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Beyond health: a systematic review of cross-sector economic implications of school-based mental health programmes in Europe

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ABSTRACT

Objective To assess the economic evidence on school-based prevention and mental health promotion interventions, focusing on costs and outcomes across key societal sectors, including healthcare, education, social care, criminal justice, as well as in productivity and individual expenses.

Design A systematic review with narrative synthesis was conducted following the Synthesis Without Meta-analysis approach, including an assessment of monetised outcomes across all sectors and an additional analysis of non-monetised outcomes in the education sector. Study quality was appraised using Consolidated Health Economic Evaluation Reporting Standards (CHEERS) and Consensus Health Economic Criteria (CHEC).

Data sources Medline, Embase, PsycINFO, Econlit, ERIC and Scopus.

Eligibility criteria for selecting studies Economic evaluations of school-based prevention or mental health promotion interventions for children or adolescents in Europe that report outcomes across healthcare and other societal sectors.

Results 20 studies were included, comprising different types of economic evaluations as well as trial-based and model-based evaluations. Based on the primary analyses reported in the studies, which consider costs and benefits across multiple societal sectors, most evaluations suggested favourable economic outcomes. Benefits exceeded costs in four out of five (80%) cost–benefit analyses (average cost–benefit ratio of 5.14). Half of the cost-effectiveness analyses found that interventions were more effective but also more costly than the comparator while two interventions were both more effective and less costly. In cost–utility analyses, 9 out of 10 (90%) fell below commonly used thresholds for good value for money. Reported outcomes covered healthcare, education, social care, criminal justice sectors, as well as productivity and individual expenses. Pronounced cost savings from included interventions were observed in productivity and healthcare, with improvements also observed in non-monetised education outcomes. Study quality was mixed.

Conclusions School-based mental health interventions yield cross-sectoral economic benefits and, in many cases, societal returns on investment, in both the short and longer term, by influencing key determinants of health and well-being across multiple sectors.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Mental health, educational attainment and broader life outcomes are closely interconnected, with major policy reports calling for intersectoral approaches.
⇒ Frameworks exist to assess intervention impacts across multiple sectors, but primary studies applying these frameworks remain scarce.
⇒ Existing reviews of economic evaluations of school-based prevention and mental health promotion interventions mostly report results from a healthcare perspective, with cost-effectiveness predominantly shown to be favourable.

WHAT THIS STUDY ADDS

⇒ This study provides the first systematic synthesis of cross-sectoral economic evidence on school-based mental health interventions, demonstrating societal returns on investment across healthcare, education, social care and criminal justice sectors, as well as in productivity and individual expenses.
⇒ It shows that benefits extend beyond the health sector, with improvements in education alongside cost savings, particularly in healthcare and productivity.
⇒ It identifies key sectors and outcomes for assessing wider societal impacts, advancing cross-sectoral evaluation methods of school-based interventions.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ By highlighting the societal returns of school-based prevention and mental health promotion, this study may support increased investment and foster discussions on intersectoral funding and co-financing.
⇒ The study underscores the need for future research and economic evaluations to comprehensively report cross-sectoral costs and effects. The developed core set of sectors may serve as a framework or standard for such interventions.
⇒ Expanding cross-sectoral assessments to other areas of public health and health economics could further enhance understanding of the value of preventive health interventions.

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INTRODUCTION

Mental health problems profoundly affect the lives and future prospects of children and adolescents, posing major public health challenges, with wide-ranging consequences for individuals, families and societies. In Europe, 10%–19% of school-aged children are affected by a mental health condition, with prevalence varying by age and gender.[1] Ongoing socioeconomic, cultural, geopolitical and environmental megatrends are contributing to rising mental health problems among the young, while awareness, access to, availability and affordability of adequate preventive services and mental healthcare remain limited.[2]

Many mental health conditions have their onset in early adolescence and persist across the life course. These conditions have immediate impacts and often also have long-lasting repercussions in adulthood.[1–4] They impose a substantial burden on individuals, including distress caused by the illness, as well as stigma, lower educational attainment, decreased employment opportunities, social and economic exclusion, which in turn reduce quality of life and increase the risk of premature mortality.[2] The associated economic impacts arise from productivity losses, reduced lifetime earnings, welfare dependency, criminal justice involvement and increased use of health and social care services.[2 5–7]

To address this lifetime trajectory, preventive and promotive interventions are crucial. Implementing such interventions in schools—institutions attended by almost all children and adolescents over extended periods—represents a setting-based, near-universal approach that offers inclusive access to the target population, including disadvantaged groups. These interventions can also benefit from systemic and peer effects, amplifying their impact. Furthermore, established school infrastructures may support efficient implementation and cost-containment of programmes.[2 8–11]

As interventions are often delivered through the education sector (eg, by teachers), focusing on educational outcomes is particularly relevant. In addition to impacts across multiple sectors, interventions can produce spillover benefits for other population groups (teachers, parents, siblings).[12–14] Limited consideration of these systemic or spillover effects, alongside potential ceiling effects in healthy populations, short follow-up periods and methodological challenges, may partly explain why research has so far found mixed effects or small effect sizes for intended health outcomes from school-based mental health programmes.[2 7 15–17] Nevertheless, even modest improvements at individual and population levels can yield substantial returns when long-term and cross-sector benefits are considered.[2 6 7]

Economists often consider health, education and productivity jointly, as they collectively determine overall welfare.[18–20] At the school level, good health and well-being support better learning, which in turn shapes future health behaviours, employment opportunities, income and wealth. Recent evidence also highlights the reinforcing role of learning in promoting broader mental well-being for children and adolescents across key domains—health, learning, connectedness, safety and resilience.[21–24]

School-based mental health programmes may additionally influence other social determinants of health (SDH), including social position (eg, through social-emotional learning), exposure to violence or discrimination (eg, bullying), access to services (eg, counselling) and health behaviours (eg, substance use). These determinants contribute to health equity but are also shaped by structural power dynamics and resource distributions, highlighting the role of multisectoral and intersectoral policies, governance and social measures.[25 26] By targeting multiple determinants simultaneously, school-based mental health interventions may improve student well-being, generate cross-sectoral benefits and enhance social equity.

Previous economic reviews in this field vary in scope and objectives. Some on school-based prevention and mental health promotion interventions target specific groups only, such as primary school children[27] or those with pre-existing psychological problems.[6] Other reviews focus on school-based interventions for physical health[28 29] or include mental health prevention outside the school setting,[30] are not limited to preventive interventions[31] and rarely report outcomes beyond health in a disaggregated manner.[6 27 28 30–32] One review emphasising cross-sectoral returns in the education sector identified only physical health interventions, mostly from low- and middle-income countries.[29] Additionally, a scoping review examined funding of intersectoral health programmes but did not assess intervention impacts.[33] Economic implications extending beyond the health sector thus remain underexplored in both systematic reviews and primary research. Findings from cross-sectoral impact assessments could inform policy by exploring shared or flexible funding opportunities, enabling co-financing arrangements and guiding sector-specific priorities and value considerations.[2 7 34–36]

Europe, defined here as the WHO European Region, comprises broadly comparable high-income countries that nonetheless vary substantially in school systems, welfare regimes and SDH. This combination makes it particularly well suited to examining the transferability and robustness of cross-sectoral economic evidence.

This systematic review aims to assess the economic evidence on school-based prevention and mental health promotion interventions, focusing on costs and outcomes extending beyond health, such as those associated with education, social care, criminal justice, productivity and individual expenses.

METHODS

The protocol for this systematic review was registered with PROSPERO (CRD420251002160). The reporting follows the Preferred Reporting Items for Systematic Reviews

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and Meta-Analyses (PRISMA) statement[37] (online supplemental appendix J) and the Synthesis Without Meta-analysis reporting guidelines.[38]

Search strategy and study selection

Searches were conducted in Medline, Embase, PsycINFO (via Ovid), Econlit, ERIC (via Ebsco) and Scopus on 23 March 2025. The strategy, developed with guidance from an information specialist, included terms and synonyms related to children and adolescents, schools, mental health interventions and economic analyses, and was adapted for each database (online supplemental appendix A). Database searches were complemented by hand-searching, screening reference lists of relevant systematic reviews and tracking research protocols to capture recently published results.

Studies were eligible if they targeted children and adolescents (<=19 years[4]) in European schools, aiming to ensure a degree of contextual comparability given broadly similar educational and healthcare infrastructures. Interventions had to be universal, aiming to promote mental well-being or prevent mental health problems. Those targeting or screening for diagnosed psychiatric disorders were excluded, while interventions for vulnerable groups (eg, children and adolescents presenting with subclinical symptoms or neurodevelopmental disorders) were included. Interventions were defined as school-based if delivered to students during school hours, on school premises, to entire classes or initiated or endorsed by schools or teachers. Programmes primarily targeting parents or teachers were excluded, although components targeting these groups were allowed, if they supplemented components targeting students. Studies with other primary aims (eg, obesity prevention or physical activity) reporting mental health outcomes only as secondary endpoints were excluded. No restrictions were applied regarding control conditions or publication dates. Eligible designs included full and partial economic evaluations,[39] whether model-based or trial-based. Consistent with the review's objective, studies were included if they extended beyond a healthcare perspective by reporting outcomes in at least one additional sector. All types of economic analyses were eligible, including cost–benefit analyses (CBA; monetising outcomes), cost–utility analyses (CUA; reporting costs per quality-adjusted life-year (QALY)) and cost-effectiveness analyses (CEA; reporting costs per effect in natural units).[39] Studies that reported intervention costs alongside non-monetised outcomes beyond health, such as educational indicators, were also included and treated as cost–consequence analyses (CCA). Publications in English, Spanish and German were considered.

