Renfrew County and District
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Dental Health of Kindergarten Children

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Dental Health of Kindergarten Children

Executive Summary

This report presents the results of the Ontario Dental Indices Survey for Renfrew County and District for the school years 2002/03, 2003/04 and 2004/05. Dental hygienists from the Renfrew County and District Health Unit visited all JK/SK classes during these three school years to conduct the survey.

Almost 90 percent of the JK/SK children surveyed were age four or five, so this report focuses on these two ages. We surveyed an estimated 80 percent of the total population of five year olds and a smaller proportion of four year olds.

Caries-Immunity

73 percent of four year olds were caries-immune (never had a cavity) during the time period studied (3-year average).

66 percent of five year olds were caries-immune during the time period studied (3-year average). Caries-immunity of five-year olds was close to what it was in 1988 and 1990. We do not have information on the survey methodology used in 1988 and 1990, so we are unable to determine if results from the two time periods are directly comparable.

Severity of Dental Caries

Severity of dental caries was measured by counting the number of decayed, extracted, missing and filled teeth (deft/DMFT).

The mean deft/DMFT in four year olds ranged from 1.12 to 1.47.

The mean deft/DMFT in five year olds ranged from 1.61 to 1.89. The deft/DMFT scores seem to have risen (worsened) since achieving lows of 1.46 and 1.28 in 1988 and 1990. As with caries immunity, we are unable to determine if results from the two time periods are directly comparable.

When children without tooth decay were taken out of the calculation of mean deft/DMFT, the scores rose from between one and two, to close to five.

Urgent Treatment Needs

8.3 percent of four year olds and 9.8 percent of five year olds were found to have urgent dental treatment needs over the three years studied (3-year averages). About one tenth of the students surveyed had urgent dental treatment needs in the 2004/05 school year.

Non-urgent Treatment Needs

5.7 percent of four year olds and 4.5 percent of five year olds were found to have non-urgent dental treatment needs over the three years studied (3-year averages).

Children in Need of Treatment (CINOT) Program

An average of 82 four and five year olds received dental treatment through the CINOT program each year during the time period studied. This represents just over half (54%) of the children identified with urgent treatment needs. The average CINOT expenditure per child was $424 over the three-year period.

Recommendations for Dental Health Programs at the Renfrew County and District Health Unit

- Continue to monitor the results of the Dental Indices Survey and report on any changes.
- Continue to offer dental health screening at Child Health Clinics (held monthly during the school year at locations across Renfrew County and District).
- Increase efforts to integrate oral health education into prenatal classes, the Healthy Babies Healthy Children program, and any healthy eating and healthy weight initiatives that reach young children.
- Involve members of the target group in the development of existing and new initiatives.
- Encourage health and social service providers to reinforce oral health education messages.
- Ensure that written communication about dental health programs and services is understandable to the target audience.
- Work with local and regional partners to promote early identification of dental disease and early initiation of regular dental care.
- Work with community partners to advocate for a public dental care program accessible to low income people of all ages.

Introduction

Dental health is an important part of overall health. The mouth has long been regarded as a mirror that reflects the state of health in the rest of the body (Ontario Dental Association, 2006).

Dental diseases such as tooth decay and gum disease can begin early in life. Dental diseases in children can cause pain that affects eating, sleeping, and speech. They can cause children to have difficulty concentrating at school and to miss school. They can cause malocclusion, which leads to further dental problems. Dental diseases have a negative impact on growth, development and self-esteem.

Part of the mandate of public health units in Ontario is to reduce the prevalence of dental diseases in children and youth. This work includes:

- Conducting the Dental Indices Survey according to the survey protocol;
- Conducting oral health screening based on the results of the current year's Dental Indices Survey;
- Providing the Children in Need of Treatment (CINOT) program;
- Providing teacher in-services and educational resources to schools;
- Ensuring the provision of clinical preventive services (topical fluoride applications and fissure sealants); and
- Ensuring that the fluoridation of municipal water supplies is monitored.

This report presents findings from the Dental Indices Survey conducted in Renfrew County and District during three consecutive school years: 2002/03, 2003/04 and 2004/05. It also provides information about the use of the Children in Need of Treatment Program during the same time period.

