

Water fluoridation, dental health and links to general health

National Centre for Farmer Health

13 October 2010

Dr Andrew Neil (BDSc MPH)
Environmental Health Unit

Overview

Introduction

The burden of oral disease

Links between oral and general health

Water fluoridation

Measures to reduce dental decay

Oral health advice for people not on reticulated supplies

The burden of oral disease

In 1940's and 50's, Australia had one of the highest rates of dental decay in the world

Since this time, Australia has been a world leader in successfully reducing dental decay, primarily due to fluoride

Despite these achievements, dental decay is still Australia's most prevalent health problem

The burden of oral disease

*Despite significant improvements in the oral health of children in the last 20-30 years, there are persistent high levels of oral disease and disability among Australian adults. Poor oral health in this country is most evident among Aboriginal and Torres Strait Islander peoples, people on low incomes, **rural and remote populations**, and some immigrant groups from non-English speaking background, particularly refugees*

(Healthy mouths health lives: Australia's National Oral Health Plan 2004-2013)

The burden of oral disease

People living outside capital cities experience more missing teeth and more untreated dental decay

(AIHW, 2007. *Australia's dental generations: The National Survey of Adult Oral Health 2004-06*)

More than 40,000 Australians a year are hospitalised for preventable dental conditions. Over 26,000 are under 15 years who are being given a general anaesthetic for dental fillings and extractions

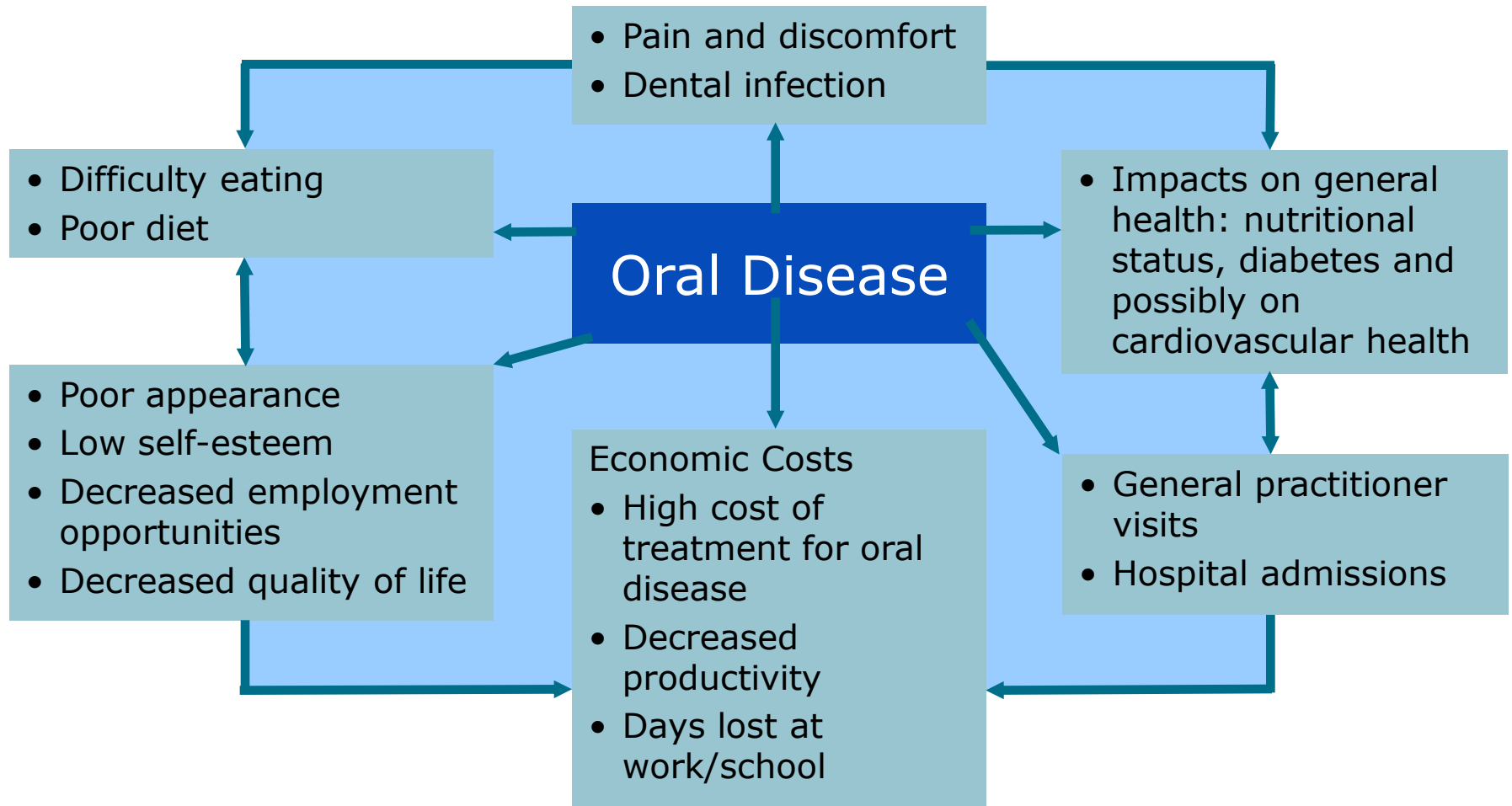
(AIHW, 2008 *Australian hospital statistics 2006-07*. Health Services Series, no. 31).

