

Project Protocol

Promoting oral health in children: Effectiveness and safety of screening and oral health promotion programs for caries prevention

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Duration: Q1 2026 to Q4 2026 (8 PM)

Language: English (with German summary)

Background:

Oral health refers to a pain-free state of the teeth, oral cavity and jaw, which includes psychosocial aspects and allows essential functions such as speaking, eating and breathing without limitations. As such, it represents a key component of overall health [1]. Traditionally, dental health – as a disease-oriented concept – focused on the absence of oral diseases like caries and periodontitis [2]. However, despite the fact that many oral diseases are preventable, nearly half of the adult population in the European Union is affected by dental caries and periodontal disease [3]. The development of these conditions is influenced both by social determinants, including social, economic, and political conditions, as well as oral hygiene practices and dietary behaviour, particularly the consumption of foods and beverages high in free sugars [1, 3, 4].

To promote oral health, the World Health Organization (WHO) has adopted a global strategy in the form of an action plan covering the period 2023 - 2030. A central objective is to better integrate oral health into general healthcare, with a stronger focus on preventive approaches [1]. Currently, dental care remains largely centred on curative treatment [3]. The WHO recommends a package of safe and cost-effective interventions focusing on prevention, prophylaxis, and treatment programs, designed to target both individual behaviours and broader structural determinants in order to reduce the prevalence of common oral diseases such as dental caries and periodontal diseases. [1].

Evidence indicates that oral health prevention needs to start as early as childhood. Findings from a recent cohort study suggest that children with caries in their primary teeth have a significantly higher risk (2.8 times higher) of developing caries in their permanent teeth [5]. Furthermore, caries in permanent teeth is a strong predictor of future caries development [6].

As early as 1999, the WHO set the target for the European region that at least 80% of 6-year-olds should be caries-free by 2020 [7]. By 2022, this goal had only been achieved by Norway, with 81%, with 58% of caries-free 6-years old in 2024. Children, who are not caries free, have a caries experience. In a European comparison of the proportion of 5- to 7-year-olds with caries experience, Austria ranks in the upper middle range among the surveyed countries at 42%. Children are considered to have caries experience if they currently have decayed primary teeth, have had caries in the past, and/or have required treatment or extraction of primary teeth due to caries. The average level of this experience is reflected by the d3mft index, which measures caries burden by indicating the proportion of children with at least one primary tooth affected by irreversible caries [8]. The WHO set a target value of 1.5 for this index among 12-year-olds by 2020 [7]. In Austria, the current value is 1.9 [8].

The prevalence of caries experience was particularly high among children whose parents have lower levels of education, as well as among children with a migration background. Treatment was needed in 29% of children overall, rising to 51% among children with a migration background and 59% among those whose parents have a low level of education. In children and adolescents, caries is associated with pain, poor sleep quality, lower oral health-related quality of life, and poorer academic performance [9, 10] and it may also lead to nutritional deficiencies [11]. Moreover, caries in childhood has long-term effects on health in middle age [12].

The aim of the project is to think of caries prevention in childhood as a continuous process from birth onwards and to analyse key interventions across different life settings with regard to their effectiveness and safety. This includes, on the one hand, dental screening services for children up to the age of six within the healthcare system, and on the other hand, oral health promotion programs in kindergarten and school. Oral health promotion is understood as a holistic approach. The settings healthcare system as well as kindergarten and schools are systematically examined in separate but thematically interconnected sections and contextualised for Austria. Overall, the project is divided into three parts, which are addressed as follows.

Part I: Dental screening in healthcare for the prevention of caries in children up to the age of six

First Author: Julia Kern-Kim

Second Author: Aline Dragosits

Duration: Q1 2026 to Q4 2026

Background:

While caries was previously considered an infectious disease, since May 2019 it has been classified by the WHO as a non-communicable disease. This shift in classification has shifted the focus from curative treatment to preventative strategies, such as reducing sugar intake, regular teeth brushing and regular dental check-ups [13]. On average the first tooth appears at six months [14], yet only 35% of children have their first visit to the dentist by the age of two, while 41% have their first visit between the ages three and four, and 16% do not have their first visit until they are between five and six years old [15]. The question therefore arises of whether an earlier dentist visit, and therefore an earlier start of preventive examinations, could reduce the caries prevalence of children in Austria.

The Austrian Parent-child passport is intended for the provision of preventive healthcare for pregnant people and their children until the 62nd month of life [16]. It currently includes five check-ups during pregnancy and nine after the birth of the child. The first ten check-ups are a prerequisite for receiving the full amount of the childcare allowance [17]. In a further development of the Parent-child passport in 2018, a screening for dental diseases from the seventh month, including consultations on fluoride, nutrition, and oral hygiene, was recommended [18]. However, by this point, the screening has not yet been included in the Parent-child passport. An inclusion could potentially lead to an earlier identification of children requiring treatment or counselling and help prevent future caries.

