Mapping selective prevention and promotion interventions for the mental health and wellbeing of children and young people from vulnerable groups: A rapid overview

Anna K. Macintyre & Dimitar Karadzhov

Centre for Health Policy, University of Strathclyde

May 2019

Acknowledgements

This work was funded by Barnardo's. We would also like to thank Neil Quinn, Co-Director of the Centre for Health Policy for his support of this project.

Suggested citation: Macintyre, A.K. & Karadzhov, D. (2019) Mapping selective prevention and promotion interventions for the mental health and wellbeing of children and young people from vulnerable groups: A rapid overview. London: Barnardo's

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1. Introduction

As a leading Children's charity in the United Kingdom, Barnardo's has identified mental health and wellbeing as a key priority area[1] for their Core Priority Programme (2018-2021). The organisation has identified an intention to focus on a social model of mental health, and to consider prevention and early intervention. In order to support this work Barnardo's commissioned research to provide a *"mapping of the types of work/policy that is currently considered good practice"* and *"to include and identify aspects which would be considered extremely transformational"*. The intention was to inform stakeholder discussions facilitated by Barnardo's in two Local Authority areas in Scotland and England. As an initial first step, mapping of evidence was required in order that stakeholders could identify gaps in existing practice as well as priorities for future development. Therefore Barnardo's commissioned 2 overviews - one on universal prevention and one on selective prevention in order to inform this work.

This report outlines the second overview: a rapid overview of reviews to provide a mapping of selective prevention and promotion interventions for child and adolescent mental health and wellbeing in relation to specific vulnerable groups. This report provides a summary of this work, undertaken by the Centre for Health Policy, University of Strathclyde. This report draws on the first overview (Macintyre & Karadzhov 2019a) and should be read in conjunction with the first report.

How to use this report: This overview is intended as a mapping of review level (previously synthesised) evidence. It is not intended to provide recommendations of particular interventions, but rather as a resource and signposts to evidence (See Section 5.2). The evidence tables are provided as a summary and readers should consult the included reviews (identified in Tables 1 and 2 and marked with asterisks ** in the reference list) for further detail.

2. Background

2.1 Child and adolescent mental health and wellbeing in the United Kingdom[2]

Child and adolescent mental health and wellbeing, defined here as both positive mental health and mental health problems (Friedli, 2009), is a public health priority (Patel et al., 2007). Globally, between 10 and 20% of children and adolescents experience mental health problems, with significant impact on health and social outcomes across the life course (Kieling et al., 2011). In recent years the possibility of increasing prevalence of youth mental health problems has also been indicated by international evidence (Bor et al., 2014, Collishaw, 2015). Data from the United Kingdom also indicates recent increases in referrals to Child & Adolescent Mental Health Services (CAMHS) (Murphy, 2016; Frith, 2016). Between 2013/14 and 2017/18 there was a 22% increase in referrals to CAMHS in Scotland, and over the same period the average waiting time for an initial treatment appointment increased from 7 weeks to 11 weeks (Audit Scotland, 2018). For England, a report published in 2018 by the Education Policy Institute suggested that referral rates had increased by 26% over the previous 5 years (Crenna-Jennings, 2018). Thus child and adolescent

[1] https://www.barnardos.org.uk/sites/default/files/uploads/Barnardo%27s%20corporate%20strategy.pdf

[2] Note that sections 2.1, 2.2 and Box 1 are drawn from the first overview report by Macintyre & Karadzhov (2019a)

mental health and wellbeing presents a crucial public health challenge, and has a high degree of salience in the lives of young people in the United Kingdom (Scottish Youth Parliament, 2016).

2.2 Focusing on prevention and mental health promotion

For mental health research, policy and practice, there is increasing recognition of the need for greater focus on prevention and promotion (Goldie et al, 2015, Kritsotaki et al, 2019); however, in contrast to the focus on therapeutic treatment there is comparatively little investment in research on mental health prevention and promotion (Wykes et al., 2015). In order to reduce the prevalence of mental health problems in the general population, and to stem the demand for clinical services it is argued that there is a need for increased focus at a population level (Barry, 2010, Wahlbeck, 2015). Accordingly recent years have seen greater interest in mental health promotion and prevention, as part of a public mental health approach (Wahlbeck, 2015). Encouragingly, there is a growing evidence base evaluating preventative and mental health promotion interventions on which to draw (Barry, 2010, Wahlbeck, 2015).

This need for greater focus on prevention is also pertinent to child and adolescent mental health. Whilst it is recognised that there is an urgent need for increased specialist service provision, it is also essential to support the funding and provision of preventative approaches (Audit Scotland, 2018).

2.3 Focusing on vulnerable groups of children and young people

The first overview (Macintyre & Karadzhov 2019a) focused on universal prevention i.e. interventions delivered to young people irrespective of their level of risk (Box 1)[3]. This second overview focused on selective prevention, and specifically on interventions intended to prevent mental health problems/promote positive mental health for specific vulnerable groups of young people.

Box 1 outlines the definition of selective prevention. As will be discussed below, selective prevention is not defined consistently in the literature, and may include a range of factors which place children and young people at greater risk for mental health problems. This might include life events such as parental divorce or bereavement, having a parent or family member with a mental health problem, or experience of social disadvantage or adversity such as experience of low income, ethnic minority status, or homelessness. For the purposes of this overview, our definition of selective prevention focuses on specific vulnerable groups, particularly those which related to aspects of social disadvantage, rather than encompassing all possible risk factors. These groups are outlined in the eligibility criteria below.

Experience of disadvantage or early life adversity can place children and young people at higher risk of developing mental health problems later in life (Young Minds nd). For example, children in foster care are recognised as having increased risk for poor outcomes in terms of psychosocial wellbeing/mental health (Leve et al 2012; Hambrick et al 2016). Young people with experience of homelessness are also known to be at increased risk of a range of mental health problems (Edidin et al 2012). Furthermore, children and young people who experience socioeconomic disadvantage are two to three times more likely to experience mental health problems (Reiss 2013).

We use the definition of selective prevention outlined in Box 1 below; however we recognise that this may not be consistently applied across the literature because definitions of 'risk' as it relates to

[3] Note the definitions outlined in Box 1 drawn from the first overview report by Macintyre & Karadzhov (2019a)

mental health and wellbeing includes a wide range of factors including those determined by social disadvantage (e.g. socioeconomic deprivation), life adversity (e.g. exposure to trauma), psychological temperament (e.g. anxious / perfectionist) or psychosocial context (e.g. parental mental health problems). We focus here on specific 'vulnerable groups', which primarily relate to aspects of social disadvantage. This will be discussed in more detail in the methods chapter below.

Please see **Box 1** for an outline of key definitions.

Box 1: Key definitions

Children and young people: For the purposes of this review this group is defined as from pre-birth to 26 years.

Mental health and wellbeing: Whilst it is recognised there is a no universal definition (Henderson, 2010), for the purposes of this review, mental health and wellbeing is defined here as both mental health problems and positive mental health (Friedli, 2009), and as relating to a range of outcomes e.g. prevention of anxiety, depression, stress, internalising/externalising problems, promotion of wellbeing, self-esteem, self-efficacy etc..

Mental health prevention: *"concerns itself primarily with specific disorders and aims to reduce the incidences, prevalence or seriousness of targeted problems, i.e. mortality, morbidity and risk behaviour outcomes."* (Barry, 2010, p.53)

Mental health promotion: *"focuses on positive mental health and its main aim is the building of psychosocial strengths, competencies and resources."* (Barry, 2010, p.53).

Universal prevention: *"targeted to the general public or a whole population group that has not been identified on the basis of individual risk"* **(**Mrazek & Haggerty, 1994)

Selective prevention: *"targeted to individuals or a subgroup of the population whose risk of developing mental disorders is significantly higher than average"* (Mrazek & Haggerty, 1994)

Indicated prevention: *"targeted to high-risk individuals who are identified as having minimal but detectable signs or symptoms foreshadowing mental disorder, or biological markers indicating predisposition for mental disorder, but who do not meet DSM-III-R diagnostic levels at the current time"* Mrazek & Haggerty (1994)

Barry, M. (2010) Adopting a mental health promotion approach to public mental health in *Public Mental Health Today. A Handbook.* Goldie, I. (Ed.) Brighton: Pavilion Publishing/Mental Health Foundation

Mrazek & Haggerty (1994), Institute of Medicine (IOM) report "*Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research"*

3. Focus of the Review

In order to provide a mapping of selective prevention and promotion interventions within the agreed timescale a **rapid overview** was undertaken. Rapid reviews are defined as: *"a type of knowledge synthesis in which systematic review processes are accelerated and methods are streamlined to complete the review more quickly than is the case for typical systematic reviews"* (Tricco et al, 2017) (p.3). Given the scope of the review question (outlined below) and the need to provide **a 'map' of evidence** across a wide range of topics, it was decided to undertake an overview of reviews rather that to appraise primary evidence; *"the distinguishing feature of overviews is that the information is compiled from systematic reviews, rather than primary studies"* (McKenzie and Brennan, 2017) (p.1). The following report describes a rapid overview of reviews in order to provide **a 'bird's eye view'** on the available interventions to prevent mental health problems and promote positive mental health for vulnerable children and young people.

Review question: *What types of selective interventions are identified (by synthesised evidence (primarily systematic reviews) or grey literature) to support the prevention of mental health problems, and the promotion of positive mental health/wellbeing for children and young people from vulnerable groups pre-birth to age 26?*

4. Method

4.1 Review protocol

A review protocol was developed informed by the conduct of previous reviews (Welsh et al., 2015a,b; McLean et al, 2017; Vojt et al 2016, 2018) and by the protocol for the first overview (Macintyre & Karadzhov 2019a).

In order to clarify the search strategy and how best to focus on vulnerable groups, we conducted pilot screening of the papers identified through the Orygen searching prior to database searching. This was conducted in order to identify the ease of distinguishing between indicated prevention interventions and to identify potential 'at risk' / vulnerable groups. An initial 20% of papers were screened by one author (DK) and cross-checked by a second author (AM).

4.2 Search strategy

The search strategy is included in Appendix A. The search strategy has been adapted from Vogt et al (2016, 2018) and McLean et al (2017) and the search strategy of the first overview (Macintyre & Karadzhov 2019a). Searches were conducted in Web of Science and PsycINFO in February 2019. In addition further sources were identified by searching through Orygen, the National Centre of Excellence in Youth Mental Health, which hosts a database of evidence specifically curated for child and adolescent mental health (https://www.orygen.org.au/Education-Training/Resources-Training/Evidence-Finder).

Additional searching was also undertaken on selected organisational websites (Mental Health Foundation, What Works Wellbeing, MAC-UK, NHS Health Scotland, the Association for Young People's Health, Kings Fund, Action for Children, Homeless Link UK, Joseph Rowntree Foundation, Carers Trust, Race Equality Foundation, Refugee Council) to identify evidence syntheses/reports relevant to the review question which may not identified in the peer reviewed literature.

4.3 Inclusion criteria

Types of study to be included: Systematic reviews, scoping reviews, rapid reviews, overviews which synthesise the evidence relating to effectiveness. Published grey literature e.g. organisational / commissioned reports which synthesise the evidence. English- language studies.

Participants/Population: General population of children and young people from pre-birth to age 26. Children and young people identified as either 'higher risk' or as 'vulnerable groups'[4] including, children / young people who:

- are 'looked after' or 'in care' or 'care leavers'
- have experience of homelessness
- young offenders or those with experience of the criminal justice system
- live in deprived / disadvantaged areas or have low socioeconomic status
- are unemployed / out of school / excluded 'not in education, employment or training'
- are teenage parents
- are young carers
- are ethnic minorities, migrants, refugees or asylum seekers
- identify as LGBT
- have experience of domestic violence
- have experience of sexual abuse

Focus on high income countries, specifically OECD countries (Organization for Economic Cooperation and Development): Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States[5].

Intervention: Selective prevention/promotion / non-clinical interventions (i.e. for those groups considered vulnerable/higher risk) intended to: I) prevent common mental health problems OR II) promote of positive mental wellbeing. Priority will be given to interventions which could be applied in a UK context.

Condition/domain being studied: Mental health and wellbeing outcomes (e.g. prevention of anxiety, depression, stress, internalising/externalising problems, promotion of wellbeing, self-esteem, self-efficacy).

4.4 Exclusion criteria

Types of evidence: Primary studies of any kind. Evaluations of national / local policies. Studies which focus primarily on theoretical / conceptual issues. Observational studies which primarily focus on epidemiological associations / risk factors / determinants of youth mental health. Editorials / viewpoints / conference papers / abstracts / review protocols / theses / dissertations/ book chapters / books reviews[6]. Studies not published in English.

[4] These vulnerable groups were informed by the review conducted by Vojt et al (2018).
[5] https://www.oecdwatch.org/oecd-guidelines/oecd
[6] Additional exclusion type added on 21.12.18

Population: Focus only on adult population (i.e. do not consider children/young people). Children and young people (or parents) with pre-existing or emerging mental health problems / mental disorders / diagnosed mental illness or other forms of diagnosed developmental conditions (e.g. autism / learning disabilities). College or University students. Studies of interventions in low or middle income countries or those not relevant to UK context. Where tobacco/ alcohol and drug use/misuse are the main outcomes i.e. for the purposes of this study these are not considered mental health outcomes.

Interventions: Indicated prevention, clinical interventions, interventions described as 'treatment', mental health service provision / CAMHS / other forms of therapeutic service e.g. counselling.

4.5 Title and abstract screening

Title and abstract screening of electronic database searches was conducted by 1 reviewer (DK) and a subset were cross-checked by a 2nd reviewer (AM). For the reviews identified through Orygen the initial title/abstract screening was conducted by 1 reviewer to identify a list of papers for further consideration (DK).

4.6 Full text screening

Full text screening of papers identified through electronic database searching was undertaken by 1 reviewer (DK) and a subset cross-checked by a 2nd reviewer (AM). The literature review software, Covidence (https://www.covidence.org) was used to assist the full-text screening phase of papers identified through electronic databases. Full text screening of papers identified through Orygen was undertaken by 1 reviewer (DK), and all were cross-checked by a 2nd reviewer (DM). For the organisational reports 1 reviewer searched and identified relevant articles (DK), and a 2nd reviewer cross-checked for relevance (AM).

4.7 Amendments to inclusion criteria

Whilst it was originally intended to include overviews, it was identified that few of these were explicitly focused on vulnerable groups. Given the difficulties outlined below of synthesising evidence with mixed populations (I.e. those including the general population and targeted vulnerable groups), it was decided that overviews would be referenced (although not formally included in the synthesis) if they had an explicit focus (I.e. in title or an objective) on targeted/vulnerable/disadvantage or selective prevention.

A threshold of 25% of primary studies needed to be relevant to the focus of our review (i.e. on selective prevention with children and young people from vulnerable groups as opposed to universal/indicated prevention/treatment or with adults) in order to enable meaningful conclusions to be drawn. Where it was not possible to identify an exact % of studies a judgement was made about the degree to which the focus was relevant. In addition, during the course of data extraction we identified that there may be the instance where a review includes a high number of primary studies, (specifically more than 100 primary studies) which would justify lowering the threshold to 10% in order not to exclude reviews which draw meaningful conclusions regarding selective prevention/promotion for vulnerable groups. In line with Vojt et al (2016), where reviews considered vulnerable populations but defined this as 'at risk' in general these reviews were included where the above criteria were met.

