The Tobacco Project

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Executive Summary

The Tobacco Project involved a cohort study to assess the effect of community tobacco interventions in Indigenous communities. It compared tobacco consumption in three communities that had held multi-component community tobacco interventions funded by Incentive Fund grants and delivered in conjunction with a ‘menu’ of evidence based interventions delivered by Aboriginal Project Officers (APOs), with tobacco consumption in three communities that had not. Only one intervention achieved a significant drop in tobacco consumption compared to its control community, with the interventions not being fully implemented in the other two communities.

The study also involved ‘before and after’ evaluation in intervention communities. There was a non-significant rise in the prevalence of tobacco use in a cohort of community residents followed up at the end of the intervention year (68 per cent to 70 per cent, p=0.52). Significantly more participants, however, were taking action to quit or thinking about quitting (61 per cent vs 72 per cent, p=0.02) and participants’ knowledge about the health effects of tobacco use had greatly increased. Community surveys showed a non-significant decrease in the overall prevalence of tobacco use (68 per cent to 67 per cent).

The evaluation suggests that incentive funds for community tobacco interventions have the potential to reduce the harm resulting from tobacco, but the success of these interventions depends on the capacity of both the community and the government tobacco unit to support the interventions.
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Lidia Tsirogianis of Independent Grocers (Darwin) kindly provided information on tobacco orders from participating communities (with their permission). Top End Wholesalers (now part of Independent Grocers) also provided some consumption data. Richard Frampton of the Arnhemland Progress Association (ALPA) also provided insights into the vendor’s perspective of sales of tobacco on remote communities.

The Institute for International Health, University of Sydney, provided office space while compiling this report. Sam Coleman of the Institute for International Health provided assistance with statistical calculations.
Background

The health effects of tobacco use for Indigenous people

In 1992-4, Indigenous people in Western Australia, South Australia and the Northern Territory had a life expectancy 15-20 years less than that of the general population (75.0 years for males born in 1994 and 80.9 years for females) (McLennan & Madden, 1997). Much of the excessive mortality and morbidity experienced by Indigenous people is due to lifestyle factors. They experience high rates of cardiovascular disease, respiratory disease and other diseases, many of which are related to tobacco use.

In 1995, 27 per cent of Australian men, and 23 per cent of Australian women smoked (Hill, White, & Scollo, 1998). By contrast, a national survey conducted in 1994 found that 54 per cent of Indigenous men, and 46 per cent of Indigenous women smoked (AIHW, 1996). In surveys conducted in the Top End of the Northern Territory, up to 83 per cent of Indigenous men (Hoy, Norman, Hayhurst, & Pugsley, 1997) and up to 73 per cent of Indigenous women smoked (Watson, Fleming, & Alexander, 1988).

Tobacco interventions for Indigenous people

Many studies have assessed the effectiveness of tobacco interventions in other populations. Despite the high prevalence of tobacco use, and high prevalence of tobacco-related disorders, there are few tobacco interventions for Indigenous Australians that have been evaluated.

Community based smoking cessation interventions

The evidence in favour of community tobacco interventions is unclear. There is some evidence that community tobacco interventions are effective in reducing uptake of tobacco use in young people (Sowden & Arblaster, 2000). The effectiveness is less clear for interventions for adults, however.

In one large trial conducted in the United States, the Community Intervention Trial for Smoking Cessation (COMMIT, 1995), a large-scale multi-component community intervention was assessed to ascertain its effect on the prevalence of smoking. Communities within 11 matched pairs were randomly assigned to either a control or intervention group, with the intervention group being exposed to a multi-component intervention delivered through the media, by health care providers, at worksites and through cessation programs. A cohort of smokers followed over the trial showed a significant increase in the cessation rate among light-moderate smokers in intervention communities compared to that in control communities (31 per cent vs 28 per cent, p=<0.01) and a non-significant decrease in the cessation rate in heavy smokers in the intervention communities compared to that in the control communities (18 per cent vs 19 per cent) (1995a). COMMIT demonstrated an overall drop in the prevalence of smoking of 3.5 per cent in intervention communities and a 3.2 per cent drop in control communities, a non-significant difference (1995b).

The effect of community tobacco programs for Indigenous people has not previously been assessed. Community based health programs have been successfully trialled in Indigenous communities (Lee, Bailey, Yarmirr, O'Dea, & Mathews, 1994; Mackerras, 1998) and it is possible that such programs may develop a momentum that is not achievable in the delivery of individually based programs.
**Brief interventions delivered to individuals**

Brief interventions delivered by health professionals are effective in reducing the prevalence of smoking and advice given by physicians increases the chance of quitting. A systematic review of data from 16 trials revealed a small but significant increase in the odds of quitting with brief advice (odds ratio 1.69) (Silagy & Ketteridge, 1998). A Cochrane Review of 15 studies of brief counselling on quitting given by nurses concluded that counselling increased the chance of quitting, resulting in an odds ratio of 1.43 (Rice & Stead, 1999). Another Cochrane Review of 11 randomised or quasi-randomised trials of counselling from a health care worker not involved in routine clinical care found that individual counselling was more effective than control. The odds ratio for successful smoking cessation was 1.55. There was no evidence that more intensive counselling was more effective than brief counselling (Lancaster & Stead, 1999).

Only one study has reported on brief interventions for tobacco use for Indigenous Australians and this did not assess smoking cessation as an outcome (Harvey et al., 2002).

**Training health professionals in smoking cessation**

Silagy, in a meta-analysis of delivering additional training to health care professionals to provide smoking cessation interventions, concluded that such interventions slightly increased smoking cessation (Silagy, Lancaster, Fowler, & Spiers, 1997). Only one study has evaluated a program to train health professionals to give cessation advice to Indigenous smokers involving health professionals who had been trained in the delivery of a brief intervention on tobacco and who were working with Indigenous people in three northern Queensland communities. Six months after the program they commented that, while the intervention was suitable for delivery in their communities, competing health priorities meant that it was difficult to continue to deliver advice on cessation (Harvey et al., 2002).

**Provision of nicotine replacement therapy**

Nicotine replacement therapies (NRT) are most useful for heavy, or addicted, smokers. Their main effect is to ease withdrawal symptoms such as craving or mood changes. A meta-analysis of nicotine replacement therapies in smoking cessation (Silagy, Mant, Fowler, & Lodge, 1994) analysed 53 trials of nicotine replacement therapies including nicotine gum, nicotine patches, nicotine sprays and inhalers. Use of nicotine gum increased the odds ratio of abstinence to 1.71 (CI 1.46-1.78). The use of nicotine patches increased the odds ratio of abstinence to 2.07 (CI 1.64-2.62). There is little data on the use of nicotine replacement therapy by Indigenous people, although a study of the use of nicotine patches in three remote Indigenous communities showed that 16 per cent of Indigenous people who had used nicotine patches had quit after six months (personal communication, Ivers, 2003).

**Quit smoking courses and clinics**

Group behaviour therapy programs or quit courses in smoking cessation are more effective than self-help interventions in helping people to quit smoking (Stead & Lancaster, 2000a). There are no quit smoking courses for Indigenous people evaluated in the medical literature, but Quit Victoria have run quit courses specifically for Indigenous people (Briggs, 1998).

**Point of sale interventions**

Educational programs for tobacco retailers have limited impact in reducing tobacco sales to minors, although enforcement of retailing laws reduces sales to minors (Feighery, Altman, & Shaffer, 1991). There has been no evaluation of the effect of education and enforcement of retailing laws on reducing sales to minors among Indigenous people.
Changes of price and changes in supply may have an effect on smoking prevalence (Chollat-Traquet, 1996). In one study in Papua New Guinea, a 10 per cent increase in tobacco excise led to a 7 per cent fall in demand for cigarettes and a 5 per cent fall in demand for tobacco (Chapman & Richardson, 1990). Changes of supply of food have made real changes to nutrition for Indigenous people (Lee et al., 1994). There is potential for changes in price and supply of tobacco products through remote community stores to be used in smoking programs, especially as these stores often have a monopoly on tobacco sales in the community (McMillan, 1991).

**Smokefree areas**

Clean indoor air policies reduce smoking prevalence. Findings from COMMIT showed that employees in smoke-free worksites were 25 per cent more likely to quit than workers at other worksites (Glasgow, Cummings, & Hyland, 1997). Borland, Owen and Hocking (1991) also assessed the effect of workplace smoking bans. Following a ban on smoking by Telecom Australia, smoking prevalence dropped by 5 per cent, which was estimated to be twice the decline found in the general community. One study of the introduction of smoke-free policies in Indigenous workplaces in Queensland found that such policies were seen as acceptable in those workplaces (Seibold, 2000).

**School based interventions**

School-based tobacco interventions were more likely to decrease uptake of tobacco use if they used social reinforcement techniques instead of the delivery of simple education or information (Bruvold, 1993). The only known study of a school-based intervention targeted at Indigenous children was the Maningrida ‘Be Smoke Free’ Project, a two week educational intervention in the school of a remote Indigenous community in the Top End. The intervention included the launch and use by students aged 5-17 years of a locally produced CD-ROM and other educational interventions. Most children had a reasonable knowledge about the health effects of smoking. It was difficult to assess, however, whether there was any change in prevalence or knowledge about smoking because of poor attendance at participating schools (Johnston, Beecham, Dalgleish, Malpraburr, & Gamarania, 1997).

**Media campaigns**

Media campaigns have an effect in reducing smoking prevalence. The National Tobacco Campaign (NTC), launched in 1997, involved a media campaign (including television and radio advertising) coordinated with quitline services and resulted in a statistically significant reduction of 1.5 per cent in the estimated adult prevalence of smoking (NTC,1999 p25). The campaign resulted in an increase in the population cessation rate from 8 per cent to 11 per cent (NTC,1999 p45). Exposure to the campaign was high: 95 per cent of smokers or recent quitters recalled seeing anti-tobacco advertising during the campaign (NTC,1999 p33). An investigation of the impact of NTC on Indigenous people in Victoria showed there were high levels of awareness of the campaign, high levels of message recall and high levels of knowledge about the health effects of tobacco (NTC,1999 p238-240).
Introduction

Overview of the Tobacco Action Project (TAP)

The Tobacco Project involved evaluating the community tobacco interventions funded through Territory Health Service’s (THS)’ Tobacco Action Project (TAP) when it was delivered in conjunction with a range of evidence-based tobacco interventions offered by the TAP Aboriginal Project Officers (APOs).

TAP, the main tobacco unit of THS, was first funded in 1995, receiving approximately $500,000 per year. Priority target groups included Indigenous adults, young people (18-24 years) and minors. The key goals of TAP were:

- to reduce the prevalence of smoking among Territorians, particularly in target groups;
- to increase the proportion of the population that had never smoked; and
- to reduce exposure to environmental smoke.

Aims of the TAP Incentive Funds Program

Prior to 1998, TAP had conducted a sports sponsorship program, which involved the distribution of grants of $500 for sponsorship of sporting teams, for example to purchase T-shirts or jerseys bearing Quit logos. The program was abandoned and replaced with the Incentive Fund Program, which provided grants of approximately $3000 to Indigenous communities for community-based tobacco programs to reduce the damaging effects of tobacco for Indigenous people. Grants were available for projects that addressed tobacco use by:

- adopting smoke-free community buildings and areas;
- providing education on the health and social effects of smoking; or
- supporting smokers to quit.

Funding was to be provided for operational costs only, and was not available for salaries or the purchase of equipment. Funded projects were supported by APOs who, depending on the wishes of the community, delivered evidence-based interventions such as training health professionals in the delivery of smoking cessation advice, conducting educational sessions at the school, distributing health promotion material, promoting smoke-free sporting activities and promoting the introduction of policy to make enclosed public places smoke-free.

