sensory Activation', 'Reimagined Social Relations' and 'Reinvented Self'	Qualitative	Inclusion in nature for both caregivers and adults with disabilities holds promise as an activity that can support mental well-being through a reimagining and equalizing of relationships and reinvention of one's experience of self in the physical environment. This study also demonstrates that, specifically, sensory, relational and physical experiences are enhanced in an inclusive nature experience.
Kiernan et al (2004, N=2 Ireland) Tim N=1 Tim N=1	years) 1e 1 Gender: 65 boys (54.6%) a 240 54 girls (45.4%) ne 2 Age: range 7-16 (mean 11 years [SD 2.4]). ne 3 119	Ind Intervention, observational study following The Barretstown Gang Camp - a therapeutic recreation programme in Ireland, aimed at European children with chronic illnesses and their siblings Control: no control	Affect: positive affect, negative affect and physiological hyperarousal (based on The Physiological Hyperarousal and Positive and Negative Affect Scale for Children) Self-esteem: Child Profile (based on The Self-Perception Profile for Children 7–12 years) and Adolescent Profile (based on Self Perception Profile for Adolescents over 12 years) QoL: Revised versions of The Perceived Illness Experience Scale [to patients] and The Sibling Perception	Cohort - Within- subjects repeated measures design	The findings indicated that in terms of children's levels of physical symptom distress, younger children (7–12 years), and those with an illness, benefited from the camp programme. Some benefits were noted in relation to children's affect, self- esteem and quality of life.





				All taken at time 1 (2 weeks before programme), time 2 (2 weeks after programme), and time 3 (6m later)		
Lee et al (2016, UK Scotland)	Intervention Baseline N=33, 3m N= 31, 6m N=30 Control Baseline N=32, 3m N= 30, 6m N=29	Insufficiently active postnatal women (given birth between 6 weeks and one year previously). Intervention: Mean age (SD)= 33.1 (4.1) Median no. of children (range)= 1 (1-4) Employment status (%)= maternity leave/housewife 94%, working 6%, unemployed 0% Marital status (%)= married/cohabitating 97%, single 3% Control: Mean age (SD)= 33.8 (5.4) Median no. of children (range)= 1 (1-5) Employment status (%) = maternity leave/housewife 74%, working 16%, unemployed 9% Marital status (%)=married/cohabitating 100%, single 0%	Intervention: Physical activity consultation and pram walking group Control: Received an information leaflet "Active Living during and after Pregnancy"	 Psychological well-being: Adapted General Well-Being Index (AGWBI). Fatigue: Visual analogue scale (VAS) response to one question. All taken at baseline, 3 months and 6 months. Interviews post trial themes identified through thematic analysis: (i) personal reasons for participating in the trial and wanting to be active; (ii) belief in benefits gained by becoming more active as a result of joining the trial 	Mixed methods (RCT and interviews)	The MAMMiS study found no impact of the physical activity intervention on health outcomes for postnatal women. Changes in general psychological well-being were not significantly different between the postnatal women receiving a physical activity consultation and taking part in pram walking and those receiving an NHS leaflet. There was no effect of the intervention on wellbeing. There was a significant positive impact on fatigue at three-month follow-up, but this was not sustained at six months. Interview findings summarised and show: (i)motivation to take part based on concerns about wellbeing; (ii) perceptions of increased WB in taking part



Mason and Conneeley (2012, UK England)	N=6	Family dynamic: Male carers (biological or non-biological fathers) of a preschool child identified as requiring additional support due to developmental, environmental or family factors. Fathers: Age range: 20s-60s (3 in their 20s, 2 in their 30s, 1 in his 60s) Ethnicity: 4 white, 1 white- Irish, 1 Afro-Caribbean No. of children: ranged between 1-4 (mode: 2)	Intervention, fathers and children attending the allotment project for 4 hours every 2 weeks, participating in gardening tasks, crafts, and nature activities. Control: no control	Method: Focus groups using pre- existing groups and observations from reflective diary of researcher Themes identified through Interpretive Phenomenological Analysis: (i) relationship with child (shared time; bonding; generativity; parenting skills); (ii) experience of the occupational form ('Daddish' activity; emotional response; social elements); (iii) the child's experience (learning; (improved behaviour; subjective experience; being active); (iv) positive identity (challenging stereotypes; being a role model)	Qualitative	"The findings offer an alternative view of the meaning of horticulture, showing that the interactions with others can be more important than the interaction with nature. Belonging to a group with a strong identity enabled the fathers to shrug off some of the stigma of their social situation. The allotment provided a masculine social and occupational environment, where the fathers could develop a stronger relationship with their child."
Morrow et al (2014, UK England)	N=4	Family dynamics: Camping trips and experiences with partners Gender: female Age range: 21-30	Intervention investigated individuals' lived experience of camping Control: no control	Method: Guided interviews with participants over a 2 month period. Photographs used to elicit memories. Theme identified through descriptive phenomenological approach: 'Camping as a Relationship Maintenance Strategy'	Qualitative	All 4 respondents saw camping as a bond-reinforcement experience and in some cases a repair and strengthening process.
Pickering et al (2013, UK Wales)	Intervention Recruited N=17, analysed N=17 Control Recruited N=18, analysed N=8	Family dynamic: Children with cerebral palsy attended the project with a family member – usually a parent plus a sibling. Age range: 2-17 Conversation style: 12 able to have a verbal conversation, 3 pre-verbal using Makaton sign language to communicate, 2 used gesture with verbal	Intervention: 6 adapted cycling sessions (6 weeks) Control: information about adapted cycling.	Method: Structured interviews (at start and end of 6 weeks for cycling group and at week 6 only for control group) and participant diaries. Themes identified: (i) learning a new skill – cycling; (ii) the impact on the wider family and friends; (iii) an opportunity for social participation; (iv) future aspirations	Qualitative	Children who took part in adapted cycling enjoyed the experience, which improved their sense of wellbeing.



	1					
Van der Riet et al (2017, Thailand)	N=16 (8 children and 8 family members)	utterances as well as signing, 8 had some form of dysarthria, making the quality of their speech difficult to hear without assistance from an adult familiar with their style. Gender: intervention 7 male & 10 female, control 6 male & 2 female Family dynamics: 7 parents and 1 grandparent of sick child (none were short stay patients). Age range: parents 29 - 35 years, grandmother was in her 60 s. Children 10 months - 14 years.	Intervention, provision of a 'fairy garden' (FG) for children (and their families) who are suffering with illness. The family members and children participated in formal and informal activities in a child-centred environment within a	Method: Semi-structured interviews (split into 4 focus groups) over 5 weeks. Dimensions and storylines identified through narrative inquiry through story telling (using Cladinin's (2007) framework).	Qualitative	The FG offered a therapeutic modality of healing improving the QoL of the sick children. Storylines included happiness, relaxation, cooperation from the children, social interaction and learning. For the family members it provided opportunities to relax with their child, watch their child play and
		her 60 s. Children 10 months - 14 years <u>.</u>	activities in a child-centred environment within a	framework).		opportunities to relax with their child, watch their child play and
		Gender: adults 5 female, 3 male	hospital in northern Thailand.			encouraged the child to eat.
			Control: no control			



Wolf et al (2015, Australia)	Interviewed N=31 Survey N=170 (156 completed not included in synthesis in this review)	Participants were first time and repeat participants (RP). Family dynamic: with a partner 34% of first timers, 26.4% of RPs; friends/relative 30% first timers, 33% of RPs; parents/children 16% first timers, 5.6% of RPs. Age: 18 years and over, with the majority aged over 54 years (72%). Gender: first timers 44% female, RPs 53.3% female.	Intervention, visitor experiences of a National Park tour series in Australian national parks. Tours were guided by volunteers and included walking, driving, mountain biking, kayaking and educational tours. Control: no control but the study distinguished between first time visitors and repeat participants.	Method: semi-structured telephone interviews and survey Participants reported improvements in four interconnected domains: relationship building; improvements in health and wellbeing; and increased environmental stewardship.	Qualitative Interviews (Survey data not included for this review – aggregated data; family factors not clear)	Participants in the series accrued improvements in relationship building, health and wellbeing and self-competence. Critical success factors for tours were their repetition, thematic connectivity, guidance by the same volunteers and staff, and appeal to a like- minded market, all fostering continued commitment.
UNPUBLISHE	ED (GREY) LITER	ATURE				
Cook M. (2015, UK Scotland)	Preliminary interviews: N=30 Pilot woodland activity programme: N = NR	Preliminary interviews: with rangers, artists and Alzheimer Scotland staff involved in the delivery of outdoor activity programmes and local dementia walking groups across Scotland. People with dementia and carers included participants of organised outdoor activity programmes and members of local dementia walking groups, as	Pilot woodlands programme: Woodlands activity programme for people with early stage dementia. Activities included woodland walks, bird box building, photography, willow weaving, bird and tree identification, fire lighting and woodland cooking.	Qualitative – 1. preliminary research and interviews (to inform the development and delivery of the pilot) 2. Pilot woodland activity programme - Observations during the activities, and formal interviews with participants (people with early- stage dementia and their carers) as well as facilitating staff (including rangers and health professionals), at the end of the 10-week programme.	Pilot project - preliminary research and interviews and evidence from a pilot woodland programme	The woodlands programme had positive wellbeing outcomes on the participants and their carers including enhanced feeling of mental wellbeing, supporting valued activities, increased sense of empowerment and control, encouraging social interaction and connecting to nature.



		well as those who enjoyed participating in outdoor activities independently. Pilot woodland activity programme: People with early stage dementia. Attended unaccompanied but were also welcome to bring along a family member, friend or carer with them to take part in the activities	Control: no control			
Evans et al., (2016, UK England)	N=206 new mums, 209 children	93% of the mothers were under-active (less than 150 minutes of activity each week).	Intervention: Active Mums Cycling project. 4-8 week delivery of sessions. Control: no control	Qualitative - quotes from participants and participant video footage	Impact summary	The Active mums cycling group had positive wellbeing outcomes for the participants quoted including more time spent with the family outside; increased physical activity; increased sociability (making new friends); improved confidence and enhanced mental health and wellbeing.

what works wellbeing

Overview of Quality of Included Studies

The scores for the quantitative quality checklists are presented in Table 2. For the quantitative studies (including the quantitative component of the mixed methods study), the most frequent methodological weaknesses within the studies were not having a clear process for determining and reporting drop-out and dose, not having an appropriate method for the treatment of missing data, not controlling for confounding factors, not being able to blind participants or measurements, not including assessment information independent of the participants, and inadequate reporting of statistical analysis clearly. Common (all studies meeting the criteria) strengths included; using appropriate measures, independent of treatment measures, giving measures before and after the intervention/control, and using appropriate methods to analyse the data. The results of the quality checklist for quantitative studies were varied with a score of 16/25 (Kiernan et al., 2004), 21/25 (Finkelstein et al., 2013), and 22/25 (Lee et al., 2016 – quantitative component of mixed methods study).