Renfrew County and District is comprised of the County of Renfrew, the City of Pembroke, the Township of South Algonquin and most of Algonquin Provincial Park in Ontario, Canada. This area covers about 15,000 square kilometers. The population was estimated to be between 100,000 and 101,000 between 2002 and 2005.

The Renfrew County and District Health Unit is mandated under the Ontario Health Protection and Promotion Act to review and report on health status in the community on a regular basis. Health status information is used to assist with planning local health promotion and disease prevention programs and services.

This report is the thirteenth in a series of health status reports that began in 1993. Most of these reports are available on our web site: http://www.rcdhu.com/community-health-status/index.htm.

Ontario Dental Indices Survey

Public health units in Ontario have been required to carry out the Dental Indices Survey (DIS) since the early 1970's. The DIS identifies dental disease and dental treatment needs of students who participate in the survey, and provides a basis for further dental health screening. It also helps to identify the need for preventive services and educational resources.

Dental hygienists carry out the survey by visiting schools throughout the school year. In Renfrew County and District (RC&D), hygienists visited all JK/SK classes in each of the 2002/03, 2003/04 and 2004/05 school years. Children were not surveyed if they were absent from school on the day of the visit, schooled at home or their parents did not want them to participate.

When the DIS is conducted with kindergarten children, the hygienists assess gingivitis, debris, calculus, tooth status, urgent and non-urgent dental conditions. They also assess the need for cleaning, topical fluoride, oral hygiene instruction, and pit and fissure sealants. Parents are informed of urgent and non-urgent dental treatment needs that are identified through the survey.

Limitations

Although public health units are required to conduct the DIS according to a protocol, different sampling methods have been used depending on local resources. Provincial documentation describing the survey methods was not finalized until 1993 (Central East Health Information Partnership, 1999). Dental hygienists use standard dental indices and equipment to conduct the DIS. However, training and personal judgment can influence their conclusions about treatment needs (Sudbury and District Health Unit, 2005). Because of these factors, the results should be interpreted with caution. This includes comparisons with other health units and with the provincial average, and comparisons within a health unit over time if the survey methodology has changed.

Numbers of Children Surveyed

The DIS was conducted with JK/SK students throughout the school year, so children surveyed ranged in age from 3 to 7 years. A breakdown of the numbers of children surveyed between September 2002 and June 2005 and their ages is shown in Figure 1.

Figure 1: Average number of JK/SK students included in the Dental Indices Survey/school year in 2002/03, 2003/04 and 2004/05, by age

Age	3	4	5	6	7	Total
Average # students surveyed/year	46	809	918	144	4	1,921
Percent of surveyed students	2.4 %	42.1 %	47.8 %	7.5 %	--	100 %

Source: Renfrew County and District Health Unit Dental Indices Survey, extracted July 19, 2006

Almost 90 percent of the children surveyed were age four or five, so results shown in this report focus on these two ages.

Figure 2 below shows that an estimated 80 percent of the total population of five year olds were surveyed. A smaller proportion of four year olds were surveyed (78%, 71% and 62% respectively).

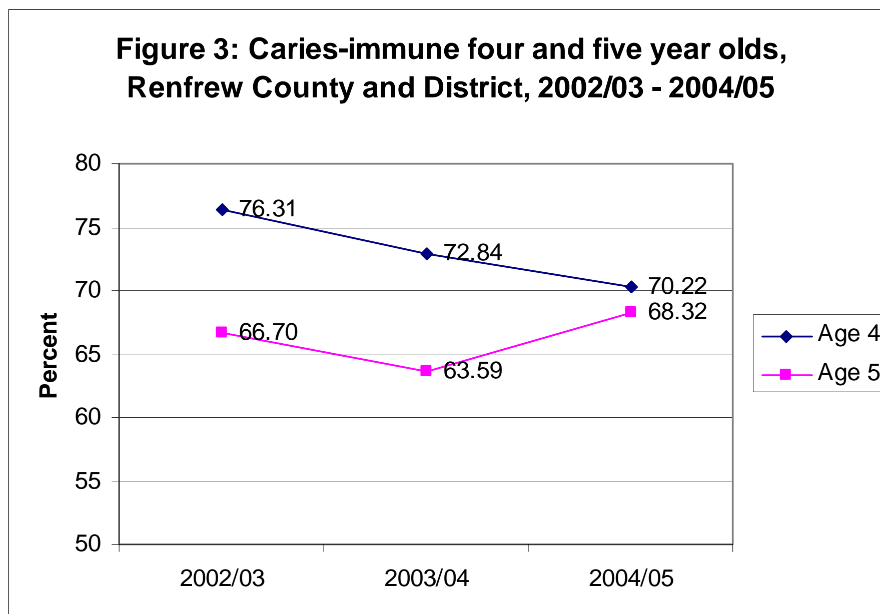
Figure 2: Estimated proportion of all four and five year olds included in the Dental Indices Survey/school year

