

The Brantford-Sarnia-Stratford Fluoridation Caries Study: Final Survey, 1963

Author(s): H. K. BROWN and MYRON POPLOVE

Source: *Canadian Journal of Public Health / Revue Canadienne de Sante'e Publique*, Vol. 56, No. 8 (AUGUST 1965), pp. 319-324

Published by: [Canadian Public Health Association](#)

Stable URL: <http://www.jstor.org/stable/41984741>

Accessed: 18-08-2015 20:47 UTC

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Canadian Public Health Association is collaborating with JSTOR to digitize, preserve and extend access to *Canadian Journal of Public Health / Revue Canadienne de Sante'e Publique*.

<http://www.jstor.org>

Canadian Journal of **PUBLIC HEALTH**

VOLUME 56

AUGUST, 1965

NUMBER 8

The Brantford-Sarnia-Stratford Fluoridation Caries Study: Final Survey, 1963¹

H. K. BROWN,² D.D.S., D.D.P.H., and MYRON POPLOVE,³ B.Sc., M.Sc., D.D.S.

BY the time that Brantford, Ontario, began to fluoridate its water supply in 1945 a great deal of information had been obtained from various parts of the world concerning the effect of naturally fluoridated water on dental caries. This information showed that the incidence of tooth decay is greatly reduced in populations consuming from birth naturally fluoridated water at a level of about one part per million. No ill effects at this level were observed. We therefore wished to determine whether the incidence of tooth decay could be reduced among children consuming fluoride-deficient water by the controlled adjustment of the fluoride content of that water supply to about one part per million.

The Brantford water supply has been continuously fluoridated since 1945. In 1946 the Department of National Health and Welfare was invited to make a comparison study of the dental effects of water fluoridation by periodically examining the teeth of Brantford children, the teeth of

children living in a city having a naturally fluoridated water supply (Stratford) and also the teeth of children of a city having a negligible amount of fluoride in its water supply (Sarnia). The Dental Health Division of the Department of National Health and Welfare conducted this study with assistance from the Research and Statistics Division of the Department, and with the co-operation of the Ontario Department of Health and the local departments of health of Brant County, of Stratford and of Lambton (Sarnia).

SELECTION OF CHILDREN

All native 16- and 17-year-old children continuously resident in each city were included in the study (Table I). Continuous residence encompasses absences, since birth, of six weeks or less. Thus the study compares (1) Brantford children who used mechanically fluoridated water continuously since birth, with (2) Sarnia children who used fluoride-deficient water continuously since birth, and (3) Stratford children who used continuously since birth water naturally fluoridated from underground deposits of fluoride. For individual children, residence eligibility was determined from information supplied by the parents. Vocational, and all separate and public secondary schools of each city were included.

¹Published simultaneously in the *Journal of the Canadian Dental Association* and in the *Canadian Journal of Public Health* by arrangement between the authors and editors.

²Lecturer, Faculty of Dentistry, University of British Columbia, Vancouver 8, B.C.; formerly Chief, Dental Health Division, Department of National Health and Welfare, Ottawa, Ontario.

³Research Consultant, Dental Health Division, Department of National Health and Welfare, Ottawa, Ontario.

TABLE I—NATIVE, CONTINUOUSLY RESIDENT
16–17-YEAR-OLD CHILDREN EXAMINED
IN SARNIA, BRANTFORD AND STRATFORD, 1963

Sarnia	Brantford	Stratford
482	356	227

TABLE II—PERCENTAGE OF 16–17-YEAR-OLD SARNIA, BRANTFORD AND STRATFORD
CHILDREN WITH CARIES-FREE PERMANENT TEETH, 1963

Sarnia		Brantford		Stratford	
%	S.E.	%	S.E.	%	S.E.
0.41	±0.291	11.80	±1.710	12.78	±2.216
Inter-city differences					
Sarnia Brantford			Brantford Stratford		
11.39 SS			0.98 NS		

SS: statistically significant at three standard error level.

NS: not statistically significant ($p > 5\%$).

