
CENTRE FOR GAMBLING RESEARCH

GAMING MACHINE ACCESSIBILITY AND USE IN SUBURBAN CANBERRA: A DETAILED ANALYSIS OF THE TUGGERANONG VALLEY

SEPTEMBER 2004

**COMMISSIONED BY
ACT GAMBLING AND RACING COMMISSION**

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ISBN 0-9757104-0-0

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Table of Contents

TABLE OF CONTENTS	3
LIST OF FIGURES.....	5
LIST OF TABLES.....	7
ACKNOWLEDGEMENTS	8
EXECUTIVE SUMMARY	9
1 INTRODUCTION.....	16
1.1 TERMS OF REFERENCE	16
1.2 THE TUGGERANONG STUDY	17
1.3 CURRENT SIGNIFICANCE TO THE ACT	19
1.4 REPORT OUTLINE	19
2 BACKGROUND AND AIMS OF THE RESEARCH	21
2.1 ACCESSIBILITY	21
2.1.1 Socio-Spatial Accessibility.....	23
2.1.2 Other Dimensions of Accessibility.....	25
2.1.3 Density of EGMs.....	25
2.1.4 Club Catchment Areas.....	26
2.2 AIMS OF THE TUGGERANONG STUDY	27
2.3 SUMMARY	28
3 METHODOLOGY	29
3.1 ETHICS AND REVIEW PROCEDURES	29
3.1.1 ANU Human Research Ethics Committee.....	29
3.1.2 Centre for Gambling Research Code of Practice	29
3.1.3 Community Advisory Group	29
3.2 TUGGERANONG SURVEY	30
3.2.1 Door-to-Door Survey Research.....	30
3.2.2 Limitations.....	31
3.2.3 Tuggeranong Survey Protocols	32
3.2.4 Response Rates and Sample Distribution	34
3.2.5 Pilot Survey.....	34
3.2.6 The Questionnaire	34
3.2.7 Data Entry	38
3.2.8 Data Analysis.....	38
3.2.9 Secondary Data	39
3.3 GIS-BASED ANALYSIS	40
3.3.1 Geocoding of survey respondents.....	41
3.3.2 Distance calculations.....	42
3.3.3 Decision tree analysis of data.....	43
3.3.4 Kernel density surfaces as an exploratory means of investigating the spatial nature of gambling behaviour	45
4 THE LOCAL CONTEXT	48
4.1 CANBERRA'S URBAN GEOGRAPHY	48
4.2 TUGGERANONG PROFILE	49
4.2.1 Tuggeranong Social and Economic Profile	51
4.2.2 Socio-economic status	56
4.3 SUMMARY	58
5 SURVEY RESULTS	59
5.1 SAMPLE PROFILE AND DATA REPRESENTATIVENESS	59
5.1.1 Demographic and socio-economic characteristics and comparisons.....	59
5.1.2 Summary.....	62
5.2 CLUB PATRONAGE AND GAMBLING IN TUGGERANONG	63

5.2.1	<i>Club Usage by Tuggeranong Residents.....</i>	65
5.2.2	<i>EGM Participation</i>	70
5.2.3	<i>Frequency of EGM Gambling.....</i>	75
5.2.4	<i>Typical EGM Session Duration</i>	80
5.2.5	<i>Typical Session Expenditure.....</i>	85
5.2.6	<i>Annual EGM Expenditure.....</i>	90
5.2.7	<i>Socio-economic and Demographic Variations in EGM Expenditure</i>	91
5.2.8	<i>EGM use by Gender and Distance</i>	96
5.3	INDIVIDUAL CLUB PROFILES	97
5.3.1	<i>Catchment areas for the major clubs used by EGM gamblers.</i>	97
5.3.2	<i>Club patron profiles.....</i>	105
5.3.3	<i>Use of EGMs and club facilities</i>	108
5.4	ATTITUDES TOWARDS GAMBLING IN TUGGERANONG.....	115
5.4.1	<i>Aggregate results.....</i>	115
5.4.2	<i>Comparisons of key groups.....</i>	116
5.4.3	<i>Socio-spatial variations</i>	117
6	DISCUSSION AND CONCLUSION.....	120
6.1	DISCUSSION OF FINDINGS.....	120
6.2	SUMMARY OF FINDINGS FROM THE TUGGERANONG GAMBLING SURVEY.....	121
6.2.1	<i>Sample Characteristics</i>	<i>121</i>
6.2.2	<i>Club patronage</i>	<i>121</i>
6.2.3	<i>Club Facility Use.....</i>	<i>122</i>
6.2.4	<i>Preferred Clubs</i>	<i>122</i>
6.2.5	<i>Gambling Facility Use.....</i>	<i>122</i>
6.2.6	<i>EGM Participation</i>	<i>122</i>
6.2.7	<i>EGM Frequency</i>	<i>123</i>
6.2.8	<i>EGM Session Duration</i>	<i>124</i>
6.2.9	<i>EGM Session Expenditure</i>	<i>125</i>
6.2.10	<i>Annual EGM expenditure</i>	<i>125</i>
6.2.11	<i>Club Catchment Areas</i>	<i>127</i>
6.2.12	<i>Club Patron Profiles.....</i>	<i>128</i>
6.3	INFORMATION TO ASSIST POLICY DECISIONS	129
6.4	ACCESSIBILITY AND EGM GAMBLING BEHAVIOUR	130
6.4.1	<i>Community attitudes to gambling and related policies.....</i>	<i>131</i>
6.5	FUTURE DIRECTIONS.....	132
6.6	POTENTIAL FURTHER APPLICATIONS OF GIS TO GAMBLING BEHAVIOUR.....	132
6.7	FRAMEWORK FOR LOCAL AREA GAMBLING RESEARCH.....	134
6.8	CONCLUSION.....	138
	BIBLIOGRAPHY.....	139
	APPENDIX 1 COMMUNITY ADVISORY GROUP MEMBERS (CAG).....	144
	APPENDIX 2 QUESTIONNAIRE SURVEY	145
	APPENDIX 3 LAMINATED INFORMATION SHEET SHOWN TO HOUSEHOLDER.....	155
	APPENDIX 4 INFORMATION LETTER OFFERED TO RESPONDENTS.....	156
	APPENDIX 5 FEATURES OF A BOX-AND-WHISKER PLOT.....	157
	APPENDIX 6 FEATURES OF A DECISION TREE OUTPUT DISPLAYED WITH THE EXPLANATORY VARIABLE PLOTTED ON THE Y AXIS.....	159
	APPENDIX 7 FULL OUTPUT FOR DECISION TREE ANALYSIS BASED ON ANNUAL FREQUENCY OF EGM GAMBLING.	160
	APPENDIX 8 FULL OUTPUT FOR DECISION TREE ANALYSIS BASED ON EGM SESSION DURATION	162
	APPENDIX 9 FULL OUTPUT FOR DECISION TREE ANALYSIS BASED ON EGM SESSION EXPENDITURE	164
	APPENDIX 10 FULL OUTPUT FOR DECISION TREE ANALYSIS BASED ON ESTIMATED ANNUAL EGM EXPENDITURE.....	166

List of Figures

FIGURE 1: DIMENSIONS OF ACCESSIBILITY TO GAMBLING FACILITIES.	22
FIGURE 2: SPATIAL ACCESSIBILITY TO EGM CLUBS, TWO THEORETICAL EXAMPLES.	23
FIGURE 3: TUGGERANONG VALLEY - DISTRIBUTION OF SURVEY RESPONSES	35
FIGURE 4: QUESTIONNAIRE PATHWAYS AND SAMPLE SIZES	36
FIGURE 5: DATA PREPARATION AND ANALYSIS OF THE GIS-BASED ASPECTS OF THE TUGGERANONG GAMBLING STUDY.	42
FIGURE 6: DIFFERENT METHODS OF DISTANCE CALCULATION BETWEEN POINTS USING A GIS.	43
FIGURE 7: KERNEL DENSITY ESTIMATION OF A POINT PATTERN.	46
FIGURE 8: THE ACT AND TUGGERANONG.	50
FIGURE 9: AGE PROFILES (AGED 18+) ACT AND TUGGERANONG.	52
FIGURE 10: MARITAL STATUS PROFILES, ACT AND TUGGERANONG.	52
FIGURE 11: WEEKLY HOUSEHOLD INCOME PROFILES, ACT AND TUGGERANONG.	54
FIGURE 12: LABOUR FORCE STATUS PROFILES, ACT AND TUGGERANONG.	54
FIGURE 13: OCCUPATION CATEGORY PROFILES, ACT AND TUGGERANONG.	55
FIGURE 14: HOUSING TENURE PROFILES, ACT AND TUGGERANONG.	55
FIGURE 15: ABS SOCIO-ECONOMIC INDEXES FOR AREAS (SEIFA) FOR TUGGERANONG CDS.	57
FIGURE 16: COMPARISON OF SAMPLE SIZE PER CD AND TOTAL PERSONS PER CD.	60
FIGURE 17: COMPARISON OF TUGGERANONG AGE PROFILES IN THE SAMPLE POPULATION AND THE 2001 CENSUS.	61
FIGURE 18: COMPARISON OF TUGGERANONG MARITAL STATUS PROFILES IN THE SAMPLE POPULATION AND 2001 CENSUS.	61
FIGURE 19: COMPARISON OF TUGGERANONG LABOUR FORCE PROFILES IN THE SAMPLE POPULATION AND 2001 CENSUS.	62
FIGURE 20: COMPARISON OF TUGGERANONG HOUSEHOLD INCOME PROFILES IN THE SAMPLE POPULATION AND THE CENSUS 2001.	63
FIGURE 21: KEY INDEPENDENT AND DEPENDENT VARIABLES FOR ANALYSIS OF EGM GAMBLING.	64
FIGURE 22: PROPORTION OF CLUB PATRONS IN TUGGERANONG SAMPLE POPULATION.	65
FIGURE 23: PERCENTAGE OF EGM GAMBLERS IN EACH INCOME GROUP	72
FIGURE 24: EGM PARTICIPATION RATE BY SUBURB (AS A % OF CLUB PATRONS).	73
FIGURE 25: PERCENTAGE OF WEEKLY EGM GAMBLERS BY SUBURB.	75
FIGURE 26: FREQUENCY OF EGM PARTICIPATION: % OF EGM GAMBLERS.	76
FIGURE 27: FREQUENCY OF EGM GAMBLING BY SOCIO-ECONOMIC AND DEMOGRAPHIC VARIABLES.	77
FIGURE 28: FREQUENCY OF EGM GAMBLING BY ASSOCIATED ACTIVITIES.	78
FIGURE 29: FREQUENCY OF EGM GAMBLING BY REGULAR CLUB, SUBURB AND MODE OF TRANSPORT. ...	79
FIGURE 30: PRIMARY RULES FOR DECISION TREE ANALYSIS BASED ON ANNUAL FREQUENCY OF EGM GAMBLING.	80
FIGURE 31: USUAL EGM SESSION DURATION	81
FIGURE 32: USUAL EGM SESSION DURATION BY SOCIO-ECONOMIC AND DEMOGRAPHIC GROUPS.	82
FIGURE 33: USUAL EGM SESSION DURATION BY ASSOCIATED ACTIVITIES.	83
FIGURE 34: USUAL EGM SESSION DURATION BY SUBURB, CLUB AND TRANSPORT VARIABLES.	84
FIGURE 35: PRIMARY RULES FOR DECISION TREE ANALYSIS BASED ON EGM SESSION DURATION.	85
FIGURE 36: FREQUENCY DISTRIBUTION OF EGM SESSION EXPENDITURE CATEGORIES.	86
FIGURE 37: TYPICAL EGM SESSION EXPENDITURE BY SOCIO-ECONOMIC AND DEMOGRAPHIC VARIABLES.	87
FIGURE 38: TYPICAL EGM SESSION EXPENDITURE BY EGM GAMBLING VARIABLES.	88
FIGURE 39: TYPICAL EGM SESSION EXPENDITURE BY CLUB, SUBURB AND TRANSPORT VARIABLES.	89
FIGURE 40: PRIMARY RULES FOR DECISION TREE ANALYSIS BASED ON EGM SESSION EXPENDITURE	90
FIGURE 41: FREQUENCY DISTRIBUTION OF ANNUAL EGM EXPENDITURE (N=884)	91
FIGURE 42: ESTIMATED ANNUAL EGM EXPENDITURE BY DEMOGRAPHIC AND SOCIO-ECONOMIC GROUPS.	92
FIGURE 43: ESTIMATED ANNUAL EGM EXPENDITURE BY ASSOCIATED VARIABLES.	93
FIGURE 44: ESTIMATED ANNUAL EGM EXPENDITURE BY CLUB, SUBURB AND TRANSPORT VARIABLES. ...	94
FIGURE 45: PRIMARY RULES FOR DECISION TREE ANALYSIS BASED ON ESTIMATED ANNUAL EGM EXPENDITURE.	95
FIGURE 46: EGM ACTIVITY VARIABLES SPLIT BY DISTANCE TO REGULAR CLUB AND GENDER.	96
FIGURE 47: CATCHMENT AREA MAPS FOR CLUBS.	99
FIGURE 48: TRAVEL DISTANCE PROFILES FOR EGM PATRONS: EIGHT MOST POPULAR CLUBS.	102
FIGURE 49: CORE CATCHMENT OF CLUB A OVERLAID WITH SEIFA.	103
FIGURE 50: CORE CATCHMENT OF CLUB E OVERLAID WITH SEIFA	103

FIGURE 51: CORE CATCHMENT OF CLUB G OVERLAID WITH SEIFA.....	104
FIGURE 52: CORE CATCHMENT OF CLUB H OVERLAID WITH SEIFA.....	104
FIGURE 53: AGE PROFILES OF INDIVIDUAL CLUBS	106
FIGURE 54: FREQUENCY OF PATRON CLUB VISITS PER ANNUM	110
FIGURE 55: FREQUENCY OF VISIT PER ANNUM TO MOST FREQUENT EGM CLUB, BY CLUB AND LOYALTY CARD.....	111
FIGURE 56: FREQUENCY OF REGULAR CLUB VISITS PER ANNUM, BY CLUB AND GENDER.	111
FIGURE 57: ESTIMATED ANNUAL EGM EXPENDITURE AT REGULAR CLUB	112
FIGURE 58: ESTIMATED ANNUAL EGM EXPENDITURE AT MOST FREQUENTLY VISITED CLUB BY GENDER.	113
FIGURE 59: BOX-AND-WHISKER PLOTS OF ANNUAL EGM EXPENDITURE AT REGULAR CLUB, BY CLUB AND LOYALTY CARD USE.	113
FIGURE 60: ESTIMATED ANNUAL EXPENDITURE AT FAVOURITE CLUB BY DISTANCE FROM IT.....	114
FIGURE 61: RESPONDENTS IN WHO (A) AGREED (B) AND DISAGREED THAT GAMBLING HAS IMPROVED SOCIAL LIFE IN TUGGERANONG.....	119
FIGURE 62: RESPONDENTS WHO (A) AGREED AND (B) DISAGREED THAT GAMBLING IS A SERIOUS SOCIAL PROBLEM IN TUGGERANONG.....	119

List of Tables

TABLE 1: SELECTED POPULATION AND EGM DATA - ACT REGIONS, 2003.....	32
TABLE 2: CLUBS LOCATED WITHIN TUGGERANONG – YEAR OF ESTABLISHMENT AND NUMBER OF EGMS PER CLUB, 2004.....	51
TABLE 3: COUNTRY OF BIRTH, PERCENTAGE OF POPULATION FOR ACT AND TUGGERANONG (SORTED BY PERCENTAGE OF POPULATION IN THE ACT).	53
TABLE 4: SOCIO-ECONOMIC INDEXES FOR AREAS (SEIFA), CANBERRA SUB-DIVISIONS.	56
TABLE 5: GENDER AND AGE PROFILE OF TUGGERANONG SAMPLE POPULATION.	60
TABLE 6: PROPORTION OF TOTAL SAMPLE AND OF CLUB PATRONS WHO HAVE PURCHASED OR PARTICIPATED IN KEY CLUB ACTIVITIES.....	66
TABLE 7: REGULAR CLUBS FOR SPECIFIC ACTIVITIES.	67
TABLE 8: OTHER CLUB FACILITIES NOMINATED BY SURVEY RESPONDENTS.	67
TABLE 9: SOCIAL ACTIVITIES OF TUGGERANONG RESIDENTS.....	68
TABLE 10: SOCIO-DEMOGRAPHIC PROFILES OF CLUB PATRONS AND NON-VISITORS.	68
TABLE 11: PROPORTION OF EACH SOCIO-DEMOGRAPHIC GROUP WHO DO AND DO NOT VISIT CLUBS.	69
TABLE 12: CLUB VISITATION BY RESIDENTS OF TUGGERANONG SUBURBS.	70
TABLE 13: EGM PARTICIPATION RATES FOR SOCIO-ECONOMIC AND DEMOGRAPHIC GROUPS.	71
TABLE 14: EGM PARTICIPATION BY SUBURB (% OF CLUB PATRONS).	72
TABLE 15: FREQUENCY OF EGM PARTICIPATION BY SUBURB (% OF CLUB PATRONS).	74
TABLE 16: USE OF TUGGERANONG CLUBS BY RESIDENT GAMBLERS.	97
TABLE 17: GENDER PROFILES OF THE EGM GAMBLER PATRONS OF EACH CLUB.	105
TABLE 18: AGE PROFILES OF EGM PATRONS OF EACH CLUB.....	106
TABLE 19: MARITAL STATUS PROFILES OF THE PATRONS OF EACH CLUB	107
TABLE 20: INCOME PROFILES OF THE PATRONS OF EACH CLUB.....	107
TABLE 21: LABOUR FORCE PROFILES OF THE PATRONS OF EACH CLUB.	108
TABLE 22: CLUB EGM PATRONS, ASSOCIATED ACTIVITIES.	109
TABLE 23: CROSS TABULATION OF REGULAR CLUB AND MODE OF TRANSPORT.....	115
TABLE 24: ATTITUDES TOWARDS POLICY ISSUES: TUGGERANONG RESIDENTS (%).....	116
TABLE 25: ATTITUDES TOWARDS POLICY ISSUES: EGM GAMBLERS AND NON-EGM GAMBLERS (%). ..	117
TABLE 26: ATTITUDES TOWARDS GAMBLING: TUGGERANONG RESIDENTS (%).....	118
TABLE 27: SUMMARY OF PROPOSED RESEARCH FRAMEWORK	136

Acknowledgements

The authors extend thanks to the ACT Gambling and Racing Commission and to members of the Community Advisory Group for their advice and collaboration with this research. Our special thanks to Phil Collins and Greg Jones for advice on the survey design and for their prompt, helpful replies to our many queries during data analysis.

Special thanks also go to Kenneth Cole, Holly Dunstan, Jessica Edquist, John Greenwood, Chris Hatherly, Natalie Hatherly, Barbara Waugh and Nicole Writz, all of whom worked tirelessly on the household surveys over the hot summer months in Canberra. Their enthusiasm, ideas and thoughtful insights were important contributions to the project.

Leah Dunn, Mary Cormick and Sean Downes gave us constant support and facilitated efficient administration of the project.

Thanks are also extended to the people of Tuggeranong who agreed to answer our questions.

Executive Summary

Introduction

This report outlines research which focuses on club use and gambling activity in a specific region of suburban Canberra, namely the Tuggeranong Valley. The study builds on the 2001 ACT gambling survey by focussing in detail on the local level patterns of club use and gambling activity.

- Using multiple methods, this study identifies patterns of gambling behaviour and/or club patronage of different Tuggeranong sub-populations. Efforts are also made to detect any explanatory factors.
- It also examines whether geographical proximity and/or other dimensions of accessibility are significant factors influencing gambling activity and use of gaming clubs.
- Face-to-face interviews with 2,447 adults were conducted to examine club patronage and gambling patterns of a sample population of residents;
- The survey data were triangulated with a range of secondary data including profiles of gaming clubs in the Tuggeranong area and ABS-SEIFA measures of relative socio-economic disadvantage.
- These data were interrogated with GIS and statistical methods to identify relationships and patterns.

The GIS-based results from this study have shed new light on a number of spatial aspects of gambling behaviour. The most significant finding from this study is the marked differences in club catchment areas:

- Some local clubs are drawing patrons from across the whole Tuggeranong region,
- Others have very clearly defined local catchments; and
- Clubs located outside the Tuggeranong Valley are attracting many regular patrons among Tuggeranong residents.

It also appears that patron gambling patterns differ for clubs which have local population bases:

- In general terms, clubs which draw their patrons from a more localised catchment have patrons with heavier gambling profiles than clubs with wider reach into the surrounding area.

Community survey: club patronage

More than three quarters of the Tuggeranong sample population report visiting clubs in the ACT (77.9% of sample population). Visiting ACT clubs is the third most common social activity after dining out (88.8%) and going to the movies (78.9%) for the sample population.

- No socio-economic or demographic group has a club visitation rate below 66%, a reflection of the universal appeal of clubs in the ACT to all social groups.
- Men (80.9%) are more likely to have visited a club in the past year than women (75.5%).
- An income effect was evident with over 84% of the highest income group visiting clubs, declining to 70.6% at the lowest end of the

income spectrum.

- The young (82.2% of 18-25 age group) and the elderly (81.3% of the 61-75 age group) have the highest club patronage rates; and
- People aged 26-40 years (73.8%) and the over 75s (68.3%) have relatively low rates of club patronage.

Only minor variations in club patronage occur across suburbs (69.1% - 87%), indicating that club patrons are located throughout the region.

Use of club facilities

Two Tuggeranong clubs (Club C and Club F) stand out as the preferred locations for a number of activities, including EGM gambling, Keno and dining.

Dining out is the most popular club activity for both club patrons (89.9%) and the total Tuggeranong sample population (70%).

- 46.9% of club patrons gamble on club EGMs (36.5% of the entire sample population) which is slightly lower than reported in the 2001 ACT gambling survey (38.1%).

EGM participation

Groups of club patrons with the highest EGM participation rates include:

- those aged 18-25 (59.5% use EGMs);
- pension recipients (73.3% use EGMs)¹;
- people who are engaged (58.6% use EGMs); and
- those in the lowest income bracket (58.4% use EGMs).
- The very elderly, high income groups and students have relatively low rates of involvement.

The rate of EGM gambling declines as household income rises. This contrasts with the rising rate of club patronage with higher incomes.

Variations in EGM gambling participation are greater when the sample population is analysed along socio-spatial lines than when demarcated by social demographic indicators alone. EGM gambling participation rates vary more widely across suburbs than is evident for any of the socio-economic or demographic variables.

- Club patrons living in Richardson, Banks, Gilmore and Calwell report high EGM participation rates; while
- Theodore, Bonython, Macarthur and particularly Fadden have low proportions of EGM gamblers amongst club visitors.

Based on self-report spending, the estimated annual EGM expenditure of Tuggeranong respondents ranges from \$1 to \$65,000 (reported by one person).

- The estimated per capita reported expenditure for the entire sample population is \$387. This compares to the annual per capita

¹ This figure must be used with caution due to the small sample size,

expenditure in the ACT during the 2002-03 financial year of \$747.² Under-reporting seems the most likely explanation for discrepancy.³

- Survey data suggest that Tuggeranong club patrons who are smokers gamble substantially more money on EGMs per annum than do non-smokers.
- Club patrons with loyalty cards appear to spend substantially more on EGM gambling than non-holders.

Differences also exist in patrons' estimated annual expenditure on EGMs at the various clubs.

- 25% of Tuggeranong residents who nominate Club E as their regular club, are estimated to spend in excess of \$2,000 per annum on EGM gambling. 10% of the Club E sample are estimated to spend in excess of \$4,000 per annum.

EGM expenditure and distance travelled

The closer EGM gamblers live to their regular club, the higher their annual expenditure on gaming machines tends to be.

- EGM gamblers living closer to their regular club report spending more on EGMs per year than do gamblers living further away.
- People who travelled less than 3.54 kilometres to their regular club were found to spend more per annum (\$1,858) than those who travelled greater than this distance to their regular club (\$580).

The annual EGM expenditure of both males and females appears to be influenced by distance to regular club:

- Overall, males spent more per annum (\$2,935) than females (\$1,065); however
- Males who travelled between 2.65-3.45 kilometres spent more per annum (\$5,921) than males who travelled less than 2.65 kilometres to their regular club (\$2,135).
- For females who travelled less than 3.54 kilometres to their regular club, women under the age of 41 years were found to spend less per annum (\$672) than those over the age of 41 years (\$3,121).

Frequency of EGM gambling

46% of Tuggeranong EGM gamblers play the machines less often than monthly.

- 21% do so at least weekly. This is somewhat higher than was found for the ACT as a whole in 2001, when 14.8% of EGM gamblers reported doing so at least weekly.
- Higher frequency was reported by males, young (18-25) and elderly (61 and over) age groups and lower income groups, although this is not a strong relationship.

² ACT Gambling and Racing Commission (2004) Personal correspondence. This figure differs to the corresponding figure published by the Tasmanian Gaming Commission, 2004, Table 68.

³ McMillen, J. *et. al.* (2001b). *Methodology Report*. Prepared for the Victorian Local Governance Association.

- Smokers, loyalty card users and gamblers who use taxis as the usual form of transport to the club tend to play gaming machines more often.
- Patrons of Clubs A and E tend to play gaming machines more frequently.
- Patrons of Club D and residents of Fadden and Isabella Plains gamble less frequently than other Tuggeranong gamblers.

Frequency of EGM gambling and distance travelled

Distance to club is identified as the strongest explanatory variable for EGM frequency when assessed statistically. Persons living within 4km of their regular EGM club have more frequent EGM sessions than more distant EGM gamblers.

- Tuggeranong residents who travelled less than 3.54km gamble on EGMs more often (32 times per annum) than people who usually travelled further to gamble (22 times per annum).
- Of this group, males gambled on EGMs more times per annum (41 times) than females (26 times).
- Tuggeranong residents with incomes greater than \$999 per week gambled on EGMs less often than people with lower incomes.
- The frequency of club visits by males appears to be more influenced by distance than are females; whereas
- Female EGM gamblers who live close to their regular club tend to have longer gambling sessions.

Cars are the main form of transport to all of the clubs under study.

- However a substantial proportion of patrons of clubs with particularly tight local catchments walk to the venue.
- Walkers and taxi users tend to report larger expenditures per EGM gambling session. Taxi patrons also have higher frequency of EGM participation

EGM Session Duration

The majority of EGM gamblers in the Tuggeranong survey report they usually gamble for no more than one hour at a time.

- Regular gamblers play for longer periods of time than recreational gamblers.
- There is no discernible difference in the usual duration of gaming machine sessions of male and female gamblers.
- Older gamblers have longer gambling sessions; the unemployed, students and pensioners report sessions of shorter duration.
- Smokers tend to play EGMs for longer than non-smoking gamblers.
- Regular patrons of Club A tend to gamble on EGMs for much longer each session than those respondents who visit other Tuggeranong clubs.
- Gamblers who live beyond 8km from their regular club play for shorter periods than residents who live closer to their regular club.

EGM Session Expenditure

The majority of EGM gamblers in Tuggeranong reported spending relatively small amounts each time they play. The mean session expenditure reported for all Tuggeranong EGM gamblers is \$22.94

- Half of all surveyed EGM gamblers estimate spending less than \$10 per gambling session. A further 27% spend between \$11 and \$20 each time.
- Males reported spending substantially more than females, with a tendency for increased EGM session expenditure with rising household incomes.
- Tuggeranong respondents in the age group 26-40 years report generally higher gambling session expenditures, despite less frequent and shorter sessions.
- Smokers, loyalty card users, weekly EGM gamblers and those who sometimes play more than one machine simultaneously report higher expenditure per gambling session.
- Clubs A, E, G and H stand out as having relatively high session expenditures compared to other clubs.
- EGM gamblers who live closer than 4km from their club report heightened levels of activity.

Club Catchment Areas

The results from the Tuggeranong study show that the spatial characteristics of club catchments are more complicated than previous studies have suggested, and that they rarely have a circular or even radius. It also demonstrates that the catchment areas for different venues can vary greatly, even within a geographically bounded community such as Tuggeranong.

Eight clubs have been identified from the survey responses as the most popular EGM clubs of Tuggeranong residents.

- Two clubs are located outside of the Tuggeranong Valley
- Six are located in the region.

Distinct groups of clubs stand out from this research.

- Three Tuggeranong clubs have very tightly confined catchment areas in the extreme corners of Tuggeranong Valley.
- In contrast, four clubs (two outside Tuggeranong) have broad patron catchment areas that spread across the whole Tuggeranong region.
- One club falls between these two groups and draws its regular EGM gamblers primarily from a large region in the centre of Tuggeranong.

Patrons at the Tuggeranong clubs also have diverse travel distance profiles:

- Tuggeranong patrons of two clubs located outside of the Tuggeranong Valley have relatively wide distance profiles, travelling up to 20km to those clubs.
- Three Tuggeranong clubs have relatively tight patron travel

distance profiles with few of their respective patrons travelling further than three kilometres to access the clubs.

- A substantial proportion of regular patrons of the other five Tuggeranong clubs travel between 5-10km to access club facilities.

The core catchment areas of four Tuggeranong clubs overlap to a high degree with the most disadvantaged suburbs in the immediate vicinity, based on the ABS-SEIFA measures.

- These are also the clubs with the most spatially confined catchments.
- Further, these clubs draw few of their patrons from the more advantaged areas in the vicinity of each of the clubs.

Patron Profiles of Clubs

Specific clubs tend to have distinctive EGM patron profiles. Analysis of the socio-economic and demographic characteristics of regular club patrons from Tuggeranong reveals that.

- Club H attracts a young, relatively less wealthy and single patron profile of Tuggeranong patrons.
- At the other end of the scale, Club D has an older and wealthier Tuggeranong customer base.
- Club G appears to have a wealthier and young EGM gambler profile; and
- Club B has an older but relatively low income profile.
- Club E has the highest proportion of loyalty card users, the largest percentage of smokers, the second highest rate of alcohol drinkers and is fourth on the list for persons who play more than one machine simultaneously.

Clubs A and E tend to have more regular visitations by EGM gamblers who live in Tuggeranong.

- These are both clubs with tight catchment areas and high loyalty card use, drinking and smoking rates.

It is also likely that those clubs identified with large catchments are also attracting large numbers of patrons from nearby areas which were not included in the survey sample population for this study.

Accessibility

This research has confirmed previous studies which found that accessibility is an important issue requiring further research in studies of gambler behaviour and problem gambling.

It also suggests that proximity of gaming venues to places of community congregation (eg shopping centres) and the close location of gaming venues to residential areas of relative socio-economic disadvantage are factors influencing gambler behaviour.

- The size and dimensions of club catchments appear to have some relationship to their proximity to large areas of community

congregation, although this relationship has not been fully explained in this study.

- Clubs with spatially extensive catchments were typically located close to large areas of community congregation whilst clubs with small catchment areas were generally located some distance from large areas of community congregation, often in suburbs with pockets of relative socio-disadvantage.
- The results from the decision tree analyses of the various EGM gambling measures in relation to distance from regular club and socio-demographic variables such as age, gender, income and marital status revealed a complex set of relationships.
- Distance between club patrons' residence and regular club was also found to have an overarching influence on levels of EGM gambling.

Future directions

- This research is a first step towards an improved practical methodology that will assist the Commission to better understand gambling impacts in the ACT community and thus to define what is acceptable with regard to the placement and operation of EGMs and other forms of gambling.
- The study findings contribute to development of a practical research framework to enable assessment of the effects of gambling policies and regulation at the level of local communities.
- Based on the findings of this Tuggeranong study, we have developed a multi-layered framework for the specific purpose of local area gambling studies. Within that framework, the GIS-based method used in this study allows for the continuous fine-scale analysis of socio-spatial aspects of gambling behaviour.
- The proposed framework also identifies appropriate data sources for local area analysis that would provide an ongoing database to inform policy and regulatory deliberations. Integration of additional information that was not considered in this study (eg measurement of problem gambling prevalence and incidence) would allow a better understanding of relationships between problem gambling, social disadvantage and access to gambling opportunities.

1 Introduction

This report outlines the findings from a study of *Gaming Machine Accessibility and Use in Suburban Canberra: A Detailed Analysis of the Tuggeranong Valley* (herein referred to as the *Tuggeranong Gambling Study*).

The project was designed to expand upon the 2001 ACT gambling survey⁴ and examine in detail the use of clubs and EGMs (electronic gaming machines, or ‘pokies’) in the Tuggeranong Valley region of suburban Canberra. The research provides an extra dimension to the 2001 ACT gambling survey by focussing on the use of local clubs and gambling behaviour of a specific geographically-defined population. While the 2001 study provided a broad overview of gambling behaviour in the ACT, this study expands that knowledge by examining factors that shape club preferences by certain population groups at a local level. It also examines whether geographical proximity and/or other dimensions of accessibility are significant factors influencing gambling activity and use of gaming clubs.

1.1 Terms of Reference

The brief as outlined in Attachment A of the contract for the *Tuggeranong Gambling Study* required this project to:

- examine in detail the accessibility of gaming machines for a sample population in a particular area of suburban Canberra (Tuggeranong) and patterns of machine usage by local residents;
- obtain information about the use of licensed gaming machine premises through a population survey in the Tuggeranong Valley;
- conduct detailed mapping and geo-statistical analysis of gaming machine use in the region at a suburb and collection district level;
- provide a detailed analysis of specific gambling behaviour at the local level that will have current and direct value for the ACT Gambling and Racing Commission and for policy formulation in the ACT as outlined below;
- identify relationships between current gaming machine provision and the use of club facilities by the region’s population;
- provide an indication of the present level of local supply and unmet demand for machine gaming; and to
- gauge the level of community support for EGMs.

In providing the specified research, the brief was to analyse, where possible, secondary data such as:

- socio-demographic characteristics and urban geography of the Tuggeranong community
- the types and size of gaming clubs, including number of EGMs, membership, etc.

⁴ McMillen, J. *et al.* (2001a). *Survey on the Nature and Extent of Gambling and Problem Gambling in the ACT*. Australian Institute of Gaming Research (AIGR), Sydney. Report prepared for the ACT Gambling and Racing Commission.

- analysis of the range of non-gaming amenities (eg restaurants, bars, other entertainment, ATMs) provided in each gaming club in the Tuggeranong Valley
- geographical analysis of the proximity of gaming clubs to local recreational facilities, shopping centres and areas of community congregation
- hours of gaming, average daily turnover and other factors related to the operation of gaming machines
- gaming club marketing and responsible gambling policies.

However many of these data were not available to the research team (eg club membership profiles, club marketing strategies, club data on machine turnover and expenditure). The tight budgetary constraints and timeline for the project also prevented primary data collection on a number of relevant issues. As a small exploratory study, we have utilised whatever secondary data sources that could be considered within project resources.

1.2 The Tuggeranong Study

The major empirical component of this study was a large survey (2,447 respondents) examining club patronage and gambling patterns of a sample population of residents in the Tuggeranong Valley. Information about the use of gaming clubs and gambling-related behaviour was obtained through a door-to-door survey of Tuggeranong adult residents in November and December 2003. The survey asked questions surrounding:

- the use of and travel to EGM clubs;
- the use of EGMs;
- the use of other club facilities including other types of gambling;
- attitudes towards EGMs; and
- other relevant policy issues.

As well as contributing to a better conceptual and empirical understanding of the effects of gambling ‘accessibility’ to a community, a primary purpose of the *Tuggeranong Gambling Study* has been to gather information to assist in evidence-based policy and regulatory decisions regarding:

- increases in the number of EGMs in existing gaming clubs;
- applications to establish new gaming clubs; and
- the expansion of EGMs into ACT hotels and taverns.

A core benefit from this Tuggeranong study is that the methodology trialled here can be refined for local area analysis that can be applied in other Canberra regions. Such a methodology, and identification of relevant factors for analysis of social and economic impacts, will assist the Gambling and Racing Commission determine applications for gaming machine increases and club licences.

In particular, the *Tuggeranong Gambling Study* trials a methodology for analysing the socio-spatial relationships between clubs and gaming facilities and their use, by employing geographical information systems (GIS). Such methods have only recently been applied to gambling related research in Australia, notably by government regulators in Queensland and Victoria where detailed statistical data on gaming

machine distribution and expenditure are collected and mapped monthly at the level of LGAs (Local Government Areas).⁵

However, to fully comprehend the local usage of gaming clubs, statistical data needs also to be supplemented with information on patron preferences, patterns of travel and use of club facilities obtained by other methods. Aggregate industry data on EGM expenditure and club income, even when accurate and comprehensive, do not provide essential information on who is contributing to the spending, why they visit one club in preference to another and what are their specific behavioural patterns.

To address this need, data obtained in the survey of Tuggeranong residents have been analysed in the context of the spatial and social characteristics of the Tuggeranong area. Socio-economic and demographic variables overlayed with existing ACT Gambling and Racing Commission data provide a major platform upon which analysis was conducted. Thus primary survey data obtained in the *Tuggeranong Gambling Study* are used in conjunction with other relevant secondary datasets to trial an innovative, multiple strategy methodology for the detailed analysis of gambling behaviour in the Tuggeranong community.

Importantly, GIS permits the overlaying of a range of contextual data (survey responses and socio-economic variables) over spatial data in order to build up a detailed profile of local club patronage and gambling behaviour. Variables which are overlaid from the data collected in the study include, among others:

- location of all Tuggeranong clubs;
- the types and size of gaming clubs, including number of EGMs;
- facilities offered by clubs (eg restaurants, bars, other entertainment, sports facilities, ATMs);
- locations of alternative entertainment and recreational facilities, shopping centres and areas of community congregation in Tuggeranong;
- which clubs are visited by particular groups of Tuggeranong residents;
- where club patrons travel from to visit their regular club;
- club usage data (eg reported frequency, facilities used, expenditure, duration of visit, among others); and
- socio-economic characteristics of suburbs and ABS collection districts (eg the SEIFA index of relative social disadvantage).

At the outset we emphasise that this study does not investigate or attempt to measure the prevalence of problem gambling in the surveyed Tuggeranong population. Time and resource constraints for the project and limitations of the survey design prevented examination of this issue. Rather, where appropriate background information on problem gambling from the 2001 ACT gambling survey was considered when analysing the findings from this study.

⁵ Queensland and Victoria have a Centralised Monitoring System (CMS) which records all gaming machine transactions statewide in a central database. The ACT does not have a CMS; consequently that type of monthly GIS analysis is not possible in the ACT.

1.3 Current Significance to the ACT

There is a current need to conduct such a study in the ACT because previous research findings which raise issues of accessibility and gambling activity are based on data collected within a different cultural and spatially arranged gambling environment. These findings may not be directly applicable to the ACT because:

- The majority of EGM facilities in the ACT are located only in clubs rather than in hotels and clubs;
- Clubs tend to be located at neighbourhood nodes – rather than scattered throughout the suburbs and along major arterial roads;
- There are no EGMs operating at the Canberra Casino; and
- Clubs may have a significantly different community role than is evident in other Australian jurisdictions.

These factors may result in quite different patterns of club patronage and gambling behaviour than occurs elsewhere. There is thus a need to establish a body of locally specific information upon which future policy and regulatory decisions can be made and justified. Such research has implications for future policy decisions with respect to the location of additional EGMs in Canberra.

The Tuggeranong study is particularly timely as the ACT Legislative Assembly recently has been considering legislation to permit EGMs into non-club licensed clubs such as taverns and hotels. During the course of this project, and against the Commission's recommendations in the 2002 *Review of Gaming Machine Act*,⁶ the Legislative Assembly passed the *Gaming Machine Amendment Act 2004* which permits taverns to operate two modern 'Class B' machines and lifts the possible total number from six to ten machines.

1.4 Report Outline

This report of the *Tuggeranong Gambling Study* starts with a brief review of the aims of the research, within the context of issues in the literature surrounding accessibility, regional variation, catchment areas and gambling activity. This provides a basis upon which the further analysis of information obtained in the *Tuggeranong Gambling Study* is embedded.

A detailed outline of the methodologies employed follows. This includes discussion of why Tuggeranong was selected as a suitable location for the study, description of the specific data collection protocols utilised in the Tuggeranong survey, as well as a detailed outline of the GIS and statistical techniques used in analysis.

The report then shifts its focus to the ACT. A background section outlines the critical social, economic, legislative, demographic and geographic aspects of the ACT with an emphasis on how specifically local aspects might influence gambling activity in the Territory. The section finishes with a more detailed examination of contextual

6 ACT Gambling and Racing Commission (2002). *Review of the Gaming Machine Act 1987, Policy Paper*.

features of the Tuggeranong Valley. This includes a brief history of the region's development, a social and economic profile of the region and a gambling facility profile among other issues. This section provides an understanding of the local circumstances within which the collection and analysis of empirical and secondary data and findings needs to be considered.

The findings from the study are then reported in the following sections. That detailed analysis starts with a broad overview of the sample Tuggeranong population recruited for the survey, their gambling and club patronage patterns and how these compare with the 2001 ACT gambling survey. The analysis is demarcated according to the key dependent variables of interest (eg participation rates, frequency of visitation, expenditure on EGMs etc.) and assesses each of these in relation to the critical independent variables (eg socio-economic and demographic characteristics, suburb of residence, distance to regular club etc.). Within each section, standard data analysis techniques are employed in the first instance before being interrogated with the more innovative GIS and decision tree methods.

The report concludes with a discussion of the findings. That section includes the potential for extending and refining the methods trialled here, implications for policy and regulation and finally a broader understanding of the findings in a wider context.

2 Background and Aims of the Research

One of the core factors underpinning the *Tuggeranong Gambling Study* is the growing recognition that accessibility to gambling facilities is a major variable influencing gambling activity by populations. This is not a new recognition. However, to date, there have not been any studies in the ACT which specifically set out to analyse the issue of regional differences in gambling activity and how accessibility to facilities might be fuelling variations. This section briefly outlines the issues underpinning this study before finishing with an overview of the project aims.

2.1 Accessibility

Accessibility is a complex issue that, despite being a term widely used in many forums, is difficult to define precisely, and thus to measure.⁷ There has been considerable debate about the concept of accessibility, and geographers and urban planners have proposed many different means by which to measure it. Handy and Niemeier,⁸ Kwan⁹ and Pirie¹⁰ all provide comprehensive coverage of the range of complex issues requiring careful consideration when attempting to measure accessibility in any context.

Legal, cultural, social, economic and spatial factors can all have an influence on the accessibility to any given product, service or facility in any given area. In its discussion about a link between the ‘accessibility’ of gambling and problem gambling, the Productivity Commission recognised this complexity and built on analysis of EGM distribution in Victoria to highlight numerous dimensions of ‘accessibility’ to gambling (Figure 1).¹¹

Others have argued that the link between gambling accessibility and problems may be weak. In the case of Australia, ‘it could be that gambling opportunities were already extensive enough that all (or nearly all) people with a potential for problem gambling had developed it, prior to the phase of liberalisation that occurred in the 1990s’.¹² On balance, however, the Productivity Commission found that:

While causation is hard to prove beyond all doubt, there is sufficient evidence from many different sources to suggest a significant connection between greater accessibility — particularly to gaming machines — and the greater prevalence of problem gambling.... Accessibility is not just about proximity; it is also about the mass appeal and ease of use of a gambling form; any conditions on entering gambling clubs; and the initial outlay required to gamble.¹³

7 Gould 1969, cited in Pirie, G. (1979) ‘Measuring accessibility: a review and proposal’, *Environment and Planning A*, 11.

8 Handy, S. and Niemeier, D. (1997) ‘Measuring accessibility: an exploration of issues and alternatives’, *Environment and Planning A*, 29.

9 Kwan, M-P. (1998) ‘Space-time and integral measures of individual accessibility: a comparative analysis using a point based framework’, *Geographical Analysis*, 30(3).

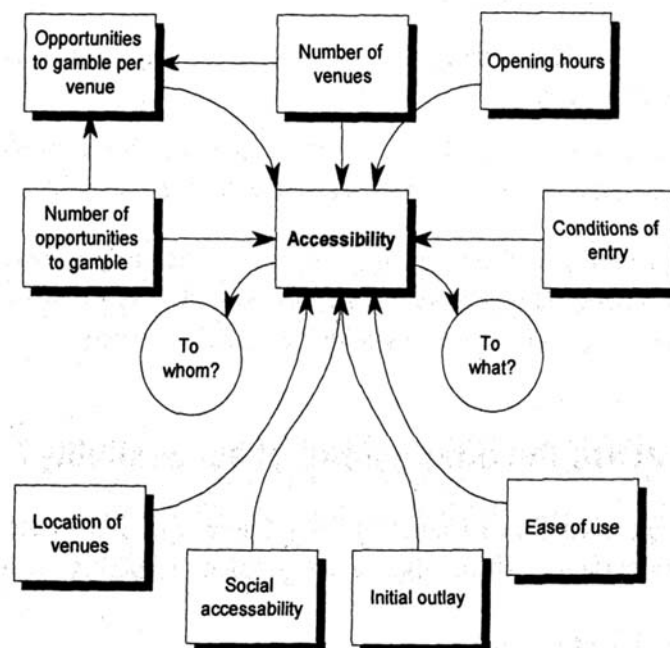
10 Pirie, G. (1979) ‘Measuring accessibility: a review and proposal’, *Environment and Planning A*, 11.

11 Productivity Commission (1999), *Australia’s Gambling Industries*, Report No. 10, AusInfo, Canberra, p. 24.

12 *ibid*, pp. 8.2-8.3.

13 *ibid*, p.8.1.

Figure 1: Dimensions of accessibility to gambling facilities.



Source: Productivity Commission, 1999, 8.4.

As well as spatial criteria such as the number and distribution of gambling opportunities, the Productivity Commission identified a range of social factors that determine exposure to gambling and thus potential gambling problems:

- The number of opportunities to gamble, including the number of clubs and the aggregate number of opportunities to gamble;
- Conditions of entry, such as the ease of club membership and dress standards;
- Ease of use of the gambling form. The Commission argued that gaming machines are more accessible than many other types of gambling as they do not require skill ‘or even interpersonal contact’;
- Initial outlay required. Low outlay gambling is more accessible to people on lower incomes than high outlay games;
- Social accessibility, the sense in which a club provides a non-threatening and attractive environment to groups who might otherwise feel excluded or isolated;
- Advertising and promotions were also seen ‘to increase demand for gambling and to alter people’s preferences so that they see gambling as an exciting activity’.¹⁴

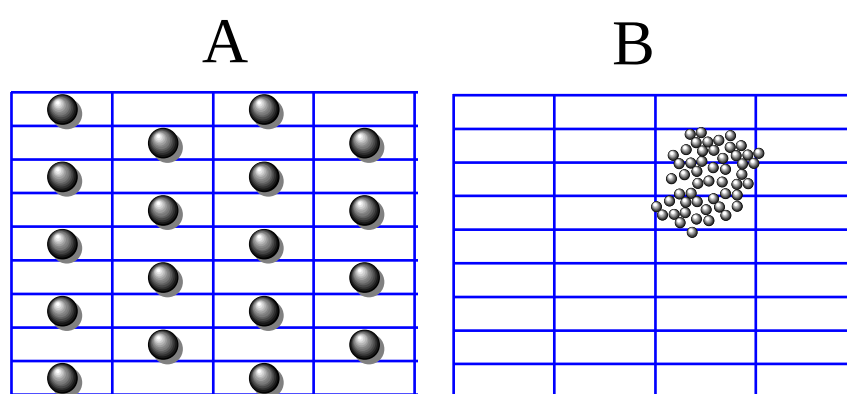
This Tuggeranong study has considered all of these socio-spatial dimensions of accessibility, insofar as the project budget and timeline allowed.

¹⁴ *ibid*, p.16.37

2.1.1 Socio-Spatial Accessibility

As the Productivity Commission has recognised, the way in which gambling opportunities are arranged spatially is critical to accessibility because this determines proximity to gambling opportunities.¹⁵ To demonstrate this point, the Commission offered two contrasting cases as examples of the different levels of spatial distribution that may exist (Figure 2). Although a simplified representation, the point is made that, despite more gambling clubs operating in City B, a greater level of spatial accessibility is likely to be evident in City A. The spatial arrangement of clubs must however be considered in conjunction with other environmental variables and determinants of gambling behaviour.

Figure 2: Spatial accessibility to EGM clubs, two theoretical examples.



Source: Productivity Commission, 1999, 8.5.

The accessibility and socio-spatial arrangement of EGM clubs have been implicated in a number of studies as possible factors in determining the level of EGM gambling activity and problem gambling in any given locality. Some communities have been shown to be particularly vulnerable to adverse social impacts and problem gambling.¹⁶ The Productivity Commission emphasised this issue in their assessment of the link between accessibility to gambling facilities and increased levels of problem gambling.¹⁷ Because of this possible link, the Commission urged caution in the further liberalisation of gambling products, particularly EGMs.¹⁸

¹⁵ *ibid*, p. 8.4.

¹⁶ See for example, Doughney, J. and T. Kelleher (1999), *Preliminary Local Area Gambling Research: Economic Effects*. Workplace Studies Centre, Victoria University of Technology; KPMG Consulting (2000) Melbourne Institute of Applied Economic and Social Research, Deakin Human Services Australia, National Institute of Economic and Industry Research (MIAESR) (1997a) *Impact of Gaming Clubs on Inner City Municipalities*, Victorian Casino and Gaming Authority; Melbourne Institute of Applied Economic and Social Research, Deakin Human Services Australia, (MIAESR) (1997b) *Social and Economic Effects of Electronic Gaming Machines on Non-Metropolitan Communities*. Victorian Casino and Gaming Authority; Pingé, I. (2000). *Measuring the Economic Impact of Electronic Gaming Machines in Regional Areas - Bendigo, a Case Study*, Centre for Sustainable Regional Communities, La Trobe University, Bendigo; Tremayne *et al.*, 2000, *op. cit.*

¹⁷ Productivity Commission (1999), *op. cit.*

¹⁸ *ibid*.