	2002/03		2003/04		2004/05	
	Age 4	Age 5	Age 4	Age 5	Age 4	Age 5
Number of children surveyed	916	862	799	967	712	925
Population estimate	1178	1119	1128	1183	1142	1133
Estimated proportion of the population surveyed	78%	77%	71%	82%	62%	82%

Source: Number surveyed - Renfrew County and District Health Unit Dental Indices Survey, extracted July 19, 2006. Population estimates - Provincial Health Planning Database, Knowledge Management and Reporting Branch, Ontario Ministry of Health and Long-Term Care, extracted July 18, 2006.

Caries-Immune Children

The DIS determines whether each child has ever experienced dental caries. The percent of four and five year olds who were caries-immune (never had a cavity) is shown in Figure 3 below.



Source: Renfrew County and District Health Unit Dental Indices Survey, extracted July 19, 2006

Any increase in the percentage of caries-immune children means an improvement in dental health. As expected, caries immunity is higher for the younger children.

There appears to be a decrease (worsening) in four year olds over the three-year period. However, the sample size also decreased from year to year (see Figure 2). We do not know who was missed and why they were missed, so are unable to judge whether the changes in deft/DMFT scores is statistically significant.

In Perspective: Caries immunity among five year olds reported by other health units across Ontario for the 2003/04 and 2004/05 school years ranged from 52 to 76 percent (Bowes & Ito, 2005). Caries immunity among five year olds in RC&D for the same two years (66%) ranked twelfth of the 28 health units that reported.

Historical information on caries immunity is shown in Figure 4. In RC&D, the percent of caries-immune five year olds increased (improved) between 1984 and 1990. Percentages in 2002/03 – 2004/05 are close to or slightly lower than they were in 1988 and 1990. We do not have information on survey methodology used during the years shown in Figure 4, so we are unable to determine if results from the two time periods are directly comparable.

Figure 4: Percent of caries-immune five year olds in Renfrew County and District and Ontario, 1984 – 1990

Year	1984	1986	1988	1990	1992	1994
Renfrew	56.25	55.46	65.54	69.51	n/a	n/a
Ontario	60.38	65.77	68.28	68.44	n/a	69