4.8 Data extraction

Data extraction fields included: Study authors; year published; title; type of review; primary review aim/objective; target vulnerable group or at-risk population in primary studies; number of primary studies; population; age range (as reported by the review authors and in primary studies); setting; type of intervention; short description of intervention; examples of selective interventions in primary studies; outcomes of the intervention relevant to child and/or adolescent mental health and wellbeing; key findings; any assessment of quality or risk of bias by review authors; other methodological issues of primary studies raised by SR authors; limitations of the review (as reported by the review authors); and any other comments.

4.9 Quality assessment

Due to resource and time constraints for this rapid review it was not possible to undertake quality assessment of the included reviews. Therefore the final selection includes reviews that are likely to be at risk of bias and may be poor quality. Without undertaking quality assessment of reviews it is not possible to identify which reviews are poor quality. The methodological quality of the reviews directly influences the degree to which clear conclusions/recommendations can be drawn and as such the findings of this overview must be interpreted cautiously (Please see section 5.2 below for full discussion of the caveats to be aware of when reading the evidence).

4.10 Mapping, matrix and synthesis

The reviews were initially synthesised by main health domain; however following discussion with the funder it became clear that it would be more useful to map and synthesise the evidence according to specific vulnerable groups where possible. During the course of data extraction it was identified that some reviews were 'focused' on vulnerable groups, whilst some reviews were included 'mixed' populations i.e. they included primary studies which were reported as including both the general population of children and young people, as well as primary studies which were reported as including disadvantaged or vulnerable groups. Therefore we applied a coding framework to classify each review in order to be able to map the evidence and synthesise more effectively. The threshold of 25% of primary studies relevant to the focus of our review still applied. Reviews were coded as either 'focused' reviews or 'mixed reviews' as defined below.

'Focused' reviews: Those reviews which were clearly focused on a vulnerable/disadvantaged group and as such were coded as 'focused' reviews. We coded reviews as 'focused' where they identified a vulnerable/disadvantaged group in their title or in an objective.

'Mixed' reviews: For reviews which included 'mixed' populations i.e. they included primary studies which were reported as including both the general population of children and young people, as well as primary studies which were reported as including disadvantaged or vulnerable groups, we tried to identify which vulnerable groups were included in primary studies wherever possible. Each 'mixed' review was coded according to whether it included vulnerable groups of interest according to our inclusion criteria. A 'YES' was coded where a review reported at least 1 primary study which involved a vulnerable group of interest. In many cases it was not possible to identify how many primary studies were focused on a particular vulnerable groups of interest as the review authors did not identify this consistently. Therefore the numbers of primary studies focused on vulnerable groups must be taken as an estimate.

5. Results

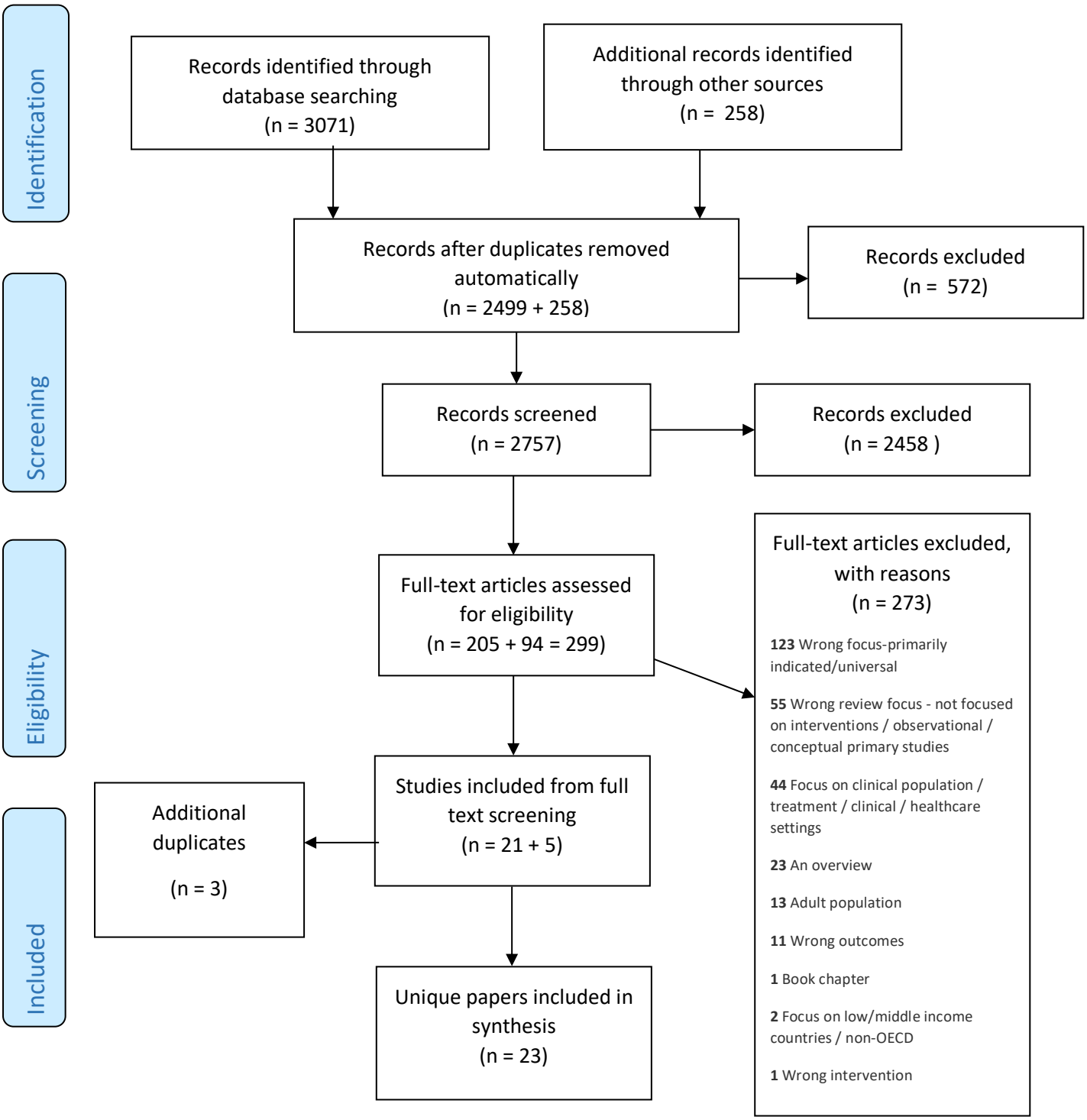
In total 23 reviews were identified which met inclusion criteria and these synthesised the data from an estimated at least 450 primary studies[7] (although only a proportion of primary studies were with vulnerable groups). See Appendix B for full details of included reviews.

Whilst it was originally intended to include overviews, it was identified that few of these were explicitly focused on vulnerable groups. As outlined above, it was decided that overviews would be referenced if they had an explicit focus on vulnerable groups/disadvantage or selective prevention. Six overviews were considered relevant, and although not formally included in the synthesis, have been outlined in Section 8.1.

Non peer reviewed literature identified through organisational websites was also not formally included in the synthesis, but has been provided as additional evidence. In total five reports were identified from searching of organisational websites which appeared potentially relevant, and these are covered in Section 8.2.

[7] We did not assess the overlap in primary studies between the included reviews and so the total number of unique primary studies is likely less than this figure. Furthermore, not all reviews identified the number of primary studies, and so this figure is an estimate.

Figure 1: PRIMSA Flow Diagram[8]



[8] *From:* Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.

5.1 Selective prevention/promotion interventions for vulnerable groups

Our findings indicate that there is an emerging but limited body of evidence on the effectiveness of mental health promotion/prevention interventions with vulnerable groups of children and young people. See Appendix B for full details of included reviews.

As outlined above, we classified reviews as either 'focused' (which were explicitly focused on vulnerable groups) or 'mixed' (which included both vulnerable groups and the general population in primary studies).

5.1a 'Focused' reviews

We identified (n=14) 'focused' reviews which met our eligibility criteria which considered the following 6 vulnerable groups (See Table 1 below):

- General 'at risk' / maltreated youth (2 reviews)
- Young people identified as 'low income' (1 review)
- Teenage parents (2 reviews)
- Indigenous / ethnic minority young people (4 reviews)
- Foster children / parents (4 reviews)
- Young offenders (1 review)

We did not identify 'focused' reviews which met our eligibility criteria for some groups; young people with experience of homelessness, unemployed/out of school/excluded young people, young carers, young people who identify as LGBT. Furthermore, during the course of the review it became clear that exposure to trauma (e.g. domestic violence, experience of sexual abuse) was often considered in relation to clinical/therapeutic treatments rather than prevention/promotion, and so these reviews did not meet our eligibility criteria. Therefore, whilst these groups are not represented here there is a wider body of evidence on therapeutic interventions which should be considered in relation to supporting the mental health of these groups of young people. Similarly, it must be noted that the focus of this review is prevention/promotion and therefore does not cover wider evidence in relation to therapeutic/clinical treatment.

Table 1: Selective prevention and promotion interventions for mental health and wellbeing of children and young people from vulnerable groups – "FOCUSED" reviews (n=14)			
Focused vulnerable group	**Intervention Type**	**Number of Reviews**	**Included reviews**
General 'at risk' / maltreated youth	Physical activity interventions "Eastern arts" interventions	2	(Lubans et al 2012; Waechter and Wekerle, 2015)
Young people identified as 'low income'	School-based mental health and behavioural programmes[9]	1	(Farahmand et al., 2011)
Teenage parents	Interventions to prevent/improve depression	2	(Sangsawang et al., 2018, Lieberman et al., 2014)
Indigenous / ethnic minority young people	Parenting interventions / Positive Youth Development interventions	2	(Antonio and Chung-Do, 2015, Ruiz-Casares et al., 2017)
	Suicide prevention interventions	2	(Harlow et al., 2014; Ridani et al 2015)
Foster children / parents	Mental health promotion/prevention interventions Group-based foster parent training interventions	4	(Hambrick et al., 2016, Leve et al., 2012, Uretsky and Hoffman, 2017, Van Andel et al., 2014)
Young offenders	Mental health interventions	1	(Kumm et al., 2019)

[9] See also Schindler et al (2015) in Table 2 which although it is a 'mixed' review (i.e. it is not explicitly focused on low income population, it contains primarily primary studies with low income children.

5.1b 'Mixed' reviews

We identified (n=9) 'mixed' reviews which met our eligibility criteria, across 6 types of intervention which included at least 25% primary studies with vulnerable groups (See Table 2 below):

- Prevention interventions – mixed (2 reviews)
- Physical activity interventions (2 reviews)
- Early childhood education (1 review)
- Positive youth development interventions (2 reviews)
- Resilience and wellbeing interventions (1 review)
- Arts based activities (1 review)

Table 2: Selective prevention and promotion interventions for mental health and wellbeing of children and young people from vulnerable groups – "MIXED" reviews (n=9)

Intervention type	Vulnerable groups included in primary studies	Number of Reviews	Included reviews
Prevention interventions – mixed	'At-risk' children defined broadly, Ethnic minorities, African American youth from homeless shelters	2	(Bayer et al., 2009, Rew et al., 2014)
Physical activity interventions	Low-income, ethnic minorities, young offenders, low income AND ethnic minority	2	(Camero et al., 2012, Brown et al., 2013)
Early childhood education	Low-income children	1	(Schindler et al., 2015)
Positive youth development interventions	Low-income or low-income AND ethnic minority young people	2	(Ciocanel et al., 2017, Lapalme et al., 2014)
Resilience and wellbeing interventions	Ethnic minority young people / young offenders / foster children	1	(Brownlee et al., 2013)
Arts activities	Low-income / ethnic minority young people	1	(Zarobe and Bungay, 2017)

5.2 Important caveats when reading the evidence[10]

What follows is a rapid overview of available review level evidence across a range of selective prevention and promotion interventions for child and adolescent mental health and wellbeing. It is intended to provide a starting point for further examination of promising interventions. There are several important caveats that must be taken into account when considering the evidence presented below.

Considerations / limitations related to our approach in this overview:

- **Search strategy:** As this was a rapid overview we undertook a streamlined search strategy (e.g. we searched for keywords only in titles rather than abstracts, and we only searched 2 databases) (King et al, 2017). Therefore our overview should not be considered comprehensive or exhaustive, (as relevant evidence may be missing), but rather an indicative 'snapshot' of the evidence base.

- **Review-level evidence:** The evidence presented are reviews i.e. previously synthesised evidence. We report here on what the review authors have concluded and as such we are reliant on the methods and conclusions of review authors. We have not assessed primary evidence.

- **Quality assessment of reviews:** As outlined above we were not able to undertake quality assessment of the included reviews. Therefore some of the included reviews may be poor quality or at risk of bias. This means that we do not know what the overall quality of the evidence is and so we cannot assess the strength of the evidence or draw clear conclusions regarding intervention effectiveness. The findings for each topic area should be treated with caution and should not be taken to indicate a recommendation or support for any particular intervention.

- **Subset of evidence on selective prevention:** Our review focused on selective prevention in relation to specific vulnerable groups (as outlined in our eligibility criteria). Therefore we only consider a subset of the evidence relevant to selective prevention as we did not include evidence which focused on selective prevention in relation to the full range of risk factors (e.g. parental divorce, family bereavement, parental mental illness temperament etc.).

- **Threshold of 25% primary studies for mixed reviews:** Based on our eligibility criteria we required 'mixed' reviews to include at least 25% primary studies with vulnerable groups. This meant that some reviews were excluded which did not meet this threshold. Sometimes this meant that reviews which included a larger total number of primary studies, but a smaller proportion focused on vulnerable groups were excluded, whilst reviews with a small number of total primary studies was included. We have estimated the number of primary studies focused on vulnerable groups; however SR authors did not always report

[10] It must be noted that many of the caveats outlined here are the same as those identified in the first overview (Macintyre & Karadzhov 2019a)

demographic characteristics, or number of included primary studies, and therefore this should be considered an estimate rather than a decisive number of primary studies.

- **Exclusion of reviews focused on treatment:** It must be noted that there is a wider literature which considers therapeutic/clinical treatment/indicated prevention for vulnerable groups which was excluded from this review. As outlined above, some reviews were excluded which focused on specific vulnerable groups (e.g. foster children, those with experience of trauma/abuse) where they were primarily concerned with treatment/therapeutic interventions.

- **Identifying intervention effectiveness specifically for vulnerable groups:** For mixed reviews findings were not always separated according to a focus on vulnerable groups, and therefore it was not always possible to identify whether the findings regarding effectiveness were specific to vulnerable groups. Furthermore, as recognised by the authors of several of the included reviews, it is common for the authors of the primary studies to under-report the demographic characteristics of their samples which makes it difficult to draw conclusions regarding the effectiveness of interventions for particular groups.

<u>Considerations / limitations of the evidence base we have reviewed:</u>

- **Different definitions of targeted/selective/indicated/universal interventions:** Definitions of targeted/selective/indicated/universal interventions are not used consistently across the literature. For example, some reviews may consider selective interventions in relation to psychological temperament / or parental mental health problems whereas our focus on vulnerable groups is a subset of the possible indicators of selective risk as identified above. Wherever possible we have tried to highlight the findings for selective interventions and those that are relevant to specific vulnerable groups; however for many reviews it was not possible to separate findings according to the type / level of prevention or definitions were used which were not consistent with our focus. This should be borne in mind when reading the evidence.