Aims of the project

The project aimed to assess the effect of multi-component community based tobacco interventions funded by small health promotion grants, which were delivered in conjunction with a range of evidence-based tobacco interventions delivered by APOs, in three intervention communities, compared to three control communities.
Project methodology

Study design

The project primarily involved comparison of tobacco turnover in three communities that received an Incentive Fund grant for a tobacco project, with consumption in three matched communities that did not receive grants. It also involved ‘before and after’ evaluation of the community tobacco intervention in intervention communities using stakeholder interviews, observation and community surveys.

Selection of intervention communities

The process of grant application in 1999 included the following steps:

- TAP APOs faxed or mailed information about the Incentive Fund and application forms to health centres and community councils in all Indigenous communities in the NT in August and December of 1999. In 1999, six grants of up to $3000 each were available.
- Communities submitted applications to TAP and a panel decided which grants would be funded.
- Communities that were successful in obtaining a grant were asked if they wished to participate in the evaluation of the Incentive Fund projects.
- The researcher visited each community to explain the process of evaluation and met with the community council, community health centre, health board (where one existed), store managers, and school staff.
- The community council was asked to provide a letter of approval if they wished the community to be involved in the evaluation of the tobacco project.

Selection of control communities

A control community was selected for every community that received an Incentive Fund grant and had agreed to be part of the evaluation. Control communities were matched so as to provide a community of similar population, geographical location and culture to that of the intervention communities. None of the control communities had ever applied for a TAP Incentive Fund Grant.

The intervention

The intervention included the project that had been developed by the community and for which the community received the Incentive Fund grant. It was delivered in conjunction with a range of optional evidence-based tobacco interventions. The participating communities were offered a ‘menu’ of evidence-based tobacco interventions from which they could choose a package of tobacco interventions to suit their own community, which would be delivered by the two APOs from TAP. Table 1 lists the evidence based interventions from which communities could choose.
Table 1 ‘Menu’ of evidence-based tobacco interventions offered to communities

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Estimated time for delivery</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community intervention</td>
<td>Dependent on community application</td>
<td>Intervention as specified by community</td>
</tr>
<tr>
<td>Training health professionals in delivering a brief intervention on tobacco</td>
<td>2 hours</td>
<td>Delivery of training module on brief interventions for smoking cessation, using the Pongi Pongi (Tobacco) Book training module. (NHF,1999). The health centre was also given at least one set of health promotion materials, including a flip chart, two posters, approximately 50 booklets and pamphlets and a training manual.</td>
</tr>
<tr>
<td>Nicotine Replacement Therapy (NRT)</td>
<td>1 hour</td>
<td>Discussion with health professionals to ensure that NRT was accessible.</td>
</tr>
<tr>
<td>Quit course</td>
<td>A total of 6 hours</td>
<td>A quit course for community members and / or health professionals.</td>
</tr>
<tr>
<td>Point of sale intervention</td>
<td>2 hours</td>
<td>Discussion with store managers regarding legislation on sales to minors.</td>
</tr>
<tr>
<td>Smoke-free environments</td>
<td>4 x 1 hour talk</td>
<td>Discussions with the community council, store managers, school principal, CDEP staff, art centre staff and staff of other public places about the introduction of no-smoking policies for enclosed areas.</td>
</tr>
<tr>
<td>Distribution of health promotion material</td>
<td>-</td>
<td>Distribution of posters, pamphlets, stickers and other health promotion material around the community.</td>
</tr>
<tr>
<td>Quitline promotion</td>
<td>½ hour</td>
<td>Promotion of Quitline by placement of stickers showing the Quitline number in all public telephone booths and in other phones in the community.</td>
</tr>
<tr>
<td>School intervention</td>
<td>1 day</td>
<td>Presentations to school students about the effects of tobacco use on health.</td>
</tr>
<tr>
<td>Media</td>
<td>1 hour</td>
<td>Presentations on local media (radio or television) about the effects of tobacco use.</td>
</tr>
</tbody>
</table>
Evaluation of changes in tobacco consumption

Tobacco consumption was measured over a 14-month period in all participating communities. Community store managers were asked for data on tobacco orders over a period of 14 months, commencing from one month before the start of the intervention period and finishing one month after the intervention period.

Information on monthly orders for each type of cigarette and tobacco was collected from either the store manager or from the store's wholesaler. The data was entered into a database and analysed using the statistical computer program Stata (Statacorp, 1999) to compare changes in consumption in intervention and control communities.

To calculate the amount of tobacco in each 'rollie' (hand-rolled cigarette), a small sample of people who regularly smoked loose tobacco were each asked to roll one. Each 'rollie' was weighed and the weights were averaged so as to compare to the amount of tobacco in a standard cigarette (henceforth called a 'cigarette equivalent'). Consumption was then calculated using the number of cigarettes or 'cigarette-equivalents' of loose tobacco ordered through stores for each month; this was then divided by the number of community members aged 12 years or older, as estimated from the 1996 ABS Census (Australian Bureau of Statistics, 1998).

The new measure ('cigarette equivalents') allowed comparison of consumption measured through tobacco orders with that reported by individuals. Consumption was graphed to show rolling averages of tobacco orders for each three month period. Information was collected as far as possible on other sources of tobacco in the community, for example, from other tobacco vendors. Data on price was sought on the most commonly purchased brand of tobacco from the vendor with the highest volume of sales in each community.

Evaluation of other changes in intervention communities

The evaluation of the project also involved 'before and after' evaluation in the intervention communities. Evaluation was conducted at baseline – in the month prior to the planned intervention – and at a follow-up visit, a year later. The evaluation involved a range of techniques, including stakeholder interviews, observations and community services.

Stakeholder interviews

Key stakeholders within each of the intervention communities were interviewed at the baseline visit and at the follow-up visit. Interviews were conducted by the researcher (RI) and by one of the TAP APOs (DP). Interviews were conducted with the president, elders, the Town Clerk, and managers of each of the different workplaces in each community, including Senior Aboriginal Health Workers (AHWs), nurse managers or doctors, school principals, store managers and store workers, art centre coordinators or president, women’s centre manager, housing manager or other important community members. The researcher and APO made efforts to interview stakeholders from a range of workplaces, of both sexes and of a range of ages.

Participants were given a verbal description of the project, together with easy-to-read information. They were then asked if they wished to participate, and if they did, were asked to sign a consent form. They were asked whether they wished to have their interview taped or if they preferred to have notes made from the interview. The researcher conducted a structured interview, based on a series of open questions and discussion points, focussing on the evolution of the Incentive Fund project in the community, the process of delivery of the intervention, and perceived success of the intervention. Taped interviews were transcribed, and then coded by hand according to emerging themes (Taylor, 1984 pp131-3).
The information was used to conduct a process evaluation of the implementation of the tobacco interventions. The researcher also briefly interviewed key stakeholders in the control communities, including health professionals, Town Clerks, presidents and store managers in control communities, seeking information on tobacco programs run in those communities during the intervention year for the purpose of comparison with those run in intervention communities.

**Observational techniques**

The evaluation also involved observation of responses to the intervention using rapid assessment techniques, which provided information about whether the environment was conducive to changes in behaviour. This technique had previously been trialled by Hall (1995) and had been developed to rapidly assess tobacco use in Native American Indian communities.

The researcher observed a variety of environments within each community, including the Council building, the CDEP building, the health centre, the school, the community store, the art centre or other public buildings in the community, in addition to observing other places where community members congregated. Observations were made of anti-tobacco materials (no-smoking signs, health promotion materials), pro-tobacco material (tobacco advertising), smoking paraphernalia (cigarette butts, tobacco tins, ashtrays) and number of smokers. Observations were recorded as notes and were tabulated together with information on stakeholder interviews and the data obtained from the two sources was compared. Baseline and follow-up observations were compared to assess whether any changes in the smoking environment had occurred in intervention communities.

**Community surveys of smoking behaviour, attitudes and knowledge**

The evaluation included community-wide surveys conducted in intervention communities to identify any changes in smoking behaviour, attitudes (readiness to quit) and knowledge following the community tobacco interventions. Indigenous research assistants helped recruit participants, explained the nature of the research project (in local language or in English), and obtained their informed consent.

Tobacco turnover was the key measure for comparison of intervention and control communities, so participants were recruited to provide a measure of all people who had been resident in the community for a period of at least two weeks at the time of survey. The term of residency was defined by the community research assistant, a senior person in each of the participating communities. The sample included both Indigenous people and non-Indigenous people. Participants were recruited in public places in the community (such as outside the community store), workplaces, or in their homes. Those aged under 12 years, those who were ill or had a disability and those who declined to participate were excluded from the evaluation.

As for the stakeholder interviews, participants were given verbal information about the project by the community research assistant or researcher (in local language if necessary), were given an easy-to-read printed pamphlet about the project and were asked to sign a consent form if they wished to participate. The researcher verbally administered a questionnaire to each participant. The questionnaire assessed prevalence of tobacco use, as well as knowledge of and attitudes towards tobacco use. It also elicited information on exposure to a range of tobacco interventions over the previous year. The questionnaire took approximately five minutes to administer.

Participants were followed up with a similar questionnaire one year later. At the second visit, they were also offered information and advice about tobacco by the researcher or local research assistant, using the Pongi Pongi (Tobacco) Book flip chart, booklets and pamphlets (NHF, 1999) as well as other health promotion information.

The data from community surveys was analysed using Stata (Statacorp, 1999) to assess changes in smoking behaviour and attitudes to cessation in:

- a cohort of those who participated in both the baseline and follow-up survey; and
- a community sample, including all participants who participated in one or both surveys.
Validation of smoking status

Participants’ smoking status was validated at the time of administration of the questionnaire by monitoring them for carbon monoxide (CO) monitoring with a hand-held CO monitor (the Bedfont Smokerlyser model EC50) that was calibrated according to the manufacturer’s recommendations. Participants were asked to blow into the mouthpiece. A measure of 0-10 ppm carbon monoxide was taken to signify non-smoking status and measures above 10ppm to signify smoking status (Bedfont Scientific Limited, 1998). Participants were informed of their results verbally or were given results and an explanation in writing.

Triangulation of results

Tobacco consumption was the main index used for comparison of the intervention communities to control communities, but the use of various modes of evaluation meant that results could be triangulated and this allowed the results to be verified (Miles & Huberman, 1984 pp234-5).

At the end of the intervention year, results were presented to participating communities. Control communities were offered health promotion materials about tobacco, training for health professionals in the delivery of smoking cessation advice and advice on where to obtain further support for tobacco control activities in their community.

Ethical approval

The Joint Institutional Ethics Committee of the Royal Darwin Hospital and Menzies School of Health Research, the Human Ethics Committee, Northern Territory University and the Tiwi Health Board gave ethical approval for the project. The Wugularr Community Council, Barunga Community Council, Milingimbi Council and Ramingining Council also gave permission for the evaluation of the Incentive Fund projects in their respective communities.
Results

Participating communities

Nine applications were submitted for Incentive Fund grants for the year 1999. Three Incentive Fund projects were subsequently funded and the remaining six applications were ineligible (for example because the project had commenced prior to the evaluation period) or withdrawn because the applicant had left the community.

Community One - Milikapiti

Milikapiti is located 120km to the north of Darwin on the north coast of Melville Island. It is accessible by air, a 40 minute journey from Darwin. The population of the community at the 1996 Census (ABS,1998) was 447 people, of whom 27 were non-Indigenous. The majority of community residents were Tiwi people, who spoke Tiwi as their first language.