Selection process

Records retrieved through database searches were imported into Endnote[40] for automatic de-duplication and complemented by manual de-duplication in Rayyan,[41] a web-based screening platform, where title and abstract screening was carried out. Studies were screened by two independent reviewers (CF and FW), with discrepancies resolved through discussion with a third reviewer (MW). Studies were excluded at this stage if the abstract did not mention any economic outcome or economic evaluation methods (eg, studies reporting only effectiveness data from trials). For all other eligibility criteria, an inclusive approach was adopted, forwarding studies to full-text screening whenever uncertainty existed. Full-text screening was conducted by two reviewers (CF and FW) with discrepancies resolved by a third reviewer (MW). Decisions were recorded in a purpose-built Excel sheet,[42] documenting primary reasons for excluded studies and also separately listing studies that met all inclusion criteria but did not report outcomes beyond the health sector (online supplemental appendix B+C). Studies meeting all inclusion criteria were included in the final data extraction and synthesis.

Data collection and synthesis

Data were extracted from original publications and recorded in a purpose-built Excel[42] sheet, collecting the following information: Basic study information (title, publication year, first author's name, country), methodological aspects (economic study type, study design, perspective, time horizon, discounting: devaluation of future costs/effects, details on statistical analysis including adjustments and model specifications, methods for uncertainty and sensitivity analyses), intervention (type and characteristics, control condition, study population including age and sample size, costs of intervention(s), cost components), outcomes (sector of monetised outcome, measure and valuation of monetised outcome, year of cost data, currency, sector of non-monetised outcome, type and measure of non-monetised outcome), findings (effect estimate reported in base case analysis, subgroup or equity data, effects on monetised outcomes per sector, effects on non-monetised non-health outcomes). Data were extracted by one reviewer (FW) and checked for completeness and accuracy by a second reviewer (CF).

Effect sizes for monetised outcomes (cost consequences, such as costs of public sector service use) were presented as mean differences (MD) in costs per student, with adjusted MDs (for clustering and/or baseline variables) prioritised where reported in primary studies. In several cases, however, MDs had to be calculated manually based on unadjusted means. Statistical uncertainty, such as CIs or SD, was extracted whenever provided by primary publications. To enhance comparability, all monetary values were converted to 2025 Euros (Germany) using the EPPI-Centre Cost converter (up to 2022), which accounts for purchasing power parity,[43 44] with subsequent inflation adjustments to 2025 based on country-specific indices.[45 46] A single reference country (Germany) was used for pragmatic standardisation purposes, which does not affect comparability of results. Health outcomes were reported as QALYs in CUAs or as

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condition-specific natural units where appropriate, while non-monetised outcomes, particularly those related to education, were presented in their original study-specific measures.

Data were synthesised narratively and summarised in tables and figures, including bubble charts, with studies grouped by outcome sector and stratified by study design (trial-based vs model-based evaluations) to explore differences in evidence structure and time horizons. Due to substantial heterogeneity in study designs, interventions and outcomes, meta-analysis was deemed inappropriate. The analytical focus of this paper is on the cross-sectoral assessment. Results from the base case analyses (main analyses conducted in the respective publications) are presented for completeness but should not be interpreted as central to the review's objectives. The Impact Inventory developed by the Second Panel on Cost-Effectiveness in Health and Medicine (USA)[47] was used as a theoretical framework for classifying outcomes across sectors (online supplemental appendix D). This framework recognises that the relevant sectors under a societal perspective depend on the specific research question and context.[47] Based on the included studies, a core set of sectors was derived including healthcare, education, social care, criminal justice, productivity and individual expenses (online supplemental appendix D). Monetised and non-monetised outcomes were categorised by the sector affected or budget impacted. Health professionals working within schools, such as educational psychologists or school nurses, were assigned to the healthcare sector, due to primarily medical roles and reimbursement structures.[48 49] Costs associated with multisector services or with unclear financing sources were reported separately.

Heterogeneity was explored descriptively by grouping studies by outcome sector, study design and time horizon; no statistical methods were applied due to substantial heterogeneity.

The synthesis prioritised monetised outcomes, particularly those informing cross-sectoral cost differences. Non-monetised outcomes in education and other non-health sectors were reported, whereas detailed assessment of non-monetised health effects beyond those covered in base case analyses was outside the review's scope and objective. Of all non-monetised outcomes, those in the education sector received particular emphasis, reflecting the fact that interventions are delivered within educational settings, often by school staff.

Subgroup analyses were not feasible due to substantial sector and outcome heterogeneity. Sensitivity analyses of the cross-sectoral assessment were conducted for trial-based versus model-based studies.

Included studies were assessed against the Consolidated Health Economic Evaluation Reporting Standards (CHEERS) checklist[50] to evaluate the reporting quality of economic evaluations. Methodological quality, including aspects of internal validity and generalisability, was additionally appraised using the Consesnus Health Economic Criteria (CHEC) list.[51] Reporting bias was assessed narratively. The confidence in our findings was assessed based on methodological quality (CHEERS/CHEC), consistency of effects and reported uncertainty across studies. No formal evidence grading system was applied, given the lack of a suitable approach and the heterogeneity of included study designs.

Patients and the public were not involved in this review; however, they were involved in some of the primary studies included in this review.

RESULTS

Database searches yielded 14 397 records. After removing duplicates, 10 224 titles and abstracts were screened. Complemented by studies identified through handsearching and reference tracking, 65 publications were assessed in full, of which 20 studies were included in the review (figure 1).[52–71]

Description of included studies

Study characteristics are summarised in table 1. Most studies were conducted in the UK (n=13),[52–60 65 67 69 71] followed by Sweden (n=3),[61 66 70] the Netherlands (n=2),[62 64] Germany (n=1)[63] and Spain (n=1).[68] CUA was most common (n=10),[53 55 58 59 61 65 67 68 70 71] followed by CEA (n=8),[52 53 55 59 60 62 67 70] CBA (n=5)[56 63 64 66 69] and CCA (n=4).[54–57] Of the included studies, 14 (70%) were trial-based,[52–60 62 65 67 69 71] and 6 (30%) were model-based.[61 63 64 66 68 70] In addition to health and healthcare sector outcomes, impacts were reported in other sectors, namely education n=13,[53 55–59 61 63 64 66 70 72] social care n=10[53 56 59–62 67 68 72] and criminal justice n=9.[53 56 57 60–63 67 70] Impacts were further reported in productivity n=8[62–65 67 69 71 72] and individual expenses n=6.[61–63 67 69 72] While these do not constitute sectors per se but rather domains, they are referred to as sectors for consistency and readability throughout this paper. In summary, healthcare, education, social care, criminal justice, productivity and individual expenses define the derived core set for assessing school-based mental health interventions.

The time horizon was <=1 year (n=7),[53 57 58 60 62 67 71] 1–5 years (n=8),[52 54–56 59 65 66 69] and 10 years to up to lifetime (n=5).[61 63 64 68 70]

Interventions targeted children (<=9 years) in four studies,[54 59 64 65] adolescents (10–19 years, following WHO definition[72] in 12 studies,[52 53 56 58 60–63 66–68 70] or both,[55 57 69 71] with four studies targeting students with particular vulnerabilities.[58 60 70 71] Most interventions were delivered during school hours by trained teachers, often within a curriculum, and commonly included classroom sessions, group activities, and occasionally take-home tasks, digital platforms, individual components, or parental involvement (online supplemental appendix E). Control conditions generally involved usual teaching, which likely included well-being elements in many studies; however, only a few studies specified such usual practice.[53–55 57 60 61 69]

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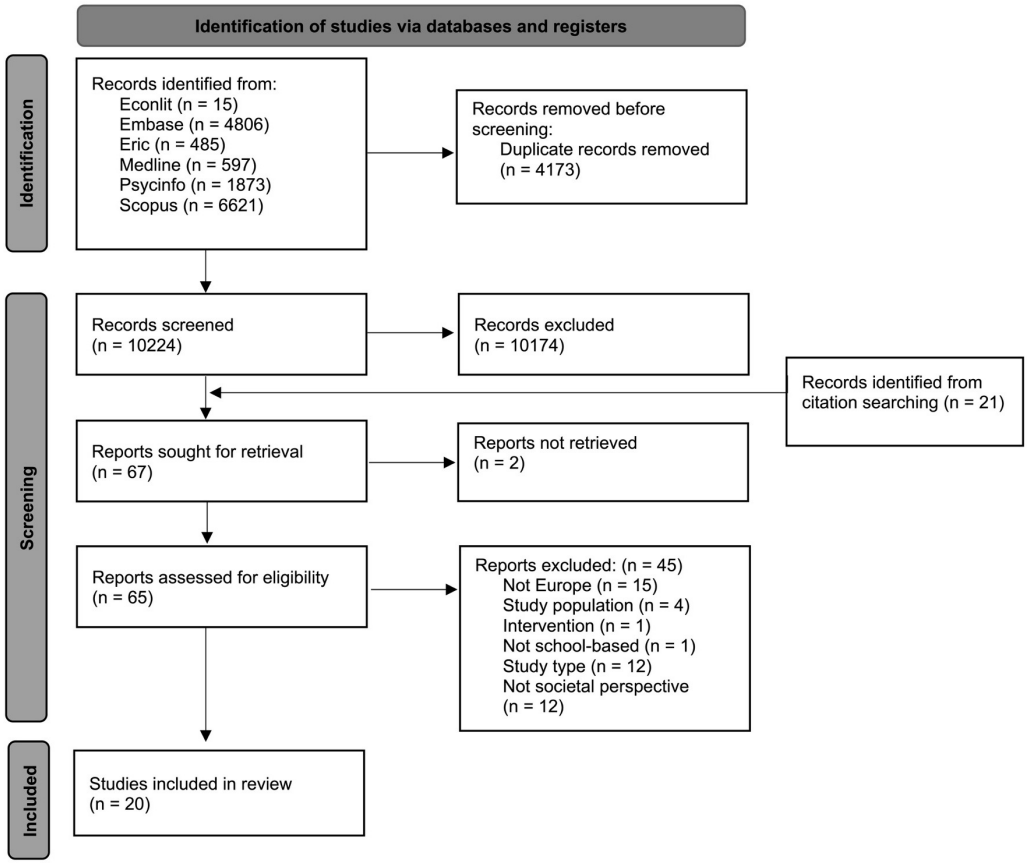


