THE ECONOMIC ASSESSMENT OF WATER FLUORIDATION IN SOUTH AFRICA AND ITS IMPACT ON HUMAN RESOURCES AND ORAL HEALTH SERVICE DELIVERY

by

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I, Jeroen Kroon, declare that the thesis, “THE ECONOMIC ASSESSMENT OF WATER FLUORIDATION IN SOUTH AFRICA AND ITS IMPACT ON HUMAN RESOURCES AND ORAL HEALTH SERVICE DELIVERY”, which I hereby submit for the degree Philosophiae Doctor at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

Jeroen Kroon
April 2008
SUMMARY

THE ECONOMIC ASSESSMENT OF WATER FLUORIDATION IN SOUTH AFRICA AND ITS IMPACT ON HUMAN RESOURCES AND ORAL HEALTH SERVICE DELIVERY

by

JEROEN KROON

Supervisor: Professor PJ van Wyk
Department: Community Dentistry
Degree for which the thesis is submitted: Philosophiae Doctor

Water fluoridation has been confirmed by three recent reviews as one of the most cost-effective and safe primary preventive measure against dental caries. Despite this evidence no artificially fluoridated water scheme exists in South Africa. The economic impact of water fluoridation in times of a reduction in dental caries should be weighed against its benefits. A minimum package of oral care has been proposed for implementation in the public oral health services. Irrespective of the implementation of water fluoridation and/or a minimum package or oral care, it will impact on the required oral health human resources.

The aim of this study was to investigate the economic viability of the implementation of water fluoridation and the delivery of the minimum package of oral care and the impact this will have on human resources planning for oral health in South Africa.

Computerised simulation models were developed for this study. Per capita cost, cost-effectiveness and cost-benefit of the implementation of water fluoridation was calculated for seventeen major metropolitan cities, towns and water boards in South Africa. Treatment need data was converted to a per capita cost to express the delivery of the minimum package of oral care as a monetary value. The World Health Organization/Fédération Dentaire Internationale and a “Service Targets
Method” model were used to calculate the oral health human resources required to deliver the minimum package of oral care.

The average per capita cost of water fluoridation for the total population is R2.08. At an anticipated 30% caries reduction achieved with water fluoridation, average cost-effectiveness is R33.16 and cost-benefit was calculated as 0.18. Cost-benefit equals or exceeds 0.8 for only three municipalities or water boards at an anticipated 10% caries reduction as a result of the implementation of water fluoridation.

The average per capita cost to provide the minimum package of oral care is R245.95 without the impact of water fluoridation and R186.03 at an anticipated 30% caries reduction due to water fluoridation.

Oral hygienists represent more than 50%, dental therapists between 30 to 40% and dentists less than 10% of the total oral health human resources required to deliver the minimum package of oral care. At an anticipated caries reduction of 30% due to the introduction of water fluoridation, the number of dentists required decrease by 29%, dental therapists between 27.5 and 29.8% and oral hygienists between 2.1 and 10.5%. This converts to a saving in salaries of R14,8 million per year.

It is recommended that water fluoridation remains a viable option for South Africa, even if only a 10% caries reduction as a result of its introduction is achieved. All provinces should actively pursue the introduction of the minimum package of oral care with appropriate modes of delivery by creating a number of posts as well as incentives to attract especially oral hygienists and dental therapists to the public service. The impact of the introduction of water fluoridation on human resources should always be considered in planning the number of oral health professionals to be trained.
“Your biggest break can come from never quitting. Being at the right place at the right time can only happen when you keep moving toward the next opportunity.”

Arthur Pine

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*Soli Deo Gloria*
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<tbody>
<tr>
<td>ANC</td>
<td>African National Congress</td>
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<tr>
<td>ART</td>
<td>Atraumatic Restorative Technique</td>
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<tr>
<td>BER-BCI</td>
<td>Bureau for Economic Research’s Building Cost Index</td>
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<tr>
<td>CBA</td>
<td>Cost-benefit analysis</td>
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<tr>
<td>CCS</td>
<td>Compulsory Community Service</td>
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<tr>
<td>CEA</td>
<td>Cost-effectiveness analysis</td>
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<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>CPI</td>
<td>Community Periodontal Index</td>
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<tr>
<td>CPITN</td>
<td>Community Periodontal Index of Treatment Need</td>
</tr>
<tr>
<td>CSIR</td>
<td>Council for Scientific and Industrial Research</td>
</tr>
<tr>
<td>CSS</td>
<td>Central Statistics Service</td>
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<tr>
<td>DASA</td>
<td>Dental Association of South Africa</td>
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<tr>
<td>dmft/DMFT</td>
<td>decayed, missing and filled teeth</td>
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<td>FDI</td>
<td>Fédération Dentaire Internationale</td>
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<tr>
<td>FTE</td>
<td>Full-time equivalents</td>
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<td>GDC</td>
<td>General Dental Council</td>
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<td>HPCSA</td>
<td>Health Professions Council of South Africa</td>
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<tr>
<td>IADR</td>
<td>International Association for Dental Research</td>
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<td>JFIC</td>
<td>Joint Fluoridation Implementation Committee</td>
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<td>MEDUNSA</td>
<td>Medical University of Southern Africa</td>
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<td>MRC</td>
<td>Medical Research Council</td>
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<td>NAMDA</td>
<td>National Medical and Dental Association</td>
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<td>NCOHS</td>
<td>National Children’s Oral Health Survey</td>
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<td>NFC</td>
<td>National Fluoridation Committee</td>
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<td>Acronym</td>
<td>Description</td>
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<tr>
<td>NHRP</td>
<td>National Human Resources Plan for Health</td>
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<td>NOHS</td>
<td>National Oral Health Survey</td>
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<tr>
<td>NRPL</td>
<td>National Reference Price List</td>
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<tr>
<td>PHC</td>
<td>Primary Health Care</td>
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<td>ppm</td>
<td>parts per million</td>
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<td>SAAWU</td>
<td>South African Association of Water Utilities</td>
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<td>SADA</td>
<td>South African Dental Association</td>
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<td>SADJ</td>
<td>South African Dental Journal</td>
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<tr>
<td>SALGA</td>
<td>South African Local Government Association</td>
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<td>SAMDC</td>
<td>South African Medical and Dental Council</td>
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<td>STATOMET</td>
<td>Bureau for Statistical and Survey Methodology</td>
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<td>UPFS</td>
<td>Uniform Patient Fee Schedule</td>
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<td>United States of America</td>
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