The scores for the qualitative quality checklists are presented in Table 3. For the qualitative studies the most frequent methodological weaknesses within the studies were limited discussion of recruitment strategies, a lack of rigor in data analysis, no adequate discussion of relationships between participants and researcher and a lack of detail regarding ethical issues. One study did not make an explicit connection between the findings and subjective wellbeing and in another the link between the research question and methods selected was not clarified. The results of the quality checklist for qualitative studies varied with Goodenough et al (2015) and Wolf (2015) scoring the worst (meeting 5 out of 9 criteria) and Mason et al (2012) scoring the best by meeting all criteria.

The use of the GRADE schema for judging quality of quantitative evidence means that despite the inclusion of RCT designs, overall the quality of the published quantitative evidence on outdoor recreation interventions to enhance wellbeing in families (measured as quality of life, self-esteem or psychological wellbeing) is low and the quantitative evidence finds no effect of that outdoor recreation interventions in enhancing wellbeing in families. This judgement reflects the lack of quantitative evidence in total, methodological limitations noted above, small sample sizes in studies, some sample bias and inadequate reporting of statistical analysis.

The use of the CERQual schema for judging the quality of the qualitative evidence means that despite the inclusion of one study which met all quality criteria (Mason et al., 2012) and two others meeting all but one criteria (Bell et al., 2015/17; Ashbullby et al., 2013) a low confidence rating was given to the review findings. We can have low confidence from the evidence in this review that outdoor recreation leads to wellbeing enhancement through improvements in self-competence learning and identity accrued when families connect to



nature, or through improving social bonding as a family in nature settings due to the major concerns with adequacy of the evidence and moderate concerns with methodological limitations and coherence in the evidence. We can also have low confidence that outdoor recreation leads to wellbeing enhancement by enhancing escapism, relaxation and sensory experience due to the major concerns with adequacy of evidence and moderate concerns with coherence of the evidence (see table 6)

Using the PHE Arts for Health and Wellbeing Evaluation Framework, the evidence from one of the grey literature reports was judged to have a high degree of credibility as it included descriptive and theoretical detail about evaluation methods and acknowledged the limitations of evaluation design. The second grey literature report relied on face value reporting of participants' accounts rather than developing latent forms of thematic analysis informed by identified theory where appropriate. The sample size was large for a qualitative evaluation and although not detailed in analysis it does provide an insight into the wellbeing benefits of a cycling project for new mums and their children.



Table 5 Summary of numerical results (published studies)

Author	Intervention	Outcome	Baseline		Follow up 1		Follow up 2		Effect size
(date)		(measure)	Intervention Numbers Mean (SD)	Control Numbers Mean (SD)	Intervention Numbers Mean (SD)	Control Numbers Mean (SD)	Intervention Numbers Mean (SD)	Control Numbers Mean (SD)	
Finkelstein et al (2013)	An incentive- based pedometer step program	1. QoL (parent- administered Paediatric Quality of Life Inventory [PedsQL 4.0])	N=147 (106 families) PedsQL aggregate score M = 83.22 (1.15) PedsQL physical health score M = 89.43 (1.41) PedsQL psychosocial health score M = 79.53 (1.26)	N= 138 (106 families) PedsQL aggregate score M = 82.51 (2.71) PedsQL physical health score M = 89.78(3.10) PedsQL psychosocial health score M = 78.08 (3.22)	N= 138 (ITT analysis: 147) PedsQL aggregate score M = 80.70 (2.16) PedsQL physical health score M = 86.50 (3.09) PedsQL psychosocial health score M = 77.50 (2.23)	N= 113 (ITT analysis: 147) PedsQL aggregate score M = 78.71 (2.99) PedsQL physical health score M = 83.73 (3.35) PedsQL psychosocial health score M = 75.97 (3.55)	N/A		Difference-in-difference (controlling for age, sex, and ethnicity) PedsQL aggregate score 1.29 (2.39) PedsQL physical health score 3.12 (3.34) PedsQL psychosocial health score 0.07 (2.42)
Kiernan et al (2004)	The Barretstown Gang Camp: an international summer therapeutic recreation programme for European children with	1. Affect: positive affect, negative affect and physiological hyperarousal (based on The Physiological Hyperarousal and Positive	N = 240 <i>Affect</i> Physiological hypological hypologic	perarousal 1: M = 1.46 (NR) perarousal M = 1.53 (NR) overall means):	N= 151 <i>Affect</i> Physiological hypera (Patients): M = 1.36 Physiological hypera (Sibling): M = 1.53 (N <i>Self-esteem</i> Children 7-12: <u>Patients</u> : M = 3.15 (N	rousal scores (NR) rousal scores NR) NR)	N= 119 <i>Affect</i> Physiological h scores (Patient 1.39(NR) Physiological h scores (Sibling (NR) <i>Self-esteem</i>	yperarousal ts): M = yperarousal): M = 1.53	Affect Significant multivariate interaction effects in IndexXAgeXTime, F(6;386) =2.0,p<0:05 and IndexXPatient/Sibling StatusXTime,F(6,384) =3:35,p<0:05. Univariate analyses: physiological hyperarousal scores differed by AgeXTime, F(2;194) =5:76;p<0.005 (interaction due to difference between children's and teenagers' scores at Time



Author	Intervention	Outcome	Baseline		Follow up 1		Follow up 2		Effect size
(date)		(measure)	Intervention	Control	Intervention	Control	Intervention	Control	
			Numbers	Numbers	Numbers	Numbers	Numbers	Numbers	
			Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	
	life threatening illnesses, and their siblings	and Negative Affect Scale for Children) 2. Self-esteem (Child Profile and Adolescent Profile) 3. QoL (The Perceived Illness Experience Scale [to patients] and The Sibling Perception Questionnaire [to siblings])	Mean (SD) negative effect (M = 1.6 (NR) Self-esteem Children 7-12: Patients: M= 3.1 Siblings: M = 3.1 Teenagers 13-16 Central Europea Southern Europea Southern Europea Solthern Europea Siblings (children Siblings (teenage) (NR)	(overall means): .6 (NR) . (NR) .2: n: M = 2.46 (NR) ean: M = 2.54 24 (NR) <u>n)</u> : M = 2.14 (NR) <u>ers</u>): M = 2.02	Siblings: M = 2.7 (NR <u>Teenagers 13-16</u> : Central European: M Southern European: <i>QoL</i> Patients: M = 2.24 (N Siblings (children): N Siblings (teenagers):	Wean (SD)) I = 2.92 (NR) M = 2.0 (NR) IR) I = 1.8 (NR) M = 2.02 (NR)	Children 7-12: Patients: M = 3 Siblings: M = 3. Teenagers 13-1 Central Europe (NR) ¹ Southern Europ (NR) ¹ QoL Patients: M = 2 Siblings (childred) (NR) ¹ Siblings (childred) 2.02 (NR)	Mean (SD) :22 (NR) 23 (NR) .6: an: M = 2.96 bean: M = 3.06 .24 (NR) en): M = 1.72 gers): M =	2 which produced a simple main effect, F(1;117) =4:13;p<0:05). and by Patient/Sibling StatusXTime, F(2;196) =9:58;p<0.001. Self-esteem Children: significant main effect for Time, F(10;78) =2:38,p<0.05 and a significant IndexXPatient/Sibling Status interaction, F(10,78) =0.71,p<0:05. Univariate analyses: global self-worth scores changed by Patient/ Sibling StatusXTime, F(2,174) =4.77,p<0:01. Teenagers: significant interaction for IndexXNationalityXTime, F(14,44) =1.87,p<0:05. Univariate analyses: only physical appearance scores differed by Time X Nationality, F(4,28) =4:84,p<0.005. Southern European teenagers decreased from Time 1 to Time 2 and rose at Time 3 producing a simple main effect, F(2,4) =11.81,p<0:05. The mean value of 14.2 for Western Europeans did not change significantly over time, F=(2,10),ns. QoL Patient: M= 2.24, did not change across time, F(2;152) =1:79;ns. Sibling: main effect of Time, F(2,40) =13.62,p<0:001 and a TimeXAge



Author	Intervention	Outcome	Baseline		Follow up 1		Follow up 2		Effect size
(date)		(measure)	Intervention Numbers Mean (SD)	Control Numbers Mean (SD)	Intervention Numbers Mean (SD)	Control Numbers Mean (SD)	Intervention Numbers Mean (SD)	Control Numbers Mean (SD)	
	Physical	1	N - 22	N- 22	N- 21	N- 20	N-20	N-29	interaction, $F(2,40) = 5:74, p<0:01$. Children's scores decreased from Time 1 to Time 2 and Time 3 producing a simple main effect, $F(2,34) = 16.6; p<0:001$. The mean score for teenagers did not change significantly $F(2,6) = 3.6, ns$.
(2016)	activity consultation and pram walking group	Psychological well-being (Adapted General Well- Being Index) 2. Fatigue (Visual analogue scale)	Psychological Well Being M = 86 (10.6) Fatigue Median (IQR) = 44 (31,66)	Psychological Well Being M = 90 (8.1) Fatigue Median (IQR) = 28 (20,49)	Psychological Well Being M = 89 (9.9) Fatigue Median (IQR) = 26(15,58)	Psychological Well Being M = 89 (8.2) Fatigue Median (IQR) = 49 (26,61) ¹	Psychological Well Being M = 88 (10.1) Fatigue Median (IQR) = 49(16,62)	Psychological Well Being M = 92 (7.5) Fatigue Median (IQR) = 27 (17,46) ⁻¹	Between groups' differences from baseline to three- ($p = 0.09$; 95%Cl-0.77, 10.95) and three-to six-month follow-up ($p = 0.19$;95%Cl -9.68,1.97). <i>Fatigue</i> Between groups' differences from baseline to three- ($p < 0.01$; 95% Cl -36.49, -9.14, in favour of intervention) and three to six months ($p < 0.01$; 95% Cl5.20,34.86, in favour of control).

<u>Key</u>

 $^{1}p<0.05$ between groups: in favour of intervention, $^{-1}p<0.05$ between groups: in favour of control, ITT = Intention to treat analysis, NR = Not reported, NA = Not applicable *p<0.05 from baseline to follow up within groups



Evidence on outdoor recreation, families and wellbeing summary and synthesis of findings

Study participants

The review includes published data from 826 participants from nine countries – England, Ireland, Scotland, Wales, Norway, Canada, Thailand, Australia and Singapore. One UK-based study did not report participant numbers. Of the total participants 350 were involved in randomised controlled designs and 24 in a cohort study. 452 participants were involved in qualitative research methods. Participants were involved in family participation in diverse ways. Studies included couples with no children, mothers and fathers with one or more children and single parents with one or more children. Where demographic characteristics of participants were reported, this revealed a mix of gender, age, socio-economic and employment status, and ethnic backgrounds including white Caucasian, Chinese, Malay and Indonesian.