Figure 1 PRISMA flow diagram. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Quality appraisal

Assessment results for individual studies are presented in online supplemental appendix F. For reporting standards (CHEERS),[50] notable gaps were identified regarding a health economic analysis plan, the characterisation of heterogeneity and distributional aspects, and engagement with children/adolescents or other affected persons. Uncertainty was not characterised in one quarter of studies. Appraising study quality (CHEC),[51] a frequent limitation concerns the handling of uncertainty. Sensitivity analyses were absent or insufficient to jointly capture sources of uncertainty in many studies. Additional concerns in some studies included the absence of incremental analyses or a limited consideration of distributional aspects. To assess the item 'all relevant costs for each alternative' from the internally derived core set of sectors, at least five had to be reported, including education for trials and productivity for models. Only 5 of 20 studies adopted such a comprehensive societal perspective.[60–62 66 71]

Further, concerns in outcome measurement and valuation were noted in almost all studies but, given the lack of robust or standardised alternatives, were not rated inappropriate according to the CHEC. These include reliance on self-reported outcomes and costs, which are prone to recall bias, social desirability bias and stigma, particularly in the context of mental health. The absence of standard tools for deriving QALYs in paediatric CUAs[73] led to the use of various instruments, including adult EuroQol 5-Dimension scale (EQ-5D),[53 58 61 68 70] youth-adapted EQ-5D-Y[72] or Child Health Utility 9D Index (CHU9D).[55 59 65 67]

Many studies lacked prespecified economic evaluation plans, potentially affecting the completeness and transparency of reporting. Protocols identified in the searches were checked, although ongoing trials or analyses may partly explain missing publications. Lastly, studies reported negative effects alongside benefits, suggesting limited risk of reporting bias.

Intervention costs

Intervention costs ranged from €21.55 to €862.27 per student (2025 price level, Germany, table 2). Only two studies reported the cost of the alternative programme,[56 57] and three explicitly adopted an opportunity cost approach, assuming zero cost for the control condition[52 53 68]; the remaining studies did not explicitly report control costs. There was considerable variation in the cost elements reported (table 3), with few studies accounting for expenditures beyond direct intervention costs, which are needed to reflect the full value of resources potentially employed elsewhere. For example, commonly reported elements included facilitator salaries, programme materials and training costs, but only three studies estimated the value of students' time.[52 61 62]

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Table 1 Characteristics of included studies

Author, year, country	Study type	Sectors of outcomes covered Italics if non-monetised only	Sample size intervention/ control	Age (target group)	Intervention	Control	Time horizon	Discounting per annum
Agus 2019 UK[52]	CEA, trial-based (cRCT)	Health, education, social care, criminal justice	4189/4037	11–12	Steps Towards Alcohol Misuse Prevention Programme	Usual practice	2.45 years	Costs at 3.5%
Anderson 2014 UK[53]	CUA and CEA, trial-based (cRCT)	Health, social care	1753/1604	12–16	Resourceful Adolescent Programme (cognitive behavioural therapy)	Usual practice (attention-focused PSHE sessions)	1 year	Not discounted
Berry 2016 UK[54]	CCA, trial-based (cRCT)	Health, education	2652/2342	4–6	PATHS (Promoting Alternative Thinking Strategies) (social emotional learning)	Usual practice (SEAL curriculum)	2 years	Not discounted
Blair 2024 UK[55]	CUA, CEA and CCA, trial-based (cRCT)	Health, social care, criminal justice (aggregated), *education*	255/292 Teachers: N.R.	4–6 and 8–10	Social and Emotional Education and Development intervention	Usual practice (Curriculum for excellence)	4 years	Costs and health outcomes at 1.5%
Bonell 2018 UK[56]	CBA and CCA, trial-based (cRCT)	Health, criminal justice, *education*	2873/3087	11–12	Learning together intervention (social emotional skills)	Usual practice	3 years	N.R.
Bowes 2024 UK[57]	CCA, trial-based (cRCT)	*Health, education*	5584/4862 Teachers: 230/228	7–11	KiVa antibullying programme	Usual practice (PSHE curriculum)	1 year	Not discounted
Brown 2024 UK[58]	CUA, trial-based (cRCT)	Health, *education*, social care	412/439	16–18 seeking psychological help for stress, worry or low mood	Brief cognitive behavioural therapy workshop	Usual practice	0.5 years	N.R.
Conolly 2018 UK[59]	CUA and CEA, trial-based (cRCT)	Health, social care, criminal justice (aggregated)	525/424	8–9	Roots of Empathy programme for improving social and emotional well-being	Usual practice	3.75 years	Costs and health outcomes at 1.5%
Cooper 2021 UK[60]	CEA and CCA, trial-based (cRCT)	Health, *education, social care, criminal justice, individual expenses*	147/150	13–16 with moderate to severe levels of emotional symptoms	Humanistic counselling	Usual practice (pastoral care)	0.5 years	Not discounted

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Table 1 Continued

Author, year, country	Study type	Sectors of outcomes covered Italics if non-monetised only	Sample size intervention/ control	Age (target group)	Intervention	Control	Time horizon	Discounting per annum
Deogan 2015 Sweden[61]	CUA, model-based (Markov)	Health, social care, criminal justice, productivity, individual expenses	100 000/N.R.	14–15	Project (Adolescent, Learning, Experiences, Resistance and Training) against cannabis use	Usual practice (Alcohol, Tobacco, and Other Drug education)	20 years and lifetime	Costs and health outcomes at 3%
Drost 2016 The Netherlands[62]	CEA, trial-based (cRCT)	Health, education, criminal justice, productivity, individual expenses	1538/955	15–19	Web-based computer-tailored alcohol reduction programme (Alcoholic Alert)	Usual practice	0.25 years	N.R.
Hoeflmayr 2008 Germany[63]	CBA, model-based (stochastic progression model)	Health, education, productivity	150 556/N.R.	11–14	Smoke-free Class Competition'	N.R., usual practice assumed	N.R., lifetime assumed	Health outcomes at 5%, costs not discounted (majority in first year)
Huitsing 2020 The Netherlands[64]	CBA, model-based	*Health,* productivity	N.R.	8–9	KiVa anti-bullying programme	Usual practice	Lifetime	Health outcomes at 3.5%, costs not discounted (majority in first year)
Humphrey 2018 UK[65]	CUA and CCA, trial-based (cRCT)	*Health, education*	2676/2542	7–9	PATHS curriculum (social emotional learning)	Usual practice	2 years	Costs at 3.5%
Klapp 2017 Sweden[66]	CBA, model-based	Health, social care (aggregated), criminal justice, productivity, individual expenses	489/174	13–16	Social and Emotional Training programme.	Usual practice	5 years and lifetime	Costs at 35%
Kuyken 2022 UK[67]	CUA, CEA and CCA, trial-based (cRCT)	Health, education, social care	3424/3370	12.2 (mean)	School-based mindfulness training	Usual practice	1 year	Costs at 35% for those with late follow-up
Mar 2023 Spain[68]	CUA, model-based (discrete event simulation)	Health, productivity, individual expenses	609 381/N.R.	12–14	UPRIGHT intervention in promoting resilience and mental health	Usual practice	30 years	Costs and survival at 3%

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Table 1 Continued

Author, year, country	Study type	Sectors of outcomes covered Italics if non-monetised only	Sample size intervention/ control	Age (target group)	Intervention	Control	Time horizon	Discounting per annum
Pritchard 2001 UK[69]	CBA and CCA, trial-based (non-randomised cluster trial)	*Health*, education, criminal justice	Secondary school: 356/503 Primary school: N.R.	9–16	Educational social work service	Usual practice (social work provision)	3 years	N.R.
Ssegonja 2020 Sweden[70]	CUA und CEA, model-based (Markov)	Health, productivity	N.R.	15 with subsyndromal depression	Group-based cognitive behavioural therapy for depression	Usual practice	5 and 10 years	Costs and health outcomes at 3%
Wang 2024 UK[71]	CUA, trial-based (cRCT)	Health, *education, social care*, productivity, individual expenses	129/120	4–11 with autism	Social Stories Intervention	Usual practice	0.5 years	Not discounted

CBA, cost–benefit analysis; CCA, cost–consequence analysis; CEA, cost-effectiveness analysis; cRCT, Cluster-randomised controlled trial; CUA, cost–utility analysis; N.R, not reported.

Intervention outcomes

Intervention outcomes primarily comprised resource use related to public sector services, individual expenses, and monetary valuations assigned of selected conditions or behaviours (eg, productivity losses). Non-monetised outcomes included a range of health outcomes, education-related outcomes, and, in some cases, service utilisation (table 3).

Studies reported outcomes from two,[53 54 57 64 65 70] three,[56 58 59 63 67–69] four,[52 55] or five sectors.[60–62 66 71] Productivity effects—such as changes in work absenteeism, presenteeism or income—were assessed in all model-based studies, whereas only one trial-based study included productivity outcomes, specifically parental productivity. Educational outcomes were assessed in 12 trial-based studies but only in one of the six model-based studies.