Specific studies in which socio-spatial accessibility has been identified as influential for gambling problems and gambler behaviour, include:

- A study in the US found problem gambling rates were higher amongst populations living within 50 miles of a casino than for the wider population.¹⁹
- In Victoria, EGM gamblers in 1999 reported travelling less than 5km to play EGMs; a later KPMG study found that Victorian gamblers travelled 2.5km on average to play gaming machines;²⁰
- A NSW study found persons living near EGM clubs (<500m) are slightly more likely to have gambled on EGMs and much more likely to use them more intensively than more distant residents.²¹
- Club size²² and proximity to places of community congregation²³ have also been identified as factors influencing gambler behaviour.

Regulatory benefits of local area analysis have been demonstrated in regulatory decisions in Victoria and Queensland and to a lesser extent, New South Wales. For example, a layered ‘stat-mapping’ approach to analysis of the distribution and market growth of gaming machines in Sydney clubs²⁴ was a factor in a decision by the NSW Liquor Licensing Court to reject an application by the Bulldogs Rugby League Club for a new club with 600 gaming machines in the disadvantaged Liverpool area of Sydney.²⁵ A key factor in that case disputed constricted industry definitions of the ‘local area’ or ‘catchment’ for the proposed gaming club.

Impact assessment regulations have become a key component of regulatory requirements in Victoria, New South Wales and Queensland. In Queensland, for example, applicants for gaming club licences or additional EGMs are required to submit a detailed Community Impact Statement (CIS) for consideration by the Queensland Gaming Commission (QGC).²⁶ Under the Commission’s guidelines, detailed information on club facilities, layout, finances, proximity to places of community congregation and other gambling clubs, community impacts and harm minimisation strategies are required. How any proliferation of EGMs will affect the character and amenities in the local community is emphasised. The QGC importantly also requires an explicit statement on methodological assumptions underpinning the assessment research and submission.

19 United States National Gaming Impact Study Commission (1999), *Final Report*, Washington DC.

20 Roy Morgan Research (1999), *Sixth Survey of Community Gambling Patterns and Perceptions: Victorian Casino and Gaming Authority*, Melbourne; KPMG Consulting (2000), *Longitudinal Community Impact Study: 1999 Report*, Victorian Casino and Gaming Authority, Melbourne.

21 Marshall D. (2002), *A Geography of Gambling: Electronic Gaming Machines in Richmond-Tweed*. Unpublished PhD thesis. University of New England.

22 *ibid.*

23 Queensland Gaming Commission (2003), *Guidelines for Applicants for Gaming Machine Licences and Increases*. <http://qogr.qld.gov.au>

24 Tremayne, K. *et al.* (2000), *The Distribution and Social Consequences of Gaming Machines in Sydney Clubs*, Australian Institute for Gambling Research, Working Paper Series, Paper No. 1.

25 Liquor Licensing Court (2001), *Decision in the Matter of...the Bulldogs Rugby League Club...Liverpool*.

26 Queensland Gaming Commission 2003, *op. cit.*

2.1.2 *Other Dimensions of Accessibility*

Non-spatial dimensions of accessibility to gambling which have been largely unexplored in gambling research include:

- club marketing and promotions to influence the use of gaming clubs;
- the hours of operation;
- the lack of alternative entertainment options;
- access to internet and telephone gambling; and
- cultural and social affiliations to specific clubs or clubs.

These data were either not available to this study or time and resource constraints prevented analysis which would further explain the role that gaming clubs play in the Tuggeranong community. A systematic analysis of these relationships would require a more comprehensive study of detailed data provided by clubs and patrons.

2.1.3 *Density of EGMs*

Despite the complexity of defining and measuring accessibility to gambling opportunities, one common approach has used the density of EGMs per capita as a proxy for local accessibility. Such an approach, seeks to highlight the number of potential opportunities to engage with EGMs in any given population. A problem with such approaches is that it implies that catchment areas for the clubs in the analysis correspond approximately with the boundaries of the statistical area units being used. However, statistical or political boundaries are unlikely in most circumstances to correspond to local patterns of consumer behaviour, whether for gambling or for other products and services.

Nevertheless, studies in NSW²⁷ and Victoria²⁸ have suggested that the density of EGMs (ie the ratio of EGMs per 1,000 residents) and the rate of growth in machine numbers can have serious social consequences for disadvantaged communities. This is despite the possibility that the types of machines available can also be having an influence. Indeed, recent Queensland research suggests that ‘the nexus between expenditure and gaming machine numbers in Queensland is tenuous ... it is necessary to incorporate dimensions of individual and community risks ... in addition to the physical placement of gaming machines and gambling clubs’.²⁹ It is likely that the types of machines available, as well as the numbers and accessibility of EGMs, can also have a significant influence on levels of gambling expenditure and problem gambling in a community.³⁰ This study therefore includes whenever possible analysis of the socio-demographic characteristics of the local population, the regulatory environment and the business practices of local clubs as research issues.

27 Tremayne *et al.* 2000, op. cit.; Doughney, J. & T. Kelleher 1999, op.cit.

28 *ibid.*

29 <http://www.responsiblegambling.qld.gov.au>

³⁰ Resource and data constraints have prevented analysis of the latter issue in this study.

2.1.4 Club Catchment Areas

With some notable exceptions, much of the research into the social effects of gambling prior to the Productivity Commission's inquiry had been conducted at the aggregate state level. However impacts of EGM gaming are experienced most acutely at the local or community level. Several studies have subsequently identified the need for local area research that explores gambling accessibility and the behaviour of various sub-populations.³¹ That research has usefully pointed to the diversity of regional communities and the wide range of impacts that individuals, households and communities may experience with gambling.

To further examine the hypothesis that accessibility is an important factor influencing the use of gambling clubs and facilities, it is logical to investigate whether patterns of consumption vary at a localised level. Variations in the use of gaming clubs will in part be influenced by accessibility of the facilities for the local population.

It is also likely that influential factors may operate differently in different places.³² In other words, it should not be expected that similar prevailing circumstances in two different localities will result in similar outcomes. Local mediating factors can result in one set of outcomes in one location and a quite different range of consequences in another place. Nor should it be considered unusual for different circumstances to produce very similar results; it is just as feasible for two places with virtually identical characteristics to produce contradictory outcomes. Gambling behaviour therefore needs to be analysed, understood and evaluated in a local context.³³

Significantly for this *Tuggeranong Gambling Study*, a small number of projects have used innovative methodologies using statistical maps that overlay accessibility of EGMs with gambling expenditure and social data to provide locally comparable information on the effects of gambling.³⁴ This is a useful and easily understood method of presenting statistical information to demonstrate concentrated areas of gambling activity and possible targeting of lower socio-economic communities. Our study aims to further refine and develop such methodologies to advance knowledge about gambling as it is accessed and experienced by local communities.

Another key issue to emerge from gambling studies across various jurisdictions are disagreements about how to define and measure the 'local community' and 'catchment area'. Legislation tends to identify ABS districts as synonymous with local communities. However:

- the geo-spatial spread of those affected by gaming machine clubs may extend beyond the boundaries of ABS divisions;

31 McMillen, J. *et al.* (2001b). *op. cit.*

32 Curtis, S. and Rees Jones, I. (1998). 'Is there a place for geography in the analysis of health inequality?' *Sociology of Health and Illness*, 20(5), pp. 645–672.

33 Marshall, D. (1996). *Putting pokies in place: a consideration of the costs and benefits of pokies since their introduction to South Australia - the case of Peterborough*, unpublished honours thesis, Flinders University of South Australia, Adelaide; South Australian Centre for Economic Studies (2001). *The Impact of Gaming Machines on Small Regional Economies*, Provincial Cities Association of South Australia.

34 D. Marshall (2002). *op. cit.*; Tremayne *et al.* (2000), *op. cit.*; Doughney and Kelleher (1999), *op. cit.*

- the distinct residential/commercial zoning mix in any given district may serve to dilute or accentuate socio-economic averages;
- the geo-spatial approach to ‘community’ avoids addressing other types of local social formations that may be equally as important in relation to potential harm, such as ‘communities of interest’ or ‘communities at risk.’

This is an important contemporary issue for Australian gambling regulators, particularly given the trend towards the requirement of social impact assessments before new clubs can be established or for existing clubs to increase their gambling offerings.

Similarly, the definition of the ‘catchment area’ of gaming clubs and hotels is important in establishing the spatial boundaries and scope of gaming impacts. In the case of the Bulldogs Rugby League Club, for example, despite submissions that the ‘local community’ comprised those residents within a 2-5km radius of the proposed club, the NSW Liquor Licensing Court determined that the relevant local area could be defined more widely to include the residential areas of all likely regular patrons. The Board’s revised definition extended to a 20 minute drive.

For the purposes of this study, it is hypothesised that a uniform distance measure is unlikely to be applicable in all situations, and that the catchment area and impacts of EGM clubs on local communities are likely to vary according to a range of factors that together have been identified as dimensions of ‘accessibility’.

2.2 Aims of the Tuggeranong Study

Given the issues raised here regarding accessibility of gambling and regional variations in gambling behaviour, this project therefore examines in detail a sample population in a particular area of suburban Canberra (the Tuggeranong Valley) and their patterns of club and EGM use. Although gambling participation data for ACT residents was collected in the 2001 ACT gambling survey, that data provided a territory-wide overview rather than the detailed local level analysis that is the aim of in this study.³⁵ The purpose of this study differs from the 2001 ACT gambling survey in that it aims to:

- provide a more in-depth understanding of the pattern of club patronage within a defined geographical area of Canberra;
- add a new dimension to knowledge of gambling behaviour in the ACT by exploring factors that shape club preferences; and
- examining whether geographical proximity and/or other dimensions of accessibility are significant risk factors for increased gambling activity.

The general purpose is to gather information which can assist in policy decisions regarding possible increases in the number of EGMs or expansion of EGMs into ACT hotels and taverns. More specifically, the research aims to gather detailed empirical evidence of population gambling patterns (preferences, frequency, expenditure, duration, travel, distance, etc.) and use of EGM and non-EGM licensed clubs in the Tuggeranong Valley. The study seeks to identify relationships between current EGM

35 McMillen, J. *et al.* (2001b), *op. cit.*

provision at a relatively local level and the use of club facilities by the region's population. Research explores the extent to which EGM gambling is a 'locally' based activity in suburban Canberra and the degree to which Tuggeranong gamblers travel outside of their immediate locality to access EGM facilities. It was proposed that this would provide an indication of the present level of local supply and unmet demand for machine gaming, as well as revealing any relationships between accessibility to and subsequent use of EGMs. The project also aims to measure the level of expenditure leakage across suburbs and out of the locality, as well as gauging the level of community support for EGMs.

To achieve these objectives, using multiple methods and data triangulation, research undertook the following tasks:

- Information about the use of EGM and non-EGM licensed premises was obtained through a population survey in the Tuggeranong Valley – a suburban area in the southern part of Canberra. The survey explored:
 - the use of and travel to EGM and non-EGM licensed clubs;
 - use of gaming machines;
 - attitudes towards a possible increase in EGMs; and
 - other relevant policy issues.
- A door-to-door survey administered to a geographically stratified sample of residents was selected as the most suitable method for generating this information. This format was chosen to allow accurate spatial variables to be integrated into the data analysis for interrogation with Geographical Information Systems (GIS). A GIS specialist was recruited for this procedure.
- To generate an understanding of social and contextual factors that could affect the gambling behaviour of residents, survey responses were analysed in the context of:
 - data on the spatial and social characteristics of the Tuggeranong area;
 - the gambling and regulatory environment
 - official data on gambling expenditure; and
 - the business practices of local clubs.
- On the basis of these data, the aim is to better understand and identify catchment areas for gaming clubs.

2.3 Summary

The overall message from this review of research issues is that a better understanding of accessibility and gambling should incorporate analysis of local factors that are a potentially important determinant of gambling activity. Assessment and regulation of gambling activity and gambling industries are most effectively tailored to fit local conditions and parameters that shape outcomes in any given area.

This analysis provides a platform from which to examine the current relationships between EGM accessibility and their use by sub-populations in a local context in the ACT. As discussed in the next section, the majority of EGM facilities in the ACT are located only in clubs at neighbourhood nodes – rather than scattered throughout the suburbs and in hotels as in other states. Hence quite different patterns of club patronage and gambling behaviour may be evident than have been found elsewhere.

3 Methodology

This section provides a detailed overview of the methodological procedures adopted for this study. It starts with a review of the broad issues affecting the research project overall and then moves onto the more detailed specifics of the empirical data collection phase of the study. The final section provides a detailed outline of the more innovative components of the analytical tools, namely GIS and decision tree analysis.

3.1 Ethics and Review Procedures

This research is committed to the highest standards of ethical research conduct. As a result, there are a number of procedures which feed into the research development process and the ongoing conduct of the work.

3.1.1 ANU Human Research Ethics Committee

The project proposal was reviewed by the Human Research Ethics Committee of the ANU which must comply with the joint National Health and Medical Research Council/Australian Vice-Chancellor's Committee *Guidelines on Research Practice* (1997).

The Human Research Ethics Committee considers the ethical implications of proposals for all research projects involving or impacting on human subjects to determine whether or not the proposals are acceptable on ethical grounds and conform to the National Health and Medical Research Council's *National Statement on Ethical Conduct in Research Involving Humans* (1999). The ethics approval for this project was granted on the 8th of October 2003.

3.1.2 Centre for Gambling Research Code of Practice

The research is also conducted within the guiding framework of the ANU Centre for Gambling Research Code of Practice. This Code applies to all research conducted by the Centre and ensures that issues of integrity and confidentiality guide the research practices of all staff involved with the project.

3.1.3 Community Advisory Group

A Community Advisory Group (CAG) was established to assist the research team in designing and conducting the research. Advice from the CAG enabled the research to encompass issues of relevance to the main stakeholders in the ACT. A list of CAG members is provided at Appendix 1. The first meeting of the CAG was held at ANU on the 18th of December 2003 to provide advice on research design and information on local contexts. Further meetings and interviews with individual members during the research provided additional information that was valuable to the project.

In addition to the internal processes outlined above, the instrument for primary data collection used in this study (the survey administered to residents of Tuggeranong)

was reviewed by the ACT Gambling and Racing Commission prior to it being used in the field. This provided an opportunity for the Commission to provide input to the design of the study. The questionnaire is attached in Appendix 2.

3.2 Tuggeranong Survey

The central methodological component of the *Tuggeranong Study* is a door-to-door questionnaire survey of a sample population of Tuggeranong residents concerning the use of ACT clubs and club facilities, including EGMs. The survey respondents were also questioned on a number of attitudinal issues related to gambling facilities in the ACT. This section outlines in detail the methods utilised for this procedure.

3.2.1 Door-to-Door Survey Research

Although gambling participation data for ACT residents was collected in the 2001 ACT telephone survey, that data provided a territory-wide overview rather than the detailed local level analysis that is the aim of in this study.³⁶ The purpose and thus data requirements of this study differ from the 2001 ACT survey in that:

- it aims to provide a more in-depth understanding of the pattern of club patronage within a defined geographical area of Canberra;
- detailed spatial data suitable for GIS analysis is required; and
- a spatially representative sample (in addition to socio-demographically representative) is needed.

A door-to-door survey administered to a dense geographically sampled household population was selected as the most suitable method for generating this information. The specific benefits of the door-to-door method which render it most suitable for this specific study, particularly in preference to telephone surveys, are:

- The need for accurate residential location data suitable for geo-coding.
- Permits stratification of the region under analysis along geographical lines, in this case ABS Collection Districts (CDs), to ensure inclusion of respondents from across the region. Such an approach also will ensure contact with residents living in a diverse range of socio-economic circumstances.
- This is a more sensitive means by which to gather data suited to geo-coding.
 - People interviewed in public locations or in a phone survey, may be reluctant to divulge details of their place of residence, particularly when answering questions on a sensitive topic such as gambling.
- Ensures that residents without phone services or who have unlisted phone numbers can be incorporated into the frame.
 - This might include residents who have had their services cancelled or who no longer maintain landline services in preference for mobile phones.

36 McMillen, J. *et al.* (2001b), op. cit.

3.2.2 Limitations

As noted above, the most suited methodology for primary data collection in this particular study is a door-to-door survey of Tuggeranong residents. However, it is recognised that this research method has certain limitations and disadvantages. Door-to-door approaches share the shortcomings commonly associated with all self-report surveys, whether telephone or face-to-face, such as:

- problems of recall, such as accurate recollection of detailed information and/or over or under-reporting. In the 2001 ACT gambling survey, for example, total gambling expenditure figures were under-reported by 55%;³⁷
- the potential for the sensitive nature of the topic to influence how respondents answer certain questions;³⁸ and
- the possibility of generating a biased sample (eg inability to contact residents who won't answer their doors or who are rarely at home).

Problems specific to door-to-door survey approaches include:

- time and labour intensiveness;
- lack of anonymity may influence answers provided (the presence of the interviewer may intimidate the respondent and thus the answers they provide);³⁹
- potential for the interviewer characteristics to influence the results (if certain types of people respond to certain types of interviewers); and
- a higher level of intrusiveness than other approaches.⁴⁰

These issues have been taken into account for this research and strategies put in place to minimise their impact on the study. The survey protocols (outlined in more detail in Section 3.2.3) were designed to ensure that the benefits of the door-to-door methodology were maintained whilst simultaneously minimising the limitations. For example:

- the questionnaire was kept as short as possible to minimise intrusion;
- households in the Tuggeranong area were over-sampled to achieve a satisfactory sample size;
- eight different survey staff of varying ages and gender were utilised to reduce the effect of interviewer bias;
- each CD was visited on four different occasions, at different times of the day and days of the week, and by different survey staff to minimise the chance of missing certain cohorts of the population; and
- the data generated from the surveys, including the socio-demographic characteristics of the sample, has been compared and triangulated with other data such as ABS information.

Given the time and resources constraints on this research, the requirement for accurate spatial information suitable for geo-coding and GIS analysis and the need for a

37 McMillen, J. *et al.* (2001a). *op. cit.*

38 Chambers, K. (2003). 'How often do you have sex: problem gambling as a sensitive topic', Paper presented at the 12th International Congress on Gambling and Risk-Taking, Vancouver.

39 Frankfort-Nachmias C. and Nachmias D. (1996), *Research Methods in the Social Sciences*, Arnold, London, p. 239.

40 Sheskin, I. (1985), *Survey Research for Geographers*, Association of American Geographers, Washington DC, p. 18.

uniformly distributed but geographically bounded population, meant that despite its limitations, the door-to-door approach was the most suitable method for this study.

3.2.3 Tuggeranong Survey Protocols

Time and financial constraints restricted the study to a specific area of Canberra –the Tuggeranong Valley in the southern part of the city. Tuggeranong was selected on the basis that:

- It contains within it a diverse population in terms of socio-economic and demographic characteristics;
- It is easily demarcated from adjoining regions;
- It has existing EGM facilities of various sizes;
- Some neighbourhood precincts do not currently have EGM clubs (eg Calwell, Isabella Plains), thus providing controls for spatial analysis;
- Residents have convenient access to other localities with gaming clubs (eg Mawson, Woden);
- It has a number of existing non-EGM taverns; and
- It has a clearly identifiable town centre containing a cluster of EGM clubs along with other retail and recreational facilities.

Despite having some suburbs with high density of EGMs, overall the Tuggeranong Valley has relatively few EGM clubs compared to other parts of Canberra, with the lowest number of clubs per 10,000 adult residents (see Table 1). It also has the second lowest ratio of EGMs per 1,000 adults.

Table 1: Selected Population and EGM Data - ACT Regions, 2003.

	<i>EGM Clubs</i>	<i>EGMs</i>	<i>Adult Population</i>	<i>EGMs per 1000 Adults</i>	<i>Clubs per 10,000 Adults</i>
<i>Belconnen</i>	12	1030	61426	16.8	1.95
<i>Gungahlin (incl Mitchell/Hall)</i>	3	313	16508	19.0	1.82
<i>North Canberra (incl Fyshwick)</i>	17	1102	32230	34.2	5.27
<i>South Canberra</i>	16	420	19101	22.0	8.38
<i>Tuggeranong Valley</i>	8	975	58443	16.7	1.37
<i>Weston Creek</i>	3	189	17234	11.0	1.74
<i>Woden Valley</i>	7	904	24429	37.0	2.87
<i>Total</i>	66	4933	229371	21.5	2.88

Source: Australian Bureau of Statistics, Census 2001; ACT Gambling and Racing Commission 2004.

The field research protocols were developed from those adopted by Marshall in a similar local area study in northern NSW, designed to facilitate spatial statistics at a highly detailed geographical level.⁴¹ As was the case in that study, a door-to-door survey approach was adopted to obtain a larger sample than would be required if analysis was confined to the Canberra region as a whole.

Under the direction of the project manager and chief investigators, door-to-door surveying was completed in December 2003 by a team of eight trained survey staff. Two key factors guided the survey strategy:

- The need to generate a sample of respondents which closely reflected the socio-economic and demographic characteristics of the Tuggeranong overall and its respective suburbs; and
- The need to generate a geographically dispersed and representative sample to enable GIS analysis at a particularly detailed level.

A number of strategies were employed to ensure that these two criteria were met. These included:

- Delineating Tuggeranong into its 117 Australian Bureau of Statistics (ABS) collection districts (CDs);
- Obtaining a large geographically stratified sample of residents. Because it was proposed to analyse GIS and spatial statistics at a highly detailed geographical level, it was necessary to obtain a larger sample than would be required if analysis was confined to the region as a whole. It was anticipated that approximately 15-20 surveys would be obtained from residents in each of the 117 CDs in the Tuggeranong region. This would enable detailed mapping and geo-statistical analysis of EGM participation and club patronage at a suburb, CD and individual point-pattern level.⁴²
- Ensuring each of the 117 CDs was surveyed for a total of six hours broken into four sessions of 1.5 hours each (10.30am–12pm, 12.30pm–2pm, 3pm–4.30pm, 5pm–6.30pm);
- Making sure each CD was revisited on four separate occasions, wherever possible at different times of the day and different days of the week, including Saturdays; and that
- Surveying was conducted by a different member of the survey team each time a CD was revisited (to counter the possibility that particular researchers might attract higher response rates than others).

Under the direction of the project manager and chief investigators, the survey was completed in December 2003 by a team of eight trained ANU researchers. Random quality checks ensured the integrity of the survey data.

Once a householder was contacted and ascertained to be at least 18 years of age, they were asked to complete the questionnaire. When first contact was made with someone

41 Marshall 2002, op. cit.

42 With such a dense and spatially distributed sample it is possible to analyse the data within standard ABS or boundaries or to exclude such boundaries and identify patterns which operate across political or statistical parameters.

under 18 years of age, an adult member of the household was sought. On occasions when no adult was available or no contact was made with any member of the household, no repeat attempts were made. Survey staff were instructed to move on to the next household in such circumstances. This approach ensured that minimal time was wasted and thus ensuring that maximum numbers of surveys could be completed in the time available.

3.2.4 Response Rates and Sample Distribution

During the survey period, 7,995 households were doorknocked. Of these, 52.6% were unoccupied at the time. Of the 3,787 households at which contact with a resident was made, 64.6% agreed to participate in the study. This resulted in 2,447 completed surveys, exceeding the upper range of expectations. Importantly for GIS analysis, the survey responses are well dispersed, with an average of 23 respondents per CD, as well as good dispersion within each CD. Excellent coverage of the entire Tuggeranong region also was obtained. The distribution of completed surveys is shown in Figure 3.

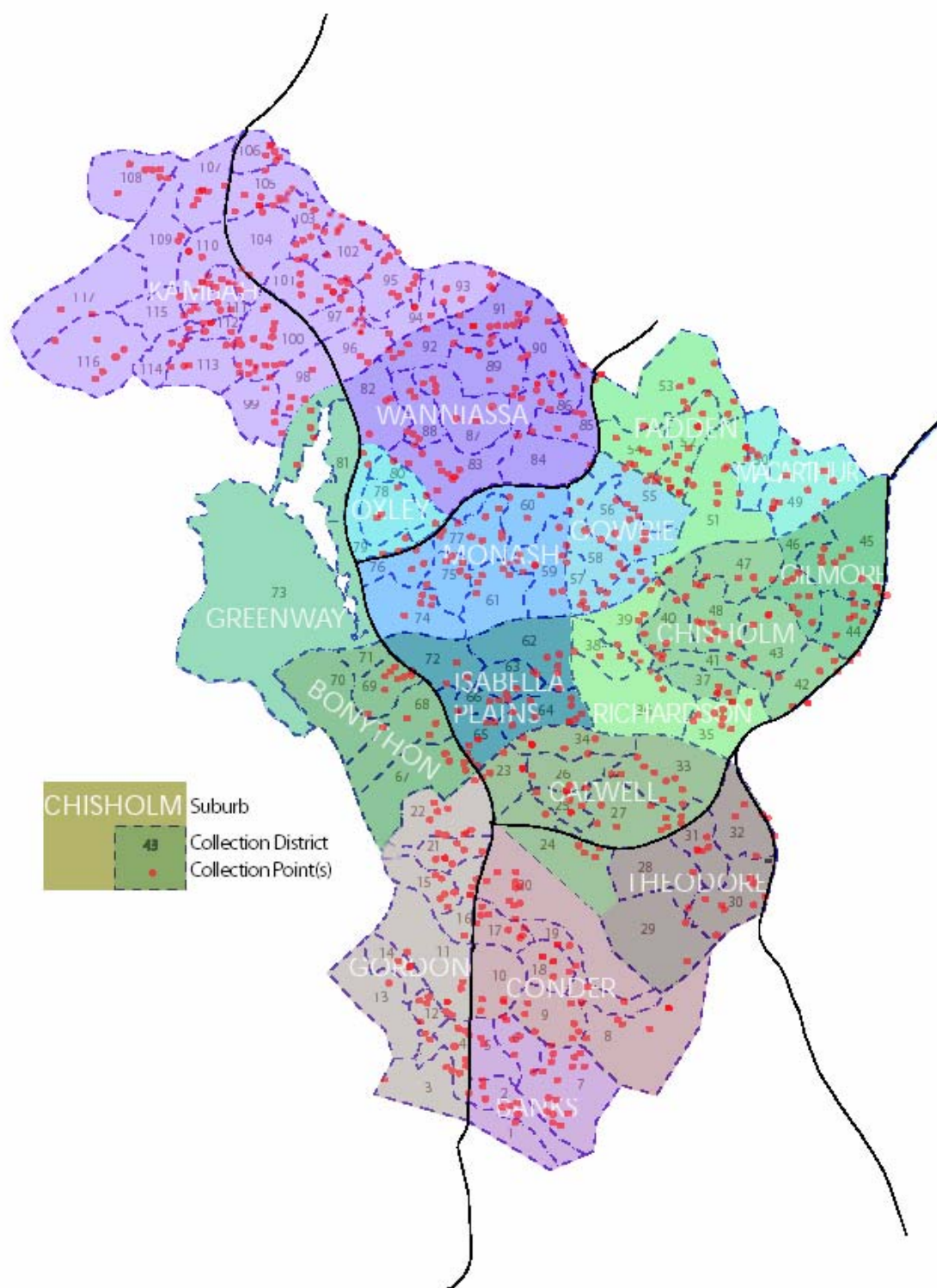
3.2.5 Pilot Survey

Two weeks prior to the commencement of surveying in Tuggeranong, a pilot survey of 20 respondents was carried out in the suburb of Fisher in the Weston Creek area adjacent to Tuggeranong. This enabled some fine-tuning of survey protocols and questions as well as providing an opportunity for survey staff to become familiarised with the process. The Fisher pilot survey was conducted for one 90 minute session on a Saturday morning with four survey staff, and enabled an early indication of the response rates to be expected once research was underway in Tuggeranong. Further refinements to improve phrasing, data collection and response rates were made following the piloting of the questionnaire.

3.2.6 The Questionnaire

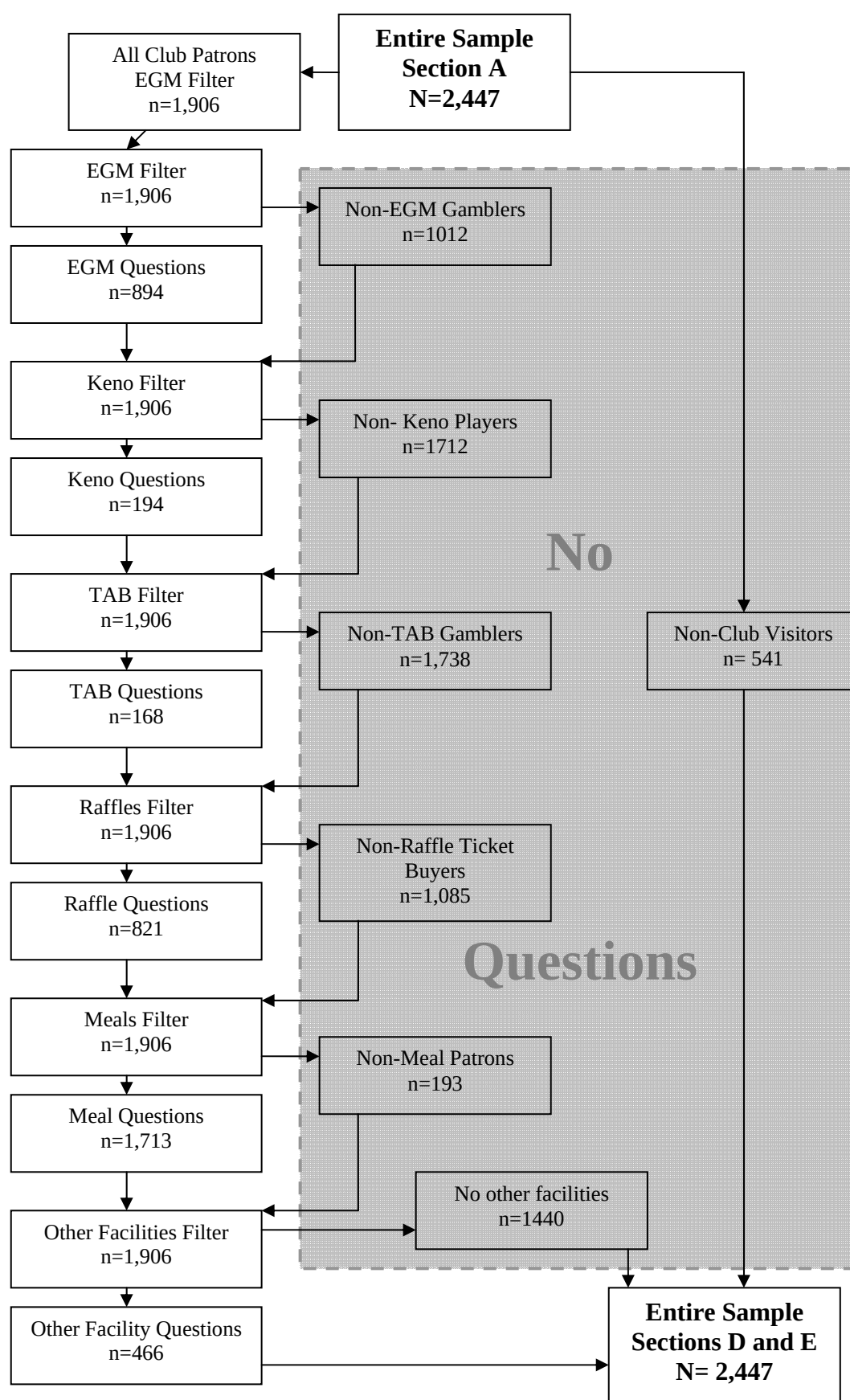
In consultation with the ACT Gambling and Racing Commission, a revised survey instrument was developed for administration to a sample of Tuggeranong residents. To address the research objectives, a multi-phase selected sampling process was designed to guide respondents through the pathways of the survey (Figure 4). The full survey instrument can be found in Appendix 2. A copy of the laminated information sheet and information letter offered to respondents is contained in Appendices 3 and 4 respectively.

Figure 3: Tuggeranong Valley - Distribution of survey responses



Note: Multiple surveys returned on same street are shown as a single point.

Figure 4: Questionnaire pathways and sample sizes



As outlined below, the questionnaire comprised five distinct sections of questions plus the after interview coding:

Section A - General leisure activities

- The survey was begun with a series of non-gambling questions to ease the respondent into the survey with relatively uncontroversial subject matter. Such questions also serve to establish a pattern which enables the respondent to become tuned to the types of questions being asked and the sorts of responses being collected.
- Together, questions in this section provide a picture of the respondent's social activities, allowing analysis of the importance of club involvement and gambling in their lives.

Section B - Club and EGM use

- This section of the questionnaire asks questions on the level of gambling and club patronage engaged in by the respondent. A filter question at the end of Section A ensures that persons answering questions in Sections B and C are only those who visit ACT clubs. A number of questions were also asked about related activities including alcohol consumption, smoking, loyalty card use and break taking when gambling on EGMs. These questions were developed in consultation with the ACT Gambling and Racing Commission.

Section C - Use of other club facilities

- Includes a number of questions related to different club activities: Keno, TAB betting, raffles, meals and 'other' facilities. The questions are less detailed than were posed for EGM gambling and relate to the frequency and expenditure patterns for each club activity.

Section D - Attitudes and opinions towards EGMs and related issues

- This group of questions was asked of all respondents and contains the attitudinal components of the survey. Questions relate to contemporary gambling issues in the ACT. Answers were recorded on a Likert scale whereby respondents indicated whether they strongly agreed/agreed/disagreed/strongly disagreed with the statements made.

Section E - Demographic information

- This section of the survey records the socio-economic and demographic characteristics of the respondent, including age, marital status, occupation, partner's occupation, number of children and approximate income.

Post-interview coding – Non-response information

- The research team recorded details not requiring answers from the respondent at this point. These included gender, street name, collection district number and the time and date of the survey.

Relatively few respondents (541 of a total sample of 2,447) were asked all the survey questions.

- Section A, D and E questions were asked of all surveyed residents (2,447 respondents) and were streamed into Section B (club patronage).

- Respondents who gave affirmative answers to the ‘club patronage’ question were asked the filter question for Section B. Only persons who identified as having played EGMs at ACT clubs were asked the remainder of questions in Section B.
- All club patrons were also asked the filter questions for each of the sub-sections of Section C. Again only those persons answering the various filters in the affirmative were questioned in further detail in that section. Those who answered in the negative for each filter immediately moved onto the next filter.

The survey method of data collection provided little opportunity to explore issues raised by respondents throughout the course of the survey. The need to limit the time allowed for face-to-face interviews (15 minutes) also limited open-ended questioning. Respondents were required to provide narrow responses to a set of pre-determined questions.

- As the survey primarily consists of closed-ended questions there was little room for respondents to offer supplementary information to that which was asked. This could result in significant information being overlooked simply because the respondent has not been specifically asked to comment upon that issue.
- However, at the end of each interview interviewers noted key unsolicited comments by residents. Relevant comments were discussed in research team meetings and helped to guide data analysis.

3.2.7 Data Entry

Data entry was completed by the research team during January. This was followed by accuracy and consistency checks and collapsing of responses into categories (such as reasons for attending clubs and types of facilities used).

Digital geo-coding of survey respondents’ residence (street only) provided the basic data from which the detailed GIS statistical examination and mapping of survey results was conducted. This process is explained in more detail in the GIS methodology (Section 3.3 below).

3.2.8 Data Analysis

In the first instance data analysis followed conventional lines of interrogation and presentation. The data were assessed with a view to identify general patterns of gambling behaviour in the Tuggeranong region, particularly how they compare to the broader ACT patterns reported in the 2001 ACT gambling survey. The next step was to analyse separately responses from residents who visit clubs in Tuggeranong and those who do not.

The detailed spatial data on gambling behaviour obtained from survey responses allowed systematic statistical analysis and mapping of patterns of club patronage reported by the Tuggeranong sample. GIS and decision-tree analysis was used to tease

out the most important variables influencing gambling behaviour in the region. Details of the GIS-based methodology follow in the next section.

Time and resource constraints prevented comprehensive analysis of all the data obtained for the project. Following consultation with the Commission, task priorities for data analysis were decided as follows:

- demographic and socio-economic profiles of club patrons, non-club patrons, gaming machine players and non-gamblers;
- geographical profiles of club patrons, gaming machine players and other groups (eg residential location of regular club patrons);
- distances travelled by club patrons to both their regular and most recently visited clubs (at the time of the survey);
- patterns of club patronage for specific socio-demographic groups (eg use of gaming and non-gaming facilities);
- the generation of ‘catchment area maps’ for specific clubs;
- identification of ‘hot spots’ of club patrons and gaming machine players (i.e. CDs or regions which have reported high levels of club and/or gaming machine use amongst their residents); and
- community perceptions and attitudes to gaming machines and related policy issues.

3.2.9 Secondary Data

In addition to the data generated from the Tuggeranong survey, other data and information are incorporated into the analysis where appropriate. Such data includes:

- Socio-economic and demographic characteristics of the Tuggeranong community, notably Australian Bureau of Statistics data;
- the types and size of gaming clubs, including number of EGMs;
- provision of non-gaming facilities in clubs (restaurants, bars, sports facilities, ATMs etc);
- history and planning issues affecting Tuggeranong’s development;⁴³
- the proximity of gaming clubs to local recreational facilities, shopping centres and areas of community congregation;
- hours of gaming and other factors related to the operation of gaming machines;
- gaming club marketing and responsible gambling policies; and
- ACT Planning and Land Authority, ACT digital street network coverage.

Of these data sources, the ABS developed Socio-economic Indexes for Areas (SEIFA) are the most heavily utilised. SEIFA indexes provide a broad-brush indication of the level of wellbeing amongst the population in each area. Four different indexes are available, each of which is designed to highlight a different aspect of socio-economic status and thus is constructed from different variables collected in the 2001 Census of

43 ACT Urban Services. 2001. *Tuggeranong Lakeshore Master Plan, Planning and Land Management*.

Population and Housing. In this report, although all indexes are used, the Index of Advantage/Disadvantage is utilised as the standard measure for relative socio-economic status for the majority of the analysis. The four indexes are:

- **Index of Advantage/Disadvantage** This index is a continuum of advantage to disadvantage. It takes into account variables relating to income, education, occupation, wealth and living conditions.
- **Index of Disadvantage** This index focuses on low income earners, relatively lower educational attainment and high unemployment.
- **Index of Economic Resources** Variables for this index include those relating to the income, expenditure and assets of families, such as family income, rent paid, mortgage repayments and dwelling size.
- **Index of Education and Occupation.** This index includes variables relating to the educational and occupational characteristics of communities.⁴⁴

Incorporation of the various datasets into the analysis involved multiple methods and triangulation of results from the Tuggeranong survey data set, information from ACT Government agencies, and gambling data obtained from the ACT Gambling and Racing Commission.

3.3 GIS-based analysis

To date, there has been limited research application of GIS to gambling behaviour. A search of research literature databases has revealed no published studies of this kind. This study shows that GIS has considerable potential as a tool to assist regulatory bodies. By definition, a GIS contains a powerful set of tools which allow the collection, storage, retrieval, transformation and display of spatial data.⁴⁵ The utility of GIS to assist in the analysis and management of complex socio-demographic problems is well established. Areas where GIS analyses have proven particularly useful for policy and regulation are in applications within crime and medical fields. Studies in these fields have frequently found GIS to be useful in delineating the extent and nature of problems, and to inform efficient allocation of resources.⁴⁶ GIS is also being increasingly adopted as a management tool at a range of government levels.

GIS techniques have only recently been applied to gambling-related analysis in Australia, notably by government regulators in Queensland and Victoria where detailed data on gaming machine patterns are collected and mapped at the level of Local Government Areas (LGAs).⁴⁷ The approach taken in this Tuggeranong study is to trial GIS methodology at a more local scale. Previous research has identified

44 A full outline of the four indexes and how they are calculated is available from the ABS in 2039.0 *Information Paper: Census of Population and Housing -- Socio-Economic Indexes for Areas*, Australia

45 Burrough, P. and McDonnell, R. (1998). *Principles of Geographic Information Systems*, Oxford University Press, New York.

46 The benefits of using GIS in medical and crime-related research is discussed by a range of authors such as Ratcliffe, J. and McCullagh, M. (2001), 'Chasing ghosts? Police perception of high crime areas', *British Journal of Criminology*, 41(2): 330-341 and Ricketts, T. (2003), 'Geographic Information Systems and public health', *Annual Review of Public Health*, 24:43-56

47 Queensland and Victoria have a Centralised Monitoring System (CMS) which records all gaming machine transactions statewide in a central database. The ACT does not have a CMS; consequently that type of GIS analysis is not possible in the ACT.

relatively fine-scale relationships between gaming clubs and the location of residents. For example, a NSW study found persons living less than 500 metres from EGM clubs were more likely to have used EGMs and to have used them more intensively than more distant residents.⁴⁸ In Victoria, EGM gamblers generally report travelling less than 5km. to play EGMs.⁴⁹ Thus, a GIS-based analysis at a finer scale than the LGA level is worth investigating.

Two GIS-based techniques were employed in the Tuggeranong study. The first involved calculation of distances between the residential location of residents and gaming clubs. This was performed using a digital street network for the area. The second was based on using an exploratory technique to examine potential hotspots, or spatial concentrations of gambling behaviour amongst the sample and differences in catchment characteristics of local clubs. The techniques used to perform these two GIS operations are discussed in more detail below.

An advantage of the GIS-based research, apart from providing detailed spatial information on gambling behaviour in the Tuggeranong area, is that the techniques developed can be further modified and applied in other regions of Canberra. Such a methodology, and identification of relevant factors for analysis of social and economic impacts, will assist the Gambling and Racing Commission to determine applications for gaming machine increases and club licences.

3.3.1 Geocoding of survey respondents

A first step in most urban-based GIS analyses involves the geocoding of datasets of interest. Geocoding is the process of turning an address into a point on a map.⁵⁰ The geocoded data points then provide the basis for much of the subsequent analysis using a GIS. Geocoding is achieved through a processing algorithm within a GIS which matches an address to a digital street network and then assigns an X and Y value to each data point.⁵¹ The digital street network for the Tuggeranong study was provided by Roads ACT, part of the ACT Government and the Department of Urban Services.

Typically, geocoding algorithms are not able to match all addresses to the relevant digital street network. The accuracy, or geocoding hit rate, is often expressed as a percentage.⁵² In the Tuggeranong study the streets from which survey respondents were sampled was recorded during the fieldwork phase. A geocoding algorithm was designed which allocated an X and Y co-ordinate for each survey respondent to the middle of a successfully matched street. The geocoding hit rate for the algorithm was 84%. The majority of the mismatched streets were cul-de-sacs or crescents with multiple segments. The remaining 26% of survey respondents were geocoded manually. This involved navigating within the GIS to locate the street in the digital network and then determining a mid-point for that street.

48 Marshall, D. C. (2002), op. cit.

49 Roy Morgan Research (1999), op. cit.

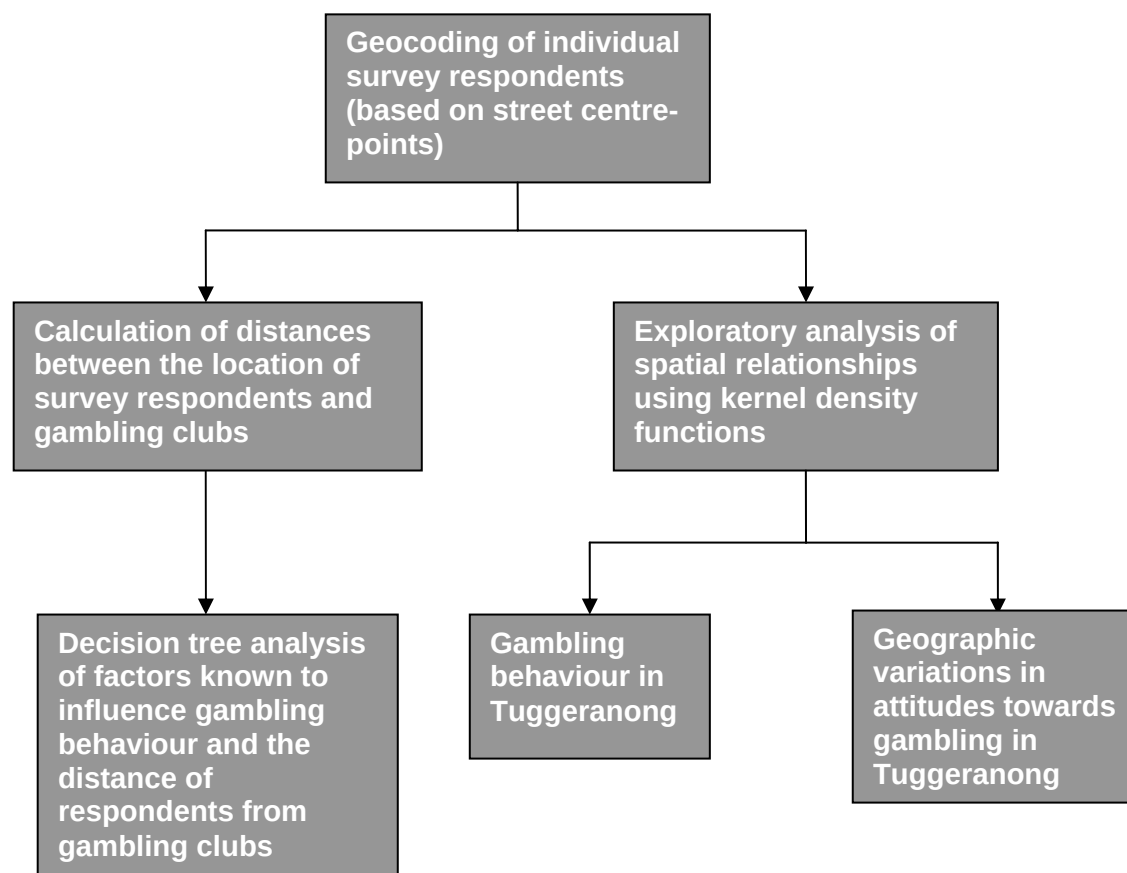
50 Ratcliffe, J. (2004), 'Geocoding crime and a first estimate of a minimum acceptable hit rate', *International Journal of Geographical Information Science*, 18 (1), 61-72.

51 Earth Systems Research Institute (ESRI). (2002), *Using ArcGIS streetmap Europe*. ESRI, United States of America.

52 Ratcliffe, J. (2004), op. cit.

The geocoding process provided a geographic coordinate for all of the survey respondents and formed the basis for a number of GIS-based analytical procedures. Figure 5 outlines the steps behind the data preparation and analysis of the GIS-based aspects of the Tuggeranong study. In addition to fine-scale analysis of survey data using point locations, GIS was also used to produce a range of thematic maps based on CD boundaries.

Figure 5: Data preparation and analysis of the GIS-based aspects of the Tuggeranong Gambling Study



3.3.2 Distance calculations

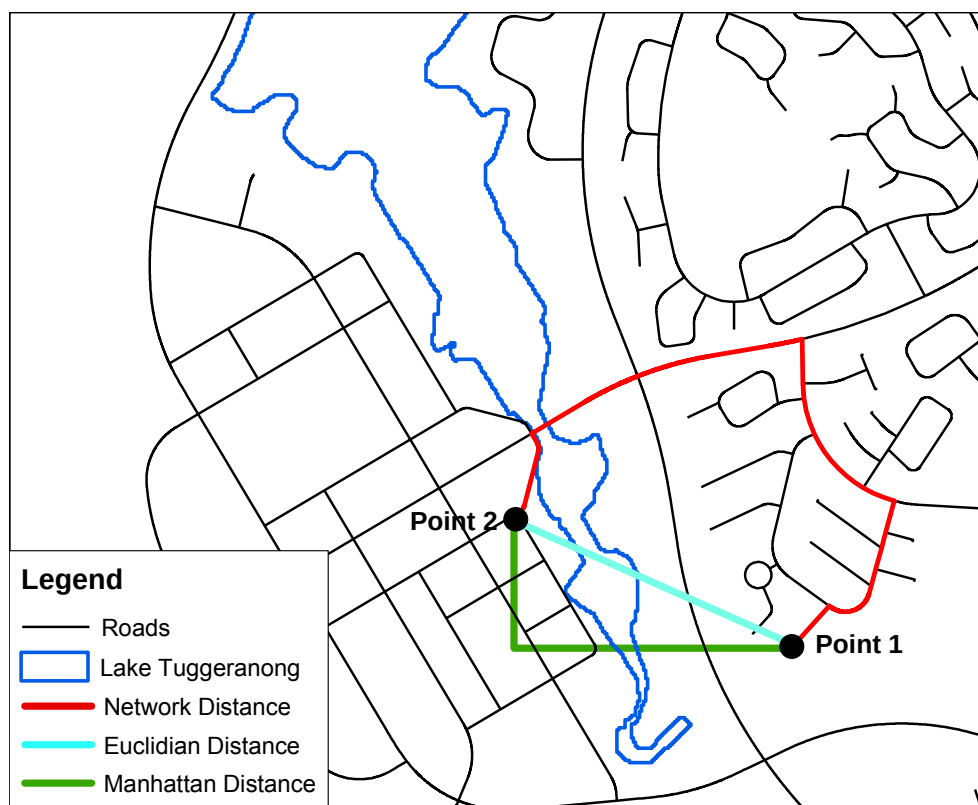
A range of techniques can be used within a GIS to calculate spatial distances between points in a dataset of interest. Broadly, three types of distances can be calculated:

- Euclidian (straight line) distance;
- Manhattan distance; and
- Network distance.

Euclidean distance can be conceptualised in terms of distance ‘as the crow flies’ and is measured as the straight line connecting two nodes or points. Manhattan distance is the length of the change in x (horizontal) direction plus the change in the y (vertical) direction. Network distance is based on traversing between the points of interest along

the digital street coverage. Network distance is usually calculated by determining the shortest or least-cost path between the points.⁵³ These different methods for distance calculations are illustrated below in Figure 6 for a hypothetical situation in Tuggeranong.

Figure 6: Different methods of distance calculation between points using a GIS.