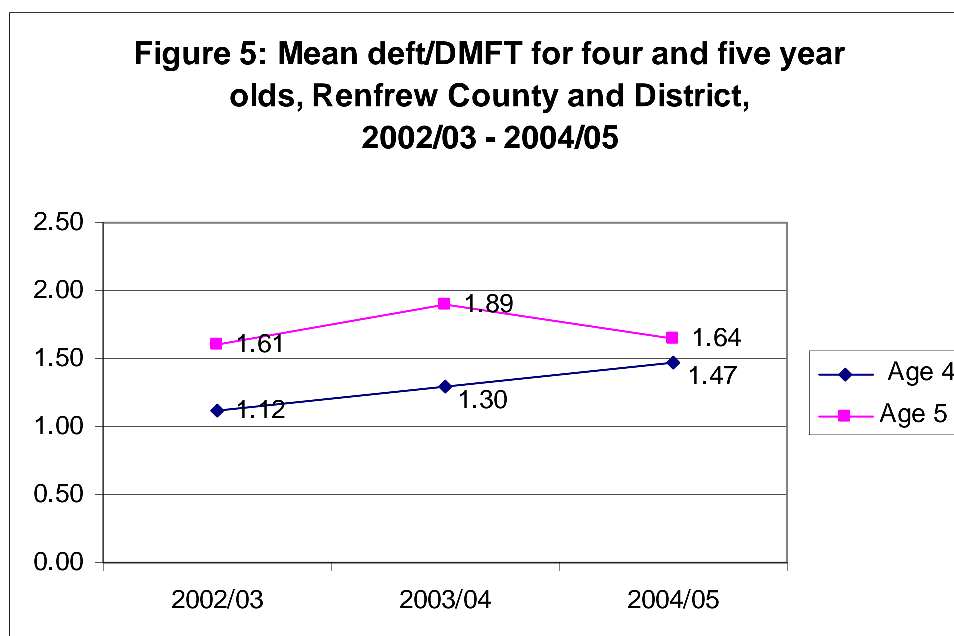
Source: Ontario Dental Indices Survey

Severity of Dental Caries

The mean number of teeth affected by caries is an indicator of the overall dental health of a population. Caries are recorded when a lesion in a pit or fissure, or on a smooth tooth surface has an unmistakable cavity, undermined enamel, or a detectably softened floor or wall. Any fillings are also recorded. The deft/DMFT score is used to measure the extent of past and present caries (deft is used for baby teeth and DMFT for permanent teeth.)

- d and D = decayed
- e = extracted
- M = missing
- f and F = filled
- t and T = teeth

For each child, if a baby tooth is decayed, extracted or filled, a score of one is applied to the tooth. With 20 baby teeth, the deft can range from zero to 20. With permanent teeth, the DMFT can from zero to 32. Mean deft/DMFT scores for four and five year olds are shown in Figure 5 below.



Source: Renfrew County and District Health Unit Dental Indices Survey, extracted July 19, 2006

Any decrease in the deft/DMFT score indicates an improvement in dental health. As expected, mean deft/DMFT is lower for the younger children.

The mean deft/DMFT in four year olds appears to have increased (worsened) over the time period shown. However, the sample size also decreased from year to year (see Figure 2). We do not know who was missed and why they were missed, so are unable to judge whether the changes in deft/DMFT scores is statistically significant.

In Perspective: Mean deft/DMFT among five year olds reported by other health units across Ontario for the 2003/04 and 2004/05 school years ranged from 0.8 to 2.8 (Bowes and Ito, 2005). Mean deft/DMFT among five year olds in RC&D for the same two years (1.8) ranked 19th of the 25 health units that reported. This comparison should be made with caution due to the limitations of the DIS described on page four.

Tooth decay among Ontario children decreased substantially between 1972 and 1988 (Goldberg, 1993). As shown in Figure 6, data for Renfrew County and District for 1984, 1986, 1988 and 1990 also shows steady improvements, although the number of teeth affected by decay was consistently higher than in Ontario as a whole. We do not have information on the survey methodology used during the years shown in Figure 6.

Figure 6: Mean deft/DMFT for five year olds in Renfrew County and District and Ontario

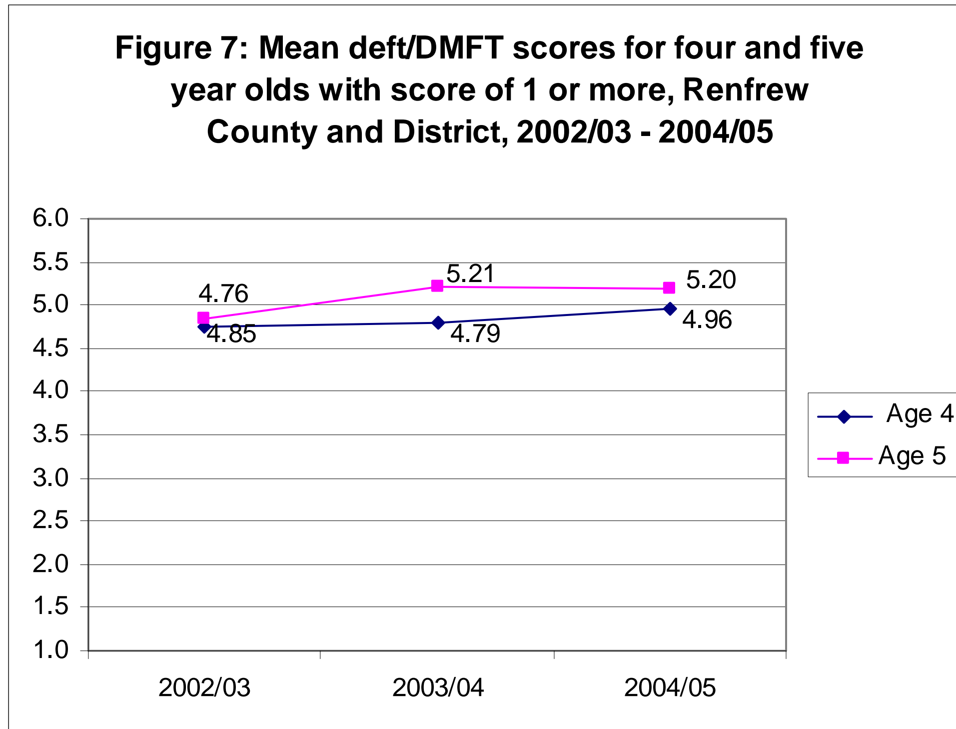
Year	1980	1982	1984	1986	1988	1990	1992	1994
Renfrew	n/a	n/a	1.59	1.55	1.46	1.28	n/a	n/a
Ontario	1.69	1.81	1.48	1.20	1.10	1.16	n/a	1.22