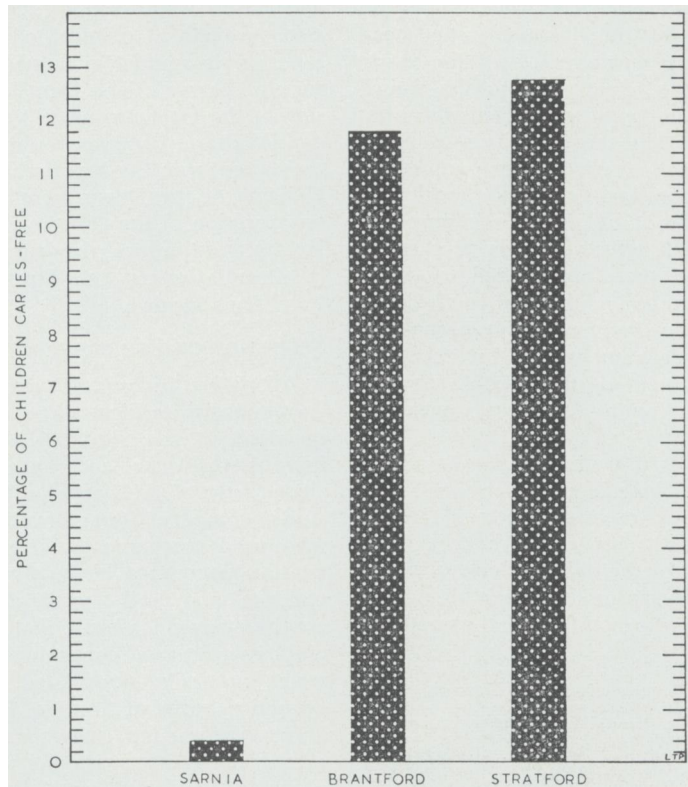


FIGURE 1. Percentage of 16–17-year-old Sarnia, Brantford and Stratford children with caries-free permanent teeth, 1963.

EXAMINING AND RECORDING METHOD

All examinations were done by the same examiner (H.K.B.) in order to maintain as uniform a scale of observation as possible throughout the study. A portable examining light of specific intensity, kept at a constant distance, plane mouth mirrors and No. 5 Clev-dent explorers were used for this purpose. The lowest limit in size for a caries lesion was defined as one in which the point of the explorer would stick and resist direct withdrawal, or in which softness could be felt. Hard discoloured enamel surfaces and enamel imperfections were not recorded as caries (1).

A chart depicting all the coronal surfaces of both permanent and deciduous teeth was used for recording. Although this report presents data only for DMF (decayed, missing and filled) permanent teeth, tooth decay was recorded in the detail necessary for analysis by the number of surfaces affected. Every tooth space was accounted for. This permitted later analysis in terms of a DMF tooth record of all erupted teeth per child.

RESULTS

Findings are presented in respect to (1) all permanent teeth, and (2) permanent upper incisors.

Indices used in this report to measure caries-prevalence are (1) percentage of caries-free children (having no permanent tooth caries experience), (2) tooth mortality rate, (3) DMF permanent teeth per child, and (4) caries-free and DMF permanent upper incisors.

Caries-Free Permanent Teeth. The percentages of children in each city with caries-free permanent teeth (DMF = 0) are shown in Table II and in Figure 1. The difference between Sarnia and Brantford is highly significant and is in favour of the Brantford children. There is no statistically significant difference between Brantford and Stratford. In Sarnia only about one child in 250 in the age group examined had caries-free permanent teeth, whereas in Brantford and Stratford approximately 12 children per 100 had caries-free permanent teeth.

Tooth Mortality. There is direct correlation between tooth mortality (missing or irreparable teeth per 100 children) and the caries attack rate (DMF teeth per child). Tooth mortality is not a very sensitive measure, and can be strongly affected by treatment, but a lower tooth mortality should reflect any measure which operates to reduce the occurrence of dental caries among children. Tooth mortality findings are summarized in Table III.

Tooth mortality is considerably higher in Sarnia than in the fluoridated cities, Brantford and Stratford. There is no significant difference in tooth mortality between the latter two cities.