Findings of the base case analyses

Base case analyses

To contextualise the evidence on cross-sectoral outcomes, the base case characteristics are first described by type of economic evaluation, distinguishing between cost-effectiveness, cost–utility and cost–benefit approaches and between trial-based and model-based analyses. This overview provides the foundation for interpreting how different evaluation frameworks capture cross-sectoral and societal effects, before detailing the reported outcomes across sectors.

Base cases represent the main analyses conducted in the primary studies relating costs (intervention costs and cost differences in resource use) to effects (expressed in unit per health outcome (CEA) or in QALYs (CUA)) or relating intervention costs with the monetary value of outcomes (CBA). As all base cases adopt a societal perspective, reported costs represent aggregated cost differences and monetary values of outcomes across sectors covered by the respective study. Data and visualisations of the base case results by type of economic evaluation as well as an assessment of uncertainty are provided in online supplemental appendix G.

CEA, based on eight included studies: Half of the studies indicate that interventions were both more effective and more costly than controls.[55 59 60 62] Two studies reported interventions being less costly and more effective,[52 70] and in two studies the intervention was dominated by the control (more costly and less effective) for one outcome analysed.[53 67]

CUA, based on ten included studies: Four interventions were found to be more effective and less costly than controls (dominance).[55 68 70 71] Three interventions would be cost-effective at a willingness-to-pay (WTP) threshold of ≤€20 000 per QALY gained,[58 59 67] one at a WTP ≤€30 000 per QALY[65] and one at a WTP ≤€50 000 per QALY.[61] These values lie within the range of thresholds typically applied by European health technology assessment agencies to guide funding decisions in public healthcare systems.[74 75] Only one intervention was less effective and more costly than its control.[53]

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Table 2 Summary of intervention costs and base case results

Author, year, country	Study type	Intervention cost per student, in 2025 €	Results of economic evaluation base case: Incremental cost per student in 2025 € (aggregated measure across sectors) Intervention vs control; commonly includes costs from for example, resource use or service utilisation over the study period	Results of economic evaluation base case: Incremental effect MD in units (instrument if specified) Intervention vs control	Interpretation
Agus 2019 UK[52]	CEA, trial-based (cRCT)	21.55	–24.69	0.08 pupils experiencing heavy drinking episode avoided	Intervention less costly and more effective than control (dominance)
			218.78	0.19 SMFQ score improvement (depressive symptoms)	Intervention more costly and more effective than control
Anderson 2014 UK[53]	CUA and CEA, trial-based (cRCT)	55.36	304.45	–0.05 QALY (EQ-5D)	Intervention dominated by control (more costly and less effective)
Berry 2016 UK[54]	CCA, trial-based (cRCT)	214.16	Cost-effectiveness not calculated given lack of clinical effectiveness		Findings of cost–consequence analysis reported in figure 3
			94.63	0.841 SDQ-TDS improvement (mental health difficulties)	Intervention more costly and more effective than control
			94.63	0.174 SDQ pro social score improvement (mental health difficulties)	Intervention more costly and more effective than control
Blair 2024 UK[55]	CUA, CEA and CCA, trial-based (cRCT)	227.24	–103.97	0.038 QALY (CHU9D)	Intervention less costly and more effective than control (dominance)
Bonell 2018 UK[56]	CBA and CCA, trial-based (cRCT)	332.01 (additional 81.22)	Total benefit (2025 €): 257.66		Benefit-cost ratio of 0.78
Bowes 2024 UK[57]	CCA, trial-based (cRCT)	45.26 (additional 24.64)	No results of full economic evaluation available yet		Findings of cost–consequence analysis reported in figure 3
Brown 2024 UK[58]	CUA, trial-based (cRCT)	129.09	174.96	0.0095 QALY (EQ-5D-3L)	Intervention cost-effective at a WTP threshold ≤€20 000 per QALY gained

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Table 2 Continued

Author, year, country	Study type	Intervention cost per student, in 2025 €	Results of economic evaluation base case: Incremental cost per student in 2025 € (aggregated measure across sectors) Intervention vs control; commonly includes costs from for example, resource use or service utilisation over the study period	Results of economic evaluation base case: Incremental effect MD in units (instrument if specified) Intervention vs control	Interpretation
			153.74	0.5414 SDQ-TDS improvement (mental health difficulties)	Intervention more costly and more effective than control
Conolly 2018 UK[59]	CUA and CEA, trial-based (cRCT)	251.43	219.82	0.0160 QALY (CHU9D)	Intervention cost-effective at a WTP threshold ≤ €20 000 per QALY gained
Cooper 2021 UK[60]	CEA and CCA, trial-based (cRCT)	550.12	525.93	1.87 YP-Core improvement (psychological distress)	Cost-effectiveness acceptability curve provided for range of potential WTP thresholds per unit
Deogan 2015 Sweden[61]	CUA, model-based (Markov)	319.67	14.59	0.000522 QALY (EQ-5D)	Intervention cost-effective at a WTP threshold of ≤€50 000 per QALY gained
Drost 2016 The Netherlands[62]	CEA, trial-based (cRCT)	67.48	94.25	0.49 Glass of alcohol per week prevented	Cost-effectiveness acceptability curve provided for range of potential WTP thresholds per unit
			94.25	0.73 Binge drinking episode prevented	
Hoeflmayr 2008 Germany[63]	CBA, model-based (stochastic progression model)	7.97 (60.56 incl. costs of students' time)	Total benefit (2025 €): 215.26		Benefit–cost ratio of 3.55
Huitsing 2020 The Netherlands[64]	CBA, model-based	254.99	Total benefit (2025 €): 1028.79 and 1712.99 (additional income through the reduction of bullying)		Benefit–cost ratio of 5.38
Humphrey 2018 UK[65]	CUA and CCA, trial-based (cRCT)	42.69	42.70	0.0019 QALY (CHU9D)	Intervention cost-effective at a WTP threshold of ≤€30 000 per QALY gained
Klapp 2017 Sweden[66]	CBA, model-based	521.35	Total benefit (2025 €): 7250.64		Benefit–cost ratio of 13.91

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Table 2 Continued

Author, year, country	Study type	Intervention cost per student, in 2025 €	Results of economic evaluation base case: Incremental cost per student in 2025 € (aggregated measure across sectors) Intervention vs control; commonly includes costs from for example, resource use or service utilisation over the study period	Results of economic evaluation base case: Incremental effect MD in units (instrument if specified) Intervention vs control	Interpretation
Kuyken 2022 UK[67]	CUA, CEA and CCA, trial-based (cRCT)	93.66	9.06	0.012 QALY (CHU9D)	Intervention cost-effective at a WTP threshold of ≤€20 000 per QALY gained
Mar 2023 Spain[68]	CUA, model-based (discrete event simulation)	188.52	–158.38 (2 years) –276.47 (5 years) –47.23 (Systematic review)	0.02 (2 years) QALY (EQ-5D-5L) 0.02 (5 years) QALY (EQ-5D-5L) 0.01(Systematic review) QALY (EQ-5D-5L)	Intervention less costly and more effective than control (dominance)
Pritchard 2001 UK[69]	CBA and CCA, trial-based (non-randomised cluster trial)	124 994.15 (all students, total number N.R.)	Total benefit (2025 €): 267 997.74 (all students)		Benefit–cost ratio of 2.11
Ssegonja 2020 Sweden[70]	CUA und CEA, model-based (Markov)	862.27	–1677.36 (5 years) –2450.16 (10 years)	0.07 (5 years) depression cases prevented 0.10 (10 years) depression cases prevented	Intervention less costly and more effective than control (dominance)
			–1677.36 (5 years) –2450.16 (10 years)	0.2 (5 years) QALY (EQ-5D) 0.15 (10 years) QALY (EQ-5D)	
Wang 2024 UK[71]	CUA, trial-based (cRCT)	82.92	–106.87	0.001 QALY (EQ-5D-Y-3L)	Intervention less costly and more effective than control (dominance)

CBA, cost–benefit analysis; CCA, cost–consequence analysis; CEA, cost-effectiveness analysis; CHU9D, Child Health Utility 9D; cRCT, Cluster-randomised controlled trial; CUA, cost–utility analysis; EQ-5D (-Y-3L), EuroQol 5-Dimension (Youth 3 Level); MD, mean difference; N.R., not reported; QALY, quality-adjusted life-year; SDQ-TDS, Strengths and Difficulties Questionnaire - Total Difficulties Score; SMFQ, Short Mood and Feelings Questionnaire; WTP, willingness-to-pay.

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Table 3 Overview of cost components and outcomes by sector

Author, year, country	Study type	Intervention cost per student, in 2025 €	Results of economic evaluation base case		
			Incremental cost per student in 2025 € (aggregated measure across sectors)	Incremental effect MD in units (instrument if specified)	
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Author, year, country	Study type	Intervention cost per student, in 2025 €	Results of economic evaluation base case		
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Pritchard[70] 2001 UK	CBA and CCA, trial-based (non-randomised cluster trial)	124 994.15 (all students, total number N.R.)	Total benefit (2025 €): 267 997.74 (all students)		Benefit–cost ratio of 2.11
Ssegonja[71] 2020 Sweden	CUA und CEA, model-based (Markov)	862.27	–1677.36 (5 years)–2450.16 (10 years)	0.07 (5 years) depression cases prevented 0.10 (10 years) depression cases prevented	Intervention less costly and more effective than control (dominance)
			–1677.36 (5 years) –2450.16 (10 years)	0.2 (5 years) QALY (EQ-5D) 0.15 (10 years) QALY (EQ-5D)	
Wang[72] 2024 UK	CUA, trial-based (cRCT)	82.92	–106.87	0.001 QALY (EQ-5D-Y-3L)	Intervention less costly and more effective than control (dominance)

*Monetised outcomes are priorised over non-monetised outcomes. For studies not reporting any monetised healthcare sector outcomes, only the health outcome used in the base case analysis is reported here.
CBA, cost–benefit analysis; CCA, cost–consequence analysis; CEA, cost-effectiveness analysis; CUA, cost–utility analysis; MD, mean difference; N.R., not reported; QALY, quality-adjusted life-year; WTP, willingness-to-pay.