In the example provided in Figure 6 it can be seen that the distances calculated using the Euclidian and Manhattan methods are much shorter than the network method, which involves traversing Lake Tuggeranong. Of core interest in this study is the accessibility of gambling clubs in relation to the residential location of survey respondents. On balance, for this study it was decided to use the *network* method to calculate the distances between the locations of survey respondents and clubs they gambled at, as this approach was deemed more realistic in terms of capturing the way in which people access gaming clubs.

3.3.3 Decision tree analysis of data

To examine the issue of ‘socio-spatial accessibility’, the distance calculations between the residential location of survey respondents who gambled on EGMs and the clubs they gambled at, combined with their reported socio-demographic characteristics, provides the basis for further investigation. As previously discussed (Section 2.1) accessibility of gambling involves a number of interrelated social factors as well as spatial proximity to EGM clubs.

⁵³ ARC/INFO online help documentation. version 8.3. 2002.

Distance to gambling clubs has been identified as an important variable potentially influencing gambling activity. As outlined in Section 2.1.1 numerous studies have highlighted empirical evidence to that effect. For example, Marshall's study in northern NSW found that persons living within 500m of an EGM club were slightly more likely to have gambled on EGMs than those living further away, but also that the frequency of participation was substantially greater amongst nearby gamblers.⁵⁴ However, as recognised in this and other forums, distance is not the only variable influencing accessibility. As such, the approach adopted here seeks to incorporate a range of factors influencing socio-spatial accessibility, in order to tease out the relative importance of the various factors – in this case distance, gender, marital status, household income and age. All have been identified as potentially having an influence on gambling activity.

The approach used to investigate these potential interactions in Tuggeranong was based on the data mining technique known as 'decision tree analysis' or tree-based modelling. The software package used to run the decision tree algorithm in this study was S-plus 6. Tree-based modelling in S-plus 6 is an exploratory technique for uncovering structure in data. This is particularly useful for classification problems that involve a set of predictor variables (x) and a single response or explanatory variable (y).⁵⁵ The rules generated by the tree-based model can be interpreted as a series of 'if-then' rules. In the case of the explanatory variable being numeric, and the predictor variables a combination of numeric and factor, the model output is of the form:

If ($c \leq 413$) and ($x_9 \in \{C, D, F\}$) and ($x_5 \leq 3.5$)
Then the predicted value of y is 4.75.⁵⁶

Whilst statistical inference for tree-based models is not as advanced as logistic and linear regression analyses,⁵⁷ they have a number of advantages over these approaches. These include easier interpretation when the predictors are a mix of numeric and factor variables and tree-based models more adept at capturing interactions between predictor variables.⁵⁸ In the context of this study, these advantages are particularly useful as they explore interactions between variables known to influence gambling behaviour amongst different groups of society and accessibility to EGM clubs. Application of this technique to Tuggeranong data will assist better understanding of the link between accessibility, club usage and EGM gambling in that region.

Typically, tree-based models involve a process to control the growth of the tree.⁵⁹ The control of the tree essentially involves a trade-off between accuracy and complexity on the one hand, and on the other, the need to simplify the core concept of

54 Marshall, (2000), op. cit.

55 Clarke and L.R. and Pregibon, D. (1992) 'Tree-based models.' *Statistical Models*, S. Chambers, J.M. and Hastie, T.J. (eds.) California: Wadsworth and Brooks, pp.377-417.

56 Clarke and Pregibon (1992) op. cit.

57 ibid.

58 Burrows *et al.*, (1995) Mathsoft, 1998. *S-Plus 5 for UNIX: Guide to Statistics*. Seattle: Mathsoft Inc..

59 Burrows *et al.* (1995) op. cit.; Silver, D.L. and Hurwitz, G.A. (1997). 'The predictive and explanatory power of inductive decision trees: a comparison with artificial neural network learning as applied to the noninvasive diagnosis of coronary artery disease'. *Journal of Investigative Medicine*, 45: 99-108.

‘accessibility’ such that the results can be clearly communicated.⁶⁰ The technique employed for controlling the growth of the tree-models in this study was to limit the number of observations contained in terminal nodes to 30 observations. That is, no rules could be generated unless subgroups contained at least 30 people.

3.3.4 *Kernel density surfaces as an exploratory means of investigating the spatial nature of gambling behaviour*

Kernel density functions are a tool often used in GIS applications to explore spatial point patterns at a local scale.⁶¹ This method has been successfully applied to complex social problems such as crime⁶² and disease.⁶³ In some situations kernel density functions may yield conclusions that can be regarded as self-evidently true, while in others the outputs may point the way for further analysis and/or data collection.⁶⁴ In this Tuggeranong study, kernel density functions were primarily used to explore aspects of gambling behaviour at a local scale and to test some of the assumptions that have been made in larger gambling studies.

For example, an influential study in Victoria suggested an average figure of 2.5kms as a benchmark for assessing the influence of EGM clubs on surrounding communities.⁶⁵ In contrast, a study in northern NSW found that people living near EGM clubs (<500m) are more likely to have used EGMs and to use them more intensively than more distant residents and thus a greater influence is likely to be felt nearby than occurs further away.⁶⁶ In another example in Sydney, the case of a large gaming complex proposed in Liverpool-Fairfield by the Bulldogs Rugby League Club, the regulatory authority found that the size and range of entertainment facilities offered by large gaming clubs can draw patrons from a large expanded catchment area, with regular gamblers willing to drive 20-30 minutes.⁶⁷

When used in a GIS, kernel density functions can be thought of as an interpolation process where points distributed throughout a landscape are ‘smoothed’ in order to generalise activity locations to an entire area.⁶⁸ Rather than simply showing the location of activities (eg gambling participation or use of club facilities), the results from a kernel density function show where activities are concentrated. The process of applying a kernel density function involves the interfacing of a point surface and a

60 Bohanec, M. and Bratko, I. (1994). ‘Trading accuracy for simplicity in decision trees’. *Machine Learning*, 15 (3): 223-250. As stated in Section 2 ‘accessibility’ in this project is defined in socio-spatial terms.

61 Bailey, T.C. and Gatrell, A. C. (1995) *Interactive Spatial Data Analysis*. Longman, New York.

62 Levine, N. (2002) *CrimeStat II: A Spatial Statistics Program for the Analysis of Crime Incident Locations*. National Institute for Justice: Washington DC.

63 Bithell, J. F. (2000) ‘A classification of disease mapping methods’. *Statistics in Medicine*, 19: 2203-15.

64 Silverman, B.W. (1986) *Density Estimation for Statistics and Data Analysis*. Chapman and Hall, New York.

65 KPMG (2000). op. cit.

66 Marshall D. (2002), op. cit.

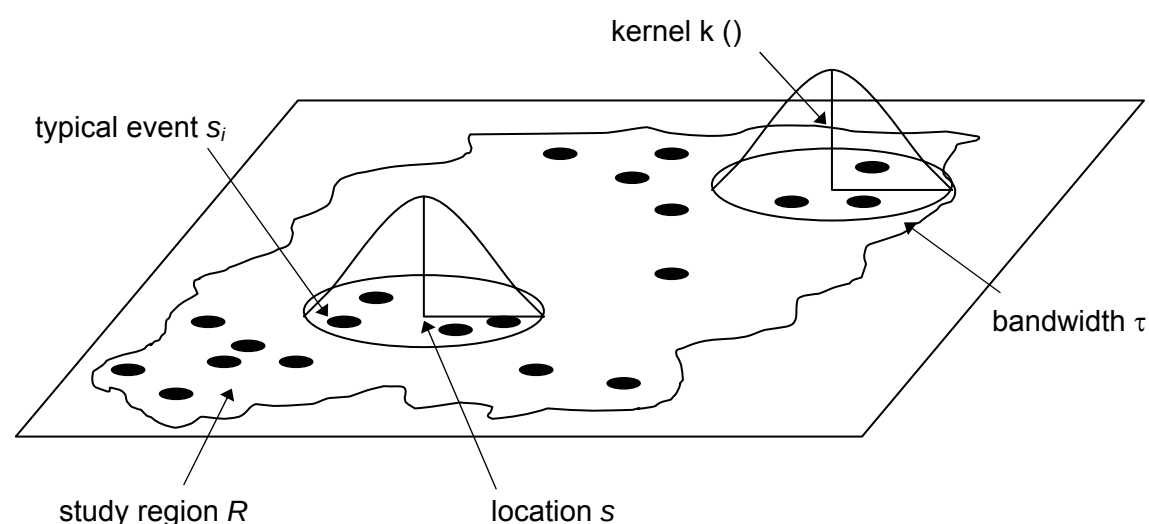
67 Liquor Licensing Court, 2001, op. cit. This process is analogous to the ‘sponge city’ concept identified in the Productivity Commission report.

68 Levine (2002), op. cit.

gridded, or raster, surface.⁶⁹ From a visual point of view, when a kernel density function is performed, the function can be seen as a three-dimensional floating circle which visits each point (s) on a fine grid (Figure 7 below). Distances to each observed point (s_i) that lies within the circle are measured to contribute to the intensity estimate at s , according to how close they are to s .⁷⁰ The outputs are generally displayed as a gridded surface where each pixel has an intensity value resulting from the kernel density function.

To give a hypothetical example, if the points shown in Figure 7 were taken to be the locations of problem gamblers, applying a kernel density function would interpolate between these points and provide an indication of where spatial concentrations were evident in study region (R). The results could be displayed as a gridded surface, with each pixel having a value indicating the concentration of problem gamblers at that location.

Figure 7: Kernel density estimation of a point pattern.



Source: Bailey and Gatrell, 1995, p. 86.

Parameters that can be chosen in the process are the type of function used for the kernel and the bandwidth, or radius, of the circle. The function used for the kernel in the Tuggeranong study was a quartic one, a common functional form for kernels.⁷¹ The selection of bandwidth influences the degree of detail shown in the results. In general, narrower bandwidths deliver results showing a finer mesh density estimate with well defined 'peaks' and 'valleys'. A larger bandwidth will lead to a smoother

69 A raster surface is one that uses a grid structure to store geographic information. The grid is composed of square cells termed pixels, where each pixel represents a uniform value. Additional information can be found in: Earth Systems Research Institute (ESRI). (2002). *Using ArcGIS Spatial Analyst*. ESRI, United States of America.

70 Bailey and Gatrell (1995), op. cit.

71 Bailey and Gatrell (1995) op. cit. A quartic kernel function is one that falls off gradually with distance until the radius is reached. Levine (2002) op. cit.

distribution and, therefore, less variability between areas.⁷² In the Tuggeranong study, visual inspection of maps produced using a range of different bandwidths suggested that a value of 750 metres provided the best balance between the need to both capture detail and to generalise across the study area.

⁷² Levine (2002) op cit.

4 The Local Context

This section provides an overview of the contexts in which the *Tuggeranong Gambling Study* was conducted. It starts with an outline of Canberra overall and the key factors which have influenced its development. A focus on Tuggeranong then follows with an overview of the local population characteristics, particularly how they compare with Canberra overall.

4.1 Canberra's Urban Geography

As noted in Section 2 a critical rationale for locally specific gambling research is to consider the effects of distinctive local conditions of any given area. In Canberra's case, perhaps the most striking local feature with potential to influence gambling activity is the unique urban geography.

Unlike any other Australian metropolitan area, Canberra has a largely planned urban environment which has resulted in a unique set of local characteristics. The design of Canberra was built upon the local topography to provide appropriate sites for the nation's major institutions of democracy and ceremonial occasions. Emphasis was placed on creating an open space system and maintaining views to the surrounding hills and bushland.⁷³ These initial design principles have been maintained as the development of outer suburbs has spread beyond the sphere of the original plans for the city. Canberra's hills have been retained in their native bushland state and natural planting patterns have been extended down from the hills into low density garden suburbs, giving rise to Canberra becoming known as the 'bush capital'.⁷⁴ Unlike other Australian cities which until recently largely evolved without formal social, spatial or economic planning, Canberra has been guided throughout its history by planning considerations. The recent release of the 'Canberra Plans' (Social, Spatial and Economic) reflect this tradition.

The most striking features of Canberra's planned urban geography are:

- The containment of retail and service activities to designated precincts;
- The interconnectedness of Canberra's suburbs by a series of major arterial roads;
- The lack of services such as petrol outlets, corner stores and hotels along major arterial roads; and
- A distinct urban hierarchy in terms of retail precincts.

Furthermore, unlike most other Australian cities, social and sports clubs are the principal licensed public clubs for community congregations. Hotels and taverns are a relatively rare feature of the Canberra urban environment, in contrast to other Australian cities where hotels and pubs are omnipresent, particularly in older established suburbs.

73 National Capital Planning Authority. (1990) National Capital Plan, December 1990, AGPS, Canberra.

74 Reid, P. (2002) Canberra Following Griffin, National Archives of Australia, Canberra.

Besides having a distinct and unique urban geography, Canberra also has a number of characteristics which render the local gambling landscape somewhat unique in Australian terms. The main features of the Canberra gambling environment which render it unique are:

- The lack of gaming machines in licensed hotels and taverns;
- The absence of gaming machines in the Canberra Casino; and
- The lack of a centralised monitoring system for regulation and monitoring of gaming machine activity.

This unique urban and gambling environment means that gambling patterns identified in research conducted elsewhere may not be applicable to the ACT. Subsequently, regulatory approaches to gambling may need to be significantly tailored to fit with the prevailing local conditions. Regulatory responses which prove effective elsewhere may not be as useful in Canberra. For example, responses which are designed to be effective in a market dominated by small gaming clubs scattered across suburbs and along major arterial roads (as found in Adelaide) may not be as suited in the Canberra scene where large club facilities located adjacent to designated retail precincts dominate the landscape. Similarly, huge gambling complexes with hundreds of EGMs like those in NSW cities are unlikely to be compatible with the lifestyle and expectations of the Canberra community.

The ACT Gambling and Racing Commission, which regulates gambling in the Territory, is also charged with monitoring and researching the social effects of gambling and ensuring that gaming operations reflect the desires of the community and the government. This study is designed to assist the Commission to better understand the factors that influence gambling behaviour in one Canberra region (Tuggeranong Valley) and thus to contribute to development of policies and regulations appropriate for the ACT environment.

4.2 Tuggeranong Profile

The study location for this project, Tuggeranong, is located in the outer southern suburbs of Canberra (Figure 8). Tuggeranong has experienced controlled growth both spatially and in terms of population. Key retail centre developments, such as those located at Erindale and the Tuggeranong Town Centre, were only opened after population targets were reached.⁷⁵ The development of suburbs in Tuggeranong shows a temporal gradient from north to south, with the northernmost suburbs being settled in the mid 1970s, the middle suburbs in the 1980s and the southernmost suburbs in the late 1980s to early 1990s.⁷⁶

Suburban development in Tuggeranong appears to be approaching its limits, as the region does not feature heavily in terms of future green-field residential sites in the recently released Canberra Spatial Plan.⁷⁷ These characteristics, along with its location at the southernmost section of Canberra, show Tuggeranong to be a relatively

75 National Capital Development Commission (NCDC). (1984) *Metropolitan Canberra: Policy Plan, Development Plan*, NCDC, Canberra

76 Australian Bureau of Statistics (ABS). (2003) *Canberra: a Social Atlas*, ABS, Canberra.

77 ACT Planning and Land Authority (ACTPLA). 2004. *Canberra Spatial Plan*, ACTPLA, Canberra.

closed system from a spatial perspective and, therefore, an appropriate site to develop and trial a GIS-based methodology to investigate gambling behaviour.

At the time of this study, there were eight clubs within Tuggeranong that have EGMs. Figure 8 shows the location of these clubs within the region. It can be seen that three clubs are located within the Tuggeranong Town Centre, with the remainder located in the surrounding suburbs.

Figure 8: The ACT and Tuggeranong.

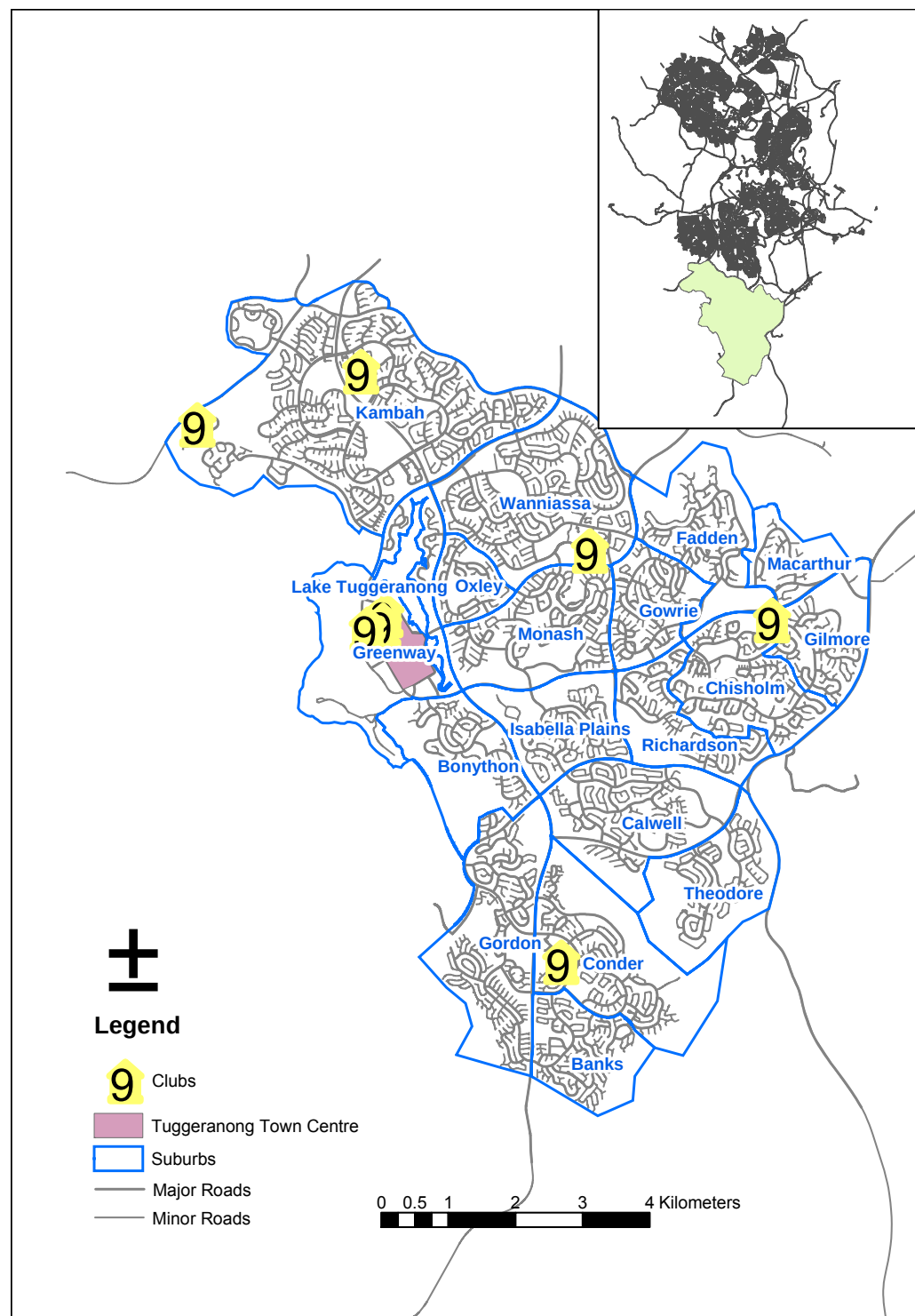


Figure 8 also shows a concentration of clubs in the northern and central suburbs of Tuggeranong. Only one club (Lanyon Valley Rugby Union and Amateur Sports Club) is located in the southern part of the region. Table 2 shows the number of EGMs (as of February, 2004) in each of the clubs located in the Tuggeranong region and their year of establishment. The Tuggeranong Valley Rugby Union and Amateur Sports Club has the largest number of EGMs (231). Most of the other clubs have between 130 and 170 EGMs. The clubs with the least number of EGMs are the Murrumbidgee Country Club Inc. and the Tuggeranong Valley Leagues Club Ltd., which have 8 and 50 EGMs respectively.

Table 2: Clubs located within Tuggeranong – Year of establishment and number of EGMs per club, 2004.

<i>Club</i>	<i>Year Est.</i>	<i>No. of EGMs (Feb 2004)</i>
Canberra Highland Society and Burns Club Ltd. (Kambah)	1975	130
Tuggeranong Valley Rugby Union and Amateur Sports Club (Wanniassa)	1979	231
Chisholm Sports Club (Chisholm)	1989	150
Murrumbidgee Country Club Incorporated (Kambah)	1990	8
Tuggeranong Valley Leagues Club Ltd. (Greenway)	1991	50
Town Centre Sports Club (Greenway)	1994	173
Lanyon Valley Rugby Union & Amateur Sports Club (Conder)	1995	140
Southern Cross Club Tuggeranong (Greenway)	1997	155

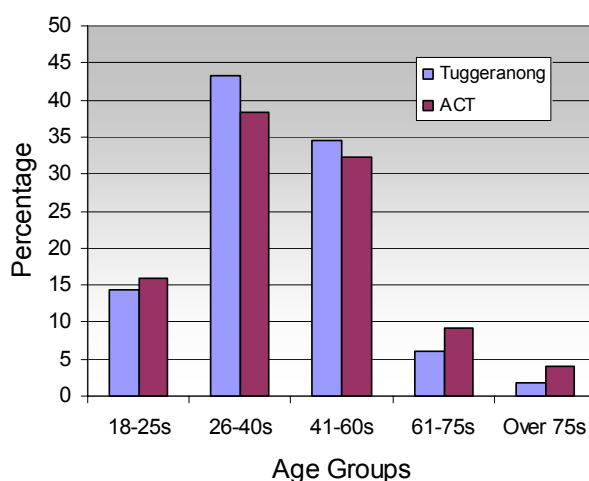
Source: ACT Gambling and Racing Commission.

4.2.1 Tuggeranong Social and Economic Profile

The 2001 Census of Population and Housing recorded that Tuggeranong had a population of 86,637 persons which represents some 27.8% of the entire Canberra population of 311,947 at the time. In terms of adults (aged 18 years), the Tuggeranong profile is similar profile to that of the ACT overall, but with a slightly younger population evidenced by higher proportions in the 26-60 age groups and lower percentages of residents aged over 60 years (Figure 9).

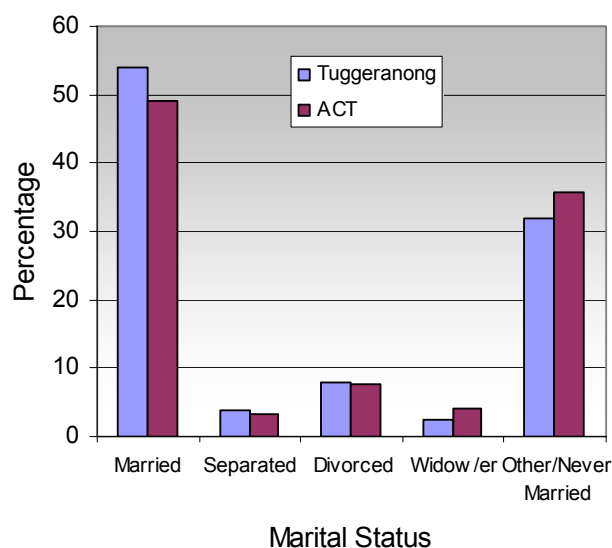
Tuggeranong also has a slightly higher proportion of its population recorded as married than for the ACT overall (Figure 10). This is balanced by a smaller proportion of people recorded in the 'other/never married' and 'widow/er' categories. The latter is a reflection of the slightly younger population and the relatively recent development of the region.

Figure 9: Age profiles (aged 18+) ACT and Tuggeranong.



Source: Australian Bureau of Statistics (2001). *Census of Population and Housing CData 2001*.

Figure 10: Marital status profiles, ACT and Tuggeranong.



Source: Australian Bureau of Statistics (2001). *Census of Population and Housing CData 2001*.

As shown in Table 3 Tuggeranong broadly reflects the ACT population in terms of country of birth, although the region has a higher percentage of persons born in Australia (77.7% as opposed to 73.2% in the ACT). The only countries-of-birth which have a greater representation in the Tuggeranong population than in the ACT overall are Yugoslavia, Lebanon, Philippines and Sri Lanka. These differences however are either small or relate to a small proportion of the total population.

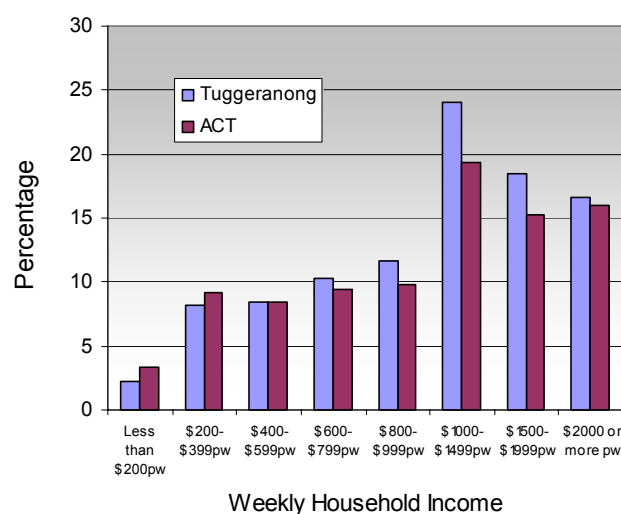
Table 3: Country of birth, percentage of population for ACT and Tuggeranong (sorted by percentage of population in the ACT).

Country of Birth	ACT	Tuggeranong
Australia	73.21	77.70
United Kingdom	5.45	5.02
New Zealand	1.27	1.15
Germany	0.78	0.69
Italy	0.75	0.50
Vietnam	0.71	0.62
China	0.66	0.34
USA	0.60	0.41
India	0.58	0.51
Croatia	0.55	0.49
Malaysia	0.51	0.47
Phillipines	0.46	0.50
Sri Lanka	0.45	0.51
Netherlands	0.42	0.40
Greece	0.41	0.21
Poland	0.39	0.38
Yugoslavia	0.38	0.42
Hong Kong	0.32	0.23
South Africa	0.30	0.22
Canada	0.25	0.17
Ireland	0.23	0.20
Singapore	0.22	0.16
Korea	0.21	0.08
Indonesia	0.19	0.12
Fiji	0.18	0.15
France	0.14	0.09
Lebanon	0.12	0.24
Macedonia (FYR)	0.12	0.06
Malta	0.11	0.11
Egypt	0.07	0.05
Turkey	0.05	0.01
Elsewhere Overseas	4.53	3.83
Overseas Visitor	0.89	0.34
Not Stated	4.52	3.63
Total Persons	100.00	100.00

Source: Australian Bureau of Statistics (2001). *Census of Population and Housing CData 2001*.

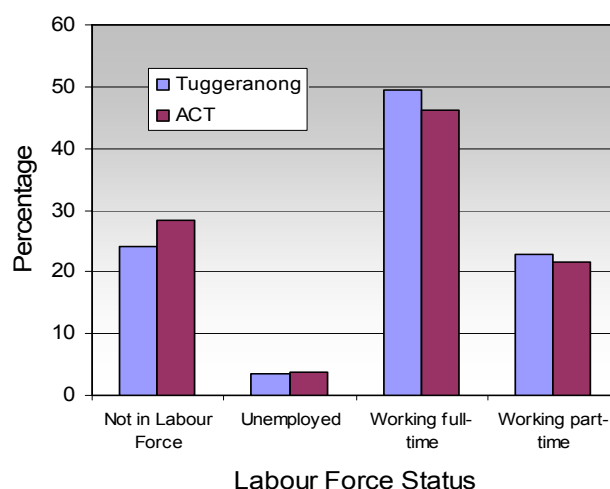
Note: Figures in bold text indicates the higher of the two figures.

Tuggeranong has a larger proportion of high income households than for the ACT as a whole (Figure 11). As will become clear in Section 4.2.2, this should not be interpreted as an indicator of an advantaged population.

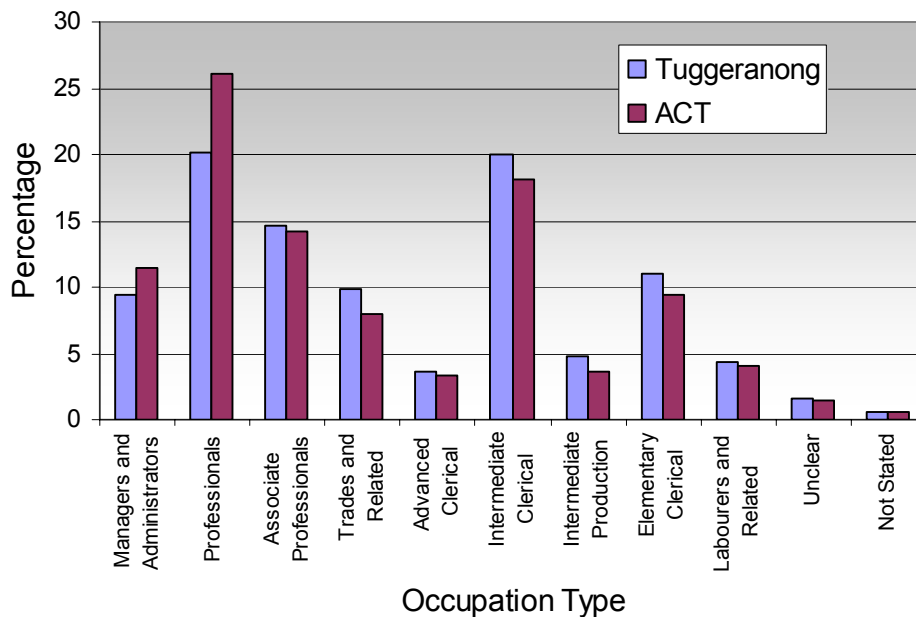
Figure 11: Weekly household income profiles, ACT and Tuggeranong.

Source: Australian Bureau of Statistics (2001). *Census of Population and Housing CData 2001*.

Tuggeranong and the ACT are generally similar in terms of labour force status (Figure 12), although Tuggeranong has slightly higher percentages of persons in employment than is evident across Canberra. However, Tuggeranong residents who are employed are more likely to be working in lower skill occupations (Figure 13). Tuggeranong has a much lower proportion of its residents employed in professional positions and a slightly smaller proportion in managerial roles than is evident for the ACT overall.

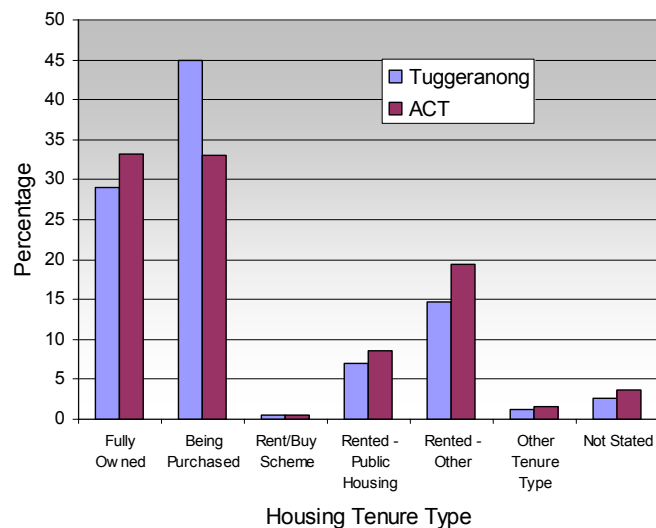
Figure 12: Labour force status profiles, ACT and Tuggeranong.

Source: Australian Bureau of Statistics (2001). *Census of Population and Housing CData 2001*.

Figure 13: Occupation category profiles, ACT and Tuggeranong.

Source: Australian Bureau of Statistics (2001). *Census of Population and Housing CData 2001*.

The Tuggeranong Valley is also an area where residents are purchasing their own home; 45% of all households are in the process of purchasing their own home, a figure much higher than for the ACT overall (33%) (Figure 14). Tuggeranong has lower levels of all other categories of housing tenure than in the ACT overall.

Figure 14: Housing tenure profiles, ACT and Tuggeranong.

Source: Australian Bureau of Statistics (2001). *Census of Population and Housing CData 2001*.

4.2.2 Socio-economic status

Using the ABS SEIFA (Socio-economic Indexes for Areas) indexes, Tuggeranong is ranked against other areas of Canberra on each of the four indexes in Table 4. Tuggeranong rates as one of the least advantaged areas relative to other areas within the ACT. On the Index of Advantage/Disadvantage, and on the Index of Education/Occupation Tuggeranong rates lowest. These data suggest that Tuggeranong is the least advantaged region of Canberra and also has the lowest levels of education and occupations. On the more focussed Index of Disadvantage, only North Canberra has a population with greater levels of disadvantage than Tuggeranong. In terms of economic resources, the more economically-centred Index of Economic Resources rates Tuggeranong amongst the lowest, with only Belconnen and North Canberra recording lower values. So, on all four scales, Tuggeranong is recorded as either the lowest or amongst the lowest when ranked alongside other Canberra regions.

Table 4: Socio-economic indexes for areas (SEIFA), Canberra sub-divisions.

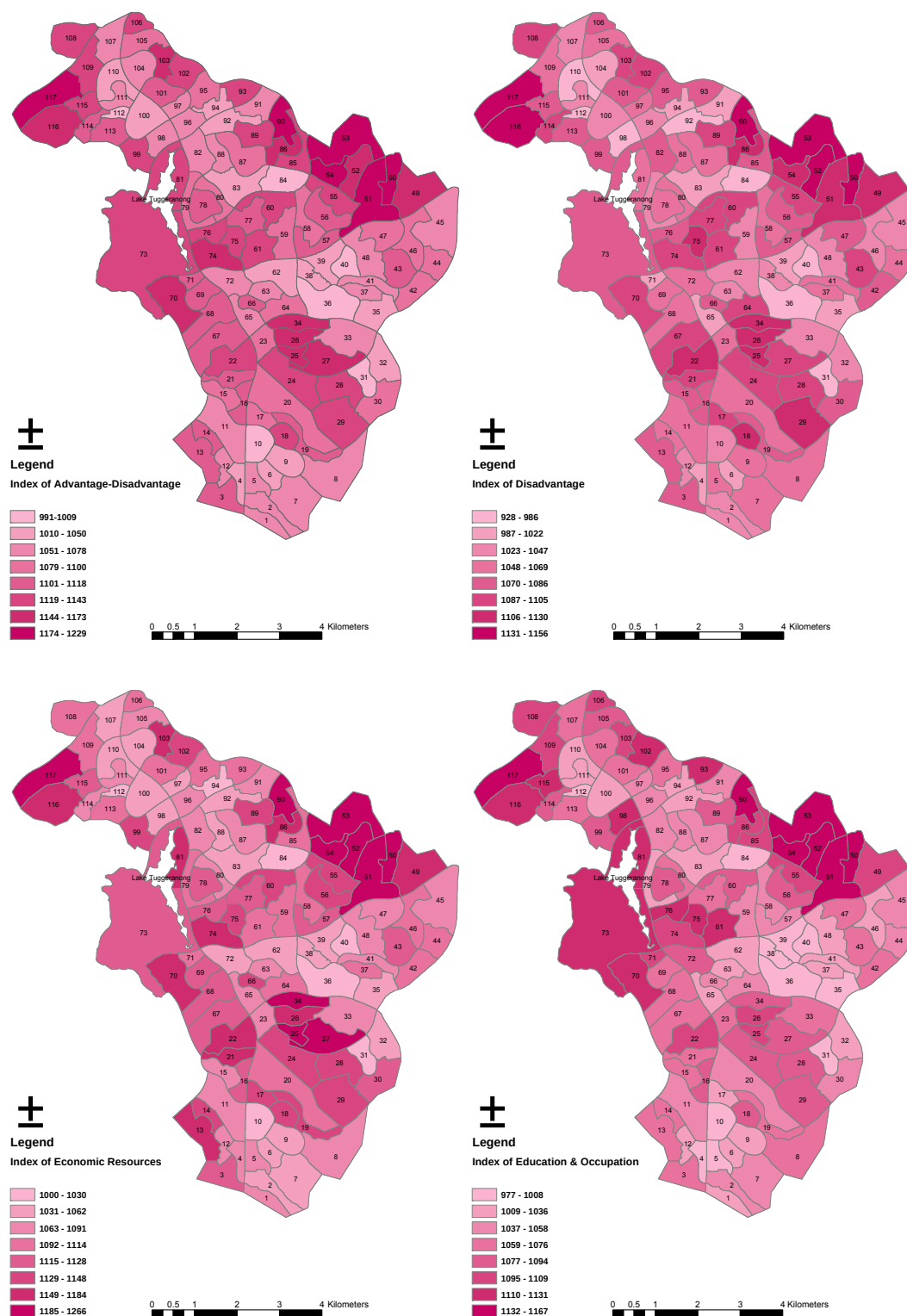
Name	Advantage-Disadvantage	Disadvantage	Economic Resources	Education/Occupation
South Canberra	1170.79	1096.50	1156.60	1177.83
Woden Valley	1155.00	1105.25	1133.35	1155.93
Weston Creek/Stromlo	1139.26	1094.19	1128.99	1124.77
Gungahlin-Hall	1137.87	1098.43	1145.40	1113.53
North Canberra	1130.36	1064.57	1086.54	1165.11
Belconnen	1106.73	1070.83	1094.67	1098.20
Tuggeranong	1099.31	1068.19	1109.78	1067.93

Source: Australian Bureau of Statistics (2003). *Socio-Economic Indexes for Areas* 2001.

Figure 15 provides an indication of the socio-economic variation within Tuggeranong, particularly the distinct segmentation in some areas. Despite each index utilising different measures, similarities are evident across the four maps.

Perhaps the most striking point of interest is the geographical divide in relative socio-economic advantage either side of Isabella Drive in the east of Tuggeranong. On all four measures, the population residing south of Isabella Drive is relatively less advantaged than the population to the north of the road. In all four maps, patterns of relative disadvantage appear in the same areas. From north to south, the most prominent areas of disadvantage are in central Kambah, south-eastern Wanniasa, Richardson, northern Theodore and south-western Conder.

Figure 15: ABS Socio-economic Indexes for Areas (SEIFA) for Tuggeranong CDs.



Source: Australian Bureau of Statistics (2003). *Socio-Economic Indexes for Areas 2001*.

4.3 Summary

The previous analysis has provided an overview of the context in which this study is being conducted. Tuggeranong is populated by relatively wealthy and young residents but also a population who display evidence of low levels of well-being. This is likely to reflect the 'mortgage belt' nature of the region, where many households are paying off their homes. Within Tuggeranong however, there are identifiable disparities in the population's socio-economic status. Some distinct locations of relatively disadvantaged populations are plainly evident. In a broader context, Tuggeranong is not dissimilar to the whole ACT region on many measures, but overall the area is one of the least advantaged communities in the ACT.

This analysis has also drawn attention to unique aspects of the Canberra environment which may shape gambling activity in the Territory. The planned and controlled nature of Canberra's development, its orderly retail and industrial precincts which are also the site for gambling facilities, all provide the setting for gambling patterns which may differ substantially from other jurisdictions.

5 Survey Results

This section presents results from the sample survey of the Tuggeranong population. In the first instance, the socio-economic and demographic characteristics of the sample population are examined and compared to the Tuggeranong population profile reported in the 2001 Census of Population and Housing. This procedure provides a profile of the survey sample and an indication of the representativeness achieved by the survey methodology.

Results of the *Tuggeranong Gambling Study* survey follow with detailed analysis of responses obtained in the survey. Emphasis is placed on analysing differences between sub-populations in the sample, namely:

- demographic and socio-economic groups;
- residents of different suburbs;
- patrons of specific clubs; and
- residential distances from the patron's preferred club.

This analysis identifies patterns of gambling behaviour and/or club patronage of different Tuggeranong sub-populations. Efforts are also made to detect any explanatory factors. Where appropriate, decision-tree analysis has teased out which factors have been most important in influencing gambling behaviour at a local suburban level.

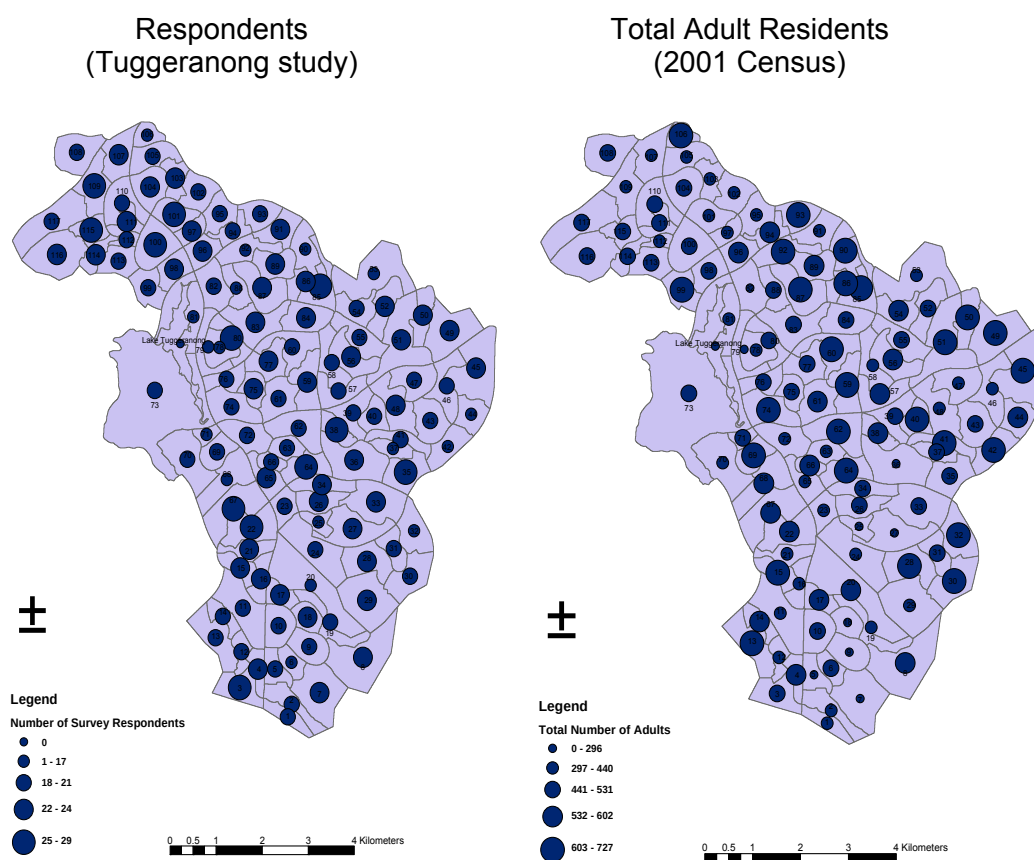
5.1 Sample Profile and Data Representativeness

In total, 2,447 adults were interviewed at their place of residence in Tuggeranong. As outlined in the methodology, interviews occurred across the entire region in an attempt to generate as geographically representative sample as possible. Figure 16 provides a comparison of the number of survey respondents in each CD in the Tuggeranong study with the total persons recorded during the 2001 Census of Population and Housing in each CD. It can be seen that the sample for the Tuggeranong study is spatially well distributed, with relatively consistent coverage of the region. As a result, the Tuggeranong survey sample approximately mirrors the distribution of adult residents recorded in the 2001 Census. There are few CDs in which the relative population/sample sizes are not consistent.

5.1.1 Demographic and socio-economic characteristics and comparisons

A further objective of the survey protocols was to generate a sample that reflected the socio-economic and demographic characteristics of the Tuggeranong population as closely as possible. As outlined below, the over-sample obtained achieved this objective within acceptable limits.

Females account for some 57% of the survey sample population (Table 5). This compares to 51% for the Tuggeranong region at the 2001 Census. Within each age group, females account for between 50% and 60% in both the Tuggeranong sample and in the Census figures. Persons aged between 26 and 60 account for over 70% of the entire sample. Substantial sample sizes are evident for all age groups surveyed.

Figure 16: Comparison of sample size per CD and total persons per CD.

Source: Tuggeranong gambling study survey. All respondents N=2,447; ABS, 2001. *Census of Population and Housing, CData 2001*.

Table 5: Gender and age profile of Tuggeranong sample population.

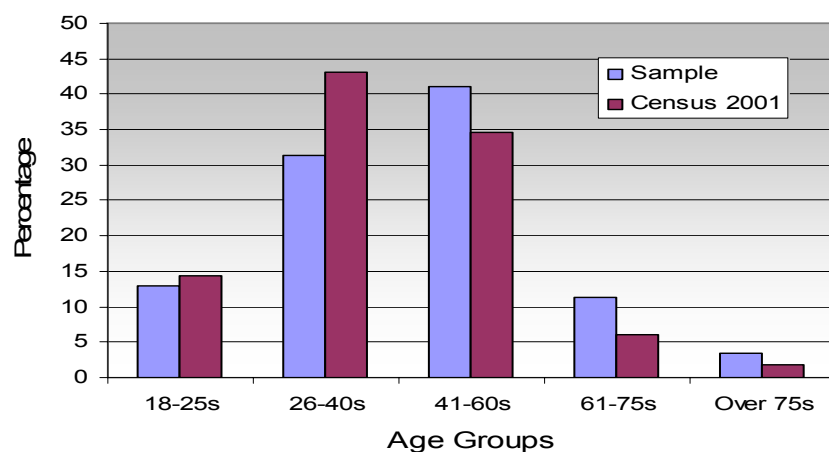
	Male n=1045	Female n=1387	Total n=2432
18-25 (n=314)	14.8 (49.4)	11.5 (50.6)	12.9 (100.0)
26-40 (n=760)	29.2 (40.1)	32.8 (59.9)	31.3 (100.0)
41-60 (n=998)	39.4 (41.3)	42.2 (58.7)	41.0 (100.0)
61-75 (n=278)	12.8 (48.2)	10.4 (51.8)	11.4 (100.0)
76 or over (n=82)	3.7 (47.6)	3.1 (52.4)	3.4 (100.0)
Total (n=2,432)	100.0 (43.0)	100.0 (57.0)	100.0 (100.0)

Source: Tuggeranong gambling study survey. All respondents (N=2,447).

Figure 17 compares the 2001 Census age profile for the Tuggeranong Valley with the survey sample. The sample population is slightly older in general than was reported at the Census. This is likely to be a reflection of the sampling methodology which was heavily weighted towards week-days and business hours when many people in the

younger age groups may be out of the home. Nevertheless, the profiles are within acceptable limits, an outcome which provides confidence for further analysis.

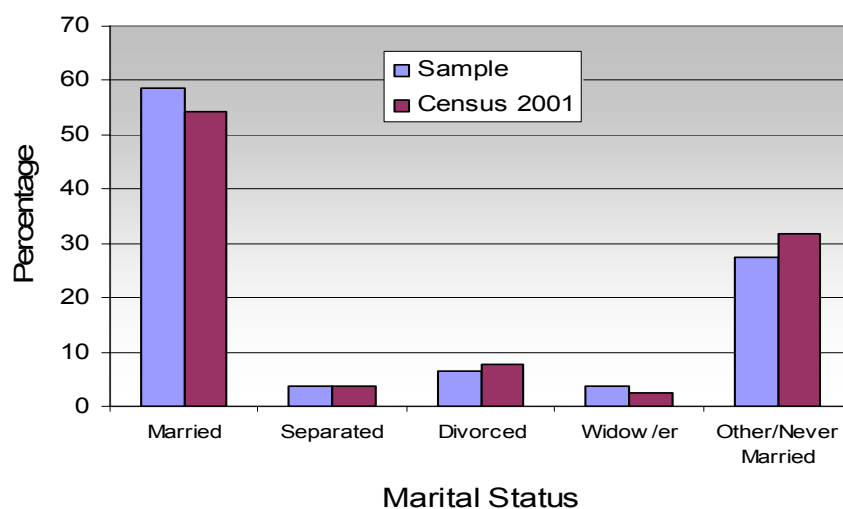
Figure 17: Comparison of Tuggeranong age profiles in the sample population and the 2001 Census.



Source: Tuggeranong Gambling Study survey. All respondents N=2,447; ABS, 2001. *Census of Population and Housing*, CData 2001.

In terms of marital status, again a close representation of the Census profile for Tuggeranong was obtained in the survey sample (Figure 18). By far the largest proportion of the sample population is married, with small proportions of divorced, separated and widow/er. The second largest category – other/never married – includes people who are engaged, in de facto relationships and single. They were combined here to coincide with the Census categories, although they have been examined as separate categories throughout the analysis.

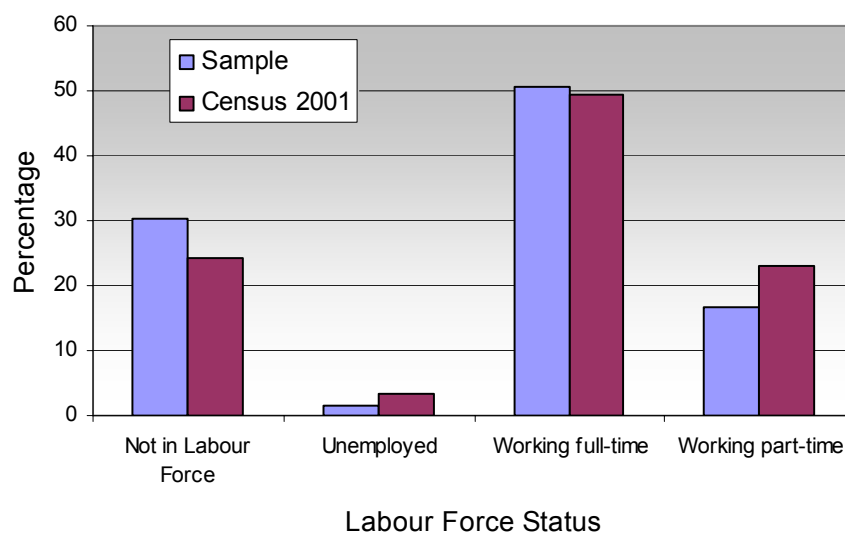
Figure 18: Comparison of Tuggeranong marital status profiles in the sample population and 2001 Census.