The Incentive Fund project was entitled ‘Smoke-free public areas at Milikapiti’ and consisted of the introduction of a smoke-free policy for enclosed public places in the community. The grant was to be used to fund signage (including two metal signs and locally designed no-smoking stickers) and for the launch of the no-smoking policy for the nominated public places, including a football carnival and educational sessions for men about the health effects of tobacco. The main applicant for the project was the Senior AHW from the health centre.

Control Community One - Pirlangimpi

Pirlangimpi is located 125 km to the north of Darwin on the north coast of Melville Island. It is accessible by air, a 35 minute journey from Darwin. The population of the community at the 1996 Census (ABS,1998) was 282 people, of whom 29 were non-Indigenous. The majority of community residents were Tiwi people, who spoke Tiwi.

Community Two - Wugularr

Wugularr (also known as Beswick) is located 118 km to the southeast of Katherine. It is accessible by road, a 75 minute journey from Katherine, some of it on dirt road. The road is often impassable when river rise during the Wet Season. The population of the community at the 1996 Census (ABS,1998) was 266 people, of whom three were non-Indigenous. The majority of community residents at the time of the survey were Jawoyn people. For most people in the community, Kriol was their first language, but many spoke Djawoyn or Malai and English.

The original Incentive Fund project was entitled ‘A holistic approach to stress management for Indigenous women in Beswick’. It was to involve a series of educational sessions about tobacco and incorporate a range of stress management exercises (involving traditional healing, massage, music and art, visualisation and relaxation techniques) over a period of four months. It was planned as a pilot program. The main applicants for the project were the Family Violence Worker from the Katherine Family Link service in Katherine, a non-Indigenous woman, and the Wugularr Women’s Centre coordinator, an Indigenous woman from the community.

Control Community Two - Barunga

Barunga (also known as Bamyili) is located 80 km to the southeast of Katherine. It is accessible by road, a one hour journey from Katherine. The road is sometimes impassable when rivers rise during the Wet Season. The population of the community at the 1996 Census (ABS,1998) was 384 people, of whom 41 were non-Indigenous. For most people in the community, Kriol was their first language, but many spoke Jawoyn, Mara, Malai, Ngalkbon, Dalabon, Rembarrnga, Ngalakan, Mangarrai and English. The community serviced one other smaller community, Manyallaluk.
Community Three - Milingimbi

Milingimbi is located km to the 440 km to the northeast of Darwin and 206 km northwest of Nhulunbuy, the nearest regional centre. It is located on an offshore island. It is accessible by boat, a 15 minute journey from the mainland near Ramingining in Arnhem Land, however the road is impassable during Wet Season. The island is accessible by air, with regular services from Darwin, a two hour journey by small plane. The population of the community at the 1996 Census (ABS,1998) was 939 people of whom 49 were non-Indigenous. The majority of community residents at the time of the survey were Yolngu people who spoke Gupapuyngu, a Yolngu language, as their first language, although many people also spoke other languages such as Djambarrpuyngu, Burarra and English.

The Incentive Fund project was to involve a basketball carnival to be held at Milingimbi to which other communities would be invited. The funding was to be used to design and purchase basketball singlets bearing the Quit logo, and to pay for basketballs, logos for the basketball court, trophies and a barbecue on the day of the basketball carnival, and was also to include educational sessions for men and women. The main applicant for the project was the community Sport and Recreation Officer, an Indigenous man.

Control Community Three - Ramingining

Ramingining is located 200 km west of Nhulunbuy, the nearest regional centre. It is located 30km inland. It is accessible by road (a 16 hour journey from Darwin), however the road is impassable during Wet Season. It is accessible by air, with regular services from Darwin, a two hour journey. The population of the community was 478 people at the 1996 Census (ABS,1998), of whom 22 were non-Indigenous. The majority of community residents were Yolngu people who spoke Gupapuyngu, Djambarrpuyngu (Dhuwal), Manharrngu, Burarra and English. The community had eleven outstations.

Evaluation of changes in tobacco consumption

Tobacco vendors:

Milikapiti
Tobacco was sold from two locations in the community, the community store and the club (both community-owned).

Pirlangimpi
Tobacco was sold at the community store (which was community owned).

Wugularr
Tobacco was sold from three locations in the community: the community store/social club (owned by the community and operated in conjunction with the Barunga store), the Women’s Centre and by an individual who sold single cigarettes from his own house. Two major floods in the community during the intervention year meant that the staff of the Wugularr store temporarily moved stock to the Barunga store. This meant that for some of the intervention year, data on orders of tobacco specifically for Wugularr were not available (data remained aggregated together with the data on Barunga orders). A third flood prior to the follow-up survey resulted in under-stocking of tobacco products at Wugularr in case of the need for rapid emergency evacuation.
Barunga
Tobacco was sold from the community store (which was community-owned and operated in conjunction with the Wugularr store).

Milingimbi
Tobacco was sold from two locations in the community: the community store/ takeaway (managed by the Arnhem Land Progress Association (ALPA), which had an Indigenous board of management) and by an individual who sold tobacco from his house after the community store was closed.

Ramingining
Tobacco was sold from three locations in the community: the community store (managed by ALPA), the homelands centre store, (owned by the outstations organisation) and from a small kiosk underneath the art centre.

Changes in tobacco consumption
The weight of the average ‘rollie’ was determined by asking 13 study participants who were regular smokers of loose tobacco to make a ‘rollie’ and then weighing the results with calibrated electronic scales. The mean weight was found to be 0.525g. A 50g tin or packet of loose tobacco thus contained 95 ‘cigarette equivalents’.

Tobacco orders were compared for all participating communities. Tobacco orders, measured in cigarettes or ‘cigarette equivalents’ per person (over the age of 12 years) were compared for each pair of intervention and control communities.

Milikapiti and Pirlangimpi
At the baseline, orders of cigarette equivalents per head of population were higher at Milikapiti than at Pirlangimpi. Orders of cigarette equivalents per person over the age of 12 years at Milikapiti fell over the intervention year but rose at Pirlangimpi.

Tobacco orders for these communities were compared by assessing differences in the trend of the line of best fit for tobacco orders for each community over the 14 month period. That is, the trend of orders was compared rather than the total sales over the year.

The trend of tobacco orders at Milikapiti was significantly different from that of tobacco orders at Pirlangimpi (t=-4.5, 95 per cent CI –33.6- -12.5, p=<0.01). Orders for tobacco at the two communities are shown in Figure 1. Price for tobacco is shown on the right hand axis of the graph.
Wugularr and Barunga

At the baseline, orders of cigarette equivalents per head of population were higher at Wugularr than at Barunga. Orders of cigarette equivalents per person over the age of 12 years fell at both Wugularr and Barunga.

The trends of the decrease in tobacco order at Wugularr and Barunga were not significantly different ($t=-1.7$, 95 per cent CI $-28.8$-$4.9$, $p=0.13$). Orders and prices for tobacco at the two communities are shown in Figure 2.
Milingimbi and Ramingining

Orders per person aged 12 or over were substantially higher at Ramingining than at Milingimbi at baseline and throughout the intervention year. Orders fell at Milingimbi over the intervention year and rose at Ramingining, but the trend of tobacco orders at Milingimbi was not significantly different from that of tobacco orders at Ramingining \( (t=-1.2, \text{ 95 per cent CI } -13.9\text{-}3.8, p=0.25) \). Orders and prices for tobacco at the two communities are shown in Figure 3.
Figure 3 Tobacco orders, Milingimbi and Ramingining

**Process analysis**

**Stakeholder interviews - participants**

Key stakeholders were interviewed at both the baseline and follow-up visits in both intervention and control communities. Stakeholders included the community council president or chairman, the town clerk, elders and managers or managers of workplaces. Overall, 106 key stakeholders were interviewed. Seventy two people were interviewed at baseline visits: 44 were Indigenous (61 per cent) and 28 were non-Indigenous (39 per cent), and 39 were men (54 per cent) and 33 were women (46 per cent). Seventy one people were interviewed at follow-up visits: 43 were Indigenous (61 per cent) and 28 were non-Indigenous (39 per cent); 34 were men (48 per cent) and 37 were women (52 per cent).

Five TAP operational staff members were also interviewed. Interviewees included the Senior APO, the cannabis/tobacco APO, the TAP education and research officer, the TAP policy officer and the TAP manager, of whom two were Indigenous and three were non-Indigenous. Two were men and three were women.
**Process analysis - Milikapiti**

The Senior APO (AC) had previously been involved in two health promotion programs, a ‘Health Week’ and the establishment of an outdoor shaded smoking area at the health centre. He had discussed the introduction of a policy on smoke-free enclosed public places with several key people in the community, including the President (an ex-smoker) and the Senior AHW (a smoker). They subsequently discussed the introduction of such a policy with the community council and land council and prepared a grant application. Most stakeholders supported the new policy before its introduction, although some acknowledged that some workplaces such as the council office, the Community Development Employment Program (CDEP) office, the health centre and the school already had smoke-free policies.

The project involved making ten public areas within the community smoke-free, including the council office, the CDEP office, the Sport and Social Club, the community store, the health centre, the school, the women’s centre and the art centre. A local artist designed a smoke-free logo using traditional imagery, which was printed onto stickers, T-shirts and onto two large metal signs which were to be placed at the council office and at the airport to show that the community was smoke-free.

TAP APOs assisted community members to organise a football carnival and a hunting expedition to obtain bush tucker, which were held during the week of the launch, in Quit Week, May 1999. Other interventions delivered included training for health professionals (using the Pongi Pongi (Tobacco) Book), a visit to the community store, distribution of health promotion materials (caps, posters, stickers), and a school educational session on tobacco.

![Figure 4 Maurice Rioli, MLA, launch of the smoke-free policy at Milikapiti, 1999](image-url)
A year after the launch of the smoke-free policy, most stakeholders believed that it had been very successful and this was also acknowledged nationally when the community council received a National Heart Foundation Local Government award for the project. Stakeholders commented that the policy was widely accepted and adhered to in the community, except in the Sports and Social club, where the manager found the policy difficult to enforce, especially with those who had been drinking, and in the community store, which was preparing to move to a new air-conditioned building that was designated as a smoke-free area. There were several unanticipated effects of the new policy, including a number of people who had made their houses smoke-free, and a perceived increase in the number of people who had quit smoking.

APOs discussed options for improving compliance with the smoke-free policy in the Sports and Social Club and the community store, and visited the community to launch two new metal smoke-free signs for these venues two years after the original launch of the policy.

Figure 5 David Parfitt, Rowena Ivers, Peter Thomsen, Anthony Castro, Milikapiti, 2001 (photograph courtesy of R. Richmond)

**Tobacco programs - Pirlangimpi**

As for Milikapiti, some community members had been involved in the development and pilot study of the Pongi Pongi (Tobacco) Book and the Tiwi for Life workers advised people about quitting smoking and on preventing exposure to environmental tobacco smoke.

**Process analysis - Wugularr**

The application for the intervention at Wugularr was instigated by a non-Indigenous Family Violence Worker based in Katherine, who only received the application form a week before the closing date for submissions. She commented that because of this she thus did not have time to consult with the community, although she had discussed the idea for the program with the Wugularr Women’s Centre Coordinator (an Indigenous woman, and a smoker). The Women’s Centre was not informed that their application had been successful until November 1999 (six months later).

TAP APOs and the Katherine Aboriginal Health Promotion Officer (an Indigenous woman) then met with the applicants. The Women’s Centre Coordinator announced that instead of an ‘alternative’ or traditional Indigenous approach to dealing with tobacco, women in the community wished instead to utilise standard health promotion approaches, including posters, educational sessions and sports sponsorship. They planned to:
• hold educational sessions about tobacco for women at the Women’s Centre with the assistance of the APOs and the female AHPO from Katherine;

• make the proposed new Women’s Centre smoke-free (to prevent smoking around infants and children and in food preparation areas);

• sponsor sporting teams to attend the Barunga Sports and Cultural Festival in mid-2000 (including provision of Quit T-shirts and for magnetic signs for the community bus to show that it was smoke-free); and

• purchase a video player to show videos about tobacco at the Women’s Centre.

