UC San Diego
UC San Diego Previously Published Works

Title
Evaluation of the Sydney “Quit. For Life” anti-smoking campaign: Part 2. Changes in smoking prevalence

Permalink
https://escholarship.org/uc/item/6q3434n2

Journal
The Medical Journal of Australia, 144(7)

ISSN
0025-729X

Authors
Dwyer, Terry
Pierce, John P
Hannam, Cherie D
et al.

Publication Date
1986-03-01

DOI
10.5694/j.1326-5377.1986.tb115916.x

Peer reviewed

eScholarship.org Powered by the California Digital Library
University of California

resolve of recent quitters and help them to stay "quit". This hypothesis merits further investigation.

Acknowledgements
The "Quit. For Life" campaign was conducted under the auspices of the Minister for Health, and the Secretary of the New South Wales Health Department, and was largely funded by the Department. Additional support was received from the Commonwealth Department of Health, the Hospitals' Contribution Fund of Australia and the NSW State Cancer Council.

References

1. Egger G, Fitzgerald W, Frape G, et al. Results of large scale media antismoking campaign in Australia: North Coast "Quit for Life" programme. *Br Med J* 1983; 287: 1125-1128.
2. McGuire W. An information-processing model of advertising effectiveness. In: Davis HL, Silk AJ, eds. Behavioral and management science in marketing. New York: John Wiley & Sons, 1978.
3. Fishbein M, Ajzen I. Understanding attitudes and predicting social behaviour. Englewood Cliffs, NJ: Prentice-Hall, 1980.
4. Dwyer T, Pierce JP, Hannan CD, et al. Evaluation of the Sydney "Quit. For Life" anti-smoking campaign. Part 2. Changes in smoking prevalence. *Med J Aust* 1986; 144: 344-347.
5. McCombes M, Shaw D. The agenda-setting function of the mass media. *Public Opinion Q* 1972; 36: 176-187.
6. US Department of Health, Education and Welfare. Smoking and Health: a report of the Surgeon General, 1979. Washington, DC: DHEW, 1979.
7. Leventhal H, Niles P. Persistence of influence for varying durations of exposure to that stimuli. *Psychol Rep* 1965; 16: 223-233.
8. Leventhal H, Cleary P. The smoking problem: a review of the research and theory in behavioural risk modification. *Psychol Bull* 1980; 88: 370-405.

(Received May 9; accepted November 26, 1985)

Evaluation of the Sydney "Quit. For Life" anti-smoking campaign*

Part 2. Changes in smoking prevalence

(for editorial comment, see page 337; see also page 341)

Terry Dwyer, John P. Pierce, Cherie D. Hannam and Nick Burke

ABSTRACT Between June and November 1983, the "Quit. For Life" media campaign was conducted in Sydney to reduce the prevalence of smoking. Surveys on a cross-sectional sample of the Sydney population were conducted before and after the campaign, and similar measures were undertaken in the rest of Australia for comparison. The sample sizes for both the Sydney and control areas comprised more than 4000 subjects. In addition, a cohort of 949 residents of Sydney and Melbourne were followed for changes in the prevalence of smoking during the year of the campaign. The cross-sectional survey results for 1984 and 1983 demonstrated decreases in the prevalence of smoking of approximately 1% for both men and women in Sydney compared with the rest of Australia. In the cohort study there was a 3.4% decrease in smoking prevalence in Sydney compared with a 0.8% increase in Melbourne. The pooled estimate of the difference in smoking prevalence attributable to the campaign was 2.8% (95% confidence interval, 0.5%–5.1%).

(Med J Aust 1986; 144: 344-347)

The "Quit. For Life" campaign was a media-based intervention that was aimed at reducing the prevalence of smoking in Sydney. The campaign was conducted between June and November in 1983, using prime-time advertisements on television and radio and posters in public places. Counselling services for those who attempted to give up smoking were also provided.