The review also includes unpublished data from 445 participants in the UK (Scotland and England). In this grey literature participants were both male and female. 30 participants with early stage dementia were involved in qualitative interviews. 206 new mothers and 209 children were involved in gathering verbal testimonial and video commentaries and images.

Types of outdoor recreation interventions or programmes and potential pathways to impact

Interventions in the published literature varied and included: open nature or national park multi-activity including hiking (Balkien et al., Jakubec et al., 2014; Finkelstein et al., 2013; Wolf et al., 2015), gardening (Mason and Conneeley, 2012; Van der Riet et al., 2017), beach or coastal visits (Ashbullby et al., 2013; Bell et al., 2015, 2017), bush craft or woodland activity (Goodenough et a;., 2015), multi-activity camps (Kiernan et al., 2004), cycling (Pickering et al., 2013), pram walking (Lee et al., 2016), and camping (Morrow et al., 2014).

Studies included families in diverse ways and involved mothers and fathers together with one or more children, mothers with one or more children, fathers with one or more children, couples without children, grandparents and siblings. One grey literature report (Cook et al., 2015) used a woodland activity intervention programme (in Scotland) for people with early stage dementia. Activities in this programme included woodland walks, bird box building, photography, willow weaving, bird and tree identification, fire lighting and



woodland cooking. An unpublished report by Evans et al (2016) employed a cycling intervention for new Mums and their children in Devon (England, UK).

Whilst studies did not provide prescriptions about how programmes should be delivered for wellbeing outcomes some commented on possible pathways to impact including peersupport mechanisms, the inclusion of professional practitioners with expertise in outdoor physical activity and the environment, community focused approaches including leveraging parental networks for targeting and recruiting participants, personalised/tailored activity programmes, and a focus on the therapeutic benefits of nature and physical activity.

Wellbeing measures and themes

A wide variety of wellbeing measures were used in the quantitative published literature, perhaps reflecting the fact that *subjective wellbeing* is a relatively recent topic of study in the outdoor recreation sector and that associated concepts such as self-esteem, confidence and anxiety have historically provided an emphasis for measurement. In the UK, it is only since April 2011 that personal wellbeing has been measured by the ONS. The Annual Population Survey (APS) includes four questions which are used to monitor personal wellbeing in the UK; (1) Overall, how satisfied are you with your life nowadays? (2) Overall, to what extent do you feel the things you do in your life are worthwhile?; (3) Overall, how happy did you feel yesterday?; (4) Overall, how anxious did you feel yesterday?

The measures used in the included published studies reflect some of these domains to some extent. An overview of wellbeing outcome measures used in the included studies can be found in Appendix 1. Two studies measured quality of life using different tools (paediatric quality of life inventory, perceived illness scale; sibling perception questionnaire). One paper measured self-esteem as a marker of wellbeing. Other validated measures encompassed several dimensions of psychological wellbeing, such as emotion/affect, psychological hyperarousal, fatigue, and general wellbeing. A summary of the numerical results for the quantitative papers included in this review can be found in Table 5.

Wellbeing evaluations in the qualitative studies used interviews and observations to assess several themes identified with wellbeing including perceived social family interactions, cultivation of family bonding, therapeutic experience, connecting with nature, parental relationships, positive sense of self, sensory activation and environmental stewardship. In the grey literature interviews, observations and testimonial and video commentary evaluated wellbeing using thematic analysis. Evaluations discussed subjective wellbeing in terms of physical wellbeing and mental restoration (including sense of escape and freedom, enjoyment and fun) nature connectedness related to sense of place, sensory stimulation, social development and human connectedness, and symbolic/ cultural/spiritual significance in terms of religious and spiritual expression; meaning and identity.



The effect of family participation in outdoor recreation on 'Quality of Life'

Two quantitative studies measured the effect of family participation in outdoor recreation intervention on quality of life of children. Finkelstein et al (2013) used the Parentadministered Paediatric Quality of Life Inventory [PedsQL 4.0] in an organised outdoor weekend intervention for families in Singapore. Compared with controls, children in the intervention group exhibited small increases in outcome measures related to post PedsQL aggregate scores (at follow-up intervention M=80.70, SD=2.16; control M=78.71, SD=2.99). The differences were not statistically significant and therefore the study showed no effect. Compared with controls, children in the intervention group exhibited small increases in outcome measures related to post PedsQL psychosocial health scores (at follow-up intervention M=77.50, SD=2.23; control M=75.97, SD=3.55). The differences were not statistically significant and therefore no effect was found. Kiernan et al (2004) conducted a cohort study on an outdoor activity camp in Ireland for children with chronic illness and their siblings. Quality of Life was measured using the Perceived Illness Scale for Patients and the Sibling Perception Questionnaire (delivered to children and teenagers). The mean Quality of Life Score for patients (M=2.24, SD NR) did not change across time and therefore no effect was found. Results of the selective sub-group analysis were not adequately reported therefore it is not possible to make comment on the sub-group analysis. Reasons identified by the authors to explain the lack of significant effects included a short study duration not sufficient to produce improvement in guality of life, outcome measures not sensitive enough to detect small improvements and a small sample size.

The effect of family participation in outdoor recreation on 'Self Esteem' and other measures of 'Psychological 'Wellbeing'

One cohort study (Kiernan et al., 2004) measured wellbeing as self-esteem using the Self Perception Profile for Children (7-12 years) and the Self Perception Profile for Adolescents (12 years +). Numerical results, as means and standard deviations were not adequately reported therefore it is not possible to make comment on the analysis.

Psychological wellbeing was measured in several additional ways in two of the quantitative studies. Kiernan et al (2004) used 'The Physiological Hyperarousal and Positive and Negative Affect Scale for Children. Numerical results, as means and standard deviations were not adequately reported and therefore it is not possible to make comment on the analysis. Lee et al (2016) found no significant differences in general psychological well-being (Adapted General Wellbeing Index) and therefore no effect of the intervention between postnatal women receiving a physical activity consultation and taking part in pram walking and those receiving an NHS leaflet from baseline to three- (p = 0.09) and three-to six-month follow-up (p = 0.19) (intervention 3 mths. M=89, SD = 9.9; 6 mths. M=88, SD=10.13: control 3 mths. M=89, SD=8.2; 6 mths. M=92, SD=17.5). There was a significant positive impact on fatigue (Visual Analogue Scale) at three-month follow-up between intervention group and control,



(p < 0.01; 95% CI –36.49, –9.14, in favour of intervention) but this was not sustained at six months (p < 0.01; 95% CI5.20,34.86) in favour of control) (intervention 3 mths. M=26, IQR = 15,58; 6 mths. M=49, IQR=16,62: control 3 mths. M=49, IQR=26,61; 6 mths. M=27, IQR=17,46). Summarised interview findings in this study indicate that participants were motivated to take part in the intervention because of concerns about their personal wellbeing. Participants reported a perceived improvement in personal wellbeing through taking part in the intervention. A full report on participant experiences listed in the reference section of this study was not accessible.

Synthesis of qualitative evidence

Thirteen qualitative studies (10 qualitative only, 2 grey, 1 mixed methods) included in this review examined the impact of family participation in outdoor recreation on wellbeing. Overall, they focus on the contribution of positive family relationships to wellbeing, but they do so in diverse theoretical ways and using a mixture of qualitative methods (interviews, observations, testimonials, video commentary, diaries). In synthesising the qualitative evidence, three key findings are identified, which concern the wellbeing impact of taking part in outdoor recreation with families on (i) improvements in self-competence learning and identity through family connection to nature, (ii) enhancing escapism, relaxation and sensory experience, and (iii) improving social bonding as a family. For each review finding in this synthesis, CERqual has been applied. The Qualitative Evidence Profile is presented in Table 6 and we provide a narrative discussion of the findings and the levels of confidence we can have in them.



Table 6: CERqual Qualitative Evidence Profile

Review findings	Studies	Methodological	Relevance	Coherence	Adequacy of	Overall	Explanation of
	contributing to	limitations	component	component	data	CERQual	judgement
	the review	component			component	assessment of	
	finding					confidence	
Taking part in outdoor recreation with families improves self- competence learning and identity through family connection to nature.	Baklien et al (2016);Goodenough et al (2015) Wolf et al (2015); Jackubec et al (2014); Cook et al (2015); Mason and Conneeley (2012); Van der Riet et al (2017)	Moderate concerns (3 studies had several limitations, 4 had minor methodological limitations)	Minor concerns about relevance (all studies looked at outdoor recreation and family)	Moderate concerns about coherence (data reasonably consistent within studies, low consistency across studies on family dynamic, setting and intervention)	Major concerns about adequacy (only 7 studies mixed re: rich and thin data)	Low confidence	Graded as low confidence due to the major concerns with adequacy and moderate concerns with methodological limitations and coherence
Taking part in outdoor recreation with families improves wellbeing via escapism, relaxation and sensory experience	Baklien et al (2016; Cook et al (2015); Jackubec et al (2014); Bell et al (2015/17); Ashbullby et al (2013); Van der Riet et al (2017)	Minor concerns (all studies had minor methodological limitations)	Minor concerns about relevance (all studies looked at outdoor recreation and family)	Moderate concerns about coherence (data reasonably consistent within studies, low consistency across studies on family dynamic, setting and intervention)	Major concerns about adequacy (only 6 studies mixed re: rich and thin data)	Low confidence	Graded as low confidence due to the major concerns with adequacy and moderate concerns with coherence
Taking part in outdoor recreation with families improves social bonding as a family	Ashbullby et al (2013; Van der Riet et al (2017); Baklien et al (2016); Goodenough et al (2015); Morrow et al (2014); Pickering et al (2013); Evans et al (2016)	Moderate concerns (all had moderate methodological limitations)	Minor concerns about relevance (all studies looked at outdoor recreation and family)	Moderate concerns about coherence (data reasonably consistent within studies, low consistency across studies on family dynamic, setting and intervention)	Major concerns about adequacy (only 7 studies mixed re: rich and thin data)	Low confidence	Graded as low confidence due to the major concerns with adequacy and moderate concerns with methodological limitations and coherence



Taking part in outdoor recreation with families improves self-competence, learning and identity through family connection to nature.