- **Quality assessment of primary evidence:** Of the included reviews 11 (48% of 23 reviews) did not undertake any quality assessment of primary studies, and so their findings must be treated with particular caution as we do not know the quality of the studies on which the findings are based (e.g. they may have problems with their design such as no control group, high dropout or small sample sizes).

- **Mixed effects/evidence:** For the purposes of this review these are considered to be where a review finds evidence in primary studies of both positive effects and null (no) effects.

- **Harmful effects:** For the purposes of this review these are considered to be where an intervention has a negative effect on an outcome. Very few reviews identified the potential harmful effects of interventions, or evidence of no effects. Indeed some reviews explicitly sought to identify interventions which had demonstrated positive outcomes, and therefore these findings must be treated with caution as they involve an inherent bias. Further in-

depth reviews and analysis of primary evidence is required in order to examine possible harmful effects or unintended consequences of interventions.

- **Statistically significant versus clinically significant effects:** Where the effects of interventions are referred to this is most often a statistical effect, but not necessarily a meaningful effect from a clinical or public health perspective. Some reviews only considered whether the intervention demonstrated statistically significant effects when compared to a control group, rather than considering whether this change was clinically meaningful. Therefore it should not be assumed that if a review suggests that an intervention shows significant effects that this necessarily means that these effects have clinical or public health significance.

6.0 'Focused' reviews which explicitly focus on vulnerable groups

Key for Tables: SR: systematic review: PYD: Positive Youth Development; CBT: Cognitive Behaviour Therapy; PTSD: Post-Traumatic Stress Disorder

6.1 General 'at risk' / maltreated youth

Focused vulnerable group	"At-risk youth" (Lubans et al 2012); "Maltreated youth" (Waechter & Wekerle 2015)
Number of reviews included (number of meta-analyses)	2 reviews (no meta-analyses) (Lubans et al 2012; Waechter & Wekerle 2015 - scoping review)
Total number of primary studies (Number of studies with vulnerable groups - Note: these are estimates)	23 primary studies (Lubans et al 2012; 12 studies -2 focused on young offenders, 10 general 'at risk'; Waechter & Wekerle 2015 - at least 3 relevant - 'inner city' children; female students who had been sexually abused; foster children).
Population ages (youngest and oldest ages in primary studies)	4 years; 19 years
Setting	School and community
Type of intervention	Physical activity interventions (Lubans et al 2012); "Eastern Arts" - meditation, yoga, tai chi, qigong Waechter & Wekerle 2015)
Short description of the intervention	Physical activity interventions (Lubans et al 2012); "Eastern Arts" - meditation, yoga, tai chi, qigong Waechter & Wekerle 2015)
Examples of interventions in primary studies (not exhaustive list)	"Outdoor adventure programmes; sport and skill-based programmes; physical fitness programmes" (Lubans et al 2012); "Yoga; transcendental meditation; mindfulness; cognitively-based compassion training" (Waechter & Wekerle 2015).

Key findings (particularly those relevant to selective interventions)	**2 reviews explicitly focused on interventions for general 'at risk' or 'maltreated' youth; 1 review focused on physical activity interventions (Lubans et al 2012) and 1 review focused on 'Eastern Arts' interventions (Waechter & Wekerle 2015)**. **Given these are different types of interventions they are reported separately here.** Lubans et al (2012) showed that there was evidence to suggest that sport/physical activity interventions / outdoor adventure programmes can improve mental health outcomes (depression, self-concept, self-esteem, resilience, and anxiety); however the authors suggest cautious interpretation due to the high risk of bias and the lack of long term follow up data (Lubans et al 2012). Waechter & Wekerle (2015) reviewed 'Eastern Arts' interventions and found that the majority of included studies (all but 1) showed positive impact on outcomes measuring mental health and wellbeing (Waechter & Wekerle 2015); however it must be noted that this is based on a relatively limited evidence base of 8 studies and only 3 of these studies are focused on vulnerable groups relevant to this review.
Effects at follow up	Lubans et al (2012) note that none of the studies include longer term follow up (more than 12 months).
Quality assessment of primary studies?	Lubans et al (2012) assessed the quality of primary studies and found that there was a high degree of bias in all studies. Waechter & Wekerle (2015) did not assess the quality of primary studies and so the findings should be treated with caution
Other methodological issues of the primary studies reported by the SR	Lack of long term follow up (Lubans et al 2012). Subjective self-report outcome measures (Waechter & Wekerle 2015).
Limitations of the SR (self-reported)	Lubans et al (2012) highlighted the lack of included primary studies, study heterogeneity in terms outcome measures and participants
Other comments	**Both reviews had very broad definitions of 'risk' and 'maltreated' which means that the included primary studies are heterogeneous in terms of the focus vulnerable group. Given this heterogeneity for both reviews it is difficult to draw conclusions regarding intervention effectiveness for specific vulnerable groups.** Lubans et al (2012) have a very broad definition of 'at risk youth' which included children with clinical problems (e.g. behavioural problems) as well as those with environmental risk factors (e.g. experience of

	poverty etc.). Waechter & Wekerle 2015) included primary studies with 'inner city youth', ethnic minority youth, children with experience of foster care and young people with experience of sexual assault.

6.2 Young people identified as 'low income'

Focused vulnerable group	Young people described as 'low income'
Number of reviews included (number of meta-analyses)	1 meta-analysis (Farahmand et al 2011)
Total number of primary studies (Number of studies with vulnerable groups - Note: these are estimates)	23 primary studies (10 primary studies were focused on universal interventions defined as "delivered to all youth" (Farahmand et al 2011, p.377). (The other studies were focused on youth with symptoms of diagnosis of mental health problem).
Population ages (youngest and oldest ages in primary studies)	5 years; 18 years
Setting	School and family
Type of intervention	School-based mental health and behavioural programmes
Short description of the intervention	"...any program, intervention, or strategy applied in a school setting that was specifically designed to influence students' emotional, behavioral, or social functioning.'' (p. 373)
Examples of interventions in primary studies (not exhaustive list)	Life Skills Training; Re-connecting Youth; Aban Aya Youth Project; SAFE Children; Penn Resiliency Program
Key findings (particularly those relevant to selective interventions)	**Overall this review identifies that there is "limited" evidence on school based mental health interventions for low income youth (Farahmand et al 2011).The SR authors report that of the ten primary studies of universal interventions (in this context universal means low-income young people without symptoms/diagnosis of mental health problems), four were found to be ''effective'', four-''mixed'', and six-''ineffective'' (p.380). These conclusions are based on qualitative (rather than quantitative) synthesis. The authors conclude that there is "limited" evidence of school based interventions' effectiveness, particularly those that aim to address externalizing problems (Farahmand et al 2011p. 387).** Overall the effect sizes were found to be small. The results for the meta-analysis does not separate the findings according to universal interventions but instead overall effect sizes are provided. Interventions which were intended to impact on internalizing difficulties or generally focus on socio-

	emotional wellbeing showed more positive effects compared to interventions which were intended to impact on conduct problems or substance use (Farahmand et al 2011).
Universal vs. selective vs. indicated	The SR authors report that there was a significant difference in effect sizes when comparing universal and selective interventions such that universal interventions showed significant positive effects whilst selective interventions showed smaller effects which were non-significant. (Note that universal here means provided to all low-income young people without mental health difficulties).
Effects at follow up	The SR authors report that of 23 samples, 6 reported data on follow up effects (at on average 10 months) and that overall the average effect size was smaller than the effect immediately post intervention. Only 2 follow ups were reported at 12 month follow up. (Farahmand et al 2011)
Quality assessment of primary studies?	This review did not conduct quality assessment of primary studies and so the findings should be treated with caution.
Other methodological issues of the primary studies reported by the SR	None reported.
Limitations of the SR (self-reported)	The SR authors highlight that the review included only articles published in peer-reviewed journals. Also, the review authors recognise that the authors of the primary studies may have tended to report only the positive results (and thus under-report negative results or results of the lack of effectiveness of the interventions). Furthermore, in many cases, the researchers of the primary studies evaluated their own intervention programmes, which introduce additional bias. Therefore, the review findings should be interpreted with caution.
Other comments	This SR compared their results with the findings of a previous review and found that there was less evidence for interventions with this vulnerable group (low income youth) than compared to the evidence available for the general population. The SR authors highlight that "the need to more systematically evaluate the impact of socioeconomic factors on program development, mode of delivery and treatment efficacy" (Farahmand et al 2011, p. 383)

6.3 Teenage parents

Focused vulnerable group	Teenage parents
Number of reviews included (number of meta-analyses)	2 reviews (Sangsawang et al., 2018; Lieberman et al., 2014)
Total number of primary studies (Number of studies with vulnerable groups - Note: these are estimates)	22 primary studies
Population ages (youngest and oldest ages in primary studies)	12 years; 19 years
Setting	Community
Type of intervention	Depression prevention interventions
Short description of the intervention	Interventions to improve or prevent depression symptoms in adolescent mothers.
Examples of selective interventions in primary studies (not exhaustive list)	"Home visiting program with parenting and adolescent curricula; Three month multicomponent program with day-care, vocational and social education and activities, music mood induction therapy, relaxation therapy, massage therapy, and mother-infant interaction coaching; support intervention delivered via pamphlet, video, or video plus pamphlet; Group interpersonal therapy adapted for pregnant adolescents; " (Lieberman et al 2014) "1) home-visiting intervention, (2) prenatal antenatal and postnatal educational program, (3) CBT psycho-educational, (4) the REACH program based on interpersonal therapy, and (5) infant massage training" (Sangsawang et al 2018).
Key findings (particularly those relevant to selective interventions)	**Both reviews report mixed findings across primary studies in terms of the effectiveness of interventions to prevent depression in adolescent mothers but do identify some interventions which can be effective.** Lieberman et al (2014) identified more evidence for prevention interventions compared to treatment interventions and found that 4 of 8 prevention studies were effective compared to controls, and this included a range of different types of interventions. Sangsawang et al 2018 found 6 of 13 interventions (psychological and psychosocial interventions - a variety of different types) were effective. It was not clear which intervention type was most effective in preventing depression for teenage mothers (Sangsawang et al 2018).
Effects at follow up	Follow up effects were not reported.
Quality assessment of primary studies?	Both reviews undertook quality assessment of primary studies. 1 review suggested that there was a need for improvement in methodological quality (Lieberman et al 2014) and 1 review

	suggested that the quality of included studies was "good quality" (Sangsawang et al 2018, p.12).
Other methodological issues of the primary studies reported by the SR	Other methodological limitations were not reported.
Limitations of the SR (self-reported)	1 review highlighted that the majority of primary studies were conducted in the U.S., and that included studies were heterogeneous in terms of interventions, outcomes etc. and so it was not possible to identify the most effective intervention (Sangsawang et al 2018)
Other comments	**Please see reviews for detail on different types of interventions**

6.4 Indigenous / ethnic minority young people

It must be noted that 3 of the 4 reviews here focus on indigenous communities/young people.

6.4 a) Parenting interventions and Positive Youth Development Programmes

Focused vulnerable group	"Ethno culturally diverse families" (Ruiz-Casares et al 2017); Indigenous youth (Antonio & Chung-do 2015)
Number of reviews included (number of meta-analyses)	2 reviews (no meta-analyses) (Antonio & Chung-do 2015; Ruiz-Casares et al 2017)
Total number of primary studies (Number of studies with vulnerable groups - Note: these are estimates)	26 primary studies - all were focused on vulnerable groups
Population ages (youngest and oldest ages in primary studies)	1 review did not report the ages of participants in primary studies but it is stated that the focus was adolescents (Ruiz-Casares et al 2017); 1 review 11 years; 18 years (Antonio & Chung-do 2015).
Setting	School and community (and family - Ruiz-Casares et al 2017)
Type of intervention	Parenting interventions (Ruiz-Casares et al 2017); Positive Youth Development programmes (Antonio & Chung-do 2015)
Short description of the intervention	See above
Examples of interventions in primary studies (not exhaustive list)	Psychoeducation; multi-component programme; computer-delivered mother-daughter intervention programme (Ruiz-Casares et al 2017); Positive Youth Development programmes (Antonio & Chung-do 2015)

Key findings (particularly those relevant to selective interventions)	**Both reviews identified that there were very few primary studies of either parenting interventions or PYD interventions with ethno culturally diverse/indigenous young people. It is argued that more evaluation research is required with this population. The lack of primary studies and lack of clear synthesis on effectiveness makes it difficult to draw firm conclusions. Given these are different types of interventions they are summarised separately here.** For parenting interventions, Ruiz-Casares et al (2017) identified that there were very few evaluations of programmes for parents of adolescents from 'ethno culturally diverse' families, and that those that were identified did not have strong methodologies/study designs which limits conclusions. The findings are summarised narratively, and effectiveness in relation to impact on mental health outcomes is not clearly reported. The SR authors highlight 2 common themes that may be pertinent; the importance of strengthening the parent-adolescent relationship and the need for community involvement in programme design and evaluation (Ruiz-Casares et al 2017). For Positive Youth Development Interventions, Antonio & Chung-do (2015) identified that many of the primary studies showed positive effects of the interventions; however this is summarised narratively, and there is no information regarding effects sizes (only a general indication of the direction of the relationship) .
Effects at follow up	Ruiz-Casares et al (2017) review did not report follow up effects whilst Antonio & Chung-do (2015) reported follow up for only two studies.
Quality assessment of primary studies?	Ruiz-Casares et al (2017) review conducted quality assessment and found that there were significant methodological limitations of primary studies. Antonio & Chung-do (2015) did not conduct quality assessment and so findings must be treated with caution.
Other methodological issues of the primary studies reported by the SR	Antonio & Chung-do (2015) highlighted that most primary studies did not involve randomisation, and that the adaptation of the interventions for different communities mean that it is difficult to compare interventions.

Limitations of the SR (self-reported)	Ruiz-Casares et al (2017) noted limitations of the SR e.g. only 2 databases were searched, single reviewer for data extraction, broad focus on 'ethno cultural communities' may limit examination of differences within these communities, and finally that the primary studies had significant methodological limitations. Antonio & Chung-do (2015) noted the limited search terms used in searching.
Other comments	**Both reviews considered both mental health and substance misuse outcomes, and so it is difficult to identify findings for mental health outcomes specifically.** Although 1 review stated it was focused on adolescent mental health, the SR authors report that most of the included primary studies were focused on substance misuse (Ruiz-Casares et al 2017). 1 review was focused on PYD interventions for both mental health and substance use and the findings are not separated for mental health specifically (Antonio & Chung-do 2015).

6.4 b) Suicide Prevention Interventions

Focused vulnerable group	Indigenous youth (Harlow et al 2014); Aboriginal youth (Ridani et al 2015)
Number of reviews included (number of meta-analyses)	2 reviews (no meta-analyses) (Harlow et al 2014; Ridani et al 2015).
Total number of primary studies (Number of studies with vulnerable groups - Note: these are estimates)	78 primary studies (Harlow et al 2014 - all studies focused on indigenous youth; Ridani et al 2015 - at least 20 studies had an explicit focus on young people).
Population ages (youngest and oldest ages in primary studies)	The ages of participants in primary studies are not reported in either review.
Setting	School and community
Type of intervention	Suicide Prevention Interventions
Short description of the intervention	Suicide Prevention Interventions
Examples of interventions in primary studies (not exhaustive list)	College Suicide Prevention Model; Zuni Life Skills Development Model; Model Adolescent Suicide Prevention Program; Blue Bay Healing Center (Harlow et al 2014); A range of different intervention types e.g. educational workshops, creative methods, sporting activities, leaflets, media e.g. DVDs or radio, reducing access to means (Ridani et al 2015).