Source: Tuggeranong Gambling Study survey. All respondents N=2,447; ABS, 2001. *Census of Population and Housing*, CData 2001.

The labour force status of survey respondents has also been collapsed to fit with the Census variables (Figure 19). Persons not in the labour force have been separated during data analysis into students, pensioners, home duties and retirees. Comparison with the Census data again shows a close match.

Figure 19: Comparison of Tuggeranong labour force profiles in the sample population and 2001 Census.



Source: Tuggeranong gambling study survey. All respondents N=2,447; ABS, 2001. *Census of Population and Housing, CData 2001*.

The largest variation between the survey sample and the 2001 Census data occurred with income profiles. As shown in Figure 20 the survey sample population reported slightly lower before tax incomes than was reported in the 2001 Census. There are many reasons why this may have occurred including:

- Under reporting of income (or indeed over-reporting of income in the Census), perhaps due to recall accuracy; or
- Lower response rates amongst wealthier residents.

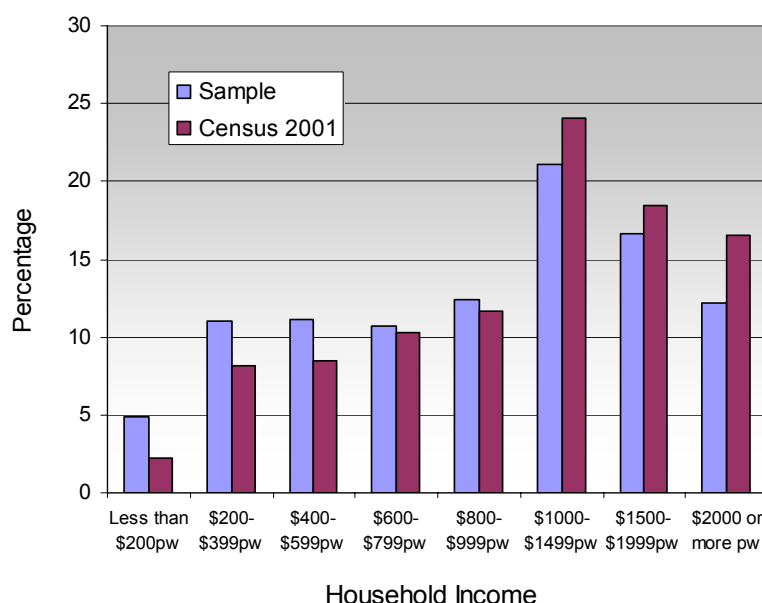
These issues are less likely to occur in the Census because it includes all households rather than just a sample, and because residents have time to check their records before completing their response. Neither option was available in this survey. Nevertheless, despite the differences, the *Tuggeranong Gambling Study* has generated a sample with an income profile similar to that evident in the Tuggeranong population overall.

5.1.2 Summary

This initial overview of the socio-demographic characteristics of the data obtained in the Tuggeranong survey provides a solid foundation for examination of gambler behaviour and club patronage. The sample population approximately reflects that of the total Tuggeranong population on a number of characteristics. Whilst some demographic and socio-economic groups are slightly over- or under-represented, the magnitude of the differences is not a cause for concern. This therefore allows analysis

of club patronage and gambling activity to be conducted with a high degree of confidence. Most importantly a geographically representative sample was obtained across the region, an outcome which lends confidence to the GIS analysis.

Figure 20: Comparison of Tuggeranong household income profiles in the sample population and the Census 2001.



Source: Tuggeranong gambling study survey. All respondents N=2,447; ABS, 2001. *Census of Population and Housing*, CData 2001.

5.2 Club Patronage and Gambling in Tuggeranong

The following results compare the findings of club patronage and gambling activity amongst the Tuggeranong survey sample. In the first instance, the variables selected to measure 'club patronage' are discussed. The analysis then moves on to examine patterns of EGM participation in the region. Five measures of EGM gambling participation have been utilised as follows:

- **Club participation rate** reports on the percentage of the sample population (and sub-populations) who report having visited clubs in the ACT. No time-frame was imposed on respondent's answers.
- **EGM participation rate** is the percentage of club patrons who report having gambled on EGMs. Where appropriate, the percentage of the total sample who gamble on EGMs is also reported.
- **Frequency per annum** is the number of times that EGM gamblers report playing the machines per year.
- **Session duration** is the reported usual EGM playing time by EGM gamblers in a typical gambling session.
- **Session expenditure** is the reported typical expenditure in an EGM gambling session by EGM gamblers.
- **Estimated annual expenditure** provides an estimate of aggregate EGM expenditure for EGM gamblers calculated from the reported frequency and

session expenditure per annum. Where appropriate, per capita annual expenditure is reported for the entire sample population as well.

Frequency and estimated annual expenditure will each be divided into two distinct indicators – one as an overall measure (all clubs) and a second measure related specifically to the nominated ‘most regular’ club. Individual clubs will not be named in this analysis, rather, they are referred to as Club A, Club B and so on. Figure 21 provides a visual representation of the EGM gambling indicators.

Figure 21: Key independent and dependent variables for analysis of EGM gambling.

<u>Independent Variables</u>	<u>Dependent Variables</u>
<i>Demographic</i> • Gender • Age <i>Socio-economic</i> • Marital Status • Labour Force Status • Household Income <i>EGM Gambling Session Variables</i> • Smoke • Drink alcohol • Loyalty cards • Take breaks • Play more than 1 machine simultaneously <i>Geographic</i> • Suburb of residence • Distance to regular club <i>By Regular Club</i> • Which club • Transport to club	<i>Participation Rate</i> <i>Frequency of EGM gambling</i> • At all clubs • At regular club <i>Duration of EGM Gambling Sessions</i> <i>Expenditure in EGM Gambling Sessions</i> <i>Estimated Annual EGM Expenditure</i> • At all clubs • At regular club

A number of different data presentation methods will be utilised here. Most of the traditional means of display such as tables, bar charts, pie graphs and maps will be utilised. However, the preferred graphical representation for much of the following analysis is with box-and-whisker plots.⁷⁸ These have a number of advantages for

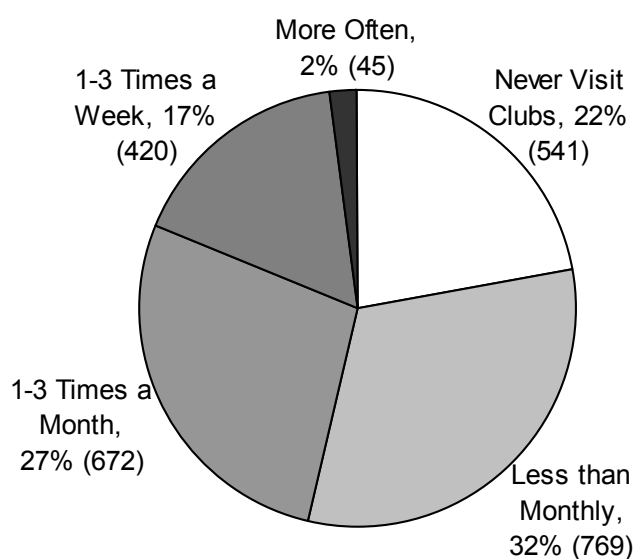
⁷⁸ Box-and-whisker plots are graphic aids that are useful when describing and comparing distributions from two or more sets of data, particularly when the data set is heavily skewed, as is the case here

analysing complex data such as this, particularly as they provide a straightforward means by which to compare multiple measures of the data. Appendix 5 provides a straightforward explanation with examples of how to interpret box-and-whisker plots. Box-and-whisker plots are particularly useful here as they are not influenced by extreme cases as occurs when using aggregate and average data. This is an advantage when examining gambling data, particularly when sample sizes are small. Mean figures, such as expenditure or frequency can be dramatically influenced by a small number of individuals with extreme levels of gambling activity. Because box-and-whisker plots utilise median and percentile indicators, the influence of extreme cases on the overall picture is reduced.⁷⁹

5.2.1 Club Usage by Tuggeranong Residents

More than three quarters of the Tuggeranong sample population report visiting clubs in the ACT; 46% of residents report visiting clubs monthly; and 2% report visiting clubs more often than 3 times a week (Figure 22). No comparison is possible with the 2001 ACT gambling survey as questions were not asked about club visitations in that survey.

Figure 22: Proportion of club patrons in Tuggeranong sample population.



Source: Tuggeranong gambling study survey. All respondents

(Welkowitz *et al.* 1982, p. 84). A detailed explanation of box-and-whisker plots and how to interpret them is contained in Appendix 5.

⁷⁹ In this report, because of the frequently skewed nature of the data, points beyond the 10th and 90th percentiles have usually been excluded to enable clearer visual representation of the most important features of the plot, those representing the majority of the population.

The facilities used at ACT clubs by Tuggeranong residents are summarised in Table 6.

- Meals stand out as the most popular club service used by club patrons in the sample population; 89.9% report dining at a club. This represents 70% of the entire sample population.
- EGMs have been used by 46.9% of club patrons and 36.5% of the entire sample population. This figure is slightly lower than the 38.1% reported in the 2001 ACT gambling survey.⁸⁰ It is higher however than the 33.5% reported in the 2003 Victorian survey.⁸¹
- Keno is played by 10.2% of club patrons and 7.9% of all survey respondents. This compares to the 6.9% participation rate recorded in the 2001 ACT gambling survey⁸² and 5.1% in the 2003 Victorian Survey⁸³
- Raffles (43.1%) are also popular activities with club patrons but TAB betting is less so, with just 8.8% of club customers and 6.9% of all survey respondents participating.

Table 6: Proportion of total sample and of club patrons who have purchased or participated in key club activities.

Facility	% of Club Patrons		% of Total Sample	
	<i>n</i>	%	<i>n</i>	%
EGMs	894	46.9	894	36.5
Keno	194	10.2	194	7.9
TAB	170	8.8	170	6.9
Raffles etc.	822	43.1	822	33.6
Meals	1712	89.9	1712	70.0

Source: Tuggeranong gambling study survey. All club patrons

The location where Tuggeranong residents engaged in particular club activities was also analysed. Two Tuggeranong clubs stand out as the preferred locations for a number of activities (Table 7).

- Clubs C and F are the regular clubs visited for EGMs, Keno and meals for the largest proportion of Tuggeranong residents who use those facilities.
- Club F is also popular for raffles, while Club C attracts over 20% of all TAB gamblers.
- Raffles are also popular at places other than the clubs listed here, with some 15% of club patrons naming ‘other’ clubs as the most usual club at which they make such purchases.

Many ACT clubs provide a wide range of facilities beyond those outlined here. In the survey, respondents were also given the opportunity to nominate other club facilities which they use on a regular basis. The facilities mentioned most often are listed in Table 8. Note that survey respondents were asked only to nominate those facilities which they used regularly. Imperfect recall and subjective interpretations of ‘regular

80 McMillen, J. *et al.* (2001b). *op. cit.*

81 McMillen, J. *et al.* (2003). 2003 *Victorian Longitudinal Community Attitudes Survey*. Gambling Research Panel, Victoria.

82 McMillen, J. *et al.* (2001b). *op. cit.*

83 McMillen, J. *et al.* (2003). *op. cit.*

use' use could mean that higher proportions of Tuggeranong club patrons do use these facilities on occasions.

Table 7: Regular clubs for specific activities.

	EGMs	Keno	TAB	Raffles etc.	Meals
<i>n</i>	<i>894</i>	<i>194</i>	<i>168</i>	<i>821</i>	<i>1713</i>
Club A	5.3	5.2	7.1	6.8	3.5
Club B	7.2	5.2	4.2	9.7	10.2
Club C	16.4	18.0	20.8	13.0	18.5
Club D	7.6	4.6	3.0	2.7	9.8
Club E	7.7	6.7	10.1	7.3	5.2
Club F	17.8	20.1	14.3	16.8	17.6
Club G	11.4	12.9	9.5	13.3	8.1
Club H	13.1	14.4	16.1	13.4	11.0
Other Clubs	9.8	8.8	13.1	15.0	12.8
None Specified	3.7	4.1	1.8	1.9	3.3
Total	100.0	100.0	100.0	100.0	100.0

Source: Tuggeranong gambling study survey. All club patrons

Table 8: Other club facilities nominated by survey respondents.

Facility	Nominated By	
	<i>n</i>	% of Club Patrons
Sports facilities (eg bowling greens, golf courses, gyms)	102	5.4
Recreational facilities (eg pool tables, dart boards)	83	4.4
Big screen TV	74	3.9
Bar	68	3.6
Function rooms	62	3.3
Children's facilities (eg games rooms)	57	3.0

Source: Tuggeranong gambling study survey. All club patrons

As noted in the methodology section of this report, Section A of the questionnaire survey was designed for the dual purpose of easing the respondent into the line of questioning as well as to gain some idea of the respondent's overall social activities, allowing analysis of the role of club involvement in their lives. As evident in Table 9:

- Visiting ACT clubs (77.9%) is the third most common social activity for the surveyed Tuggeranong population after dining out (88.8%) and going to the movies (78.9%). A minority attend sporting events (49.2%) and visit taverns (41.7%) as places for outings.
- However, the mean frequency of visitations by club patrons (29.7) is the highest of the various activities, followed by tavern visits (27.3 times in the past year).
- Notably, although more surveyed Tuggeranong residents go to the movies than go to ACT clubs, the mean frequency of movie visits is much lower than for clubs.

Table 9: Social activities of Tuggeranong residents

Facility	No		Yes		Mean Frequency
	<i>n</i>	%	<i>n</i>	%	
Eat out for dinner	274	11.2	2173	88.8	22.2
Attend live sporting events	1242	50.8	1205	49.2	16.1
Go to the movies	516	21.1	1931	78.9	11.7
Go to taverns/pubs	1427	58.3	1020	41.7	27.3
Go to clubs	541	22.1	1906	77.9	29.7

Source: Tuggeranong gambling study survey. All respondents

The profiles of surveyed Tuggeranong residents who visit clubs and those who do not are summarised in Table 10. Whilst the results for both groups reflect the total sample population to a degree, a number of observations can be made. Females, whilst accounting for the majority of surveyed club patrons, are under-represented in comparison to their presence in the overall sample and over-represented amongst those who do not visit clubs. Higher income groups tend to be more heavily represented amongst surveyed club patrons and under-represented amongst club non-participants when compared with their presence in the sample.

Table 10: Socio-demographic profiles of club patrons and non-visitors.

	Sample Population	Do Not Visit Clubs	Do Visit Clubs
<i>Gender n=2442</i>			
Male	43.0	37.0	44.7
Female	57.0	63.0	55.3
	100.0	100.0	100.0
<i>Age n=2437</i>			
18-25	12.9	10.4	13.6
26-40	31.3	37.2	29.6
41-60	41.0	37.8	41.9
61-75	11.4	9.7	11.9
76 or over	3.4	4.8	2.9
	100.0	100.0	100.0
<i>Marital Status n=2447</i>			
De facto	8.1	6.3	8.6
Divorced	6.4	6.5	6.4
Engaged	1.3	.6	1.5
Married	58.7	59.1	58.6
Not Specified	.7	.6	.7
Separated	3.6	3.3	3.7
Single	17.4	17.9	17.3
Widow/er	3.8	5.7	3.3
	100.0	100.0	100.0
<i>Income n=2252</i>			
Less than \$200pw	4.8	6.5	4.4
\$200-\$399pw	11.1	14.3	10.1
\$400-\$599pw	11.1	13.5	10.5
\$600-\$799pw	10.7	12.9	10.1
\$800-\$999pw	12.4	11.5	12.6
\$1000-\$1499pw	21.1	19.2	21.6
\$1500-\$1999pw	16.6	13.5	17.5
\$2000 or more pw	12.2	8.7	13.2
	100.0	100.0	100.0

Source: Tuggeranong gambling study survey. All respondents

Table 11 provides another perspective on this issue, indicating the proportion of each socio-demographic group in Tuggeranong which visits clubs. The most obvious observation is that the likelihood of being a club patron increases with income.

- Over 84% of the highest income group visits ACT clubs declining to 70.6% at the lowest end of the income spectrum.
- In terms of marital status, Tuggeranong residents currently engaged have the highest proportion of club visitors (90.6%) whilst widow/ers (66.7%) have the lowest.
- Men (80.9%) are more likely to have visited a club in the past year than women (75.5%);
- The highest visitation rates by age groups are the young (82.2% of 18-25 age group) and the elderly (81.3% of the 61-75 age group); and
- The lowest are people aged 26-40 (73.8%), which probably reflects this group being affected by work and family responsibilities and the over 75s (68.3%).

Nevertheless, it is noteworthy that no socio-economic or demographic group has a participation rate below 66%, a reflection of the universal appeal of clubs in the ACT to all social groups.

Table 11: Proportion of each socio-demographic group who do and do not visit clubs.

	<i>n</i>	Do Not Visit Clubs	Do Visit Clubs
<i>Gender</i>			
Male	1049	19.1	80.9
Female	1393	24.5	75.5
	2442	22.2	77.8
<i>Age</i>			
18-25	315	17.8	82.2
26-40	763	26.2	73.8
41-60	999	20.3	79.7
61-75	278	18.7	81.3
76 or over	82	31.7	68.3
	2437	22.0	78.0
<i>Marital Status</i>			
De facto	198	17.2	82.8
Divorced	157	22.3	77.7
Engaged	32	9.4	90.6
Married	1436	22.3	77.7
Not Specified	16	18.8	81.3
Separated	89	20.2	79.8
Single	426	22.8	77.2
Widow/er	93	33.3	66.7
	2447	22.1	77.9
<i>Income</i>			
Less than \$200pw	109	29.4	70.6
\$200-\$399pw	249	28.5	71.5
\$400-\$599pw	251	26.7	73.3
\$600-\$799pw	241	26.6	73.4
\$800-\$999pw	279	20.4	79.6
\$1000-\$1499pw	475	20.0	80.0
\$1500-\$1999pw	374	17.9	82.1
\$2000 or more pw	274	15.7	84.3
	2252	22.0	78.0

Source: Tuggeranong gambling study survey. All respondents

The level of club patronage in Tuggeranong varies slightly from suburb to suburb (Table 12). Macarthur and Gilmore have higher percentages of surveyed residents who visit clubs while Richardson and Bonython record the lowest levels of club patronage. The fact that the range is modest (69.1% - 87%), indicates that club patrons are located throughout the region and are not confined to particular suburbs.

Table 12: Club visitation by residents of Tuggeranong suburbs.

	<i>n</i>	Do Not Visit Clubs	Do Visit Clubs
Banks	95	20.0	80.0
Bonython	94	29.8	70.2
Calwell	147	23.1	76.9
Chisholm	135	22.2	77.8
Conder	142	23.2	76.8
Fadden	81	19.8	80.2
Gilmore	57	14.0	86.0
Gordon	222	19.4	80.6
Gowrie	82	23.2	76.8
Greenway	35	20.0	80.0
Isabella Plains	130	23.1	76.9
Kambah	550	22.5	77.5
Macarthur	46	13.0	87.0
Monash	148	20.9	79.1
Oxley	57	21.1	78.9
Richardson	97	30.9	69.1
Theodore	99	24.2	75.8
Wanniassa	230	20.4	79.6

Source: Tuggeranong Gambling Study survey. All respondents

5.2.2 EGM Participation

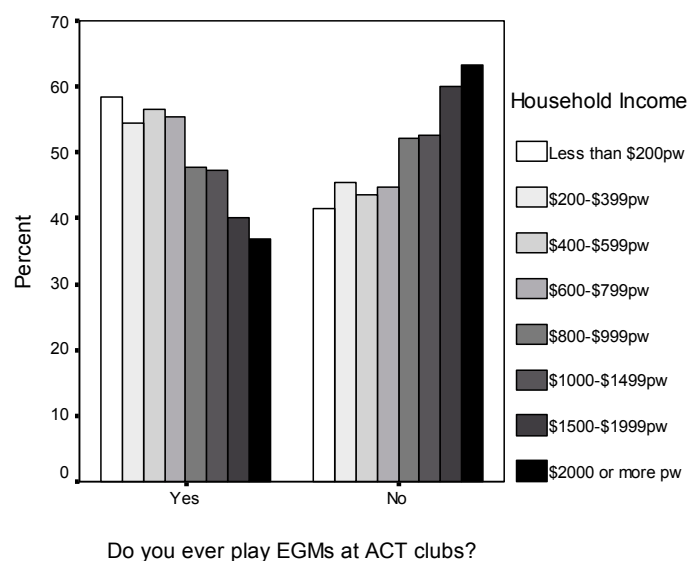
Participation in EGM gambling for the various socio-economic and demographic groups is provided in Table 13. Groups with the highest EGM participation rates include residents aged 18-25 (59.5%), pension recipients (73.3%)⁸⁴, engaged (58.6%) and those in the lowest income bracket (58.4%). The very elderly, high income groups and students have relatively low rates of involvement. Of particular interest is the declining rate of EGM gambling as household income rises (Figure 23). This contrasts with the rising rate of club patronage as incomes rise. In effect, the patronage of clubs has a positive relationship with income, but of those persons who do go to clubs, the EGM participation rate has a negative relationship with income.

⁸⁴ This figure must be used with caution due to the small sample size.

Table 13: EGM participation rates for socio-economic and demographic groups.

	<i>n</i>	Play EGMs	Do Not Play EGMs
<i>Gender</i>			
Male	849	45.5	54.5
Female	1052	48.0	52.0
Total	1901	46.9	53.1
<i>Age</i>			
18-25	259	59.5	40.5
26-40	563	42.6	57.4
41-60	796	47.0	53.0
61-75	226	45.6	54.4
76 or over	56	35.7	64.3
Total	1900	46.9	53.1
<i>Marital Status</i>			
De facto	164	57.9	42.1
Divorced	122	50.8	49.2
Engaged	29	58.6	41.4
Married	1116	43.4	56.6
Not Specified	13	46.2	53.8
Separated	71	40.8	59.2
Single	329	53.2	46.8
Widow/er	62	41.9	58.1
Total	1906	46.9	53.1
<i>Income</i>			
Less than \$200pw	77	58.4	41.6
\$200-\$399pw	178	54.5	45.5
\$400-\$599pw	184	56.5	43.5
\$600-\$799pw	177	55.4	44.6
\$800-\$999pw	222	47.7	52.3
\$1000-\$1499pw	380	47.4	52.6
\$1500-\$1999pw	307	40.1	59.9
\$2000 or more pw	231	36.8	63.2
Total	1756	47.7	52.3
<i>Occupation</i>			
Home duties	140	49.3	50.7
Pensioner	15	73.3	26.7
Retired	307	47.2	52.8
Student	103	36.9	63.1
Unemployed	26	50.0	50.0
Working full-time	976	48.0	52.0
Working part-time	329	44.7	55.3
Total	1896	46.9	53.1

Source: Tuggeranong Gambling Study survey. All club patrons

Figure 23: Percentage of EGM gamblers in each income group

Source: Tuggeranong Gambling Study survey. All club patrons

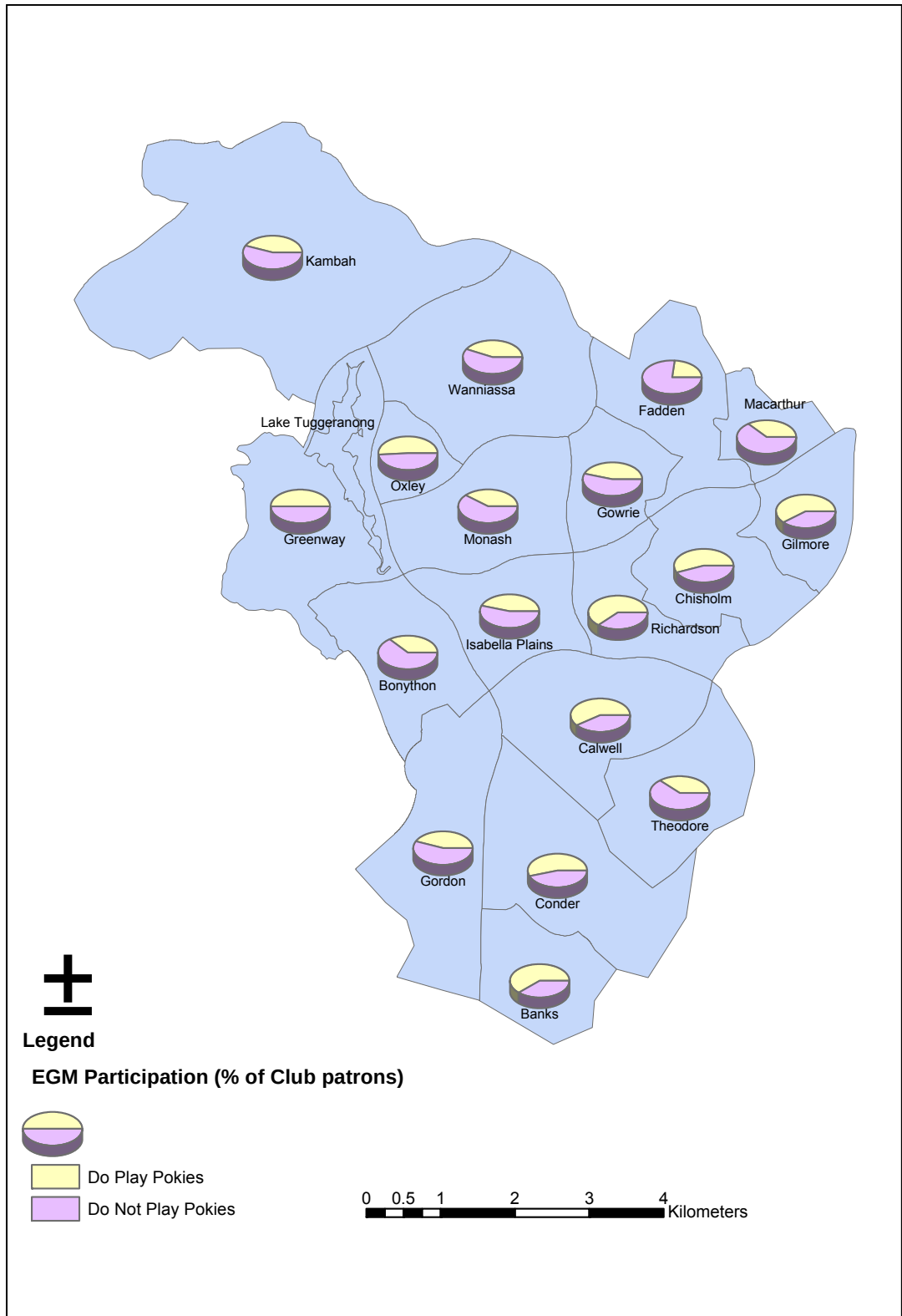
Substantial variation is evident in the proportion of each suburb's club patrons who report gambling on EGMs (Table 14 and Figure 24). Club patrons living in Richardson, Banks, Gilmore and Calwell report high EGM participation rates while Theodore, Bonython, Macarthur and particularly Fadden have low proportions of EGM gamblers amongst club visitors.

Table 14: EGM participation by suburb (% of club patrons).

	<i>n</i>	Play EGMs	Do Not Play EGMs
Banks	76	60.5	39.5
Bonython	66	37.9	62.1
Calwell	113	58.4	41.6
Chisholm	105	55.2	44.8
Conder	109	54.1	45.9
Fadden	65	23.1	76.9
Gilmore	49	59.2	40.8
Gordon	179	44.7	55.3
Gowrie	63	46.0	54.0
Greenway	28	50.0	50.0
Isabella Plains	100	46.0	54.0
Kambah	426	44.8	55.2
Macarthur	40	37.5	62.5
Monash	117	41.0	59.0
Oxley	45	51.1	48.9
Richardson	67	61.2	38.8
Theodore	75	38.7	61.3
Wanniassa	183	43.7	56.3

Source: Tuggeranong Gambling Study survey. All club patrons

Figure 24: EGM participation rate by suburb (as a % of club patrons).



Source: Tuggeranong Gambling Study survey. All club patrons.

As well as having the lowest percentage of club patrons who play gaming machines, Fadden also has the lowest percentage of EGM gamblers who gamble at least weekly (Table 15 and Figure 25). Other suburbs with low levels of frequent machine play

include Banks, Chisholm and Isabella Plains. Suburbs with the highest proportions of frequent EGM gamblers include Gilmore, Bonython and Greenway.

Table 15: Frequency of EGM participation by suburb (% of club patrons).

	<i>n</i>	Play EGMs less than weekly	Play EGMs weekly or more often
Banks	46	87.0	13.0
Bonython	25	68.0	32.0
Calwell	66	77.3	22.7
Chisholm	58	86.2	13.8
Conder	59	79.7	20.3
Fadden	15	93.3	6.7
Gilmore	29	62.1	37.9
Gordon	80	80.0	20.0
Gowrie	29	75.9	24.1
Greenway	14	71.4	28.6
Isabella Plains	46	84.8	15.2
Kambah	191	77.5	22.5
Macarthur	15	80.0	20.0
Monash	48	75.0	25.0
Oxley	23	78.3	21.7
Richardson	41	68.3	31.7
Theodore	29	75.9	24.1
Wanniassa	80	83.8	16.3

Source: Tuggeranong Gambling Study survey. All club patrons.

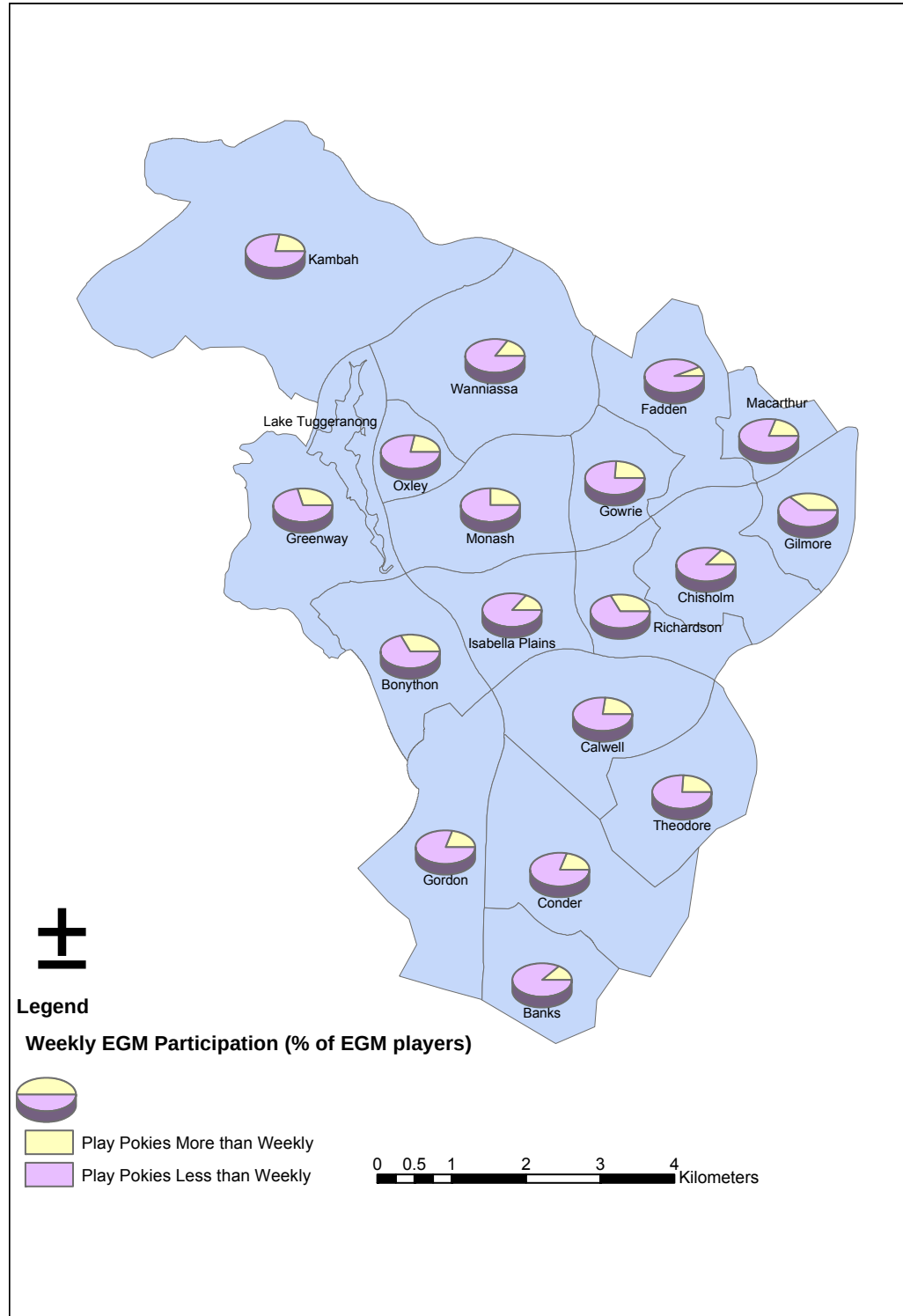
Overall, the findings in this survey indicate that EGM gambling participation rates vary more widely across suburbs than is evident for any of the socio-economic or demographic variables. These findings reflect research by Marshall in northern NSW which found that variations in EGM gambling participation are greater when the sample population is analysed along socio-spatial lines than when demarcated along a single socio-economic or demographic category.⁸⁵

We further explore possible relationships between spatial and social categories in later stages of this analysis with the use of decision tree analysis, kernel density mapping and comparisons with SEIFA data. Further research into these relationships in other Canberra communities also seems warranted in the light of the high EGM density and club patronage in the ACT.⁸⁶

⁸⁵ D. Marshall (2002), op. cit.

⁸⁶ McMillen, J. *et al.* (2001b), op. cit.

Figure 25 Percentage of weekly EGM gamblers by suburb.



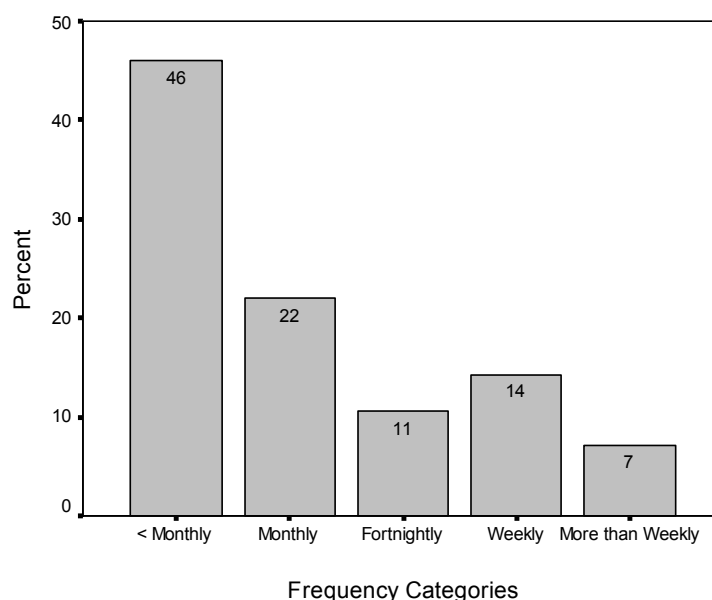
Source: Tuggeranong Gambling Study survey. All EGM gamblers.

5.2.3 Frequency of EGM Gambling

The frequency of EGM gambling by surveyed Tuggeranong residents is shown in Figure 26. 46% of EGM gamblers play the machines less often than monthly. However 21% of players do so at least weekly. This is somewhat higher than was

found for the ACT as a whole in 2001, when 14.8% of EGM gamblers reported doing so at least weekly.⁸⁷ This is also much higher than in the Victorian 2003 survey where just 8.5% of EGM gamblers report at least weekly use of the machines.⁸⁸

Figure 26: Frequency of EGM participation: % of EGM gamblers



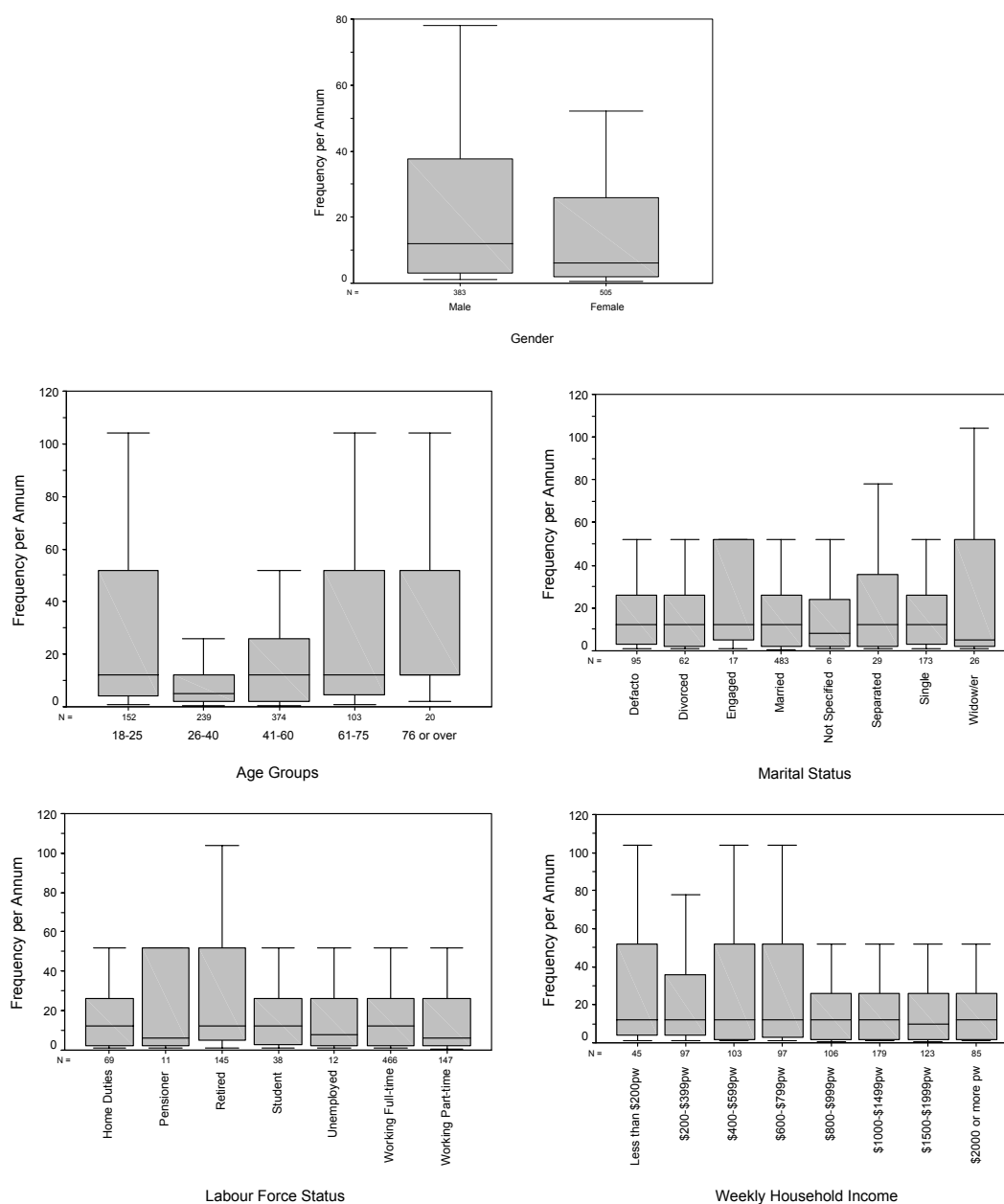
Source: Tuggeranong gambling study survey. Q. B2 All EGM Gamblers (N=891)

Males reported more frequent EGM gambling than females (Figure 27).

- Over 10% of male EGM gamblers play the machines more often than 75 times per year and 25% play at least weekly.
- In contrast, the most frequent 10% and 25% of female EGM gamblers play the machines approximately 50 and 30 times per year respectively.
- There also appears to be an age effect. Young (18-25) and elderly (61 and over) age groups have higher frequency of EGM gambling than do those in the middle age groups. This is not an unexpected finding given the tendency for people in the 25-60 age groups to be more restricted by careers and children in their frequency of recreational activities.
- There is also a slight tendency for high frequency of play amongst lower income groups although this is not a strong relationship.

⁸⁷ McMillen, J. *et al.* (2001b). *op. cit.*

⁸⁸ McMillen, J. *et al.* (2003). *op. cit.*

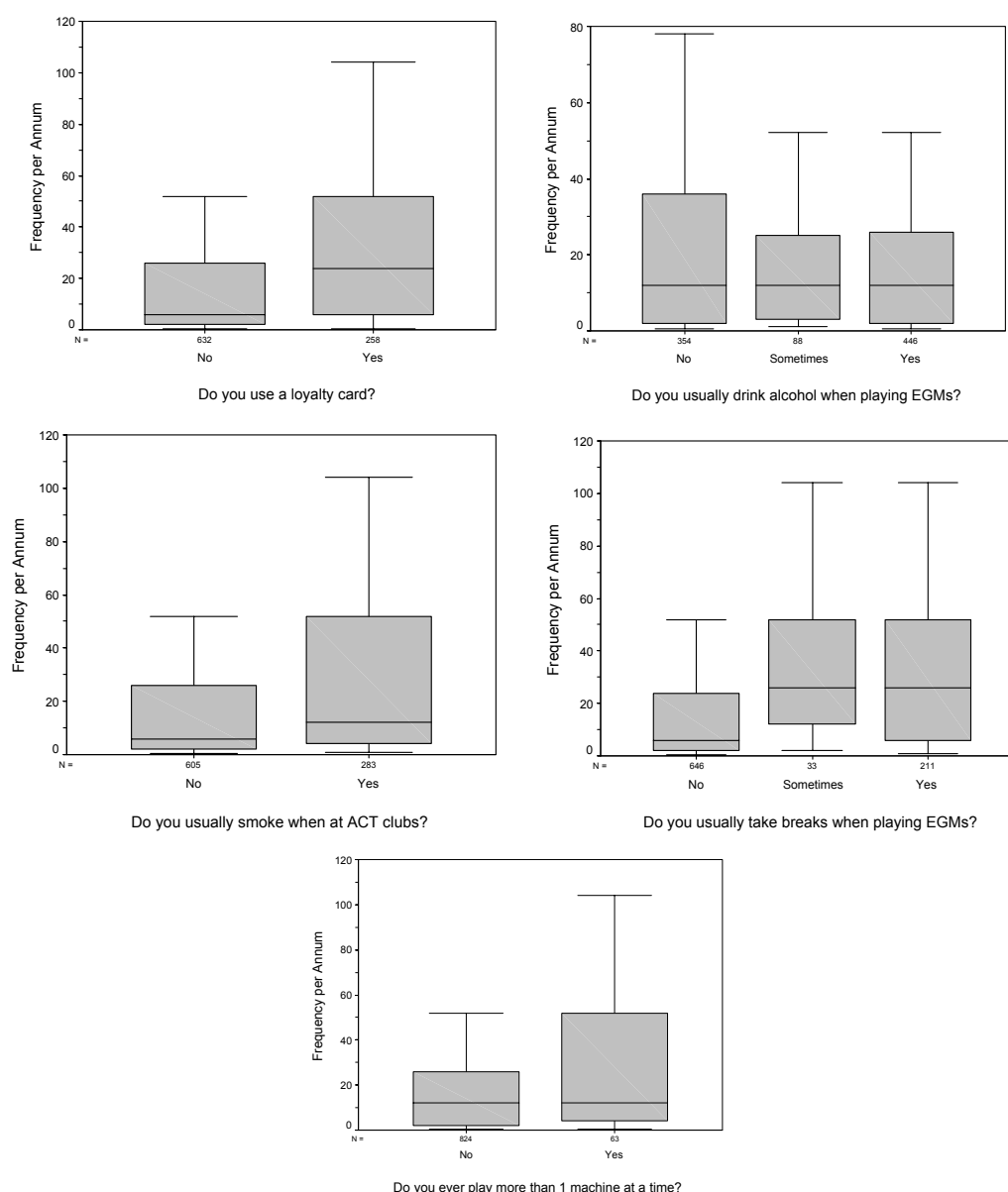
Figure 27: Frequency of EGM gambling by socio-economic and demographic variables.

Note: Due to the wide variation in results between graphs, the scale on the y axis differs on each graph.
 Source: *Tuggeranong Gambling Study* survey. All EGM gamblers (N=891)

A number of interesting relationships were found between the frequency of EGM gambling and other activities associated with club patronage (Figure 28).

- Smokers and loyalty card users tend to play gaming machines more often, whilst there is little difference between gamblers who drink alcohol while gambling and non-drinkers.
- People who sometimes play more than one machine simultaneously, and those who take breaks when playing, also tend to be more frequent EGM gamblers.

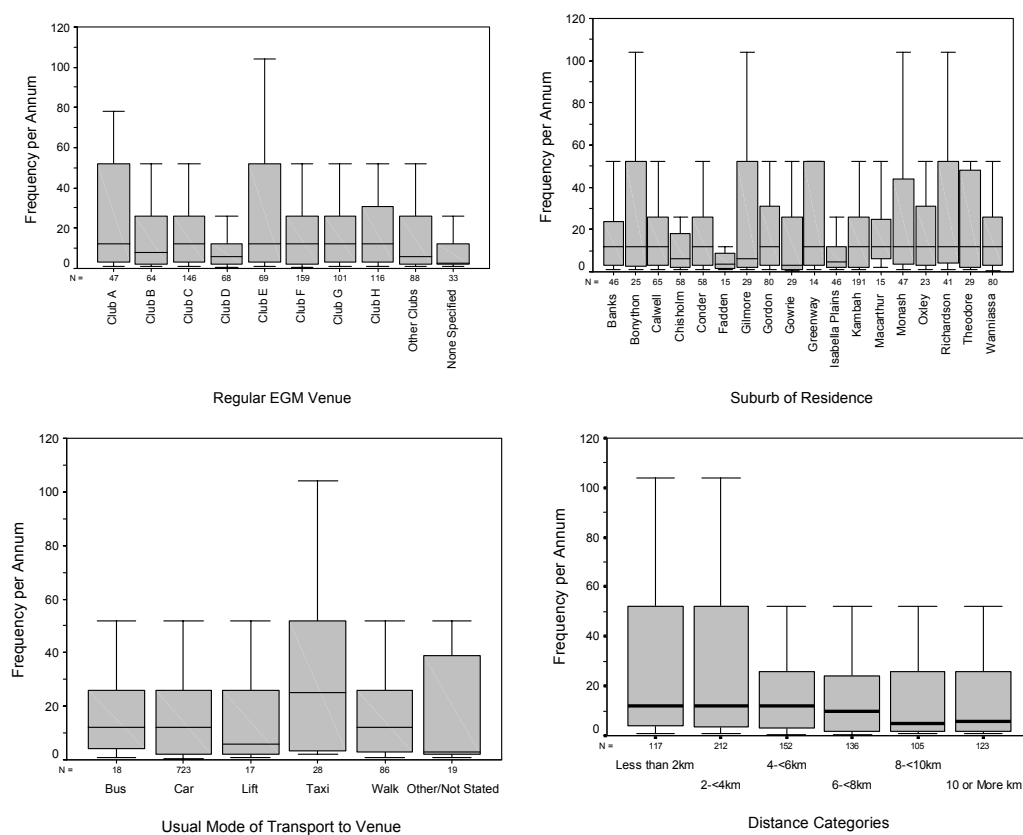
Figure 28: Frequency of EGM gambling by associated activities.



Note: Due to the wide variation in results between graphs, the scale on the y axis differs on each graph.
Source: *Tuggeranong Gambling Study* survey. All EGM gamblers (n=859)

Figure 29 examines relationships between the frequency of EGM gambling and socio-spatial (regular club, suburb of residence and distance to regular club) and transport variables.

- Gamblers who use taxis as the usual form of transport to the club and patrons of clubs A and E tend to play gaming machines more frequently.
- Groups with low frequency of EGM gambling include patrons of Club D and residents of Fadden and Isabella Plains.
- Of most interest is the relationship with distance. Persons living within 4km of their regular EGM club have more frequent EGM sessions than more distant EGM gamblers.

Figure 29: Frequency of EGM gambling by regular club, suburb and mode of transport.

Note: Due to the wide variation in results between graphs, the scale on the y axis differs on each graph.
Source: *Tuggeranong Gambling Study* survey. EGM gamblers (n=859)

To further explore factors which might influence the frequency of EGM gambling by Tuggeranong residents, a decision tree analysis was conducted. Figure 30 provides a summary of rules or factors which were found to have the greatest explanatory power for a decision tree analysis based on annual frequency of EGM gambling as the explanatory variable. Age, gender, marital status, income and residential distance to regular club were used as the predictor variables. The complete results from this decision tree analysis are shown in Appendix 7. Appendix 6 provides an explanation of the key features of a decision tree output displayed with the explanatory variable plotted on the Y axis (eg Figure 29).

