



Economic Burden of Childhood Caries: Cost analysis of national nursery toothbrushing programme

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Aim

A recent study has shown an improvement in the dental health of Scottish five-year-olds was associated with the uptake of nursery toothbrushing¹. The aim of this study was to compare the cost of providing the Scotland-wide nursery toothbrushing programme with the associated National Health Service (NHS) expected cost savings from an improvement in dental health of five-year-old children: namely, cost savings through avoided dental extractions, fillings and potential treatments for decay.

Methods

- 1) Cost estimates of the nursery toothbrushing programme in 2011/12 financial year were requested from the 14 Scottish Health Boards. This included: staff salaries, transport and travel, administration/office costs, staff training and toothbrushing resources.
- 1) Unit costs of a filled, extracted and decayed deciduous tooth were calculated in 2009 GBP (£) using verifiable sources of information.
- 2) The total costs associated with actual and anticipated dental treatments were estimated for the period from 1999/00 to 2009/10. These costs were calculated based on the unit costs above and using data from the National Dental Inspection Programme (multiple cross-sectional dental epidemiology surveys, which included 62,419 five-year-old children, covering 11.0% to 23.2% of the relevant population in various years) extrapolated to the population level.
- 3) Expected cost savings (avoided costs of dental treatments) were calculated for each of the subsequent years in comparison with the estimated dental treatment costs in 2001/02, the year when the nursery toothbrushing programme was rolled-out nationally (baseline).

Results

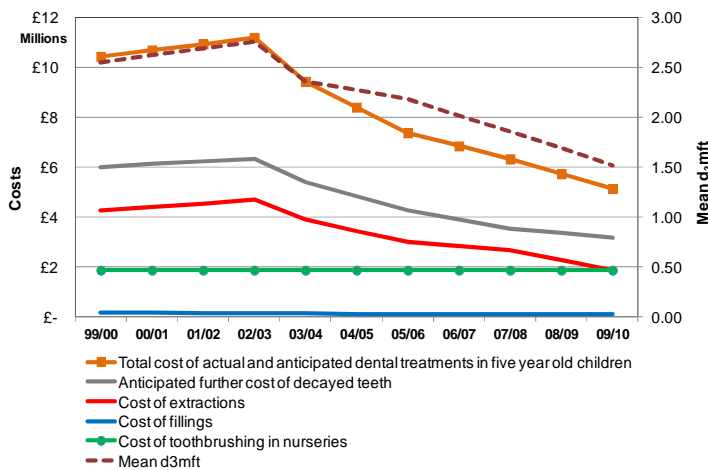
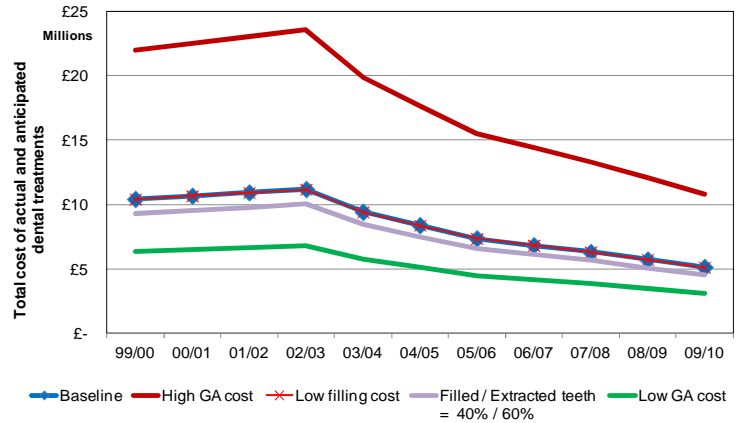


Fig 1: Costs of actual and anticipated dental treatments in five-year-old children, cost of nursery toothbrushing programme and d₃mft over time (baseline scenario) – Scotland, 1999/00-2009/10 financial year

[1] Macpherson, L.M.D., et al., *National supervised toothbrushing program and dental decay in Scotland*. J Dent Res, 2013. 92(2): p. 109-113.
[2] HMRC, Average Exchange Rates for 2009/10 financial year: <http://www.hmrc.gov.uk/exrate/exchangerates-0910.pdf> (£1 = €1.1298)



Costs	Scenario				
	Baseline	Low GA cost	High GA cost	Low filling cost	Different filled / extracted teeth ratio
Filled tooth	£8.84 (€9.99) ²	£8.84 (€9.99)	£8.84 (€9.99)	£8.25 (€9.32)	£8.84 (€9.99)
Decayed tooth	£55.71 (€62.94)	£33.89 (€38.29)	£117.87 (€133.17)	£55.71 (€62.94)	£45.44 (€51.34)
Tooth extraction under local anaesthetic (LA)	£14.33 (€16.19)				
Tooth extraction under general anaesthetic (GA)	£653.26 (€738.05)	£393.22 (€444.26)	£1,393.89 (€1,574.82)	£653.26 (€738.05)	£653.26 (€738.05)
	Ratio of filled to extracted 'treated' decayed teeth = 26% / 74%				Ratio of filled to extracted teeth = 40% / 60%

Fig 2: Sensitivity analysis: total cost of actual and anticipated dental treatments

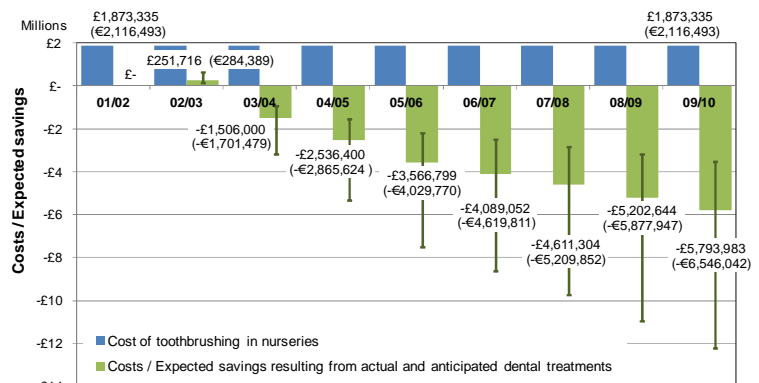


Fig 3: Cost of nursery toothbrushing programme and costs / expected savings resulting from actual and anticipated dental treatments – in comparison with 2001/02 dental treatment costs

The whiskers represent costs / expected savings resulting from actual and anticipated dental treatments in the case of 'low' and 'high' cost scenarios, depending on the cost of a tooth extraction under general anaesthesia.

Conclusions

The NHS costs associated with the actual and anticipated dental treatments for five-year-old children decreased dramatically over time, with the findings suggesting that within three years the expected cost savings (freed-up resources) outweighed the costs of implementing the toothbrushing programme and by eight years the expected cost savings were in excess of three times these costs. These expected resource savings were associated with the national roll-out of the nursery toothbrushing programme and an improvement in children's oral health. **In economic terms the toothbrushing programme therefore represents a 'win win' scenario being associated with reduced costs and gains in child oral health outcomes.**