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CBA, based on five five included studies: All but one intervention[56] showed benefits exceeding costs, with an average benefit–cost ratio of 5.14.

Distributional aspects

No study applied a distributional CEA (DCEA),[76 77] but four studies reported distributional effects disaggregated by subgroup.[58 61 62 68] Cost-effectiveness was higher among students with a low socioeconomic status,[68] elevated depression scores,[58] boys from deprived backgrounds,[61] as well as adolescents with lower educational levels[62] and those from older age groups (≥17 years).[62]

Impacts beyond healthcare

Monetised outcomes

Cost differences between intervention and control groups reported for both healthcare and selected non-health sectors related to service utilisation and monetary values assigned to specific conditions or behaviours. Studies varied in the number and types of services, conditions or behaviours considered, as well as in their applied time horizons. The monetised outcomes of the cross-sectoral impact assessment are presented in figure 2a and b, with full details in online supplemental appendix H.

Above: full range of costs

Below: zoomed-in view (excluding extreme values)

Total societal effects (excluding intervention costs) suggested an overall trend toward cost savings or economic benefits exceeding costs. Sector-specific results were mixed; education, social care, criminal justice and individual expenses showed both savings and increases among students receiving the intervention, whereas the productivity and healthcare sectors more consistently showed cost savings or economic benefits exceeding costs. Model-based studies generally reported larger MDs and predominantly cost savings or economic benefits compared with trial-based studies.

Non-monetised outcomes

Across studies, non-monetised outcomes in non-health sectors predominantly captured effects on service utilisation without associated cost estimates. As such, in the education and social care sectors, some studies reported higher use of targeted support[58 60] in the intervention group, while others found lower use of general support.[71] In the criminal justice sector, differences in service contacts were negligible.[60] The use of privately financed or services with unclear financing varied, with minor increases in helpline use[58 60] and reductions in youth club attendance[60] and digital tool use.[58]

Outcomes not directly related to service utilisation were rarely reported with the exception of education-related outcomes. These outcomes are presented in figure 3, with full details provided in online supplemental appendices H & I. Additionally, some studies reported non-monetised outcomes for which sectoral attribution beyond health could be debated, for instance vandalism, family relationships or non-consensual sex.

Over 60 non-monetised educational outcomes were reported, often showing mixed effects.[57 60 65 67] Significant effects favouring the intervention included student social behaviour, relationships, engagement and school climate,[55 69] academic achievement and learning,[69] truancy and student exclusions,[56 69] as well as teacher-related outcomes such as behaviour, well-being or working conditions.[54 69] Effects favouring the control were consistently minor and non-significant.

Overall, the certainty of evidence varied by analytical focus, with both assessments affected by heterogeneity in study designs, interventions, outcomes and time horizons. For the base case analyses (overall societal costs and effects, certainty was assessed as moderate, as the consistency of findings across economic evaluation types—with most interventions showing favourable outcomes—supports confidence in the overall direction of effects. For the cross-sectoral assessment, certainty was assessed as low, further driven by considerable uncertainty in effect estimates and incomplete capture of societal effects.

DISCUSSION

This systematic review of economic evaluations aimed to assess the costs and outcomes of school-based prevention and mental health promotion interventions across multiple sectors.

Our main findings indicate that such interventions have cross-sectoral impacts in education, healthcare, social care, criminal justice, as well as on productivity and individual expenses. Within individual sectors, results were subject to substantial uncertainty, although cost savings and economic benefits were particularly pronounced in productivity and in healthcare. While monetised outcomes in the education sector did not provide unequivocal evidence of economic benefit, the non-monetised outcomes indicated a positive trend, the societal value of which remains to be quantified. Across sectors, model-based studies tended to show a trend towards cost savings and employed longer time horizons compared with trial-based studies. The results of the base cases (based on the aggregated effects across sectors) mostly indicated cost-effectiveness ratios within common WTP thresholds (CUA), higher effectiveness and higher costs of interventions (CEA) and benefits often exceeding costs (CBA). Overall, the quality of evidence was mixed. Certainty was rated moderate for the base case analyses and low for the cross-sectoral assessment.

Previous research has emphasised the wide-ranging impacts of poor mental health, including multi-sectoral costs and potential benefits of school-based interventions.[2 7] Yet, findings from this review are marked by substantial uncertainty regarding the extent to which such interventions consistently generate economic gains across sectors.

Some studies even reported higher costs in certain sectors for intervention groups. Beyond statistical uncertainty, possible explanations include modest incremental

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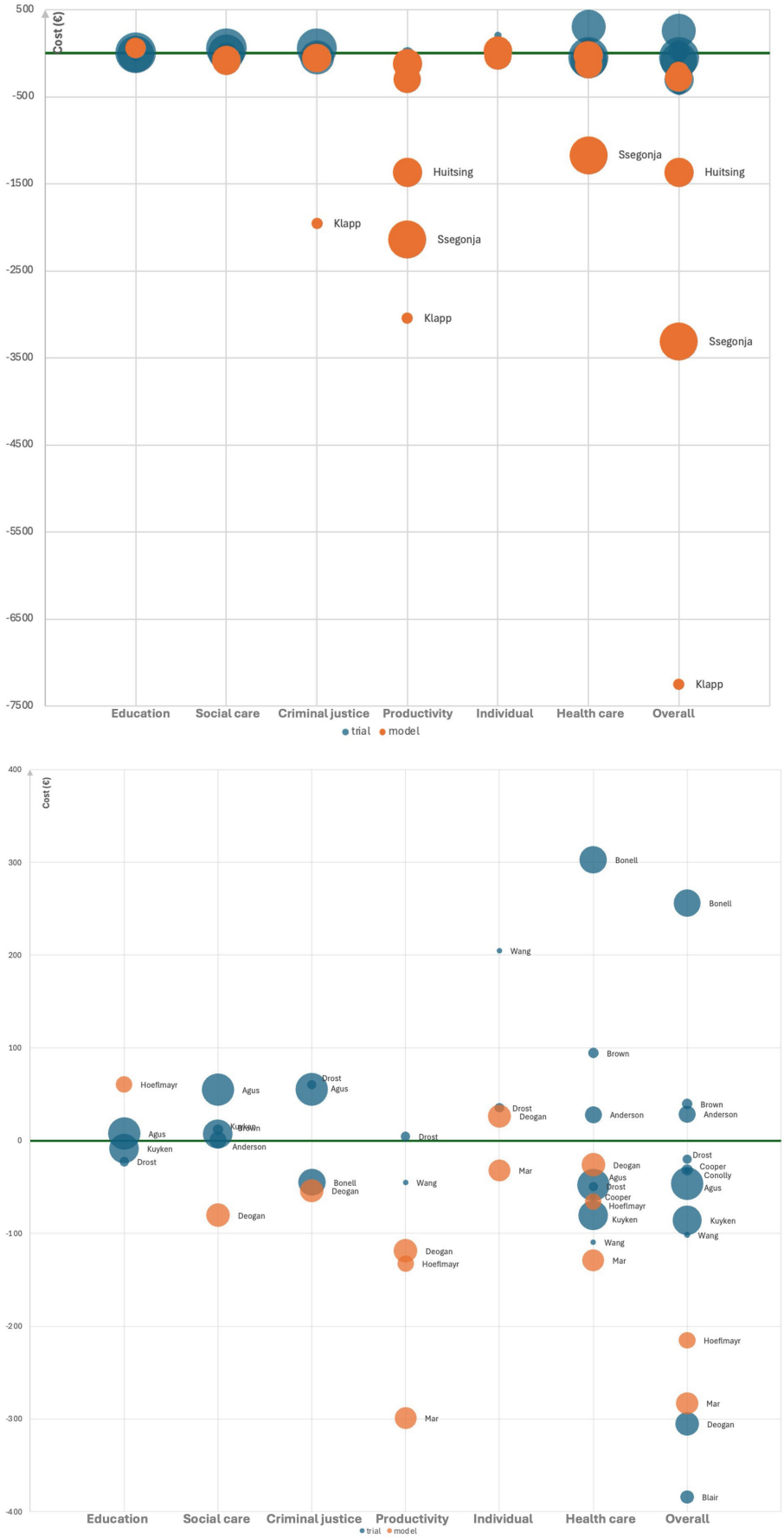


Figure 2 Cross-sectoral assessment of cost differences by sector.MD per student, bubble size indicates sample size of studyAbove: full range of costsBelow: zoomed-in view (excluding extreme values)

