

Integrating evidence-based dentistry within a public dental program for children

Mr Tan Nguyen, Professor Hanny Calache, Dr Utsana Tonmukayakul, Ms Sue McKinlay, and Dr Lily Milczarek-Todorovska

The International Caries Classification and Management System (ICCMS) integrates the Minimal Intervention Dentistry (MID) philosophy in a combined caries risk assessment and dental caries management plan. There is evidence that dental clinical practice guidelines^{1, 2} and motivational interviewing^{3, 4, 5, 6, 7} improved health outcomes. Based on a systematic review, there was moderate to high quality evidence that continuing professional development (CPD) programs improve patient outcomes; multimethod and multiphased CPD has potential for the greatest impact.⁸

Peninsula Health is a Victorian community dental agency that provide public dental services at four sites. In 2017, as part of the quality assurance project (funded by the Alliance for a Cavity Free Future, 2016), the Carrum Downs, Rosebud, and Hastings sites were chosen as the intervention group, while the Frankston site was selected as the standard care site (control group). The target group were children from families who are socially disadvantaged or on low incomes. All children aged 0-12 years receiving dental services at Peninsula Health were participants for the intervention and control groups. Dental practitioners working in Carrum Downs, Rosebud, Hastings received professional development training on MID and ICCMS; dental practitioners working in Frankston did not receive the intervention.

A two-stage clinical record audits of participants collected information on dental item codes billed for dental services for the 12-month pre- and 12-month post-intervention follow-up. To date, the 12-month pre- and 6-month post-intervention data has been collected and statistically analysed. The total number of children included in the analysis was 2,210 in the intervention group, and 2,012 in the control group. Clinical services were benchmarked against oral disease prevalence among children. The proportion of children aged 5-10 years for any dental caries experience was 41.7%, and the proportion of children with gingivitis was 21.8%.⁹ A summary of the suggested performance benchmark is shown in Table 1 for a 12-month period.

Using the MID philosophy to emphasise preventive approaches to dental caries management, it was anticipated with short-term evaluation, that dental practitioners receiving training on MID and ICCMS would provide statistically more frequent preventive dental services and minimally invasive clinical techniques. Two-sample proportions tests determined whether there is statistical significant difference between the intervention and control groups on outcomes related to preventive and restorative procedures. Data were analysed using Microsoft Excel 2016, and software packages Stata IC Version 12 and TreeAge Pro 2018.

Dental Service Activity	Benchmark	Indicators of Performance
Periodic Oral Exam*	142	Benchmark Met
Dental Radiographs	42	Benchmark Met
Prophy/Scale	22	Benchmark Met
Topical Fluoride Application*	142	Benchmark Met
Dietary Advice	42	Benchmark Met
Oral Hygiene Instructions	42	Benchmark Met
Fissure sealants	n/a	Increased from Baseline
Dental extractions	n/a	Decreased from Baseline
Dental restorations	n/a	Decreased from Baseline

n/a = not applicable

*It was assumed 42% of children with a history of dental caries experience would be at high risk for dental caries and should have this type of dental service every six months.

An economic evaluation was performed using the decision-tree analysis from the health service perspective. Dental item codes billed are allocated Dental Weighted Activity Unit Value (DWAU) to measure clinical productivity. Cost measures are based on fee charges from the Child Dental Benefits Schedule. Dental outcomes are measured using Quality Adjusted-Tooth Years (QATY) gained (assuming tooth was decayed and requiring either removal of the tooth or restoration), and the

combined deciduous and permanent Decayed, Missing and Filled Teeth prevented (DMFT-prevented) index. It was assumed for the intervention and control group, the average time spent per child for clinical dental services was the same. The DWAU, cost (\$A), QATY-gained and DMFT-prevented were calculated as an average per child. Figure 1 illustrates the number of clinical dental services per 100 persons, which were compared against the suggested performance benchmarks (Table 1).