Key findings (particularly those relevant to selective)	**Both reviews highlight significant limitations of existing evaluations of suicide prevention interventions with this population which limits the conclusions that can be drawn. Both reviews indicate the need for more robust, rigorous, well designed evaluations.** Harlow et al (2014) report that there were some indications of positive outcomes; however the authors caution that the study designs were not robust and so must be treated with caution. Ridani et al (2015) report the percentage of programmes that showed positive results - however this is not formally analysed, and they indicate that most of the included programmes did not report on programme effectiveness. Therefore it is very difficult to draw any conclusions regarding programme effectiveness.
Effects at follow up	Follow up effects were not reported by either review.
Quality assessment of primary studies?	Quality assessment was not undertaken by either review and so the findings should be treated with caution.
Other methodological issues of the primary studies reported by the SR	1 review highlighted issues with study design e.g. lack of programme description, lack of process evaluation, lack of randomisation, lack of control groups (Harlow et al 2014) and 1 review also suggested lack of programme description and lack of suicide-related outcome measures (Ridani et al 2015).
Limitations of the SR (self-reported)	Neither review highlights clear methodological limitations of the review.
Other comments	Ridani et al (2014) included non-peer reviewed grey literature, (and only focused on Australia).

6.5 Foster children / parents

Focused vulnerable group	Foster children / parents
Number of reviews included (number of meta-analyses)	4 reviews Hambrick et al (2016); Leve et al (2012) (including 2 meta-analyses Uretsky & Hoffman (2017); van Andel et al (2014))
Total number of primary studies (Number of studies with vulnerable groups - Note: these are estimates)	90 primary studies, all of which were with foster children/parents
Population ages (youngest and oldest ages in primary studies)	0 years; 18 years
Setting	School and community (and family, institutions - Hambrick et al 2016)
Type of intervention	Mental health promotion/prevention interventions and group-based foster parent training

Short description of the intervention	3 reviews were focused on interventions to promote/reduce/prevent mental health problems/wellbeing for foster children (van Andel et al 2014; Hambrick et al 2016; Leve et al 2012). 1 review was focused on group-based foster parent training (Uretsky & Hoffman 2017)
Examples of interventions in primary studies (not exhaustive list)	The Incredible Years (IY), KEEP (Keeping Foster and Kin Parents Supported and Trained), Middle School Success program, and Cognitive Behavioural Parent training (Uretsky & Hoffman 2017); School-based mental-health prevention programme; Attachment-focused intervention; Circle of security; Video interaction positive parenting (van Andel et al 2014); Attachment and Biobehavioral Catchup (ABC), Child Parent Psychotherapy (CPP), Fostering Healthy Futures (FHF), Incredible Years (IY), Keeping Foster Parents Trained and Supported (KEEP), Kids in Transition to School (KITS), Parent-Child Interaction Therapy (PCIT), Short Enhanced Cognitive-Behavioral Parent Training (CEBPT), Trauma-focused cognitive behavioural therapy, treatment foster care Oregon for pre-schoolers (Hambrick et al 2016); Early childhood Attachment and Biobehavioral Catch-up (ABC); Multidimensional Treatment Foster Care for Pre-schoolers (MTFC-P); Modified Incredible Years (IY); Keeping Foster Parents Trained and Supported (KEEP) Fostering Individualized Assistance Program (FIAP); Multi-dimensional Foster Care for Adolescents (Leve et al 2012).

Key findings (particularly those relevant to selective interventions)	**Overall, four reviews identify a range of interventions that show promise in terms of reducing problematic behaviour/externalising difficulties; however there are limitations with both the primary studies and the quality of the reviews.** Uretsky & Hoffman (2017) reviewed group foster parent training programmes and found that all included studies (n=11) demonstrated reductions in problematic behaviour or the intensity of behaviour, and meta-analysis of 7 studies found "small to medium" effects on externalising difficulties. Van Andel et al (2014) also supported the effectiveness of a variety of types of interventions for foster children and their foster parents and the SR authors suggest that the average effect was 30% reduction problematic child behaviour/improvement in parental discipline; however this review did not undertake quality assessment of primary studies and so interpretation must be cautious. Leve et al (2012) identified 8 interventions which have shown positive effects with foster children; however the review explicitly sought to identify only interventions which showed positive results, and did not undertake quality assessment so there will be inherent bias in the findings. A final review provided a follow up to the review by Leve et al (2012) by also considering interventions which had not been originally designed for foster children and not necessarily using a randomised design (Hambrick et al 2016). This review identified 10 "possibly efficacious" interventions for promoting positive mental health outcomes for children in foster care; however the findings do not include an analysis of effect sizes (Hambrick et al 2016).
Effects at follow up	1 review noted the lack of longer term follow up data; however it was found that in the limited number of studies which did measure outcomes at follow up effects were maintained (Uretsky & Hoffman 2017). Another review noted the lack of follow up (albeit where it was reported it seemed that effect sizes attenuated over time) and suggested that longer term follow was required in order to evaluate interventions more robustly (Leve et al 2012). Follow up data was not reported by 2 reviews (van Andel et al 2014; Hambrick et al 2016).
Quality assessment of primary studies?	1 review conducted quality assessment and excluded studies with high risk of bias (Hambrick et al 2016). The other 3 reviews did not conduct quality assessment and so findings must be treated with caution (van Andel et al 2014; Leve et al 2012; Uretsky & Hoffman 2017).

Other methodological issues of the primary studies reported by the SR	A range of methodological limitations of primary studies were noted including small sample sizes, predominance of females in the samples, caregiver report outcome measures, lack of randomisation (Uretsky & Hoffman 2017); lack of longer term follow up, lack of blinding, lack of reported effect sizes (Leve et al 2012).
Limitations of the SR (self-reported)	Uretsky & Hoffman (2017) noted that there may be bias in the search process, the possibility of publication bias, and the wide range of settings/countries which may make comparisons difficult, and only 7 of 11 studies could be included in the meta-analysis. Van Andel et al (2014) did not consider the limitations of the SR. Leve et al (2012) noted that the explicit intention to review only interventions which showed positive effects involved an inherent degree of bias. Hambrick et al (2016) noted that although reviews with high risk of bias were excluded there may be some bias in studies because some were included if they had been evaluated in at RCT with at least one population (even if the included primary study was less robust. The SR authors also highlight that they only included evaluations which showed a positive outcome, and therefore did not include studies which showed negative or null effects (Hambrick et al 2016).
Other comments	**It must be noted that these reviews are not explicitly defined as preventative interventions; however the focus on providing input on the basis of status as 'looked after'/foster children rather than mental health status, indicates that the interventions may preventative/mental health promotion. Furthermore two reviews included specific inclusion criteria that meant interventions had to show positive outcomes e.g. "Intervention evidenced at least one positive child mental health outcome for children in foster care" (Hambrick et al 2016, p.66), and "the intervention produced at least one positive outcome for the intervention children relative to the control children" (Leve et al 2012, p.1201). Therefore there is an inherent bias in the focus of these reviews and so findings must considered cautiously.**

6.6 Young offenders

Focused vulnerable group	Young offenders/youth in juvenile justice facilities
Number of reviews included (number of meta-analyses)	1 meta-analysis (Kumm et al 2019)

Total number of primary studies (Number of studies with vulnerable groups - Note: these are estimates)	11 primary studies. Of these, 5 studies are focused on 'universal populations' i.e. "intervention delivered to all group of juveniles regardless of their mental health status" (Kumm et al 2019, p. 7) and are therefore more likely to be prevention/promotion interventions.
Population ages (youngest and oldest ages in primary studies)	11-22 years of age
Setting	Juvenile justice facilities - secure facilities
Type of intervention	Mental health interventions intended to address internalising (e.g. depression, anxiety, PTSD) symptoms.
Short description of the intervention	See above
Examples of interventions in primary studies (not exhaustive list)	Psychoeducational group interventions; cognitive-behavioural interventions; animal therapy
Key findings (particularly those relevant to selective interventions)	**The authors report that the main finding was that there were very few high quality primary studies examining mental health interventions for young people in juvenile justice settings. The authors report that overall there were ''mixed'' results regarding the effectiveness of mental health interventions in juvenile justice settings for improving internalising problems (p.1).** Many of the observed differences between the intervention and the non-intervention groups were not statistically significant. Furthermore, findings are not presented specifically in relation to the 'universal' interventions, and so it is not possible to identify the impact of more preventative interventions.
Effects at follow up	Not reported.
Quality assessment of primary studies?	Yes. The authors use the Council for Exceptional Children quality standards. No overall assessment of study quality was provided but the SR authors state "the need for more rigorous research designs" (p. 16).
Other methodological issues of the primary studies reported by the SR	The research designs of the primary studies varied considerably, which makes meaningful comparisons difficult. There was a dearth of rigorous, experimental studies.
Limitations of the SR (self-reported)	A relatively small number of studies were included in the review. Also, both published and unpublished studies were included, which raises questions about the quality standards of the sample of included studies.

Other comments	**It must be noted that this review does not focus specifically on prevention; however it does include 5 studies of mental health interventions delivered 'universally' in juvenile justice settings i.e. to young people without a prior mental health diagnosis, which suggests a more preventative rather than therapeutic focus. Findings are not presented separately for those interventions delivered universally, and so the results must be treated with caution.** Finally, this review focused specifically on juvenile justice settings / secure settings, and therefore does not consider preventative support for youth offending in the community.

7.0 'Mixed' reviews which include primary studies with vulnerable groups

7.1 Prevention Interventions – mixed

Type of intervention	2 different types of interventions; prevention interventions mixed (Bayer et al 2009); stress management interventions (Rew et al 2014).					
Number of reviews included (number of meta-analyses)	2 reviews (no meta-analyses) (Bayer et al 2009; Rew et al 2014)					
Total number of primary studies	75 primary studies					
Number of primary studies with vulnerable groups (Note: these are estimates)	*Low income*	*Ethnic minority*[11]	*Young offenders*	*Low income AND ethnic minority*	*Other*	*Comments*
Rew et al 2014		5				1 – African American from homeless shelters
Bayer et al (2009)	Cannot be estimated, but the SR authors state: "Most programmes were targeted to at-risk children, with selective environmental and/or indicated behavioural risks." (Bayer et al 2009, p.705).					
Population ages (youngest and oldest ages in primary studies)	6 years; 21 years; (Rew et al 2014) Bayer et al (2009) did not report the age ranges of primary studies					
Setting	School and community (and family - for Bayer et al 2009).					

[11] Note – for coding of number of primary studies we did not employ a pre-specified definition of 'ethnic minority' and this can include a variety of different groups as described by SR authors.

Short description of the intervention	This category considers a variety of interventions which intend to impact on a range of mental health outcomes including measures of anxiety/depression/self-esteem/stress as well as externalising difficulties.
Examples of interventions in primary studies (not exhaustive list)	**Prevention interventions mixed:** Nurse Home Visitation Programme; the individual Family Check Up; the Good Behaviour Game class programme; the Incredible Years group format, Triple P individual format, and Parent Education Programme group format (Bayer et al 2009) **Stress management interventions:** mindfulness/awareness; Transcendental meditation; relaxation exercises; and life skills training. (Bayer et al 2009).
Key findings (particularly those relevant to selective programmes)	**Overall, it appears that there is some evidence for intervention effectiveness for some vulnerable groups (primarily young people identified as ethnic minority and/or low income); however it is not possible to identify the specific impacts/effectiveness for particular vulnerable groups or whether interventions need to be adapted to be effective with these vulnerable groups. Stress-management interventions:** It was found that of 17 studies, 10 showed statistically significant effects, four were equivocal, and two showed no statistically significant effects (Rew et al 2014). **Prevention interventions-mixed:** This review identified several different effective interventions and the authors highlight three US programmes specifically the Nurse Home Visitation Programme, the Family Check Up and the Good Behaviour Game (Bayer et al 2009).
Effects at follow up	Not reported
Quality assessment of primary studies?	Rew et al (2014) did not undertake quality assessment and so findings must be treated with caution. Bayer et al (2009) undertook quality assessment and found that primary studies had moderate to high risk of bias.
Other methodological issues	Rew et al (2014) reported other methodological limitations including small sample sizes and issues with randomisation.
Limitations of SR (self-reported)	Bayer et al (2009) acknowledge that they did not follow a formal systematic review procedure and did not include cross-checking by more than one reviewer.
Other comments	For Bayer et al (2009) it is not clear how 'at risk' or selective/indicated are defined and so some of the studies may not be relevant to the vulnerable groups of interest for this review.

7.2 Physical activity interventions

Type of intervention	Physical activity interventions
Number of reviews included (number of meta-analyses)	2 reviews (Camero et al 2012; Brown et al 2013)

Total number of primary studies	17 primary studies					
Number of primary studies with vulnerable groups (Note: these are <u>estimates</u>)	*Low income*	*Ethnic minority*	*Young offenders*	*Low income AND ethnic minority*	*Other*	*Comments*
Camero et al (2012)	1	1		3		5 out of 8 studies
Brown et al (2013)	1	1	2			4 out of 9 studies
Population ages (youngest and oldest ages in primary studies)	7 years; 19 years					
Setting	School and community					
Short description of the intervention	Physical activity interventions - either intended to promote physical activity in general (Brown et al 2013) or to impact on the determinants of mental health e.g. self-esteem etc. (Camero et al 2012).					
Examples of interventions in primary studies (not exhaustive list)	Youth Fit for Life; Creating Opportunities for Personal Empowerment (COPE) Healthy Lifestyles Thinking, Emotions, Exercise and Nutrition (TEEN) intervention programme (Camero et al 2012); Physical fitness programmes; additional sport and physical education (PE) classes (Brown et al 2013)					
Key findings (particularly those relevant to selective interventions/vulnerable groups)	**Both reviews found evidence of the positive effects of interventions on measures of depression (Brown et al 2013) and on measures of depression, anxiety, self-efficacy/self-esteem (Camero et al 2012). Primary studies within these reviews include vulnerable groups suggesting that these interventions can be effective with these populations.** Camero et al (2012) found that 7 out of 8 studies showed significant effects on symptoms of depression. Brown et al (2013) found a "small but significant effect" of physical activity interventions for symptoms of depression (p.195).					
Effects at follow up	Not reported					
Quality assessment of primary studies?	Camero et al (2012) did not conduct quality assessment and so the findings must be treated with caution. Brown et al (2013) assessed quality and found that 2 studies (of 9) were high quality/low risk of bias.					
Other methodological issues	Camero et al (2012) reported that for some primary studies the intervention length was short and there was variety in the study designs. Brown et al (2013) reported the lack of primary studies as an issue.					
Limitations of the SR (self-reported)	The SR authors identify the heterogeneity of study designs (Camero et al 2012) and few primary studies (Brown et al 2013) as limitations.					