Previous studies have reported conflicting results on the effectiveness of media-based programmes in changing community-wide levels of smoking. The Stanford "Three Communities Study",[1,2] which was active from 1972 to 1975, did not report a reduction in the prevalence of smoking as a result of a media intervention campaign, although a reduction in the number of cigarettes that were smoked per day took place. However, the study included a subgroup of heavy smokers at high risk of coronary heart disease who received intensive counselling over three years, in addition to the media campaign. This subgroup showed a substantial reduction in the prevalence of smoking.

The North Karelia Project in Finland, which ran from 1972 to 1977, involved a broad-based community intervention with a media component.[3] It achieved a 1% change in smoking prevalence compared with a control group. The only study to report a substantial effect was the North Coast "Healthy Lifestyle" project[4] that was conducted in Australia between 1978 and 1981. This campaign duplicated the Stanford study design; the town with the media campaign had a 5% greater reduction in the prevalence of smoking than did the control town.

The "Quit. For Life" campaign in Sydney was initiated because of the positive outcome of the North Coast project. However, the programmes discussed above had been conducted in rural or semi-rural settings, whereas the "Quit. For Life" campaign targeted the entire population of the greater Sydney metropolitan area (3.25 million people).

This paper reports the changes in smoking prevalence and cigarette consumption which could be attributed to the campaign.

Methods

The change in smoking prevalence was assessed primarily by comparing the results of a precampaign survey in May–June 1983, and a postcampaign survey in the same months in 1984. This is demonstrated graphically in Figure 1. For comparison, the same measurements were conducted on a sample drawn from the rest of Australia.

The 1983 precampaign survey was based on 9132 subjects aged 14 years and over: 3978 of these from Sydney and 5154 from the rest of Australia. In 1984, 8369 subjects were interviewed, 4051 of whom were in Sydney, and 4318 in the rest of Australia.

The primary comparison is with the "rest of Australia", as this is statistically the most powerful comparison. However, a separate comparison was made with Melbourne, because this city is more like Sydney in terms of its urban and demographic characteristics.

Subjects were selected and interviews were conducted by the Ray Morgan Research Company, a

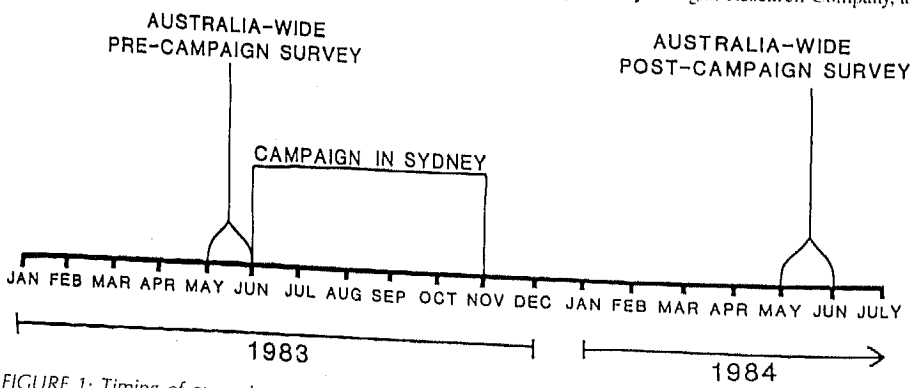

FIGURE 1: Timing of campaign evaluation.

*The project was managed by the following Steering Committee: A. Cripps (Chairperson), J. Carson, G. Frape, B. Higham, T. Carroll and S. Chapman (all of the NSW Department of Health); T. Dwyer and J. Pierce (School of Public Health and Tropical Medicine); D. Gadiel (Hospitals' Contribution Fund of Australia); E. Henry and G. Sarfaty (NSW State Cancer Council); B. Herriot (Australian Medical Association); J. Mullins (Pharmacy Guild of New South Wales); and J. Shaw and S. Walker (National Heart Foundation of Australia). S. Leeder (The University of Newcastle) acted as auditor to the project.