DMF Permanent Teeth. An effective community-wide anti-caries measure decreases the number of persons affected by dental caries. It also reduces individual caries susceptibility, as reflected by caries attack rates. In this respect there is a highly significant difference between Sarnia and Brantford children, while again there is no

TABLE III—MEAN TOOTH MORTALITY (MISSING AND IRREPARABLE PERMANENT TEETH PER 100 CHILDREN) IN 16–17-YEAR-OLD SARNIA, BRANTFORD AND STRATFORD CHILDREN, 1963

Sarnia		Brantford		Stratford	
Rate	S.E.	Rate	S.E.	Rate	S.E.
131.33	±10.433	37.92	±4.274	41.85	±5.758
Inter-city differences					
Sarnia Brantford			Brantford Stratford		
-93.41 SS			3.93 NS		

SS: statistically significant at three standard error level.

NS: not statistically significant ($p > 5\%$).

TABLE IV—MEAN DMF PERMANENT TEETH PER CHILD IN 16–17-YEAR-OLD SARNIA, BRANTFORD AND STRATFORD CHILDREN, 1963

Sarnia		Brantford		Stratford	
Rate	S.E.	Rate	S.E.	Rate	S.E.
10.44	±0.215	4.74	±0.176	4.19	±0.212
Inter-city differences					
Sarnia Brantford			Brantford Stratford		
-5.70 SS			-0.55 NS		

SS: statistically significant at three standard error level.

NS: not statistically significant ($p < 5\%$).

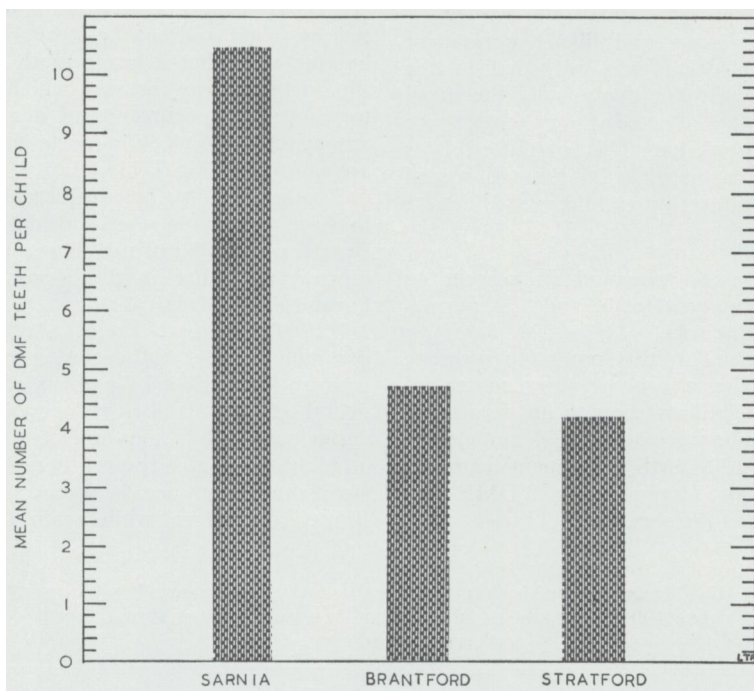


FIGURE 2. Mean DMF permanent teeth per child in 16–17-year-old Sarnia, Brantford and Stratford children, 1963.

significant difference when comparing Brantford and Stratford children (Table IV and Figure 2).

Caries Free and DMF Permanent Upper Incisors. Dental caries experience in the upper permanent incisors is shown in Tables V and VI. Brantford children

sustain an extremely low level of caries attack upon their upper permanent incisors. There is a striking difference between the Sarnia and Brantford children. Brantford and Stratford children, on the other hand, exhibit comparable caries resistance in the permanent upper incisors.