Baklien et al (2016) consider that for family members, hiking involves different skills and tasks and that in sharing experiences of learning or doing these tasks, memories are formed that strengthen family identities through the nature experience. Family members become more aware of their shared existence developing a common aim and closeness in the nature environment. Mason and Conneeley (2012) reported that gardening activity in local allotments provided a masculinity validating experience for fathers living in socially deprived communities and with children identified as needing support due to developmental, environmental or family issues. Allotment activities provided opportunities for learning skills connected to horticulture, and social wellbeing was enhanced through a shared occupation and sense of meaning achieved in the connection with nature. In Jackubec et al's (2014) study of day trips, week-end and week-long nature activities for adults with disabilities and caregivers in Canada, a connection to nature through inclusive activity, offered through a Government sponsored support programme, provided opportunities for both to experience a reinvention of the self and a reimagining of more equal relationships. Both carers and those living with disabilities took part in the same activities. Supported by professional practitioners (Forest Rangers) and harnessing support of family and peers/friends, the activities allowed carers to feel free to participate without worry and to experience an environment where their family member appeared to them to have higher wellbeing through being more content. Family relationships were renewed and more balanced through the inclusive nature activities and such wellbeing gains were reported to last several days after the experience. Natural places, spaces and the activities provided transformative experiences for those with disabilities who could, for example leave wheelchairs on land to take part in kayaking. Carers also highlighted a chance to remember a time before their family member became disabled as a positive experience they could associate with their personal and family identity. A sense of nostalgia was reported in Cook et al's (2015) unpublished evaluation on the impact of woodland activities for wellbeing improvements in participants with early stage dementia and their caregivers (most of whom were family members). Being treated as normal and having a chance to share knowledge by being in contact with family and other people supported the wellbeing of those with dementia and their carers by developing a sense of meaning, identity and autonomy through connecting to nature, and learning and demonstrating woodland skills. Pickering et al's (2013) study of an adapted cycling intervention for children with cerebral palsy included family members. The findings illustrated that children in this study reported positive wellbeing impacts from taking part through learning a new skill (cycling), an opportunity for being sociable and meeting people and by developing a new sense of capability and future aspiration. These wellbeing improvements had a positive impact on wider family and friends who could see the encouraging outcomes of the project on the children and suggest the potential for urban outdoor recreation, specifically cycling, to improve wellbeing in families.



Van der Riet et al (2017) explored the impact of providing activities in a hospital 'fairy garden' to children with chronic illness and their families. Improvements in quality of life, happiness, social interaction and learning were recorded for those children who engaged with the fairy garden alongside family members. In Goodenough et al's (2015) study, conducted with families living in known areas of rural and urban social deprivation found woodland bush craft activity to be a learning experience for both children and their parents or grandparents providing a unique opportunity for families to affirm existing family relationships or build new positive ones. Wolf et al's (2015) study of Australian National Park's (New South Wales) showed that opportunities for visitors to take part in biking, bush walking, four-wheel driving kayaking and special interest talks in history, environmental issues and geology created a connection to nature as the context in which families could build relationships through becoming aware and knowledgeable about the natural environment. Positive wellbeing was experienced through the strengthening of family bonds and developing new relationships with others who cared for and knew about nature. Increased self-competence, learning, and a sense of environmental stewardship were associated with taking part in nature-based activities with family members.

Taking part in outdoor recreation with families improves wellbeing through escapism, relaxation and sensory experience

Baklien et al (2016) identified positive impacts of hiking on family dynamics associated with the ability of families to be active in a place that was different to everyday life. Natural places and spaces contributed to a sense of relaxation through an escape from the usual task of family life (work, school, domestic chores). Participants in Jackubec et al's (2014) study who were living with disability experienced a heightened sensory experience through outdoor activity which enhanced their wellbeing. The natural environment evoked feelings of relaxation from hearing running water or having the warmth of the sun on their face, excitement at the touch of natural rock, and a sense that food tasted better in an outdoor natural space. A different sense of time, free from the pressures of everyday tasks contributed to a sense of escapism and relaxation. Similarly, Cook et al's (2015) study reported positive feelings of escapism from family caregivers and those with early stage dementia as well as a purposeful sensory experience. For the family members in Van der Riet's (2017) study, outdoor garden space in the form of a 'fairy garden' for sick children provided opportunities to relax with their child, watch their child play and encouraged the child to eat and be more cooperative. Bell et al's (2015/17) study of coastal environments and outdoor recreation defined a therapeutic value in connecting with coastal areas of nature for diverse families with different incomes and employment status. Specifically, wellbeing of family members was enhanced through a perceived sense of escape, the restorative quality of seascapes and an escape from negative emotions and challenges associated with early parenthood. For some participants, engaging in outdoor coastal activity with family members enhanced both a social and therapeutic experience which was



identified as having a positive impact on wellbeing. Ashbullby et al (2013) also identified the beach as a specific coastal environment for family outdoor recreation resulting in improved wellbeing of family members. Outdoor physical activity was identified as an important motivator for going to the beach. However, centrally important to being at the beach was experience of decreased stress and increased fun through a connection to nature. Parents were identified as key to enabling family visits to the beach and barriers including car parking expenses, distance to the beach and limited time were reported.

Taking part in outdoor recreation with families improves social bonding between family members

Baklien et al (2016) identified positive impacts of hiking on family dynamics associated with the ability of families to be active in a place where they were able to cultivate and identify with family values and pass experiences from parent to child through a connection to nature. The experience of being active in the natural environment becomes an established family tradition. Ashbullby et al (2013) also noted the significance of beach/coastal environments as places to interact with their own families and others suggesting that parental networks could be leveraged in increasing the time families spend in outdoor environments. In the UK, Goodenough et al (2015) found bush craft activities that encouraged engagement with woodland environments, to allow positive emotional experiences through the ability of family members to put aside negative emotions about bad parenting and to cultivate family cohesion and a sense of shared time in making nature available to the family. Parents and grandparents were motivated to engage children with natural environments as they perceived the experience would create happier children and develop their imagination. Witnessing children enjoying nature also created a sense of pleasure in parents who watched them, most often when the activity was new or novel. Watching creates a reflective opportunity for adults which was associated with developing closeness between adult and child family members through the nature-based activities. Considering the wellbeing impact of camping on couples with no children, Morrow et al., (2014) reported improvements in wellbeing via a positive bonding experience. Camping together provided an opportunity for repairing and strengthening relationships. In Evans et al's (2016) impact case study of a mother and child cycling programme, participants spent more time with the family outside, increased their physical activity through cycling, increased sociability with family and by making new friends, improved confidence and enhanced their sense of positive mental health and wellbeing.



Evidence of addressing wellbeing inequalities through outdoor activities

The studies in this review variously reported on the demographic characteristics of participants including household income, marital status, ethnicity, gender and age. Of the qualitative studies in this review, Bell et al (2015/2017) selected participants to reflect demographic diversity in socioeconomic status, age, employment status, income and family dynamic. Goodenough et al (2015) and Mason and Conneeley (2015) targeted participants from known socially deprived communities (rural and urban) and Jackubec et al. (2014), Pickering et al., (2013), Van der Riet et al., (2017) and Cook (2015) included participants with cognitive or physical disability. No studies in this review presented a detailed analysis of the relationship between wellbeing enhancement, natural outdoor activity and wellbeing inequalities.

Completeness of the included evidence

The review includes one randomised control trial, one mixed methods paper (RCT and interviews) and one cohort study (pre/post-test design) from the published literature. There are few published papers using rigorous systematic quantitative research designs to examine the subjective wellbeing outcomes of outdoor recreation for families. Ten published qualitative studies met our inclusion criteria. Seven of the included published studies were conducted in the UK providing some potential for drawing on the evidence for understanding the effect and impact of outdoor recreation for families on subjective wellbeing. Many studies contain data on individuals who are members of 'family' households, but do not provide detailed information about those household dynamics or a commentary on conceptualising 'family wellbeing'. Two unpublished reports on outdoor recreation and subjective wellbeing were included. Despite established evidence on the overall benefits of outdoor recreation on wellbeing and the prioritisation of wellbeing in UK policy and in organisations delivering outdoor recreation, very few evaluation reports were submitted or found for this review on outdoor recreation, families and wellbeing. We searched for a full report on participant experiences in the study by Lee et al (2016) but the report was not accessible.

Summary statement on quality of the included evidence

Overall the quantitative evidence finds no effect of outdoor recreation interventions in enhancing wellbeing in families. There is a lack of quantitative evidence in total, methodological limitations noted above, small sample sizes in studies, some sample bias and inadequate reporting of statistical data. In relation to the review findings from qualitative evidence, due to the major concerns with adequacy of evidence and moderate concerns with methodological limitations and coherence in the evidence we can have low confidence that outdoor recreation leads to wellbeing enhancement through improvements



in self-competence learning and identity accrued when families connect to nature, or through improving social bonding as a family in nature settings. We can also have low confidence that outdoor recreation leads to wellbeing enhancement by enhancing escapism, relaxation and sensory experience due to the major concerns with adequacy of evidence and moderate concerns with coherence of evidence. Most published studies obtained appropriate ethics approval, although this was not always reported extensively. Few studies provided exact details of the researcher's role, potential bias and influence on sample recruitment, setting and responses of participants.

Strengths and Limitations of the review process

The considerable number of hits following initial searches and the overlap between indoor and outdoor recreation means that it is possible that some relevant evidence has not been included in this report. The focus on a specific target group (families) will have excluded evidence from studies that have not specifically identified 'the family' as a context for their study but collected data on family members. However, the comprehensive search strategy ensures that this overview represents a comprehensive summary of all existing eligible studies published prior to the search dates and the pre-publication of our protocol on PROSPERO ensures methodological transparency and militates against potential post-hoc decision making which can introduce bias to the process. Dual screening of searches and data extraction and independent quality assessment of included reviews ensured a rigorous process.

There is a potential risk of publication lag, wherein possible important new evidence that has not yet been included in published articles and reports and is not identified and included.

The use of the GRADE and CERQual criteria introduces an element of subjective judgement. A consistent approach to judgements across the different interventions has been applied but it should be recognised that these judgements are open to interpretation.

Implications for research, policy and practice

Families play a role in determining levels of outdoor recreation and supporting outdoor activities for wellbeing enhancement. UK reports have identified that children are spending decreasing amounts of time outdoors and that the outdoor natural environment can enhance wellbeing in diverse population groups including those in good health and those experiencing health and wellbeing problems (see for example, CABE, 2010a, 2010b and Forestry Commission Scotland, 2009) Reviewing and understanding the evidence on outdoor recreation and families is both timely and significant for environment policy-makers



and service providers. There is established evidence on the wellbeing benefits of outdoor recreation which supports recent national policy agendas identifying wellbeing as an outcome in connecting with nature (e.g. Natural England, the Forestry Commission, the National Trust, the National Parks Association, English Heritage, Historic England). This policy focus needs to be accompanied by attention to agreeing definitions and developing relevant measures of wellbeing outcomes and evaluating what works to enhance wellbeing through outdoor recreation. National agencies may be influential in promoting this approach; conversely, a lack of national lead may discourage regional and local stakeholders from prioritising this. The development of a programme of wellbeing evaluation training would support key personnel in the outdoor recreation sectors in ensuring a comprehensive programme of delivery includes appropriate and rigorous monitoring and evaluation.