School of Public Health and Tropical Medicine, Building A27, The University of Sydney, NSW 2006.
Terry Dwyer, MD, MPH, Senior Lecturer.
John P. Pierce, MScEpid, PhD, Senior Lecturer.
Cherie D. Hannam, BA, Research Assistant.
Nick Burke, MB BS, Research Assistant.
Reprints: Dr J.P. Pierce.

commercial survey organization, by means of the following procedure. A list of all electoral subdivisions within Australia was compiled, and from this a sample of subdivisions was selected at random each week. A starting address within each subdivision was then selected at random from the electoral rolls. The interviewer who was assigned to that area used this address as a starting point and proceeded from this point in a clockwise direction around the residential block. The interviewer was instructed to obtain 10 interviews from this location on Saturdays and Sundays; an incentive was given to obtain interviews from the first 10 homes. If people were out, the interviewer was instructed to call back at least once.

Interviewers were given standard training by the Roy Morgan Research Company on how to approach prospective subjects, and on how to administer the questionnaire. The format of the questions was specified strictly. The question on smoking status was one that had been used previously by the Victorian Anti-Cancer Council.[5] Information was also obtained on the age, sex, marital status, education, income and occupation of the respondent.

The sampling procedure yielded an Australia-wide response rate of approximately 60%. This is less than optimal for an epidemiological survey of this kind, although it is comparable with the figures obtained in other recent large Australian surveys.[6] This procedure, with similar response rates, proves to be fairly accurate in predicting the results of elections, which suggests that the sample that is obtained may be relatively unbiased. To assess further whether there was any evidence of bias, a survey of non-respondents from the 1983 survey was conducted in Sydney and Melbourne in 1984. A comparision of non-respondents with respondents from the same areas in Sydney and Melbourne in 1983 is made in Table 1. The 1981 census as compiled by the Australian Bureau of Statistics (ABS)[7] was used to calculate the potential demographic parameters of the study sample if it were a representative sample from the suburbs that had been selected from the electoral roll.

There were no statistically significant differences in either Sydney or Melbourne between the demographic characteristics of the respondents and the calculation from the ABS data of the likely appearance of the representative sample. Further, there were no significant differences between study participants and the non-respondents who were located and surveyed one year later.

In addition to the before-and-after surveys, a cohort of 900 subjects in Sydney and 600 in Melbourne who were interviewed in the 1983 survey were selected for follow-up in April–June 1984, by means of the same broad methods of measurement that have been described for the cross-sectional surveys. At follow-up, 949 persons agreed to participate. A decision was made not to follow anyone who had changed their place of residence during the year and, excluding these subjects, the response rate was 76% in Sydney and 73% in Melbourne.

On two weekends of the May 1983 and May 1984 surveys, at the completion of the interview, all the respondents were asked to provide a sample of their saliva "for a study of environmental pollution". Cotinine is a direct product of nicotine break down, and the salivary cotinine concentration provides an estimate of the validity of self-reported smoking status. Of the 1172 people who were approached, 975 or 83.2% provided a satisfactory sample. The small differences in characteristics between participants and non-participants in the cotinine analysis were considered unlikely to bias the results.

Estimates of the change in the prevalence of smoking were obtained from both the cross-sectional and the cohort studies. In order to produce a better assessment of the change due to the campaign, these results were pooled to give an overall estimate of the effects of the campaign.