Source: Ontario Dental Indices Survey

The mean deft/DMFT scores for Renfrew County and District five year olds in 2002 - 2005 have risen since achieving lows of 1.46 and 1.28 in 1988 and 1990, although we are unable to determine if the results from the two time periods are directly comparable.

Others have observed that the decrease in dental caries in Ontario between 1980 and 1988 appears to level off after 1988 and may be on the rise (Bennett, 1996; Speechley and Johnston, 1996).

The deft/DEFT score for children with scores of 1 or more tells us about the severity of dental disease among children who have experienced tooth decay.



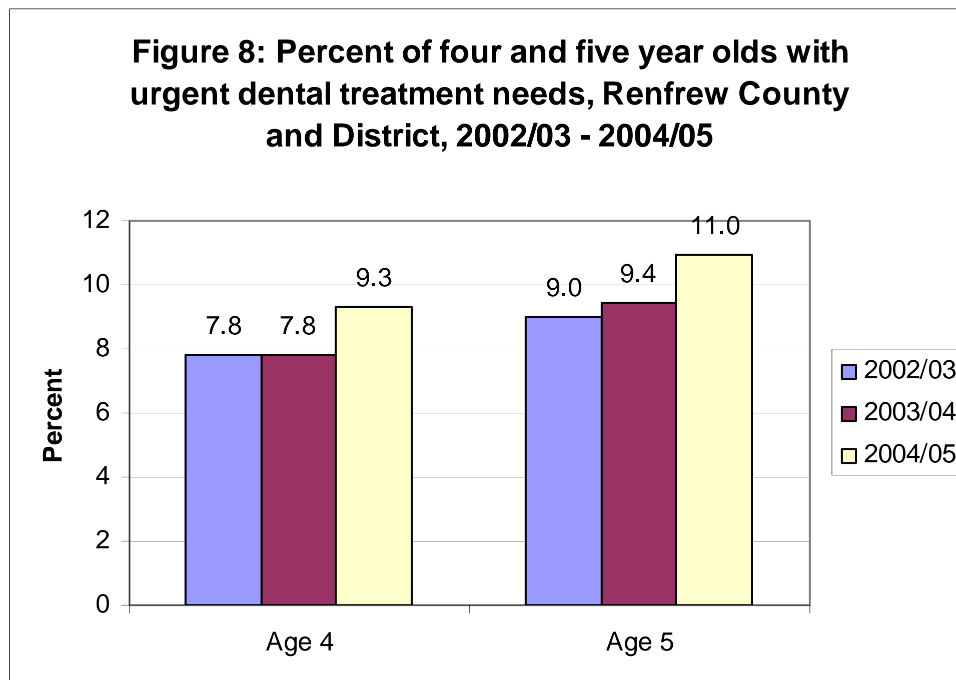
Source: Renfrew County and District Health Unit Dental Indices Survey, extracted July 19, 2006

Figure 7 shows that when children who were caries-immune were taken out of the calculation of mean deft/DMFT, the scores for four and five year olds rose from between one and two, to close to five. Figure 7 focuses on the 27 percent of four year olds and 34 percent of five year olds who were not caries-immune. Bennett (1996) found a similar pattern: 25 percent of Ontario children bore most of the dental disease burden.

Urgent Treatment Needs

The DIS identifies children who have an urgent need for dental treatment. Urgent dental conditions according to the criteria used include pain, large lesions, infections, bleeding, trauma, pathology or irreversible periodontal disease.