We used a definition of 'family' that would accommodate different family forms at various stages in the life course. In the evidence in this review there was a focus on parent-child relationships, couples without children with no health conditions, and couples in which one partner was caring for another who had physical or cognitive impairment. Family members took part in a wide variety of outdoor physical activities (e.g. walking, hiking, camping, mountain biking, cycling, gardening, beach/coastal visits, woodland activities, horse rising and canoeing). The quantitative studies showed no improvement in quality of life, selfesteem or other measures of psychological wellbeing from family participation in outdoor recreation. The available qualitative evidence suggests for wellbeing improvements to be realised through family engagement in outdoor recreation several factors need to be addressed. Outdoor recreation could be promoted more extensively as a family orientated activity. Wide access and opportunities could be ensured for families to engage in a diverse range of outdoor activities, adapted to be inclusive for those with physical and cognitive impairment. Outdoor recreation aimed at improving the wellbeing of family members is likely to have an impact if it is supported by local authority or national organisations to include peer support, professional support, a personalised/tailored approach and one that is community focused and locally available. Working with informal and formal parent networks may provide opportunities to reach and engage families in outdoor activities. Outdoor recreation can have positive impacts on the wellbeing of family members by providing opportunities for physical activity, family time together and the development of family values, activities that are different from everyday life, a sense of collective achievement and positive memories. The limited evidence identified in this review does not necessarily mean that wellbeing benefits are not accrued for families taking part in outdoor recreation. The evidence suggests that experiencing the outdoors by engaging in physical activity with family members improves wellbeing by building confidence, developing therapeutic and sensory feelings of relaxation and restoration, and enhancing a sense of meaning/purpose in family relationships.



It should be noted that the synthesis of qualitative findings and identification of the processes by which the wellbeing improvements happen has been drawn from context specific studies, which include several types of outdoor activity programmes for diverse families in various places. The findings may not be transferrable and generalizable, and the best studies warn against this.

There is scope to build evidence on wellbeing outcomes of outdoor recreation for families who take part through well-designed, rigorous and appropriate research methods which are underpinned by relevant theory and use established methods of analysis. There is also a need for such work to explore relationships between wellbeing inequalities and families' participation in outdoor recreation, and to examine whether and how outdoor recreation might support families with the lowest wellbeing. We do not know which outdoor activities might reinforce wellbeing inequalities due to issues of accessibility and cost

There is a need for further studies of the wellbeing impacts of outdoor recreation for families to be conducted and to be made public through academic and non-academic dissemination.



References

Included Studies: Outdoor Recreation, Families and Wellbeing Review

Published studies

- Ashbullby KJ, Pahl S, Webley P, White MP. The beach as a setting for families' health promotion: A qualitative study with parents and children living in coastal regions in Southwest England. Health & Place. 2013 Sep 30;23:138-47. <u>https://doi.org/10.1016/j.healthplace.2013.06.005</u>
- Baklien B, Ytterhus B, Bongaardt R. When everyday life becomes a storm on the horizon:
 Families' experiences of good mental health while hiking in nature. Anthropology & medicine. 2016 Jan 2;23(1):42-53. https://doi.org/10.1080/13648470.2015.1056056
- Bell SL, Phoenix C, Lovell R, Wheeler BW. Seeking everyday wellbeing: The coast as a therapeutic landscape. Social Science & Medicine. 2015 Oct 31;142:56-67. https://doi.org/10.1016/j.socscimed.2015.08.011 Full Text
- Bell SL, Wheeler BW, Phoenix C. Using Geonarratives to Explore the Diverse Temporalities of Therapeutic Landscapes: Perspectives from "Green" and "Blue" Settings. Annals of the American Association of Geographers. 2017 Jan 2;107(1):93-108. https://doi.org/10.1080/24694452.2016.1218269
- Finkelstein EA, Tan YT, Malhotra R, Lee CF, Goh SS, Saw SM. A cluster randomized controlled trial of an incentive-based outdoor physical activity program. The Journal of pediatrics. 2013 Jul 31;163(1):167-72. <u>https://doi.org/10.1016/j.jpeds.2013.01.009</u>
- Goodenough A, Waite S, Bartlett J. Families in the forest: guilt trips, bonding moments and potential springboards. Annals of Leisure Research. 2015 Jul 3;18(3):377-96. https://doi.org/10.1080/11745398.2015.1059769
- Jakubec SL, Carruthers Den Hoed D, Ray H. 'I Can Reinvent Myself Out Here': Experiences of Nature Inclusion and Mental Well-Being. In Environmental Contexts and Disability 2014 Nov 4 (pp. 213-229). Emerald Group Publishing Limited. ISBN: 978-1-78441 263-0
- Kiernan G, Gormley M, MacLachlan M. Outcomes associated with participation in a therapeutic recreation camping programme for children from 15 European countries: Data from the 'Barretstown Studies'. Social science & medicine. 2004 Sep 30;59(5):903-13. <u>https://doi.org/10.1016/j.socscimed.2003.12.010 Full Text</u>
- Lee AS, McInnes RJ, Hughes AR, Guthrie W, Jepson R. The effect of the More Active MuMs in Stirling trial on body composition and psychological well-being among postnatal women. Journal of pregnancy. 2016 Aug 16;2016. <u>http://dx.doi.org/10.1155/2016/4183648</u>
- Mason J, Conneeley L. The meaning of participation in an allotment project for fathers of preschool children. British Journal of Occupational Therapy. 2012 May;75(5):230-6. https://doi.org/10.4276/030802212X13361458480324
- Morrow R, Rodriguez A, King N. Camping: a tool for relationship maintenance? Therapeutic Communities: The International Journal of Therapeutic Communities. 2014 Jun



3;35(2):48-55. http://dx.doi.org/10.1108/TC-12-2013-0034

- Pickering D, Horrocks LM, Visser KS, Todd G. 'Every picture tells a story': Interviews and diaries with children with cerebral palsy about adapted cycling. Journal of paediatrics and child health. 2013 Dec 1;49(12):1040-4. <u>http://dx.doi.org/10.1111/jpc.12289 Full Text</u>
- Van der Riet P, Jitsacorn C, Junlapeeya P, Thursby E, Thursby P. Family members' experiences of a "Fairy Garden" healing haven garden for sick children. Collegian. 2017 Apr 30;24(2):165-73. <u>https://doi.org/10.1016/j.colegn.2015.11.006</u>
- Wolf ID, Stricker HK, Hagenloh G. Outcome-focused national park experience management: transforming participants, promoting social well-being, and fostering place attachment. Journal of Sustainable Tourism. 2015 Mar 16;23(3):358-81. <u>https://doi.org/10.1080/09669582.2014.959968</u>

Unpublished studies

- Cook M. Forests as places of mental well-being for people with dementia. Forestry Commission Scotland. 2015 June. <u>Full Text</u>
- Devon County Council. Impact Summary: Active Mums Cycling in Devon. 2016 Nov. Full Text

Additional References

- Benzies, K.M., Premji, S., Hayden, K.A. and Serrett, K., 2006. State-of-the-evidence reviews: advantages and challenges of including grey literature. *Worldviews on Evidence-Based Nursing*, *3*(2), pp.55-61.
- Bowler, D.E., Buyung-Ali, L.M., Knight, T.M. and Pullin, A.S., 2010. A systematic review of evidence for the added benefits to health of exposure to natural environments. *BMC public health*, *10*(1), p.456.
- Brymer, E., Cuddihy, T.F. and Sharma-Brymer, V., 2010. The role of nature-based experiences in the development and maintenance of wellness. *Asia-Pacific Journal of Health, Sport and Physical Education*, 1(2), pp.21-27.
- CABE (2010a) Urban green nation building the evidence base. CABE/DCMS, London. Crown Copyright.
- CABE (2010b) Community Green; using local spaces to tackle inequality and improve health. CABE/DCMS, London. Crown Copyright
- Daykin with Joss (2016) Public Health England Arts and Health Evaluation Framework <u>https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/49</u> <u>6230/PHE_Arts_and_Health_Evaluation_FINAL.pdf</u>
- Daykin, N., Mansfield, L., Payne, A., Kay, T., Meads, C., D'Innocenzo, G., Burnett, A., Dolan,P., Julier, G., Longworth, L. and Tomlinson, A., 2017. What works for wellbeing in culture and sport? Report of a DELPHI process to support coproduction and establish



principles and parameters of an evidence review. *Perspectives in public health*, *137*(5), pp.281-288.

- Edwardson, C.L. and Gorely, T., 2010. Parental influences on different types and intensities of physical activity in youth: A systematic review. *Psychology of Sport and Exercise*, *11*(6), pp.522-535.
- Forestry Commission Scotland (2009) Woods for Health. Edinburgh Crown Copyright
- Kay, T., 2004. The family factor in sport: A review of family factors affecting sports participation. *Driving up participation: The challenge for sport, 39*.
- Kay, T. and Spaaij, R., 2012. The mediating effects of family on sport in international Development contexts. *International Review for the Sociology of Sport*, 47(1), pp.77 94.
- Lewin, S., Glenton, C., Munthe-Kaas, H., Carlsen, B., Colvin, C.J., Gülmezoglu, M., Noyes, J., Booth, A., Garside, R. and Rashidian, A., 2015. Using qualitative evidence in decision making for health and social interventions: an approach to assess confidence in findings from qualitative evidence syntheses (GRADE-CERQual). *PLoS Medicine*, *12*(10), p.e1001895.
- Pretty, J., Peacock, J., Hine, R., Sellens, M., South, N. and Griffin, M., 2007. Green exercise in the UK countryside: Effects on health and psychological well-being, and implications for policy and planning. *Journal of environmental planning and management*, *50*(2), pp.211-231.
- Rugel, E., 2015. *Green Space and Mental Health: Pathways, Impacts, and Gaps*. National Collaborating Centre for Environmental Health.
- Sharma-Brymer, V., Brymer, E. and Davids, K.E.I.T.H., 2015. The relationship between physical activity in green space and human health and wellbeing: An ecological dynamics perspective. *Journal of Physical Education Research*, *2*(1), pp.7-22.
- Thompson Coon, J., Boddy, K., Stein, K., Whear, R., Barton, J. and Depledge, M.H., 2011. Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental wellbeing than physical activity indoors? A systematic review. *Environmental science & technology*, *45*(5), pp.1761-1772.
- Völker, S. and Kistemann, T., 2011. The impact of blue space on human health and wellbeing–Salutogenetic health effects of inland surface waters: A review. *International journal of hygiene and environmental health*, 214(6), pp.449-460



Appendix 1: Summary of wellbeing measures (published studies)