Other comments	**The findings were not separated according to vulnerable group and so it is difficult to identify the specific effects of interventions for vulnerable groups.**

7.3 Early Childhood Education

Type of intervention	Early Childhood Education
Number of reviews included (number of meta-analyses)	1 meta-analysis (Schindler et al 2015)
Total number of primary studies	31 primary studies.
Number of studies with vulnerable groups (Note: these are estimates)	Not clear how many studies include vulnerable groups; however the authors state that over 86% of participants are "low income" (Schindler et al 2015, p.251)
Population (youngest and oldest ages in primary studies)	Participant ages of primary studies not reported, but the SR searched for programme evaluations of children aged 3 to 5 years.
Setting	Schools
Short description of the intervention	Early Childhood Education, defined as: "center-based education for children from birth to age 5". The authors define three 'levels' of ECE: - Level 1: "without a clear focus on social and emotional development" e.g. positive nurturing environment and focus on education - Level 2: "with a clear but broad focus on social and emotional development" e.g. Head Start / Early Head Start. - Level 3: "with a clear and intensive focus on social and emotional development" (Schindler et al 2015, p.245-246). Two types of level 3 programme were identified: social skills training (e.g. PATHS) and caregiver behaviour management training (e.g. Incredible Years delivered in schools).
Examples of interventions in primary studies (not exhaustive list)	Child Social Skills Training; Caregiver Behavior Management Training; Standard Head Start plus Promoting Alternative Thinking Strategies (PATHS) Curriculum; Good Behavior Game

Key findings (particularly those relevant to selective interventions/vulnerable groups)	**Overall the authors argue that Early Childhood Education programmes which are focused on social and emotional development (particularly child social skills training) can be effective in preventing/reducing externalising difficulties (Schindler et al 2015).** The authors report that with increasing intensity of the 'level' of the programme there were increasing positive effects (Schindler et al 2015). Level 1 programmes did not show significant positive effects. Level 2 programmes showed significant moderate positive effects i.e. reductions in externalising difficulties. Level 3 programmes showed further positive effects on reducing externalising problems when compared to Level 2 programmes. However, the addition of caregiver behaviour management training did not show significant benefits in comparison to level 2 programmes (Schindler et al 2015).
Effects at follow up	The authors report that level 2 programmes remained more effective compared to level 1 programmes even when the analysis was restricted to measures taken at different lengths of follow up e.g. 1, 3 and 5 years post-intervention.
Quality assessment of primary studies?	There were pre-specified methodological criteria for the studies included in the database used by the SR authors e.g. need for a comparison group, minimum sample size of 10, attrition rate below 50%. In addition the authors assessed quality using an index of quality to assess evaluations. The authors report that the meta-analysis was restricted to "rigorously evaluated" (Schindler et al 2015, p. 257) "high quality" evaluations (Schindler et al 2015, p.258).
Other methodological issues	The authors report there was no evidence of publication bias.
Limitations of the SR (self-reported)	The authors highlight that they only reviewed programmes that have been "rigorously evaluated" (p.257) and so this represents only a portion of the wider evidence on ECE programmes. The SR authors also highlight that they were not able to identify which features of the programme were most effective, and the focus on externalising difficulties meant they did not examine a wider range of outcomes (Schindler et al 2015).
Other comments	This review primarily reviews primary studies which have been conducted with low income children, and so could be considered a 'focused review'.

7.4 Positive Youth Development

Type of intervention	Positive Youth Development interventions					
Number of reviews included (number of meta-analyses)	2 reviews (Lapalme et al 2014, including 1 meta-analysis: Ciocanel et al., 2017)					
Total number of primary studies	125 primary studies					
Number of primary studies with vulnerable groups (Note: these are estimates)	*Low income*	*Ethnic minority*	*Young offenders*	*Low income AND ethnic minority*	*Other*	*Comments*
Ciocanel et al (2017)	7			6	1 - high risk of teen pregnancy	14 out of 24 studies
Lapalme et a (2014)	Cannot be estimated, but included a range of vulnerable groups including: youth described as 'low income', 'at risk of delinquency' ethnic minorities, and LGBTQ youth.					
Population (youngest and oldest ages in primary studies)	5-18 years of age (Note: Age range not reported in Lapalme et al. (2014)					
Setting	Mixed (Ciocanel et al., 2017; Lapalme et al., 2014); (n.b. Ciocanel et al 2017 focused on interventions delivered out of school even if actually on school premises and Lapalme et al 2014 were focused on the role of context/neighbourhood).					
Short description of the intervention	Positive youth development programmes aim to promote positive outcomes such as interpersonal relationships, resilience, positive social, emotional, cognitive, behavioral skills, self-determination, identity and pro-social behavior (Ciocanel et al 2017).					
Examples of interventions in primary studies (not exhaustive list)	Teen Outreach Program; Leadership and Young Professionals (LYP); All Stars; Big Brothers Big Sisters; The Quantum Opportunities Program; Choices Enhanced, Reach for Health and others (Ciocanel et al 2017); community projects; art-based programs; Youth Centres (Lapalme et al 2014).					
Key findings (particularly those relevant to selective programmes/vulnerable groups)	**Both reviews suggest the effectiveness of Positive Youth Development interventions for a range of outcomes; however Ciocanel et al (2017) raise concerns regarding the methodological quality of primary studies, and Lapalme et al (2014) did not consider the size or statistical significance of effects.** Ciocanel et al. (2017) found that, overall, Positive Youth Development (PYD) programmes had small but statistically effects on academic outcomes and psychological adjustment, but no significant effects on prosocial behaviours or reducing problem behaviours (e.g. substance misuse, sexual behaviour, violence/anti-social behaviour). The authors					

	caution that there are a lack of rigorous primary studies (Ciocanel et al, 2017). Lapalme et al (2014) did not synthesize evidence of effectiveness across interventions, but instead reported whether PYD interventions had positive/negative/neutral impact on a range of outcomes and considered the role of context/environment on interventions. Nevertheless, Lapalme et al. (2014) reported that PYD programmes could be effective for a wide range of outcomes, such as cognitive competencies (e.g. problem-solving), self-esteem and self-confidence, social relationships and sense of belonging, self-control, reduce problem behaviours, and promote leadership and civic engagement in youth. However, the findings do not provide effect sizes, or discuss whether the changes were statistically significant or not and so these conclusions must be treated with caution.
Universal vs. selective vs. indicated	Ciocanel et al. (2017) observed that ''[l]ow risk young people derived more benefit from positive youth development interventions than high-risk youth.'' (p. 483).
Effects at follow up	Ciocanel et al (2017) were only able to calculate the follow-up effects for psychological adjustment and academic achievement, and found mixed evidence, with some studies showing sustained positive effects, while others-no significant effects. The authors highlight the need for longer term follow up studies (Ciocanel et al 2017). Conclusions regarding follow-up effects were not reported by Lapalme et al. (2014).
Quality assessment of primary studies?	Quality assessment was only carried out by Ciocanel et al. (2017). The authors found that all of the included studies had methodological problems, which may have led to be over-estimation of the observed positive effects.
Other methodological issues	Ciocanel et al (2017) note the lack of longer-term follow-up effects of the interventions and small sample sizes. Many studies tend to only rely on self-report measures of positive youth development outcomes. Demographic data were absent in some studies. Ciocanel et al (2017) highlight that the evidence predominantly comes from primary studies conducted in the U.S. which limits potential transferability and outcome measures based on self-report.
Limitations of the SR (self-reported)	Ciocanel et al (2017) highlight that there were only a small number of primary studies, which makes it difficult to confidently estimate the likely programme effectiveness due to a lack of power. Other limitations include: non-comprehensive search strategy, (particularly in relation to unpublished studies) (Ciocanel et al 2017).
Other comments	**As noted by Lapalme et al. (2014), most interventions tend to only report outcomes that showed an improvement, rather than any outcomes that showed deterioration or no change. In many cases, the observed positive effects were only small or of no statistical significance.**

7.5 Strengths and resilience based interventions

Type of intervention	Strength and resilience based interventions					
Number of reviews included (number of meta-analyses)	1 review (no meta-analyses) (Brownlee et al 2013)					
Total number of primary studies	11 primary studies					
Number of primary studies with vulnerable groups (Note: these are estimates)	*Low income*	*Ethnic minority*	*Young offenders*	*Low income AND ethnic minority*	*Other*	*Comments*
Brownlee et al (2013)		1	2		1 - foster children	4 studies out of 11
Population (youngest and oldest ages in primary studies)	3 years; 19 years					
Setting	School and community					
Short description of the intervention	Intervention programmes that have strength- or resilience-based outcomes (e.g. self-concept, self-esteem, resilience, social competencies, sense of control)					
Examples of interventions in primary studies (not exhaustive list)	Preventing the Abuse of Tobacco, Narcotics, Drugs, and Alcohol (PANDA); Leadership, Education, Achievement and Development (LEAD) programme; Youth Competency Assessment (YCA)					
Key findings (particularly those relevant to selective programmes/vulnerable groups)	**This review identified strengths based interventions, 3 of which had been evaluated with vulnerable groups. However the diversity of interventions and populations, and the lack of efficacy studies makes it difficult to draw conclusions regarding strengths based interventions for specific vulnerable groups. The SR authors also highlight a lack of well conducted evaluations of strengths based interventions in general.** The SR authors report the effectiveness of interventions narratively. In terms of interventions which were conducted with vulnerable groups of interest: the LEAD programme demonstrated positive impacts on resilience, self-esteem, social competence, and sense of control; however effect sizes are not reported (Brownlee et al 2013). The Youth Competency Assessment demonstrated reduction negative behaviours, and positive impact on the climate of the juvenile justice setting (Brownlee et al 2013). Finally, the PANDA programme demonstrated satisfaction of teachers, and improved self-concept in participants; however again the strength or statistical					

	significance of these effects are not reported (Brownlee et al 2013).
Effects at follow up	Not summarised by the review authors.
Quality assessment of primary studies?	Quality assessment was undertaken. Three studies were found to be of high methodological quality; the remaining eight studies were assessed to have moderate or weak methodological quality. In terms of studies conducted with vulnerable groups only the evaluation of the Youth Competency Assessment was considered to be a high quality evaluation.
Other methodological issues	The SR authors highlight the lack of experimental studies (e.g. using control groups, before/after evaluations, robust outcome measures) etc. It is suggested that the evidence has focused on effectiveness (i.e. real world) evaluations - which limits conclusions regarding the efficacy of programmes (Brownlee et al 2013). In many instances, the researchers who were assessing the interventions were the ones delivering them-which introduces the risk of bias. In some studies, there was inadequate information as to how the intervention was implemented, what was involved, etc. and the SR authors highlight the need for more detailed description of intervention characteristics (Brownlee et al 2013).
Limitations of the SR (self-reported)	The review was limited to studies assessing ''internal strengths'' (Brownlee et al, 2013 p.457), as opposed to strengths related to the participants' environments, e.g. community, family.
Other comments	**It must be noted that only 3 of the 11 included studies were focused on vulnerable groups and so not all the findings are necessarily relevant to vulnerable groups.**

7.6 Arts based activities

Type of intervention	Arts activities					
Number of reviews included (number of meta-analyses)	1 (no meta-analyses) (Zarobe & Bungay 2017)					
Total number of primary studies	8 primary studies					
Number of primary studies with vulnerable groups (Note: these are <u>estimates</u>)	*Low income*	*Ethnic minority*	*Young offenders*	*Low income AND ethnic minority*	*Other*	*Comments*

Zarobe & Bungay (2017)	1	1				2 studies out of 8
Number of primary studies with vulnerable groups	2 primary studies					
Population (youngest and oldest ages in primary studies)	9 years; 26 years					
Setting	School and community					
Short description of the intervention	Creative arts (singing, dancing, drama, theatre, visual arts)					
Examples of interventions in primary studies (not exhaustive list)	Drama/theatre, music, visual arts and dance					
Key findings (particularly those relevant to selective programmes/vulnerable groups)	**Overall the SR authors conclude that arts activities could have positive effects on outcomes such as self-confidence, self-esteem, relationships and sense of belonging (Zarobe & Bungay 2017). However, the very limited number of primary studies, reliance on narrative synthesis, and that only 2 studies focused on vulnerable groups, suggests the need for cautious interpretation. The authors highlight that there is a clear lack of research on arts-based interventions in relation to mental health outcomes.**					
Effects at follow up	Not reported.					
Quality assessment of primary studies?	Yes. The only two studies conducted with vulnerable groups were rated as methodologically ''weak''. The SR authors highlight the need for more high quality research evaluating such arts-based interventions.					
Other methodological issues	Limited methodological was detail provided in most of the included studies. Most of the included studies were either qualitative or observational rather than experimental.					
Limitations of the SR (self-reported)	The SR authors note that the review was not a systematic review, which limits the conclusions that can be drawn.					
Other comments	**It must be noted that only 2 primary studies are with vulnerable groups which suggests that this is very preliminary evidence.** It should also be noted that the exclusion criteria included some vulnerable groups e.g. young offenders, refugees, children in care, and so the review may miss relevant studies focused on these groups.					

8.0 Additional evidence – signposts for further resources

8.1 Overviews

In addition, several overviews were relevant to this overview and are referenced here to provide signposts to additional relevant evidence.

Two overviews cut across several topic areas and were relevant to the whole overview (Vojt et al 2018; Welsh et al 2015). Vojt et al (2018) focus specifically on adolescents, and provide a mapping of interventions intended to improve the mental health and wellbeing of vulnerable groups. Whilst this overview also includes evidence on psychological treatments (and therefore includes wider evidence than our focus on selective prevention), and is focused only on adolescents, it provides a helpful mapping of the evidence in relation to relevant vulnerable groups. The authors conclude there is a stark lack of evidence (including mixed/conflicting evidence), and clear recommendations were not possible (Vojt et al 2018). Evidence that was identified related to the use of Cognitive Behaviour Therapy (CBT) for specific groups – homeless adolescents, young offenders, and young people with experience of sexual abuse (Vojt et al 2018). The authors also identify a lack of evidence specifically for ethnic minorities, asylum seekers and refugees, young people with experience of domestic violence or intimate partner violence, and young people with low socioeconomic status (Vojt et al 2018), and identify no evidence at all for some groups: young carers, young people who were unemployed, or those out of education (Vojt et al 2018).

The scoping review by Welsh et al (2015) is also relevant to our overview as it considers interventions to address equity in the mental health and wellbeing of children and young people. Although the title is not focused specifically on vulnerable groups or selective prevention, it is considered here as it includes a focus on equity in the title, and the abstract identifies consideration of disadvantaged groups. The authors identify a large number (over 1000) interventions which have been evaluated in relating to promoting mental wellbeing or preventing mental illness for children and young people in high income countries (Welsh et al 2015). However, it is argued that most interventions were aimed at prevention rather than promotion, and there was a distinct lack of evidence on the differential impact of interventions according to disadvantage or equity (Welsh et al 2015). The authors highlight that there is some evidence of the effectiveness of interventions with particular disadvantaged groups (e.g. indigenous or low income communities) (Welsh et al 2015). The findings are summarised by intervention type, and specific 'at risk' groups identified where appropriate. This scoping review should be consulted for further relevant evidence in relation to promotion/prevention for child and adolescent mental health.