Project aims:

The project aim is to provide an overview of current recommendations in international, evidence-based guidelines regarding caries prevention in children up to the age of six in the healthcare setting. Recommended screening tools, treatment pathways and involved professional groups will be derived from these recommendations. Additionally, the current evidence on efficacy, safety and accuracy will be examined.

Non-aims:

There will be no systematic review on the efficacy or safety of interventions that would result from screening.

RQ 1: What are the recommendations for screening in children from evidence-based guidelines, especially recommendations regarding professional groups involved, the setting, used screening tools and pathways.

RQ 2: What is the evidence on the efficacy, safety and accuracy of screening for caries or oral health in children up to the age of six in the healthcare setting?

Methods:

To answer the first research question, a manual online search for evidence-based guidelines will be conducted in the TRIP and G-I-N (Guidelines International Network) databases, as well as on websites of well-established guideline institutions. Guideline quality will be assessed by two authors independently with the AGREE-II tool following the methodology outlined by IQWiG. Screening recommendations as well as information on how the screening should be conducted will be extracted. Results will be synthesised narratively.

A systematic literature search for systematic reviews and HTA reports (or if necessary for primary studies) on screening interventions will be conducted in multiple databases (PubMed, The Cochrane Library, PsycINFO, Medline via Ovid, Embase, INAHTA) to answer the second research question. Title, abstract and full text screening will be done by two authors. Extraction will be conducted by one author and validated by a second author. Two authors will independently conduct the quality assessment of the included studies with established tools. Afterwards, study characteristics, efficacy, safety and information about the accuracy measurement will be extracted by one author and validated by a second. Results will be synthesised narratively.

Precise inclusion and exclusion criteria are described in the following PICO table.

Inclusion criteria (PICOS)

	Inclusion criteria
Population	Infants and children up to the age of six Exclusion: Pregnant people, children six years or older
Intervention	Caries screening/ (early) oral health examination (with or without further consultation of the legal guardian) Exclusion: Other interventions, dental treatments
Control	No screening
Outcomes	At least one of the following outcomes: RQ 1: - Recommendation for or against screening - Recommendation characteristics - Information on screening tools - Professional groups - Setting - Treatment pathways - Intervals - Methods - Etc. RQ 2: - Efficacy outcomes, e.g. - Presence of caries (dmf-t-index), - Caries stage (ICDAS) - Dental restoration - Oral health-related quality of life (measured with a validated tool, e.g. ECOHIS), - Safety (any reported safety outcomes that could result from screening such as false negative or positive tests, overdiagnosis, unnecessary treatments, long waiting times because of false positive tests, anxiety/uncertainty) - Screening accuracy - Diagnostic accuracy (e.g. sensitivity, specificity, reliability, etc.) Exclusion: Outcomes assessing cost effectiveness
Setting	Health care, for example primary care, paediatricians, dentists, other relevant non-medical professionals ... etc. Exclusion: Setting Kindergarten and primary school Rationale: Since the implementation of a screening is specifically considered in the Austrian parent-child-passport only healthcare settings are of interest.
Study design	Research question 1: Evidence based guidelines Research question 2: Systematic reviews, HTA-reports (If possible, update of a systematic review or inclusion of primary studies)
Countries	Europe, North America, Australia, New Zealand
Languages	German/English Exclusion: Other languages
Publication period	Systematic reviews (or primary studies): 2016-2026 Evidence based guidelines: 2021-2026 (or confirmation that the guideline is still valid and up to date) Exclusion: Research question 2: If primary studies are included, exclusion of case series or retrospective studies

Note: ^a Primary studies will be used to answer research question 2, if not enough or no high-quality systematic reviews of HTA reports are identified.

Part II: Oral health promotion programmes for caries prevention in children in kindergarten and primary school

First Author: Aline Dragosits

Second Author: Julia Kern-Kim

Duration: Q1 2026 to Q4 2026

Background:

Although the proportion of caries-free children in Austria is increasing, the WHO-defined target of 80% caries-free children by 2020 is still far from being achieved with a value of 58%. Although the target has already been formulated for 2020, no new target has been formulated by the WHO yet. The Austrian Oral Health Survey

further shows that in 2023/2024, 90% of first-graders consume sweets daily or several times a week, and 57% consume sugar-sweetened beverages daily or several times a week [8]. In Austria, oral health promotion and prophylaxis programs are offered for children. The design and implementation of these programs is the responsibility of the respective federal states and varies in terms of availability and structure [19]. The proportion of caries-free children aged six to seven also varied by federal state in 2023/2024, being highest with 72% in Tyrol to 46% in lowest with 46% in Lower Austria [8].

Project aims:

The aim of this project is to analyse the current evidence on the effectiveness and safety of oral health promotion programs for caries prevention in kindergarten and primary school. The focus is on identifying and evaluating key program characteristics that are associated with greater health benefits.