Note that in this analysis and subsequent sections the distance travelled between the respondents' residence and their regular club has been calculated using GIS techniques. In other Australian studies of distance travelled to gamble, eg the KPMG report on EGM gambling in Victoria, distance has been measured by self-report estimates⁸⁹ which are known to show a high degree of variation in terms of accuracy.⁹⁰

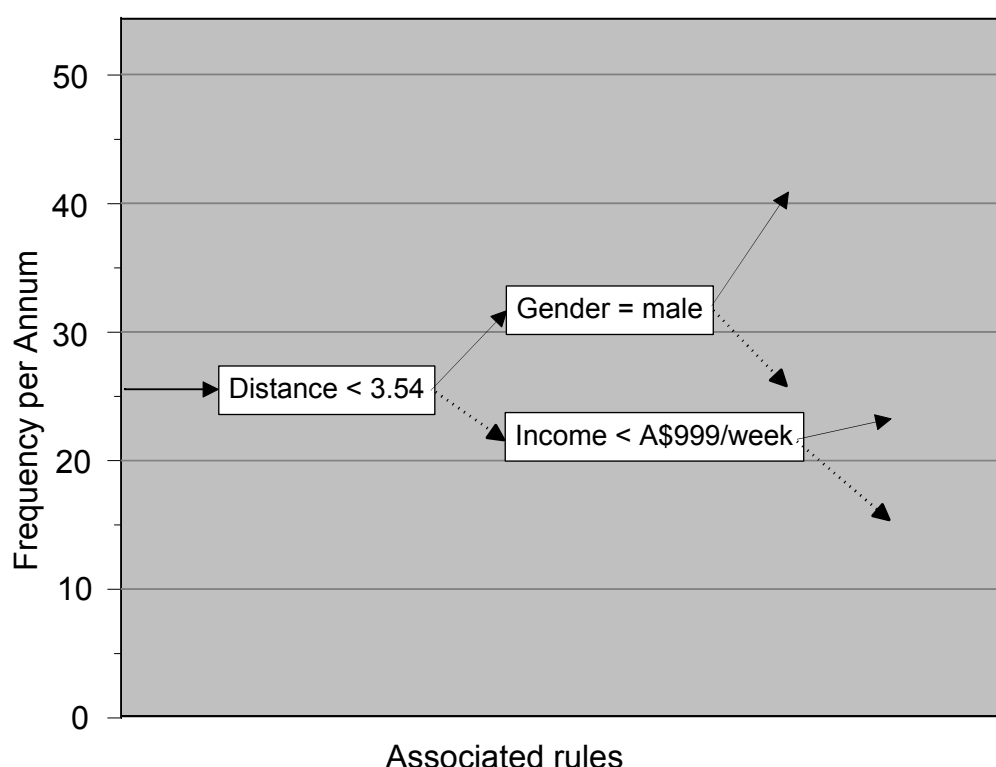
The primary split on the data is based upon a distance of 3.54 kilometres.

89 KPMG (2000), op. cit.

90 Downs, R.M. and Stea, D. (1977). *Maps in Minds: Reflections on Cognitive Mapping*. New York: Harper and Row.

- Tuggeranong residents who travelled less than this distance gamble on EGMs more often (32 times per annum) than people who usually travelled more than this distance (22 times per annum).
- For people who travelled less than 3.54 kilometres to their regular club, those who were males gambled on EGMs more times per annum (41 times) than those who were females (26 times).
- For people who travelled more than 3.54 kilometres to their regular club, those who had an income greater than \$999 per week gambled on EGMs less times per annum (15 times) than people who had an income of less than \$999 per week (27 times).

Figure 30: Primary rules for decision tree analysis based on annual frequency of EGM gambling.



Note: Solid arrows indicate the rule being true; dotted lines indicate the rule being false.

Source: Tuggeranong Gambling Study survey. All EGM gamblers (n=859)

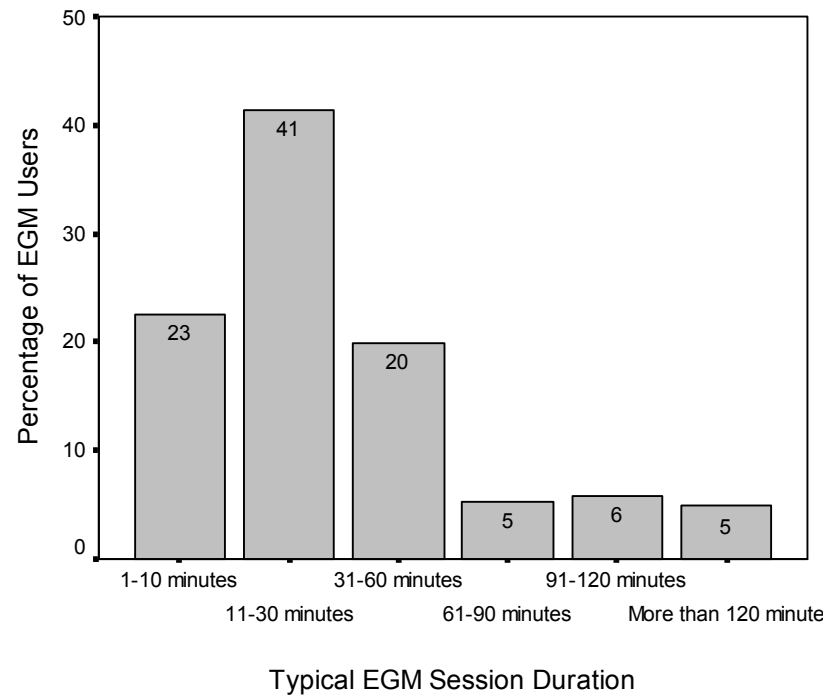
5.2.4 Typical EGM Session Duration

The majority of EGM gamblers in the Tuggeranong survey report they usually gamble for no more than one hour at a time (Figure 31). These figures are comparable with the 2003 Victorian survey which reports that 34% of EGM gamblers play for between 11 and 30 minutes.⁹¹

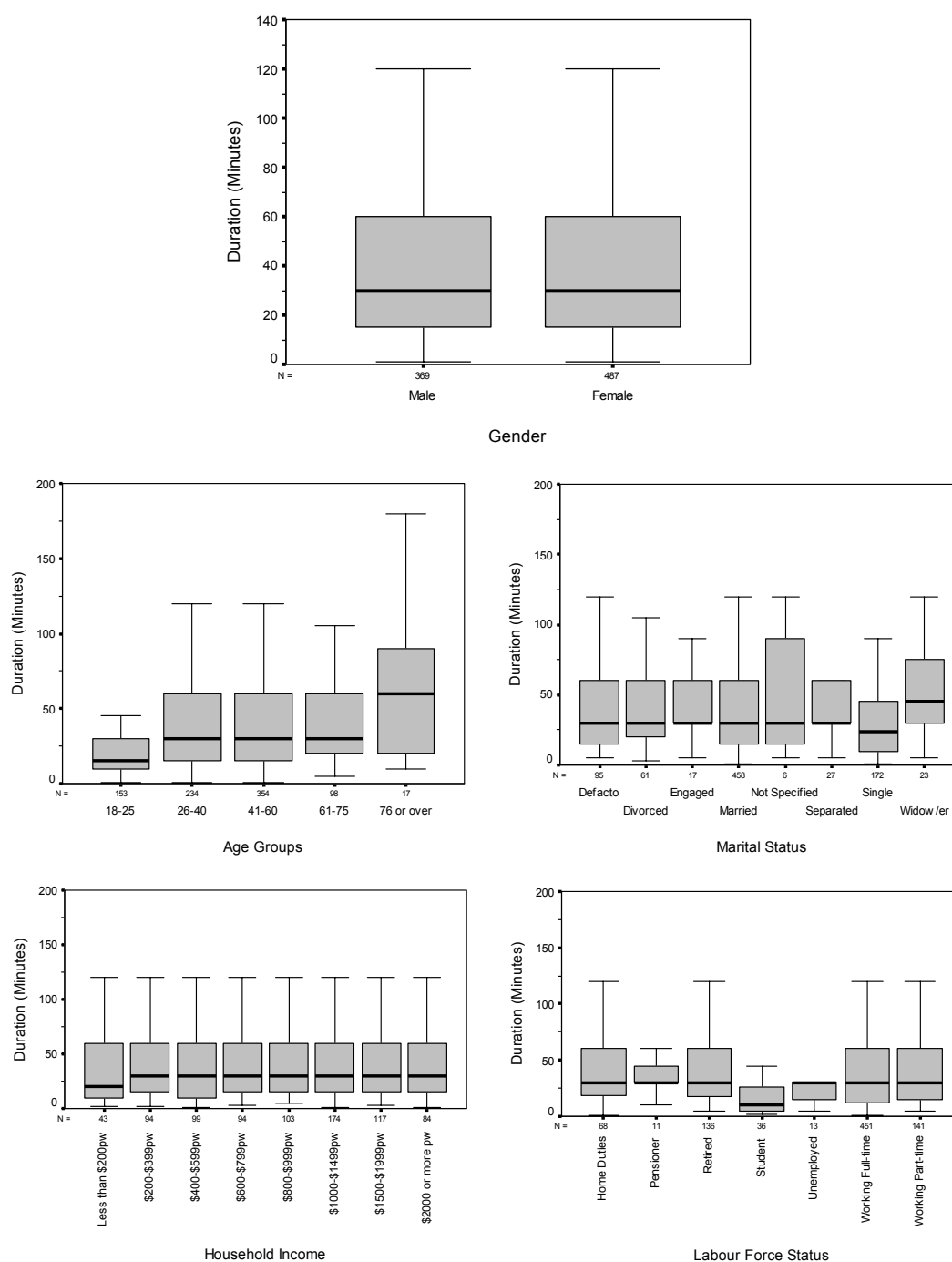
⁹¹ McMillen, J. *et al.* (2003) *op. cit.*; McMillen, J. *et al.* (2001a) *op. cit.*

- There is no discernible difference in the usual duration of gaming machine sessions of male and female gamblers (Figure 32). The median for both groups is 30 minutes, although 10% of each gender usually spends longer than 2 hours. The mean duration for male EGM gamblers is 48 minutes whilst for females it is 42 minutes. Interestingly, duration of play is the only EGM activity measure for which there is no major difference between males and females.
- The most pronounced variation in usual duration of EGM sessions is with age, with a trend towards longer gambling sessions for older persons in the sample population. A small sample size for the over 75 year olds means that the long durations for that group should be treated with caution.
- There is also a minor income effect. The lowest income group is the only one which stands out when the population is divided by income. Persons earning under \$200 per week reported a lower median duration of gambling session than all other categories.
- The other prominent variations are in the labour force status plots where the unemployed, students and pensioners reported generally shorter session durations. These three groups have low sample sizes, but given that they are also likely to represent persons on lower incomes, it is a finding of note.

Figure 31: Usual EGM session duration



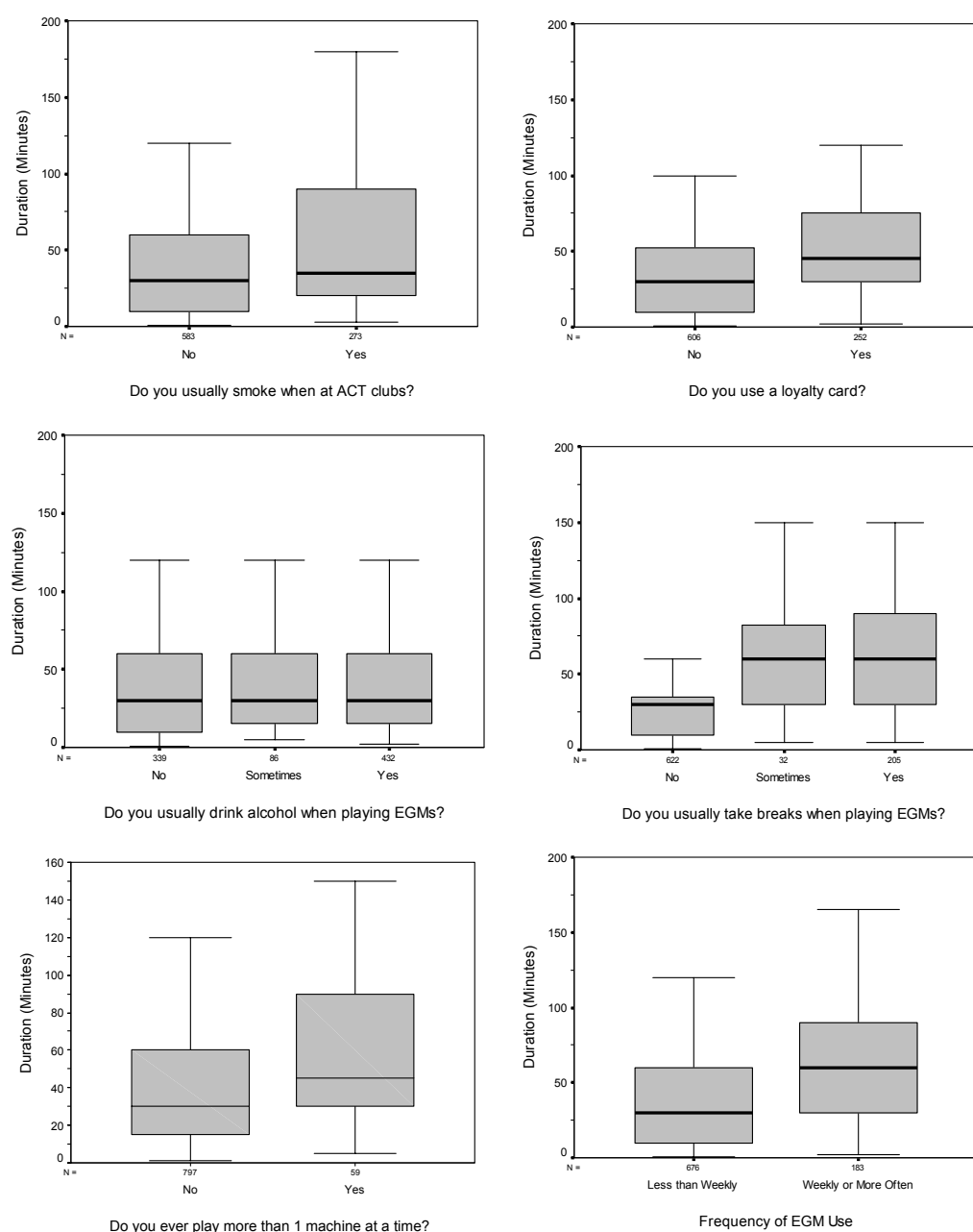
Source: *Tuggeranong Gambling Study* survey. All EGM gamblers (n=859)

Figure 32: Usual EGM session duration by socio-economic and demographic groups.

Source: *Tuggeranong Gambling Study* survey. All EGM gamblers (N=859)

Variations in EGM session duration were also found when examined with associated club activities (smoking, loyalty cards, drinking alcohol) (Figure 33).

- Most notably the survey found that smokers tend to play EGMs for longer than non-smoking gamblers.

Figure 33: Usual EGM session duration by associated activities.

Source: Tuggeranong Gambling Study survey. All EGM gamblers (N=859)

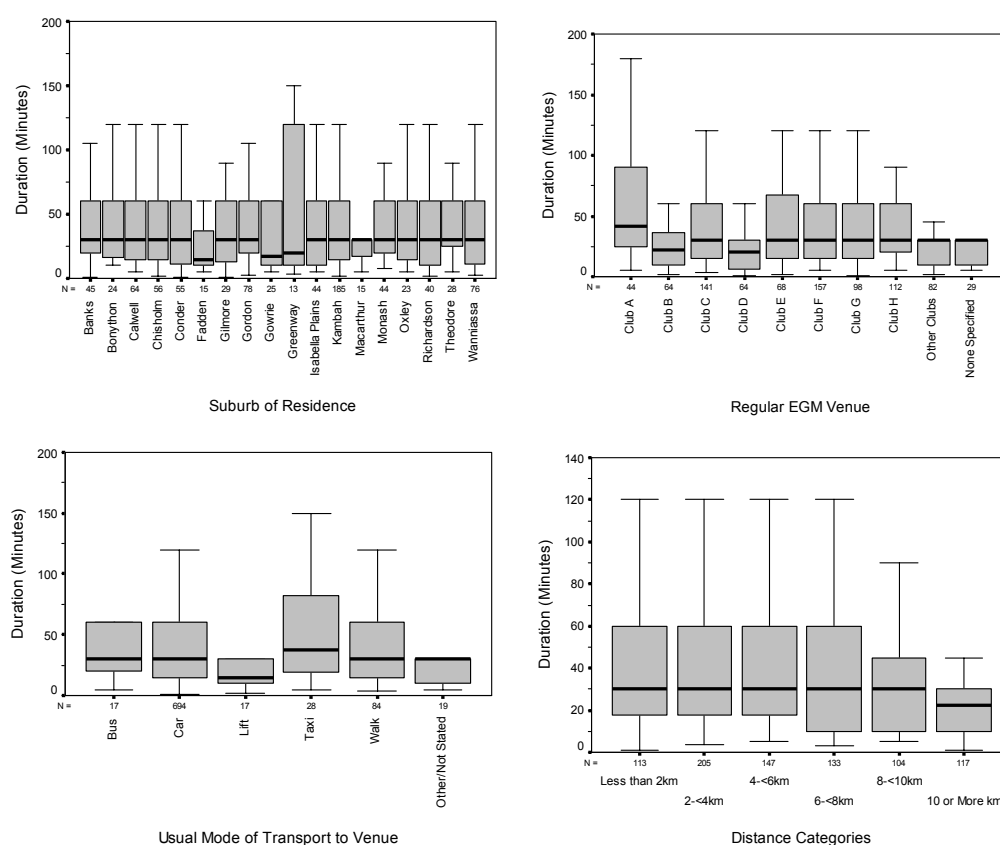
- A significant proportion of smokers (25%) gamble longer than 75 minutes at a time. Loyalty card users, people who sometimes play more than one machine and people who take breaks also play for long periods.
- Gamblers who play gaming machines at least weekly also tend to play them for longer periods of time. The median for the weekly gamblers (more than 50 minutes) is high relative to most other groups in this analysis. This finding serves to highlight different patterns of behaviour between more regular EGM gamblers and recreational gamblers. A small proportion of EGM gamblers gamble quite frequently (20% weekly); these same people also tend to play the machines for substantially longer periods of time. Over 10% of this group

usually play the machines for longer than 2.5 hours at a time, on a weekly or more frequent basis.

Survey responses were also analysed to explore variations in EGM session duration by the respondent's regular club, their distance and travel mode to that club, and their usual mode of transport to it (Figure 34). Results of this analysis underline the marked differences in the characteristics of Tuggeranong club patrons already noted above.

- Regular patrons of Club A tend to gamble on EGMs for much longer each session than those respondents who visit other Tuggeranong clubs.
- Clubs B and D tend to have patrons who play for shorter time periods.
- Strong variations in duration of EGM play were also found when demarcated by suburb of residence. However the largest variations occur in suburbs with relatively low sample sizes and thus should be viewed with caution.
- The last note of interest is the tailing off of the duration amongst gamblers who live beyond 8km from their regular club. There is little difference in session duration up to 8km but it drops sharply in the 8-10km range and then drops again in the >10km zone.

Figure 34: Usual EGM session duration by suburb, club and transport variables.

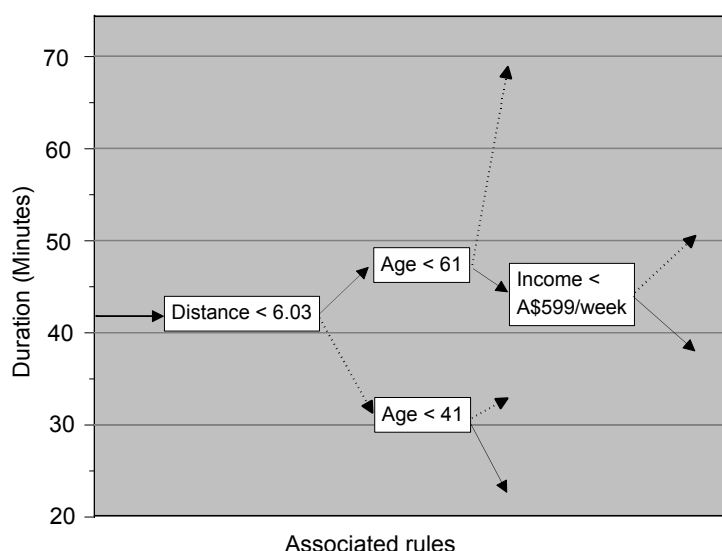


Source: Tuggeranong gambling study survey. All EGM gamblers (N=859)

As was done for frequency of EGM gambling (Section 5.2.3 above), a decision tree analysis was conducted to further explore factors which might influence the duration of EGM gambling sessions by Tuggeranong residents. Figure 35 provides a summary of the rules which were found to have the greatest explanatory power for a decision

tree analysis based on EGM session duration as the explanatory variable and age, gender, marital status, income and residential distance to regular club as the predictor variables. The complete output from this decision tree analysis is shown in Appendix 8.

Figure 35: Primary rules for decision tree analysis based on EGM session duration



Note: Solid arrows indicate the rule being true; dotted lines indicate the rule being false.

Source: *Tuggeranong Gambling Study* survey. All EGM gamblers (N=859)

The primary, or first, split on the data is based upon a distance of 6.03 kilometres.

- People who travelled less than this distance to their regular club stayed on average longer (49 minutes) than people who travelled further than this distance (32 minutes).
- Of the Tuggeranong residents who travelled less than 6.03 kilometres to their regular club, those who were aged more than 60 years reported gambling longer (69 minutes) than those who were aged 60 or less (47 minutes).
- Of the people who travelled less than 6.03 kilometres to their regular club and were younger than 61, those with an income of less than \$599 per week gambled for shorter duration (38 minutes) than those who had an income of greater than \$599 per week (50 minutes).
- Of the people who travelled more than 6.03 kilometres to their regular club, residents over the age of 40 years gambled longer (39 minutes) than those who were 40 years of age or younger (28 minutes).

5.2.5 Typical Session Expenditure

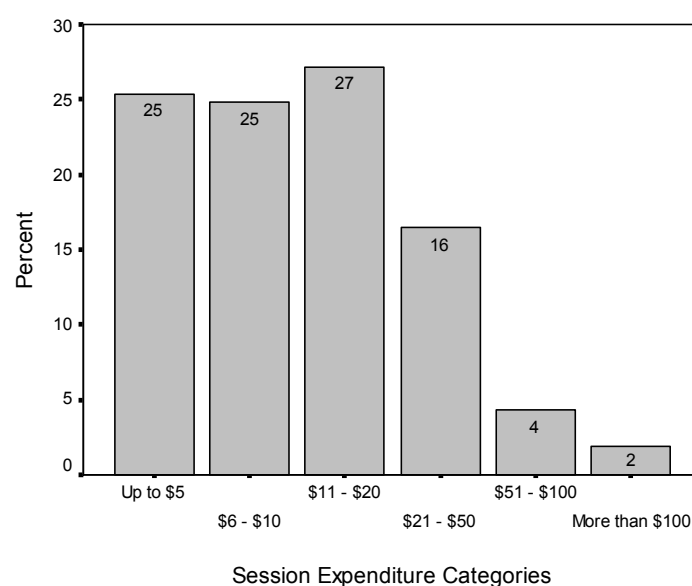
Respondents were asked to estimate approximately how much they spent during a typical EGM session (Figure 36). The majority of EGM gamblers reported spending relatively small amounts each time they play. Half of all surveyed EGM gamblers estimated spending less than \$10 per gambling session. A further 27% reported

spending between \$11 and \$20 each time. The mean session expenditure for all EGM gamblers is \$22.94.

Figure 37 summarises the reported EGM session expenditures by socio-economic and demographic groups.

- Males reported spending substantially more than females, despite having previously found no difference in reported duration between the genders. This would suggest that male EGM gamblers in Tuggeranong are spending more per bet than are females.

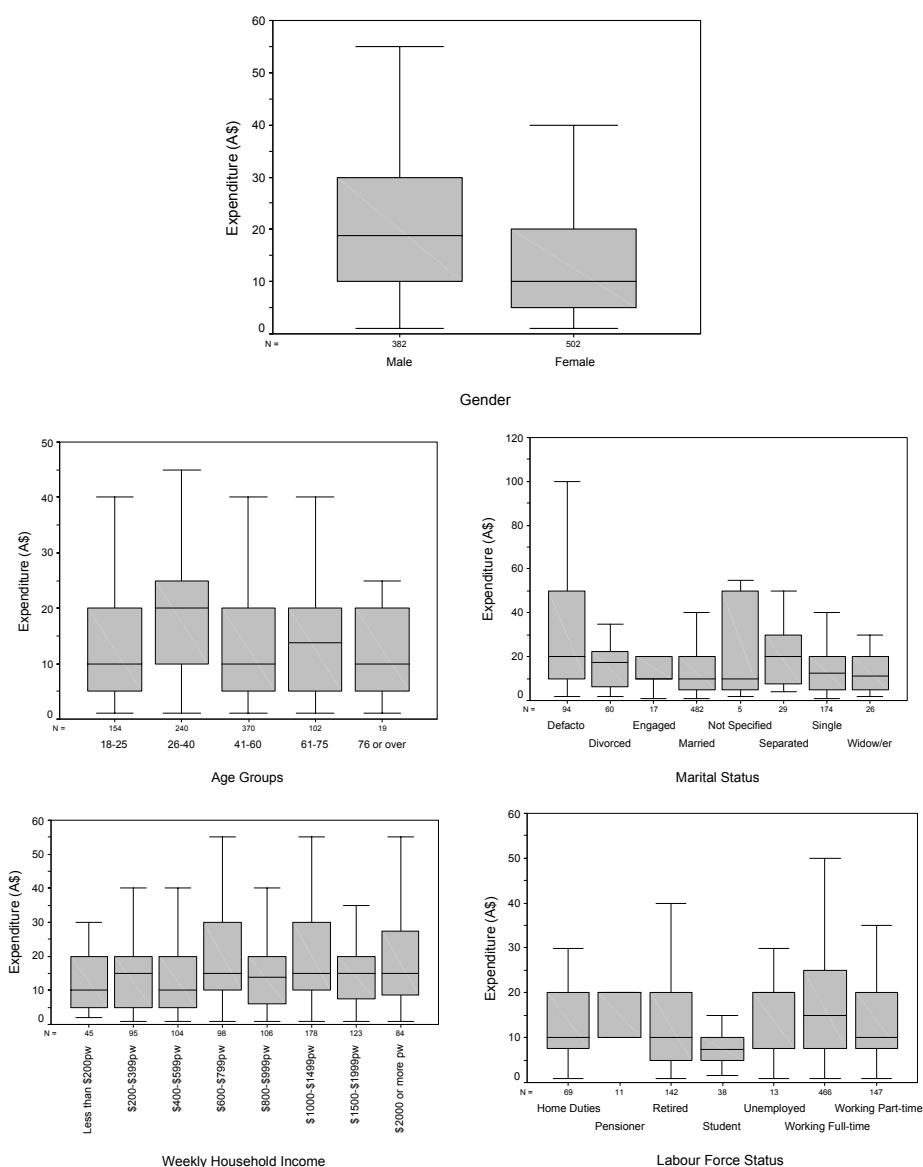
Figure 36: Frequency distribution of EGM session expenditure categories.



Source: *Tuggeranong Gambling Study* survey. All EGM gamblers (N=859)

- However, these self-report data must be treated with caution. Several studies, including the 2001 ACT gambling survey, show that gamblers tend to under-report EGM expenditure by as much as 60%.⁹²
- Survey responses also suggest a tendency for increased EGM session expenditure with rising household incomes.
- Another noteworthy observation is that Tuggeranong respondents in the age group 26-40 years have generally higher session expenditures. This is of interest because this age group reported a relatively low rate of club patronage; those who do play EGMs reported low frequency of gambling. The survey evidence suggests that when this group does play gaming machines, their expenditure tends to be higher than other groups.

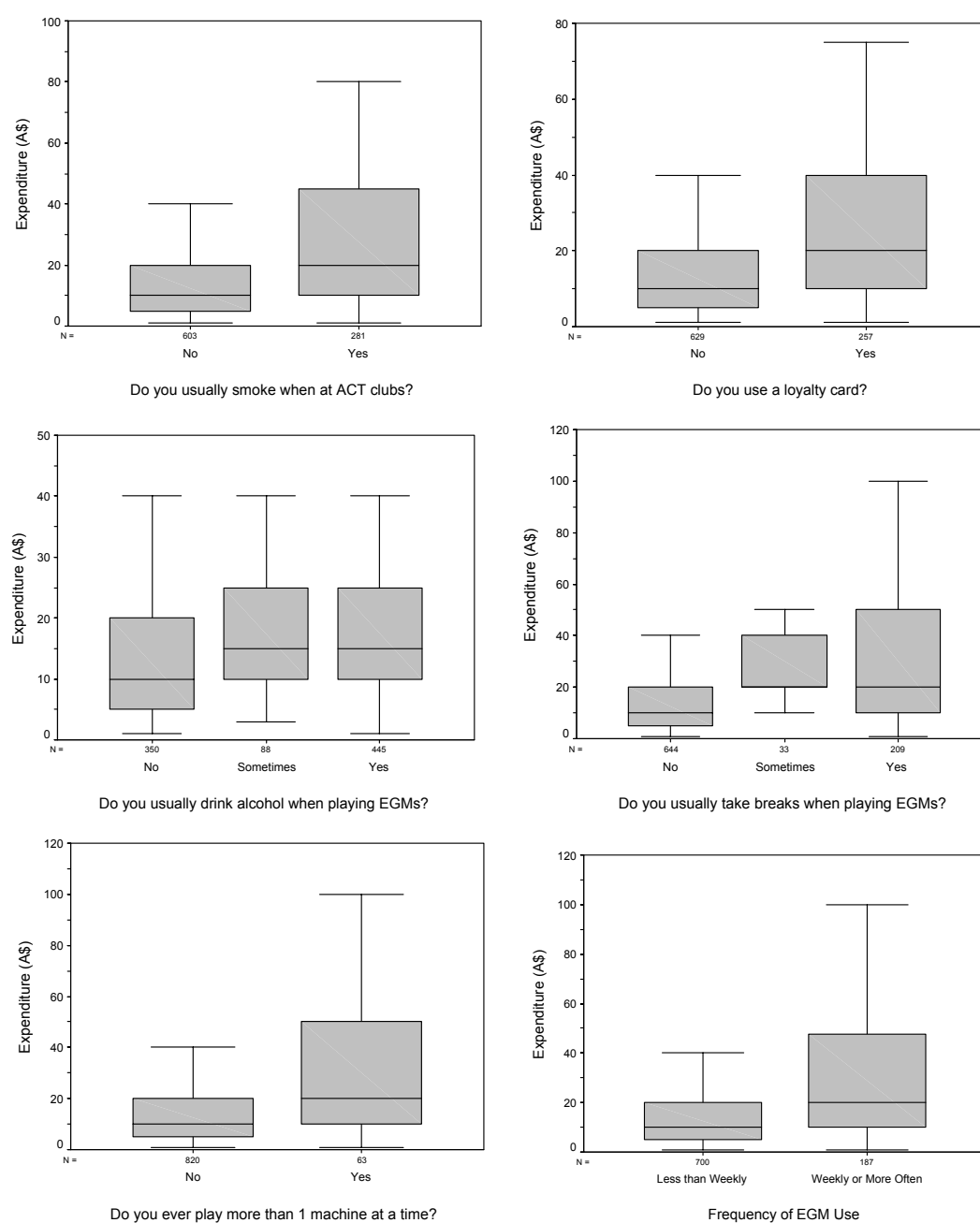
⁹² See for example, Productivity Commission (1999), op. cit., and McMillen, J. *et al.* (2001b) op. cit.

Figure 37: Typical EGM session expenditure by socio-economic and demographic variables.

Note: Due to the wide variation in results between graphs, the scale on the y axis differs on each graph.
 Source: *Tuggeranong Gambling Study* survey. All EGM gamblers (N=859)

Comparison of typical EGM session expenditure by a range of associated variables also reveals interesting relationships (Figure 38).

- Smokers, loyalty card users, weekly EGM gamblers and those who sometimes play more than one machine simultaneously report higher expenditure per gambling session.
- Consumption of alcohol does not appear to be a significant variable.

Figure 38: Typical EGM session expenditure by EGM gambling variables.

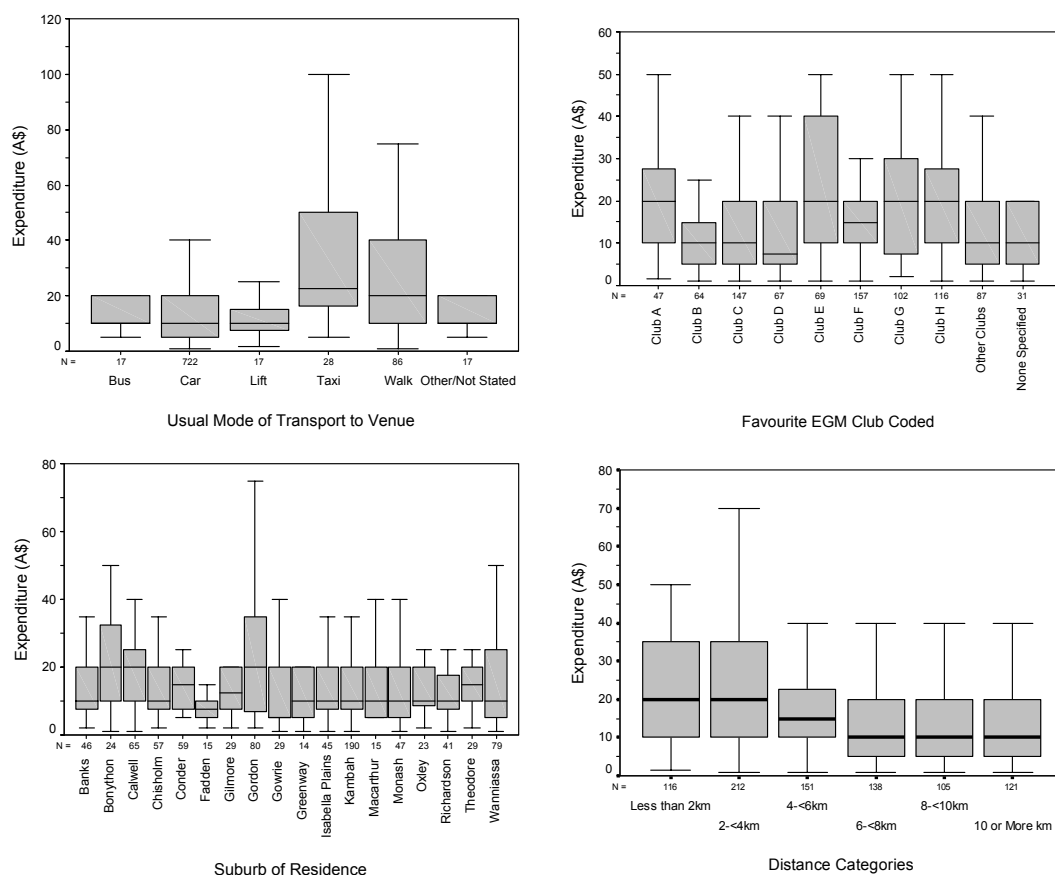
Note: Due to the wide variation in results between graphs, the scale on the y axis differs on each graph.
 Source: *Tuggeranong Gambling Study* survey. All EGM gamblers (N=859)

The majority of EGM gamblers in Tuggeranong drive to their regular club; however, persons who walk or take taxis tend to have higher session expenditure patterns (Figure 39).

- Clubs A, E, G and H stand out as having relatively high session expenditures compared to other clubs. This is of particular interest in the context of the club catchment area analysis later in this section because these four clubs are identified as having have tightly defined local catchment areas in contrast to the other clubs which attract patrons from a wide range of Tuggeranong suburbs.

- Little difference in EGM session expenditure across suburbs is evident from survey responses. Gordon is the only suburb where more than 10% of resident EGM gamblers report spending over \$70 per session.
- The distance influence on session expenditure is similar to that reported in the session duration analysis. Namely, EGM gamblers who live closer than 4km from their club reporting heightened levels of activity.

Figure 39: Typical EGM session expenditure by club, suburb and transport variables.



Note: Due to the wide variation in results between graphs, the scale on the y axis differs on each graph. Source: *Tuggeranong Gambling Study* survey. All EGM gamblers (N=859)

Figure 40 provides a summary of the rules which were found to have the greatest explanatory power for a decision tree analysis based on EGM session expenditure as the explanatory variable. Age, gender, marital status, income and distance to regular club were the predictor variables. The complete output from this decision tree analysis is shown in Appendix 9.

The primary, or first split on the data, are based upon a distance of 5.93 kilometres.

- Tuggeranong residents who travelled less than 5.93 kilometres to reach their regular club reported spending an average of \$28 per EGM gambling session, whereas those who travelled more than this distance to their regular club spent an average of \$15 per session.

- For respondents who travelled less than 5.93 kilometres to their regular club, those who were male reported spending an average of \$38 per EGM session whereas those who were female spent an average of \$21 per session.
- Of males who travelled less than 5.93 kilometres to reach their regular club, those who were divorced, engaged, married or who did not specify their marital status reported spending less per EGM gambling session (\$33) than males who were single, separated, widowers or in de facto relationships (\$46).
- Of the females who travelled less than 5.93 kilometres to reach their regular club, those who were single reported spending less per EGM session (\$17) than those who were in de facto relationships, divorced, engaged, separated, widows, or did not specify their marital status (\$29).

Figure 40: Primary rules for decision tree analysis based on EGM session expenditure



Solid arrows indicate the rule being true; dotted lines indicate the rule being false.
Source: *Tuggeranong Gambling Study* survey. All EGM gamblers (N=859)

5.2.6 Annual EGM Expenditure

The final gambling activity dependent variable to be examined is an *estimate* of annual EGM expenditure. Annual expenditure was not reported by the survey respondents directly but has been calculated by multiplying the reported frequency of EGM gambling by the reported expenditure in a typical EGM session. As before, we caution that self-report data on gambling expenditure often under-estimates the amount actually spent on gambling.

Based on self-report data, the estimated annual EGM expenditure of individual respondents in the Tuggeranong survey ranges from \$1 to \$65,000. The estimated mean figure is \$1,069 per EGM gambler per annum and the median is \$120. The estimated per capita reported expenditure for the entire sample population is \$387.

This compares to the annual per capita expenditure in the ACT during the 2002-03 financial year of \$747.⁹³

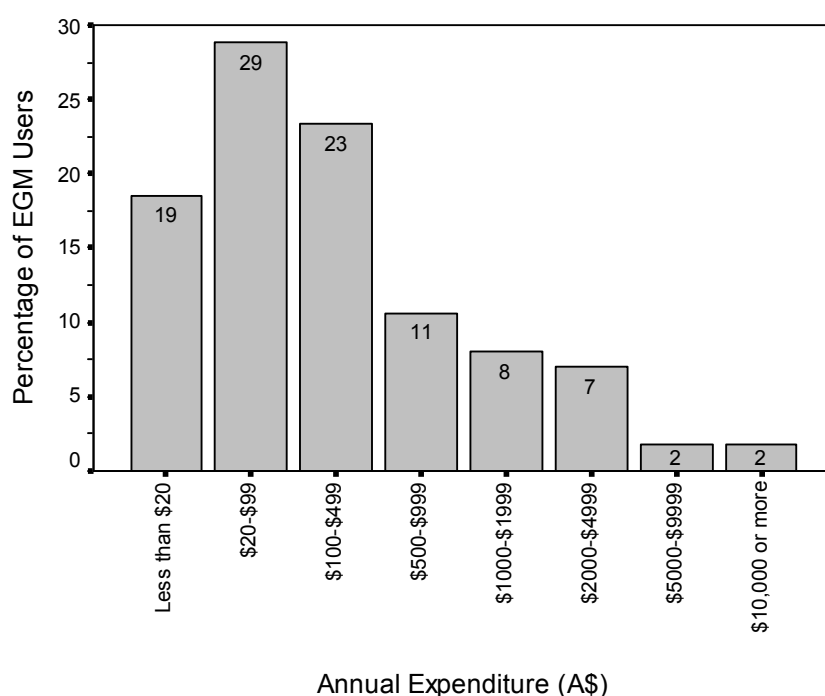
The discrepancy could be due to a number of reasons including:

- under-reporting of gambling expenditure; or
- that Tuggeranong residents spend less per capita on EGMs than occurs in the ACT overall.

Given that the 2001 ACT gambling survey also found a substantial discrepancy between official and reported expenditures (55% under-reported in that study), under-reporting seems the most likely explanation.⁹⁴

Figure 41 presents the frequency distribution for estimated annual expenditure. As is evident, nearly half of all gamblers surveyed (48%) report spending less than \$100 per year or under \$2 per week on EGMs. However, 30% spend an estimated \$500 per annum or more.

Figure 41: Frequency Distribution of Annual EGM Expenditure (N=884)



Source: *Tuggeranong Gambling Study* survey. All EGM gamblers (N=859)

5.2.7 Socio-economic and Demographic Variations in EGM Expenditure

Analysis of the estimated level of expenditure on EGMs by Tuggeranong residents reveals substantial differences across groups (Figure 42).

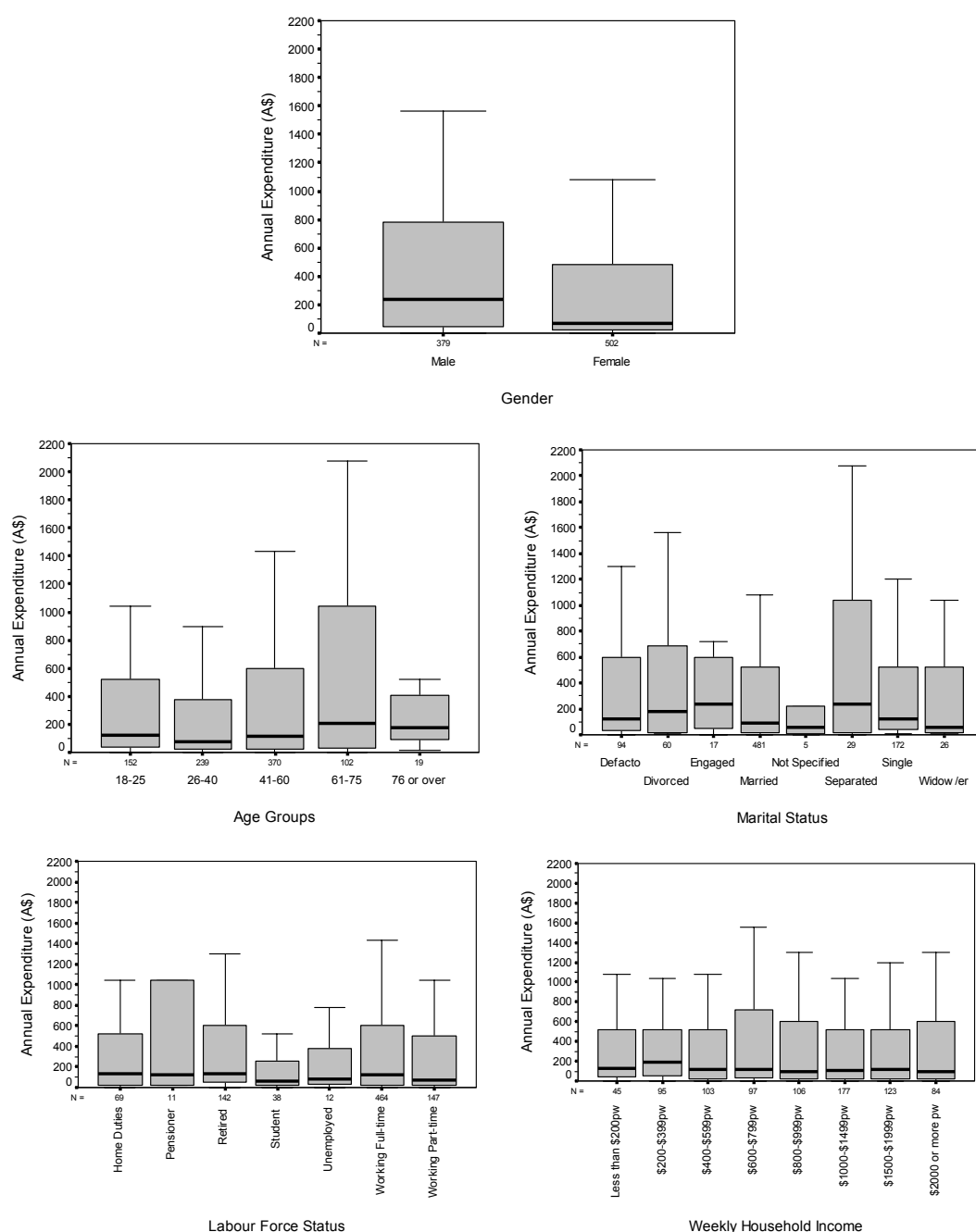
⁹³ ACT Gambling and Racing Commission (2004) Personal correspondence. This figure differs to the corresponding figure published by the Tasmanian Gaming Commission, 2004, Table 68.

⁹⁴ J. McMillen *et al.* 2001b, *op. cit.*

Males report higher general expenditure patterns than do females. Of particular note is the much lower median expenditure for females - under \$50 compared to \$200 for males.

- Few differences are evident in the reported gambling expenditure patterns of EGM gamblers from different income groups. Only the \$200-\$399pw group stand out with a relatively high median figure and the \$600-\$799pw sector have slightly higher 75th and 90th percentiles. Differences are not substantial however, and do not indicate a significant pattern of income related gambling behaviour.

Figure 42: Estimated annual EGM expenditure by demographic and socio-economic groups.

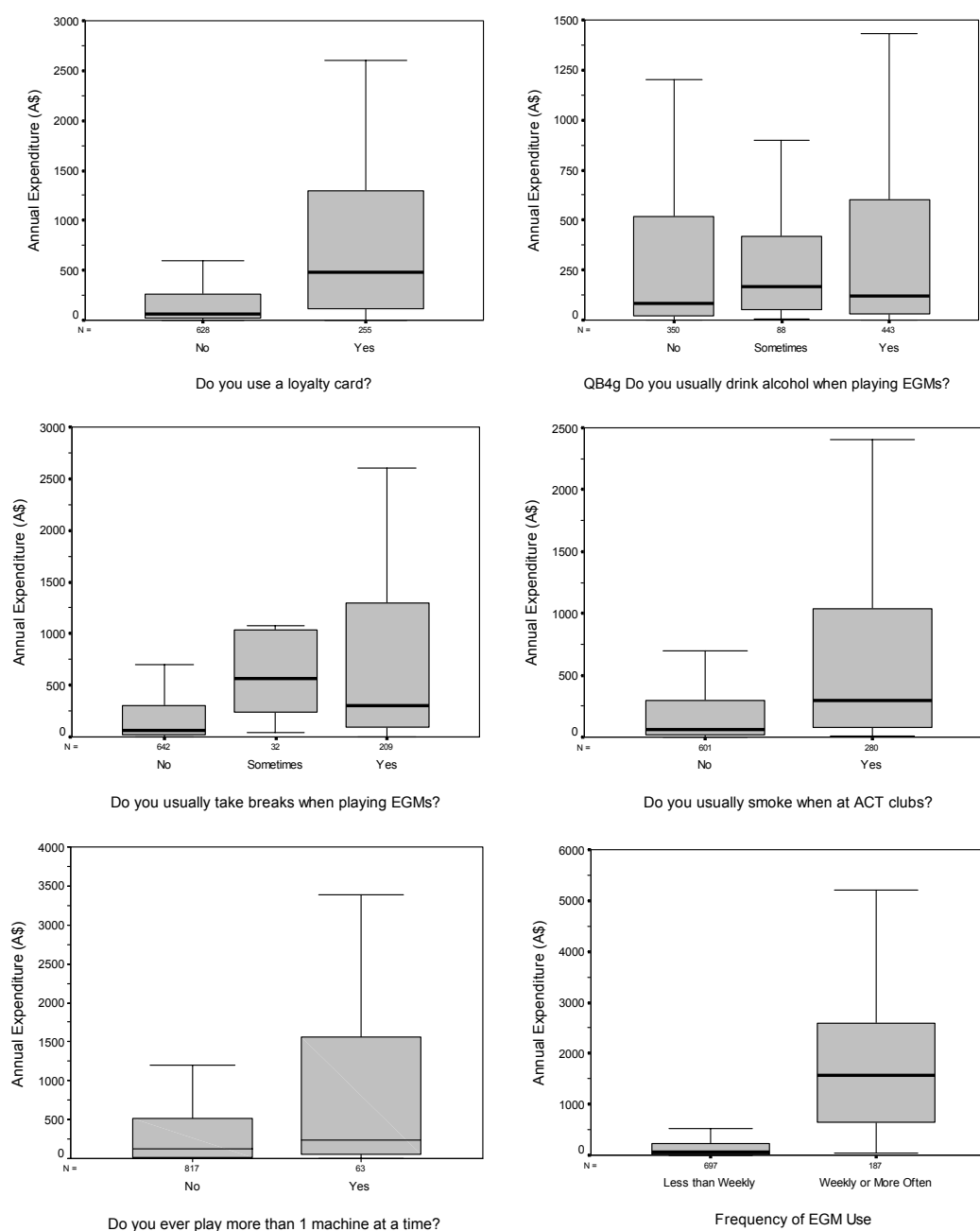


Source: Tuggeranong gambling study survey. All EGM gamblers (N=859)

Analysis of associated activity variables with gambling produced interesting results. Survey data suggest that Tuggeranong smokers gamble substantially more on EGMs per annum than do non-smokers (Figure 43). Several explanations are possible, none of which can be confirmed with the available data. For example, it may be that:

- For some reason smokers among Tuggeranong residents tend to gamble more on EGMs than non-smokers;
- EGM gamblers in Tuggeranong tend to be smokers;
- Non-smokers tend not to go to clubs as often or to stay as long as smokers because they do not enjoy the smoky environment; and/or
- A combination of the above.

Figure 43: Estimated annual EGM expenditure by associated variables.