The overview by Khanlou & Wray (2014) provides a broad review of resilience literature, including a question to consider the evidence on interventions to promote resilience and mental health, and specifically whether these interventions can be effective for addressing the gap between most and least disadvantaged young people. The authors suggest that there is evidence for mental health promotion interventions with higher risk children (e.g. interventions have been evaluated in areas of socioeconomic disadvantage or with high levels of crime). However, they also identify that there is a lack of evidence on whether interventions have different effects according to socioeconomic status, race/ethnicity or gender (Khanlou & Wray 2014).

A literature review by Edidin et al (2012) focuses on homeless youth, and considers a wide range of key issues for this population, including intervention and prevention studies. The authors argue that there is a lack of evidence (particularly high quality studies) with this vulnerable group, despite the fact that they are identified as an especially vulnerable group in terms of physical and mental health (Edidin et al 2012).

In addition, we would also like to make reference to two further overviews which signpost to further useful evidence – although it must be noted they did not include a focus on vulnerable groups or selective prevention in the title or objective. Paulus et al (2016) focus on school based interventions including 'Tier II' (i.e. selective) prevention interventions for child mental health. This overview provides a useful resource in the form a table of selective school based programmes which have been evaluated e.g. Incredible Years parenting programme and the FRIENDS programme – see Paulus et al (2016) for further detail on specific reviews for each intervention type/topic area. The authors also outline a useful summary of factors that may be important for identifying and implementing relevant school-based interventions (Paulus et al 2016).

Finally, an overview by Sandler et al (2015) may also be useful to consult as it provides an overview of meta-analyses across a wide range of preventative interventions for child and adolescent mental health. The findings are summarised by problem type and then by interventions to promote development and resilience. The authors highlight that only a few of the included meta-analyses consider socioeconomic status or ethnicity as a moderator, and that this requires further attention (Sandler et al 2015). Although this overview is not focused on vulnerable groups/selective prevention it provides a useful summary which might inform prevention research and practice in general.

8.2 Organisational reports

Below we outline some additional non peer reviewed evidence which we provide as a signpost. As outlined above we conducted some limited screening of a range of organisational websites to identify organisational reports that were relevant to the focus of our overview (i.e. focused on selective mental health prevention/promotion interventions and on vulnerable groups). However, it must be noted that this was not a comprehensive search, and was based on a limited number of organisational websites rather than a wider search for grey literature. We have not included all possible general reports relevant to particular vulnerable groups – more in-depth searching would be required for each vulnerable group in order to identify a wider range of grey literature.

Furthermore, we have not searched for reports produced by the National Institute for Health and Care Excellence (NICE). https://www.nice.org.uk/ Additional searching of this resource may be useful to identify briefings on relevant topics.

An initial starting point is the report by Goldie et al (2016), *'Mental Health and prevention: Taking location action for better mental health'* (https://www.mentalhealth.org.uk/publications/mental-health-and-prevention-taking-local-action-better-mental-health). This policy report advocates a whole-community, life course approach to mental health promotion and prevention, and stresses the importance of targeted intervention efforts for those at increased risk. The report identifies several parenting interventions that have been shown to be effective for improving children's well-being, particularly in families living in poverty and experiencing other forms of risk. Examples of such evidence-based interventions are interventions aimed at enhancing caregiver sensitivity and infants'

attachment security (The report cites the review conducted by Scott and colleagues (2006), *'What makes parenting programmes work in disadvantaged areas?'* (https://www.jrf.org.uk/report/what-makes-parenting-programmes-work-disadvantaged-areas). Goldie et al (2016) also point to evidence of the effectiveness of caregiver interventions for improving the resilience of looked after children. The report broadly highlights that childhood transitions - defined as "…living in unsafe home environments (characterised by domestic violence, neglect, physical and / or sexual abuse); caring responsibilities; bereavement; separation of parents; parental unemployment; moving house or homelessness; developing a disability or health condition; migration-related trauma and discrimination." (Goldie et al 2016, p. 43) are crucial foci for mental health promotion and prevention efforts.

A 2014 report by NHS Health Scotland '*Interventions to support parents of older children and adolescents'* (http://www.healthscotland.scot/media/1158/interventions-to-support-parents-of-older-children-03-14.pdf) includes consideration of more disadvantaged groups (Scott & Woodman 2014). The report considers evidence of a wide range of interventions to support parents of older children and adolescents. Some of the programmes reviewed had been implemented with high-risk populations such as low-income children and families and children at risk of exclusion from school (Scott & Woodman 2014).

An edited book by Young Minds focused on young people who have experienced adversity: *'Addressing Adversity: Prioritising adversity and trauma-informed care for children and young people in England'* (https://youngminds.org.uk/media/2142/ym-addressing-adversity-book-web.pdf), (Edited by Bush, 2018) considered a number of preventive interventions are discussed that have been shown to be effective in meeting the mental health needs of looked after children.

In addition, we identified two reports focused on youth offending and violence prevention. *'Protecting people, promoting Health. A public health approach to violence prevention for England'* (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/216977/Violence-prevention.pdf) by Bellis et al (2012) gathers evidence of interventions that may reduce the risk of violence and enhance protective factors in at-risk young people (Bellis et al 2012).

A 2015 report by Public Health England '*The mental health needs of gang-affiliated young people'*(https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/771130/The_mental_health_needs_of_gang-affiliated_young_people_v3_23_01_1.pdf) provides an overview of a range of prevention and promotion interventions aimed at improving the mental well-being and social outcomes of gang-affiliated young people (Hughes et al 2015).

8.3 Relevant excluded reviews

Finally, we identified some reviews which, although they were relevant to the focus of this overview, did not meet our eligibility criteria. For example, some reviews did not meet the threshold of 25% primary studies focused on vulnerable groups or did not have sufficient focus on selective prevention (in comparison with indicated or universal prevention). Furthermore, some reviews were focused on a specific vulnerable group, but were more focused on therapeutic or clinical treatments.

Nevertheless, many of these reviews are relevant (e.g. include primary studies of selective prevention of anxiety/depression prevention interventions) when considering targeted/selective approaches. We have identified a selection of these reviews for further consideration. Please see Appendix C for full details. However, please not that this is not the full list of excluded reviews – only those identified as particularly relevant.

9. Strengths and Limitations

This rapid overview provides a 'snapshot' of available evidence in relation child and adolescent mental health and wellbeing for vulnerable groups. It is offered as a starting point for identifying existing evidence which may strengthen policy and practice intended to prevent mental health problems and promote wellbeing for children from vulnerable groups.

However, several limitations of this overview must be recognised. In line with guidance regarding the conduct of rapid reviews, (Tricco et al, 2017), several decisions were made to 'streamline' the methodology which must be taken into consideration. Firstly the search strategy was restricted to 2 electronic databases, and 1 additional curated database specific to child and adolescent mental health. It must also be noted that searches were restricted to 'title' searches, to between 2008 and 2019, to articles published in English and article/review document types. These parameters will have limited the number of 'hits' and means that it is likely that the search will not have identified all possible records. The search strategy was also not exhaustive and it may be that relevant terms were missed or may have biased the types of results achieved. For example, it is possible that the strategy was not sufficiently sensitive to concepts focused on wellbeing / positive mental health or to capture the evidence relevant to the vulnerable groups of interest.

Second, many reviews considered universal, selective, indicated prevention, and treatment in combination, and definitions of each were not used consistently. As outlined above, we iteratively applied an exclusion criterion which excluded reviews with less than 25% of primary studies relevant to the focus of the review. We acknowledge that this threshold is arbitrary, and may mean that some relevant reviews are excluded (particularly those with a higher total number of primary studies) whilst other reviews are included which only include a few relevant primary studies, simply because these represent a higher proportion of their total primary study sample. We recognise that this may have biased the sample of included reviews in our overview, and may miss relevant literature. As outlined above the number of primary studies focused on vulnerable groups was also an estimate and was reliant on SR authors reporting the number of studies and demographic characteristics.

Thirdly, and relatedly, we recognise that our definition of selective prevention was narrower than some of the definitions used across the literature. We focused specifically on vulnerable groups, and did not consider studies were selective prevention was focused on other types of risk factor e.g. parental divorce, bereavement, temperament etc. rather we focused on selective prevention for the specific vulnerable groups outlined in our eligibility criteria, and therefore have focused on a subset of the selective prevention evidence. Relatedly, we did not include reviews focus on treatment interventions for vulnerable groups and so this (separate) evidence base should be examined if this

is of interest (For example, see overviews de Arellano et al (2014) and Turrini et al (2017)). Thus the evidence presented here is subset of the wider evidence base, and must be considered as such.

Fourth, for title, abstract and full text screening it was not possible for both reviewers to screen all titles. In order to expedite the process a subset were cross-checked by a second reviewer in order to check for consistency. However, it is recognised that this may mean that a degree of bias will have been introduced, potentially missing relevant papers, or including those that are less relevant.

Fifth, as mentioned above, we were not able to undertake quality assessment of systematic reviews, which limits our ability to draw conclusions regarding the strength of the evidence base and to make recommendations regarding the effectiveness of particular interventions. We also did not outline a prior definition of 'systematic review' and therefore considered some reviews which may not meet strict definitions. However, this approach also ensured that we have maintained an inclusive approach in order to provide a map of the types of interventions which are currently evaluated, rather than only those that have been appraised in a formal systematic review.

Sixth, the data extraction undertaken was pragmatic and it was not possible to extract all possible relevant information from included reviews. For example, we did not extract specific effect sizes, or moderators of intervention effects, and as such we are not able to comment on factors which may influence effectiveness (such as mode of delivery, training or fidelity, number of sessions, local context etc.). For 'mixed' reviews it was often difficult to identify a specific number of studies which were focused on vulnerable groups. We have extracted this information wherever possible; however the numbers are estimates, and therefore it is not possible to obtain an accurate assessment of the degree to which vulnerable groups are considered within mixed reviews. Relatedly, we recognise that our identification of primary studies as including 'ethnic minority' young people was not predefined, and therefore may include a diverse set of groups.

Seventh, our grey literature searches were restricted to pre-determined key websites and therefore only cover specific parts of the evidence. We did not incorporate overviews and grey literature into the key findings sections of the synthesis, and so this may mean that the full range of interventions and approaches are not fully represented.

Finally, our overview is also subject to the limitations of overviews in general (McKenzie and Brennan, 2017), in that we were reliant on the data provided in systematic reviews, and were not able to assess the primary evidence directly. This means that the interventions reviewed are those which have been previously evaluated in primary studies and therefore our review may miss emerging or newly developed practice and interventions which have not yet been considered in synthesised evidence (Weare & Nind, 2011).

Despite these limitations, this overview provides a guide to available evidence which can be used to identify evidence across a wide range of interventions and for a diverse range of vulnerable groups. We have adopted a systematic approach to searching the evidence, and have synthesised the evidence in order to make it easy to navigate and provide signposts for further resources.

10. Conclusions

This mapping overview has demonstrated that there is an emerging evidence base (at the level of reviews) focused on selective prevention and mental health promotion for vulnerable groups of children and young people. In general this is a limited evidence base, with few 'focused' reviews for specific vulnerable groups, and some groups particularly underexplored. Within 'mixed' reviews it is also difficult to identify clear evidence regarding whether and how interventions can support the mental health and wellbeing of specific vulnerable groups. Of the evidence that was identified, there were significant methodological limitations, with many primary studies considered high risk of bias. This limits the conclusions that can be drawn regarding the effectiveness of interventions, and necessitates further scrutiny of both the extant and future evidence base.

Nevertheless, this overview suggests that there is emerging evidence, and that a wide variety of interventions have been reviewed in relation to a range of vulnerable groups. For example, there is some evidence regarding interventions to support the mental health of 'at risk'/maltreated children in general, and also some evidence in relation to specific vulnerable groups (e.g. ethnic minority or indigenous young people, foster children, young people identified as low income). Furthermore, a variety of interventions (e.g. physical activity interventions, positive youth development interventions, early childhood education) have been carried out with vulnerable groups (as well as the general population) and there is evidence that some of these interventions can be effective.

As outlined above, is not possible to provide clear recommendations regarding specific intervention effectiveness or the strength of the evidence. This would require further reviews and overviews including a detailed assessment of the quality and strength of the evidence for specific vulnerable groups. Nevertheless it is important to recognise that there is an evidence base on which to draw, and that absence of clear recommendations from this overview does not mean that there is no evidence which can inform an understanding of selective prevention interventions for vulnerable groups. This overview provides an initial starting point and as a guide to the evidence which can be examined in more depth. Before proceeding to implementation service commissioners should conduct further in-depth examination of the evidence for target groups, as well as considering this evidence alongside that for universal prevention, in order to determine the most appropriate interventions, and how to balance universal and targeted approaches to best serve the mental health and wellbeing needs of children and young people.

Appendix A: Search Strategy

Searches

Web of Science Core Collection and PsycInfo (EBSCOhost) will be searched for reviews published in the last 10 years (2008 – February 2019) for articles published in English.

In addition searching of up to 8 organisational websites will be conducted.

As a robustness check additional searching will be conducted on an available open-access evidence database which has been developed to help map evidence in the area of youth mental health: https://www.orygen.org.au/Education-Training/Resources-Training/Evidence-Finder (De Silva et al 2016). Search string not required: Key search: Selective/indicated prevention. Dates: 2008 – 2018. Limited to systematic reviews.

In order to clarify the search strategy and how best to focus on vulnerable groups, we conducted pilot screening of the papers identified through the Orygen searching prior to database searching. This was conducted in order to identify the ease of distinguishing between indicated prevention interventions and to identify potential 'at risk' / vulnerable groups. An initial 20% of papers were screened by one author (DK) and cross-checked by a second author.

The search strategy has been adapted from Vogt et al and McLean et al.

Searches: (Each category i, ii, iii, iv combined with AND) Restricted to title searches.

Searches restricted to: 2008 – February 2019. (n.b. PsycINFO specifies from 1st Jan 2008); English language articles only.

