Developing, validating and using a national quality of care indicator for early childhood oral health

Country: Malaysia

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Country snapshot

Malaysia has prioritized preventive oral health as a core component of its public health agenda, with particular emphasis on children in the early years of life. Poor oral health in early childhood is associated with long-term consequences for health, wellbeing and service utilization, making early detection and prevention a critical policy concern.

The Oral Health Programme of the Ministry of Health Malaysia (OHP MoH) is responsible for the planning, delivery and monitoring of public-sector oral health services nationwide. As part of its mandate, OHP MoH has invested in digital health infrastructure, clinical standardization and quality assurance mechanisms to improve service effectiveness and accountability across all levels of care.

This learning brief describes Malaysia's experience in establishing and operationalizing a national quality of care (QoC) indicator to assess oral health outcomes among children under five years of age, offering practical insights and adaptable strategies for similar initiatives in other settings. The initiative was led by the Oral Health Programme of the Ministry of Health Malaysia, with technical contributions from the Institute for Health Systems Research (IHSR) and oversight through national quality assurance mechanisms. Implementation spans national, state, district and facility levels and is fully supported by dental digital infrastructure.

Rationale for developing the indicator

Early childhood caries remains a prevalent and persistent public health issue in Malaysia. Dental caries in young children can lead to pain, infection, impaired nutrition and reduced quality of life, while also increasing future treatment needs and health system costs. Evidence consistently shows that children who maintain a caries-free mouth in early childhood are more likely to sustain good oral health into adulthood.

The development of a national indicator was driven primarily by strategic policy objectives. Malaysia's National Oral Health Strategic Plan (NOHSP) 2022–2030 established a national impact target of achieving at least 50% caries-free five-year-olds by 2030, a substantial increase from the national baseline of 28.7% reported in 2015. Monitoring progress towards this target requires a reliable, standardized and routinely available measure.

Additional motivations included the need to strengthen programme monitoring and evaluation, ensure alignment with the National Indicator Approach (NIA) under the Quality Assurance Programme, and capitalize on the availability of comprehensive routine clinical data through the Dental Information System (DIS). Importantly, the indicator needed to be feasible to implement without imposing additional reporting burden on frontline dental personnel.

Indicator scope and definition

Malaysia developed a national outcome-oriented QoC indicator to measure the effectiveness of preventive oral health services for young children. The indicator is defined as:

Percentage of children aged < 5 years who are examined and found to be caries-free (dmft = 0).

The indicator captures children's oral health status at their first dental examination in the reporting year and is classified under the "effectiveness" dimension of quality. It reflects the outcome of preventive interventions, early engagement with oral health services and parental awareness.

- Numerator: Number of children below five years with caries-free mouth
- Denominator: Total number of new attendances of children below five years

Clinical data are entered daily by dental personnel at Ministry of Health facilities using the DIS:Clinical subsystem. While data capture occurs in real time, aggregation and analysis are conducted on a semi-annual basis to support programme monitoring, planning and review.

How the indicator was developed

Stakeholder engagement and governance arrangements

Stakeholder engagement was embedded throughout the process. OHP MoH worked closely with oral health personnel at state and facility levels to ensure that the indicator was clearly defined, technically sound and operationally feasible.

Formal engagement mechanisms included deliberations through the National Quality Assurance Programme Committee and the Quality Assurance Technical Committee, chaired respectively by Deputy Director General of Health (Research & Technical Support) and the Director of IHSR. These committees provided structured platforms to review the indicator's conceptual basis, assess feasibility, and ensure consistency with national service delivery priorities.

Expert input was provided by Dental Public Health Specialists operating at national, state and district levels. Their involvement ensured that the indicator reflected clinical realities, adhered to professional standards and aligned with population oral health priorities. Stakeholder engagement also incorporated literature review and benchmarking against international oral health measurement frameworks to strengthen scientific credibility.

Methodological approach

Indicator development followed Malaysia's National Indicator Approach, aligned with the strategic objectives of the NOHSP 2022–2030. The indicator was assessed and prioritized using the SIFA selection criteria –Scientific Soundness, Importance, Feasibility and Actionability which evaluate its validity, relevance, practicality and usefulness for informing action.

Scientific soundness was ensured using the dmft index, a globally recognized and widely applied measure of dental caries experience. Importance and relevance were established by the high burden of early childhood caries and the indicator's direct link to national policy targets. Feasibility was supported by the routine availability of required data elements within DIS:Clinical, while actionability was demonstrated by the indicator's ability to inform preventive strategies, outreach planning and service improvement.

From a practical perspective, the indicator was designed to integrate seamlessly into existing clinical workflows. Required variables such as age, attendance type and dmft score were already captured as part of routine dental examinations, allowing analysis without additional tools or parallel reporting systems.