Measurement tool	Outcome measuring	Description	Scoring/ interpretation	Validity & Reliability
Quantitative				
Parent-administered Pediatric Quality of Life Inventory [<u>PedsQL</u> 4.0]	Quality of Life	23-item questionnaire that evaluates children's QoL in 4 core dimensions: physical (8 items), emotional (5 items), social (5 items), and school functioning (5 items). Parents rate how problematic each item is (in the last month) on a 5-point Likert scale (0, never a problem; 1, almost never a problem; 2, sometimes a problem; 3 often a problem; 4, almost always a problem)	The PedsQL 4.0 yields a Total Summary Score (23 items) and 2 sub scores: Physical Health Summary Score (8 items); Psychosocial Health Summary Score (15 items) Higher scores indicate better QoL (nb reverse scoring used; lower numbers indicate higher QoL score)	Internal consistency reliability: Total Scale Score (alpha = 0.88 child, 0.90 parent report), Physical Health Summary Score (alpha = 0.80 child, 0.88 parent), and Psychosocial Health Summary Score (alpha = 0.83 child, 0.86 parent). Validity: distinguishes between healthy children and pediatric patients with acute or chronic health conditions, related to indicators of morbidity and illness burden, and displays a factor-derived solution largely consistent with the a priori conceptually-derived scales. (Full text)
The Perceived Illness Experience Scale (revised)	Quality of Life	Administered to patients to determine the impact of chronic illness from the child's perspective. 40-item scale with 10 subscales (4 items in each): physical appearance, interference with activity, peer rejection, integration in school, manipulation, parental behaviour, disclosure, preoccupation with illness, food and, treatment. Each item is rated on a 5-point Likert scale from 1 (really disagree) to 5 (really agree). Revised measure: 24-item scale with 6 subscales: school/peer rejection (7 items), thinking about illness (3 items), physical appearance (3 items), interference with activity (3 items), parental responses (4items), and manipulation (3 items).	Scores are summed for each subscale and a total score calculated. Higher scores indicate more negative illness experience	Reliability of revised measure: alpha = 0.84 6 subscales: school/peer rejection (alpha=0.76), thinking about illness (alpha =0.65), physical appearance (alpha =0.68), interference with activity (alpha= 0.64), parental responses (alpha= 0.64), and manipulation (alpha=0.61).
The Sibling Perception Questionnaire (revised)	Quality of Life	Administered to siblings to assess siblings' feelings and attitudes to brothers and sisters with an illness, specifically cancer.	Separate scores are obtained for each subscale. Higher scores indicate a less positive perception of their brother's/sister's illness and its impact on their lives.	Reliability of revised measure: 14-item scale (alpha 0.84). Subscales: interpersonal (alpha 0.83), and intrapersonal (0.80).



		23-item scale with 4 subscales: interpersonal (9		
		items), intrapersonal (7 items), communication (4		
		items) and, fear of disease (3 items).		
		Each item is rated using a Likert-type scale from 1		
		(Never) to 5 (Always). Revised measure: 14-item scale		
		with 2 subscales: interpersonal (9 items), and		
		intrapersonal (5 items).		
The Physiological	Affect (positive affect,	48-item scale with 3 sub scales: positive affect (15	Separate scores are obtained for positive affect,	Reliability of revised measure: 34-item
Hyperarousal and	negative affect and	items), negative affect (15 items), and physiological	negative affect and physiological hyperarousal	scale (alpha 0.70). Positive affect (alpha
Positive and	physiological	hyperarousal (18 items). Respondents are required to	by summing ratings.	=0.79), negative affect (alpha=0.85) and
Negative Affect	hyperarousal)	indicate how often they have felt, for example,	Higher scores indicate higher levels of each.	physiological hyperarousal (alpha = 0.75).
Scale for Children		interested, sad, or experienced dry mouth and sweaty		
(revised)		hands during the past few weeks on a 5-point Likert		
		scale from 1 (Never) to 5 (Always).		
		Revised measure: 34-item scale: positive affect (11		
		items), negative affect (13 items), and physiological		
		hyperarousal (10 items).		
Child Profile (based	Self-esteem	The Self-Perception Profile for Children 7–12 years is	Separate subscale scores are obtained by	Reliability of revised measure: 21-item
on The Self-		a 36-item scale with 6 subscales (6 items in each):	summing ratings for items	scale (alpha=0.85). Subscales: global self-
Perception Profile		global self-worth, scholastic, social, athletic, physical		worth (alpha = 0.60), social acceptance
for Children 7–12		appearance, and behavioural conduct.		(alpha =0.62), athletic competence
vears)		Revised measure: 21-item scale with 5 subscales:		(games) (alpha =0.60), physical
		global self-worth (6 items), social acceptance (4		appearance (alpha= 0.77), and athletic
		items), athletic competence (2 items), physical		competence (sports) (alpha = 0.69).
		appearance (6 items), and athletic competence (3		
		items).		
Adolescent Profile	Self-esteem	The Self Perception Profile for Adolescents over 12	Separate subscale scores are obtained by	Reliability of revised measure: 29-item
(based on Self		years is a 48-item scale with the same 6 subscales	summing ratings for items	scale (alpha 0.86). Subscales: global self-
Perception Profile		plus 3 additional ones to reflect the concerns of		worth (alpha=0.62), scholastic competence
for Adolescents over		adolescents, namely job competence, romantic		(alpha= 0.75), social acceptance (alpha
12 years)		appeal and close friendship. Each item is answered on		=0.61), athletic competence (alpha =0.85),
		a scale from 1 to 4, where a score 4 indicates high		physical appearance (alpha=0.76), job
		perceived competency.		competence (alpha =0.64), and close
		Revised measure: 29-item scale with 7 subscales:		friend (alpha =0.70).
		global self-worth (3 items), scholastic competence (5		
		items), social acceptance (4 items), athletic		
		competence (5items) physical appearance (5 items).		
		iob competence (3 items), and close friend (4 items).		
			1	



Adapted General	Psychological well-being	22-item 5-point Likert response scale assesses well-	Range: 22–110	Validity: significantly discriminates people
Well-Being Index		being, self-control, anxiety and depression, vitality,	Higher scores indicate more positive well-being	with a limiting long term illness, those
		and general health concerns in the past two weeks		reporting suffering from anxiety,
				depression or bad nerves, users of general
				practitioner services over the previous two
				weeks and respondents reporting taking
				anti-depressants, tranquillizers or sleeping
				tablets. It was also able to discriminate
				respondents with psychosocial difficulties
				in a small sub-sample who reported that
				they were in excellent health and did not
				have a limiting long term health problem
				or psychological illness (Full text)
Visual analogue	Fatigue	One-item question: place a mark on a 100 mm line to	Scale 0-100: no fatigue = 0; worst possible	Good reliability, responsiveness, and
scale		indicate the extent to which you have been "affected	fatigue = 100	validity found on patients post stroke.
		by fatigue in the past two weeks"	Higher scores indicate worse fatigue	<u>(Full text)</u>
Qualitative				
Semi structured	Themes: Perceived	Mothers, fathers and children interviewed separately,	Thematic analysis. Audio files transcribed,	Initially, data from each of the 15 families
interviews	physical health; Perceived	usually in their own homes. Child interviews	detailed reading and preliminary coding of the	(including child and adult interviews) were
	psychological health;	conducted face to face, two of the adult interviews	data to capture the meanings in the text and the	examined separately. Following coding by
	Perceived social and	conducted on the phone (due to scheduling	creation of a gualitative index of coded	the first author, a random sample of 40
	family interaction.	difficulties). Parents could choose to be present for	categories. The index was refined and related	data excerpts was cross-coded by the
		their child's interview and five of the children were	concepts combined to generate key themes.	second author to check for inter-coder
		interviewed with their parents present.	The concepts created were based on the aims of	agreement on concepts, and good
		Adult interviews lasted 25–40 min. child interviews	the study and the themes that emerged.	agreement was found.
		lasted 15–30 min.		
		Prompts were used where necessary to encourage		
		more detailed responses.		
Observations.	Constituents: creating a	Families sitting by a lake, usually at a campfire.	Transcripts were analysed with Giorgi's	All authors analysed transcripts.
conversations and	space in everyday life to	approached. Their behaviour and interactions were	descriptive phenomenological research method	The constituents in the essential structure
in-depth interviews	cultivate the family as a	observed, field notes were written immediately after	(focuses on the family's present experience	were checked against the data material to
	social institution:	the trip and casual conversations were in the form of	without letting researchers own past knowledge	determine whether that was where they
	generating a different	a dialogue where the family were asked to talk about	be activated to influence the ongoing	originated.
	existence with a sense of	good experiences of being together as a family in	experience). It consists of four steps that lead to	
	here-and-now presences:	nature and varied from approximately 10-30 minutes	a general structure of the experience that 1	
	passing down experiences	They were conducted standing up, sometimes on	transcripts read several times: 2. spontaneous	
	that can be realised by	cross-country skis, or squatting, or whilst at a	shifts in meaning are defined into meaning	
	future generations.		units, not as an intellectual discrimination but	



		campfire making pancakes or heating hot dogs on sticks. In-depth interviews conducted by walking along with	based on a sense of change in the meaning expressed in the text; 3. meaning units are transformed into coherent language by	
		families. These lasted for about 2 hours and were	reflecting on each one individually in order to	
		conducted while sitting around the campfire having	discern what it revealed about the phenomenon	
		food and coffee.	under investigation and to describe it as it	
			presented itself to consciousness, using	
			imaginative variation; 4. these more sensitively	
			expressed meaning units are synthesized into a	
			consistent statement that expressed the	
			structure of the experience of the phenomenon.	
Used	Therapeutic experience	Personal maps from GPS data used as visual prompts	In-depth thematic analysis, exploring how the	Critical friends (colleagues/peers) were
accelerometers, in-	dimensions: Symbolic	to guide an in-depth interview exploring how and	diverse green and blue space experiences	consulted throughout in order to identify
depth interviews	therapeutic experiences	why they engage with different local environments to	recounted by participants reflected: (a) existing	personal interpretive 'blind spots', and a
and walk along	at the coast; 'Achieving'	promote and maintain a sense of wellbeing. Open	cultural place narratives; (b) specific personal	field diary was kept for purposes of
interviews.	therapeutic experiences	questioning techniques used to explore the place	identities, relationships, priorities and emotions;	reflexivity and transparency.
	at the coast; Immersive	narratives offered by participants in more detail,	(c) shifts through the life-course; and (d) the	To reduce the risk of recruiting only those
	therapeutic experiences	focussing on the physical and social contexts of their	interview context itself (recognising how the	individuals who self-identify with, or use,
	at the coast; Social	place interactions, associated meanings and feelings,	researcher participant interaction shaped the	green and blue spaces, green/blue spaces
	therapeutic experiences	changes over time, and any other important places	course of the interview). Similarities and	were not indicated by the study materials
	at the coast.	not depicted on their maps.	variations (including outliers) in the wellbeing	or the researcher to be the primary
	And concepts of "fleeting	Case-study go-along interviews with a subset of	experiences emerging across participants'	research focus.
	time", "restorative time"	participants, in places they deemed therapeutic,	accounts explored in relation to different green	
	and "biographical time"	offering further insights into the lived experiences	and blue space interactions, life circumstances	
		and relationships playing out within such places.	and transitions, and personal identities.	
			Although an inductive analytical approach was	
			adopted, efforts were made to move back and	
			forth iteratively between the data and the	
			literature in order to examine participants'	
			narratives in relation to existing theoretical	
			constructs in the fields of green space, health,	
			wellbeing, and leisure research.	
Semi-structured	Key concepts: guilt trips	Five minute, walking or activity-centred, snapshot	Data examined using a guiding analytical	The observations provided a means of
interviews and semi-	('Good' parenting and	interviews with adult respondents. Mobile methods	framework: an understanding of types of	interrogating the interview evidence; to
participatory	feeling good; making a	used to reduce tensions associated with formal	subjective well-being and indicators developed	consider the observed experiences that
observation	'good' choice on behalf on	interviews. Parents asked why they had chosen to	for Good from Woods in collaboration with	respondents' did not appear to verbalize,
	the child); bonding	attend, whether they undertook any similar activities	practitioner-researchers. This shared	or perhaps deem relevant to the
	moments; potential	with their child on other occasions and what they had	conception of well-being (emotional, social,	researcher, compared with those they