N.B. PsycINFO: 'Find all my search terms' Auto AND all search terms entered (E.G. web AND accessibility)

i) POPULATION (TITLE SEARCH) (including vulnerable groups)

child* OR youth OR adolescen* OR young OR pediatric OR paediatric OR infant* OR neonat* OR toddler* OR pre-school OR preschool OR prenatal OR life course OR life-course OR young adult OR young women OR young men OR young people OR young male* OR young female* OR parent OR looked after OR looked-after OR care leavers OR kinship care OR welfare OR in-care OR homelessness OR homeless* OR offend* OR prison OR justice OR crim* OR delinq* OR SES OR socioeconomic OR socio-economic OR low-income OR low income OR poverty OR disadv* OR deprive* OR neighbourhood OR unemploy* OR out of school OR out-of-school OR exclu* OR NEET OR 'Not in Education, Employment or Training' OR teenage parent OR teenage mum* OR teenage mother OR teenage pregnancy OR adolescent pregnancy OR young carer OR young-carer OR ethnic minor* OR asylum seekers OR refugees OR migrants OR LGBT OR gay OR lesbian OR homosexual OR bisexual OR transgender OR domestic violence OR domestic abuse OR abuse OR sexual abuse OR sexual exploitation OR at risk OR vulnerable

ii) OUTCOMES (TITLE SEARCH)

mental health OR mental wellbeing OR mental well-being OR mental health prob* OR depressi* OR anxiety OR post-traumatic stress disorder OR temperament OR emotional difficulties OR

internalizing OR internalising OR externalising OR externalizing OR prosocial OR stress OR eating disorders OR conduct disorders OR oppositional defiant disorder OR suicide OR self-harm OR resilien* OR mental capital OR positive development OR mental illness OR mental disorder OR affective disorders OR mood disorders OR behavioural disorders

iii) INTERVENTIONS (TITLE SEARCH):

health promotion OR policy OR legislat* OR regulat* OR law OR program* OR intervention* OR advocacy OR service OR initiative OR media OR review OR public awareness OR prevent OR mental health promotion OR online OR internet OR web OR workplace OR community-based OR school-based OR family-based OR parenting OR social marketing OR prevent*

iv) PUBLICATION TYPE (TITLE SEARCH)

review OR literature review OR systematic review OR scoping review OR rapid review OR overview OR meta-analysis

Appendix B: Evidence Tables of Included Reviews

Key: CB = cognitive behavioural; **CBT** = cognitive behavioural therapy; **ES** = effect size; **ECE** = early childhood education; **IPT** = interpersonal therapy; **MA** = meta-analysis; **NR**= not reported; OECD = Organization for Economic Cooperation and Development; **PA** = physical activity; **PPD** = postpartum depression; **PS** = primary studies; **PRP** = Penn Resiliency Programme; **PYD** = Positive Youth Development; **RCT** = randomised controlled trial; **SD** = standard deviation; **SR** = systematic review; **$** = as reported by review authors

Table B1: Included 'Focused' Reviews

Authors [Type of review]	Aim / objective / question $	Number of primary studies [Estimate of number focused on vulnerable groups]	Age	Setting	Type of Intervention	Outcomes	Key findings	Quality assessment
'FOCUSED' REVIEWS								
GENERAL 'AT RISK' / MALTREATED YOUTH								
Lubans et al. (2012) [SR]	"'...to describe the effectiveness of physical activity interventions to improve social and emotional wellbeing in at-risk youth.'' (p. 3)	15 [12]	SR: 4-18; PS: 4-19	School and community	Physical Activity Interventions	Measures of depression, self-concept, resilience, anxiety and self-esteem	"There is some evidence to suggest that outdoor adventure, sport and physical fitness programmes have the potential to improve social and emotional well-being	Yes. ''Studies were assessed for risk of bias using criteria adapted from the Consolidated Standards of Reporting Trials (CONSORT) statement by

							in at-risk youth. [...] While many of the interventions resulted in significant positive effects, the risk of bias was high in all of the included studies.'' (p. 9)	two authors independently (Moher et al., 2010).'' (p. 3) The risk of bias was high in all studies.
Waechter & Wekerle (2015) [Narrative/literature review]	To evaluate ''...existing evidence for the effects of ‘‘Eastern Arts’’ (i.e., meditation, yoga, tai chi, qigong) on resilience (i.e., positive health and socioeconomic outcomes) among maltreated youth.'' (p. 17)	8 [At least 3]	SR: 11-18; PS: NR	School and community	‘‘Eastern Arts’’ (i.e., meditation, yoga, tai chi, qigong)	Anxiety, stress and depression scores; externalising problems; emotional well-being; self-esteem; hopelessness	"...all but one of the studies (Hill et al. 2011) showed some improvement in the targeted dependent variable for the Eastern Arts intervention group versus the control group.'' (p.21)	Yes. Conducted quality assessment according to the US Department of Health and Human Services (0 - 8) The authors report: "...the average quality rating of the studies included in this review was relatively high, with a mean = 6.25 out of a possible maximum of 8.'' (p. 28)
YOUNG PEOPLE IDENTIFIED AS ‘LOW INCOME’								

Farahmand et al. (2011) [SR and MA]	To assess ''...the effectiveness of school-based mental health and behavioral programs for low-income, urban youth.'' (p. 372)	23 [10 delivered to all low-income youth i.e. no diagnosis of mental health problem]	SR: N.R.; PS: 5-18.	School and family	School-Based Mental Health and Behavioral Programs	Measures of externalising behaviour problems; measures of internalising problems (e.g. depressive symptoms; stress); broad mental health and/or behavioural outcomes (e.g. competence ⁄social skills)	"Qualitative analyses of the 29 samples included in this review resulted in five programs classified as effective (17%), eight as mixed (28%), and 16 as ineffective (55%). Of the conduct focused programs, no programs were deemed effective, three were deemed mixed, and nine were deemed ineffective. Of the depression-focused programs, one was deemed effective, one mixed, and one ineffective. Of the substance use–focused programs, one was deemed effective	N.R.

							and three ineffective with no mixed programs. Finally, of the general mental health and behavioral-focused programs, three were deemed effective, four mixed, and three ineffective. For the universal programs, four were effective, four mixed, and six ineffective...'' (p. 380)	
TEENAGE PARENTS								
Lieberman et al. (2014) [SR]	"...to address these gaps by conducting a systematic review of the current preventive and treatment interventions of perinatal depression specifically tested for	9	N.R.; PS: Mean ages ranged from 14 to 18.	Community	Perinatal depression interventions	Depression scores	"Eight prevention studies were located, of which four were more efficacious than control conditions in preventing depression…'' (p. 1227) ''Four of the eight	Yes. The Jadad Scale was used. ''However, compared to the treatment studies, some of the prevention studies were more methodologically rigorous. Each

	adolescents, with a focus on low SES, racial or ethnic minority populations.'' (p. 1228)						prevention studies were effective in reducing depression incidence compared to control conditions; these included: a maternal massage program (Field et al., 1996); a multi-component treatment with day care, relaxation, massage, and mother-infant coaching (Field et al., 2000); a 12-week IPT group intervention (Miller et al., 2008); and a maternal infant massage program (Oswalt et al.,	utilized a randomized controlled design, and all but two (Field et al., 1996, 2000) reported on participant retention. Three reported effect sizes (Barnet et al., 2007; Ginsburg et al., 2012; Oswalt et al., 2009), and three utilized intent-to-treat analysis and fidelity checks (Barnet et al., 2007; Ginsburg et al., 2012;Walkup et al., 2009). However, quality ratings ranged from one to three out of five

							2009). No significant effects on depressive symptomatology (versus control) were demonstrated in: two home-visiting based psychoeducational interventions (Barnet et al., 2007; Walkup et al., 2009); an individual home-based CBT intervention (Ginsburg et al., 2012); or a one-time social support enhancement intervention (Logsdon et al., 2005).'' (p. 1231)	points. Therefore, there remains room for increased rigor in these studies.'' (p. 1233)
Sangsawang et al. (2018) [SR]	"...to examine the effectiveness of the	13	SR: 10-19; PS: 12-19	Community	Postpartum depression interventions	Depression scores	"In six studies, five of seven interventions reported the	"Regarding quality ratings, the study qualities were

	existing interventions to prevent PPD in adolescent mothers.' (p. 1)						effectiveness of preventive PPD interventions which found the adolescent mothers in the intervention group to have lower PPD symptoms or lower incidence of PPD than the control group…'' (p. 11) ''In another seven studies, however, four interventions reported no significant differences in the prevention of PPD symptoms between the intervention and control groups...'' (p.11)	evaluated by using the 14-itemQUALSYST (Kmet et al. 2004). Most of the studies (eight studies) reported a summary score of more than 70 points, which is classified as good quality. Items 6, 7, 11, and 12 included the blinding of investigators, blinding of subjects, estimates of reported variance for the main results, and control of confounding factors, respectively. These were the items that mostly lacked reporting.'' (p. 12)

INDIGENOUS / ETHNIC MINORITY YOUNG PEOPLE								
Antonio & Chung-Do (2015) [SR]	To analyse ''...interventions focusing on mental health and substance use that utilize the Positive Youth Development (PYD) framework, incorporate culturally tailored programs, and are geared toward Indigenous adolescents.'' (p. 36)	8	SR: 10-19; PS: 11-18	School and community	Positive Youth Development programmes	Mixed mental health outcomes (e.g. suicide risk, depression, anxiety, resilience and overall mental health)	The programmes that focused on suicide prevention found increases in coping and life skills, knowledge about suicide, overall mental health and/or decreases in depressive and suicidal symptomatology. The programmes that focused on broader aspects of mental health found statistically significant decreases in depressive symptoms and short-term resiliency. One study found no significant differences for anxiety symptoms.	No

Ruiz-Casares et al. (2017) [Narrative/literature review]	"...to describe and rate the quality of studies that have evaluated programmes for ethno culturally diverse parents and adolescents that specifically address mental health promotion and prevention.'' (p. 744)	18	SR: 12-18; PS: N.R.	School, community and family (i.e. mixed)	Mental health promotion interventions for ethno culturally diverse adolescents and their families	Child behavioural problems; depressive symptoms; parent-child relationship	The findings of the reviewed studies are described narratively, with few synthesising statements regarding effectiveness outcomes. For example: ''For example, improved communication was linked to decreased violent behaviour and favourable attitudes towards drugs (e.g. Parents Who Care; Haggerty et al. 2007), and decreased behavioural problems and increased condom use (e.g. Familias Unidas; Pantin et al. 2009, Prado et al. 2007).'' (p. 747).	Yes. ''...the quality of these 18 studies was assessed using a marginally modified version of the Downs and Black Checklist (Downs & Black 1998). Their average quality assessment score was 16 out of 28.'' (p. 743) ''For those studies captured by this review, quality assessment reveals significant weaknesses in methods used, indicating either a lack of rigour in programme evaluation or perhaps merely the authors' lack of

							''Programmes such as Sembrando Salud (Litrownik et al. 2000), Familias Unidas (Pantin et al. 2009, Prado et al. 2007, 2012), Esperanza del Valle (Lalonde et al. 1997) and the Family Skills Training Intervention for Latino Families (Allen et al. 2013) developed interventions that addressed culturally specific risk and protective factors by engaging with the ethno cultural community they served. For example, in order to enhance parent adolescent communication in ways that reflect the cultural realities and	clear reporting of findings.'' (p. 754).

							experiences of Hispanic-American youth, Sembrando Salud developed program material drawing from the notions of familismo and respeto to teach adolescents alcohol and tobacco refusal skills while remaining respectful to their elders (Litrownik et al. 2000).'' (p. 753)	
Harlow et al (2014) [SR]	To assess ''...suicide prevention programs that have been evaluated for indigenous youth in Australia, Canada, New Zealand, and the United	11	NR; NR	School and community	Suicide prevention interventions	Suicide-related knowledge, thoughts and behaviours; anxiety scores;	"Although all reported favorable outcomes, most had study and evaluation designs not rigorous enough to yield reliable evidence of intervention effect.'' (p. 317). Other information	No

	States.'' (p. 310)						about programme effectiveness was not reported in the main text of this review. Effectiveness evidence could be extracted from 'Table 2': Most programmes reported positive outcomes such as increased suicide-related knowledge and awareness; reductions in internalising symptoms; and reductions in suicidal ideation and attempts.	
Ridani et al (2015) [Narrative/literature review]	"...to identify interventions reported to have an impact in reducing suicidal rates and behaviors.'' (p. 111)	67 [At least 20 studies focused on young people]	NR;NR	School and community	Suicide prevention interventions	Suicide rates and suicide-related behaviours; mental health measures, e.g. depression, anxiety, psychosis; well-being measures, e.g. hope, resilience	"Of the 25 programs that mentioned outcome information, 32% conducted qualitative evaluations, 16% conducted quantitative evaluations, 12%	No

							combined qualitative and quantitative evaluation, and 40% had informal evaluations indicating observed improvements in outcome data over a period of time. Improvement in suicide awareness and readiness to help a person at risk occurred for 28% of evaluated programs. Twenty-four percent of evaluated programs outlined improvements in protective factors such as resilience, whereas 20% indicated improvements in help-seeking behavior. Twenty-	

							eight percent of evaluated programs made mention of observed changes in suicide rates over time, although these changes were not systematically evaluated. Only one program, "You Me—Which Way" measured and reported reduced suicidal ideation for individuals within the intervention group.'' (p.136)	
FOSTER CHILDREN / PARENTS								
Van Andel et al (2014) [MA]	To investigate whether interventions to help foster parents and foster children cope with stress and behavioural problems are effective	19	SR: N.R.; P.S: 0-17	School and community	Interventions to help foster parents and foster children cope with stress and behavioural problems	Measures of externalising behaviour problems	"On average, the interventions diminished the child problem behaviour (average correlation-based effect size, AES 0.27) and improved	N.R.

	improving the child's behaviour or parental competence.						positive parental discipline (AES 0.29)...This means that, on average, the interventions improved these outcomes by more than 30% – a clinically significant effect. None of the interventions were specifically focusing on avoidance behaviour of the foster child, or on foster children aged 0–4 years'' (p. 152)	
Hambrick et al (2016)	"...to systematically review the intervention research that has been conducted with children in foster care, and to identify future research	39	SR: 0-12; PS: 0-18	Family, community, institutions, school	Mental health interventions for children in foster care	A range of behavioral, internalizing, cognitive/academic outcomes, e.g. attachment, theory of mind, emotional functioning, emotional self-regulation,	"Despite the positives regarding the promise of available research, the status of the evidence for interventions for children in foster care was mixed.'' (p.	Yes. ''Risk of bias was defined as potential for systematic error based on study design and analyses, and was assessed using a coding scheme adapted from Goldman Fraser et al.

	directions.'' (p. 65)					behavioural problems	75). See 'Table 3', for more details. Effectiveness evidence not discussed in detail in the main text.	(2013), who conducted a Comparative Effectiveness Review of interventions addressing child maltreatment for the Agency for Healthcare Research and Quality.'' (p. 68) Articles assessed as having a high risk of bias were excluded from the review.
Leve et al (2012) [Narrative/literature review]	"...to identify intervention programs that have been tested with foster-care families and have been shown to be effective in improving children's outcomes.'' (p. 1200)	21	NR; PS: 2 months old-18 years old	School and community	Interventions that improve the well-being of foster children and their families	A range of mental health outcomes (e.g. stress responses; positive affect, internalising problems); attachment outcomes; cognition and attention outcomes; relationships with peers and parents;	"...several interventions across childhood and adolescence offer promise...'' (p. 1197) ''Three independent interventions for young foster children demonstrate that, when foster caregivers are given appropriate	No.

						behavioural disruptions, prosocial behaviour etc.	support and training, children can develop healthy emotion and behavior regulation and positive, secure social relationships.'' (p. 1201) ''Four interventions for foster families have been shown to be effective during middle childhood...'' (p.1204): modified Incredible Years; Keeping Foster Parents Trained and Supported (KEEP); Middle School Success (MSS); and the Fostering Individualized Assistance Program. ''One intervention has been shown to produce positive outcomes for	

							foster adolescents: Multidimensional Treatment Foster Care for Adolescents (MTFC-A)...'' (p. 1205). ''The results from most of these studies have small to moderate effect sizes that typically decrease over time (MTFC-A and BEIP are two exceptions to this pattern, with more sustained effects and some evidence of large effect sizes). Overall, effective programs are attachment focused or have evolved from parenting interventions based on social-learning	

							frameworks.'' (p. 1206)	
Uretsky & Hoffman (2017) [SR and MA]	"...to examine the effectiveness of group-based in-service foster parent training programs in reducing externalizing child behaviors.'' (p. 464)	11	SR: N.R.; PS: 4-18	School and community	Group-Based Foster Parent Training Programmes	Measures of externalising behaviour problems	"All studies reported a significant decrease in at least one measure of child behavior problems for treatment-group participants. The programs appear to be effective across ethnically and nationally diverse samples and produce similar results for older and younger children, as well as boys and girls. Overall the evidence suggests that group-based foster parent programs are an effective method for reducing problem behaviors among children in out of	N.R.