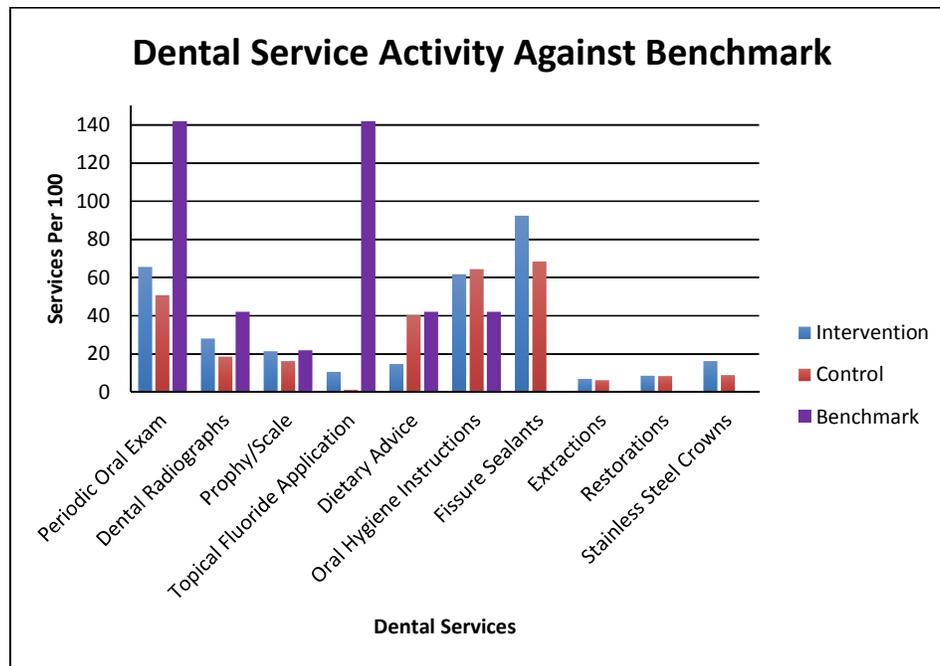


Figure 1 Clinical services provided compared against performance benchmarks.

For QATY gained outcome, the intervention was more productive (DWAU and \$A) and more clinically effective. For DMFT-prevented outcome, the intervention was costlier from a government funding perspective and less clinically effective. Based on other research work, using DMFT-prevented outcomes may not be an appropriate outcome measure to use in health economic evaluations.

In summary, the results of this study indicate that a one-day professional development program on MID can influence dental practitioners to deliver more MID orientated clinical services over a 6-month period.

References

1. Lee, G., McGrath, C., & Yiu, C., 'Evaluating the impact of caries prevention and management by caries risk assessment guidelines on clinical practice in a dental teaching hospital', *BMC Oral Health*, vol. 16, no. 58, pp. 1-7, 2016.
2. Clark, R., Tonmukayakul, U., Mangan, Y., Smith, M., Gussy, M., Manton, D., Bailey, D., Calache, H. Measuring adherence to evidence-based clinical practice guidelines. *Journal of Evidence Based Dental Practice*, vol. 17, pp. 301-309, 2017.
3. Resnicow, K., McMaster, F., Bocian, A., Harris, D., Yan, Z., Snetselaar, L., et al., 'Motivational Interviewing and Dietary Counseling for Obesity in Primary Care: An RCT', *Pediatrics*, vol. 135, no. 4, pp. 649-657, 2015.
4. Cascaes, A.M., Bieleman, R.M., Clark, V.L., & Barros, A.D., 'Effectiveness of motivational interviewing at improving oral health: a systematic review', *Revista De Saúde Pública*, vol. 48, no. 1, pp. 142-153, 2014.
5. Weinstein, P., Harrison, R., & Benton, T., Motivating mothers to prevent caries: Confirming the beneficial effect of counselling, *Journal of the American Dental Association*, vol. 137, no. 6, pp. 789-793, 2006.
6. Gao, X., Lo, E.C., Kot, S.C. & Chan, K.C. Motivational Interviewing in Improving Oral Health: A Systematic Review of Randomized Controlled Trials. *Journal of Periodontology*, 2014, vol. 85, pp. 426-437.

7. Kopp, S.L., Ratka-Krueger, P., Woelber, J.P., & Ramseier, C.A. Motivational Interviewing As an Adjunct to Periodontal Therapy-A Systematic Review, *Frontiers in Psychology*, vol. 8, 279.
8. Firmstone, V.R., Elley, K.M., Skrybant, M.T., Fry-Smith, A., Bayliss, S., & Torgerson, C.J., 'Systematic Review of the Effectiveness of Continuing Dental Professional Development on Learning, Behavior, or Patient Outcomes', *Journal of Dental Education*, vol. 77, no. 3, pp. 300-315, 2013.
9. Do, L.G. and Spencer, A.J. (eds) (2016). *Oral health of Australian children: The National Child Oral Health Study 2012–14*. University of Adelaide Press, Adelaide.