TABLE 1: Comparison of Sydney and Melbourne on relevant sociodemographic characteristics

	Sydney			Melbourne		
	1983 survey (n=900)	Non-response (n=464)	ABS* (n=1 145 121)	1983 survey (n=600)	Non-response (n=284)	ABS* (n=819 284)
Sex						
Male	49.0%	44.0%	49.1%	47.2%	43.7%	49.9%
Female	51.0%	56.0%	50.9%	52.8%	56.3%	50.1%
Age (years)						
14–19	15.8%	13.6%	12.6%	10.3%	9.2%	13.6%
20–39	41.3%	43.1%	41.7%	48.7%	44.4%	41.6%
40–59	24.3%	26.1%	27.8%	21.8%	20.8%	28.2%
60 and over	18.6%	17.2%	17.9%	19.2%	25.7%	16.6%
Education						
Tertiary	15.1%	14.9%	11.9%	15.8%	15.8%	11.6%
HSC equivalent	11.4%	11.2%		12.8%	14.1%	
Below HSC level	66.1%	65.7%		66.5%	64.1%	
Employment						
Employed	47.5%	50.0%	57.5%	55.3%	44.3%	56.4%
Unemployed	5.7%	5.6%	2.4%	4.5%	3.6%	2.3%

* ABS data is from the same suburbs as the survey data.

TABLE 2: 1983 and 1984 prevalence of smoking in Sydney compared with the rest of Australia

	Sydney			Rest of Australia		
	Men	Women	Total	Men	Women	Total
1983	1969(35.9%)	2009(30.4%)	3978(33.1%)	2464(39.2%)	2690(29.3%)	5154(34.1%)
1984	2035(31.7%)	2016(28.8%)	4051(30.3%)	2155(35.9%)	2163(29.1%)	4318(32.5%)
Difference	−4.2%	−1.6%	−2.8%	−3.3%	−0.2%	−1.6%

Results

Validation of self-reported smoking status

In 1983 in Sydney, the estimated prevalence of smoking as based on self-report was 0.7% greater than the prevalence based on salivary cotinine estimation. In 1984, the situation was reversed with the cotinine estimation of smoking prevalence being 1% higher than the self-reported estimate. There was a similar trend in Melbourne, with the self-reported estimate being 3% greater than the cotinine estimate in 1983, and no difference between them in 1984. These results will be described in detail elsewhere. In view of the small differences between the estimates of the prevalence of smoking as based on salivary cotinine concentration and self-reports, only the self-reported results are given below.

Changes in smoking prevalence

The first estimate of the change in the prevalence of smoking comes from the April–June cross-sectional surveys in 1983 and 1984. Table 2 shows changes in prevalence for both sexes in Sydney compared with the rest of Australia for these surveys. In Sydney there was an overall decrease in the prevalence of smoking of 2.8%, which compared favourably with a decrease of 1.6% in the rest of Australia. In this survey the difference between Sydney and and the rest of Australia of 1.2% (standard error of the difference, 1.49) was not statistically significant with a test of difference in proportions based on the normal approximation.

Age and sex categories were examined to determine whether there had been a larger effect within major subgroups. However, there was no obvious pattern (Figure 2). We also examined specific subgroups as defined by marital status, education, income and occupation, but again were unable to detect substantially different effects within subgroups. A logistic model that was designed to predict the smoking status, which included age, sex, education, and marital status, found the year of interview to be a significant variable ($P<0.05$), but neither the location of interview, nor the interaction between the location of interview and the year of interview was significant.

Number of cigarettes smoked a day among smokers

For men there was a decrease in the average number of cigarettes smoked in Sydney, but an increase in the rest of Australia, although the difference was not significant (see Table 3). Women experienced a decrease in the average number of cigarettes that they smoked a day in both areas, but the decrease was greater in Sydney. If the median number of cigarettes smoked a day was used, similar results were obtained, but with a more pronounced effect among women in Sydney.