							home care.'' (p. 464)	
YOUNG OFFENDERS								
Kumm et al (2019) [SR and MA]	"to evaluate the methodological characteristics and effectiveness of mental health interventions delivered in juvenile justice settings on symptoms associated with internalizing disorders.'' (p.1)	11 [5 focused on young people irrespective of whether they had mental health difficulties]	SR: N.R.; PS: 11-22	Juvenile justice settings; school	"...mental health interventions delivered in juvenile justice settings on symptoms associated with internalizing disorders.'' (p. 1)	Measures of depression, anxiety, posttraumatic stress disorder, or internalizing disorders.	"Meta-analytic findings indicate mixed results for interventions affecting internalizing symptoms and varying results between studies implementing an experimental design compared to those using a single group non-experimental design.'' (p. 1) Many of the effects sizes were non-significant. ''Results of the current review of experimental and quasi-experimental research suggests that the represented interventions do not improve on	Yes. A measure was used; however it is not clear what the overall assessment of quality was. “Quality indicators established by the Council for Exceptional Children (CEC) were used to assess all 23 measurements across eight broader categories (Cook et al., 2014).'' (.13)

							standard practice. Whereas experimental and quasi-experimental designs compare effects across different conditions, single-group designs examine change for one group over time. Results of the single-group studies indicated consistent improvements, though results must be interpreted with caution because these designs do not address various alternative explanations...'' (p. 16)	

Table B2: Included 'Mixed' Reviews

Authors [Type of review]	Aim / objective / question $	Number of primary studies [Estimate of number with vulnerable groups]	Age	Setting	Type of Intervention	Outcomes	Key findings	Quality assessment
PREVENTION INTERVENTIONS – MIXED								
Bayer et al. (2009) [SR]	"...to identify evidence-based preventive interventions for behavioural and emotional problems of children aged 0-8 years." (p. 695)	50 [UNCLEAR – but most programmes focused on 'at risk' children	SR: 0-8; PS: N.R.	School, community and family (i.e. mixed)	Preventive mental health interventions for children	Measures of internalising and externalising problems, .e.g. child hostility and aggression, anxiety scores, etc.	"Three US programmes have the best balance of evidence: in infancy, the individual Nurse Home Visitation Programme; at preschool age, the individual Family Check Up; at school age, the Good Behaviour Game class programme. Three parenting programmes in England and Australia are also worthy of highlight: the Incredible Years group format, Triple P individual format, and Parent Education Programme group format. Effective preventive interventions	Yes. "We therefore ranked the quality of each RCT using the Australian National Medical Health and Research Council (NHMRC) recommendations from their 2000 report [31] and guidelines of the 2006 Cochrane handbook of systematic reviews." (p. 697) "All trials

							exist primarily for behaviour and, to a lesser extent, emotional problems, and could be disseminated from research to mainstream in Australia, ensuring fidelity to original programmes.'' (p. 695) A range of ineffective programmes was also identified.	contained some risk for bias in their design. Typically the trials rated as having high risk of bias did not report correct concealed randomization procedure, had large (15%) loss to follow up, and/or analysed only outcomes from families who attended the whole programme (not intention-to-treat analyses).'' (p. 698) The studies had moderate or high risk of bias.

Rew et al. (2014) [SR]	To review ''...the literature on stress management interventions for adolescents …'' (p. 851)	17 [6]	SR: 10-19; PS: 6-21 (Mean ages ranged from 10 to 17)	School and community	Stress management interventions	Stress-related outcomes, e.g. psychological distress, emotional discomfort, self-reported stress and anxiety scores	"...there is evidence to support the effectiveness of interventions that aim to develop cognitive skills among adolescents…'' (p. 851) ''Of the 17 studies reviewed, 10 (58%) had statistically significant findings.'' (p. 855) ''Four studies showed equivocal findings.'' (p. 860) ''Two studies found no statistically significant results from the intervention.'' (p. 860)	N.R.
PHYSICAL ACTVITY INTERVENTIONS								
Brown et al. (2013) [SR and MA]	"...to assess the impact of PA interventions on depression in children and adolescents using meta-analysis.'' (p. 195)	9 [4]	SR: 5-19; PS: 8-19	School and community	Physical activity interventions	Depression scores	"There was a small significant overall effect for PA on depression.'' (p. 195) Greater effect sizes tended to be associated with shorter duration, and overweight samples.	Yes. The Delphi list was used. Quality ratings ranged from 2-7 (out of a maximum of 8). Two studies scored 7 (i.e. high quality/low risk of bias). The most common methodological problem was the lack of

								blinding/concealment.
Camero et al (2012) [Narrative/literature review]	"…to review the effects of physical activity (PA) lifestyle intervention on determinants of mental health among children and adolescents.'' (p. 196)	8 [5]	SR: 6-18; PS: 7-19	Community and school	Physical activity interventions	Depression scores; anxiety scores; self-efficacy and self-esteem score	"Seven [studies] found a significant ($p < 0.05$) reduction in depression when various aerobic and/or resistance training exercises were introduced…PA appears to improve determinants of mental health, such as depression, global self-worth and self-efficacy.'' (p. 196)	No
EARLY CHILDHOOD EDUCATION								
Schindler et al. (2015) [MA]	To examine ''...the overall effect of ECE [early childhood education] on externalizing behavior problems and the differential effects of 3 levels of	31 [UNCLEAR but over 80% low SES]	SR: 3-5; PS: ''Ages of children at the time of measurement ranged from	School	Early childhood education	Measures of externalising behaviour problems	"In short, we found that each successive level of programs did a better job than the prior level at reducing externalizing behaviour problems. Level 1 programs, or those without a clear focus on social and emotional development, had no significant effects on externalizing	"In order to control for variation in the quality of study design, we included an index ranging from zero to three, with higher values representing higher quality studies. The index was created by

	practice, each with increasing specificity and intensity aimed at children's social and emotional development.''		18 months to 40 years. '' (p. 249)				behavior problems relative to control groups (ES=.13 SD, p b .10). On the other hand, level 2 programs, or those with a clear but broad focus on social and emotional development, were significantly associated with modest decreases in externalizing behaviour problems relative to control groups (ES=−.10 SD, p b .05). Hence, level 2 programs were significantly better at reducing externalizing behavior problems than level 1 programs (ES=−.23 SD, p b .01). Level 3 programs, or those that more intensively targeted children's social and emotional development, were associated with additional significant reductions in externalizing behavior problems relative to level 2 programs (ES=−.26 SD, p b .05). The most	summing across three dichotomous measures: 1) the study used random assignment, 2) the study had less than 25% attrition in treatment and comparison groups at the time of follow-up, and 3) coders did not observe any evidence of systematic bias in the evaluation or study methods (i.e., attrited treatment subjects were excluded from analyses; degree of volunteering for the program was different for the experimental and control groups).We also

							promising effects came from level 3 child social skills training programs, which reduced externalizing behavior problems half of a standard deviation more than level 2 programs (ES= −.50 SD, p b .05).'' (p. 243)	included a dichotomous variable indicating if the study was published in a peer-reviewed journal to account for the possibility that larger and more significant findings are more likely to be published in such outlets. Similarly, a variable was included that identified studies with an active control group (sought out ECE services out of their own volition), a characteristic thought to be associated with smaller effect sizes. Finally, we included a set of dichotomous

								variables to describe if the measure was taken during treatment, at the end of treatment, or at follow-up (omitted)." (p.250)
POSITIVE YOUTH DEVELOPMENT INTERVENTIONS								
Ciocanel et al. (2017) [MA]	To examine "...the effects of positive youth development interventions in promoting positive outcomes and reducing risk behavior." (p. 483)	24 [14]	SR: 10-19; PS: 10-16	School, community and family (i.e. mixed)	Positive Youth Development programmes	Behavioral problems, sexual risk behavior, academic achievement, prosocial behavior and psychological adjustment	"Positive youth development interventions had a small but significant effect on academic achievement and psychological adjustment. No significant effects were found for sexual risk behaviors, problem behavior or positive social behaviors." (p. 483) "Effect sizes ranged from 0.04 to 0.22, and despite all being positive (i.e., favoring the intervention condition), only three were significantly different from zero. Specifically, the	Yes. The Cochrane Collaboration Risk of Bias Tool was used. "Overall, the studies did not provide sufficient information to judge the randomization procedure quality, with 16 studies having an unclear rating." (p. 492) "Nevertheless, given the nature of the interventions,

							analyses indicated significant effects in two areas; academic/school outcomes and psychological adjustment. The largest positive effect size was found in academic achievement (g = 0.22), with the lowest effect size found in positive social behaviors (g = 0.04).' ' (p. 493)	the blinding of participants or personnel was often not possible. Only three studies reported a blinding of the outcome assessors. Attrition bias was high in 13 of the included studies, uncertain in two and low risk in nine. The findings in these studies may be biased and may not reflect the true effects of the intervention as the results may have been influenced by the characteristics of the participants who dropped out of the studies. Reporting bias

								was assessed as low risk in 18 studies, as these papers appeared to have provided results on the expected outcomes. Three studies were assessed as high risk, as they had incomplete information on the expected outcomes.'' (p. 493)
Lapalme et al. (2014) [Narrative/literature review]	To answer the question, ''How do neighbourhood interventions become effective in promoting PYD for adolescents aged 12–18 years?'' (p. 31)	19 [UNCLEAR but most interventions with vulnerable groups]	SR: 12-18; PS: N.R.	School and community	Positive Youth Development Programmes	A range of cognitive competencies (e.g. goal-setting); a range of social competencies (e.g. personal relationship competencies)' confidence; connection; self-control; caring and	"In relation to PYD outcomes, results of this review confirm the findings from past reviews; neighbourhood interventions can promote PYD, notably competencies, confidence, connection, and character.'' (p. 39) ''The most significant improvements of PYD outcomes involve cognitive competences,	N.R.

						compassion, etc.	confidence, connection, character, and those under the others category. Significant cognitive competences included problem solving, communication, critical thinking, working in groups, and awareness. Under the confidence category, most interventions were associated with increased self-esteem and self-confidence. The connection category included significantly improved positive relationships with peers and adults, sense of belonging, and contribution to the community. Significant improvements of PYD outcomes in the character category involved self-control and decrease in problem behaviour. Lastly, most	

							interventions discussed achievement of leadership skills, civic engagement, and feelings of empowerment for youth. Few interventions were able to promote caring and compassion outcomes. Evaluations rarely discussed PYD elements that had decreased or not changed.'' (p. 34)	
RESILIENCE / STRENGTHS BASED INTERVENTIONS								
Brownlee et al. (2013) [SR]	To systematically identify and review ''...all of the outcome studies over the last decade for strength and resilience based intervention programs...'' (p. 435)	11 [4]	SR: N.R.; PS: 3-19	School and community	Strength and resilience based intervention programmes	Strength- or resilience-based outcomes (e.g. self-concept, self-esteem, resilience, social competencies, sense of control)	"We concluded that these 11 studies provide preliminary support for the efficacy of strength and resilience based interventions.'' (p. 435) ''All studies reported some significant benefit of a strength-based or resiliency-based intervention or intervention based upon a strength oriented assessment tool.'' (p. 454)	"Using the Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practice Project, we found three studies to be high quality, exhibiting high levels of experimentally

							''The LEAD program shows potential with the need to conduct future studies with larger randomized samples.'' (p. 443) ''Overall, a positive shift in behaviour and climate took place over the 6-month implementation of the YCA.'' (p. 450) ''The program [PANDA] was favourably received by teachers who showed high satisfaction and resulted in improvements in self-concept in the experimental group compared to the control group...'' (p. 451)	controlled research. The remaining 8 studies we considered to be moderate to weak quality research.'' (p. 435-436)
ARTS ACTIVITIES								
Zarobe & Bungay (2017) [Narrative/literature review]	''This rapid review explores the role of arts activities in promoting the mental wellbeing and resilience of	8 [2]	SR: 11-18; PS: 9-26	School and community	Arts activities	A range of resilience and well-being outcomes: self-confidence, self-esteem, relationships, sense of	''It was found that participating in arts activities can have a positive effect on self-confidence, self-esteem, relationship building and a sense of belonging, qualities which have been associated with resilience	N.R.

	children and young people aged between 11 and 18 years.'' (p. 337)					belonging, stress management	and mental wellbeing.'' (p.337)	

Appendix C: Selected useful excluded reviews for further consideration

Note: Many of these reviews are relevant as they include studies of selective prevention and should be consulted in relation to evidence on selective prevention interventions e.g. anxiety/depression.

Brunwasser, S. M., Gillham, J. E., & Kim, E. S. (2009). A meta-analytic review of the Penn Resiliency Program's effect on depressive symptoms. *Journal of consulting and clinical psychology*, *77*(6), 1042.

Brunwasser, S. M., & Garber, J. (2016). Programs for the prevention of youth depression: Evaluation of efficacy, effectiveness, and readiness for dissemination. *Journal of Clinical Child & Adolescent Psychology*, *45*(6), 763-783.

Carter, T., Morres, I. D., Meade, O., & Callaghan, P. (2016). The effect of exercise on depressive symptoms in adolescents: A systematic review and meta-analysis. *Journal of the American Academy of Child & Adolescent Psychiatry*, *55*(7), 580-590.

Dunning, D. L., Griffiths, K., Kuyken, W., Crane, C., Foulkes, L., Parker, J., & Dalgleish, T. (2019). Research Review: The effects of mindfulness-based interventions on cognition and mental health in children and adolescents–a meta-analysis of randomized controlled trials. *Journal of Child Psychology and Psychiatry*, *60*(3), 244-258.

Fisak, B. J., Richard, D., & Mann, A. (2011). The prevention of child and adolescent anxiety: A meta-analytic review. *Prevention Science*, *12*(3), 255-268.

van Genugten, L., Dusseldorp, E., Massey, E. K., & van Empelen, P. (2017). Effective self-regulation change techniques to promote mental wellbeing among adolescents: A meta-analysis. *Health Psychology Review*, *11*(1), 53-71.

Murray, K. E., Davidson, G. R., & Schweitzer, R. D. (2010). Review of refugee mental health interventions following resettlement: Best practices and recommendations. *American Journal of Orthopsychiatry*, *80*(4), 576.

Richardson, R., Trépel, D., Perry, A., Ali, S., Duffy, S., Gabe, R., ... & Palmer, S. (2015). Screening for psychological and mental health difficulties in young people who offend: A systematic review and decision model. *Health Technology Assessment, No. 19.1.*

Salerno, J. P. (2016). Effectiveness of Universal School-Based Mental Health Awareness Programs Among Youth in the United States: A Systematic Review. *Journal of School Health*, *86*(12), 922-931.

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Venning, A., Kettler, L., Eliott, J., & Wilson, A. (2009). The effectiveness of cognitive–behavioural therapy with hopeful elements to prevent the development of depression in young people: A systematic review. *International Journal of Evidence-Based Healthcare*, *7*(1), 15-33.

Yap, M. B., Morgan, A. J., Cairns, K., Jorm, A. F., Hetrick, S. E., & Merry, S. (2016). Parents in prevention: A meta-analysis of randomized controlled trials of parenting interventions to prevent internalizing problems in children from birth to age 18. *Clinical Psychology Review*, *50*, 138-158

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