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 toothbrushing. 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.
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 22,419 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 \(d_{3mft}\) over time (baseline scenario) – Scotland, 1999/00-2009/10 financial year

| Costs / Expected savings resulting from actual and anticipated dental treatments
| Scenario | Baseline | Low GA cost | High GA cost | Low filling cost | Different filled / extracted teeth ratio
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<td>Total cost of actual and anticipated dental treatments</td>
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<td>Cost of toothbrushing in nurseries</td>
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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

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.

References