Note: Due to the wide variation in results between graphs, the scale on the y axis differs on each graph.
Source: Tuggeranong gambling study survey. All EGM gamblers (N=859)

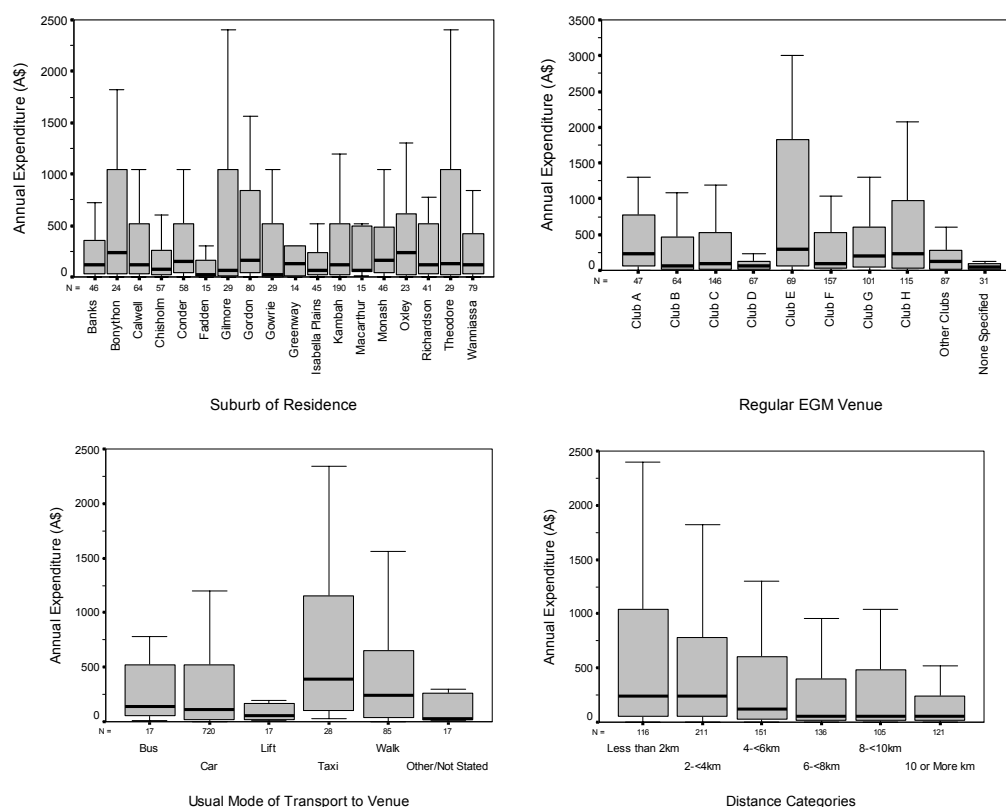
Relationships between estimated EGM expenditure and other associated activities were also examined:

- The survey found little difference in the estimated annual expenditure on EGMs when comparing alcohol drinkers and non-drinkers.
- However different EGM expenditure patterns were reported between those respondents who report that they take breaks while gambling and those who do not. The low figures for those who don't take breaks is likely to simply reflect their shorter session durations.
- Moreover, a higher median figure is recorded for those who sometimes take breaks as opposed to those who stated yes to taking breaks. Over 50% of those who sometimes take breaks spend more than \$500 per year.
- The greatest difference in reported annual expenditure is between weekly and non-weekly gamblers. 10% of weekly EGM gamblers are estimated to spend more than \$5,000 on gaming machines annually while 25% of that group spends over \$2,500 per year.

Figure 44 shows that patrons of Clubs E and H, and people who use taxis to travel to their regular club tend to have the highest estimates of annual EGM expenditure.

- More than 10% of Club E's regular patrons were found to spend in excess of \$3,000 per annum on EGMs.
- The most prominent pattern however is the effect distance to regular club appears to have. Indicated here is that the closer EGM gamblers live to their regular club, the higher their annual expenditure on the machines tends to be.

Figure 44: Estimated annual EGM expenditure by club, suburb and transport variables.



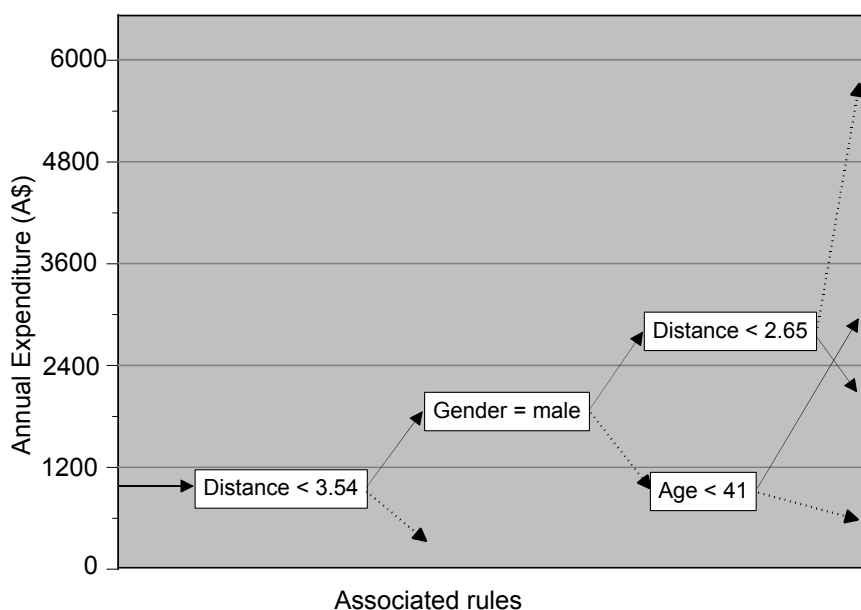
Note: Due to the wide variation in results between graphs, the scale on the y axis differs on each graph.
Source: Tuggeranong gambling study survey. All EGM gamblers (N=859)

Figure 45 provides a summary of the primary rules for a decision tree analysis based on estimated annual EGM expenditure as the explanatory variable and age, gender, marital status, income and residential distance to regular club as the predictor variables. The complete output from this decision tree analysis is shown in Appendix 10.

The primary split on the data is based upon a distance of 3.54 kilometres.

- People who travelled less than 3.54 kilometres to their regular club were found to spend more per annum (\$1,858) than those who travelled greater than this distance to their regular club (\$580).
- For people who travelled less than 3.54 kilometres to their regular club, those who were males spent more per annum (\$2935) than those who were females (\$1065).
- A further rule for males who travelled less than 3.54 kilometres to their regular club is based upon a distance of 2.65 kilometres. This rule shows that males who travelled between 2.65 and 3.45 kilometres spent more per annum (\$5,921) males who travelled less than 2.65 kilometres to their regular club (\$2,135).
- For females who travelled less than 3.54 kilometres to their regular club, women under the age of 41 years were found to spend less per annum (\$672) than those over the age of 41 years (\$3,121)

Figure 45: Primary rules for decision tree analysis based on estimated annual EGM expenditure.



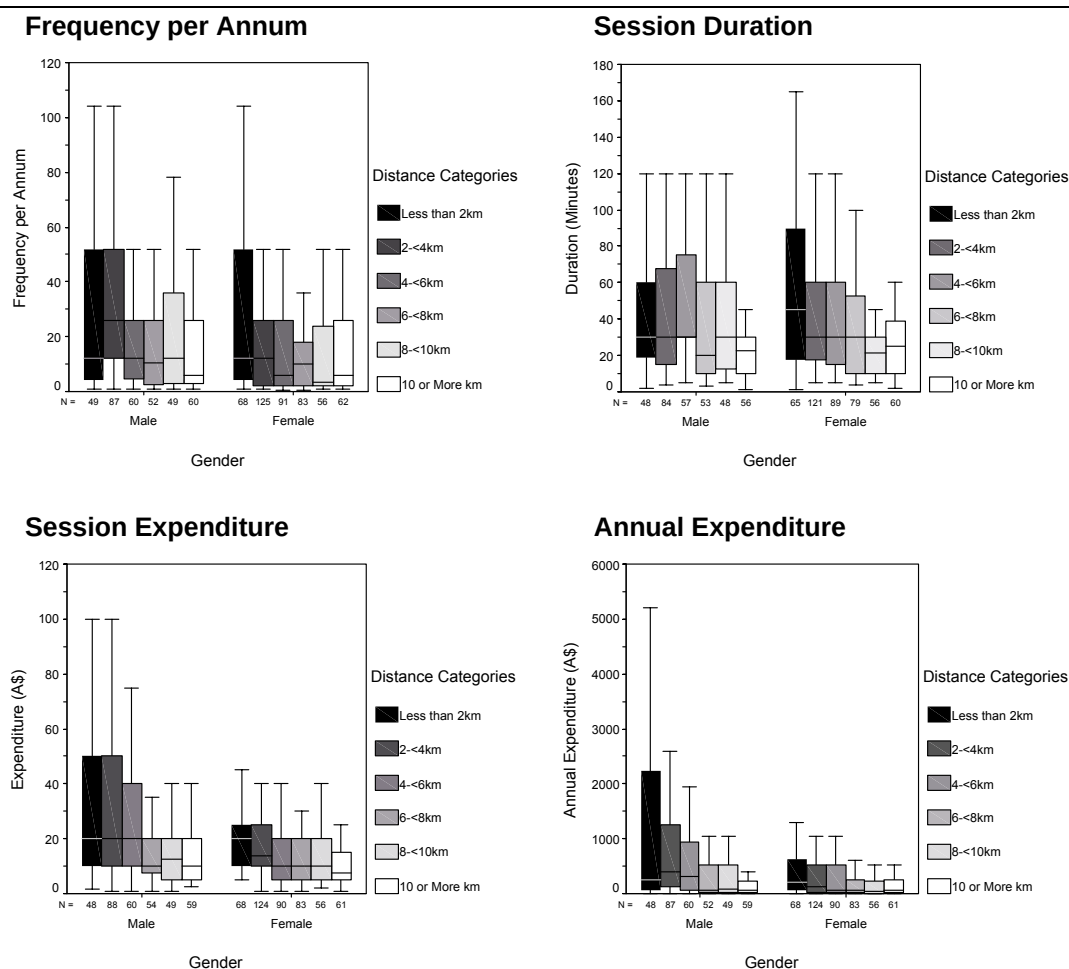
Note: Solid arrows indicate the rule being true; dotted lines indicate the rule being false.

Source: Tuggeranong Gambling Study survey. All EGM gamblers (N=859)

5.2.8 EGM use by Gender and Distance

Distance to regular club and gender have emerged in the above analysis on multiple occasions as key variables of interest. Given this, it is worth now briefly analysing these two key variables simultaneously, for each of the EGM gambling measures (Figure 46).

Figure 46: EGM activity variables split by distance to regular club and gender.



Source: Tuggeranong Gambling Study survey. All EGM gamblers (N=859)

Figure 46 indicates that strong differences exist between the genders in their EGM gambling behaviours and that distance may be a useful explanatory variable. The most prominent patterns are evident for session and annual expenditure, where both men and women tend to have higher expenditure when living closer to their regular club. However, it would appear that the reason for this heightened expenditure varies by gender. Examination of the duration graph reveals little difference in male behaviour across the distance categories. However, females appear to reflect a distance effect. Female EGM gamblers who live close to their regular club tend to stay longer. In terms of frequency, the pattern is less clear, but it seems that the frequency of males may be more influenced by distance than are females. Such findings are particularly interesting and need further analysis; that research might best be conducted qualitatively and with temporal variables incorporated.

5.3 Individual Club Profiles

As evident in the analysis to date, the EGM gambling patterns by Tuggeranong survey respondents appear to vary according to which club gamblers visit most often. Therefore it is now worth looking more closely at the EGM patron profiles and the catchment areas for each club in the region. Whilst over twenty ACT clubs were nominated by EGM gamblers in the survey as regular clubs, eight were nominated by large numbers of respondents.

The following analysis compares the characteristics of Tuggeranong patrons who nominated each of these eight clubs and patterns of usage of specific clubs. Persons who nominated clubs other than the most popular eight have been amalgamated into the category of 'other'. Thirty one EGM gamblers did not nominate a specific regular club and are also compared in this analysis. They are grouped together under the category 'not specified'. In the first instance the catchment areas for each club are presented then the distance profiles and socio-economic and demographic characteristics of regular club patrons. The final section will examine gambling behaviours of each of the club's patrons.

5.3.1 Catchment areas for the major clubs used by EGM gamblers.

EGM gamblers surveyed in Tuggeranong were asked to nominate their most regular EGM club. As a result, eight clubs have been identified from the survey responses as the most popular EGM clubs of Tuggeranong residents. Two clubs are located outside of the Tuggeranong Valley whilst the other six are located in the region. Several other clubs from across Canberra were nominated by survey respondents but the number of nominations for each was deemed too small for meaningful analysis.

As stated in the methodology (Section 3), kernel density functions were used in the Tuggeranong study primarily to explore the spatial reach of club catchment areas and to test assumptions about accessibility that have been made in previous studies. An examination of the survey data revealed a total of 891 people surveyed in the Tuggeranong study reported gambling on EGMs. Of these 891 people, 86.4% of them used eight major clubs as their regular gambling club (Table 16). Kernel density surfaces were created for these eight major clubs.

Table 16: Use of Tuggeranong clubs by resident gamblers.

<i>Club</i>	<i>Number of respondents listing this club as their regular gambling club</i>	<i>Percentage of gamblers</i>
A	47	5.3
B	64	7.2
C	146	16.4
D	68	7.6
E	69	7.7
F	159	17.8
G	101	11.3
H	116	13.0
Total	770	86.4

Source: Tuggeranong Gambling Study survey.

Catchment area maps for the eight major clubs were generated and presented in Figure 47. All maps are based on kernel density surfaces using a quartic function and a bandwidth of 750 metres. Of initial interest is that the maps for the club catchments show a high degree of spatial variation. Some clubs show catchments spanning much of the Tuggeranong region, whilst others show catchments confined to relatively small areas.

Two distinct groups of clubs stand out from this exercise. Perhaps the most interesting group is comprised of three Tuggeranong clubs with very tightly confined catchments. Clubs A, G and E primarily draw their patrons from nearby residents. These three clubs also have catchment areas in the extreme corners of Tuggeranong.

- Club A draws its EGM gambling patrons from the far northern areas, mostly in Kambah;
- Club E's regular gambling patrons come primarily from the eastern suburbs of Gilmore, Chisholm and Richardson;
- while Club G's regular gambling patrons are from the far southern outskirts of Tuggeranong, mostly in Banks, Conder and Gordon.

In stark contrast to these three tight catchment clubs are Clubs B, C, D and F. These clubs have regular patron catchments from across the Tuggeranong region. Indeed it is likely that they also draw patrons from outside of the study area. Despite the relatively widespread catchment areas, spatial concentrations of patrons for these clubs are still evident.

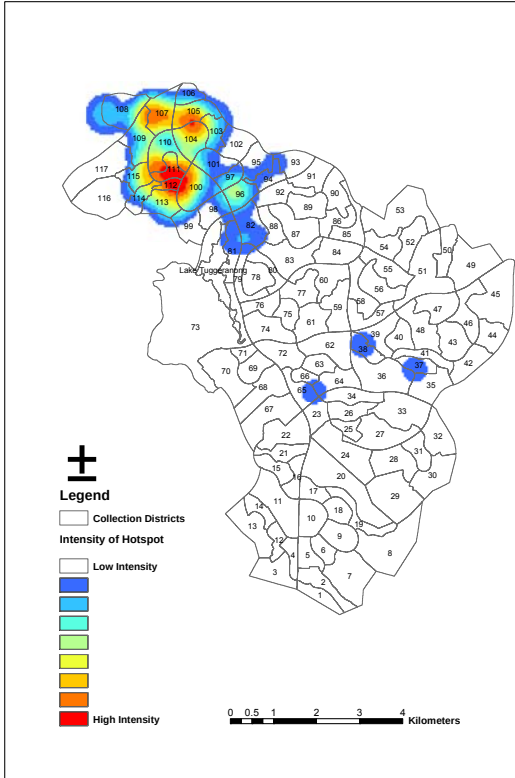
- Clubs B and D have regular patron hotspots in the north of the region. This is not surprising as both clubs are located outside of the Tuggeranong region. Although both cases have some patron hotspots evident in southern Tuggeranong, they are of lower intensity than in the north.
- The other two wide-catchment clubs (C and F) each have different hotspots. Club C's are in the central and northern suburbs while F's are in the central and southern suburbs.

Club H falls between these two groups and draws its regular EGM gamblers primarily from a large region in the centre of Tuggeranong.

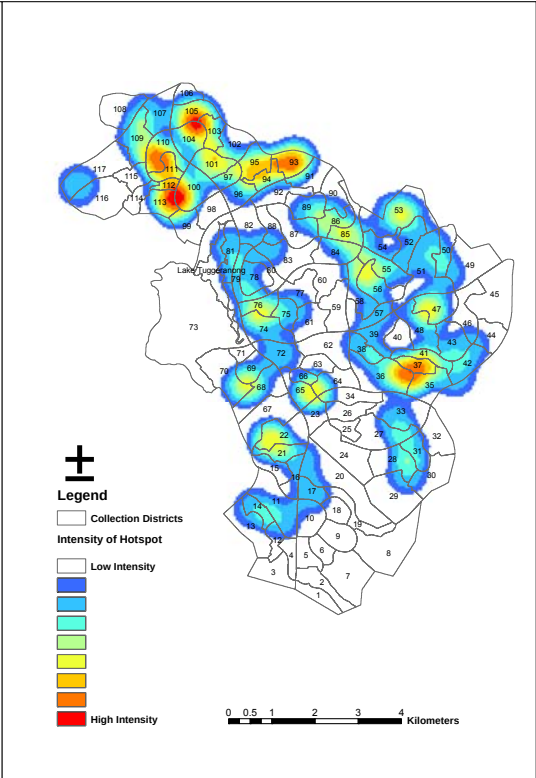
- Three patron hotspots stand out for this club – a major one in western Wanniassa and two less intense pockets in Monash and Calwell.

Figure 47: Catchment area maps for clubs.

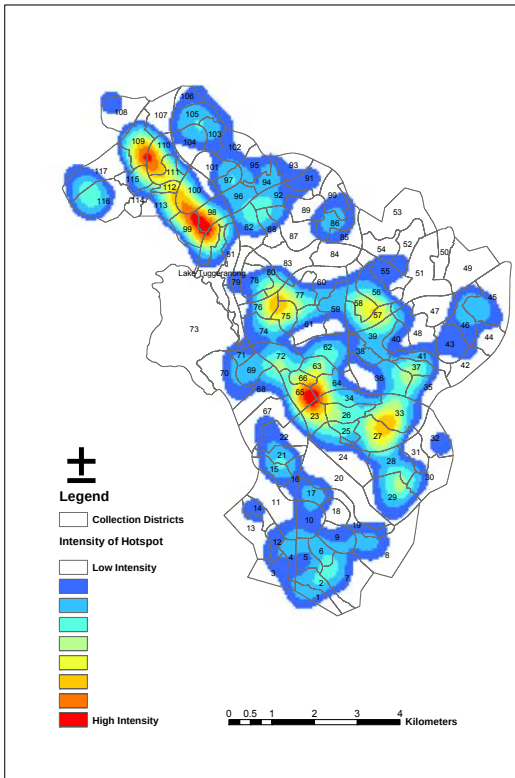
Club A



Club B



Club C



Club D

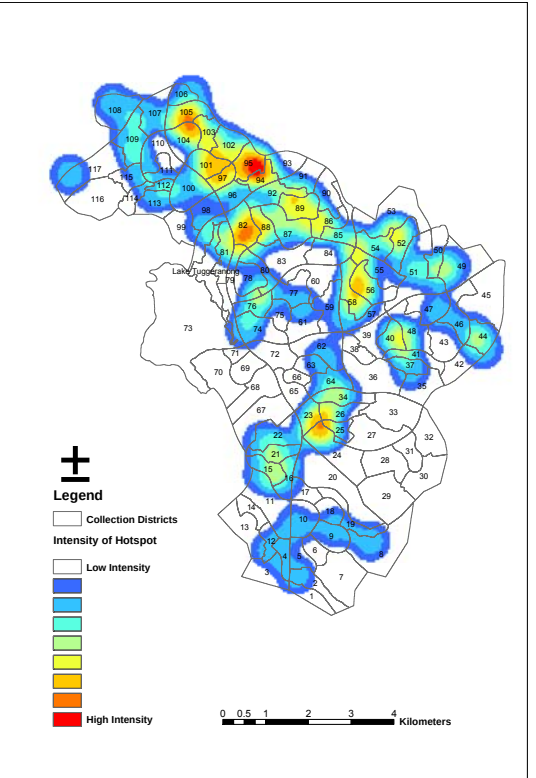
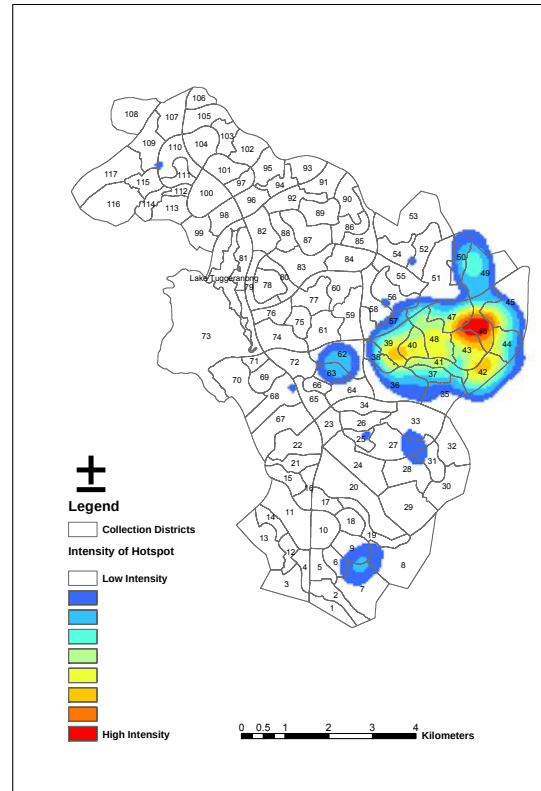
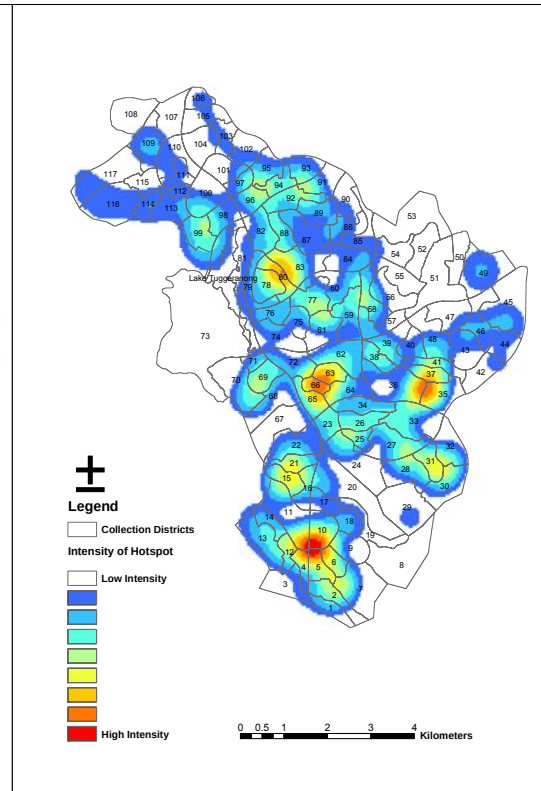


Figure 47 Catchment maps for clubs (cont.)

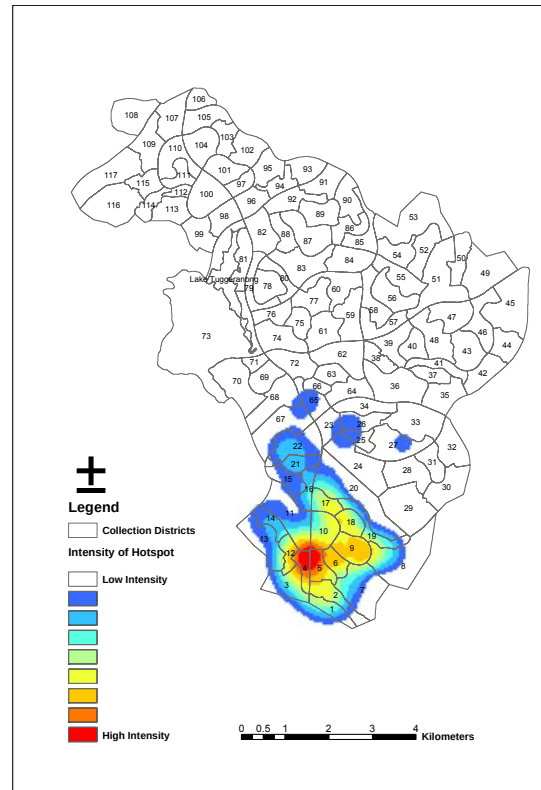
Club E



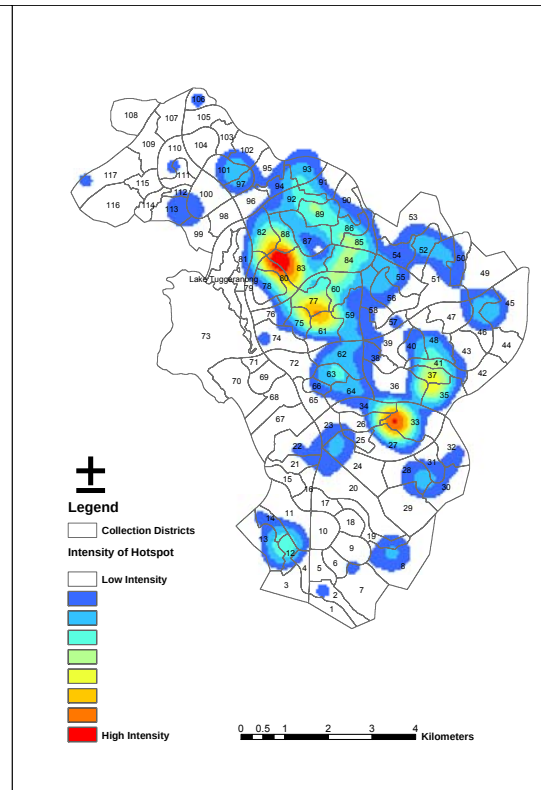
Club F



Club G



Club H



Source: Tuggeranong Gambling Study survey. All EGM gamblers

Analysis also reveals considerable differences in patron travel distance profiles for each of the clubs. Figure 48 shows the large distances that Tuggeranong respondents travel to access each of the clubs. The most striking feature of these comparisons is the wide variation between clubs in their patron travel distance profiles.

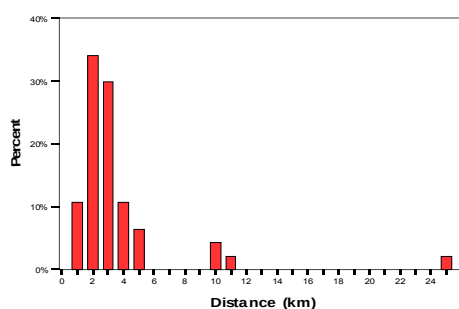
- Clubs B and D have relatively flat profiles, with patrons travelling from a wide range of distances up to 20km away. As these two clubs are located outside of Tuggeranong Valley, this pattern is not surprising.
- There are few Tuggeranong respondents who travelled less than 5km to access these clubs. Those who did have travelled from work rather than their residence.
- Moreover, as discussed below, access and travel to these two clubs is facilitated by major arterial roads and the close proximity of both clubs to a large regional shopping centre.
- Clubs A, E and G have relatively close patron travel distance profiles with few of their respective patrons travelling further than three kilometres to access the clubs. These three club catchment areas fit closely with the 2.5km radius found by KPMG in their Victorian study.⁹⁵
- The other five Tuggeranong clubs however do not conform to the 2.5km range suggested by KPMG. Clubs F, C, and H are all located in Tuggeranong Valley yet a substantial proportion of regular patrons travel between 5km and 10km to access club facilities.

It is possible to compare the core areas that clubs with smaller catchments are drawing their clients from with CD level SEIFA data. These comparisons are given below in Figures 49 to 52. The SEIFA index used for the comparison is the Index of Advantage/Disadvantage. The core areas of the club catchments are determined by examining the kernel density surfaces for the relevant clubs and selecting the middle class (i.e. that represented by light green in Figure 47). A boundary was then drawn around this class and the core area was taken to be those classes with intensity values greater than, or equal to, the middle class (i.e. those grading from light green to red in Figures 47). Figures 49 to 52 generally show that the core areas of the club catchments show a high degree of overlap with the most disadvantaged suburbs in the immediate vicinity of each club. Further, there is relatively little overlap between the core areas that clubs are drawing their clients from and the more advantaged areas in the vicinity of each of the clubs.

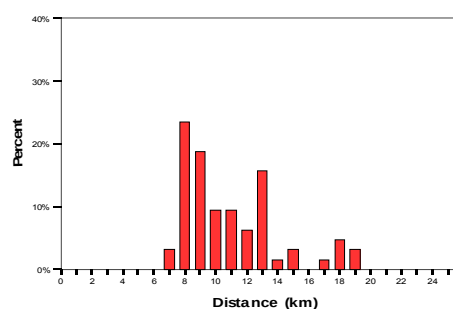
95 KPMG (2000), *op. cit.*

Figure 48: Travel distance profiles for EGM patrons: eight most popular clubs.

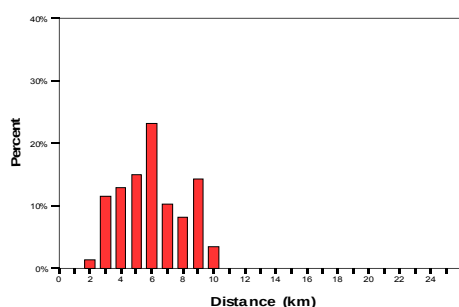
Club A



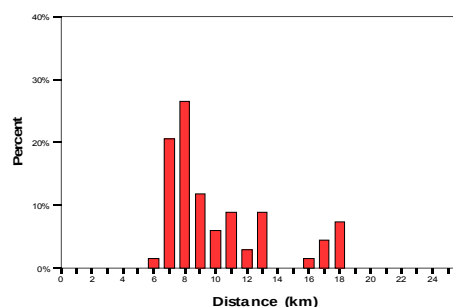
Club B



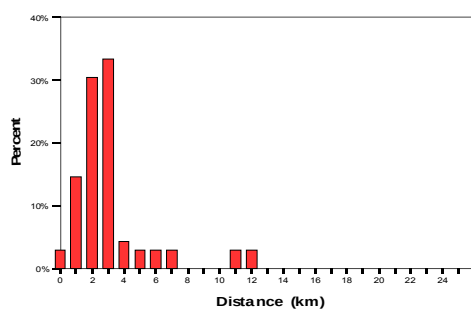
Club C



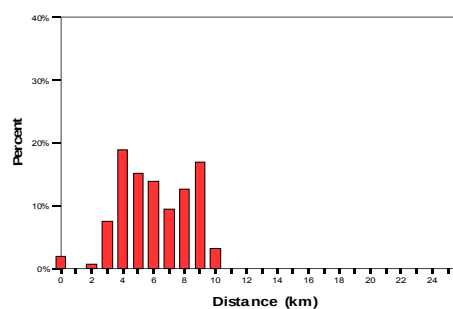
Club D



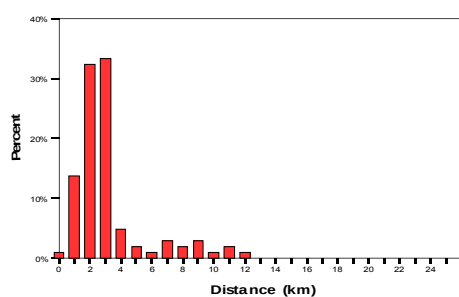
Club E



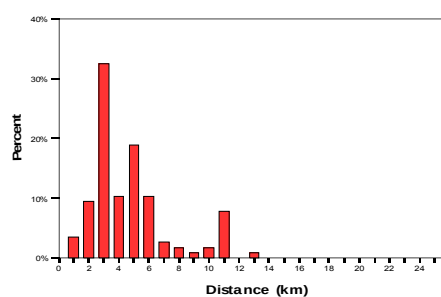
Club F



Club G



Club H



Source: Tuggeranong Gambling Study survey. All EGM gamblers.

Figure 49: Core catchment of Club A overlaid with SEIFA

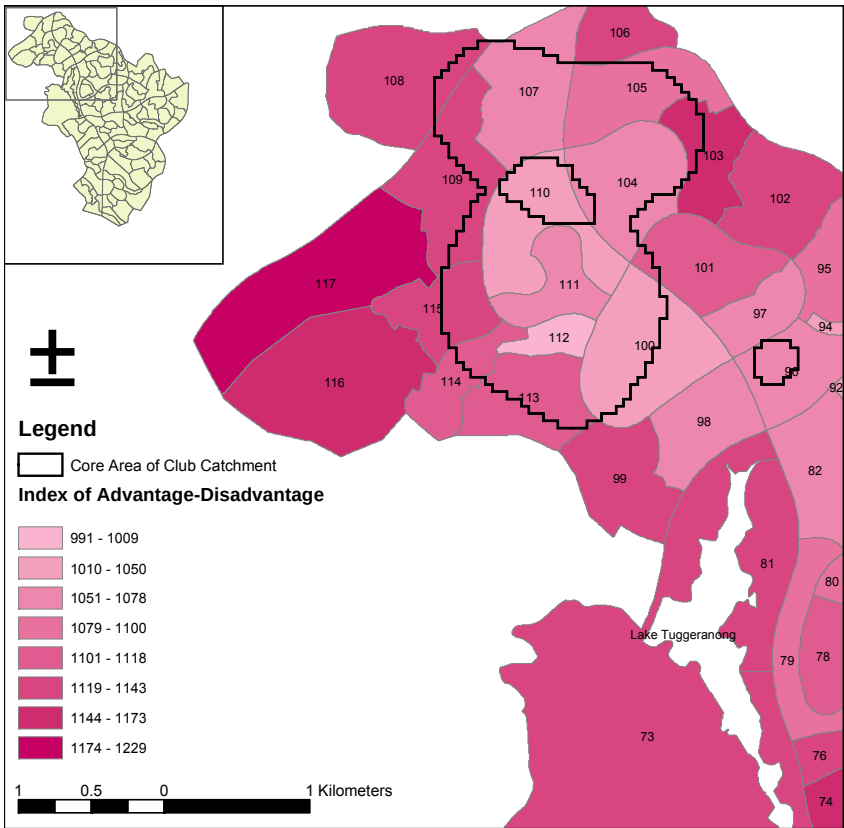


Figure 50: Core catchment of Club E overlaid with SEIFA

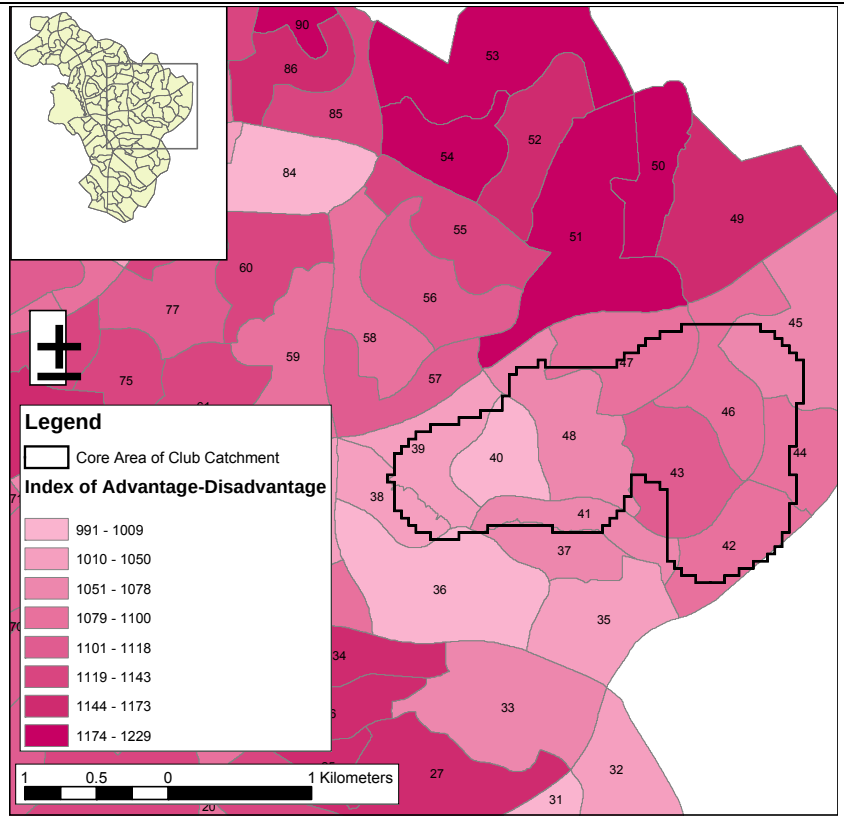


Figure 51: Core catchment of Club G overlaid with SEIFA

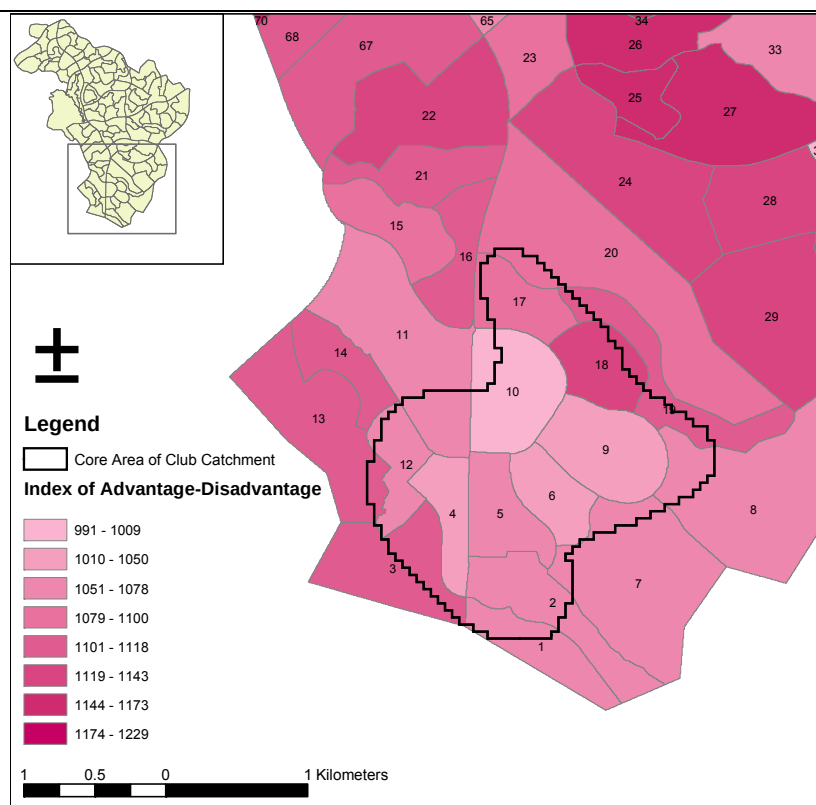
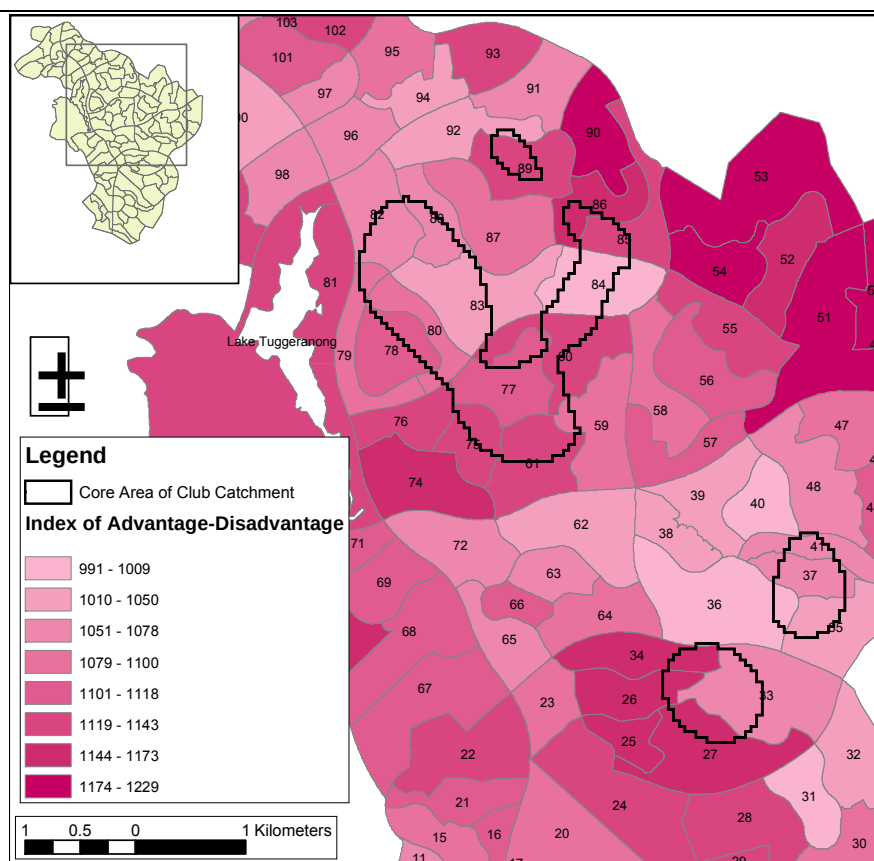


Figure 52: Core catchment of Club H overlaid with SEIFA



5.3.2 Club patron profiles

This section examines the socio-demographic characteristics as reported by survey respondents who play EGMs at each of the eight most popular clubs. Table 17 indicates that for the most part, *gender* profiles of EGM gamblers do not differ greatly between clubs.

- Club A has the largest proportion of female EGM gamblers, substantially more than Clubs F and G. Clubs A and G are both clubs with tight confined catchments.
- Only Club D has a larger proportion of males than females amongst patrons. These figures are likely to reflect the survey procedures which resulted in a female heavy sample. Even so, the fact that five of the eight clubs have proportions of female patrons over and above the representation of females amongst EGM gamblers is noteworthy. Such findings may indicate that clubs are relatively gender neutral in terms of their appeal as places for social and recreational activities.

Table 17: Gender profiles of the EGM gambler patrons of each club.

	<i>n</i>	Males	Females	Total
Club A	47	27.7	72.3	100.0
Club B	63	41.3	58.7	100.0
Club C	146	42.5	57.5	100.0
Club D	68	51.5	48.5	100.0
Club E	69	49.3	50.7	100.0
Club F	159	38.4	61.6	100.0
Club G	102	38.2	61.8	100.0
Club H	117	47.0	53.0	100.0
Other Clubs	87	47.1	52.9	100.0
Not Specified	33	60.6	39.4	100.0
Total	891	43.3	56.7	100.0

Source: Tuggeranong Gambling Study survey. All EGM gamblers.

The overall EGM patron *age* profiles of the eight clubs do reveal some interesting differences.

- Table 18 and Figure 53 show that Clubs A, B, D and H have a relatively large proportion of older customers.
- Club A differs insofar as it has a higher proportion of patrons in the oldest age group (76+) than the 61-75 age group. Moreover, 77% of Club A's patrons are from the 26-60 year age ranges. This might indicate that the population in its tight catchment area has been in a state of social transition.
- Clubs C, E, G and H have relatively large segments of young clientele (18-25 age group).

Such differences in age profiles are likely to be due to a number of reasons, perhaps operating in conjunction with each other and perhaps not. For example, club patronage may simply reflect the age profiles of the local neighbourhoods in which the clubs are located (such as Clubs A, E and G which have tight catchments), or it might reflect the clubs' specific marketing strategies of the

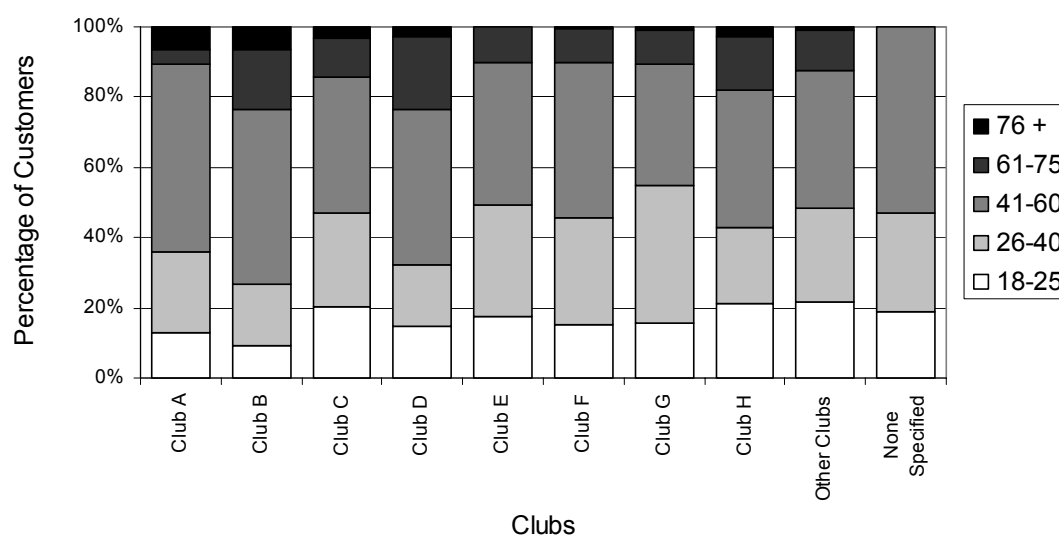
clubs. It is conceivable that a club located in a suburb populated largely by families may seek to broaden potential membership base by marketing to a different demographic in neighbouring areas.

Table 18: Age profiles of EGM patrons of each club

	<i>n</i>	18-25	26-40	41-60	61-75	76 +	Total
Club A	47	12.8	23.4	53.2	4.3	6.4	100
Club B	64	9.4	17.2	50.0	17.2	6.3	100
Club C	147	20.4	26.5	38.8	10.9	3.4	100
Club D	68	14.7	17.6	44.1	20.6	2.9	100
Club E	69	17.4	31.9	40.6	10.1	0.0	100
Club F	158	15.2	30.4	44.3	9.5	0.6	100
Club G	102	15.7	39.2	34.3	9.8	1.0	100
Club H	117	21.4	21.4	39.3	15.4	2.6	100
Other Clubs	87	21.8	26.4	39.1	11.5	1.1	100
Not Specified	32	18.8	28.1	53.1			100
Total	891	17.3	26.9	42.0	11.6	2.2	100

Source: Tuggeranong Gambling Study survey. All EGM gamblers.

Figure 53: Age profiles of individual clubs



Source: Tuggeranong Gambling Study survey. All EGM gamblers.

The marital status profiles of the club patrons reveal few notable differences.

- Clubs B and G attract a high proportion of married EGM gamblers and low numbers of patrons in de facto relationships compared to the other clubs studied (Table 19).
- Clubs C, H and the 'not specified' category all have relatively high proportions of single Tuggeranong residents in their patron base. 36% of respondents who did not specify a regular EGM club are either single or separated.

Table 19: Marital status profiles of the patrons of each club

	<i>n</i>	De facto	Divorced	Engaged	Married	Not Specified	Separated	Single	Widow/er	Total
Club A	47	14.9	6.4	2.1	51.1		4.3	14.9	6.4	100
Club B	64	3.1	10.9	1.6	64.1		1.6	14.1	4.7	100
Club C	147	10.2	4.8	0.7	54.4		4.1	23.1	2.7	100
Club D	68	11.8	8.8	1.5	50.0	1.5		17.6	8.8	100
Club E	69	11.6	4.3	4.3	53.6		4.3	20.3	1.4	100
Club F	159	10.1	6.9	1.9	56.6	1.3	3.8	18.2	1.3	100
Club G	102	11.8	8.8	1.0	62.7	1.0	1.0	11.8	2.0	100
Club H	117	8.5	5.1	3.4	52.1		1.7	26.5	2.6	100
Other Clubs	88	14.8	11.4	2.3	42.0	1.1	6.8	19.3	2.3	100
Not specified*	33	12.1			48.5	3.0	6.1	30.3		100
Total	894	10.6	6.9	1.9	54.1	0.7	3.2	19.6	2.9	100

* Clubs in this group were not specified by respondents.

Source: Tuggeranong Gambling Study survey. All EGM gamblers.

In Table 20 the income profiles for the clubs' patrons reveal a number of variations:

- A high proportion of relatively wealthy respondents regularly visit Clubs D and G, both of which have more than 30% of their customers living in households earning over \$1500 per week.
- At the other end of the spectrum are Clubs C, B and H where more than 20% of Tuggeranong respondents who nominate them as regular clubs live in households with incomes below \$400 per week.

This study was unable to investigate whether these variations have any effect on the EGM expenditure or revenue in the clubs.

Table 20: Income profiles of the patrons of each club

	<i>n</i>	Less than \$200pw	\$200-\$399pw	\$400-\$599pw	\$600-\$799pw	\$800-\$999pw	\$1000-\$1499pw	\$1500-\$1999pw	\$2000 or more pw	Total
Club A	43	4.7	4.7	14.0	11.6	9.3	34.9	11.6	9.3	100
Club B	60	6.7	15.0	6.7	11.7	6.7	31.7	16.7	5.0	100
Club C	140	8.6	13.6	12.1	11.4	10.7	18.6	15.7	9.3	100
Club D	63	3.2	11.1	15.9	11.1	11.1	17.5	15.9	14.3	100
Club E	67	6.0	11.9	11.9	10.4	13.4	22.4	14.9	9.0	100
Club F	147	3.4	10.9	11.6	12.2	17.0	20.4	12.9	11.6	100
Club G	97	2.1	9.3	10.3	9.3	13.4	21.6	20.6	13.4	100
Club H	108	8.3	15.7	16.7	10.2	14.8	17.6	8.3	8.3	100
Other	82	4.9	12.2	12.2	15.9	9.8	20.7	18.3	6.1	100
Not spec.	31	3.2		12.9	16.1	16.1	22.6	9.7	19.4	100
Total	838	5.4	11.6	12.4	11.7	12.6	21.5	14.7	10.1	100

* Clubs in this group were not specified by respondents.

Source: Tuggeranong Gambling Study survey. All EGM gamblers.

The last of the socio-demographic variables examined is the Tuggeranong patron labour force status of the eight preferred clubs (Table 21).

- No major issues stand out, although a high proportion of people who did not nominate a regular EGM club are employed either part-time or full-time, substantially higher than any of the nominated clubs.
- Club D has the greatest proportion of retirees/pensioners whilst Club B has the largest proportion of home duties patrons residing in Tuggeranong.

Table 21: Labour force profiles of the patrons of each club.