Note: An assessment of the cost-effectiveness of the oral health promotion programs is considered but cannot be implemented within the current available project capacities. The project objectives, research questions and methodological approaches for the cost-effectiveness evaluation will therefore be outlined in more detail in a separate protocol.

Non-aims:

- It is not the aim of this project to evaluate the existing caries prevention programs in Austria
- Medical caries prophylaxis: no analysis of dental care services such as fissure sealants

Research questions (RQ):

RQ 1: Which oral health promotion programs for caries prevention in kindergartens and primary schools can be identified from the literature, and what are their key characteristics/scope?

RQ 2: How effective and safe are oral health promotion programs for caries prevention in kindergartens and primary schools in comparison to one another with regard to health-relevant outcomes?

Methods:

To answer the first research question a manual online search for evidence-based guidelines will be conducted in the TRIP and G-I-N (Guidelines International Network) databases, as well as on websites of well-established guideline institutions. Guideline quality will be assessed by two authors independently with the AGREE-II tool following the methodology outlined by IQWiG. Key characteristics of oral health promotion programs for caries prevention will be extracted and the findings will be described narratively.

Furthermore, to address the first and, in particular, the second research question, a systematic literature search for systematic reviews and HTA reports (and/or primary studies) will be conducted. Inclusion and exclusion criteria for the literature search will be defined using the PICO framework. Based on these defined criteria, relevant databases (PubMed, The Cochrane Library, PsycINFO, Medline via Ovid, Embase, INAHTA) will be systematically searched. The identified studies will be screened by two authors each, after which the included reviews will be extracted by one author and checked by a second. The quality of the studies will be assessed by two authors each using established appraisal tools. Following the literature selection, information from the relevant literature will be extracted, summarised in pre-structured tables, and narratively synthesised.

The precise inclusion and exclusion criteria for the literature covering both research questions are listed in the following PICO table.

Inclusion criteria (PICO):

	Inclusion criteria
Population	Addressees of the intervention (e.g., children in kindergarten and primary school settings, nursery staff, teachers) Exclusion: Children in other settings (e.g., healthcare), children aged 11 and above
Intervention	Community-based oral health promotion interventions (e.g., those contributing to caries prevention)
Comparison	Interventions compared to each other
Outcomes	Including but not limited to, and at least one of the following outcomes: RQ 1: ■ Key characteristics, such as components and duration of the intervention, as well as relevant professional staff or materials of oral health promotion programs for caries prevention RQ 2: Primary oral health outcomes

	Inclusion criteria
	■ Caries burden (dmft/DMFT-Index) ■ Caries-free children ■ Plaque- and gingivitis-Parameter ■ Periodontitis prevalence Secondary oral health outcomes ■ Oral health literacy ■ Oral health behaviour ■ Oral health attitudes Safety (any reported safety endpoints, e.g., avoidable hospital admissions, age- and risk-group-appropriate use of active ingredients, e.g., in fluoridation measures, avoidable orthodontic interventions, articulation disorders, Turner's teeth, nutritional deficiencies, days absent due to toothache) <i>Rationale:</i> Based on existing literature
Setting	Kindergarten and primary school <i>Rationale:</i> Existing structure in place <i>Exclusion:</i> Healthcare settings, e.g., primary care, paediatrics Parent-child facilities
Publication type	RQ 1: ■ Guidelines & published position- and consensus papers ■ Reviews RQ 2: Systematic reviews (in descending order of priority) based on ■ Systematic reviews, meta-analyses, HTA-reports (preferred) ■ Primary studies (alternative) <i>Rationale:</i> A "best-evidence approach" is applied to study selection, whereby current and methodologically well-conducted systematic reviews (as assessed by GRADE) are preferentially considered, while attention is paid to the transferability of findings. Although systematic reviews and RCTs represent the methodological gold standard, they may have limited informative value at the population level, as they do not reflect a real-world setting. Furthermore, caries prevention interventions are rarely implemented in isolation but are instead introduced as packages of measures. For this reason, these reviews will be supplemented by primary studies where necessary.
Countries	Countries with a comparable healthcare infrastructure and socioeconomic status to Austria (Global North [20]) <i>Rationale:</i> Social determinants as well as dietary habits have a significant influence on oral health
Languages	German/English <i>Exclusion:</i> Other languages
Publication period	Since 2016

Part III: Contextualisation for Austria

Research question:

What recommendations regarding the prevention of caries can be derived for the Austrian context based on the results of the first two parts of the report?

Method:

To answer the research question, recommendation for action in Austria will be discussed based on the findings of the first and second project part.

Timetable:

Period	Tasks
Q1/Q2 2026	Scoping and finalisation of the project protocol
Q2 2026	■ Systematic and manual literature search ■ Literature selection
Q2/Q3 2026	Data extraction and quality appraisal
Q2/Q3 2026	Writing
Q3/Q4 2026	Internal and external review

Period	Tasks
Q4 2026	Layout & publication

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