TAP APOs also planned educational sessions for young men to be delivered after football training sessions along with a barbecue.

In February-March 2000, the community was flooded and evacuated twice and there was a period of disruption. The distribution of funding was substantially delayed due to a change in approval process, which meant that funding was not available in time for the activities planned for the Barunga Festival (an annual sporting and cultural event) in mid-2000. Once funding was approved, and after many attempts to coordinate visits with the AHPO in Katherine, TAP APOs visited Wugularr in October 2000, accompanied by an AHPO-alcohol worker. They held several educational sessions about tobacco for young men, although stakeholders interviewed commented that the men who were over 18 failed to attend because the sessions were held at the same time that the social club was open. Other interventions delivered included training for health professionals (using the Pongi Pongi (Tobacco) Book), a visit to the community store, distribution of health promotion materials (caps, posters, stickers), and a school educational session on tobacco.

During the year, the new Women’s Centre was completed. At the follow-up interviews, women stated that the building was smoke-free. A new regional nutrition program based at the Women’s Centre and sponsored by the Fred Hollows Foundation was established in the community, supported by a nutritionist. As part of the program, the Women’s Centre held a workshop for women in the community, which was attended by the AHPO from Katherine, the Aboriginal Family Violence Worker, and an environmental health officer, all of whom were women. The women discussed a range of health issues including alcohol, child nutrition, and tobacco.

At the follow-up visit, however, the Women’s Centre Coordinator commented that the Centre still had not received the educational session on tobacco for which they had submitted the grant. They had, however, received the Quit T-shirts, caps and magnetic smoke-free signs for the community bus and planned to use them for sports teams attending the Barunga Festival in 2001. Although they had received funding for the video player, it had not been purchased by the follow-up visit.

The Women’s Centre Coordinator believed that they had made some gains in that the new Women’s Centre was mostly smoke-free, and tobacco had been discussed as part of the women’s workshop. In addition, the Women’s Centre no longer sold tobacco products as it had at the baseline visit. However the staff of the Women’s Centre perceived these as activities that they had decided to do themselves rather than being facilitated as part of the Incentive Fund project.
Tobacco programs - Barunga

The health centre staff advised people on quitting smoking, although they had not undergone any specific training to do so. School staff had been involved in development of health modules, including a module on tobacco. As part of the nutrition program, a workshop (including a discussion on tobacco) for women was held at Barunga and Manyallaluk.

Process analysis - Milingimbi

The community's Sport and Recreation Officer, a Yolngu man and a non-smoker, submitted the application for the Incentive Fund grant to encourage young people – especially those playing sport - to be non-smokers through promotion of a healthy lifestyle. Bureaucratic delays within THS meant that funding for the program was 'rolled over' to the 1999-2000 financial year. The TAP APOs visited the community twice to help plan a basketball carnival, the focus for the application, to which other communities in the region were to be invited to enter teams. The Sport and Recreation Officer and TAP APOs designed trophies and basketball singlets printed with the Milingimbi logo together with Quit logos for all players and Quit logos to be printed onto basketballs.

The basketball carnival was originally scheduled for late in 2000, but the Community Council was experiencing financial difficulties and organisational changes and the carnival was postponed and rescheduled for February 2001. The TAP APOs then visited the community, and together with the Sport and Recreation Officers, spray-painted quit logos onto the basketball court in preparation for the basketball carnival. Plans for the carnival, however, were disrupted because there were two cyclones in the region. In addition, players from other communities had been unable to access funding to attend the basketball carnival. Nevertheless, TAP APOs conducted educational sessions about tobacco for approximately 50 men and a separate session for approximately 30 women, followed by barbecues. Other interventions included training for health professionals (using the Pongi Pongi (Tobacco) Book), a visit to the community store, distribution of health promotion materials (caps, posters, stickers), and a school educational session on tobacco.
TAP APOs planned to return to support the basketball festival when a date had been finalised. The Sport and Recreation Officer changed employment, but continued to plan a second attempt at holding the basketball carnival. Some time after this, he left Milingimbi for family reasons and moved semi-permanently to Darwin. Another one of the Sport and Recreation Officers, a senior man, continued to organise the basketball carnival. An AHPO moved to Milingimbi during the intervention year to take up a position as Sport and Recreation Officer, and assisted the second Sport and Recreation Officer in organising the carnival. The carnival was held 4-7th May 2001, with the aim of targeting petrol sniffing as well as tobacco, as there had been a recent upsurge of sniffing in the community. The Sport and Recreation Officers invited players from Galiwin’ku (Elcho Island) and their community covered the costs of transport. The carnival included volleyball and football in addition to basketball. The carnival was smoke-free, with players being encouraged not to smoke while they were wearing Quit singlets.

At the end of the intervention year, the TAP APOs and the original applicant were unaware that the carnival had taken place. The remaining Sport and Recreation Officers commented that the carnival had been a success. One added that an unanticipated benefit was that many (he estimated 30 per cent) of the players tried to quit during the carnival, and that respected community members had shared their experiences of quitting with others, emphasising the positive side of quitting for all smokers. Following the carnival, non-smokers continued to wear the basketball singlets bearing quit logos. The two Sport and Recreation officers made a report as a result of the project, which was printed as a poster incorporating traditional art for display around the community.

Other tobacco programs, Ramingining

Health centre staff advised people on quitting smoking, although staff had not undergone any specific training to do so.

Barriers to the implementation of Incentive Fund projects

Many participants commented that reducing the harm resulting from tobacco was not a priority for most people in these communities. Participants were more concerned about the harmful effects of alcohol, petrol sniffing, cannabis smoking and kava consumption than of tobacco smoke.

Stakeholders identified a number of barriers to the implementation of community tobacco programs funded by Incentive Fund grants over the course of the study, including:

- lack of information about availability of grants;
- lack of involvement of community members in planning the intervention;
- complexity of the application process;
- lack of response to grant applications;
- inflexibility in use of the funds;
- delays in the distribution of funding;
- lack of commitment to long-term funding;
- insufficient funding;
- insufficient support from TAP APOs and health promotion officers because of understaffing;
- lack of women TAP APOs;
- insufficient time for APOs and other health promotion workers to develop relationships with the community; and
- lack of feedback to the community on the outcomes of projects.
Many of those interviewed commented on smoking behaviour within the community. Smoking was very much the norm in these communities and an accepted and expected part of normal social interactions, for example when meeting others in the street or when playing cards. That so many people in these communities smoked and that it was a normalised behaviour was seen as a significant barrier to the success of tobacco programs.

**Observation**

Public places observed at both baseline and follow-up visits for changes in smoking behaviour included council offices, CDEP offices, health centres, schools, community stores, art centres and other centres, such as women’s centres and housing offices.

At Milikapiti, all public places apart from the Sports and Social Club were smoke-free both before and after the intervention. No significant changes in the number of smoke-free environments were noted at Wugularr or Milingimbi.

**Community surveys**

**Participants**

Community surveys were conducted at both the baseline and follow-up visits. The question on smoking status was assessed in 497 study participants. The kappa score (for repeatability) was 0.93 (very good agreement) (Brennan & Silman, 1992).

Community workers nominated 1228 people as residents of their communities at the baseline visit, of whom 643 participated in the community survey. Of the 1201 people who were deemed to be residents at the follow-up visit, 628 participated in the community survey.

<table>
<thead>
<tr>
<th>Survey</th>
<th>Completed</th>
<th>Refused</th>
<th>Under 18, no consent</th>
<th>Elderly, disabled</th>
<th>Unable to locate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline survey</td>
<td>643</td>
<td>82</td>
<td>36</td>
<td>46</td>
<td>421</td>
<td>1228</td>
</tr>
<tr>
<td>Baseline survey (per cent)</td>
<td>52</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>34</td>
<td>100</td>
</tr>
<tr>
<td>Follow-up survey</td>
<td>628</td>
<td>21</td>
<td>5</td>
<td>10</td>
<td>537</td>
<td>1201</td>
</tr>
<tr>
<td>Follow-up survey (per cent)</td>
<td>52</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>45</td>
<td>100</td>
</tr>
</tbody>
</table>

Eighteen people who had been nominated as residents at the baseline visit passed away during the intervention year. Five of those included in the baseline survey passed away during the intervention year; four were smokers. Participation in community surveys is shown in Table 3.
Table 3 Participation in community surveys

<table>
<thead>
<tr>
<th>Participation in surveys</th>
<th>Number of participants</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline survey only</td>
<td>292</td>
<td>20</td>
</tr>
<tr>
<td>Follow-up survey only</td>
<td>277</td>
<td>19</td>
</tr>
<tr>
<td>Both surveys</td>
<td>351</td>
<td>24</td>
</tr>
<tr>
<td>Neither survey</td>
<td>538</td>
<td>37</td>
</tr>
<tr>
<td>Total</td>
<td>1458</td>
<td>100</td>
</tr>
</tbody>
</table>

A greater proportion of community residents from Milikapiti and Wugularr participated in the community surveys (68 per cent and 75 per cent at baseline and 54 per cent and 81 per cent respectively at the follow-up survey) than at Milingimbi (30 per cent at the baseline survey and 35 per cent at the follow-up survey).

Demography

Nine hundred and twenty one people participated in the study. Of all participants in either survey:

- 91 per cent were Indigenous (including one person of both Aboriginal and Torres Strait Islander origin) and 9 per cent were non-Indigenous;
- 50 per cent were men and 50 per cent were women;
- 15 per cent were aged < 18 years, 46 per cent were aged 18-34 years and 39 per cent were aged >=35 years;
- 13 per cent of participants had a degree or diploma;
- 19 per cent were skilled workers;
- 7 per cent had completed high school;
- 47 per cent had completed primary school;
- 12 per cent were students and 2 per cent could not state what training they had done;
- 21 per cent were employed in fully paid work;
- 27 per cent were employed by CDEP, 20 per cent were unemployed, 20 per cent were not in the labour force (retired, on a disability pension or parenting pension); and
- 1 per cent could not state their current occupation.

Changes in smoking behaviour

Prevalence of cessation in the year prior to the intervention year

- Of cohort participants, 13 (29 per cent) of those who claimed to be ex-smokers had given up in the year prior to the baseline survey, and 32 (71 per cent had given up prior to that).

Prevalence of cessation during intervention year

- Overall, ten people who claimed to be smokers at the baseline visit had quit at the follow-up survey
- The quit rate among smokers during the intervention year was four per cent,
- But some ex-smokers (11 participants, 24 per cent of ex-smokers) and some who reported that they had never smoked (11 participants, 16 per cent of never-smokers) took up smoking during the intervention year.
• Of cohort participants, there was a net gain of eleven smokers at the end of the intervention year. When ex-smokers and never-smokers were recoded as non-smokers, the prevalence of smoking rose from 68 per cent to 70 per cent, however this rise was not significant (McNemar’s test statistic=0.64, p = 0.52).

• When data was assessed for all participants (the community sample), the prevalence of tobacco use dropped from 68 per cent at the baseline to 67 per cent at the follow-up survey.

CO Validation

• Of those who were included in the cohort study, 46 self-reported smokers (30 per cent) recorded a CO that was inconsistent with smoking (CO<10ppm) and 106 (70 per cent) recorded a CO than was >=10ppm at the baseline.