	<i>n</i>	Home Duties	Pensioner	Retired	Student	Unemployed	Working Full-Time	Working Part-Time	Total
Club A	47	10.6		17.0	6.4		44.7	21.3	100
Club B	64	12.5		18.8	3.1	3.1	50.0	12.5	100
Club C	147	4.8	.7	17.7	4.1	.7	51.0	21.1	100
Club D	68	8.8	1.5	23.5	5.9		44.1	16.2	100
Club E	69	8.7	1.4	13.0	1.4	1.4	55.1	18.8	100
Club F	159	8.2	1.3	14.5	3.1	2.5	57.9	12.6	100
Club G	102	4.9	1.0	12.7	2.0	2.0	60.8	16.7	100
Club H	117	9.4	.9	17.9	5.1	2.6	48.7	15.4	100
Other Clubs	88	9.2	3.4	18.4	8.0		49.4	11.5	100
Not specified*	33		3.2	3.2	6.5		58.1	29.0	100
Total	894	7.7	1.2	16.3	4.3	1.5	52.5	16.5	100

* Clubs in this group were not specified by respondents.

Source: Tuggeranong Gambling Study survey. All EGM gamblers.

In summary, analysis of the socio-economic and demographic characteristics of regular club patrons from Tuggeranong reveals substantial differences. Specific clubs tend to have distinctive EGM patron profiles.

- Club H attracts a young, relatively less wealthy and single patron profile of Tuggeranong patrons.
- At the other end of the scale, Club D has an older and wealthier Tuggeranong customer base.
- Club G appears to have a wealthier and young EGM gambler profile; and
- Club B has an older but relatively low income profile.

While speculation might suggest why such variations exist, further research into the marketing practices, services and facilities of individual clubs is needed to draw stronger conclusions. What becomes of interest then is to analyse the gambling activity of the club patrons in the next section of the analysis.

5.3.3 Use of EGMs and club facilities

Having identified different Tuggeranong patron profiles at the most popular clubs, this study then considered EGM gambling behaviour and other issues of interest. These include the use of non-EGM facilities, loyalty cards and modes of transport to

the clubs. EGM participation and reported expenditure have been examined earlier in this report; however that discussion relates to overall EGM use by Tuggeranong residents who were surveyed. The results presented here relate only to reported activity at the nominated 'regular' club.

Only reported frequency and estimated annual expenditure have been analysed. Patrons were not asked about duration of EGM gambling sessions and session expenditure for individual clubs. However, some cross-tabulated analysis of frequency and reported annual expenditure has been done for individual clubs.

In the first instance, Table 22 presents variables of interest to the study: use of loyalty cards, smoking and drinking alcohol while gambling on EGMs and using more than one EGM simultaneously. The percentage of surveyed Tuggeranong residents who report doing each of the four activities are identified for each club; and the top four clubs have been identified for each category.

- Club E has the highest proportion of loyalty card users, the largest percentage of smokers, the second highest rate of alcohol drinkers and is fourth on the list for persons who play more than one machine simultaneously.
- Club C is the only club which does not figure highly on any of the specific measures.
- Clubs with high proportions of Tuggeranong patrons who drink while gambling and who use loyalty cards (Clubs A, E and G) have tightly defined local catchment areas. Gamblers who wish to drink whilst playing EGMs are less likely to travel far from home for convenience and safety reasons, particularly if driving to clubs.
- Tuggeranong patrons with the lowest reported alcohol consumption rates visit Clubs B and D which are located outside of the Tuggeranong region. However, Club B also has a high proportion of loyalty card users.
- Club D has the highest percentage of EGM patrons from Tuggeranong who say they sometimes play more than one machine simultaneously.
- Smoking has the widest range of participation rates with more than twice as many Club E patrons smoking than occurs at Clubs B and D.

Table 22: Club EGM patrons, associated activities.

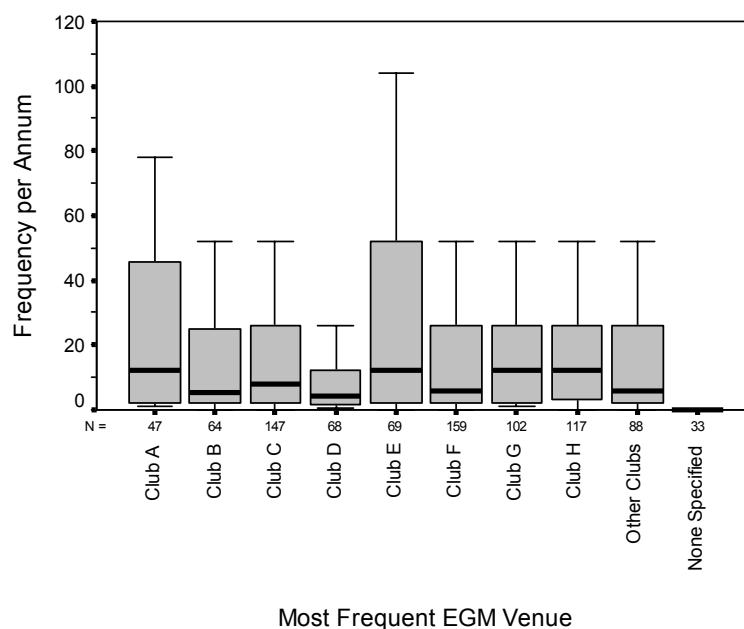
	<i>N</i>	% Use Loyalty Cards	% Smoke while at the Club	% Drink Alcohol when playing EGMs	% Simultaneously use more than 1 EGM
Club A	47	38.3	44.7	63.8	4.3
Club B	64	39.1	22.2	39.7	9.4
Club C	147	24.5	26.5	61.9	5.4
Club D	68	23.5	17.6	51.4	14.9
Club E	69	40.6	47.8	67.7	9.0
Club F	159	25.8	31.6	58.5	10.1
Club G	102	34.3	39.2	70.3	2.9
Club H	117	32.5	40.5	63.3	6.0
Other Clubs	87	19.5	20.5	57.5	3.4
Not specified*	33	18.2	30.3	63.7	6.3
Total	893	29.1	31.9	60.2	7.1

* Clubs in this group were not specified by respondents.

Source: Tuggeranong Gambling Study survey. All EGM gamblers (N=894)

Figure 54 indicates that clubs A and E tend to have more regular visitations by EGM gamblers who live in Tuggeranong. These are both clubs with tight catchment areas and high loyalty card use, drinking and smoking rates. However, the profiles of their Tuggeranong patrons are quite different.

Figure 54: Frequency of patron club visits per annum

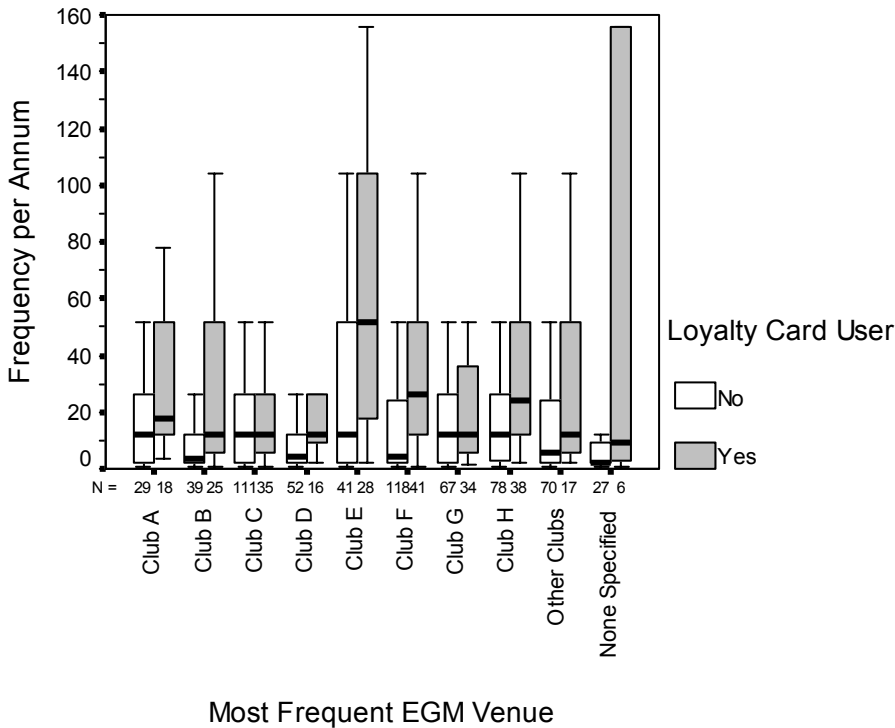


Source: Tuggeranong Gambling Study survey. All EGM gamblers (N=894)

In looking at the loyalty card issue and EGM gambling frequency (Figure 55) Tuggeranong patrons at Club E who use loyalty cards have higher EGM participation rates than other clubs. Even non-loyalty card users at Club E have generally higher frequency patterns than the non-card holders of other clubs. Only patrons at Club C reveal patterns of EGM gambling frequency that are virtually indistinguishable between loyalty card holders and non-card holders.

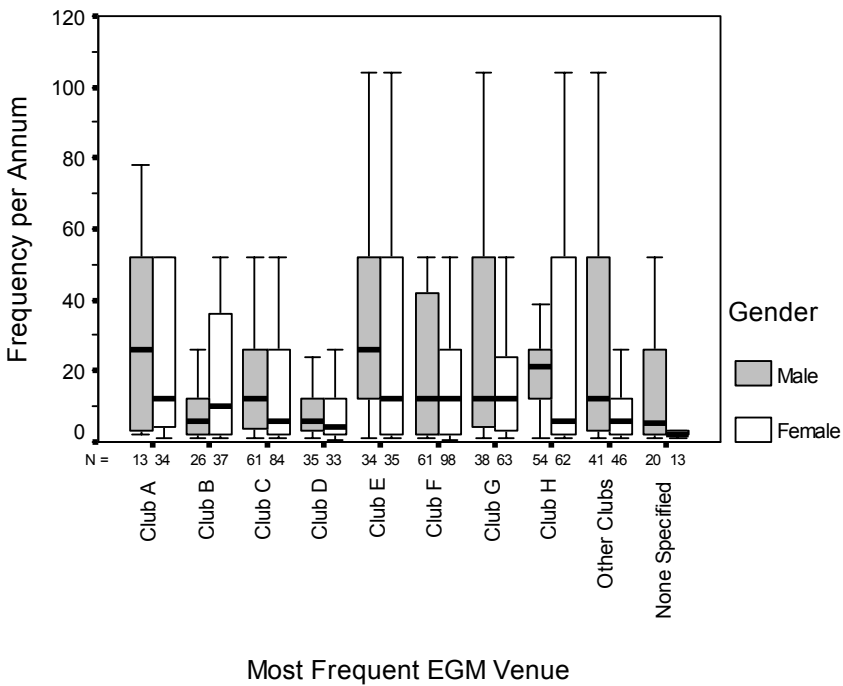
As gender is the only socio-demographic variable without multiple categories, it is the only one which can be used to analyse within club gambling behaviour without rendering many of the sample sizes too small. In terms of frequency of club visit, the results are displayed in Figure 56. Again Club E stands out as the only club at which males and females both exhibit high levels of visitation frequency. Only at Club B do females rate more highly than males.

Figure 55: Frequency of visit per annum to most frequent EGM club, by club and loyalty card.



Source: Tuggeranong Gambling Study survey. All EGM gamblers (N=894)

Figure 56: Frequency of regular club visits per annum, by club and gender.

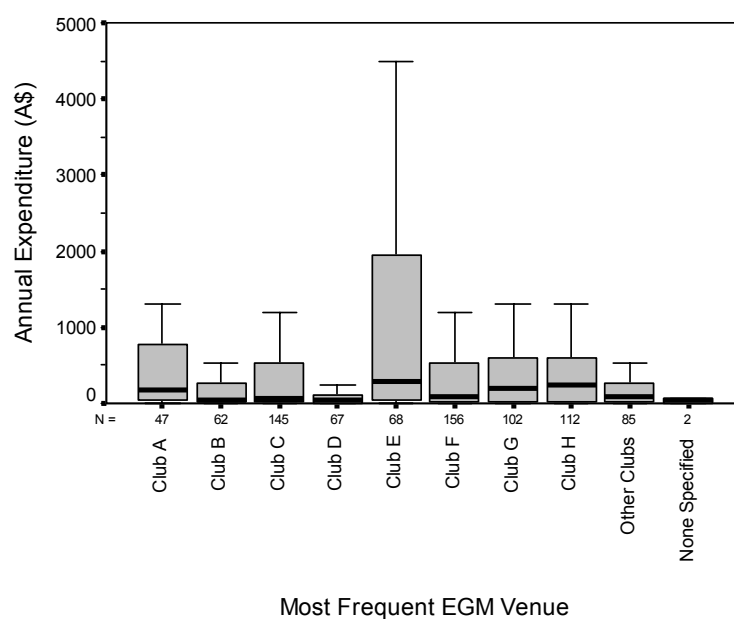


Source: Tuggeranong Gambling Study survey. All EGM gamblers (N=894)

Differences also exist in patrons' reported annual expenditure on EGMs at the various clubs (Figure 57).

- Most striking is that 25% of Tuggeranong residents who nominate Club E as their regular club report spending in excess of \$2,000 per annum on EGM gambling. 10% of Club E's patron sample is estimated to spend in excess of \$4,000 per annum.
- No patrons at the other identified clubs report expenditure figures as high as those identified by these two Club E patron groups.

Figure 57: Estimated annual EGM expenditure at regular club



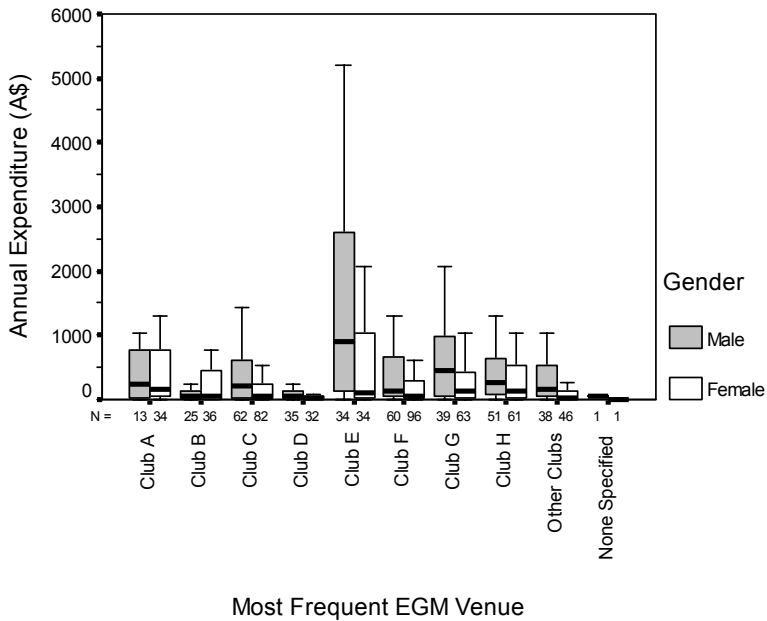
Source: Tuggeranong Gambling Study survey. All EGM gamblers (N=894)

- When splitting the estimated patron annual EGM expenditure by gender, Figure 58 indicates that male patrons of the clubs under study tend to have higher levels of reported expenditure than female patrons.
- The exception is Club B where female patrons tend to have higher levels of reported EGM expenditure.
- 50% of male gamblers who prefer Club E are estimated to spend in excess of \$900 per year at that club; 25% spend over \$2,500 and 10% spend in excess of \$5,000. These figures are well in excess of any other club in the study, the closest being Club G where the estimated median male expenditure is under \$500.

Club patrons with loyalty cards appear to spend substantially more on EGM gambling than non-holders (Figure 59). Whilst there is no evidence of a causal relationship here, a two-way process may be occurring. Persons who gamble more money on gaming machines may be more inclined to use a loyalty card, which in turn might encourage higher gambling expenditure.

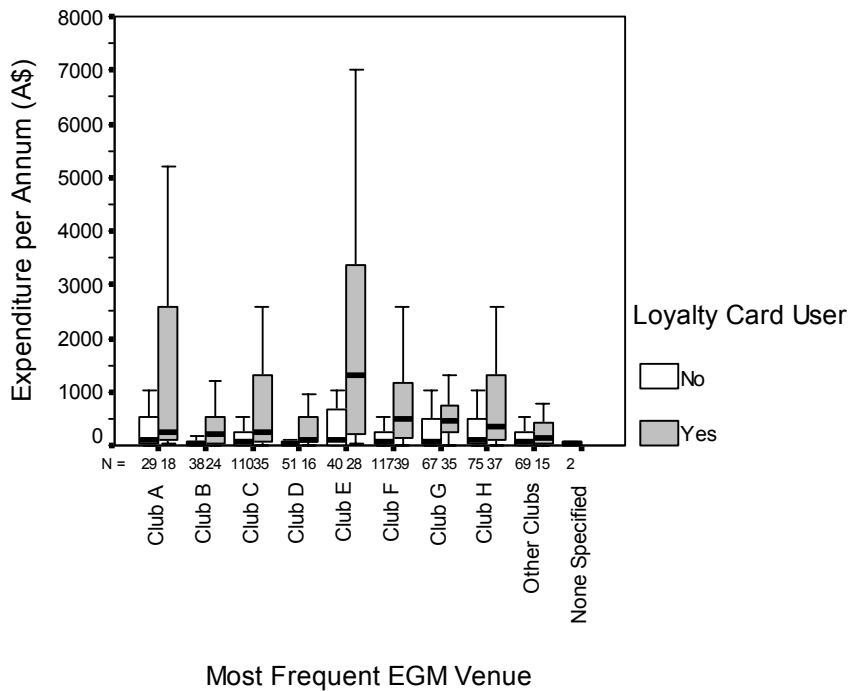
- As for individual clubs, once again Club E stands out as having high rates of loyalty card use, followed by Clubs A, C, F and H.

Figure 58: Estimated annual EGM expenditure at most frequently visited club by gender.



Source: Tuggeranong Gambling Study survey. All EGM gamblers (N=894)

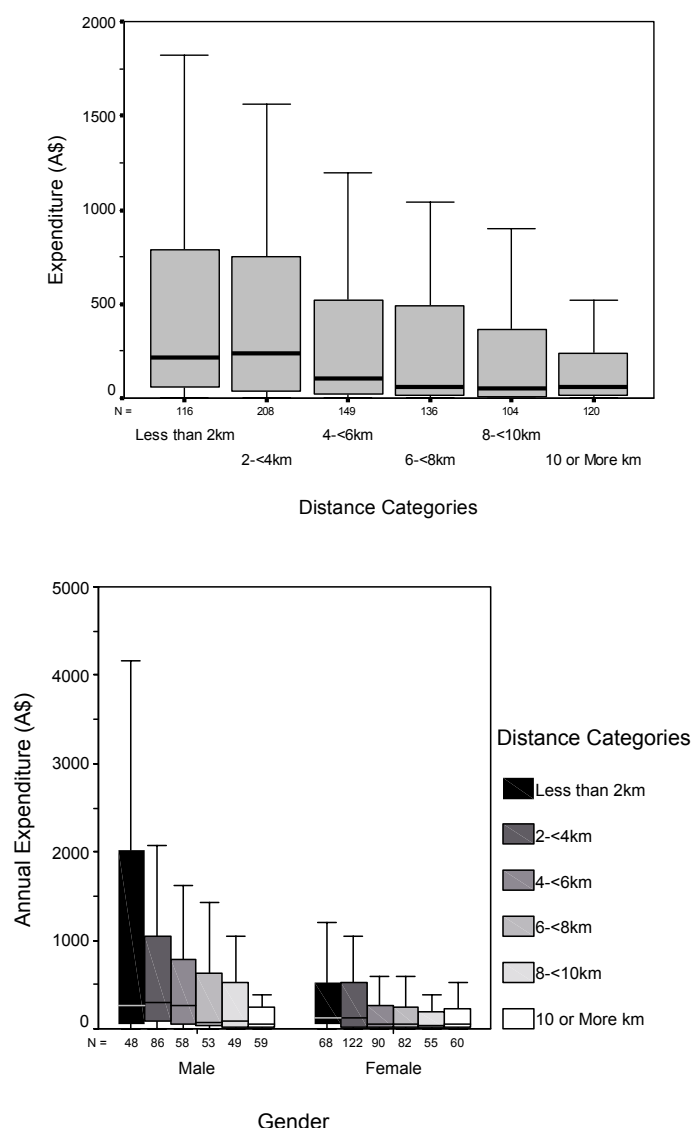
Figure 59: Box-and-whisker plots of annual EGM expenditure at regular club, by club and loyalty card use.



Source: Tuggeranong Gambling Study survey. All EGM gamblers (N=894)

In terms of distance from regular EGM club and reported annual EGM expenditure, a distance effect is evident in Figure 60. EGM gamblers living closer to their regular club report spending more on gaming machines per year than do gamblers living further away. This effect is detected by the 90th percentile, the 75th percentile and the median measures. When this analysis is dissected by gender, it is apparent that annual expenditure by both males and females is subject to a distance effect. While males have significantly higher spending patterns than females, the pattern remains approximately consistent between the two.

Figure 60: Estimated annual expenditure at favourite club by distance from it.



Source: Tuggeranong Gambling Study survey. All EGM gamblers (n=894)

The last factor examined before moving on to examine the attitudes of Tuggeranong survey respondents is the usual mode of patron transport to regular clubs (Table 23).

- Cars are the main form of patron transport to all of the clubs under study.

- However a substantial proportion of Clubs A, E and G patrons usually walk. Notably these clubs were identified with particularly tight local catchments when examined with the kernel density GIS tool.
- Furthermore, as shown previously, walkers and taxi users tend to report larger expenditures per EGM gambling session. Taxi patrons also have higher frequency of EGM participation.

Table 23: Cross tabulation of regular club and mode of transport.

	Bus	Car	Lift	Taxi	Walk	Other/Not Stated	Total
Club A (n=47)		61.7	4.3	2.1	29.8	2.1	100.0
Club B (n=64)	4.7	85.9			7.8	1.6	100.0
Club C (n=147)	2.0	83.7	3.4	6.8	4.1		100.0
Club D (n=68)	2.9	89.7	2.9	1.5	2.9		100.0
Club E (n=69)		71.0		5.8	23.2		100.0
Club F (n=159)	3.1	87.4	1.3	2.5	5.0	.6	100.0
Club G (n=102)		77.5	2.0	2.0	18.6		100.0
Club H (n=117)	.9	81.2	2.6	4.3	11.1		100.0
Other clubs (n=88)	4.5	88.6	1.1	1.1	4.5		100.0
None specified (n=33)		51.5				48.5	100.0
Total (n=894)	2.0	81.1	1.9	3.1	9.7	2.1	100.0

Source: Tuggeranong Gambling Study survey. All EGM gamblers (N=894)

5.4 Attitudes towards gambling in Tuggeranong

This final section of the Tuggeranong household survey outlines the responses to attitudinal questions posed in the questionnaire. In the first instance results are presented in aggregate terms then segregated by EGM gamblers and non gamblers. The findings are then compared geographically with the GIS kernel density tool previously used.

5.4.1 Aggregate results

Tuggeranong residents have strongest opinions on the proposition that there should be more EGMs in the ACT (Table 24).

- Over 89% of the sample disagreed with this statement (D2), with 35.5% strongly disagreeing. That is, the large majority of surveyed Tuggeranong residents believe that there should not be more EGMs in the ACT.
- Suggestions that EGMs should be removed from local shopping areas also drew a strong response, with some 57% agreeing with this statement.
- 60% disagreed with the proposition that smoking be allowed in gambling clubs.
- Only 8.1% of the total Tuggeranong sample did not hold the view that gambling is a serious social problem in Tuggeranong. Opinions of remaining residents were divided between those who agreed (45.6%) and those how did not have an opinion either way (46.3%).
- Responses to other statements were more evenly divided, with opinion tending towards the middle ground.

Table 24: Attitudes towards policy issues: Tuggeranong residents (%)

	Strongly Disagree	Disagree	Don't Know/ Neither	Agree	Strongly Agree
D1. EGMs should be removed from local shopping areas	2.7	23.9	16.4	31.9	25.1
D2. There should be more EGMs in the ACT	35.5	53.8	9.8	.7	.3
D3. Gambling has improved social life in Tuggeranong	21.3	43.7	25.9	8.4	.7
D4. People gamble in Tuggeranong because there is nothing else to do.	5.0	39.0	27.3	25.9	2.8
D5. Smoking should be permitted in gambling clubs.	23.5	37.9	12.9	20.5	5.2
D6. Gambling is a serious social problem in Tuggeranong	.6	7.5	46.3	30.7	14.9

Source: Tuggeranong Gambling Study survey. All respondents N=2,447

5.4.2 Comparisons of key groups.

Comparison of the attitudinal responses of EGM gamblers and residents who do not gamble on EGMs revealed significant differences on only one issue (Table 25).

- 63% of non-EGM gamblers agree that gaming machines should be removed from local shopping areas (D1). In contrast only 45.1% of EGM gamblers agree with this statement; 34.9% of EGM gamblers disagree with it.
- On the remaining statements, the pattern of agreement/disagreement is broadly similar for EGM gamblers and non-gamblers.

The Tuggeranong survey also examined residents' attitudes to smoking in gaming clubs in the context of the ACT Government's proposals for a ban.

- Over 66% of non-smoking EGM gamblers in the sample said they would not change the frequency of their club visits if smoking were banned and only 32% said they would visit clubs more often.
- Nearly 60% of smokers said they would go less often if smoking were banned while 40% said they would not change.

These findings could suggest that gambling involvement may increase amongst non-smokers should a ban on smoking be introduced, and that this trend might be countered by a reduction in gambling frequency amongst smokers. It must be stressed, however, that such attitudes cannot be taken as a reliable measure of future gambling behaviour.

Table 25: Attitudes towards policy issues: EGM gamblers and non-EGM gamblers (%).

	Use EGMs	Strongly Disagree	Disagree	Don't Know/ Neither	Agree	Strongly Agree
D1. EGMs should be removed from local shopping areas	Yes	4.7	33.2	17.0	29.3	15.8
	No	1.5	18.6	16.0	33.4	30.5
D2. There should be more EGMs in the ACT	Yes	27.5	59.6	11.4	.9	.6
	No	40.1	50.4	8.8	.5	.2
D3. Gambling has improved social life in Tuggeranong	Yes	15.7	47.1	24.5	11.5	1.1
	No	24.6	41.7	26.6	6.6	.5
D4. People gamble in Tuggeranong because there is nothing else to do.	Yes	3.9	40.9	22.2	29.1	3.9
	No	5.6	37.9	30.3	24.1	2.1
D5. Smoking should be permitted in gambling clubs.	Yes	18.2	31.4	12.2	28.6	9.5
	No	26.5	41.7	13.3	15.9	2.6
D6. Gambling is a serious social problem in Tuggeranong	Yes	1.1	11.5	45.7	29.8	11.9
	No	.3	5.3	46.6	31.2	16.6

Source: Tuggeranong Gambling Study survey. All respondents N=2,447

5.4.3 Socio-spatial variations

This section presents the results of a GIS-based exploratory analysis of geographic variations in attitudes towards gambling amongst the sample in the Tuggeranong study. As with the analysis of club catchment characteristics, kernel density functions were used to examine spatial differences across the study region. The same parameters were used to create kernel density surfaces (i.e. a bandwidth 750 metres and quartic function).

Unlike the kernel density analysis of gambling behaviour (which used only EGM gamblers), it was possible to use data from all respondents to examine attitudes towards gambling. The responses to the six questions in Section D of the survey were sorted according to whether people agreed (i.e. 'strongly agree' and 'agree') to disagreed ('disagree' and 'strongly disagree') with the statements. Two kernel density surfaces were created for each question, one for respondents who agreed and one for those who disagreed. Respondents who answered 'neither or don't know' to the attitude questions were not used in the analysis. Table 26 below shows the percentage and number and of respondents who agreed or disagreed with the statements in Section D of the survey.

Table 26: Attitudes towards gambling: Tuggeranong residents (%)

Attitude statement	Number of respondents agreeing with statement	Percentage of respondents agreeing with statement	Number of respondents disagreeing with statement	Percentage of respondents disagreeing with statement
D1: Poker machines <u>should</u> be removed from local shopping areas	1394	57.0	649	26.5
D2: There <u>should</u> be more gaming machines in the ACT	24*	1.0	2181	89.1
D3: Gambling has <u>improved</u> social life in Tuggeranong	223	9.1	1587	64.9
D4: People in Tuggeranong gamble at the clubs because there are <u>few other</u> <u>leisure facilities</u> around	700	28.6	1072	43.8
D5: Smoking <u>should</u> be permitted in gambling clubs, such as clubs, TABs or casinos	627	25.6	1499	61.3
D6: Gambling is a <u>serious</u> <u>social problem</u> in Tuggeranong	1111	45.4	199	8.1

*Note: a kernel density surface was not created for respondents who agreed with statement D2, as 1% of the sample (24 people) was deemed too small to derive a reliable analysis.

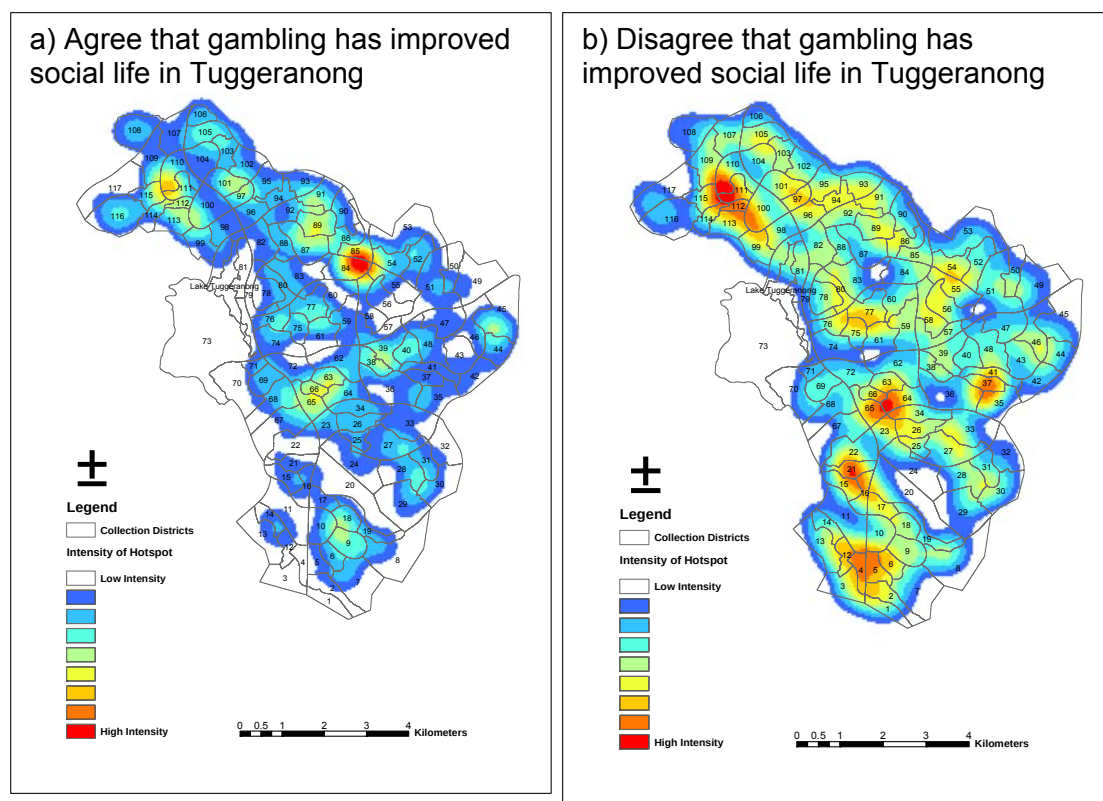
Source: Tuggeranong Gambling Study survey. All respondents, N=2,447

The focus of this analysis was to determine if there were any large geographic differences between Tuggeranong respondents who agreed or disagreed with the attitude statements in the questionnaire. The results showed that large geographic differences were evident for only two of the attitude statements, D3 (*Gambling has improved social life in Tuggeranong*) and D6 (*Gambling is a serious social problem in Tuggeranong*). Therefore only these two are examined here. Figures 61 and 62 show kernel density surfaces for respondents who agreed or disagreed with these two attitude statements.

Only relatively confined spatial concentrations of respondents displayed a positive attitude towards gambling in the Tuggeranong region.

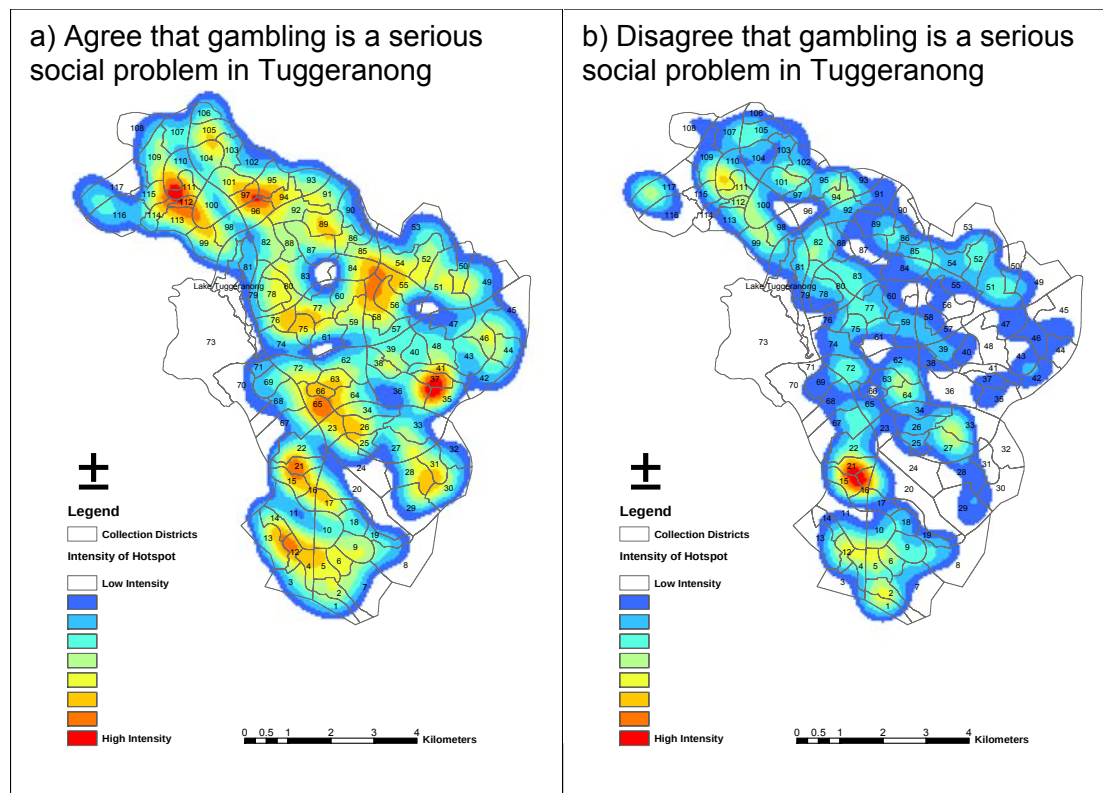
- A small concentration in the middle-north of the region agreed that gambling had improved social life in Tuggeranong (Figure 61a).
- This finding contrasts strongly with Figure 61b, which shows that most of the respondents in the study area felt that gambling had not improved social life in Tuggeranong.
- In the case of the attitude statement D6, Figure 62b shows that only one confined concentration of respondents in the southwest of the region thought that gambling was not a serious social problem in Tuggeranong.
- Again, this contrasts with respondents in other areas of the study who either agreed with the statement that that gambling was a serious social problem in Tuggeranong (Figure 62a) or did not have an opinion either way.

Figure 61: Respondents in who (a) agreed (b) and disagreed that gambling has improved social life in Tuggeranong.



Source: Tuggeranong Gambling Study survey. All respondents, N=2,447.

Figure 62: Respondents who (a) agreed and (b) disagreed that gambling is a serious social problem in Tuggeranong.



Source: Tuggeranong Gambling Study survey. All respondents, N=2,447.

6 Discussion and Conclusion

This final section of the report seeks to pull together the key findings and relate them back to the core issues underpinning the objectives of the project. In the first instance, the research findings are discussed in relation to the research questions and theories raised earlier in the report, particularly as they relate to regulatory and policy measures. Future research directions are then proposed. That commentary is general in nature and provides suggestions as to how the findings and lessons learned here might be expanded and/or applied elsewhere. Finally the potential application of a proposed methodology using GIS analysis in future community gambling studies is discussed.

6.1 Discussion of Findings

Research results from this study show that gaming clubs in Tuggeranong differ in their patron characteristics in important ways. This study has identified variability in the club environment in the Tuggeranong region of Canberra. Whilst many of the Tuggeranong clubs share similar characteristics (eg numbers of gaming machines), the most significant finding from this study is the marked differences in club catchment areas:

- Some local clubs are drawing patrons from across the whole Tuggeranong region,
- Others have very clearly defined local catchments; and
- Clubs located outside the Tuggeranong Valley are attracting many regular patrons among Tuggeranong residents.

It also appears that patron gambling patterns differ for clubs which have local population bases:

- In general terms, clubs which draw their patrons from a more localised catchment have patrons with heavier gambling profiles than clubs with wider reach into the surrounding area. Club E stands out with patron gambling activity levels well in excess of other clubs in Tuggeranong.
- It is also likely that those clubs identified with large catchments are attracting patrons from nearby areas which were not included in the survey sample for this study. Residents of Weston Creek and Woden may be travelling to Tuggeranong clubs just as many residents of Tuggeranong frequent clubs in those regions.
- It is unlikely however that Tuggeranong clubs found to have tight local catchment areas are generating regular visitations from outside of the Tuggeranong area. If few people from other parts of Tuggeranong are visiting those premises, it seems unlikely that many people from beyond Tuggeranong would be visiting.

This factor may explain why the expenditure figures based upon the sample self-reports indicate that the local catchment clubs have higher revenues than the broader focused clubs – in contrast to the official figures reported by such clubs. Because this survey did not survey residents of other parts of Canberra, the reported club expenditure figures are biased towards those clubs with largely locally resident patrons. Ultimately then it might be assumed that the survey successfully captured a

good cross representation of the patrons of clubs with local catchments but recorded only a segment of the patrons of clubs with wider catchments. Many customers of the latter who also may be spending on EGMs, may reside outside of the study area.

In terms of collating data for meaningful impact studies, this study highlights the need and value of fine scale geographical data. Whereas a broad survey such as the 2001 ACT gambling survey provides useful territory wide data, it is also likely to miss many of the subtle and particularly local impacts that gaming machine clubs are having – both positive and negative – at the local level.

6.2 Summary of findings from the Tuggeranong Gambling Survey

6.2.1 Sample Characteristics

- 2,447 adults were interviewed at their place of residence in Tuggeranong.
- The sample population is spatially well distributed, with relatively consistent coverage of the region.
- The sample population approximately reflects the socio-economic and demographic characteristics of the Tuggeranong population reported in the 2001 Census of Population and Housing.

6.2.2 Club patronage

Visiting ACT clubs (77.9%) is the third most common social activity for the sample population after dining out (88.8%) and going to the movies (78.9%).

- Although more surveyed Tuggeranong residents go to the movies than go to ACT clubs, the mean frequency of movie visits is much lower than for clubs.
- The mean frequency of visitations by club patrons (29.7 times per annum) is the highest of the various activities, followed by tavern visits (27.3).
- 46% of residents surveyed report visiting clubs monthly
- 2% report visiting clubs more often than 3 times a week
- Men (80.9%) are more likely to have visited a club in the past year than women (75.5%).
- Higher income groups tend to be more heavily represented amongst surveyed club patrons when compared with their presence in the sample.
- An income effect was evident for club patronage with over 84% of the highest income group visiting ACT clubs, declining to 70.6% at the lowest end of the income spectrum.
- In terms of age, the young (82.2% of 18-25 age group) and the elderly (81.3% of the 61-75 age group) have the highest rates of club patronage; and
- The lowest are the over 75s (68.3%) and people aged 26-40 (73.8%), which probably reflects this group being affected by work and family responsibilities.

It is noteworthy that no socio-economic or demographic group has a club patronage rate below 66%, a reflection of the universal appeal of clubs in the ACT to all social groups.

Minor variations in club patronage were found among residents of different suburbs (69.1%-87%), indicating that club patrons reside throughout the Tuggeranong region and are not confined to particular suburbs.

- Macarthur and Gilmore have the highest percentages of surveyed residents who visit clubs
- Richardson and Bonython record the lowest levels of club patronage.

6.2.3 *Club Facility Use*

Meals are the most popular club service used by club patrons in the sample population:

- 89.9% of club patrons report eating meals at a club.
- 70% of the entire sample population report eating meals at clubs.

6.2.4 *Preferred Clubs*

Two Tuggeranong clubs stand out as the preferred locations for a number of activities.

- Clubs C and F are the regular clubs visited for EGMs, Keno and meals for the largest proportion of Tuggeranong residents who use those facilities.
- Club F is also popular for raffles, while Club C attracts over 20% of all TAB gamblers.
- Raffles are also popular at places other than the eight clubs discussed here, with some 15% of club patrons naming 'other' clubs as the most usual club at which they make such purchases.

6.2.5 *Gambling Facility Use*

- EGMs have been used by 46.9% of club patrons
- 36.5% of the entire sample population reported using EGMs which is slightly lower than the 38.1% reported in the 2001 ACT gambling survey.⁹⁶
- Keno is played by 10.2% of club patrons
- 7.9% of all survey respondents report gambling on Keno compared to the 6.9% participation rate recorded in the 2001 ACT gambling survey.⁹⁷
- Raffles (43.1% of club patrons) are also popular activities
- TAB betting is less popular, with just 8.8% of club customers and 6.9% of all survey respondents participating.

6.2.6 *EGM Participation*

Groups with the highest EGM participation rates include

- residents aged 18-25 (59.5% of club patrons),
- pension recipients (73.3% of club patrons)⁹⁸,
- engaged (58.6% of club patrons) and

96 McMillen, J. *et al.* (2001b). *op. cit.*

97 McMillen, J. *et al.* (2001b). *op. cit.*

98 This figure must be used with caution due to the small sample size,

- those in the lowest income bracket (58.4% of club patrons.).
- The very elderly, high income groups and students have relatively low rates of involvement.
- Of particular interest is the declining rate of EGM gambling as household income rises. This contrasts with the rising rate of club patronage as incomes rise. In effect, the patronage of clubs has a positive relationship with income, but of those Tuggeranong residents who do go to clubs, the EGM participation rate has a negative relationship with income.
- Club patrons living in Richardson, Banks, Gilmore and Calwell report high EGM participation rates; while
- Theodore, Bonython, Macarthur and particularly Fadden have low proportions of EGM gamblers amongst club visitors.

Overall, the findings in this survey indicate that EGM gambling participation rates vary more widely across suburbs than is evident for any of the socio-economic or demographic variables. These findings reflect research by Marshall in northern NSW which found that variations in EGM gambling participation are greater when the sample population is analysed along socio-spatial lines than when demarcated along a single socio-economic or demographic category.⁹⁹

6.2.7 EGM Frequency

- 46% of Tuggeranong EGM gamblers play the machines less often than monthly.
- 21% do so at least weekly. This is somewhat higher than was found for the ACT as a whole in 2001, when 14.8% of EGM gamblers reported doing so at least weekly.¹⁰⁰
- Males reported more frequent EGM gambling than females
- Young (18-25) and elderly (61 and over) age groups have higher frequency of EGM gambling than do those in the middle age groups.
- There is also a slight tendency for high frequency of play amongst lower income groups although this is not a strong relationship.
- Smokers and loyalty card users tend to play gaming machines more often.
- Gamblers who use taxis as the usual form of transport to the club gamble more frequently.
- Patrons of Clubs A and E tend to play gaming machines more frequently.
- Groups with low frequency of EGM gambling include patrons of Club D and residents of Fadden and Isabella Plains.

Of most interest is the relationship with distance. Persons living within 4km of their regular EGM club have more frequent EGM sessions than more distant EGM gamblers.

Distance to club is identified as the strongest explanatory variable for EGM frequency when assessed statistically. The primary split on the data is a distance of 3.54 kilometres.

99 D. Marshall (2002), op. cit.

100 McMillen, J. *et al.* (2001b). op. cit.

- Tuggeranong residents who usually travelled less than this distance gamble on EGMs more often (32 times per annum) than people who usually travelled more than this distance (22 times per annum).
- For people who travelled less than 3.54 kilometres to their regular club, males gambled on EGMs more times per annum (41 times) than females (26 times).
- For people who travelled more than 3.54 kilometres to their regular club, those who had an income greater than \$999 per week gambled on EGMs less times per annum (15 times) than people who had an income of less than \$999 per week (27 times).

6.2.8 EGM Session Duration

The majority of EGM gamblers in the Tuggeranong survey report they usually gamble for no more than one hour at a time.

- Regular gamblers who play gaming machines at least weekly also tend to play them for longer periods of time than recreational gamblers.
- There is no discernible difference in the usual duration of gaming machine sessions of male and female gamblers.
- The most pronounced variation in usual duration of EGM sessions is with age, with a trend towards longer gambling sessions for older persons in the sample population.
- Groups reporting generally shorter EGM session durations are the unemployed, students and pensioners.
- Smokers tend to play EGMs for longer than non-smoking gamblers.
- Regular patrons of Club A tend to gamble on EGMs for much longer each session than those respondents who visit other Tuggeranong clubs.
- Clubs B and D tend to have patrons who play for shorter time periods.

On relationships between EGM session duration and other factors, the primary split on the data in the statistical decision-tree analysis is distance to club (6.03 kilometres). Gamblers who live beyond 8km from their regular club reported lower session duration.

- People who travelled less than 6.03km to their regular club stayed on average longer (49 minutes) than people who travelled further than this distance (32 minutes).
- Of the Tuggeranong residents who travelled less than 6.03 kilometres to their regular club, those who were aged at least 61 years reported gambling longer (69 minutes) than those who were aged less than 61 (47 minutes).
- Of the people who travelled less than 6.03 kilometres to their regular club and were younger than 61, those with an income of less than \$599 per week gambled for shorter times (38 minutes) than those who had an income of greater than \$599 per week (50 minutes).
- Of the people who travelled more than 6.03 kilometres to their regular club, residents over the age of 40 years gambled longer (39 minutes) than those who were aged 40 or younger (28 minutes).

6.2.9 EGM Session Expenditure

The majority of EGM gamblers in Tuggeranong reported spending relatively small amounts each time they play.

- Half of all surveyed EGM gamblers estimate spending less than \$10 per gambling session.
- A further 27% spend between \$11 and \$20 each time.
- The mean session expenditure reported for all Tuggeranong EGM gamblers is \$22.94.
- Males reported spending substantially more than females.
- Survey responses also suggest a tendency for increased EGM session expenditure with rising household incomes.

Tuggeranong respondents in the age group 26-40 years report generally higher gambling session expenditures. This is of interest because this age group reported a relatively low rate of club patronage and those who do play EGMs reported low frequency of gambling. The survey evidence suggests that when this group does play gaming machines, their expenditure tends to be higher.

- Smokers, loyalty card users, weekly EGM gamblers and those who sometimes play more than one machine simultaneously report higher expenditure per gambling session.
- Clubs A, E, G and H stand out as having relatively high session expenditures compared to other clubs.
- The distance influence on reported session expenditure is similar to that reported in the session duration analysis. Namely, EGM gamblers who live closer than 4km from their club report heightened levels of activity.

In the statistical decision tree analysis, once again distance to regular EGM club was identified as the strongest explanatory variable.

- Tuggeranong residents who travelled less than 5.93 kilometres to reach their regular club reported spending an average of \$28 per EGM gambling session, whereas those who travelled more than this distance to their regular club spent an average of \$15 per session.
- For respondents who travelled less than 5.93 kilometres to their regular club, those who were male reported spending an average of \$38 per EGM session whereas those who were female spent an average of \$21 per session.
- Of males who travelled less than 5.93 kilometres to reach their regular club, those who were divorced, engaged, married or who did not specify their marital status reported spending less per EGM gambling session (\$33) than males who were single, separated, widowers or in de facto relationships (\$46).
- Of the females who travelled less than 5.93 kilometres to reach their regular club, those who were single reported spending less per EGM session (\$17) than those who were in de facto relationships, divorced, engaged, separated, widows, or did not specify their marital status (\$29).

6.2.10 Annual EGM expenditure

- Based on self-report spending, the estimated annual EGM expenditure of individual Tuggeranong respondents ranges from \$1 to \$65,000

- The estimated mean figure is \$1,069 per EGM gambler per annum and the median is \$120.
- The estimated per capita reported expenditure for the entire sample population is \$387. This compares to the annual per capita expenditure in the ACT during the 2002-03 financial year of \$747.¹⁰¹ Under-reporting seems the most likely explanation for this discrepancy.¹⁰²
- Survey data suggest that Tuggeranong smokers gamble substantially more on EGMs per annum than do non-smokers.
- More than 10% of Club E's regular patrons were found to spend in excess of \$3,000 per annum on EGMs.

The closer EGM gamblers live to their regular club, the higher their annual expenditure on the machines tends to be.

- People who travelled less than 3.54 kilometres to their regular club were found to spend more per annum (\$1,858) than those who travelled greater than this distance to their regular club (\$580).
- For people who travelled less than 3.54 kilometres to their regular club, those who were males spent more per annum (\$2935) than those who were females (\$1065).

The annual EGM expenditure of both males and females appears to be influenced by distance to regular club:

- Males who travelled between 2.65-3.45 kilometres spent more per annum (\$5,921) than males who travelled less than 2.65 kilometres to their regular club (\$2,135).
- For females who travelled less than 3.54 kilometres to their regular club, women under the age of 41 years were found to spend less per annum (\$672) than those over the age of 41 years (\$3,121)
- Female EGM gamblers who live close to their regular club tend to have longer gambling sessions; whereas
- The frequency of visits for males appears to be more influenced by distance than are females.

Such findings need further analysis; that research might best be conducted qualitatively and with temporal variables incorporated.