Changes in smoking status in the cohort study

Table 4 shows the changes in 934 subjects in smoking prevalence in Sydney compared with Melbourne, with appropriate measures in the cohort study in both 1983 to 1984. This shows a positive campaign effect for Sydney, with a 3.4% decrease in prevalence, compared with a slight increase in prevalence in Melbourne. When allowance was made for the different smoking prevalence in Melbourne and Sydney at cohort inception, the standardized difference

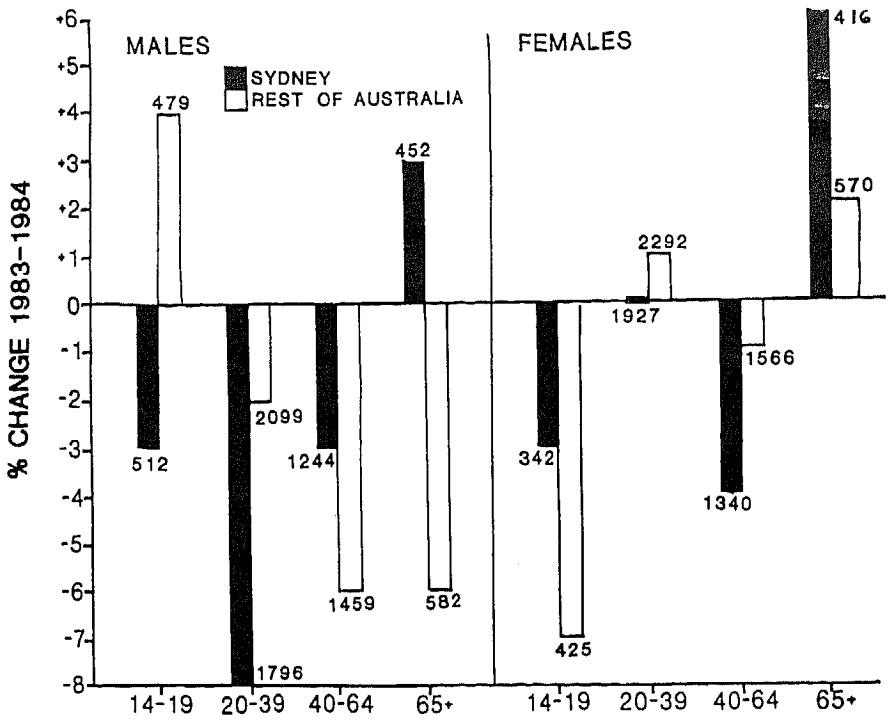

FIGURE 2: Changes in smoking prevalence by age and sex.

TABLE 3: Changes in mean number of cigarettes smoked a day by smokers in Sydney and the rest of Australia*

	Men		Women	
	Sydney	Rest of Australia	Sydney	Rest of Australia
1983	580(20.1%)	757(20.3%)	576(18.4%)	721(18.2%)
1984	576(19.5%)	678(20.5%)	587(17.1%)	639(17.4%)
Difference	−0.6%	+0.2%	−1.3%	−0.8%

* These data were collected from a survey of 9132 Australians in May–June 1983 and 8369 in May–June 1984.

TABLE 4: Changes in smoking prevalence in the cohort study in Sydney and Melbourne*

	Sydney (n=570)	Melbourne (n=364)
1983	30.9%	36.8%
1984	27.5%	37.6%
Difference	−3.4%	+0.8%

* The replies from 15 respondents were not included because of incomplete information.

between the cities for the 12-month period was 5.4% (standard error of the difference in proportions, 1.89). This difference was significant ($P<0.01$), with a normal approximation. In order to allow for potential confounding factors, a logistic model was developed to predict quitting smoking. The only significant predictor ($P<0.05$), of those smokers who quit was the location of interview (Sydney compared with Melbourne). Sex, age, education, marital status, and socioeconomic status were not important predictors of change in this sample.

Estimate of total campaign effect

An estimate of the overall effect of the campaign can be made from the two studies by means of the estimates from each study and their standard effors, that is 1.2% (SE, 1.49) for the cross-sectional study and 5.4% (SE, 1.89) for the cohort study. This is performed by forming a weighted mean of the two estimates, with the inverse of the variances of each estimate as weights and assuming independence between the two studies.

$$\text{Weighted mean} = [a(-1.2) + b(-5.4)] \div (a + b)$$

where $a = (1/1.49)^2$, and $b = (1/1.89)^2$ with the standard error being derived from $1/\sqrt{(a+b)}$.