The burden of oral disease

In non-fluoridated areas of Victoria, twice as many children per capita required a general anaesthetic in hospital for treatment of dental decay

(Department of Health, 2008, unpublished)

Links between oral and general health



Links between oral and general health

Dental decay and gum disease directly impacts upon diet and nutritional status

Likely impact of gum disease reducing ability to maintain stable blood sugar levels in diabetes

Association between gum disease and heart disease

Association between gum disease and pre-term births

Water fluoridation

Water fluoridation is the adjustment of fluoride in drinking water to a level that helps protect teeth against dental decay in all age groups

Water fluoridation

In Victoria, the level of fluoride in fluoridated drinking water is 1mg/L or 1 part per million

Standard fluoride toothpaste is 1000mg/L (1000ppm)

Children's toothpaste is 400-550mg/L (400-550ppm)

Water fluoridation research

Water fluoridation is one of the ten great public health achievements of the 20th century

CDC, 1999. Achievements in public health, 1900-1999. *Morbidity and Mortality Weekly Report* 48 (41): 933-940

Fluoridation of drinking water remains the most effective and socially equal way of providing all community members with the benefits of fluoride

NHMRC, 2007: *A Systematic Review of the efficacy and safety of fluoridation.*

Water fluoridation research

In 2008, the effectiveness of water fluoridation on children's dental health across four Australian States (QLD, VIC, TAS and SA) was studied

Dental data from over 16,800 children were examined, including more than 4,000 Victorian children

Armfield, Spencer, Roberts-Thomson and Slade, 2008. *Lifetime exposure to water fluoridation and child experience*. Presented at the 86th General Session and Exhibition of the International Association for Dental Research, Toronto, Canada.

Water fluoridation research

The study also considered a number of other factors:

- tooth brushing history
- use of other fluoride products
- water and food consumption
- use of infant formula
- socioeconomic status.

Water fluoridation research

5-6 year old children → optimal water fluoridation →
50% less dental decay in their baby teeth

12-13 year old children → optimal water fluoridation →
38% less dental decay in their adult teeth

Water fluoridation in Victoria in 2004



Water fluoridation in Victoria in 2010

Legend:

- Towns with water fluoridation
- Towns without water fluoridation
- Natural fluoride in the water

Map Labels (Towns and Years):

- Mildura 2010
- Red Cliffs 2010
- Robinvale 2006
- Swan Hill 2010
- Kerang 2010
- Cohuna
- Cobram
- Yarrowonga 2009
- Rutherglen
- Echuca 1978
- Numurkah
- Barnawartha 2009
- Wodonga 2007
- Kyabram 2010
- Tatura
- Shepparton 1985
- Wangaratta 2007
- Beechworth
- Benalla 2009
- Myrtleford
- Euroa
- Bright
- Mount Beauty
- Mansfield
- Alexandra
- Woodend
- Broadford
- Kilmore
- Walla 2006
- Gisborne 2004
- Daylesford
- Kyneton 2002
- Castlemaine 2008
- Seymour 2009
- Melbourne 1977/Mornington Peninsula 1978
- Bairnsdale 2010
- Orbost
- Lakes Entrance 2010
- Warragul 2006
- Moe 2006
- Maffra 1976
- Sale 2006
- Traralgon 2006
- Morwell 2006
- Drouin 1974
- Yarram
- Leongatha
- Korumburra
- Inverloch
- Wonthaggi
- Phillip Island 2009
- Apollo Bay
- Colac 2010
- Torquay 2009
- Geelong 2009
- Camperdown
- Warrnambool
- Port Fairy 2008
- Portland
- Casterton
- Hamilton 2009
- Bacchus Marsh 1962
- Melton 1972
- Ararat
- Stawell
- Maryborough
- St Arnaud
- Warracknabeal
- Nhill
- Kaniva