• All of those who claimed to be ex-smokers or never-smokers (20 participants) at the baseline recorded a CO that was consistent with non-smoking status (<10ppm).

• At the follow-up survey 35 self-reported smokers (42 per cent) recorded a CO that was inconsistent with smoking (CO<10ppm) and 49 (58 per cent) recorded a CO than was >=10ppm.

• Twenty three of those who claimed to be ex-smokers or never-smokers (96 per cent) at follow-up recorded a CO that was consistent with non-smoking status (<10ppm) and one person (4 per cent) recorded a CO >=10ppm.

The sensitivity of CO breathalyser testing was 70 per cent at the baseline visit and 58 per cent at the follow-up visit. The specificity of CO breathalyser testing was 100 per cent at the baseline and 96 per cent at the follow-up visit (Bland, 1991 p284).

Changes in self-reported consumption

• Of participants in the cohort study, significantly more smokers reported that they were light smokers (<70 cigarettes per week) at the follow-up survey than at the baseline survey (40 per cent vs 46 per cent, McNemar’s test statistic=5.2, p=0.03).

• There was also an increase in the number of people who were light or moderate smokers (<175 cigarettes per week) from 55 per cent to 62 per cent (McNemar’s test statistic=4.0, p=0.48).

Changes in attitudes to smoking

• Significantly more people were taking action to quit or thinking about quitting following the intervention year (61 per cent vs 72 per cent, McNemar’s test statistic = 6.22, p=0.02).

• However those who were ready to quit or thinking about quitting were no more likely to quit than those who were not thinking about quitting or were not sure if they were thinking about quitting (7 per cent vs 8 per cent, X^2=0.3, 1 df, p=0.84).
Changes to knowledge about the health effects of tobacco

- Of those who participated in both surveys, there was a significant increase in the number of people who believed that lung cancer was linked to tobacco use; at the baseline survey 85 per cent believed tobacco use was linked to lung cancer and at the follow-up survey 90 per cent believed it was linked to lung cancer (Mc Nemar’s test statistic= 4.74, p= 0.04).

- Of those who participated in both surveys, there was a significant increase in the number of people who believed that heart disease was linked to tobacco use; at the baseline survey 82 per cent believed tobacco use was linked to heart disease and at the follow-up survey 89 per cent believed it was linked to heart disease (Mc Nemar’s test statistic=8.32, p<0.01).

Exposure to evidence based components of the intervention

The level of exposure of participants of the cohort study to the various evidence-based components of the multi-component intervention and changes in prevalence of tobacco use, assessed through both stakeholder interviews and community surveys are shown in Table 4 (below).
Table 4 Use of and effect of other tobacco interventions, cohort study

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Stakeholder interviews</th>
<th>Community surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comments</td>
<td>Exposure during the intervention year.</td>
</tr>
<tr>
<td>Advice on cessation from health professionals</td>
<td>Insufficient time to deliver interventions Advice mainly given opportunistically to those with smoking-related illness Health professionals not comfortable in the delivery of cessation advice Low accessibility due to cost except at Milingimbi where it was provided for free at the health centre Few smokers tried NRT even when it was available at no cost No Indigenous participants had tried bupropion</td>
<td>62 per cent of smokers attended the health centre during the intervention year. 58 per cent of smokers had been given advice on quitting.</td>
</tr>
<tr>
<td>NRT and bupropion</td>
<td></td>
<td>3 per cent of smokers (8 people) used NRT.</td>
</tr>
<tr>
<td>Quit course</td>
<td>Not chosen as an intervention in any community. Not seen as appropriate.</td>
<td>-</td>
</tr>
<tr>
<td>Point of sale intervention</td>
<td>All community stores displayed required signage on sales to minors. TAP APOs unaware of other tobacco vendors in communities, and therefore were unable to monitor for display of required sales to minors signage, for sales to minors or for other</td>
<td>-</td>
</tr>
<tr>
<td>Promotion of smoke-free environments</td>
<td>Policy on smoke-free enclosed public places introduced at Milikapiti. Many enclosed public places in all intervention communities already had official or unofficial smoke-free policies.</td>
<td>Number of people who lived in smoke-free homes was 15 per cent at the baseline and 16 per cent at follow-up. Support from smoke-free enclosed public places rose from 79 per cent to 93 per cent.</td>
</tr>
<tr>
<td>Exposed to anti-tobacco posters</td>
<td>Health promotion materials rarely used in consultations at the health centre.</td>
<td>83 per cent of all participants (and 83 per cent of smokers) had seen anti-tobacco posters.</td>
</tr>
<tr>
<td>Called Quitline</td>
<td>No intervention community chose to include this intervention from 'menu' of interventions. Poor access as few public telephones or telephones in houses. Mainstream Quitline seen as inappropriate for Indigenous people.</td>
<td>Only one smoker had called Quitline.</td>
</tr>
<tr>
<td>Educational talks at schools</td>
<td>TAP officers held talks for students at primary schools. Principals believed health professionals should conduct educational about tobacco rather than teachers. No training for teachers in the delivery of education about tobacco. No use of existing curriculum resources on tobacco for Indigenous students. Principals were concerned about tobacco as a discipline issue One school (Milingimbi) had developed a tobacco policy.</td>
<td>1 per cent of smokers (3 people) had attended talks at the school.</td>
</tr>
<tr>
<td>Exposed to anti-tobacco advertising on television, radio or in the print media</td>
<td>High exposure to television advertisements, including those targeted at Indigenous people. Almost no exposure to radio or print media.</td>
<td>88 per cent of smokers had been exposed to anti-tobacco advertising during the intervention year.</td>
</tr>
</tbody>
</table>
Discussion

Overall study design

The communities that had submitted applications for Incentive Fund grants to run tobacco programs in their communities were clearly more motivated than control communities to take action on tobacco as a health issue. Although the control communities were matched to intervention communities on population and culture (for example sharing a language) as closely as was possible, none of the control communities had expressed an interest in running tobacco programs or had received Incentive Fund grants in previous years. As a result of self-selection to receiving tobacco interventions, the community intervention and control groups are likely to differ on baseline parameters. This precludes any direct comparison of the impact of community interventions on tobacco consumption.

The use of such a study design clearly was not optimal for ascertaining the effects of community tobacco interventions. When planning the project, the researcher had held discussions with THS staff regarding conducting the study as a randomised controlled trial. However this option was not acceptable to THS staff, because of concern that the project would be seen as inequitable – that is, that communities that did not receive support for a community tobacco intervention would be disadvantaged, even if such support was staggered and delivered later.

Delays in the process of approval and distribution of funds meant that three communities declined the offer of support because the main applicant (a non-Indigenous person) had left the community before funding was distributed.

The delivery and evaluation of the remaining three Incentive Fund projects was delayed by many factors, including delays in the release of funding, traditional funeral and ceremonies, extensive flooding and cyclones. Incentive Fund projects were carried out as planned at Milikapiti, 16 months late at Wugularr and 24 months late at Milingimbi.

Evaluation of changes in tobacco consumption

The measurement of tobacco turnover had successfully been used in previous studies in other populations (COMMIT research group, 1995; Manley et al., 1997) and in Indigenous communities (Goto, 1998; Watson et al., 1988). Using data on tobacco orders obtained from wholesalers was a quick, cheap and non-invasive method of collecting information. Store managers in community-run stores were generally enthusiastic about involvement in the project as tobacco was a significant part of their commercial activities. Had wholesalers not been able to provide the information, however, it would have made it much more difficult to obtain as store managers did not have uniform ways of collecting data on sales of tobacco.

Four other communities had been approached to participate as control communities, but were eventually not included because it was difficult or impossible to collect data on store turnover. Tobacco turnover may not be a suitable measure of changes in tobacco consumption in communities where the store was privately managed, where there were more than one or two retailers, or where there were no available records on tobacco orders.

Tobacco orders were likely to closely reflect consumption. Data was collected on tobacco orders from the community stores (up to three in each) in the participating communities. There may have been other sources of tobacco in these communities that was not recorded in turnover from the stores or by the independent vendor in the analysis. It is possible that the independent vendors underestimated the amount of tobacco sold, as they appeared to have no record of sales of tobacco. Chop chop – or illegal tobacco – did not appear to be available in these communities.
The estimates of population used as the denominator for the amount of tobacco consumed per person aged 12 years or more may have been inaccurate. The amount consumed was calculated on the population at the 1996 Census, which was a substantial amount of time prior to the study and was sufficient time to permit large population drifts between communities. The disparity in tobacco consumption between otherwise similar communities may also be evidence that the population of communities used to calculate consumption per head of adult population was inaccurate; if population was underestimated, this would overestimate consumption and vice versa.

Over the intervention year, the tobacco consumption appeared to decline in all intervention communities. Tobacco consumption rose in two control communities (Pirlangimpi and Ramingining); consumption was much higher (almost three times as high) in Ramingining than in Milingimbi, an unexpected finding. There was a trend to a larger decrease in intervention communities than in control communities, but the trend in intervention communities only differed significantly from that of control communities in Milikapiti and Pirlangimpi.

Given the lack of a decrease in the prevalence of tobacco use shown in the community surveys it is likely that the decrease in consumption was due to a drop in tobacco consumed by individuals – for example a drop in the number of cigarettes smoked per week, which was confirmed by the community surveys.

It appears that factors that may have affected all communities (including control communities), such as anti-tobacco advertising (to which all communities were exposed) and price rises (which occurred in both intervention and control communities) did not have a marked effect on consumption, as consumption rose in two of the control communities. However, the decrease in consumption at Milikapiti could possibly be explained by an increase in the price of tobacco in the community when the price remained stable in the control community.

The tobacco interventions may have had some effect on consumption, in that they appeared to produce a trend to a decrease in consumption, but this trend was not significant at Wugularr and Milingimbi. This is not surprising as tobacco was not identified as a high priority health issue for these communities. In addition, the process analysis revealed that the interventions were not implemented as planned in these communities.

Process analysis

Key stakeholders were selected because they were deemed to hold important positions in the community, and so as to provide a spread of perspectives. Many key positions, such as managers of workplaces, were held by non-Indigenous people, who were thus likely to be over-represented.

The Milikapiti Incentive Fund project was widely viewed as a success both outside and inside the community. It was also recognised nationally for instituting smoke-free areas in a remote community – the first time this had been documented in Australia. It provided evidence that smoke-free areas were acceptable to Indigenous people – information that was used when considering new legislation on smoke-free areas in the NT in 2002. The project had had unanticipated effects such as encouraging some people to make their homes smoke-free.

Among the likely reasons for the intervention’s success are:

- the longevity of the relationship between the Senior APO and the community;
- the full support and involvement of key community members; and
- the length of time taken to fully institute the changes (three to five years).
The Wugularr Incentive Fund project was perceived as not being successful mainly because it did not address the original aims of the project – to deliver education on tobacco to women in the community. The fact that the new Women’s Centre was smoke-free and that cigarettes were no longer sold there can be viewed as a success, but it is likely that this could be attributed to policy made by the women rather than because of the TAP project. Reasons for its perceived failure included:

- that it was not instigated by a community member;
- there were delays in the process of grant approval and distribution of funds and;
- lack of support from THS staff due to under-staffing.

Nevertheless, there was sufficient capacity within the community – in workers at the Women’s Centre – to conduct anti-tobacco activities by themselves.

The Milingimbi Incentive Fund project was perceived as being successful by some community members, although not all key stakeholders knew that the project (the basketball carnival) had taken place. The TAP staff did not perceive it as successful because of:

- the barriers to the basketball carnival initially succeeding, including delays in planning the basketball carnival attributed to factors within the council;
- cancellation of the basketball carnival due to a cyclone; and
- the original applicant leaving the community.