Validation of the indicator

A comprehensive and multi-faceted validation process was undertaken to ensure reliability, consistency and credibility.

The indicator's foundation in the internationally recognized dmft index provided an initial level of validation and supported international comparability. Conceptual validation was strengthened through reference to WHO guidance, particularly Oral Health Surveys: Basic Methods (5th Edition), which endorses the dmft = 0 criterion for defining caries-free status.

Expert validation was conducted through iterative review by Dental Public Health Specialists at all levels. National consultations through the Quality Assurance Technical Committee allowed refinement of definitions and confirmation of feasibility within routine service delivery. To address variability in clinical assessment, calibration and standardization exercises were routinely conducted for dental personnel involved in caries diagnosis, reducing inter-examiner variation and diagnostic drift.

Additional validation mechanisms included regular clinical audits of patient records and examinations, structured data entry through predefined coding fields in DIS:Clinical, and ongoing end-user feedback to identify and address implementation challenges.

Integration into the health information system

The indicator is fully embedded within the DIS:Clinical subsystem of Malaysia's Dental Information System. DIS:Clinical serves as the national electronic clinical record for all Ministry of Health dental clinics and uses standardized data fields to ensure consistency across facilities.

The system automatically generates performance reports at clinic, district, state and national levels. These reports are analyzed and evaluated semi-annually and form part of routine performance monitoring under the National Indicator Approach and the NOHSP implementation framework.

Capacity-building and implementation support

Capacity-building activities were integral to successful implementation. Training focused on improving diagnostic consistency, strengthening data entry practices and reinforcing understanding of indicator definitions and purpose. Continuous mentorship by supervisors supported competency development and adherence to standard operating procedures.

A dedicated indicator dictionary was developed and disseminated nationwide, providing clear operational definitions and serving as a reference for all dental officers, dental therapists and dental surgery assistants. These efforts strengthened data quality, supported loop closure and promoted consistent use of indicator data for quality improvement.

Use of indicator data across the health system

The indicator is actively used at national, subnational and facility levels. At national level, it contributes to monitoring progress under the National Indicator Approach and the NOHSP 2022–2030. At state and district levels, it is incorporated into annual plans of action and performance reviews. At facility level, it supports local quality improvement discussions and service planning.

Indicator findings have informed expanded collaboration with private dental practitioners and external agencies to increase outreach and service coverage for children under five, particularly in early childhood care settings.

What changed: early results and observed value

In Malaysia, improvements in oral health status are reflected through service utilisation and sustained outreach efforts, particularly among children under five years of age. These efforts are implemented through the Ministry of Health's Early Childhood Oral Healthcare Programme, which has strengthened early prevention and health promotion, improved access to oral healthcare services for toddlers, and supported progress towards a cavity-free future.

To further support and expand this programme, several targeted strategies have been implemented. These include maximising the mobilisation of dental therapists to enhance service coverage for toddlers, as well as initiatives to engage Maternal and Child Health (MCH) personnel to improve referral workflows and embed dental check-ups within routine well-child appointments. Efforts have also been strengthened to engage childcare providers by training them to conduct daily toothbrushing drills, embedding toothbrushing as a routine practice, and providing guidance on reducing sugary dietary intake.

The proportion of children under five receiving oral health services increased from 11.25% in 2020 to 23.98% in 2024. Engagement with nurseries and kindergartens expanded substantially, and collaboration with external agencies increased, contributing to broader reach of preventive services. The G-TOD programme, which involves engagement with private dental practitioners for toddler oral healthcare, has further strengthened service delivery, with a total of 6,360 children screened under the programme.

These trends suggest improved access to early childhood oral healthcare and a greater system focusing on prevention, supported by systematic use of indicator data. Overall, these efforts are aligned with the strategic

directions outlined in the National Oral Health Policy, Health White Paper, as well as Sustainable Development Goals (SDGs), particularly Universal Health Coverage (UHC).

Challenges and how they were addressed

During development, challenges included ensuring consistent interpretation of indicator definitions and integrating measurement into existing systems without increasing workload. These were addressed through standardized guidance, digital integration and ongoing engagement with service providers.

Validation challenges included data entry errors and variability in diagnostic practices. Continuous training, periodic competency assessments, calibration exercises and routine audits were implemented to mitigate these risks and strengthen reliability.

Key lessons for other countries

Key lessons include the importance of clear operational definitions, robust digital data systems, sustained stakeholder engagement and continuous capacity-building. Routine data can support meaningful outcome measurement when supported by standardization, validation and feedback mechanisms.

> ***What would you do differently?***
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> *The indicator was initially identified through a centrally driven process. Greater involvement of district- and facility-level personnel at earlier stages could have enhanced ownership, contextual relevance and sustainability. Future indicator development efforts may benefit from a more explicitly bottom-up design approach.*

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