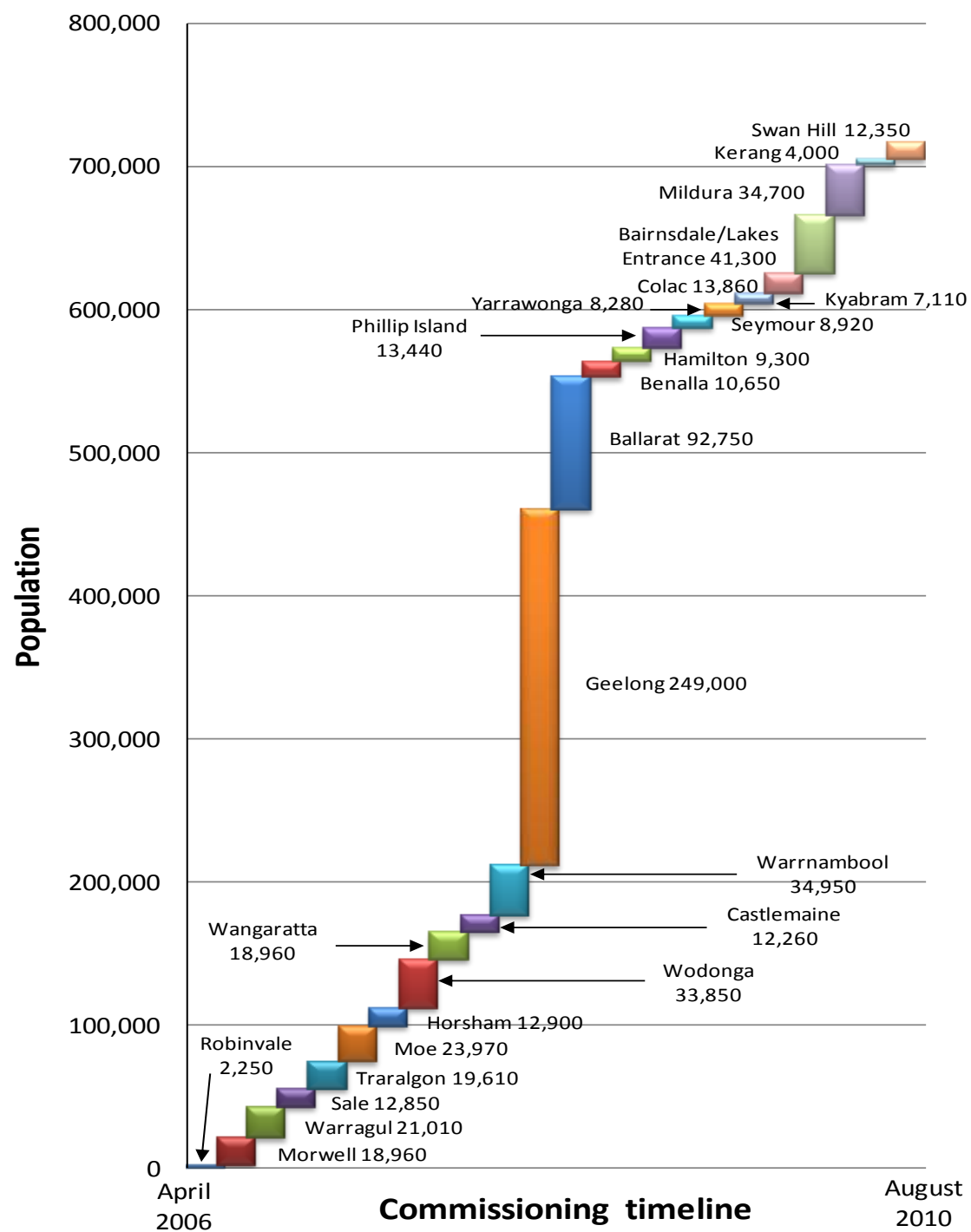
Water fluoridation in Victoria

30 water fluoridation plants in 25 towns

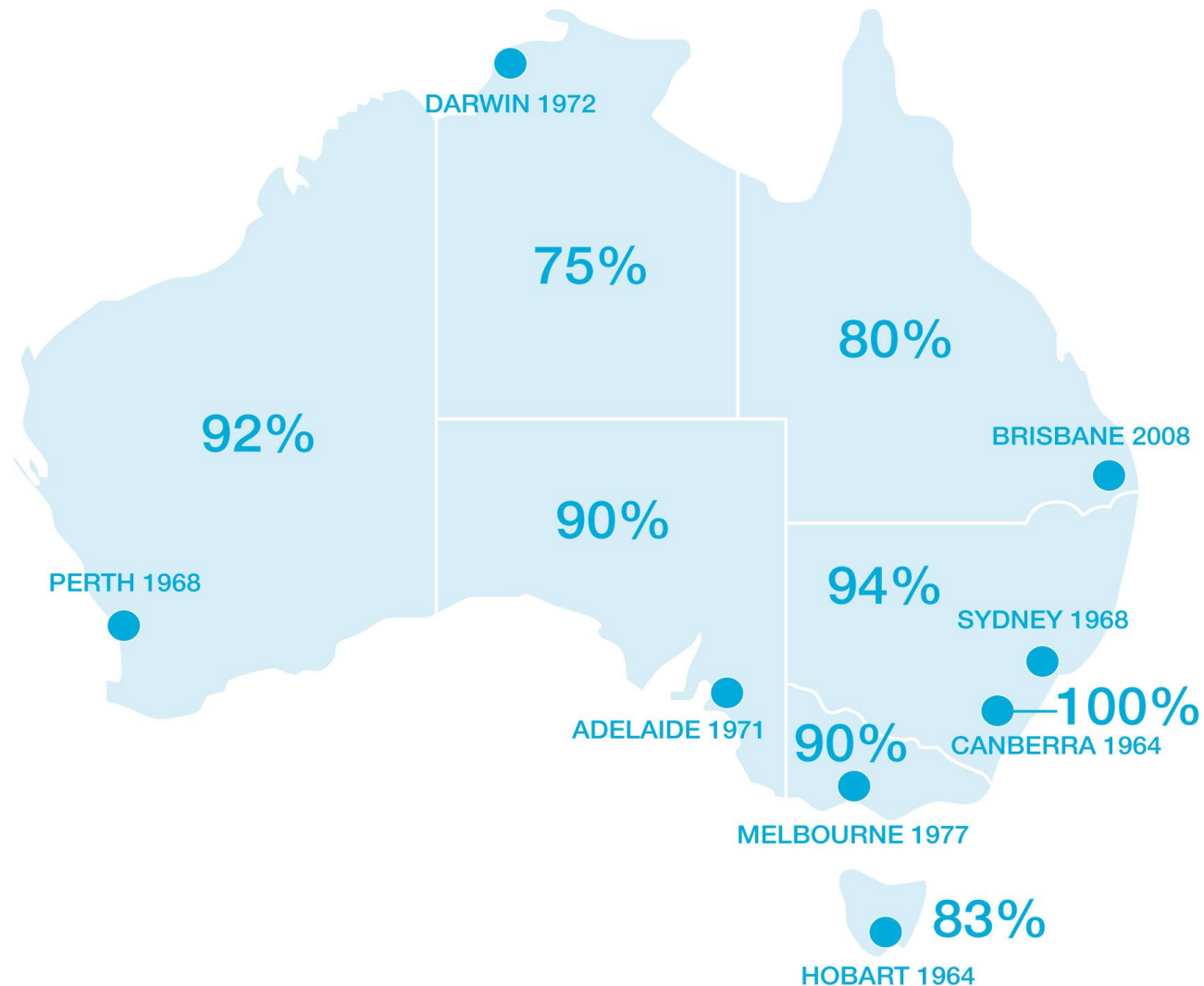
90% coverage, up from 74% in 2004

700,000 additional Victorians

Investment of \$23M



Water fluoridation in Australia



Measures to reduce dental decay

Water fluoridation alone is not the answer. Must also have:

Healthy diet

Regular brushing

Appropriate use of fluoridated toothpaste

Regular dental checkups

Water fluoridation

Measures to reduce dental decay

Smile for miles

Kids go for your life!

Best Start

Healthy for life



Aim to increase the consumption of fresh fruit and vegetables and tap water

Healthy school canteen policy 2009

5% of Victorians are not on reticulated water supplies

Regardless of reticulated supply status:

Children aged up to 18 months of age: use a soft toothbrush and water, with no toothpaste

Children between 18 months and 5 years: use low-fluoride children's toothpaste

Children aged six years and over and adults: use standard fluoride toothpaste

For children who are at higher risk of dental decay, dental professionals may modify these guidelines

For teenagers and adults at higher risk of dental decay, toothpastes are available with higher fluoride levels than those in standard fluoride toothpastes - discuss with your dental professional

‘Halo’ effect:

Consumption of foods and beverages produced in fluoridated areas

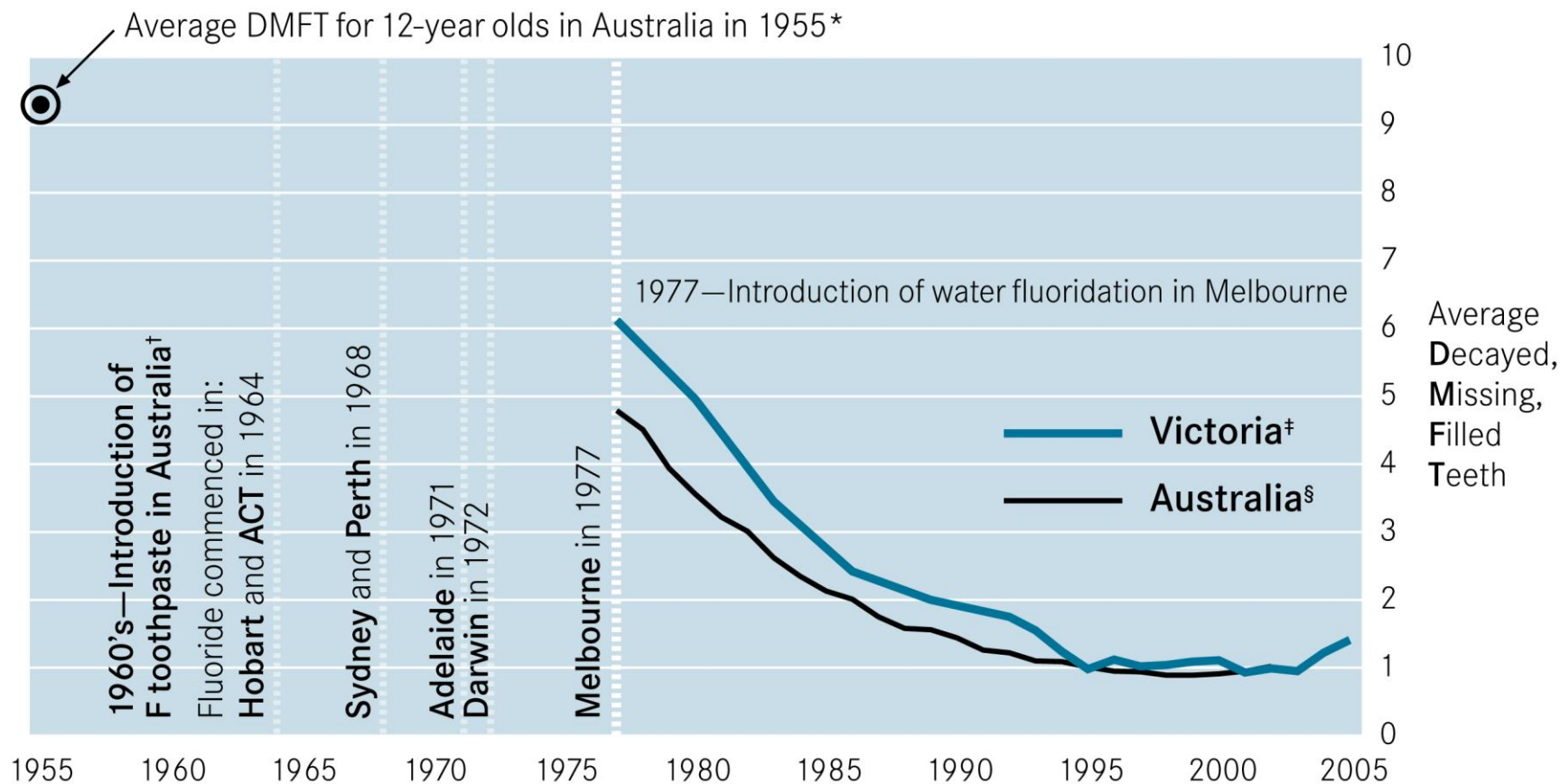
Exposure to fluoride when working/studying in fluoridated areas

Bottled water can now have added fluoride - check label

Questions?

health

Dental decay experience in 12 year olds



* Barnard P, 1955.

‡ Dental Health Services Victoria, 2006.