That the Sport and Recreation Officers had nevertheless run the smoke-free sports carnival was evidence of community capacity to manage health promotion interventions and suggests that such projects do not always require outside support. Reasons for its success included the presence of enthusiastic and skilled local residents and financial support. Delays in the approval process for funding, however, together with dysfunction in the community council and natural phenomena (cyclones), meant that the intervention was delayed. Community members were able to conduct the basketball carnival themselves without the support of the TAP APOs, which could be seen as evidence of sufficient capacity to continue health promoting activities. It may be claimed as a positive outcome.

The features contributing to the success or otherwise of the Incentive Fund projects are summarised in Table 5, using a predictor – outcome – consequences matrix (Miles & Huberman, 1994 p219).
<table>
<thead>
<tr>
<th>Feature of intervention</th>
<th>SITES</th>
<th>Low assistance</th>
<th>Low assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Milikapiti</td>
<td>Wugularr</td>
</tr>
<tr>
<td>Antecedent conditions</td>
<td>Level of prioritisation of tobacco in the community</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Relationship between APOs &amp; community</td>
<td>Long-term</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Relationship between applicant &amp; community</td>
<td>Long-term – applicants were Indigenous residents</td>
<td>Short-term - applicants were a non-Indigenous non-resident and an Indigenous resident</td>
<td></td>
</tr>
<tr>
<td>Application forms received in timely manner</td>
<td>Timely</td>
<td>Late</td>
<td>Timely</td>
</tr>
<tr>
<td>Ability of applicants to complete application form</td>
<td>Adequate - form completed by Indigenous applicant and TAP officer</td>
<td>Adequate - form completed by non-Indigenous applicant</td>
<td>Adequate - for completed by local Indigenous applicant</td>
</tr>
<tr>
<td>Applicants’ level of experience in submitting grant applications</td>
<td>High – one applicant had completed training in completing grant applications</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Level of consultation with most key stakeholders in the community Addressed aims of application</td>
<td>High – although not complete Yes</td>
<td>Low</td>
<td>No</td>
</tr>
<tr>
<td>Support from TAP staff to complete application</td>
<td>High</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Community council able to support project</td>
<td>High</td>
<td>Moderate</td>
<td>Low (delayed)</td>
</tr>
<tr>
<td>Funding received in timely manner</td>
<td>Timely</td>
<td>Late</td>
<td>Late</td>
</tr>
<tr>
<td>Level of funding</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Appropriate gender</td>
<td>Yes</td>
<td>No</td>
<td>Mixed</td>
</tr>
<tr>
<td>Support from specialist TAP APO</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Support from other HPOs</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Activities: Smoke-free areas</td>
<td>All public areas</td>
<td>One centre only</td>
<td>Nil</td>
</tr>
<tr>
<td>Activities: School education</td>
<td>Successful</td>
<td>Successful</td>
<td>Successful</td>
</tr>
<tr>
<td>Activities: Health staff training</td>
<td>Successful</td>
<td>Successful</td>
<td>Successful</td>
</tr>
<tr>
<td>Activities: Distribution of health promotion materials</td>
<td>Moderately successful</td>
<td>Moderately successful</td>
<td>Moderately successful</td>
</tr>
<tr>
<td>Consequences</td>
<td>Level of perceived success</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Unanticipated positive effects</td>
<td>Yes – smoke-free houses</td>
<td>No</td>
</tr>
</tbody>
</table>
### Prioritisation of tobacco issues
Where tobacco was a high priority, it was probably as a result of the long relationship with the TAP APOs who had promoted the importance of tobacco as a cause of ill-health and premature mortality.

Where it was a low priority, those communities had other priorities that took precedence which meant that the community tobacco interventions were less likely to be effective. The communities gave priority to health issues that were disruptive and predominantly used by young people who challenged traditional structures of authority, such as petrol sniffing and alcohol.

Smoking was considered the norm and a socially sanctioned activity in these communities, and non-smokers were considered somewhat aberrant. Where smoking was seen as a positive activity by most people, tobacco interventions may be more difficult to implement.

People routinely shared packets of cigarettes and tobacco, and even shared individual cigarettes, meaning that it may have been difficult for participants to quantify the amount smoked. Participants commented that this sharing was often involuntary – ‘demand sharing’ (Peterson, 1997). This caused disruption in communities, and in one case documented resulted in a threat to suicide unless tobacco was given.

### Factors likely to contribute to the success of tobacco interventions

**Table 6: Factors likely to contribute to the success of community tobacco interventions**

<table>
<thead>
<tr>
<th>Antecedents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco a priority for the community</td>
</tr>
<tr>
<td>Few other competing priorities</td>
</tr>
<tr>
<td>Functional community with a community controlled health board</td>
</tr>
<tr>
<td>Application process well publicised to suitable recipients</td>
</tr>
<tr>
<td>Applicants with experience in submitting grant applications</td>
</tr>
<tr>
<td>Training for potential applicants in health promotion (for example Principles and Practices of Health Promotion course run by THS) including applying for grants</td>
</tr>
<tr>
<td>Application forms easy to understand and complete</td>
</tr>
<tr>
<td>Literate applicants</td>
</tr>
<tr>
<td>Applicants with access to facilities to submit grants (for example computer, facsimile machine)</td>
</tr>
<tr>
<td>Local, Indigenous applicants</td>
</tr>
<tr>
<td>Adequate consultation between applicant and other community members</td>
</tr>
<tr>
<td>Good relationship between the community and the APO</td>
</tr>
<tr>
<td>Support in-person for those who found it difficult to complete forms, including sufficient resources for THS staff to visit the community to complete</td>
</tr>
<tr>
<td>applications;</td>
</tr>
</tbody>
</table>
- Adequate time for applications to be lodged, for example to include adequate
time for consultation with the community
- Timely response to communities regarding progress of the application
- Realistic information about when funding would be distributed and the chance of
  receiving funding

**Assistance**

- Funding received in timely manner
- Adequate funding
- Adequate time in which to deliver the project (for example two – three years)
- Project driven by local community members
- Ongoing communication between applicant, other community members and
- APOs
- Flexible time frames for program delivery
- Appropriate access to funding for grant applicant
- Adequate support from specialist HPOs/ TAP APO
- Indigenous APOs
- Presence of APOs of appropriate gender (both males and females available)
- No other events to delay the project (floods, cyclones)
- Simple acquittal and reporting procedures for small grants

**Consequences**

- Capacity of community members increased (for example specifically in
delivering anti-tobacco programs, but also in developing, implementing and
evaluating small health promotion projects
- Adequate reporting to community
- Adequate reporting to funding body
Evaluation of changes to the environment

Rapid assessment techniques were selected to evaluate changes in the environment following the intervention (Hall et al., 1995). This technique proved to be quick and non-invasive, but the number of people in each location for observation varied widely at different visits, meaning that the patterns of smoking observed may not have been reliable. Observation provided an opportunity for validation of stakeholder interviews, for example to confirm stakeholder reports of the success of no-smoking policies. On occasions it was clear that observation was not an accurate reflection of smoking behaviour, for example when there was no evidence of smoking behaviour (such as ashtrays or cigarette butts) apart from a cloud of smoke and a strong smell of tobacco smoke.

Evaluation of changes in smoking behaviour, attitudes and knowledge

Community surveys

Most community members were included in the sample at Milikapiti and Wugularr. Recruitment was more difficult at Milingimbi; the research team was not able to recruit as many people as anticipated at the baseline visit because of a large traditional ceremony. This meant that the sample in Milingimbi is likely to not be as representative as those in the other intervention communities.

The sampling method – ‘residents’ – those who had been in the community for more than two weeks, as nominated by a senior Indigenous person - was designed to reflect those who were likely to be consuming tobacco through the community store. Indigenous workers were given identical instructions as to eligibility for the trial, but this technique of sampling may not be reliable.

Other evaluations of community tobacco campaigns have utilised random selection of participants from telephone directories as a method of sampling community members (Hymowitz et al., 1995; NTC, 1999 pp27-8). This is not likely to be a useful way of sampling Indigenous people in remote communities as so few people possessed telephones. Other potential sources of publicly available information on who lived in the community included the Electoral Roll, however many people in these remote communities were not enrolled to vote.

In all communities there was a higher than expected turnover of people. There appeared to be a core of permanent residents, but here was also a large pool of people who moved between a community and neighbouring communities (including control communities) or between remote communities and regional centres such as Darwin, Katherine or Nhulunbuy. This made it more difficult than anticipated to include participants in both the baseline survey and follow-up survey, although the level of sampling of people who were currently in the community at the time of each survey was relatively high.

Demography

The composition of samples did not differ markedly between communities. The gender balance of those surveyed in each of the communities reflects the gender of the research assistant employed in that community; men were employed as research assistants in Milikapiti and Wugularr (where more men were surveyed), and women were employed as research assistants in Milikapiti (where more women were surveyed). On more than one occasion, a research assistant at Milingimbi pointed out that she was unable by traditional law to speak to certain men. Employment of both men and women as research assistants in future surveys may provide a more balanced gender mix for surveys.

It is likely that adolescents were under-sampled. Adolescents were also often reticent to participate in the survey, possibly because they knew that they would be asked about tobacco and cannabis use and for fears that the confidentiality pact would be broken.
Changes in smoking behaviour

At the baseline, the prevalence of tobacco use among cohort participants (74 per cent in men and 66 per cent in women) was much higher than in the general population. By comparison, the prevalence of smoking in the general Australian population at the NDS Household Survey in 1998 was 29 per cent for men aged 14 years or older and 24 per cent for women aged 14 years or older (AIHW, 1999).

The prevalence of tobacco use was higher than among Indigenous people in the NATSIS survey in 1994 (54 per cent in men and 46 per cent in women) (ABS, 1996) and was typical of studies of Indigenous people in the region. In Milikapiti and Milingimbi it was a little lower than studies in the region in 1987. The prevalence in 1987 was 81 per cent for men and 73 per cent for women in the Top End (which included Milikapiti and Milingimbi). A later survey in the Tiwi Islands (where Milikapiti was located) had found a prevalence of tobacco use of 83 per cent in men and 70 per cent in women (Hoy et al., 1997). The small decline in the prevalence of tobacco use over the last ten years may have been because of the success of preventative programs, particularly at Milikapiti, which had been exposed to preventive health programs, including a large renal screening program.

It is unclear why the prevalence of tobacco use was lower in Milingimbi than in the other communities. This may have been because the community sample was not representative and in particular because young men were underrepresented. The prevalence of tobacco use at Wugularr (79 per cent of men and 68 per cent of women participants of the baseline survey) appeared to be higher than for the 1987 survey in the Katherine region (which included Wugularr) where 71 per cent of men and 35 per cent of women smoked (Watson et al., 1988). It is unclear why the prevalence of tobacco use might have risen over the 14 year period.

Of those who participated in the cohort study, there was a very low prevalence of ex-smokers at the baseline survey (11 per cent of men and 12 per cent of women) compared to the general Australian population (43 per cent for men and 37 per cent for women) (AIHW, 2000 p6). The prevalence of people who had never smoked (16 per cent of men and 22 per cent of women) was also much less than that in the general Australian population (28 per cent for men and 40 per cent for women) (AIHW, 2000 p6).

Among people who participated in the cohort study, very few claimed to have given up during the intervention year. Only ten cohort participants (four per cent) who were smokers at the baseline survey claimed to be ex-smokers by the follow-up survey. An additional seven smokers (three per cent) claimed never to have smoked, which is inconsistent with their answer at the baseline survey. This may be because they did not understand the question or because of their ‘willingness to please’ at the second survey. The baseline quit rate is lower than that of the general Australian population. The evaluation of the NTC showed a baseline cessation rate of eight per cent which rose to 11 per cent after the campaign (NTC, 1999 p 45).