This gives a combined estimate of the effect of the campaign of 2.8% (95% confidence interval, 0.5%–5.1%), which is statistically significant.

Prices of cigarettes and tobacco

The consumer price index for cigarettes and tobacco products within each state are collected as a routine by the ABS on a quarterly basis.[9]

TABLE 5: Consumer price index* for cigarettes and tobacco in Sydney compared with the rest of Australia, 1983–1984

	Sydney	Rest of Australia
March 1983	128.4	133.7
June 1983	133.1	137.2
September 1983	137.4	145.9
December 1983	149.6	158.6
March 1984	151.5	161.0

* Base: 1980–1981 = 100.0.

These data show that, during the campaign period, there was a smaller increase in price in Sydney than the average for the rest of the Australian cities (Table 5). The effect of these different price increases should be to reduce smoking more in the rest of Australia than in Sydney. If this had occurred, it would have reduced the chance of detecting a true campaign effect in Sydney.

Discussion

The results from the evaluation suggest that the "Quit. For Life" programme did have some impact on the prevalence of smoking. Although the before-and-after cross-sectional surveys failed to reveal a significant difference, a greater decrease was observed in Sydney than in the rest of Australia. This decrease was mirrored by the cohort study, which demonstrated a significant decline in the prevalence of smoking in Sydney compared with Melbourne. The conclusion that the campaign had a real effect is also supported by the reported observations on the immediate impact of the campaign,[9] and the decline in the mean number of cigarettes smoked in Sydney from 1983 to 1984 in contrast with the small change elsewhere in Australia.

The estimate of change in Sydney compared with the control areas was 2.8% (95% confidence interval, 0.5%–5.1%), a decrease in smoking prevalence greater than that achieved in California by the Stanford Heart Disease Prevention Program,[1,2] and in Finland by the North Karelia group.[3] The magnitude of the change was less than the 5% change observed during the North Coast Healthy Lifestyle project,[4] but this may reflect a number of differences between the two campaigns. In the North Coast study, a major controversy developed between the tobacco companies and the Health Department about anti-smoking campaigns. The towns received considerable attention from the national media as a result. It is possible that this led to a "Hawthorne effect"[10] in the intervention towns, and produced greater decreases in smoking than in other similar projects.

The likelihood of a bias either in measurement or in the selection of subjects has been discussed, and we have indicated that a substantial effect from either is unlikely. The comparability of self-reported and biochemical measures of smoking status in Sydney supports a lack of measurement bias. However, it is possible that biases in other areas may have influenced the results. Anti-smoking campaigns were operating in South Australia and Western Australia for part of the campaign period. Therefore, these States were not true control areas, and this could have reduced the chances of detecting a positive campaign effect in Sydney. The greater increase in the price of cigarettes in areas other than Sydney could also have masked a positive campaign effect.

Thus, the campaign appears to have led to an extra 2.8% reduction over the current trend of Australians to stop smoking. In Sydney, this estimate means that there were approximately

83 000 fewer smokers in 1984 than in the previous year.

Acknowledgments
The "Quit. For Life" campaign was conducted under the auspices of the then Minister for Health, Mr Laurie Brereton, and the then Secretary of the New South Wales Health Department, Mr B. McKay, and was largely funded by the Department. Additional support was received from the Commonwealth Department of Health, the Hospitals' Contribution Fund of Australia, and the NSW State Cancer Council.