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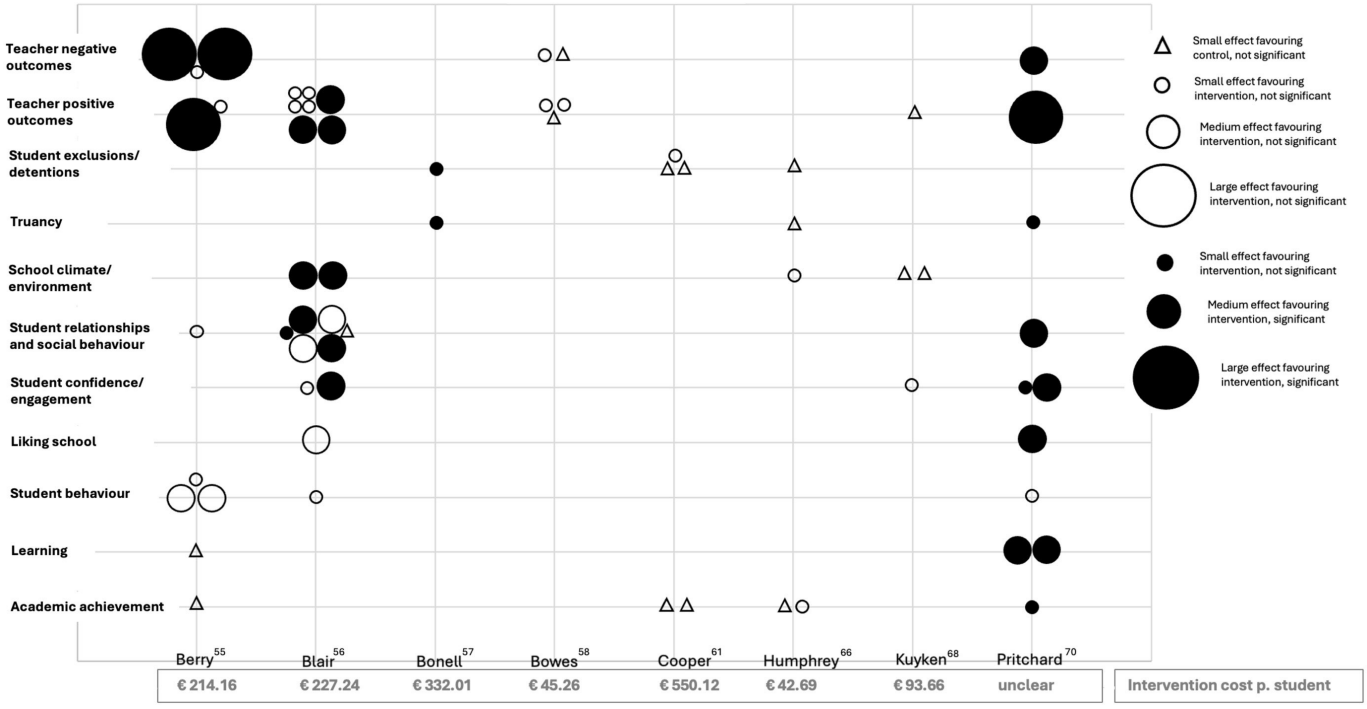


Figure 3 Educational outcomes (non-monetised).

effects due to active control conditions, increased awareness and help-seeking resulting from the intervention or societal trade-offs where gains in one sector may be offset by costs in another. Rather than diminishing their value, this underscores the complexity of cross-sectoral impacts and the need for both comprehensive evaluation and intersectoral coordination. Moreover, the positive trend in non-monetised educational outcomes suggests that some benefits may not yet be fully captured by current economic assessments.

While educational outcomes are commonly reported alongside health outcomes in clinical studies of school-based health interventions,[78 79] the broader set of sectors that may be affected is rarely captured in clinical and public health research. For economic evaluations, the consideration of multiple sectors is conceptually embedded in the societal perspective. However, the studies included in this review demonstrate the practical challenges of applying a comprehensive societal perspective, with sectoral impacts variably operationalised, quantified or reported. The patterns observed in the included studies suggest that healthcare and productivity outcomes are most commonly reported, while social care, criminal justice, individual expenses and educational (monetised) outcomes are less frequently included. This may reflect established conventions in economic evaluation as well as differences in data availability and ease of monetisation and attribution. This imbalance may be particularly relevant for school-based interventions, where educational impacts are central, suggesting a need for more systematic inclusion of cross-sectoral outcomes in future evaluations.

Supporting evidence therefore remains limited and largely methodological, underscoring the need for standardisation and highlighting current knowledge gaps.[29 36 80 81] Verguet *et al*[29] found a small positive effect of school-based health programmes on the education sector (measured in Learning-Adjusted Years of Schooling (LAYS)) and suggested assessing impacts in social protection, agriculture and gender, based on included studies of physical health programmes in low resource settings.[29] In a European context, Drost *et al*[80] proposed components for multisectoral benefit assessment, including education and criminal justice. A costing study[81] identified education, household and leisure, labour and social security, and healthcare as key sectors, with opportunity costs largely borne by education and offsets accruing primarily to households.[81]

The findings of this systematic review must be interpreted in light of two key methodological challenges in economic evaluations, particularly pronounced in mental health, prevention and interventions for children and adolescents.

First, choosing time horizons that adequately capture effects emerging or intensifying later in life is challenging, while discounting may reduce the apparent value of long-term preventive effects. The trial-based studies included in this review may have underestimated the benefits by excluding longer-term impacts, and often reported small or mixed economic gains. In contrast, the model-based studies often reported larger cost differences, likely reflecting the inclusion of long-term effects - particularly healthcare cost savings and productivity gains—even though these were discounted. This difference is likely

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driven by the structural ability of modelling studies to extrapolate beyond observed trial data, capturing downstream effects that occur later in life and across sectors, whereas trial-based studies are constrained by shorter follow-up periods. However, model-based estimates depend on assumptions regarding effect persistence, transition probabilities and cost trajectories, which introduces additional uncertainty and may result in both upward or downward bias depending on model structure.

Second, while CUAs using QALYs enable comparison across interventions and are often favoured by policymakers, their validity for mental health outcomes remains debated.[82] Established instruments such as EQ-5D[83 84] focus narrowly on anxiety and depression and show ceiling effects,[85 86] whereas CHU9D,[87] developed for children and adolescents, seems to better capture mental health, well-being, daily activities and school work.[85 86] Despite these shortcomings, QALYs remain useful against WTP thresholds and sector-specific instruments, such as LAYS[88] in education and the Adult Social Care Outcomes Toolkit (ASCOT[89]) in social care could provide valuable complements.

Limitations of the evidence include heterogeneity, uncertainty, incomplete capture of societal effects and inconsistent reporting, which reduce the strength and generalisability of conclusions. In the absence of established standards for a societal perspective, many studies focused on one or two non-health sectors, specific services or reported aggregated results. Consideration of full opportunity costs was not observed, the inclusion of which could have enabled a more thorough assessment of trade-offs across sectors.[36] Inconsistent reporting of cost-related uncertainty estimates or necessary data resulted in unquantifiable uncertainty of the cross-sectoral analysis. Distributional aspects were underexplored, with little consideration of how benefits and costs were shared across population groups.[90] Geographical bias was present, likely reflecting cross-country variation in the use of economic evidence for decision-making and funding. In addition, differences in national health, education and social care systems as well as variation in costing and reporting practices across countries may limit the comparability of economic outcomes. Given this heterogeneity in institutional and policy contexts, the findings should be interpreted as indicating overall patterns of economic value rather than precise, transferable effect sizes, underscoring the importance of contextualised economic evidence.

Review-level limitations include possible omission of clinical studies reporting costs only in full text and context-dependent variation in sectoral attribution of outcomes (eg, school nurses). The synthesis is further limited by substantial heterogeneity across study designs, interventions, outcomes, and time horizons, which required reliance on narrative synthesis and grouping by sector and study design. While this approach facilitated a structured comparison, it may obscure within-group variation and context-specific effects, meaning that findings should be interpreted as indicative patterns rather than precise effect estimates. Strengths include broad database coverage across health, education, and economics, combined with an inclusive search strategy and a structured cross-sectoral framework for extracting and synthesising economic outcomes. The review procedure follows current methodological standards, including protocol registration, systematic methodology and reporting,[91] while the dual appraisal of quality goes beyond common practice. Importantly, this review introduces a novel and systematic approach to capturing wider societal impacts by drawing on economic literature and applying a structured assessment of monetised and non-monetised outcomes across sectors. This contributes to advancing methodological development in prevention research and provides a foundation for more holistic economic evaluations in the future.

Implications for research and policy

Future studies should prioritise robust trial-based and model-based economic evaluations adopting a comprehensive societal perspective, with disaggregated reporting of outcomes and costs across healthcare, education, social care, criminal justice, productivity and individual expenditures, reflecting the core set of sectors identified in this review. Well-conducted trials would provide the empirical foundation for modelling studies assessing longer-term impacts. Spillover effects on families, teachers and communities warrant systematic examination, while new approaches are needed to value non-monetised outcomes, for instance, school climate or student engagement. To assess the distribution of outcomes across the population, beyond subgroup or scenario analyses, DCEA could capture equity impacts and societal value judgements. Finally, robust methods to estimate opportunity costs are essential to assess trade-offs across sectors. Establishing sector-specific and outcome-specific WTP thresholds (eg, using generic measures), and eliciting stakeholder or public preferences, could further enhance transparency and guide multisectoral decision-making. Recognising that contextualised evidence is needed to inform decision-making, research should align with national, regional or local policy objectives and use methods linking economic evidence to real-world financing and implementation processes to support evidence-based policy.

This review highlights the potential of school-based mental health interventions to generate benefits across multiple sectors and societal returns, underscoring the need for increased investment in prevention and mental health promotion, and a shift from single-sector funding toward coordinated, multisectoral approaches. In light of rising mental health needs among children and adolescents and broader demographic changes, including an ageing population and a declining working-age population, strengthening mental health in younger generations is urgent, as current investments are likely to translate into future gains in productivity, healthcare

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demand, and social care needs. Strengthening the evidence base through contextualised, policy-oriented analyses can support co-financing arrangements and optimise resource allocation, thereby enhancing well-being, health, equity and societal returns.