However, 22 people (20 per cent of non-smokers at the baseline survey) had taken up smoking during the year. That the number of smokers rose (non-significantly) during the year suggests that the community tobacco intervention was not successful. It is of some concern that the number of smokers in the cohort actually increased. This may be an indication that the tobacco program actually had a negative effect rather than a neutral or positive effect.

Some of the cohort had passed away during the intervention year and of these, four out of five were smokers and this may have decreased the numbers of smokers. The cessation rate was lower among cohort participants at Milikapiti where the community tobacco program was deemed successful, than it was at the other two intervention communities (two per cent at Milikapiti as against five per cent at Wugularr and four per cent at Milingimbi). This is not surprising, given that the primary aim of the Milikapiti Incentive Fund project was to establish smoke-free public places rather than to reduce the prevalence of tobacco use.
Quit rates were similar in those who were light-moderate and heavy smokers at the baseline survey (6 per cent in light-moderate smokers and 2 per cent in heavy smokers, Fisher's exact p=0.459). Analysis of cessation rates in the cohort of smokers followed over the course of COMMIT, by comparison, showed a cessation rate of 31 per cent for light-moderate smokers and 18 per cent for heavy smokers (1995a).

The high prevalence of tobacco use in this population is maintained because of the relatively low quit rate. It is also likely that, although some smokers made attempts to quit, that less people made attempts to quit than in the mainstream. In addition, there appeared to be many barriers to the maintenance of cessation, particularly the constant presence of other smokers.

This study did not include collection of data on age of uptake of tobacco use and in any case did not include participants under the age of 12 years, which is the age by which many children had already commenced smoking. It is impossible to judge whether there was a change in the uptake of smoking as a result of the community tobacco interventions.

When data was assessed for all participants (that is, those who participated in one or both surveys), the prevalence of tobacco use dropped from 68 per cent at the baseline to 67 per cent at the follow-up survey. COMMIT also demonstrated an overall drop in the prevalence of smoking of 3.5 per cent in intervention communities and a 3.2 per cent drop in control communities, a non-significant difference (1995b). It also showed a drop in prevalence of 2.9 per cent among heavy smokers in both intervention and control communities (1995b).

As for COMMIT, the NTC, launched in 1997, resulted in a decrease of 1.5 per cent per year in the estimated adult prevalence of smoking (NTC, 1999 p25). It is possible that even this reported drop in the prevalence of tobacco use was due to the Hawthorn effect (Chadwick, 1984 p271): participants may have been more influenced to quit because of involvement in the evaluation of the project (being interviewed, being asked questions from the questionnaire and using the CO breathalyser) than influenced by the community tobacco intervention.

The small drop in prevalence is not surprising given that the effect seen at a population level even in very large studies such as COMMIT, or as a result of the NTC in Australia, was very small — but significant. For example, in Australia, the prevalence of tobacco use has continued to decline, although slowly, so that important declines occur over decades rather than over a year.

It had been postulated that part of the reason that large community interventions such as COMMIT failed was because the prevalence of tobacco use in participating communities was already low, and because of a relatively high exposure to previous anti-tobacco health promotion campaigns (Redman, 1996). It appears that this may not be true, because the community interventions described here were delivered to a population with a very high prevalence of tobacco use and relatively low exposure to previous tobacco campaigns - and still failed to show an effect.

CO validation

Self-report of smoking status was not necessarily reliable. Eleven of those who participated in both surveys reported at the follow-up visit that they had never smoked, yet had reported at the baseline that they were current smokers or ex-smokers. This may have been because of willingness to please on behalf of the participant or because of lack of comprehension of a survey conducted in English. Use of an interpreter or conducting surveys using local languages may remedy lack of comprehension of survey questions and this is recommended for future studies.

The sensitivity for CO testing demonstrated in this sample (58 per cent and 70 per cent) was lower than that for other studies which demonstrated a mean sensitivity of 86 per cent. This is likely to be because many self-reported smokers recorded CO levels which were consistent with being non-smokers. The intermittent nature of their smoking may have meant that they had excreted sufficient CO to bring them back into the normal range. In some cases this was because their CO was measured early in the morning, before they had smoked their first cigarette for the day. This may have meant that the test failed to pick up self-reported non-smokers who actually continued to smoke intermittently.
The specificity demonstrated in this study (96 per cent and 100 per cent) was higher than those in other studies which showed a mean specificity of 89 per cent (Patrick et al., 1994).

Overall, only three non-smokers recorded a CO level which was inconsistent with being a non-smoker. This may have meant that the cessation rate was even lower than what was recorded. However, there are other factors, such as the presence of environmental CO (for example from wood smoke) or respiratory disease in the subject, which may have meant that a false positive was recorded.

CO is not an ideal validation tool for smoking status in this population. It was chosen for this study because it was cheap, and could be carried out in the field, in the ‘camps’. It could also be used, to some extent, as an educational tool. When used at the first survey, this itself may have influenced smokers to consider quitting and may potentially have biased the study (the Hawthorn effect - see Chadwick, 1984 p271). However one systematic review of the effect of brief advice on cessation also assessed the use of interventions which gave physiological feedback (such as the use of a CO breathalyser) and concluded that they had no effect on cessation rate (Rice & Stead, 1999).

The authors of a review of validation tools for self-reported smoking status concluded that measurement of plasma cotinine was the optimal tool (Patrick et al., 1994), but concluded that self-report was sufficiently accurate in most settings. The use of plasma cotinine could be considered for future studies, although it would be costly and invasive. Other options would include validation of smoking status through confirmation with a family member or friend (a proxy report).

**Comparison of store orders to self reported consumption**

Self-report was likely to have been an inaccurate way of measuring true consumption. Participants were perhaps less likely to be numerate than other Australians. When estimating the amount smoked, participants were prompted with show cards previously used in a survey of drug and alcohol consumption in Indigenous communities (Watson et al., 1988), which allowed non-literate participants to choose an image representing the amount they smoked. Participants were asked to nominate how much they smoked over a week rather than in one day, but poor recall may have made the estimation inaccurate. Participants still found it difficult to nominate how much they smoked, probably because of the strong culture of sharing in the community. Many people also smoked intermittently according to how much money was available.

The reported consumption of tobacco differed from the alternative measure – tobacco orders. In general, participants over-estimated the amount they smoked when taking part in the survey.

When the proportion of smokers aged 12 years or over and the tobacco orders per person aged 12 years or over were used to estimate tobacco orders per smoker, tobacco consumption was estimated to be 15.8 cigarette equivalents per day per person, compared to a self-reported 16.9 cigarette equivalents per day per person at baseline. At follow-up, the estimated tobacco consumption per smoker was 8.7 cigarette equivalents per day and self-reported consumption14.0 cigarette equivalents respectively. This is in contrast to the survey conducted by Watson, Fleming and Alexander, where Indigenous smokers under-estimated how much they smoked compared to the amount sold. Only 44 per cent of tobacco product sales were accounted for by self-report (Watson et al., 1988 pp146–7).

**Changes in tobacco consumption**

There appeared to be more light smokers in this sample that in the NATSIS survey. At the baseline, 40 per cent of cohort participants smoked < 70 cigarettes or cigarette equivalents per week, while in the NATSIS survey, 34 per cent of all smokers smoked 1-10 cigarettes per day (ABS,1996 p22) In the 1998 NDS Household Survey, both men and women smokers smoked an average of 14 cigarettes per day (AIHW,1999) and in the evaluation of the NTC, smokers smoked an average of 16.4 cigarettes per day (NTC,1999 p50).
Although there was no decrease in the prevalence of tobacco use among those who were included in the cohort study, twenty percent of the smokers had decreased their consumption at the end of the intervention year. Data on tobacco orders confirmed a reduction in consumption in these communities was likely. However this compares to 41 per cent in the general Australian population, and 32 per cent in Indigenous smokers surveyed at the NDS Household Survey in 1993 (AIHW,1994 p27).

**Changes in attitudes to smoking**

At the baseline survey, 61 per cent of smokers included in the cohort study said that they were taking action to quit or were thinking about quitting and over the course of the intervention year this increased significantly to 72 per cent, which is encouraging. By comparison, in the evaluation of the NTC, 52 per cent were considered to be preparing to quit or to be contemplators at the baseline survey, and this increased to 57 per cent over the course of the campaign (NTC,1999 p43).

Self-reported contemplation or taking action at the baseline visit was not associated with cessation at the follow-up visit. By contrast, in studies in other populations, readiness to quit is a predictor of eventual success at cessation. For example, DiClemente et al (1991) found that after six months, eight per cent of precontemplators had given up smoking, while 12 per cent of contemplators and 21 per cent of those who were preparing to give up smoking had quit. The low quit rate even in people who stated they were taking action to quit or thinking about quitting may have been because participants were polite or willing to please the researcher by stating that they were more interested in quitting than they actually were. Being a current smoker was difficult to refute, but people could quite easily overstate their readiness to quit.

**Changes to knowledge about the health effects of tobacco**

Most participants knew that smoking caused lung cancer and heart disease. For example, prior to the intervention 85 per cent of this sample knew that tobacco use was linked to lung cancer, compared to 79 per cent in a sample of AHWs in South Australia, 98 per cent in a sample of other health professionals in South Australia (Lake, 1992) and 50 per cent in a community sample in Victoria (Mullins & Borland, 1995). Eighty two percent of this sample knew that tobacco use was linked to heart disease compared to 89 per cent of AHWs and 98 per cent of other health professionals in the study in South Australia (Lake, 1992) and 36 per cent of the community sample in Victoria (Mullins & Borland, 1995).

It is not surprising that so many people responded positively, because there was high exposure to the NTC’s television advertisements showing lung cancer and vascular disease. Despite the high level of knowledge, knowledge about these health issues increased over the intervention year.

**Exposure to evidence based components of the intervention**

**Training health professionals in delivering a brief intervention on tobacco**

Although many smokers had received advice on quitting, this study was unable to show a significant increase in the proportion of smokers who reported discussing tobacco with health professionals. The COMMIT trial (Ockene et al., 1997) also failed to show that the proportion of smokers who had quit in the year after health professionals had been trained in delivering smoking cessation advice had increased.

Nevertheless, the delivery of such advice was seen as appropriate and it is likely that it may have some effect. The delivery of brief advice on cessation is likely to be quick, non-invasive and cheap and thus should be delivered to all smokers at every opportunity.

**Nicotine Replacement Therapy (NRT)**

Although NRT use was seen as appropriate, few participants used NRT during the intervention year, mainly because of its cost. Even in the community where it was available at no cost, few people used it. Only one person included in the cohort study who had used NRT during the intervention year had quit; the small sample of those who had tried NRT means that it is difficult to comment on the cessation rate. There are many barriers to cessation apart from the lack of access to NRT, despite evidence of effectiveness in assisting cessation (Silagy, Mant, Fowler, & Lancaster, 2000).
Quit courses

Quit courses were not nominated as an option for interventions in communities. Stakeholders interviewed commented that they did not believe Quit courses were appropriate for delivery in remote communities, despite evidence for their effectiveness (Stead & Lancaster, 2000a). The communities involved may have been too small to attract sufficient numbers of motivated smokers to run such a course. Group therapy may not be an appropriate approach to behavioural change for Indigenous people; one on one interaction may be preferable (Brady, 1995). There may be potential for culturally appropriate quit courses to be run within very motivated groups of smokers in communities, but this would require further evaluation.