	springboards; Engaging with or witnessing moments in nature: critiquing shared experience.	done during the event (questions informed by Good from Woods' overarching focus on well-being). Semi-participatory observation: researcher engaged in conversation during activities and helped as needed, but did not fully engage in the activities (making notes). Notes made during data collection sessions reflected both on the observed experiences of families and the experience of capturing the evidence.	psychological, physical and biophilic) and feelings and behaviours was formulated in the early stages (from the literature, empirical evidence gathered in pilot projects, and measures and approaches employed within UK governmental and non-governmental organizations). The suggested components of subjective well-being provided a frame of reference (helping to shape research questions, methods, thematic analysis and cross study comparison) rather than a definitive model. Each practitioner–researcher was encouraged to engage with it critically	mentioned often and felt were significant to the enquiry.
Semi-structured interviews and reflective writing	Themes about the meaning of inclusion in nature for adults with disabilities and their caregivers: 'Sensory Activation'; 'Reimagined Social Relations'; and 'Reinvented Self'	Semi structured interviews: audio-taped and transcribed. Prompting questions about the informant's previous experiences of, and desires for, inclusive nature activities, as well as barriers and facilitators to inclusion in nature activities. Reflective writing: participants comment on their experiences while they are amidst the natural setting (e.g. half way on a hike while having a lunch break). Participants also asked specific questions in the reflective writing form, including: At what moment did you feel most engaged with nature? Describe how you were feeling. At what moment did you feel most distant from nature? Describe how you were feeling. What action did you or anyone else take that you found most helpful or affirming of the experience? In what way? What action did you or anyone else take that you found most puzzling or confusing? Any other reflections on your experience? Support to interpret and/or write for participants who require/request assistance	Thematic analysis. Data put into texts. Initial reading: inductive approach to thematic analysis allowing themes to emerge from the data, rather than searching for pre-defined themes. Notes were made of individual experiences that arose in the interview or written data in order to acquire a sense of the topics of benefits, barriers and desires for nature inclusion embedded in the data. Re-reading: examined more closely, line by line, in order to facilitate analysis. Later, broad themes emerged by organizing items relating to similar topics into categories - this was not a-theoretical work.	The interdisciplinary and inter-sectoral research team jointly completed thematic analysis of qualitative data. A collaborative approach to the project at all stages meant that all were involved and able to offer direction and suggestions for the final interpretation and analysis. Working with a lead analyst as well as a broad team in this way also allowed for checking and establishing 'trustworthiness', and a resonance of the analysis with the perspectives of those who hold expertise in the subject, are working in the field, and those who were present at the interviews or completed the reflective accounts themselves.
In depth interviews	Themes: Personal Reasons for Participating in the Trial and Wanting to Be Active; Belief in Benefits Gained by Becoming More	One in-depth interview (30–90 minutes long) after completion of all outcome measures. Interviews were completed at the participants' homes or another suitable venue.	Thematic analysis based on the approach described by Braun and Clarke; iteratively code, and build up a final set of themes and subthemes. Two people coded a sample of	All interviews were conducted by a separate researcher not involved in the main trial in order to create an open atmosphere to explore trial experiences



	Active as a Result of	A topic guide was developed to guide the interview;	interviews prior to compiling a final list and then	and assess acceptability of the
	Johning the That	issues important to them.	quotes were extracted to exempiny themes.	
		All interviews were tape-recorded and transcribed		
		verbatim.		
Guided Interviews	Theme: 'Camping as a Relationship Maintenance Strategy'	Guided interviews with participants over a 2-month period. Asked to recall their most memorable camping experiences. Photographs used to elicit memories.	Descriptive phenomenological method of analysis - Colaizzi's seven-stage method. 1. Become familiar with the data; 2. Extracting significant statements (related to the topic) from each of the transcripts; 3. Significant statements re-read and the formulation of meanings; 4. Formation of clusters of themes from the formulated meanings; 5. Create description of the phenomenon; 6. Condensed exhaustive description into a fundamental structure; 7. Participant view the findings, approving if they agree.	Colaizzi's (1978) seven stage method is less well-known than that proposed by Giorgi (Giorgi and Giorgi, 2003). However, it has been used successfully in other phenomenological studies in the health and wellbeing field (e.g. Gallagher & Jasper, 2003; Salmelaet al, 2010). Its step-by-step nature allows accounts to be analysed in depth, with opportunities for critical reflection, while at the same time keeping the process manageable.
Structured	Themes: learning a new	Structured interviews (at start and end of 6 weeks for	Transcripts highlighted and coded into a	As the two interviewers were
interviews and	skill – cycling; the impact	cycling group and at week 6 only for control group)	template of emerging themes. A mind map used	physiotherapists, the interpretation was
participant diaries.	on the wider family and	and participant diaries (a diary of their cycling	to show the relationship between themes.	bound within this context. This empathic
	friends; an opportunity	experiences for the intervention and of their physical		understanding may be biased towards
	for social participation;	activity for the control).		wanting the children to be as active as
	future aspirations	Interviews structured to ask the children about their		possible to gain health benefits. However,
		cycling experiences, how the bike/trike was selected		this fits with the agenda of the promotion
		and set up, who they cycled with, what the bike was		of physical fitness and the aim of reducing
		like, where they went, and the speed and control of		secondary complications, so it is not a
		the children in drawing and creative activities		disadvantage.
		Limitations with hand control and balance affected		an independent research assistant) and
		the child's expression via these methods. For children		mind mans were sent to participants for
		who were fearful or had limited cognition the use of		verification
		hand nunnets and laminated nictures about cycling		
		used. The style of questioning had to be adapted to		
		make the questions more close ended to enable some		
		children to respond. Where appropriate, happy and		
		sad faces used to enable children to respond to non-		
		verbal prompts as shown in these pictures. It was		



		necessary to have an adult present who is familiar with the child's preferred way of communicating.		
Semi-structured interviews.	Dimensions and storylines identified through narrative inquiry through story telling (using Cladinin's (2007) framework).	Semi-structured interviews (split into 4 focus groups) over 5 weeks. Several key questions designed to encourage discussion and guide the development of the interview: the things they liked about the FG, what benefits they saw for the children who used the garden. What did they think was going well? What was not going well with the garden? Had the FG changed the behaviours of the children? How was it being used and who used it? What were the things they did not like about the FG? Did they encounter any difficulties or barriers? What was missing from the garden?	Narrative view (using Cladinin's framework) of experience (the participants stories i.e. the phenomena). Looked for: words images (capture the richness of storylines and experiences); stories that bumped and rubbed against each other; complex layers of text to provide the main threads or storylines; and contexts involving temporality, spatiality and the context of sociality.	The researchers checked with one another on many occasions to see whether the findings made sense (credibility). The interviews were through a translator and checked with translator at the end to see if on the same path in understanding the storylines, and translation checked with translator. Researchers engaged in reflexivity (confirmability) to be mindful of own behaviours and actions.
Questionnaires and semi-structured telephone interviews	Participants reported improvements in four interconnected domains: relationship building; improvements in health and wellbeing; and increased environmental stewardship.	A survey with 7-point rating scales and telephone interviews. In the interviews, participants free to comment on any of their tour series experience(s). Focused on: general information on the tour series in which interviewees had participated; motivations and satisfaction; improvements in knowledge, skill, physical, mental, and spiritual transformations; place attachment; time spent in national parks; environmental stewardship; and community experience/social bonding. And about the relationship with the tour guides (added in response to survey comments). Interviews typically lasted 25- 45 minutes.	Qualitative interview data recorded, transcribed and coded for themes and sub-themes that were refined through subsequent levels of analysis. This entailed a process of familiarisation and immersion in the data, coupled with a dynamic process of sorting the material into key themes, and finally interpreting the data to determine the significance of different themes.	Mixed-method approach of surveys and interviews for cross-validation. Two independent coders were involved, achieving an inter-coder reliability score above the recommended reliability level.
Quotes from participants and participant video footage	Quotes	NR	NR	NR
Observations and interviews	Comments in the areas of 'The importance of the woodland environment for people with dementia and their carers': health (physical wellbeing; mental restoration;	Observations during the activities, and formal interviews with participants and facilitating staff at the end of the 10-week programme.	NR	Finding correlated with many of the well- being categories and types identified in wider research on wellbeing benefits gained from trees, woods and forests and associated activities.



escape and freedom;		
enjoyment and fun);		
nature connectedness		
(sense of place; sensory		
stimulation; nature		
connectedness); social		
development and		
connectedness; and		
symbolic/		
cultural/spiritual		
significance (Religious and		
spiritual expression;		
Meaning and identity)		



Appendix 2: Reasons for exclusions and table of excluded studies (published literature)

Reasons for Exclusion:

- **Population** Does not include the population of interest i.e. families
- Outcome Does not include outcomes of interest i.e. subjective wellbeing measured as an outcome measure using a recognised measure/method
- Intervention Does not include interventions of interest i.e. outdoor recreation in greenspace or bluespace
- Study design Is not a study design of interest i.e. primary study with empirical data of wellbeing outcomes and processes by which wellbeing outcomes are achieved. Quantitative, qualitative or mixed methods. Published between 1997-2017
- Comparator does not use a comparator (inactive comparator or usual routine if it is without outdoor recreation, or historical/time-based comparator)