Figure 8 below shows the proportion of four and five year olds who participated in the Dental Indices Survey that were identified as having urgent treatment needs. There appears to be an increase in the proportion of children with urgent needs in 2004/05 compared to the two previous years for both ages. The increase is small, but we should continue to track this dental health indicator to identify any trends.



Source: Renfrew County and District Health Unit Dental Indices Survey, extracted July 19, 2006

Dental staff at this health unit have observed over the years that when children have an urgent dental need, it means that they have probably not seen a dentist for some time. The child's family may be experiencing a barrier to accessing dental care. Barriers include:

- Lack of money to pay for dental treatment, including treatment that is only partially covered by dental insurance
- Lack of dental insurance
- Lack of knowledge about the need for regular dental care
- Fear of the dentist
- Lack of transportation to dental services

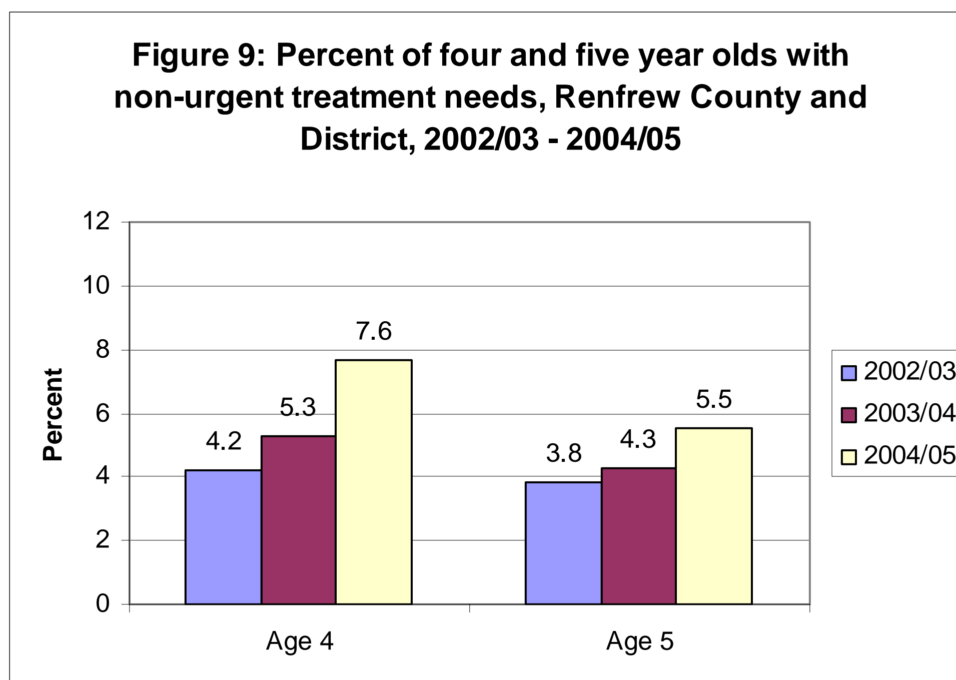
In perspective: The proportion of five year olds with urgent treatment needs varies across the province. For the 2003/04 and 2004/05 school years, Ontario health units reported urgent treatment needs of five year olds as low as 4 percent and as high as 19.4 percent (Bowes and Ito, 2005).

In a benchmarking project that described dental screening procedures in ten Ontario health units, Beynon et al (2004) found some differences in the clinical criteria that dental staff used to assess caries. This could be part of the reason for variations in the prevalence of urgent needs that were reported.

Non-urgent Treatment Needs

In addition to identifying children with urgent treatment needs, the Dental Indices Survey identifies children who have non-urgent dental needs. These needs do not meet the dental eligibility conditions of the Children in Need of Treatment program (described on next page). Parents/guardians are notified of non-urgent needs through a card that is sent home with the students.

Figure 9 below shows the proportion of four and five year olds who participated in the Dental Indices Survey that were identified as having non-urgent treatment needs. There appears to be an increase in the proportion of children with non-urgent needs in 2004/05 compared to the two previous years for both ages. As with urgent needs (Figure 7), the increase is small but we should continue to track this dental health indicator to identify any trends.



Source: Renfrew County and District Health Unit Dental Indices Survey, extracted July 19, 2006

In perspective: The proportion of five year olds with non-urgent treatment needs varies across the province. For the 2003/04 and 2004/05 school years, Ontario health units reported non-urgent treatment needs of five year olds as low as 2 percent and as high as 19 percent (Bowes and Ito, 2005).