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REFERENCES

1 United Nations Children's Fund (UNICEFPOLICY brief 2: child and adolescent mental health. the state of children in the European Union 2024. 2004. Available: https://www.unicef.org/eu/media/2576/file/Child%20and%20adolescent%20mental%20health%20policy%20brief.pdf [Accessed 16 Sep 2025].
2 McGorry PD, Mei C, Dalal N, *et al*. The Lancet Psychiatry Commission on youth mental health. *The Lancet Psychiatry* 2024;11:731–74.
3 CDC. Data and statistics on children's mental health. 2025. Available: https://www.cdc.gov/children-mental-health/data-research/index.html [Accessed 16 Sep 2025].
4 WHO. Mental health of adolescents. 2025. Available: https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health [Accessed 16 Sep 2025].
5 Evans-Lacko S, Font Gilabert P, Knapp M. The double disadvantage faced by adolescents from low socioeconomic backgrounds with mental health problems affects earnings up to mid-life. *Soc Sci Med* 2024;362:117385.
6 Mental health promotion and mental illness prevention: the economic case. 2011. Available: https://assets.publishing.service.gov.uk/media/5a7bad75ed915d1311060cb2/dh_126386.pdf [accessed 16 Sep 2025]
7 McDaid D. An investment framework to build mental capital in young people. 2020. Available: https://www.researchgate.net/publication/355158835_An_investment_framework_to_build_mental_capital_in_young_people [Accessed 16 Sep 2025].
8 Margaretha M, Azzopardi PS, Fisher J, *et al*. School-based mental health promotion: A global policy review. *Front Psychiatry* 2023;14:1126767.
9 World Health Organisation (WHO). Making every school a health-promoting school: global standards and indicators for health-promoting schools and systems. 2021. Available: https://www.who.int/publications/i/item/9789240025059 [Accessed 16 Sep 2025].
10 Flay BR, Collins LM. Historical Review of School-Based Randomized Trials for Evaluating Problem Behavior Prevention Programs. *Ann Am Acad Pol Soc Sci* 2005;599:115–46.
11 Fazel M, Hoagwood K, Stephan S, *et al*. Mental health interventions in schools 1: Mental health interventions in schools in high-income countries. *Lancet Psychiatry* 2014;1:377–87.
12 Rehfuess EA, Stratil JM, Scheel IB, *et al*. The WHO-INTEGRATE evidence to decision framework version 1.0: integrating WHO norms and values and a complexity perspective. *BMJ Glob Health* 2019;4:e000844.
13 Stratil JM, Biallas RL, Movsisyan A, *et al*. Development of an overarching framework for anticipating and assessing adverse and other unintended consequences of public health interventions (CONSEQUENT): a best-fit framework synthesis. *Bmjph* 2024;2:e000209.
14 Francetic I, Meacock R, Elliott J, *et al*. Framework for identification and measurement of spillover effects in policy implementation: intended non-intended targeted non-targeted spillovers (INTENTS). *Implement Sci Commun* 2022;3:30.
15 Weatherly H, Drummond M, Claxton K, *et al*. Methods for assessing the cost-effectiveness of public health interventions: key challenges and recommendations. *Health Policy* 2009;93:85–92.
16 Johnstone KM, Kemps E, Chen J. A Meta-Analysis of Universal School-Based Prevention Programs for Anxiety and Depression in Children. *Clin Child Fam Psychol Rev* 2018;21:466–81.
17 Clarke A, Sorgenfrei M, Mulcahy J, *et al*. Adolescent mental health: a systematic review on the effectiveness of school-based interventions. London: Early Intervention Foundation; 2021. Available: https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.eif.org.uk/files/pdf/adolescent-mental-health-summary.pdf&ved=2ahUKEwj7-9zEy9-PAxVtBNsEHda1ECEQFnoECBoQAQ&usg=AOvVaw1t7VTP_OLB9LSoyAU0gxer [accessed 17 Sep 2025]
18 Adler MD. Social Welfare Functions. New York, Oxford Academic, 2019. Available: https://doi.org/10.1093/oso/9780190912765.003.0008
19 Barro RJ. Health and Economic Growth. *Ann Econ Finance* 2013;14–2:329–66.
20 Barro RJ. Education and Economic Growth. *Ann Econ Finance* 2013;14–2:277–304.
21 Lee I. Co-benefits from health and health systems to education. *Health Policy* 2024;142.
22 Pinna Pintor M, Fumagalli E, Suhrcke M. The impact of health on labour market outcomes: A rapid systematic review. *Health Policy* 2024;143.
23 Limburg M, Cronin M, Black M, *et al*. School is more than a place to learn: An intersectoral assessment of adolescent well-being prior to and after the COVID-19 pandemic in the WHO European Region. *Public Health Pract (Oxf)* 2025;10:100654.

BMJ Public Health: first published as 10.1136/bmjph-2025-004776 on 25 June 2026. Downloaded from https://bmjpublichealth.bmj.com on 1 July 2026 by guest. Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

24 Ross DA, Hinton R, Melles-Brewer M, *et al*. Adolescent Well-Being: A Definition and Conceptual Framework. *J Adolesc Health* 2020;67:472–6.
25 Commission on the Social Determinants of Health. Closing the gap in a generation: health equity through action on the social determinants of health. Geneva, World Health Organization; 2008. Available: https://iris.who.int/bitstream/handle/10665/43943/9789241563703_eng.pdf [accessed 16 Sep 2025]
26 Solar O, Irwin A. A conceptual framework for action on the social determinants of health. social determinants of health discussion paper 2 (policy and practice). Geneva: World Health Organisation; 2010. Available: https://www.afro.who.int/sites/default/files/2017-06/SDH_conceptual_framework_for_action.pdf [accessed 16 Sep 2025]
27 Abou Jaoude GJ, Leiva-Granados R, Mcgranahan R, *et al*. Universal Primary School Interventions to Improve Child Social–Emotional and Mental Health Outcomes: A Systematic Review of Economic Evaluations. *School Ment Health* 2024;16:291–313.
28 Lima de Oliveira FPS, Moita GF, Ferreira e Ferreira E, *et al*. Economic Evaluation of School Health Programmes: A Mapping Review (2005-2015). *NHC* 2020;5:33–40.
29 Verguet S, Gautam P, Ali I, *et al*. Investing in school systems: conceptualising returns on investment across the health, education and social protection sectors. *BMJ Glob Health* 2023;8:e012545.
30 Mihalopoulos C, Chatterton ML. Economic evaluations of interventions designed to prevent mental disorders: a systematic review. *Early Interv Psychiatry* 2015;9:85–92.
31 Kularatna S, Hettiarachchi R, Senanayake S, *et al*. Cost-effectiveness analysis of paediatric mental health interventions: a systematic review of model-based economic evaluations. *BMC Health Serv Res* 2022;22:542.
32 Schmidt M, Werbrouck A, Verhaeghe N, *et al*. Universal Mental Health Interventions for Children and Adolescents: A Systematic Review of Health Economic Evaluations. *Appl Health Econ Health Policy* 2020;18:155–75.
33 McDaid D, Park AL. Evidence on Financing and Budgeting Mechanisms to Support Intersectoral Actions Between Health, Education, Social Welfare and Labour Sectors. Copenhagen: WHO Regional Office for Europe, 2016.
34 McGuire F, Vijayasingham L, Vassall A, *et al*. Financing intersectoral action for health: a systematic review of co-financing models. *Global Health* 2019;15:86.
35 Drummond M, Stoddart G. Assessment of health producing measures across different sectors. *Health Policy* 1995;33:219–31.
36 Walker S, Griffin S, Asaria M, *et al*. Striving for a Societal Perspective: A Framework for Economic Evaluations When Costs and Effects Fall on Multiple Sectors and Decision Makers. *Appl Health Econ Health Policy* 2019;17:577–90.
37 Page MJ, McKenzie JE, Bossuyt PM, *et al*. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71.
38 Campbell M, McKenzie JE, Sowden A, *et al*. Synthesis without meta-analysis (SWiM) in systematic reviews: reporting guideline. *BMJ* 2020;368:l6890.
39 Drummond MF, Sculpher MJ, Claxton K, *et al*. Methods for the Economic Evaluation of Health Care Programmes4th Edition. Oxford: Oxford University Press, 2015.
40 EndNote x20.4. Philadelphia, PA: Clarivate; 2019.
41 Ouzzani M, Hammady H, Fedorowicz Z, *et al*. Rayyan-a web and mobile app for systematic reviews. *Syst Rev* 2016;5:210.
42 Redmond, WA: Microsoft. Microsoft excel 16.89.1. Microsoft; 2021.
43 EPPI Centre. CCEMG - EPPI-Centre Cost Converter, 2024. Available: https://eppi.ioe.ac.uk/costconversion/ [Accessed 17 Sep 2025].
44 Tools. Cochrane methods economics. Available: https://methods.cochrane.org/economics/workshops [Accessed 17 Sep 2025].
45 DESTATIS. Harmonisierter Verbraucherpreisindex: Deutschland, Jahre. Available: https://www-genesis.destatis.de/datenbank/online/statistic/61121/table/61121-0001/search/s/SEIDUA [Accessed 17 Sep 2025].
46 DESTATIS. Harmonisierter Verbraucherpreisindex: Deutschland, Monate. Available: https://www-genesis.destatis.de/datenbank/online/statistic/61121/table/61121-0002/search/s/SEIDUA [Accessed 17 Sep 2025].
47 Sanders GD, Neumann PJ, Basu A, *et al*. Recommendations for Conduct, Methodological Practices, and Reporting of Cost-effectiveness Analyses: Second Panel on Cost-Effectiveness in Health and Medicine. *JAMA* 2016;316:1093–103.
48 van der Pol S, Postma MJ, Jansen D. School health in Europe: a review of workforce expenditure across five countries. *BMC Health Serv Res* 2020;20:206.
49 Michaud P-A, Vervoort JPM, Visser A, *et al*. Organization and activities of school health services among EU countries. *Eur J Public Health* 2021;31:502–8.
50 Husereau D, Drummond M, Augustovski F, *et al*. Consolidated Health Economic Evaluation Reporting Standards 2022 (CHEERS 2022) Statement: Updated Reporting Guidance for Health Economic Evaluations. *Value Health* 2022;25:3–9.
51 Evers S, Goossens M, de Vet H, *et al*. Criteria list for assessment of methodological quality of economic evaluations: Consensus on Health Economic Criteria. *Int J Technol Assess Health Care* 2005;21:240–5.
52 Agus A, McKay M, Cole J, *et al*. Cost-effectiveness of a combined classroom curriculum and parental intervention: economic evaluation of data from the Steps Towards Alcohol Misuse Prevention Programme cluster randomised controlled trial. *BMJ Open* 2019;9:e027951.
53 Anderson R, Ukoumunne OC, Sayal K, *et al*. Cost-effectiveness of classroom-based cognitive behaviour therapy in reducing symptoms of depression in adolescents: a trial-based analysis. *J Child Psychol Psychiatry* 2014;55:1390–7.
54 Berry V, Axford N, Blower S, *et al*. The Effectiveness and Micro-costing Analysis of a Universal, School-Based, Social–Emotional Learning Programme in the UK: A Cluster-Randomised Controlled Trial. *School Ment Health* 2016;8:238–56.
55 Blair S, Henderson M, McConnachie A, *et al*. The Social and Emotional Education and Development intervention to address wellbeing in primary school age children: the SEED cluster RCT. *Public Health Res (Southampt)* 2024;12:1–173.
56 Bonell C, Allen E, Warren E, *et al*. Effects of the Learning Together intervention on bullying and aggression in English secondary schools (INCLUSIVE): a cluster randomised controlled trial. *The Lancet* 2018;392:2452–64.
57 Bowes L, Babu M, Badger JR, *et al*. The effects and costs of an anti-bullying program (KiVa) in UK primary schools: a multicenter cluster randomized controlled trial. *Psychol Med* 2024;54:4362–73.
58 Brown J, James K, Lisk S, *et al*. Clinical effectiveness and cost-effectiveness of a brief accessible cognitive behavioural therapy programme for stress in school-aged adolescents (BESST): a cluster randomised controlled trial in the UK. *Lancet Psychiatry* 2024;11:504–15.
59 Connolly P, Miller S, Kee F, *et al*. A cluster randomised controlled trial and evaluation and cost-effectiveness analysis of the Roots of Empathy schools-based programme for improving social and emotional well-being outcomes among 8- to 9-year-olds in Northern Ireland. *NIHR Journals Library* 2018.
60 Cooper M, Stafford MR, Saxon D, *et al*. Humanistic counselling plus pastoral care as usual versus pastoral care as usual for the treatment of psychological distress in adolescents in UK state schools (ETHOS): a randomised controlled trial. *The Lancet Child & Adolescent Health* 2021;5:178–89.
61 Deogan C, Zarabi N, Stenström N, *et al*. Cost-Effectiveness of School-Based Prevention of Cannabis Use. *Appl Health Econ Health Policy* 2015;13:525–42.
62 Drost RMWA, Paulus ATG, Jander AF, *et al*. A Web-Based Computer-Tailored Alcohol Prevention Program for Adolescents: Cost-Effectiveness and Intersectoral Costs and Benefits. *J Med Internet Res* 2016;18:e93.
63 Hoeflmayr D, Hanewinkel R. Do school-based tobacco prevention programmes pay off? The cost-effectiveness of the “Smoke-free Class Competition”. *Public Health* 2008;122:34–41.
64 Huitsing G, Barends SI, Lokkerbol J. Cost-benefit Analysis of the KiVa Anti-bullying Program in the Netherlands. *Int Journal of Bullying Prevention* 2020;2:215–24.
65 Humphrey N, Hennessey A, Lendrum A, *et al*. *The PATHS Curriculum for Promoting Social and Emotional Well-Being among Children Aged 7–9 Years: A Cluster RCT*. *Southampton (UK): NIHR Journals Library* 2018.
66 Klapp A, Belfield C, Bowden B, *et al*. A Benefit-Cost Analysis of a Long-Term Intervention on Social and Emotional Learning in Compulsory School. *Int J Emot Educ* 2017;9:3–19.
67 Kuyken W, Ball S, Crane C, *et al*. Effectiveness and cost-effectiveness of universal school-based mindfulness training compared with normal school provision in reducing risk of mental health problems and promoting well-being in adolescence: the MYRIAD cluster randomised controlled trial. *Evid Based Ment Health* 2022;25:99–109.
68 Mar J, Larrañaga I, Ibarrondo O, *et al*. Cost-utility analysis of the UPRIGHT intervention promoting resilience in adolescents. *BMC Psychiatry* 2023;23:178.
69 Pritchard C, Williams R. A three-year comparative longitudinal study of a school-based social work family service to reduce truancy,