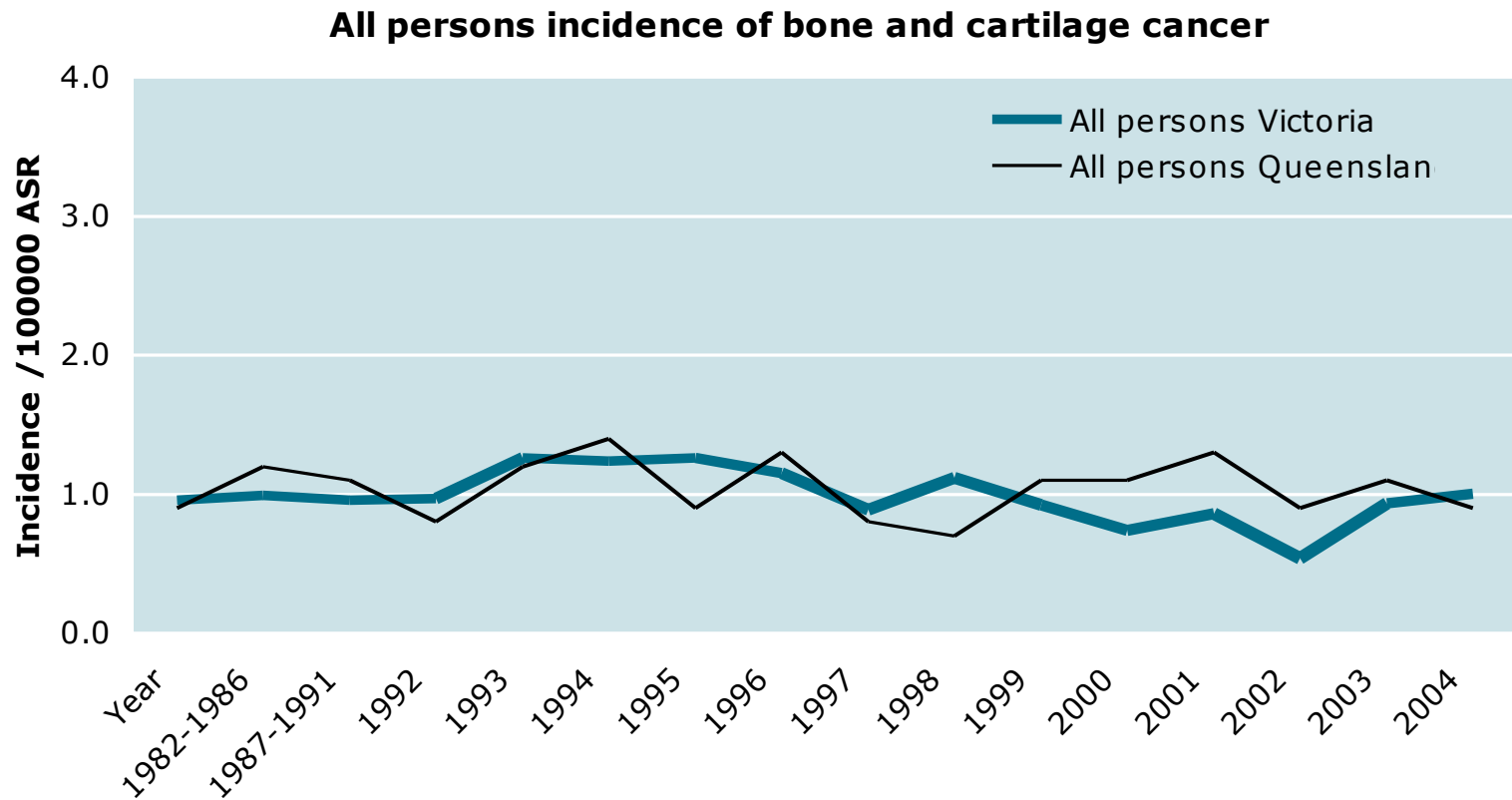
† Spencer A, Armfield J and Slade G, 2008.

§ Armfield J and Spencer A, 2008.

Changes taste and smell of water	<p>Fluoride is tasteless and odourless</p> <p>WHO, 2002: World Water Day – Oral Health</p>
Toxic chemical/poison	<p>Unscheduled at 1 part per million</p> <p>Standard for the Uniform Scheduling of Drugs and Poisons: 2007</p>
Cost effectiveness	<p>\$1 billion savings in 25 year period in Melbourne</p> <p>DHS, 2003: Impact analysis of water fluoridation – prepared by Jaguar Consulting</p>

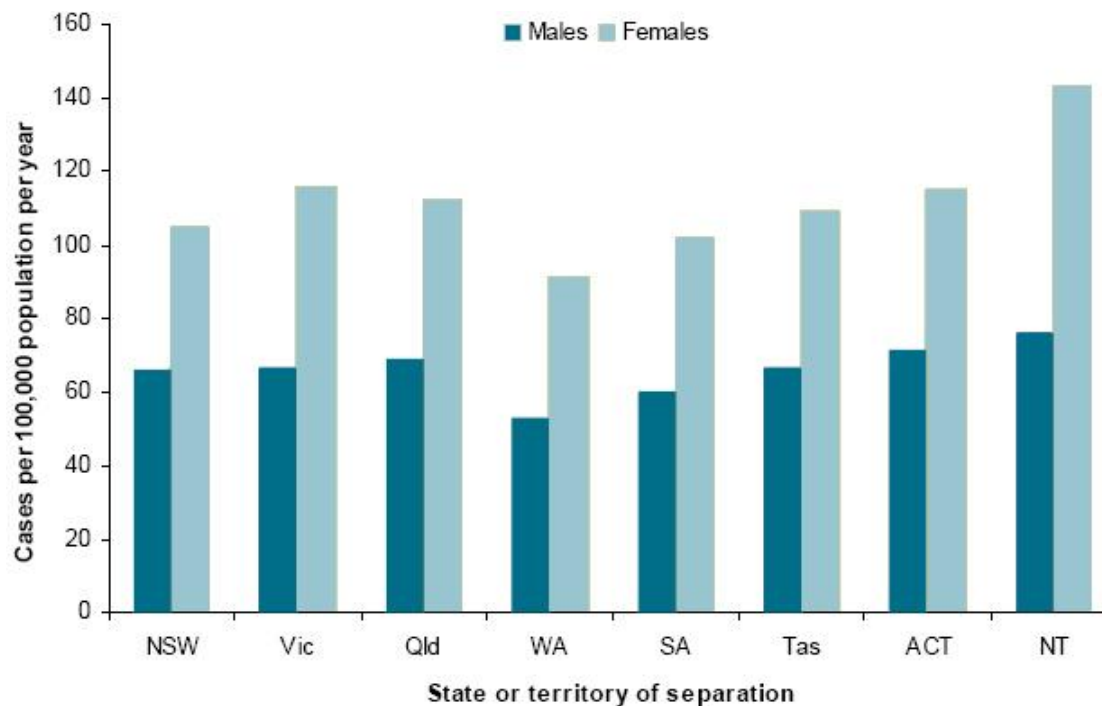
Osteosarcoma

No difference between Victoria (75% fluoridated) and Queensland (<5% fluoridated)