References

1. Farquhar JW, Maccoby N, Wood PD, et al. Community education for cardiovascular health. *Lancet* 1977; 1: 1192-1195.
2. Maccoby N, Solomon D. Heart disease prevention: community studies. In: Rice RE, Paisely WJ, eds. Public communication campaigns. Beverly Hills: Sage Publications, 1981.
3. Salonen JT, Puska P, Kottke TE, Tuomilehto J. Changes in smoking, serum cholestrol and blood pressure levels during a community-based cardiovascular disease prevention program — the North Karelia Project. *Am J Epidemiol* 1981; 1: 114.
4. Egger G, Fitzgerald W, Frape G, et al. Results of large scale media antismoking campaign in Australia: North Coast "Quit for Life" Programme. *Br Med J* 1983; 287: 1125-1128.
5. Hill DJ, Gray NJ. Patterns of tobacco smoking in Australia. *Med J Aust* 1982; 1: 23-25.
6. National Heart Foundation of Australia. Risk factor prevalence study report no. 1. Canberra: National Heart Foundation, 1980.
7. Australian Bureau of Statistics. 1981 census microfiche, 81-205. Post Code Areas. Canberra: ABS, 1981.
8. Australian Bureau of Statistics. Average retail price of selected items, eight capital cities. Canberra: ABS, 1983; Catalogue no. 6403.0.
9. Pierce JP, Dwyer T, Frape G, et al. Evaluation of Sydney "Quit. For Life" anti-smoking campaign. Part 1. Achievement of intermediate goals. *Med J Aust* 1986; 144: 341-344.
10. Roethlisberger FJ, Dickson WJ. Management and the worker: an account of a research program conducted by the Western Electric Company. Chicago: Harvard University Press, 1939.

Bone-marrow transplantation for haematological malignancy in childhood

(for editorial comment, see page 338; see also page 372)

Marcus R. Vowels, P. Reg L. Lam-Po-Tang, David Ford, Hedy Mameghan, Darcy W. O'Gorman-Hughes, John B. Ziegler, Yiu-Lam Kwan and Les White

ABSTRACT Twenty-three children with haematological malignancies and a poor prognosis underwent bone-marrow transplantation. Thirteen children had acute lymphoblastic leukaemia, eight had acute non-lymphoblastic leukaemia, one had chronic myeloid leukaemia and one had malignant histiocytosis. One child was in relapse at the time of transplant and 22 were in first or subsequent remission. Before transplantation all patients received cyclophosphamide (60 mg/kg) on two consecutive days followed by total body irradiation given as a single dose of 10 Gy at 0.18 Gy/min (one patient) or 0.07 Gy/min (three patients), or as a fractionated dose of 10–12 Gy at 0.07–0.1 Gy/min (19 patients). One child with malignant histiocytosis also received two doses of etoposide (5 mg/kg). Methotrexate was given after transplantation to prevent or modify graft-versus-host disease (GVHD). One patient who received a transplant in relapse died early from overwhelming bacterial sepsis. Twenty-two patients engrafted, and of these 11 developed acute GVHD; five developed chronic GVHD; seven developed interstitial pneumonitis, with four deaths; and five relapsed between three and 12 months after transplantation, with three deaths. Fifty-nine per cent (13/22) of patients who received a transplant during remission remain in continuous complete remission and 68% (15/22) have survived for a median of 18 months (range, four to 73 months). Bone-marrow transplantation that is undertaken during remission of disease offers a prolonged disease-free survival in selected childhood malignancies.

(Med J Aust 1986; 144: 347-350)

The Prince of Wales Children's Hospital, High Street, Randwick, NSW 2031.
Marcus R. Vowels, FRACP, Head, Department of Paediatric Haematology/Oncology.
P. Reg L. Lam-Po-Tang, FRCPA, Staff Haematologist.
David Ford, FAIMLS, Senior Medical Technologist.
Hedy Mameghan, FRCR, Staff Radiotherapist.
Darcy W. O'Gorman-Hughes, MD, FRACP, Associate Professor of Paediatrics.
John B. Ziegler, FRACP, Staff Immunologist.
Yiu-Lam Kwan, FRCPA, Staff Haematologist.
Les White, FRACP, Paediatric Oncologist.
Reprints: Dr M.R. Vowels.