Author	Year	Reason for Exclusion
Adjei P.O. Agyei F.K.	2015	Population
Arcury, TA; Trejo, G; Suerken, CK; Grzywacz, JG; Ip, EH; Quandt, SA	2015	Intervention
Bang KS., Lee I., Kim S., Lim C.S., Joh HK., Park BJ., Song M.K.	2017	Population
Barber S.E., Jackson C., Akhtar S., Bingham D.D., Ainsworth H., Hewitt C., Richardson G., Summerbell C.D., Pickett K.E., Moore H.J., Routen A.C., O'Malley C.L., Brierley S., Wright J.	2013	Study design
Bell S.L., Phoenix C., Lovell R., Wheeler B.W.	2015	Duplicate
Blanck H.M., Allen D., Bashir Z., Gordon N., Goodman A., Merriam D., Rutt C.	2012	Study design
Carbó-Carreté, María; Guàrdia-Olmos, Joan; Giné, Climent; Schalock, Robert L.	2016	Intervention
Chaplin, LN	2009	Intervention
Cheville, AL; Dose, AM; Basford, JR; Rhudy, LM	2012	Intervention
Cocks, M; Alexander, J; Mogano, L; Vetter, S	2016	Intervention
Colistra, C.M; Schmalz, D; Glover, T.	2017	Intervention
Cotter, Elizabeth W.; Hamilton, Natia S.; Kelly, Nichole R.; Harney, Megan B.: Greene, LaShaun: White, Kelly A.: Mazzeo, Suzanne E.	2016	Intervention
Cox, A; Dudgeon, P; Holland, C; Kelly, K; Scrine, C; Walker, R	2014	Study design
Doughty K.	2013	Population
Downs M.L	2008	Intervention
Duggan, Sandra; Blackman, Tim; Martyr, Anthony; Schaik, Paul Van	2008	Population
Eriksson, U; Asplund, K; Sellstrom, E	2010	Intervention
Ettema, D; Smajic, I	2015	Population
Faulkner, G; Biddle, SJH	2004	Population
Felton, L; Jowett, S.	2013	Intervention
Fletcher E., Prince H.	2017	Population
Flett R.N., Moore R.W., Pfeiffer K.A., Belonga J., Navarre J.	2010	Intervention
Fraser, C; Lewis, K; Manby, M	2012	Population
Fromel, K; Kudlacek, M; Groffik, D; Svozil, Z; Simunek, A; Garbaciak, W	2017	Intervention
Gandy, R; Bell, A; McClelland, B; Roe, B	2017	Population
Garcia-Villamisar, D; Dattilo, J; Muela, C	2017	Population



	Giallo R., Rose N., Cooklin A., McCormack D.	2013	Intervention
	Godfrey C., Devine-Wright H., Taylor J.	2015	Population
	GonzÃilez-Del-Yerro A., SimÃn-Rueda C., Cagigal-Gregorio V., Blas-GÃmez	2013	Intervention
	Е.		
	Green, D; Martin, D	2017	Intervention
	Gunnarsdottir T., Einarsson SM., Njardvik U., Olafsdottir AS., Gunnarsdottir AB., Helgason T., Bjarnason R.	2014	Unavailable
	Haas P., Schmid J., Stadler G., Reuter M., Gawrilow C.	2017	Population
	Halliday GC., Miles GCP., Marsh JA., Kotecha RS., Alessandri AJ.	2017	Population
	Han KT.	2017	Population
	Hanson S., Guell C., Jones A.	2016	Population
	Hanson, HM; Hoppmann, CA; Condon, K; Davis, J; Feldman, F; Friesen, M; Leung, PM: White, AD: Sims-Gould, J: Ashe, MC	2014	Intervention
	Hinckson EA., Dickinson A., Water T., Sands M., Penman L	2013	Intervention
	Ho, HCY; Mui, M; Wan, A; Stewart, SM; Yew, C; Lam, TH; Chan, SS	2017	Intervention
	Hordyk S.R., Hanley J., Richard T.	2015	Intervention
	Howard, J; Miles, GE; Rees-Davies, L; Bertenshaw, EJ	2017	Intervention
	Izenstark. D., & Ebata. A. T.	2017	Outcome
	Janisse H.C., Nedd D., Escamilla S., Nies M.A.	2004	Population
	Jong-Kil L., Mun-Suk L., Yang-Ho L.	2016	population
	Kennedy, FH: Krahn, H: Krogman, NT	2013	Intervention
	Kim H., Lee S., Uvsal M., Kim J., Ahn K.	2015	Population
	King AC: Brassington G	1997	Population
	Knez, J: Eliasson, J	2017	Population
	Knibbe TI: Biddiss, F: Gladstone, B: McPherson, AC	2017	Population
	Knox S	2009	Study design
	Kobavashi, M: Heiney, SP: Osawa, K: Ozawa, M: Matsushima, F	2017	Intervention
	Kolstrup N. Kristiansen I S	1997	Intervention
	Ku Po-Wen: Fox Kenneth R · Chang Chun-Yi: Sun Wen-lung: Chen Li-lung	2014	Population
	Larson-Mever, D. Enette	2003	Study design
	Lewis, B: Ridge, D	2005	Population
	Lin, HC: Chen, KY: Kuo, KP	2014	Intervention
	Llovd K., Q'Brien W., Riot C.	2016	Population
	Lumber R. Richardson M. Sheffield D	2017	Population
	Mansson AG: Elmose M: Dalsgaard S: Roessler KK	2017	Population
	Marsselle MR Irvine KN Lorenzo-Arribas A Warber SI	2017	Population
	Martiniuk A	2014	Study design
	Macon Phil: Curl Angela: Kearns Ade	2003	Intervention
	Magumi Haruna: Etcuko Watanabe: Masayo Matsuzaki: Erika Ota: Mie	2010	Intervention
	Shiraishi: Rvoko Muravama: Mikako Yoshida: SeonAe Yeo	2013	Intervention
	Morrison, J; Pikhart, H; Goldblatt, P	2017	Intervention
	Moylan, MM; Carey, LB; Blackburn, R; Hayes, R; Robinson, P	2015	Population
	Mullan, E	2003	Intervention
	Muller C., Krauth KA., Gers J., Rosenbaum D.	2016	Outcome
	Mutz, M; Muller, J.	2016	Intervention
	Naeem A.G.	2003	Intervention
	Nicholls, L; Lewis, AJ; Petersen, S; Swinburn, B; Moodie, M; Millar, L	2014	Intervention
	Nisbet, EK; Zelenski, JM.	2011	Population
Ц			



O'Brien L., Morris J., Stewart A.	2014	Intervention
Ram, B; Nightingale, CM; Hudda, MT; Kapetanakis, VV; Ellaway, A; Cooper,	2016	Intervention
AR; Page, A; Lewis, D; Cummins, S; Giles-Corti, B; Whincup, PH; Cook, DG;		
Rudnicka, AR; Owen, CG		
Ray, HA; Verhoef, MJ	2013	Population
Rhudy L., Dose A.M., Basford J., Grifn J.M., Cheville A.L.	2015	Intervention
Riaz, A; Younis, A; Shah, A; Navid, S	2012	Intervention
Ritchie, SD; Wabano, MJ; Russell, K; Enosse, L; Young, NL	2014	Intervention
Robertson, W; Fleming, J; Kamal, A; Hamborg, T; Khan, KA; Griffiths, F;	2017	Intervention
Stewart-Brown, S; Stallard, N; Petrou, S; Simkiss, D; Harrison, E; Kim, SW;		
I NOROGOOO, MI. Postami, P. Lamit, H. Khoshnava, SM: Postami, P.	2014	Intorvontion
Rostanni, N. Lannit, H. Khosiniava, Sivi, Kostanni, K.	2014	Outcome
Rotheram-Borus, Mary Jane; Swendeman, Danas, Becker, Kimberry D.	2014	Untervention
Sasionaran, V; Payne, L; Orsega-Smith, E; Godbey, G	2006	
Sato, M; Yoshida, M; Wakayoshi, K; Shonk, DJ.	2017	Study design
Sjogren, K; Hansson, EE; Stjernberg, L.	2011	Population
Stewart, AL; Mills, KM; Sepsis, PG; King, AC; McLellan, BY; Roitz,K; Ritter, PL.	1997	Population
Tak, SH; Kedia, S; Tongumpun, TM; Hong, SH.	2015	Study design
Takahashi, S; Ishiki, M; Kondo, N; Ishiki, A; Toriyama, T; Takahashi, S;	2015	Population
Moriyama, H; Ueno, M; Shimanuki, M; Kanno, T; Oki, T; Tabata, K	2012	
Tappe, Karyn A.;Glanz, Karen;Sallis, James F.; Zhou, Chuan; Saelens, Brian E.	2013	Population
Thomas, F	2015	Study design
Thompson, C; Lewis, DJ; Greenhalgh, T; Smith, NR; Fahy, AE; Cummins, S	2015	Intervention
Thomson, H; Kearns, A; Petticrew, M	2003	Intervention
VÃlker S., Kistemann T.	2015	Population
Van Yperen N.W.	1998	Population
von Mackensen, S	2007	Population
Waite-Jones, JM; Hale, CA; Lee, HY	2013	Population
Warbrick, I; Wilson, D; Boulton, A	2016	Population
Ward J.S., Duncan J.S., Jarden A., Stewart T.	2016	Population
Weber D., Anderson D.	2010	Study design
Williams, Philippa; Pocock, Barbara	2010	Intervention
Witten, K; Kearns, R; Carroll, P.	2015	Population
Wood C.J., Pretty J., Griffin M.	2016	Population
Wyles K.J., Pahl S., Holland M., Thompson R.C.	2017	Population



Appendix 3: Data Extraction Form

Title, Author, year	
Study objectives	
Study design	
Method of allocation to study group	
Outcomes and measures used (relevant to review) (Include scale(s) used and time-points)	
Intervention (brief description of the intervention used)	
Details of analysis (Include type of analysis i.e. quantitative/qualitative/mixed,and method and/or process of analysis e.g. thematic analysis/statistical analysis, any subgroup analysis and any methods used in the treatment of missing data)	
Participants included (at baseline and follow up in <u>each group</u>) (Source/recruitment, eligible and selected, number, age restrictions, exclusions, gender)	Intervention Comparator
Intervention(s) and comparison group(s) (Type, content, intervener, duration, method, mode or timing of delivery)	Intervention See above – no other detail
Results (Key numerical results including proportions experiencing relevant outcomes in each group, means, medians, standard deviations, ranges and effect sizes with precision estimates e.g. confidence intervals/ p values whether or not significant [if P values are not reported this should be stated]. For qualitative data what categories/themes were found, results drawn by authors and evidence provided. Identify any inadequately reported missing data	<u>Intervention</u> <u>Comparator</u>
Protected characteristics (Methods and findings that relate to protected characteristics [age, sex, gender reassignment, sexual orientation, disability, race, religion, pregnancy/maternity, marriage/civil partnerships] and income and/or socio-economic status. Limitations identified Review conclusions (for each comparison made) Conflicts of interest and sources of funding	
Ethical procedures reported	





systematic review | family and outdoor recreation