The benchmarking project referred to on page 11 also found significant variation in the criteria used to define non-urgent cases across the ten health units that participated in the project (Beynon et al, 2004).

Children in Need of Treatment Program

When children are identified with urgent treatment needs through the DIS or dental screening, a letter is sent to the parent(s), which directs them to seek dental treatment. If the family does not have dental coverage and the cost of treatment would be a financial hardship, they are referred to the Children in Need of Treatment (CINOT) program.

The CINOT program acts as a public health "safety net" by providing a basic level of dental care to eligible children. In 2004, over 30,000 children in Ontario received treatment through the CINOT program (Ontario Ministry of Health and Long-Term Care, 2006).

Children must meet three criteria to be eligible for CINOT:

1. **Age and Grade** - Children are eligible from birth to grade 8 or their 14th birthday, whichever is later.
2. **Dental Conditions** - Children must have identified dental conditions requiring urgent care. While most children are identified through routine elementary school screening, parents may request that their child be screened by calling their local public health unit.
3. **Access** - Children must not have access to dental insurance or any other government program (e.g. Federal Refugee Program, Ontario Works, Ontario Disability Support Program) and a parent must sign a written declaration that the cost of the necessary dental treatment would result in financial hardship. Parents may be asked to provide proof of financial hardship.

Once a child begins treatment through CINOT, the dentist completes all required dental work (non-urgent needs too), as long as the work is included in the CINOT fee schedule. Hopefully the family can then afford the ongoing cost of preventive treatment.

Figure 10: Use of the CINOT program for children age 4 and 5 in Renfrew County and District, 2002/03 – 2004/05

School year	Number (%) of 4 and 5 year olds surveyed who were identified as having an urgent need(s)	Number of 4 and 5 year olds who received treatment paid by CINOT*	CINOT expenditures for 4 and 5 year olds (Sept. – August)*	Proportion of all CINOT expenditures for 4 and 5 year olds*
2002/03	140 (8.4)	71	$29,574	27.8%
2003/04	152 (8.8)	80	$32,302	26.5%
2004/05	167 (10.3)	94	$41,885	32.3%
Average	**153 (9.1)**	**82**	**$34,587**	**29%**

Source: Renfrew County and District CINOT Program, extracted July 27, 2006
** Note that CINOT figures include many children who were identified with treatment needs in the previous school year.*

An average of 82 four and five year olds were treated through CINOT each year during the time period studied. This represents just over half (54%) of the children identified through DIS with urgent treatment needs, although a few of the children treated may have been identified in other ways (e.g. self-referred or referred through a visit to a Child Health Clinic). The average CINOT expenditure per child was $424/year over the three-year period.

Reasons for not using CINOT are: the family had access to dental insurance* through employment, Ontario Works, Ontario Disability Support Program, private insurance*, or the family was able to pay for the treatment themselves.

CINOT costs for 4 and 5 year olds increased between 2002/03 and 2004/05, both in dollars and in proportion of all CINOT expenditures. This is congruent with the observed increase in the proportion of children with urgent treatment needs (page 10).

** Families that have dental insurance may still be unable to access treatment. Sometimes they are required to pay at the time of treatment but are unable to do so, or the insurance will only pay for part of the cost and the family is unable to pay the difference. Some treatment is not covered by insurance.*

Dental Health Screening Program

The Dental Indices Survey (DIS) identifies the proportion of JK/SK students in each school with decay on two or more teeth. According to guidelines from the Ministry of Health and Long-Term Care, results of the current year's DIS are used to determine which grades receive dental screening. The guidelines are described in the table below.

Figure 11: Guidelines to determine which grades receive dental health screening in elementary schools

Percentage of students with decay on 2 or more teeth	Risk level of school	Dental screening required
>= 14 %	High risk	Minimum of grades 2, 4, 6 and 8
>= 9.5 % <= 13.99 %	Medium risk	Grades 2 and 8
<= 9.49 %	Low risk	none

Dental health screening in grades 2, 4, 6 and 8 involves a quick visual inspection of the mouth using a light, a mirror and an explorer. The hygienist looks for immediate acute dental conditions, as well as the need for preventative measures such as fluoride, pit and fissure sealants, or preventive instruction. Treatment needs are identified and followed up in the same way as for participants of the Dental Indices Survey.