Bone-marrow transplantation was introduced as therapy for haematological malignancy in Seattle in 1969.[1] Initially it was offered late in the disease and undertaken when the patient was in relapse, often infected and in poor condition. In this setting 15% of patients died from infection and/or bleeding within two months of transplantation and only 17% of patients survived in the long term.[1] These results suggested that bone-marrow transplantation should be performed earlier in the disease when the patient was in remission and in better general condition. With this approach, 30% to 60% of patients survived, free of disease, for two years or more.[2,3]

These results contrast with those obtained when patients received chemotherapy for the treatment of childhood leukaemia in relapse. In acute lymphoblastic leukaemia (ALL) and acute non-lymphoblastic leukaemia (ANLL) the proportion of survivors at two years was less than 20% and 5%, respectively.[4,5] Moreover, when ANLL was treated initially with chemotherapy the survival was 20% to 30% at two years; in chronic myeloid leukaemia there were virtually no long-term survivors.[6-8]

Thus, bone-marrow transplantation appeared to have a role in the management of childhood malignancy in patients in whom the prognosis was poor with conventional therapy. This report reviews the first 23 patients who underwent transplantation at our hospital.

Patients and methods

Between May 1, 1975 and December 31, 1984, 23 patients underwent bone-marrow transplantation for childhood haematological malignancy at The Prince of Wales Children's Hospital; these children form the basis for this review. Informed consent was obtained from the parents, as well as from the patient and the donor where age permitted. All patients and donors agreed to and were enthusiastic about the transplant. There were three periods of patient selection. Transplantation was initially offered in late-stage disease, was then offered earlier in the disease but after at least one relapse while receiving therapy, and, more recently, has been undertaken for ANLL in first remission.

Donors were required to be HLA-identical and mixed lymphocyte culture (MLC) non-reactive, to be older than one year of age, and to be in excellent health. Recently, donor selection has been widened to include siblings with one mismatched antigen. Donor marrow was collected under general anaesthesia from posterior and anterior iliac crests. The collected marrow was filtered through wire mesh to remove bone and fat particles and then infused into the recipient by the intravenous route over one to two hours without a filter.[9] A unit of blood for transfusion was collected from the donor a week beforehand and reinfused on the day of the marrow collection.

Before transplantation, conditioning therapy that was aimed both at the eradication of the underlying disease process and immunosuppression to prevent graft rejection, was given. All patients received cyclophosphamide (60 mg/kg) on two consecutive days, and in one patient with malignant histiocytosis two doses of etoposide (5 mg/kg) were added. After a two-day rest this was followed by 10–12 Gy of total body irradiation. The first patient received a single dose of 10 Gy which was delivered at 0.18 Gy/min over 18 hours; the next three patients received a single dose of 10 Gy at 0.07 Gy/min; and the remainder received fractionated total body irradiation (10–12 Gy at 2 Gy/fraction) twice a day at 0.07–0.1 Gy/min.

When major ABO blood group incompatibility was present, plasmapheresis of the recipient to an anti-A or anti-B titre of below one in four was undertaken before the transplantation.

Methotrexate was administered after the transplantation to prevent or to modify graft-versus-host disease (GVHD).[1] The first 11 patients received 15 mg/m^2 of methotrexate on day 2, 10 mg/m^2 on days 4, 7 and 12 and then weekly until 103 days after the transplantation. The doses on days 26, 54 and 82 were given by the intrathecal route to decrease the risk of meningeal leukaemia. The next 12 patients received identical doses of methotrexate until day 26, after which methotrexate was only given by the intrathecal route on days 54 and 82. If meningeal leukaemia was known to have been present previously, intrathecal methotrexate was given for a further 15 months after the transplantation at intervals of eight weeks. GVHD (acute and chronic) was diagnosed and graded for severity according to published criteria.[10,11]