Point of sale intervention

Systematic reviews of evidence from other populations show that education to prevent sales to minors is only effective at reducing such sales when combined with enforcement (Contributors to the Cochrane Collaboration and the Campbell Collaboration, 2000; Stead & Lancaster, 2000b) and has no effect on uptake of tobacco use. TAP APOs routinely delivered education material (pamphlets) and required signage (stickers) to remote communities, but no participants commented on such education and it was unlikely to have had an effect. There were many barriers to enforcement of the legislation. TAP officers were able to respond to complaints but had had no such formal complaints lodged. They did not have the resources to conduct enforcement and monitoring of the Act and because of the absence of a licensing system in the NT Tobacco legislation, there was no way of telling who was selling tobacco in the community. TAP APOs were unaware of other vendors in the intervention communities and thus were not able to check signage or other legislative requirements. The introduction of licensing of tobacco vendors clearly would have increased TAP’s capability to check that these vendors were fulfilling their requirements - if vendors obtained a license.

Although TAP officers had conducted retailer compliance testing in Darwin, such testing was probably inappropriate in a small community where a newcomer would be obvious and where using an adolescent from the community could potentially result in repercussions for the adolescent or their family. It was clear that vendors did not take seriously the legislation banning sales to minors because of the lack of enforcement.

Although many people knew that it was illegal to sell tobacco to a minor, they did not know it was illegal to give tobacco to a minor – a widespread practice in all of the participating communities. An education campaign around this legislation is warranted. Adolescents clearly attempted to purchase tobacco. Store staff never checked identification and few people would have had identification as very few people had driving licenses. The introduction of some form of identification, such as the proof of age card, could potentially be discussed within communities.

One retailer had sold single cigarettes to minors (which was legal according to NT legislation as long as the cigarette was covered in a health warning); the introduction of a law to restrict sales of cigarettes to packets of 20 or more may prevent such sales to minors (if it was enforced).

Only one retailer used a vending machine. It was clear that minors were able to access the vending machine at Milikapiti. This correlates with previous research conducted by THS in urban centres, where minors were able to access vending machines in 97 per cent of attempts (Personal communication, D Rayson, 2001). An alternative would be to keep the vending machine – or the smaller model adopted by ALPA – behind the counter to be operated by store staff only so as to prevent sales to minors. Alternatively, vending machines could be banned in legislation.
TAP officers did not discuss with store managers such matters as:

- tobacco advertising – the presence of tobacco advertising in one store may have increased sales. Stores could voluntarily remove advertising; alternatively, legislation could be introduced to ban point of sale advertising.

- store policies for the sale of tobacco with store managers but the introduction of such policies also had the potential to have an impact on sales to minors. Some stores in Indigenous communities have developed nutrition policies, and ALPA had policies for the sale of kava and alcohol. The promotion of store policies on tobacco sales could clarify issues regarding sales of tobacco.

- tobacco pricing - over the long term, price rises are likely to have an impact on consumption. In a study of tobacco turnover at Maningrida for example over a ten year period – in the absence of any specific tobacco education programs apart from television advertising – consumption halved (Goto, 1998), which is probably at least partly due to the cost of tobacco. However, tobacco price rises were unlikely to have resulted in the drop in consumption, as shown by the larger decline in consumption in intervention communities compared to control communities.

- It is a concern that in some communities the ‘mark-up’ for tobacco was much less than for other products. Effectively, community purchases of the more highly priced food (including fruit and vegetables) subsidised the cost of tobacco. ALPA’s policy of specifically increasing the price of tobacco to subsidise the cost of fruit and vegetables is a good example of how such pricing policy can be used to encourage healthy lifestyles (McMillan, 1991).

- However it is possible that increases in price for tobacco may mean that smokers may experience hardship unless they reduce their consumption – and in particular, may not have enough money with which to purchase food (Contributors to the Cochrane Collaboration and the Campbell Collaboration, 2000). The researcher unsuccessfully attempted to obtain records of food sales in these communities to assess the effect of price increases for tobacco on the consumption of food. However the instigation of price rises by store managers was uncontroversial in these communities and such price rises may present an opportunity to reduce consumption of tobacco.

**Promotion of smoke-free environments**

A systematic review of studies assessing the effect of interventions designed to reduce smoking in public places concluded that such interventions were effective (Serra, Cabezas, Bonfill, & Pladevall-Vila, 2000), especially well-resourced multi-component interventions. The introduction of a smoke-free policy was widely accepted both in Milikapiti, where it formed the key strategy of the community tobacco intervention, and in the other communities.

The policy appeared to be successful at Milikapiti, according to stakeholder interviews and observation, although many enclosed public places were officially or unofficially smoke-free prior to the introduction of the new policy.

**Distribution of health promotion material**

Both TAP APOs and stakeholders said that they believed that development and distribution of health promotion material was a key function of the TAP program. Most community members (83 per cent) recalled seeing anti-tobacco posters during the intervention year; in the evaluation of the NTC no participants recalled seeing campaign posters in doctors surgeries (NTC,1999 p33). Clearly posters reached a large sector of the target audience. Those who recalled seeing health promotion material about smoking during the intervention year were marginally less likely to have quit than those who did not, but this difference was not significant. There is little research on the effectiveness of the use of health promotion materials such as posters in reducing the prevalence of tobacco use; further research is to confirm the effect of posters when they are used in a community setting.
Health professionals commented that they rarely used health promotion materials when giving advice on cessation. It is unlikely, therefore that they had any effect in this study because of failure to use them in a consultation setting. There is mixed evidence as to whether the use of health promotion materials within clinical consultations increases the cessation rate above advice alone (Silagy & Ketteridge, 1998).

**Quitline promotion**

That none of the participating communities chose to promote the Quitline as part of their intervention may be evidence that Indigenous people did not see it as a useful aid to quitting. Awareness of the existence of the Quitline was high (probably because of the NTC, which featured information about the Quitline) and rose over the intervention period, but few Indigenous people had called the Quitline either before or during the intervention year. It is likely that the use of Quitline is inappropriate for Indigenous people, who may have felt uncomfortable discussing quitting with non-Indigenous counsellors. Although in theory calls from Indigenous people could be transferred to TAP APOs, this rarely occurred. Many people living in these remote communities did not own telephones, and public phones were often not functioning; this would have made it difficult to access the Quitline. Monitoring the number of Indigenous callers to the mainstream Quitline may also provide a measure of frequency of use of mainstream services.

**School intervention**

Although many school students may have attended the talks on tobacco delivered in all intervention communities, most were not included in the study as they were under the age of 12 years. The community survey did not demonstrate an increase in the quitting rate in adolescents who had attended school talks, but this is not surprising as the sample of adolescents who took part in both the baseline and follow-up survey was so small. The study did not assess changes in uptake of tobacco use. Of these schools, only the Milingimbi school had developed a policy for smoking among pupils. This had been developed in consultation with high school students and with community elders and it provides a good model of how a smoking policy can be implemented.

Neither TAP APOs nor teachers had accessed available resources on tobacco designed for Indigenous school children, or modules on tobacco (incorporating tasks to enhance literacy and numeracy), which may have been a more sustainable approach to the delivery of such education.

**Media**

More community members had had exposure to anti-tobacco message through television than from any other source. Many participants recalled television advertisements produced by the NTC and advertisements targeted at Indigenous people, developed by TAP. Recalling anti-tobacco advertisements was not, however, related to giving up smoking. Additionally, control communities had also been exposed to anti-tobacco advertising, and they did not show a drop in consumption. There was however a decrease in the prevalence of smoking in the community sample. As discussed above, the NTC resulted in a decrease of the prevalence of tobacco use of 1.5 per cent per year in a community sample (NTC, 1999 p25). It appears that such campaigns may also have some effect for Indigenous people.

Advertising may have had a more subtle effect. It appeared to be a reminder for all community members and may have acted to ‘prime’ smokers to receive other anti-smoking messages, for example from health professionals. Council members, health professionals, teachers and store workers and other community members are likely to have seen advertising and this may have prompted them to introduce smoke-free public places or discuss cessation with smokers, or at least reinforced their actions. Other forms of media, such as print advertising and radio, did not have as great a penetration.
Conclusions

- The controlled trial of a community tobacco intervention had a significant impact in reducing consumption of tobacco in one intervention community compared to a matched control community. It failed, however, to demonstrate an effect in the other two intervention communities compared to their respective control communities.

- The process analysis demonstrated that the community which showed a significant drop in consumption compared to a matched control community involved the introduction of smoke-free policy for enclosed public places in the community, backed with other tobacco interventions for which there is evidence of effectiveness in other populations. These programs had successfully been delivered in the community.

- The interventions in the other two communities had involved sports sponsorship delivered in conjunction with other tobacco interventions. The process analysis showed that there were many barriers to the successful implementation of these programs, including bureaucratic delays, disruption within communities, lack of support from Health Promotion Officers due to inadequate staffing and natural phenomena such as floods and cyclones.

- The process analysis also showed that many successful applications for Incentive Fund programs in the evaluation year did not even reach the stage where they received funding because of high turnover of non-Indigenous staff within remote communities and delays in distribution of funding.

- ‘Before and after’ evaluation of the prevalence of tobacco use in a cohort of those who participated in both community surveys failed to demonstrate a decrease in the prevalence of tobacco use, and in fact demonstrated a net gain of 12 smokers, which is of concern. Analysis of the prevalence of smoking in community samples showed a very slight drop in prevalence of tobacco use (69 per cent to 67 per cent), which is similar to that demonstrated in both COMMIT and in the evaluation of the NTC.

- The quit rate for smokers was 4 per cent, which is less than that in the general Australian population. Many participants reported making quit attempts and said that maintaining cessation was difficult – which is not surprising considering the social setting. This study was unable to show whether the intervention had any impact on uptake rates.

- Significantly more smokers reported an increase in readiness to quit at the follow-up survey. That more smokers were considering cessation could be seen as a positive step in this population, where smoking is the norm and cessation is seen as aberrant behaviour. More Indigenous people were considering quitting or taking action to quit than was demonstrated in the general Australian population.

- Knowledge about the health effects of tobacco also increased over the course of the study, although was high prior to the intervention, possibly as a result of anti-tobacco media campaigns.

- It is not surprising that the study failed to show a decrease in the prevalence of tobacco use as prevalence of smoking was measured over a short period and changes are more likely to occur over longer periods of time. In addition, the intervention involved multiple components, which may have meant that interventions were too diffuse. Even a large-scale, long-term, well-funded trial such as COMMIT failed to demonstrate a major decrease in the prevalence of smoking in a cohort followed over the course of the study.

- There were many reasons why this study population is different from that used in COMMIT, or in the general Australian population. A long history of tobacco use and its incorporation into ceremonies means that tobacco plays a strong role in the cultural life of Indigenous people. Tobacco use was accepted and expected. Sharing of tobacco appeared to play a part in the reinforcement of relationships. The very high prevalence of tobacco use meant that tobacco was always present, and that even for those who gave up, maintenance of tobacco use was difficult.
There are many challenges to tobacco control for Indigenous people, not least of which is the low priority to which Indigenous people give tobacco as a health issue. TAP should:

- continue to advocate for a higher prioritisation of tobacco as a health issue in Indigenous communities; and
- continue to provide specialist support to communities interested in delivering tobacco control programs.

Adequate staffing and funding of TAP is critical to the sustainability of such programs, however. At present, resourcing appears insufficient to adequately support communities in their attempts to run tobacco control programs; in particular TAP lacks funding for a woman APO and is only able to supply minimal funding for individual grants to communities or community controlled organisations.


Silagy, C., Lancaster, T., Fowler, G., & Spiers, I. (1997). 'Meta-analysis: Training health care professionals to provide smoking cessation interventions only slightly increases smoking cessation'. Evidence-Based Medicine, 2, 48.