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delinquency and school exclusions. *J Social Welfare Family Law* 2001;23:23–43.
70 Ssegonja R, Sampaio F, Alaie I, *et al*. Cost-effectiveness of an indicated preventive intervention for depression in adolescents: a model to support decision making. *J Affect Disord* 2020;277:789–99.
71 Wang H-I, Bell K, Blackwell J, *et al*. for children with autism spectrum disorder in mainstream primary schools: results from a randomised controlled trial. *BJPsych Open* 2024;10:e123.
72 World Health Organization (WHO). Adolescent health. Available: https://www.who.int/health-topics/adolescent-health#tab=tab_1 [Accessed 17 Sep 2025].
73 ISPOR Good Practice Task Force. Valuing HRQoL of children & adolescents in economic evaluation (pediatric utilities). 2023. Available: https://www.ispor.org/docs/default-source/euro2023/ispor-eu-2023-pediatric-utilities-presentation-slides-final.pdf?sfvrsn=479db672_0 [Accessed 17 Sep 2025].
74 McCabe C, Claxton K, Culyer AJ. The NICE cost-effectiveness threshold: what it is and what that means. *Pharmacoeconomics* 2008;26:733–44.
75 Strohmaier C, Zechmeister-Koss I. Threshold values in health economic evaluations and decision-making. Vienna HTA Austria – Austrian Institute for Health Technology Assessment GmbH; 2024. Available: https://eprints.aihta.at/1549/1/HTA-Projektbericht_Nr.163.pdf [accessed 1 Dec 2025]
76 Asaria M, Griffin S, Cookson R. Distributional Cost-Effectiveness Analysis: A Tutorial. *Med Decis Making* 2016;36:8–19.
77 National Institute for Health and Care Excellence (NICE). NICE health technology evaluations: the manual. support document: health inequalities. 2022. Available: https://www.nice.org.uk/process/pmg36/resources/support-document-health-inequalities-15313210669/chapter/distributional-cost-effectiveness-analysis-methods [Accessed 17 Sep 2025].
78 Corcoran RP, Cheung ACK, Kim E, *et al*. Effective universal school-based social and emotional learning programs for improving academic achievement: A systematic review and meta-analysis of 50 years of research. *Educational Research Review* 2018;25:56–72.
79 Dix K, Ahmed SK, Carslake T, *et al*. Student health and wellbeing: a systematic review of intervention research examining effective student wellbeing in schools and their academic outcomes. Melbourne Evidence for Learning; 2020.
80 Drost RMWA, Paulus ATG, Ruwaard D, *et al*. Valuing inter-sectoral costs and benefits of interventions in the healthcare sector: methods for obtaining unit prices. *Expert Rev Pharmacoecon Outcomes Res* 2017;17:77–84.
81 Oosterhoff M, Bosma H, van Schayck OCP, *et al*. A Cost Analysis of School-Based Lifestyle Interventions. *Prev Sci* 2018;19:716–27.
82 Brazier J, Connell J, Papaioannou D, *et al*. A systematic review, psychometric analysis and qualitative assessment of generic preference-based measures of health in mental health populations and the estimation of mapping functions from widely used specific measures. *Health Technol Assess* 2014;18:vii–viii.
83 Rabin R, de Charro F. EQ-5D: a measure of health status from the EuroQol Group. *Ann Med* 2001;33:337–43.
84 Wille N, Badia X, Bonsel G, *et al*. Development of the EQ-5D-Y: a child-friendly version of the EQ-5D. *Qual Life Res* 2010;19:875–86.
85 O'Loughlin R, Jones R, Chen G, *et al*. Comparing the Psychometric Performance of Generic Paediatric Health-Related Quality of Life Instruments in Children and Adolescents with ADHD, Anxiety and/or Depression. *Pharmacoeconomics* 2024;42:57–77.
86 Carlton J, Powell PA, Kirkcaldy A, *et al*. Determining the Content Validity of the EQ-5D-5L, EQ-5D-Y-3L, and CHU9D Instruments for Assessing Generic Child and Adolescent Health-Related Quality of Life: A Qualitative Study. *Patient* 2025;18:523–37.
87 Stevens K. Valuation of the Child Health Utility 9D Index. *Pharmacoeconomics* 2012;30:729–47.
88 Filmer DP, Halsey F, Angrist N, *et al*. Learning-Adjusted Years of Schooling (LAYS): Defining A New Macro Measure of Education. Washington DC: World Bank Group; 2018. Available: http://documents.worldbank.org/curated/en/243261538075151093 [Accessed 17 Sep 2025].
89 Netten A, Burge P, Malley J, *et al*. Outcomes of social care for adults: developing a preference-weighted measure. *Health Technol Assess* 2012;16:1–166.
90 Skarda I, Asaria M, Cookson R. Evaluating childhood policy impacts on lifetime health, wellbeing and inequality: Lifecourse distributional economic evaluation. *Soc Sci Med* 2022;302:114960.
91 Higgins JPT, Thomas J, Chandler J, *et al*. Cochrane Handbook for Systematic Reviews of Interventions Version 6.5 (Updated August 2024). London: Cochrane, Available: www.cochrane.org/handbook

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