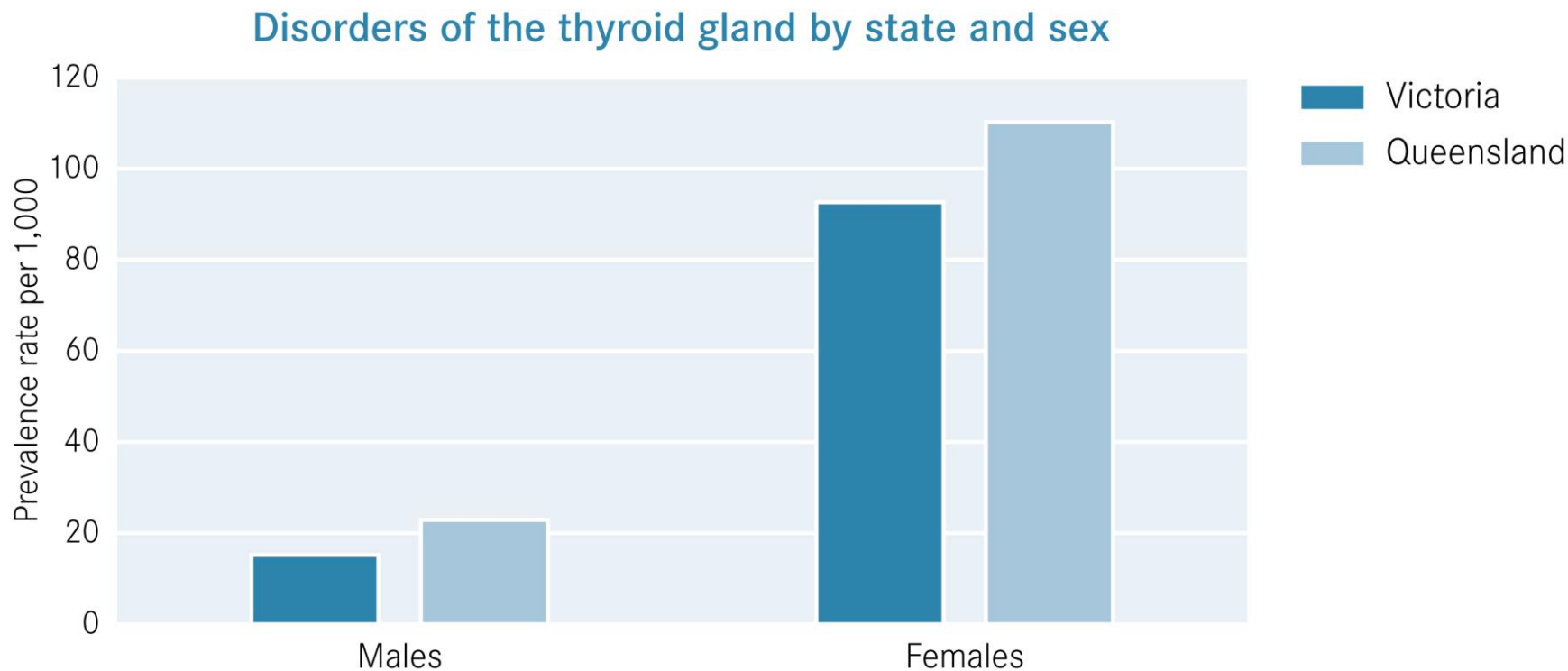
Hip fractures

No significant difference between Victoria (75% fluoridated) and Queensland (<5% fluoridated) 2002-2003



AIHW, 2006: National Injury Surveillance Unit, briefing number 8: Hip fractures

Disorders of the thyroid gland



There was a statistically significant difference in the prevalence rate of disorders of the thyroid gland for the total female population in Victoria and Queensland. Disorders of the thyroid gland includes endocrine, nutritional & metabolic diseases of the thyroid - most commonly hyperthyroidism and hypothyroidism.

Excludes cancer/neoplasm of the thyroid - as per the ICD-10 definition.

In my 25 years as a practising allergist I have never seen a patient with a condition that I would attribute to a clinical allergy to fluoride.