The number of schools identified as high, medium and low risk is shown in Figure 10 below. In 2004/05, more schools were classified as medium risk and fewer schools were classified as low risk compared to the two previous years.

Figure 12: Number of schools classified as high, medium and low risk, 2002/03 – 2004/05

	High risk	Medium risk	Low risk
2002/03	16	7	30
2003/04	13	8	33
2004/05	15	14	25

We are aware that there must be some children with urgent dental needs in the grades that are not screened. However, we adhere to the guidelines for determining which grades to screen. We will screen children in other grades if requested.

Discussion

It is a widespread concern that although the incidence of cavities has declined throughout North America and Western Europe, there is growing disparity of dental health according to socioeconomic status. Children living in lower income households have more untreated decayed teeth than their higher income counterparts (Beynon et al, 2004). People with lower incomes report fewer dental visits, tend to visit dental offices for emergency care only and receive fewer preventive services (Ontario Association of Public Health Dentistry, 2004).

It is this issue that the Children in Need of Treatment (CINOT) program is designed to address. However, CINOT only provides for urgent treatment needs for children up to age 14/grade 8. In RC&D, there is limited assistance for youth and adults who are unable to access dental care because of low incomes.

In the year 2000, 9.3 percent of economic families in Renfrew County and District had incomes below the low-income cut-off, or LICO. At that time, about 12 percent of children under age 15 lived in families with incomes below the LICO (Statistics Canada, 2001 Census).

A question of public health concern is, "Did the Dental Indices Survey and the dental health screening program identify the children who needed dental treatment?" A discussion of the effectiveness of the Ontario Dental Indices Survey and the dental screening program is beyond the scope of this report. Public health dental programs are being reviewed in 2006 and 2007 and we expect changes in how these programs are to be carried out.

Another question is, "Did the children who were identified with urgent dental needs get the treatment they needed?" We use several steps to follow up with parents of children with urgent needs. Not all children who are eligible for the CINOT program receive treatment quickly, and the reasons for this are complex.

Summary

This report focused on the dental health of four and five year old children in Renfrew County and District for three consecutive school years: 2002/03, 2003/04 and 2004/05. A summary of the findings are shown in Figure 12 below.

Figure 13: Summary of dental health indicators for four and five year olds in Renfrew County and District, 2002/03 - 2004/05, three-year averages

Dental Health Indicator	Four year olds	Five year olds
Caries-immunity (never had a cavity)	73%	66%
Mean deft/DMFT	1.30	1.71
Mean deft/DMFT of children with 1 or more	4.87	5.06
Urgent dental treatment needs	8.3%	9.8%
Non-urgent dental treatment needs	5.7%	4.5%
Average number of children/year who received dental treatment paid by the CINOT program	82 children/year	
Average CINOT cost/child/year	$424/child/year	
Average CINOT cost for 4 and 5 year olds/year	$34,587/year	
Average proportion of all CINOT expenditures for 4 and 5 year olds	29%	

Caries immunity and mean deft/DMFT were relatively stable over the three years studied. Mean deft/DMFT scores for Renfrew County and District five year olds in 2002 - 2005 were higher (worse) than in 1988 and 1990, although we are unable to determine if the results from the two time periods are directly comparable.

The proportion of children with urgent and non-urgent dental treatment needs increased between 2002/03 and 2004/05. CINOT costs for 4 and 5 year olds also increased, both in dollars and in proportion of all CINOT expenditures.

Recommendations for Dental Health Programs at the Renfrew County and District Health Unit

- Continue to monitor the results of the Dental Indices Survey and report on any changes.
- Continue to offer dental health screening at Child Health Clinics (held monthly during the school year at locations across Renfrew County and District).
- Increase efforts to integrate oral health education into prenatal classes, the Healthy Babies Healthy Children program, and any healthy eating and healthy weight initiatives that reach young children.
- Involve members of the target group in the development of existing and new initiatives.
- Encourage health and social service providers to reinforce oral health education messages.
- Ensure that written communication about dental health programs and services is understandable to the target audience.
- Work with local and regional partners to promote early identification of dental disease and early initiation of regular dental care.
- Work with community partners to advocate for a public dental care program accessible to low income people of all ages.

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