TABLE V—PERCENTAGE OF 16–17-YEAR-OLD SARNIA, BRANTFORD AND STRATFORD CHILDREN WITH CARIES-FREE PERMANENT UPPER INCISORS, 1963

Sarnia		Brantford		Stratford	
%	S.E.	%	S.E.	%	S.E.
45.85	±2.270	87.92	±1.727	85.46	±2.340
Inter-city differences					
Sarnia Brantford			Brantford Stratford		
42.07 SS			-2.46 NS		

SS: statistically significant at three standard error level.

NS: not statistically significant ($p < 5\%$).

TABLE VI—MEAN DMF PERMANENT UPPER INCISORS PER CHILD IN 16–17-YEAR-OLD SARNIA, BRANTFORD AND STRATFORD CHILDREN, 1963

Sarnia		Brantford		Stratford	
Rate	S.E.	Rate	S.E.	Rate	S.E.
1.38	±0.070	0.22	±0.035	0.30	±0.055
Inter-city differences					
Sarnia Brantford			Brantford Stratford		
-1.16 SS			0.08 NS		

SS: statistically significant at three standard error level.

NS: not statistically significant ($p < 5\%$).

OTHER EFFECTS OF FLUORIDATION

No cases of unsightly mottling were observed among the children examined in Brantford and Stratford. Neither did we observe any ill effects attributable to the presence of fluoride in the water supply. The health authorities and the practising physicians of Brantford and Stratford did not report any ill effects either.

SUMMARY

The 1963 findings of the Brantford Fluoridation Study are consistent with those of previous surveys of the native child populations of Sarnia, Brantford and Stratford (2–5). There has been continuing reduction in caries experience in 16- and 17-year-old Brantford children during the 17½ years following the introduction of

water fluoridation in Brantford. The Brantford data for these children are compared to similar data from Sarnia (not fluoridated) and from Stratford (naturally fluoridated).

The data indicate that there is no observable difference in caries reducing effect between a mechanically fluoridated water supply and a naturally fluoridated water supply. This beneficial effect of water fluoridation extends at least until the eighteenth year of life.

Sommaire

Les constatations de l'enquête de 1963, dans le cadre de l'étude de Brantford sur la fluoration, démontrent après 17½ ans de fluoration Brantford une diminution constante de l'état de la carie chez les enfants

de 16 et 17 ans, de Brantford. Les données de Brantford concernant ces enfants, sont présentées par rapport à des données analogues obtenues à Sarnia (absence de fluor) et à Stratford (fluoruration naturelle). Les données indiquent qu'entre une eau

d'alimentation mécaniquement fluorée et une eau d'alimentation fluorée par la nature, il n'y a pas de différence notable dans l'effet de diminution de carie. Elles indiquent aussi que cet effet bienfaisant persiste au moins jusqu'à la dix-huitième année de vie.

REFERENCES

1. Canada, Department of National Health and Welfare, Dental Health Division and Research and Statistics Division. Suggested methodology for fluoridation surveys in Canada. 1952. (Mimeo.)
2. Brown, H. K., McLaren, H. R., Josie, G. H. and Stewart, Barbara J.: J. Canad. Dental Assoc., 1956, 22: 207.
3. Idem.: Brantford fluoridation caries study —1957 report. Dental Health Division, Department of National Health and Welfare, Ottawa. (Mimeo.)
4. Brown, H. K., McLaren, H. R. and Poplove, Myron: J. Canad. Dental Assoc., 1960, 26: 131.
5. Brown, H. K.: Canad. J. Public Health, 1962, 53: 401.

CERTIFICATE IN PUBLIC HEALTH INSPECTION (CANADA)

Correspondence Course

Commencing September 15, 1965

to prepare candidates for examinations in September 1966

for the

Certificate in Public Health Inspection (Canada), C.P.H.I.(C)

Basic Requirements: Satisfactory secondary school education.
Full-time employment for 12 months in and sponsorship by an official health agency.

Residents of Ontario and Quebec are ineligible for the course.
Closing date for receipt of applications is September 1, 1965.

**For information
and application forms for the course and examinations apply to:**

Secretary, Board of Certification of Public Health Inspectors,
Canadian Public Health Association,
1255 Yonge Street, Toronto 7, Ontario.