Allergy and immunology specialist, Monash University / Alfred Hospital

Dental fluorosis

Dental fluorosis is the only potential adverse effect of water fluoridation

Usually only very mild or mild (if at all)

Mottling of the tooth enamel

Function of teeth is not altered

Once teeth have formed, no further chance of fluorosis developing

Dental fluorosis



Normal – enamel
is translucent



Very mild



Mild

Dental fluorosis

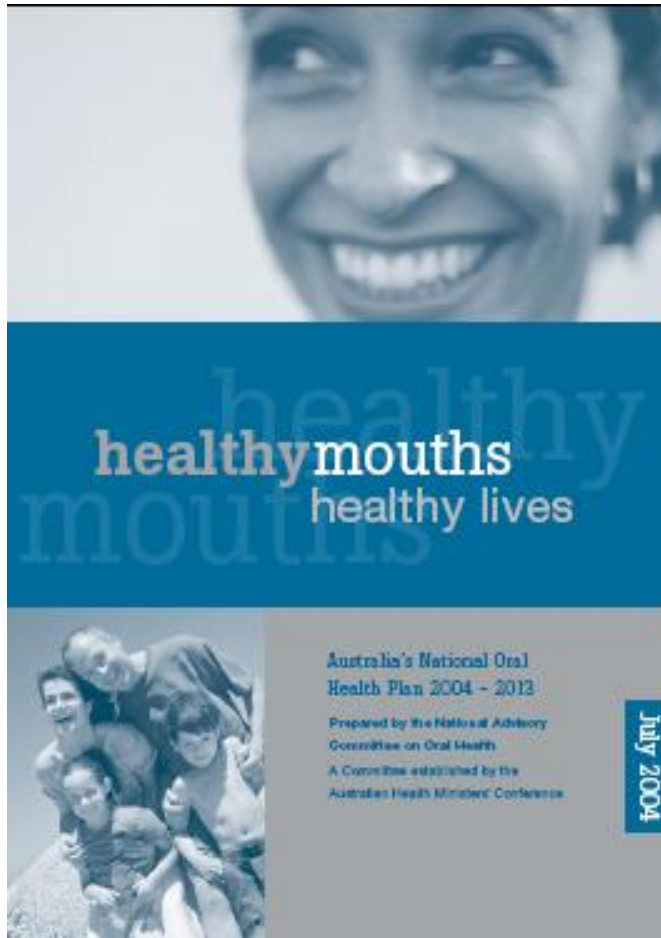
In Australia, since the mid 1990s, the prevalence of fluorosis has markedly reduced:

Low fluoride children's toothpastes

Reduced supplement use

Fluoridation of drinking water remains the most effective and socially equal way of providing all community members with the benefits of fluoride

Australia's National Oral Health Plan



Action area 1.2 states:

Extend water fluoridation of public water supplies to communities across Australia

Plan endorsed by all Health Ministers

How does fluoride work?

Source	Destination	Action	Effect type
Absorption from gut	Incorporation into developing tooth structure	Structural alteration of mineral – more resistant to acid	Structural
Absorption from gut	Redistributed into saliva	Repairs damage	Topical
Pre-absorption	Washes over teeth during eating and drinking	Repairs damage	Topical

Fluoride around the world

Countries with widespread water fluoridation include:

New Zealand, USA, Canada, UK, Ireland, Spain, Israel, Brazil, Chile, Argentina, Colombia, Hong Kong, South Korea, Singapore and Malaysia

Countries with fluoridated salt include:

Switzerland, France, Austria, Germany, Hungary, Slovakia and Belarus

Countries with fluoridated milk include:

Chile, China, Peru, Thailand and the UK

Evidence base

2006 WHO/IADR/FDI *Call to Action to promote dental health using Fluoride*

2007 NHMRC *Systematic Review of the Efficacy and Safety of Fluoridation*

2008 ARCPOH *Lifetime exposure to water fluoridation and child caries experience*

2010 DH *Fluoridation impact on hospitalisation of young children in rural Victoria*

Health impacts

Allergy and chemical sensitivity

Cancer

Brittle bones / bone fracture

Negative effects on the brain
and nervous system

Delayed eruption of teeth

Weight loss

Anaemia / weakness

Joint stiffness and pain

Reduced IQ

Hypothyroidism

Peeling skin

Heart problems

Kidney problems

Reduced immune function

Mental retardation

Childhood arthritis

Reduced self esteem - due to
dental fluorosis

Systematic reviews	York Review (2000)
	National Health and Medical Research Council (2007)
WHO statements	WHO / IADR / FDI Call to Action (2006)
	<i>Equity, social determinant and public health programmes (2010)</i>
ARCPOH	<i>The use of fluorides in Australia: Guidelines (2006)</i>
	<i>Lifetime exposure to WF and child caries experience (2008)</i>
AIHW	<i>Australia's dental generations: The National Survey of Adult Oral Health 2004-06 (2007)</i>