Club patrons with loyalty cards appear to spend substantially more on EGM gambling than non-holders. Whilst there is no evidence of a causal relationship here, a two-way process may be occurring. People who gamble more money on gaming machines may be more inclined to use a loyalty card, which in turn might encourage higher expenditure.

- As for individual clubs, once again Club E stands out as having high rates of loyalty card use, followed by Clubs A, C, F and H.

Differences also exist in patrons' estimated annual expenditure on EGMs at the various clubs.

101 ACT Gambling and Racing Commission (2004) Personal correspondence. This figure differs to the corresponding figure published by the Tasmanian Gaming Commission, 2004, Table 68.

102 J. McMillen *et al.* 2001b, op. cit.

- Most striking is that 25% of Tuggeranong residents who nominate Club E as their regular club, are estimated to spend in excess of \$2,000 per annum on EGM gambling. 10% of the Club E sample are estimated to spend in excess of \$4,000 per annum.

In terms of distance from regular EGM club and annual EGM expenditure, a distance effect is evident.

- EGM gamblers living closer to their regular club report spending more on the machines per year than do gamblers living further away.
- It is apparent that both male and female annual expenditure is subject to a distance effect. While males have significantly higher spending patterns than females, the pattern remains approximately consistent between the two.

6.2.11 Club Catchment Areas

Eight clubs have been identified from the survey responses as the most popular EGM clubs of Tuggeranong residents.

- Two clubs are located outside of the Tuggeranong Valley (Clubs B and D)
- Six are located in the region (Clubs A, C, E, F, G, H).

Distinct groups of clubs stand out from this exercise.

- Three Tuggeranong clubs have very tightly confined catchment areas in the extreme corners of Tuggeranong. Clubs A, G and E primarily draw their regular patrons from nearby residents.
- In contrast, Clubs B, C, D and F have broad patron catchments that spread across the Tuggeranong region.
- Club H falls between these two groups and draws its regular EGM gamblers primarily from a large region in the centre of Tuggeranong.

Patrons at the Tuggeranong clubs also have diverse travel distance profiles:

- Clubs B and D have relatively flat distance profiles, with Tuggeranong patrons travelling from a wide range of distances up to 20km away.
 - As these two clubs are located outside of the Tuggeranong Valley, this pattern is not surprising.
- Clubs A, E and G have relatively close patron travel distance profiles with few of their respective patrons travelling further than three kilometres to access the clubs. These three club catchment areas fit closely with the 2.5km radius found by KPMG in their Victorian study.¹⁰³
- The other five Tuggeranong clubs however do not conform to the 2.5km range suggested by KPMG. Clubs F, C, and H are all located in Tuggeranong Valley yet a substantial proportion of regular patrons travel between 5-10km to access club facilities.

The core catchment areas of Clubs A, E, G and H overlap to a high degree with the most disadvantaged suburbs in the immediate vicinity, based on the SEIFA socio-economic measures.

- These are also the clubs with the spatially confined catchments.

103 KPMG (2000), op. cit.

- Further, these clubs draw few of their patrons from the more advantaged areas in the vicinity of each of the clubs.

It is also likely that those clubs identified with large catchments are also attracting large numbers of patrons from nearby areas which were not included in the survey sample population for this study. Residents of Weston Creek and Woden may be venturing to such clubs just as many residents of Tuggeranong frequent clubs in those areas. It is unlikely however that those clubs identified with extremely tight local catchment areas are generating many visitations from outside of the Tuggeranong area. If few people from other parts of Tuggeranong are visiting those venues, it seems unlikely that many people from beyond Tuggeranong would be.

6.2.12 *Club Patron Profiles*

Gender profiles of EGM gamblers do not differ greatly between clubs.

- Club A has the largest proportion of female EGM gamblers, substantially more than Clubs F and G. Clubs A and G are both clubs with tight confined catchments.
- Only Club D has a larger proportion of males than females amongst patrons.

Tuggeranong club patron profiles vary on age and income.

- Clubs A, B, D and H have a relatively large proportion of older customers.
- Club A differs insofar as it has a higher proportion of patrons in the oldest age group (76+) than the 61-75 age group. Moreover, 77% of Club A's patrons are from the 26-60 year age ranges.
- Clubs C, E, G and H have relatively large segments of young clientele (18-25 age group).
- A high proportion of relatively wealthy respondents regularly visit Clubs D and G, both of which have more than 30% of their customers living in households earning over \$1500 per week.
- At the other end of the spectrum are Clubs C, B and H where more than 20% of Tuggeranong respondents who nominate them as regular clubs live in households with incomes below \$400 per week.

In summary, analysis of the socio-economic and demographic characteristics of regular club patrons from Tuggeranong reveals that specific clubs tend to have distinctive EGM patron profiles.

- Club H attracts a young, relatively less wealthy and single patron profile of Tuggeranong patrons.
- At the other end of the scale, Club D has an older and wealthier Tuggeranong customer base.
- Club G appears to have a wealthier and young EGM gambler profile; and
- Club B has an older but relatively low income profile.
- Club E has the highest proportion of loyalty card users, the largest percentage of smokers, the second highest rate of alcohol drinkers and is fourth on the list for persons who play more than one machine simultaneously.

Clubs A and E tend to have more regular visitations by EGM gamblers who live in Tuggeranong.

- These are both clubs with tight catchment areas and high loyalty card use, drinking and smoking rates.
- Again Club E stands out as the only club at which males and females both exhibit high levels of visitation frequency.
- Only at Club B do females visit more often than males.

Cars are the main form of transport to all of the clubs under study.

- However a substantial proportion of Clubs A, E and G patrons usually walk. Notably these clubs were identified with particularly tight local catchments when examined with the kernel density GIS tool.
- Walkers and taxi users tend to report larger expenditures per EGM gambling session. Taxi patrons also have higher frequency of EGM participation.

6.3 Information to assist policy decisions

The various findings of this research provide a comprehensive picture of the socio-spatial aspects of EGM gambling in the Tuggeranong region. In general, the localised nature of this information overcomes some of the limitations that have been identified in conventional methodologies used to investigate gambling behaviour. One shortcoming of standard methodologies relates to analysis at an aggregate level (eg state-wide surveys, SLA and LGA data), which may not be indicative of local community areas. This can have significant ramifications for sensitive assessment of community gambling impacts. States, SLAs and LGAs may encompass a number of distinct ‘communities’ within their boundaries.¹⁰⁴ Other limitations of conventional gambling studies are:

- the geo-spatial spread of those affected by gaming machine clubs may extend beyond the boundaries of states/territories and ABS divisions;
- the distinct residential/commercial zoning mix in any given district may serve to dilute or accentuate socio-economic averages; and
- a strictly geo-spatial approach to ‘community’ avoids addressing other types of local social formations that may be equally as important in relation to potential harm, such as ‘communities of interest’ or ‘communities at risk.’

The results from this study suggest that distinct ‘communities’ exist within the Tuggeranong region and further provide a localised, relevant framework with which to assess the potential impacts of future initiatives such as:

- Possible increases in the number of EGMs or expansion of EGMs into ACT hotels or taverns; and
- The proposed establishment of a future EGM club in the Calwell area.

In relation to the first point above, the research findings suggest that the patterns of EGM gambling amongst Tuggeranong residents in hotels or taverns would be strongly influenced by the social setting and location of these facilities.

- If such hotels and taverns are located in close proximity to large areas of community congregation, it is likely that they would generate a wide, extensive catchment area.

104 McMillen, J. *et al.* (2001b). *op. cit.*

- If they were located in a primarily residential area and not close to large areas of community congregation, such as shopping centres, it is likely that such facilities would have a much more confined catchment and more localised impact on residents living nearby.
- Further, if the hotels or taverns were located in or adjacent to areas characterised by relative disadvantage, it is likely that the club catchments would encompass those areas over time.

In relation to the second point above, the establishment of an EGM club in the Calwell area is likely to generate a catchment area similar to Clubs A, E and G located in the suburbs of Tuggeranong. To elaborate, the catchment would most likely be of a confined nature, drawing clientele from within 1-4 kilometres of the club and mostly from areas showing a greater degree of socio-economic disadvantage.

The local-area techniques developed in this study and the subsequent results raise a number of broader issues relating to community-level impacts of EGM gambling. These include:

- The impetus to further investigate and understand the ability of communities to absorb the impacts of gambling behaviour where such communities are comparatively more disadvantaged than surrounding areas.
- Potential investigation of the prevalence of problem gambling amongst communities that are comparatively more disadvantaged and are the focus of core areas of club catchments. The techniques developed here could be used to focus qualitative research techniques.
- A more detailed analysis and understanding of the relationships between the usage of EGM clubs and their proximity to areas of community congregation.

This is an important contemporary issue for Australian gambling regulators, particularly given the trend towards the requirement of social impact assessments before new clubs can be established or for existing clubs to increase their gambling offerings.

6.4 Accessibility and EGM gambling behaviour

This research has confirmed previous studies which found that accessibility is an important issue requiring further research in studies of gambler behaviour and problem gambling. It also suggests that proximity of gaming venues to places of community congregation and the placement of gaming venues close to residential areas of relative socio-economic disadvantage are factors influencing gambler behaviour. Such findings support the Productivity Commission's assessment that participation in EGM gambling is driven in part by the supply of gambling facilities and not entirely a function of demand.¹⁰⁵

The results from the decision tree analyses of the various EGM gambling measures in relation to distance from regular club and socio-demographic variables such as age, gender, income and marital status revealed a complex set of relationships.

¹⁰⁵ Productivity Commission (1999) op. cit.

- Distance between club patrons' residence and regular club was found to have an overarching influence on EGM gambling behaviour, with all primary splits for the various models being based on this variable.
- The interactions between age, gender, income and marital status in relation to distance from regular club, suggest that the social dimension of accessibility is an important consideration.
- Certain subgroups of the sample were found to have higher levels of EGM gambling (eg of the people who travelled less than 3.54 kilometres to their regular club, those who were males visited their club more times per annum (41) than those who were females (26 times).

It is likely that strategies to minimise the harmful impacts of gambling will, in order to be effective, need to be relevant to the lifestyles of the various subgroups exhibiting higher levels of EGM gambling. Understanding the times and social contexts in which such subgroups operate when accessing EGM facilities is an area worthy of future investigation.

6.4.1 *Community attitudes to gambling and related policies*

A significant finding of this study is that there is generally a convergence of views on gambling and policy issues among Tuggeranong residents surveyed.

- Only a minority support the idea of additional EGMs in the community. Over 89% of the surveyed Tuggeranong residents disagreed that there should be more EGMs in the ACT, 35.5% strongly.
- Suggestions that EGMs should be removed from local shopping areas also drew a strong response, with some 57% agreeing with this proposition.
- 63% of non-EGM gamblers agree that the machines should be removed from local shopping areas. In contrast only 45.1% of EGM gamblers agree with this statement. Indeed, 34.9% disagree with it.
- 60% disagreed with the suggestion that smoking be allowed in gambling clubs.
- Only 8.1% of the total Tuggeranong sample did not hold the view that gambling is a serious social problem in Tuggeranong. Opinions of remaining residents were divided between those who agreed (45.6%) and those who did not have an opinion either way (46.3%).

However, the results showed well-defined geographic differences on two of the attitude statements, D3 (*Gambling has improved social life in Tuggeranong*) and D6 (*Gambling is a serious social problem in Tuggeranong*).

- In the case of the attitude statement D6, only one close concentration of respondents in the southwest of the region thought that gambling was not a serious social problem in Tuggeranong. This contrasts with the view held by the majority of respondents in other areas of study.

The Tuggeranong survey examined residents' attitudes to smoking in gaming clubs in the context of the ACT Government's proposals for a ban.

- Over 66% of non-smoking EGM gamblers in the sample said they would not change the frequency of their club visits if smoking were banned and only 32% said they would visit clubs more often.

- Nearly 60% of smokers said they would go less often if smoking were banned while 40% said they would not change.

6.5 Future Directions

As set out in the *Gambling and Racing Control Act 1999*, the ACT Gambling and Racing Commission has responsibility to monitor and research the social effects of gambling and problem gambling in the ACT.¹⁰⁶ To help meet this agenda, we propose a framework to assist with future research and data collection. The focus of this section is to provide guidelines for improving the methodology used in this Tuggeranong study to assist the ACT Gambling and Racing Commission to measure the impacts of gambling on respective communities in the ACT. The second part of this section will make recommendations as to a framework and appropriate data sources for local area analysis. The study findings could thus contribute to development of a practical methodology and research framework to enable assessment of the effects of gambling policies and regulation at the level of local communities.

In framing this review we have been conscious of the importance of addressing the particular characteristics of the ACT community and were mindful of the core objectives of the Canberra Social and Spatial Plans, which are best summarised as being to recognise that:

...innovation and creation must be encouraged in order to continue strong economic growth, that the causes of disadvantage and social exclusion must be addressed if all citizens are to share in our good fortune, and that our natural and built environment must be kept healthy so that all in the community can reap the recreational and spiritual benefits they offer.¹⁰⁷

6.6 Potential further applications of GIS to gambling behaviour

The GIS-based results from this study have shed new light on a number of spatial aspects of gambling behaviour. A consistent finding was that the distances Tuggeranong respondents were travelling to access gambling clubs varied significantly and were generally greater than the 2.5 kilometres identified in the Victorian KPMG study.¹⁰⁸ The conclusion drawn in the KPMG report was that people gamble locally; the implication is that the impact is greatest within a 2.5 kilometre radius of a club.

The results from the Tuggeranong study show that the spatial characteristics of club catchments are far more complicated than this and that they rarely have a circular or even radius. It also demonstrates that the catchment areas for different venues can vary greatly, even within a geographically bounded community such as Tuggeranong. Some clubs in this study showed highly concentrated catchments, while others

¹⁰⁶ ACT Government. 2004b. *Gambling and Racing Control Act 1999, Republication No 6*. ACT Parliamentary Counsel.

¹⁰⁷ ACT Government 2004a. *Building our Community: The Canberra Social Plan*. Policy Group, Chief Minister's Department, p. 3.

¹⁰⁸ KPMG (2000). op. cit.

showed broad, extensive catchment areas with people travelling up to 14 kilometres to access the clubs.

The size and dimensions of club catchments appear to have some relationship to their proximity to large areas of community congregation, although this relationship has not been fully explained in this study. Clubs with spatially extensive catchments were typically located close to large areas of community congregation whilst clubs with small catchment areas were generally located some distance from large areas of community congregation, often in suburbs with pockets of relative socio-disadvantage.

The GIS-based method used in the Tuggeranong study allows for the continuous fine-scale analysis of socio-spatial aspects of gambling behaviour. Data and subsequent analysis in this form overcomes many of the limitations of using thematic mapping approaches which are subject to criticism on the grounds that they apply arbitrary administrative boundaries¹⁰⁹ (in this case CDs) which may have relatively little relevance to gambling behaviour. This is not true for all cases. For example, in some situations the boundaries of CDs are based on streets that demarcate a discrete social boundary. However, in other situations, a CD boundary may dissect a 'community' which has relatively similar socio-demographic characteristics. In that case, using the CD boundary as a unit of analysis removes the potential to investigate subtle, finer-scale aspects of the phenomenon. Further, it is possible to aggregate point data upwards to the CD, SLA or LGA level but not possible to move in the other direction.

The approach developed and trialled in the Tuggeranong study was based upon geocoding the residential location of survey respondents and the clubs where they gambled. This provided the framework for investigating the socio-spatial character of club catchments and the distances people travelled to access gaming clubs. Of particular relevance to the understanding of gambling impacts is a recent review that drew a number of conclusions regarding the uptake of GIS by institutions with the responsibility of addressing public health issues.¹¹⁰ One of the points emphasised in that study was that GIS in public health systems is moving towards the development of integrated systems of data collection and information geo-coding. In the context of regulating gambling behaviour, if GIS is incorporated into future surveys it has the potential to provide regulators and policy-makers with a decision support system whereby:

- Survey results can be analysed to provide an indication, at a specific point in time, of the local characteristics of club catchments in a region.
- Distance-based analyses of gambling behaviour can provide information of how people are accessing gaming clubs.
- Club catchment hotspots can be compared to independent ABS data such as SEIFA indices to determine if concentrations of gambling behaviour are spatially coincident with concentrations of relative disadvantage.
- Data on gambling 'harm' and the prevalence of problem gambling can be assembled into a socio-economic GIS database to enable a local perspective on problem gambling to be developed.

109 Brown, S. (2003). 'Spatial Analysis of Socio-economic Issues: Gender and GIS in Nepal'. *Mountain Research and Development*, 23:338-344.

110 Rushton, G. (2003). 'Public health, GIS and spatial analytic tools', *Annual Review of Public Health*, 24, pp. 43-56.

- Maps of club catchment areas can be used to assess the likely spatial and social impact of proposed gaming clubs.
- If surveys are replicated over time, longitudinal data could be gathered to determine if club catchments are showing variation over time.

All of the methodological techniques above can be used to inform policy and regulatory deliberations, in conjunction with a range of other data.

The two GIS-based analytical techniques used in the Tuggeranong study, namely kernel-density functions and decision tree analysis, were exploratory methods. It is worth commenting that there are many possible future avenues for the use of GIS as a tool to assist regulators. Sophisticated techniques exist for modelling the mobility of urban populations and issues related to the accessibility of clubs to the general public.¹¹¹ One particular suite of models, broadly referred to as ‘gravity models’, have been used to investigate the ‘pull’ of certain retail outlets in relation to other retailers and the general public. Gravity models have also been useful for investigating spatial aspects of supply and demand,¹¹² informing managers and furthering the understanding of complex interactions related to public health issues.¹¹³ This approach would assist a better understanding of the potential ‘sponge city’ effects of gambling venues on other recreational facilities and neighbouring communities.¹¹⁴ Although beyond the scope of this preliminary study, developing and adapting such models to spatial aspects of gambling behaviour could prove beneficial to regulatory bodies.

6.7 Framework for local area gambling research

Based on the findings of the Tuggeranong study, this section proposes a practical research framework to enable assessment of the effects of gambling policies and regulation at the level of local communities. The framework also provides guidance to the ACT Gambling and Racing Commission on relevant databases that could be developed and maintained to allow ongoing assessment of the impacts of gambling in the ACT.

Though the quantitative and qualitative themes mentioned above broaden the scope of issues that might be considered when examining gambling behaviour and related impacts, there are still a range of matters that have thus far been overlooked in community gambling research to date. Examples include:

- comparative local area studies;
- venue business and marketing practices;
- implementation of responsible gambling programs;
- dimensions of individual and community risks and resiliency;
- social well-being and quality of life indices;
- social network analysis;

111 Boothby, J. and Dummer, T.J. (2003) ‘Facilitating mobility? The role of GIS’, *Geography*, 88(4), pp.300-311.

112 Roy, J.R. and Thill, J. (2004) ‘Spatial interaction modeling’, *Papers in Regional Science*, 83, pp. 339-361.

113 Luo, W. and Wang, F. (2003) ‘Measures of spatial accessibility to health care in a GIS environment: synthesis and a case study in the Chicago region’, *Environment and Planning B: Planning and Design*, 30 (6), pp. 865-884

¹¹⁴ PC 1999, op. cit.

- lifestyle aspects of gaming venue patronage;
- case studies and social action research.

These methodologies may provide useful guidelines for future local area gambling research.

A literature review of relevant studies of the impact of gambling has identified the theoretical, empirical and practical limitations of assessing the *actual* impacts of EGM gambling in diverse localities.¹¹⁵ That review also gave consideration to the availability and adequacy of data sources for local area analysis, the merits and limitations of different economic models (eg cost benefit analysis, input-output analysis) and the practicality of applying each approach to a variety of situations.

Based on that review and the findings of this Tuggeranong study, we have developed a proposed research framework for the specific purpose of local area gambling studies (Table 27). This framework enables research to be designed so that the interplay between various levels of the social, spatial and economic, and the properties emerging from that interplay, becomes the focus for analysis. This approach allows multi-strategy research with data gathering and triangulation undertaken at macro and micro levels of the community to explore hypotheses and test theories about gambling behaviour and gambling impacts.

The proposed framework could utilise both quantitative and qualitative methodologies, as outlined below. For example, research into the ‘context’ and ‘setting’ would be approached mainly using secondary quantitative and historical data. A combination of primary data generated through fieldwork and secondary data is needed to address research issues at the level of ‘situated activity’ and the ‘self’. Research activities would be conducted at all four levels simultaneously, so that the various data would be integrated and analysed for relevant relationships.

GIS-based analytical techniques are crucial elements of the proposed framework. A socio-spatial GIS database could be assembled to successfully combine gambling participation data, gambling harm indices, dimensions of individual and community risks, and venue implementation of responsible gambling programs that would provide a local perspective on gambling participation and problem gambling.

Research in the sample areas could be conducted at four levels: CDs or Statistical Local Areas [SLAs], communities, venues and residents. This framework would thus consider:

- relationships between the structural conditions of the gambling venue/sector;
- the production of different types of venues and their emergent characteristics;
- their specific local socio-cultural, economic and geographical contexts;
- an understanding of the socially heterogeneous character of ACT communities, configuration of gambling activity and different types of gamblers;
- socio-spatial distribution of problem gambling and associated factors; and
- relationships between accessibility, problem gambling and relative socio-economic advantage.

¹¹⁵ McMillen *et al.*, 2001b, op. cit.

Table 27: Summary of proposed research framework^{*116}

Research Element	Research Focus	Data Sources	Research activity/ Research outcome
Context (gambling & regulatory environment)	Review of regulations and programs; Demography of ACT areas including SEIFA, social capital criteria, etc. Data on gambling participation, problem gambling; community capacity,/resiliency, risk/vulnerability.	Australian Bureau of Statistics various databases; ACT community survey data; ACT Government databases and research.	Sample of SLAs/communities. GIS mapping of survey responses, other data Identify catchment areas for each venue. Identify factors associated with problem gambling.
	Spatial distribution and characteristics of gambling venues	ACT Gambling and Racing Commission, gambling industry data.	Statistical mapping using spatial and social data.
	State government policies, legislation, regulation and taxation for gambling; licensing and taxation of hotel and club gambling venues.	ACT sources (as above)	Document analysis. Policy and regulatory review. Profile and typology of venues.
	Characteristics of gambling clubs/hotels (non-profit, privately owned, type of venue, size, etc)	ClubsACT, AHA, Casino Canberra, etc	Document analysis. Profile and typology of venues.
Setting (community)	Socio-demography of case study SLAs/communities	ABS various databases. ACT sources (as above)	Community histories and profiles.
	Role of clubs/hotels/casino in local community, economy & urban landscape.	Structured interviews in sample SLAs/communities.	Typology and GIS mapping of SLA/communities' mix of gambling venues.
	Clubs & hotels as entertainment venues, relationship to other local amenities, retailers.	Structured interviews in sample SLAs/communities. SLA secondary data. Profile of social infrastructure, recreation and leisure facilities in the SLA.	Location of gaming venues and places of community congregation. Analysis of venue amenities and facilities.
	Community benefit: eg leisure, social interaction, community cohesion and opportunity; meaningful social relationships, friends/family/clubs/ Clubs and hotels as community benefactor. Community harm/costs: eg community vulnerability, gambling losses, community polarisation, decline of alternative leisure & entertainment options.	Clubs/hotels/casino: Community Contribution Statements; Industry data, marketing strategies, etc. Structured interviews. Document analysis.	Benefit and harm data as per conceptual framework. Analysis of local facilities and venue public contributions.

¹¹⁶ This framework draws on D. Layder (1993) *New Strategies in Social Research*. Cambridge, Blackwell, p. 72) and Productivity Commission (2003) *Social Capital: Reviewing the Concept and its Policy Implications. Research Paper*, AusInfo, Canberra. It incorporates criteria in the Queensland Gaming Commission's *Guidelines – Community Impact Statement* 2003, op. cit., and in the Victorian Casino And Gaming Authority *Application for Approval of Premises Form*: <http://www.gambling.vcga.vic.gov.au>. Accessed June 13th 2004.

Situated activity (club, hotel, casino, etc)	Community benefits (as above)	Survey of residents in sample SLAs/communities. Structured interviews with local stakeholders, industry representatives and staff. Club/hotel patron focus groups.	Benefit and harm data as per conceptual framework. Design, conduct & analysis of local community surveys. Plan, recruit and conduct focus groups. Analysis of perceptions of venues, gambling, responsible gambling programs and industry actions
	Community harm/costs (as above)	As above. Interviews with community service agencies and gambling counsellors.	As above.
Self (residents)	Leisure patterns and preferences, social integration, community participation, etc. Problem gambling, gambling-related harm, social exclusion, social disruption, etc	Participant-observation in sample SLAs/communities. ACT survey data. Survey of residents in sample SLAs/communities. Club/hotel/casino patron focus groups. Activity diaries of expenditure and use of gaming venues.	GIS and statistical analysis of benefit and harm data as per conceptual framework. Plan, recruit and conduct focus groups. Analysis of gambling behaviour, expectations and perceptions of responsible gambling programs and industry actions. Analysis of modes of sociality in local gambling venues.

Source: Adapted from © J. McMillen 2000.

The extent to which gambling impacts upon a region will vary according to the relationship between gaming venues and the residents of the community. Application of this framework would assist the Commission's understanding of key issues that underpin its regulatory decisions.

- The definition of 'community' in relation to local impact assessment has yet to be debated in the context of ACT gambling regulation. There has been a tendency to use the term as a catch-all phrase thereby overlooking social and economic sub-populations within areas that may be differently affected by gambling.
- The approach of this Tuggeranong study could be extended to examine how different ACT 'communities' access gambling and/or experience problem gambling, and any relationships with the geographical location, facilities and business practices of gaming venues.
- As this study demonstrates, the definition of the 'catchment area' of gaming clubs and hotels is also important in establishing the spatial boundaries and scope of impact.

Most existing gambling research is predominantly concerned with relatively short-term issues and regulatory implications. Many impact assessment frameworks tend to be geared towards snapshot evaluations with little consideration of ongoing developments that may occur after the assessment period has passed. Questions about the long-term effects of gambling on individuals and communities have yet to be seriously addressed in research.

In light of public disquiet over the negative effects of gambling, a submission on behalf of Victorian Government Treasury to the NCC questioned whether the 'precautionary principle' should be adopted in gambling regulation:

... the precautionary principle states that where the costs of inaction are high and likely irreversible, then the lack of conclusive technical evidence is not a reason for doing nothing.¹¹⁷

This tenet has equal applicability to gambling impact assessment in the ACT.

Replication of studies using the proposed framework would allow longitudinal data to be gathered to determine if gambling patterns and club catchments are showing variation over time. The study of continuities and discontinuities in individual behaviour and gambling industry development alongside factors that influence these processes is critical to understanding recreational gambling behaviour as well as gambling impacts. It also improves scope for understanding the diverse experiences of gambling within sub-populations as community characteristics alter, for example as the population ages or local economies change.

6.8 Conclusion

This research offers preliminary insights into the actual impacts of club gambling on the local Tuggeranong community and suggests that the effects are far more complex and community-specific than quantitative research alone may convey. Given that this issue was not examined systematically (eg by comparison with other communities and examination of qualitative and industry data), this study can only be taken as a first step towards a more strategic and wider ranging research program that will assist the Commission to define what is acceptable with regard to the placement and operation of EGMs and other forms of gambling. Participatory research approaches that facilitate community and industry involvement in design and data collection, and that use a range of qualitative and quantitative methods are likely to produce more representative and valid information on local gambling impacts.

This report proposes some practical suggestions to assist the Commission's task of understanding gambling impacts in local communities and making appropriate regulatory decisions to safeguard the interests of the Canberra community. To facilitate this process, we strongly recommend that the Commission identify and compile baseline data on relevant social and economic issues, and to develop a collaborative local area research strategy for the longitudinal monitoring of gambling impacts in various communities in the ACT.

¹¹⁷ Marsden Jacobs and Associates, 2000b, 24.

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- Welkowitz, J., Ewen, R. and Cohen, J. 1982. *Introductory Statistics for the Behavioural Sciences*, Academic Press, New York.

Appendix 1 Community Advisory Group Members (CAG)

- ACT Gambling and Racing Commission
- ACT Women's Consultative Council
- ACT Multicultural Consultative Council
- Aboriginal and Torres Strait Islander Consultative Council
- Council on the Ageing
- ACT Churches' Council
- Gambling Care - Lifeline
- ACT Council of Social Services
- Clubs ACT
- CARE Financial Counselling and Legal Services
- Migrant Resource Centre
- ACT Community Care
- Australian Hotels Association, ACT
- ACT-TAB
- Casino Canberra

Appendix 2 Questionnaire Survey

SECTION A – INTRODUCTION

I'm going to start by listing a number of leisure activities in the ACT and I'd like you to tell me how often you do each of them.

-
- **A1.** Eat out for dinner at a BYO or licensed restaurant, not including clubs

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Week Fortnight Month Year Never

-
- **A2.** Attend live sporting events, not including school sport

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Week Fortnight Month Year Never

-
- **A3.** Go to the movies

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Week Fortnight Month Year Never

-
- **A4.** Visit pubs, hotels or taverns, not including clubs

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Week Fortnight Month Year Never

-
- **A5.** Visit clubs with poker machines

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Week Fortnight Month Year Never

(If Never go to Section D)

SECTION B – CLUB/MACHINE USE

- **B1.** Do you ever play pokies when visiting clubs in the ACT?
YES **NO** (if **NO** go to question **C1**)
-
- **B2.** How often do you play pokies when visiting an ACT club?
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
 Week Fortnight Month Year
- **B2a** Which club do you play pokies at most often? (Prompt for Suburb)

- **B2b.** How often do you play pokies at the?
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
 Week Fortnight Month Year
- **B2c** Where do you usually travel from when going there?
 (ie: work or home etc.) (Prompt for Suburb if not Home)

- **B2d** How do you usually get there? (ie. car, taxi, bike, walk etc.)

- **B2e** Why do you usually go there in preference to other clubs?

- **B2f** Which other places do you regularly play pokies at?
None or Yes (Prompt for name, suburb and frequency at each)
- **First Club**..... (Prompt for Suburb)
 Frequency 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
 Week Fortnight Month Year
- **Second Club**.....(Prompt for Suburb)

Frequency 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
 Week Fortnight Month Year

- B3a. Which was the last ACT club you played pokies at?

- B3b. When was that? (ie. 1 day ago, 2 weeks ago etc.)

- B3c. Did you go there mainly to play the pokies? (circle)
 YES (if yes go to B4)
 NO (if no go to question B3d)
 B3d. What was the main purpose for your visit to the club?

B4. Now I'm going to ask you some questions about your use of pokies over the past 12 months.

- **B4a** When you play the pokies, about how long do you usually play for?
Minutes **or**.....Hours **or** Unsure
- **B4b.** Do you ever play more than one pokie at the same time?
 Yes Sometimes No
- **B4c.** How much money, not including winnings, do you normally spend on the pokies during a typical session? (.....This means the maximum amount you are prepared to be out of pocket, but does not include money won and then spent).
Dollars
- **B4d.** Do you ever use a loyalty card when playing the pokies?
 Yes **Unsure / No** (if No or Unsure go to question B4g)
 - B4e. Which clubs do you have loyalty cards for?
 1.....
 2.....
 3.....
 - B4f. Which of these do you use the most? (Circle which one above)

- **B4g.** Do you usually drink alcohol when you are playing the pokies?

Yes **Sometimes** **No**

- **B4h.** Do you usually take breaks when you are playing the pokies?

Yes **Sometimes** **No** (If No go to C1)

|

- B4i. Why do you usually take a break? (*Tick for a Yes*)

1. Purchase Drink ☐

5. Purchase Food ☐

2. Toilet ☐

6. Go Outside ☐

3. Socialise/talk ☐

7. Get/Change Money ☐

4. Cigarette/Smoke ☐

8. Others (Specify).....

SECTION C – OTHER CLUB FACILITIES

I'm now going to ask you some questions about other activities and facilities in ACT clubs.

- **C1a** Do you ever play Club Keno when visiting an ACT club?
YES **NO** (if **no** go to C2a)
 - **C1b** How often do you play Club Keno at ACT clubs?
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Week Fortnight Month Year
 - **C1c.** Where do you usually play Club Keno in the ACT?
.....(Prompt for Suburb)
 - **C1d.** Where did you last play Club Keno in the ACT?
.....(Prompt for suburb)
 - **C1e.** When was that?
.....
 - **C1f.** How much money, not including winnings, do you normally spend on Club Keno in a typical session?
(.....This means the maximum amount you are prepared to be out of pocket, but does not include money won and then spent).
.....**Dollars**
-
- **C2a** Do you ever place bets with the TAB when visiting an ACT club?
YES **NO** (if **no** go to C3a)
 - **C2b** How often do you place bets with the TAB when visiting an ACT club?
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Week Fortnight Month Year
 - **C2c.** At which ACT club do you usually place bets with the TAB?(Prompt for suburb)
 - **C2d.** At which ACT club did you last place a bet with the TAB?
.....(Prompt for Suburb)
 - **C2e.** When was that?
.....

- **C2f.** How much money, not including winnings, do you normally spend in a typical TAB betting session?

(.....This means the maximum amount you are prepared to be out of pocket, but does not include money won and then spent).

.....**Dollars**

-
- **C3a** Do you ever buy tickets in meat raffles, chocolate wheels or any other raffles when visiting ACT clubs?

YES

NO (if **no** go to **C4a**)

- **C3b** How often do you buy these sorts of tickets when visiting an ACT club?

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Week Fortnight Month Year

- **C3c.** At which ACT club do you usually buy these types of raffle tickets?

.....(Prompt for suburb)

- **C3d.** At which ACT club did you last buy such tickets?

.....(Prompt for Suburb)

- **C3e.** When was that?

.....

- **C3f.** How much do you normally spend on such tickets in a typical visit to an ACT club?

.....**Dollars**

-
- **C4a** Do you ever purchase a meal when visiting an ACT club?

YES

NO (if **no** go to **C5**)

- **C4b** How often do you purchase meals at ACT clubs?

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Week Fortnight Month Year

- **C4c.** Which ACT club do you usually buy meals at?

.....(Prompt for Suburb)

- **C4d.** Where did you last buy a meal at an ACT club?

.....(*Prompt for Suburb*)

- C4e. When was that?

.....

- C5 Are there any other facilities you regularly use when visiting an ACT club?

YES (*Prompt for facility and frequency of use*) or **NO** (*if no go to C6*)

1. First Facility

- *Frequency*

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Week Fortnight Month Year

2. Second Facility

- *Frequency*

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Week Fortnight Month Year

-
- C6. Do you usually smoke when you are at ACT clubs?

*Yes**No*

-
- C7. Would you go to clubs more often or less often if smoking were banned?

More Often

No Change

Less Often

SECTION D – ATTITUDES AND OPINIONS

I'm now going to make some statements about some gambling issues. Could you tell me which of these (hand over card) best represents your opinion?

- D1.** Poker machines should be removed from local shopping areas

Strongly Agree Agree Neither Disagree Strongly Disagree
Don't Know

- D2.** There should be more gaming machines in the ACT.

Strongly Agree Agree Neither Disagree Strongly Disagree
Don't Know

- D3.** Gambling has improved social life in Tuggeranong.

Strongly Agree Agree Neither Disagree Strongly Disagree
Don't Know

- D4.** People in Tuggeranong gamble at the clubs because there are few other leisure facilities around.

Strongly Agree Agree Neither Disagree Strongly Disagree
Don't Know

- D5.** Smoking should be permitted in gambling clubs, such as clubs, TABs or casinos.

Strongly Agree Agree Neither Disagree Strongly Disagree
Don't Know

- D6.** Gambling is a serious social problem in Tuggeranong

Strongly Agree Agree Neither Disagree Strongly Disagree
Don't Know

SECTION E - DEMOGRAPHICS

Finally I just need to ask you some very basic questions about yourself.

- **E1.** Which of the following age groups do you fall into?
(Show card)
A=18-25 B= 26-40 C= 41-60
D= 61-75 E=76 or over

-
- **E2.** Which of these best describes your marital status?
(Show card)
Married De facto Engaged
Divorced Separated Widow/er Single

-
- **E3.** What is your main occupation?

.....

- E3a. Is that *Full-time* or *Part-time*

-
- **E4.** What is your partner's/husband's/wife's main occupation?

.....

- E4a. Is that *Full-time* or *Part-time*

Ask E4
& E4a only
if **married**
or **de facto**

-
- **E5.** Do you have any dependent children living at home?
Yes – How Many?.....or No

-
- **E6.** Which of these letters best defines your before tax household income? (Show card)
A B C D E F G H

Thank You Very Much for Your Time.

If you are interested in any further information about the project I can leave this information sheet with you.

AFTER INTERVIEW CODING SECTION

Gender: **Male** **Female** **Unclear**

CD:.....

Street:.....

Date:.....

Time:.....

Survey Staff Name:

Appendix 3 Laminated Information Sheet Shown to Householder.



To the Householder

This survey is being conducted to examine the use of licensed clubs and gaming machines in the Tuggeranong Valley. It is being supervised by Dr. David Marshall and Professor Jan McMillen of the Research School of Social Sciences at ANU. The survey has been funded by the ACT Gambling and Racing Commission to inform policy decisions.

- *Your place of residence has been **randomly selected** to ensure that our sample **represents everyone** in the Tuggeranong community*
- *There is **no obligation** to participate*
- *Approximately **1500-2000 residents** of the **Tuggeranong Valley** will be surveyed*
- *Surveys will take approximately **10-15 minutes** to complete*
- ***No names or addresses** are being recorded ensuring complete **anonymity***
- *If you agree to participate there is **no obligation** to answer all questions*
- *You may **terminate** the interview **at any time***
- *A detailed **information sheet** is available after completion*

Appendix 4 Information Letter offered to Respondents.



To the Householder

This survey is being conducted as part of research into the use of licensed gaming clubs and gaming machines in the Tuggeranong Valley. The project is being directed by **Dr. David Marshall** and **Professor Jan McMillen** of the Research School of Social Sciences at ANU and is funded by the ACT Gaming and Racing Commission to inform policy decisions.

The project has been designed to investigate the use of various services offered by licensed clubs in Tuggeranong and neighbouring areas, including electronic gaming machines (pokies). Specific interests of the project is the degree to which the use of gaming machines is a localised activity and whether geographical proximity and/or other dimensions of accessibility are significant risk factors for increased gambling. It will also gauge the level of community support for gaming machines and other club leisure facilities. The findings will provide useful information for policy formation and decisions relating to future gambling in the ACT.

Your household has been selected as part of a random sample of residents in all suburbs of the Tuggeranong Valley. The survey is designed to ensure our sample adequately represents everyone in the Tuggeranong community. Approximately 1500-2000 interviews will be conducted between October and December 2003. All surveys are identical and will take approximately 10-15 minutes to complete. No survey participant will be asked to provide their name; nor will any addresses be recorded. Subsequently, all interviews will remain totally anonymous. Data collected during the survey process will be analysed and written into a comprehensive report to the ACT Racing and Gaming Commission for publication.

Any further questions concerning this research can be directed one of the coordinators. Dr. David Marshall 6125-6768
Prof. Jan McMillen 6125-4665.

Should you have any complaints concerning the manner in which this research is conducted, please contact one of the coordinators listed above. If you are not satisfied with the response provided please contact the Human Ethics Officer at the following address: Secretary (Human Ethics Officer)

Human Research Ethics Committee
Research Office, Chancelry 10B
The Australian National University
Canberra ACT 0200
Telephone: 02-6125-2900
Fax: 02-6125-4807
Email: Human.Ethics.Officer@anu.edu.au

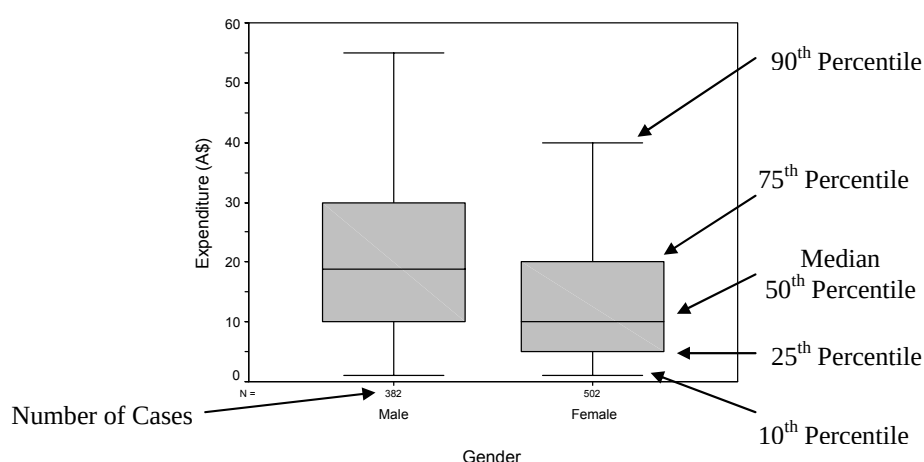
Thank you for your interest in this project.

Appendix 5 Features of a Box-and-Whisker Plot

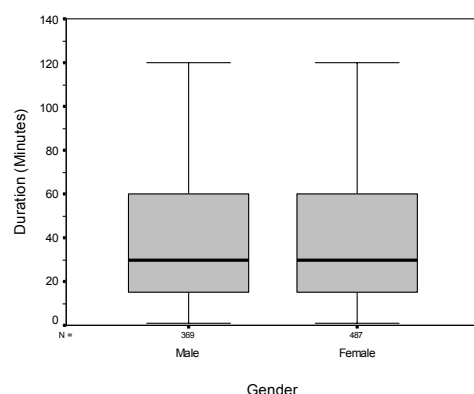
A box-and-whisker plot is a graphical representation of a set of data and is designed to highlight the distribution and range of the responses obtained. Five measures are used in a box-and-whisker plot – 10th percentile, 25th percentile, median, 75th percentile and 90th percentile – as illustrated in Example 1. The box represents responses in the middle of the range (between the 25th and 75th percentile) and the whiskers represent the top and bottom 25% of responses respectively.

A series of box-and-whisker plots side-by-side (such as the examples presented here) permits quick and simple comparison of the same data across multiple groups. For example, the expenditure on gambling amongst a sample population can be compared by gender, age or income. Box-and-whisker plots are more useful than average figures for comparative purposes because more than one measure is used and the influence of extreme figures is nullified. Three examples are provided below.

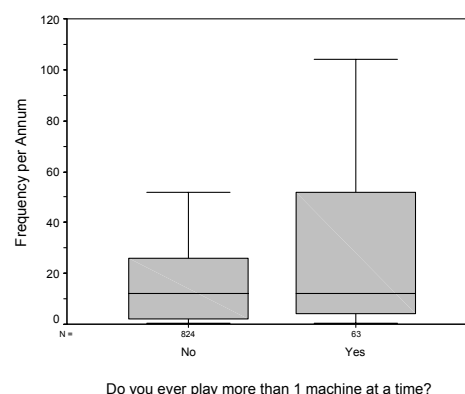
Example 1



The figure above shows two box-and-whisker plots for usual EGM session expenditure. One is for males and the other for females, based on self-report responses from the Tuggeranong gambling survey. There are 382 males and 502 females in the dataset. In this example, the data indicate that males tend to spend more in an EGM session than do females. There are a number of ways to assess this. One is by comparing the same indicator (eg median). For example, the graph reveals that the median for males is \$19. This means that 50% of males spend in excess of \$19 and 50% spend less than \$19. In contrast, the median figure for females is \$10. A comparison could also be done for a specific expenditure figure. Using \$10 as an example, it is apparent that only 25% of males spend less than \$10 per session (those below the 25th percentile) whereas 50% of females spend less than \$10 at a time.

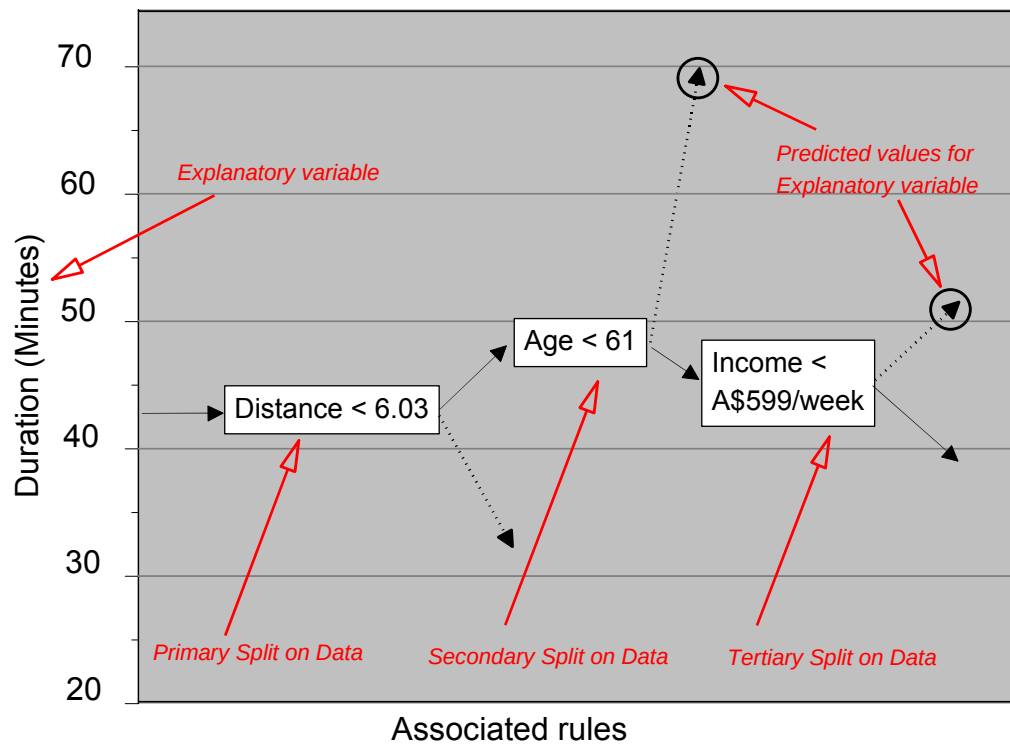
Example 2

In contrast to Example 1 – in which there was clear variation between males and females and their expenditure per session – Example 2 reveals that there is no difference when examining duration per session by gender. Ten percent of males and females (those whose responses are above the 90th percentile) usually gamble for longer than 120 minutes at a time, 25% (those above the 75th percentile) play EGMs for longer than 60 minutes and 50% (above the median) for longer than 30 minutes and so on. Considering Example 1 and Example 2 together, it can thus be concluded that the tendency for increased session expenditure by males detected in Example 1, is not due to longer session duration but is probably due to higher stake per spin.

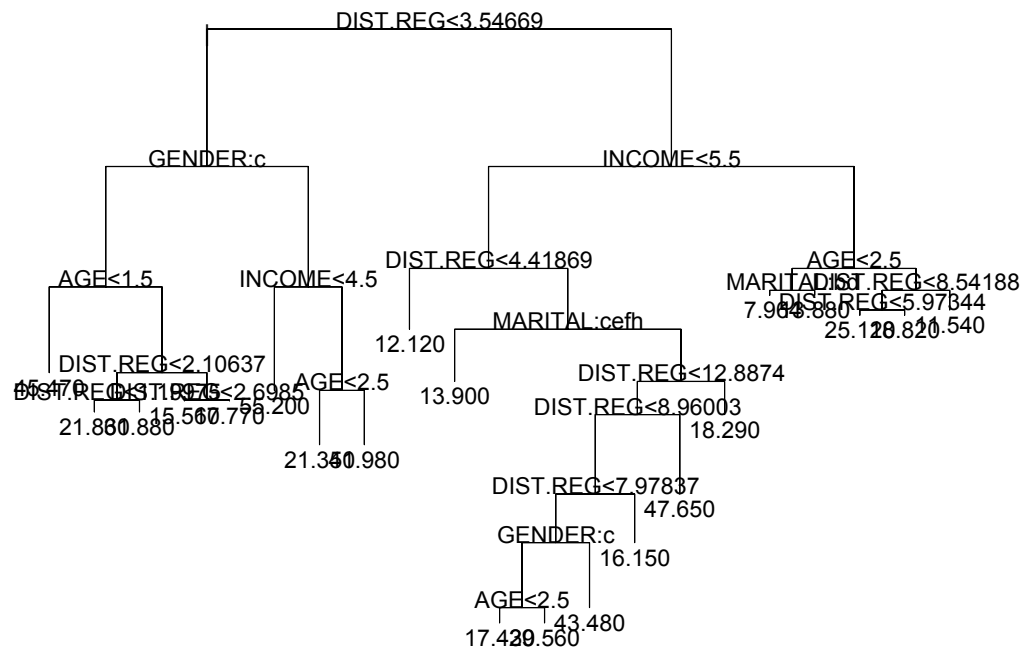
Example 3

Example 3 highlights how useful box-and-whisker plots can be when comparing data. In this example, the frequency of EGM gambling per annum is examined for two groups – those who sometimes play more than one machine simultaneously and those who do not. It is apparent that there is little difference in the lower 50% of each plot. The median figures are the same and the 25th and 10th percentiles are also similar. However, it is evident that a greater proportion of multiple machine users (ie those who gamble on more than one machine simultaneously), visit EGM venues frequently. Looking at those who gamble on EGMs at least 50 times per year, 25% of multiple machine users (above the 75th percentile) fall into this category whereas only 10% (above the 90th percentile) of the other group do. Had the median measure been used alone, this difference would not have been detected.

Appendix 6 Features of a decision tree output displayed with the explanatory variable plotted on the Y axis.



Appendix 7 Full output for decision tree analysis based on annual frequency of EGM gambling.



*** Tree Model ***

Regression tree:

```
tree(formula = POKIFQ ~ AGE + MARITAL + INCOME + GENDER + DIST.REG, data =
  pokietuggdata.splus, na.action=na.exclude, mincut = 30, minsize = 60,
  mindev = 0.01)
```

Number of terminal nodes: 21

Residual mean deviance: 1741 = 1519000 / 872

Distribution of residuals:

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
	-55.20	-17.56	-9.35	0.00	5.71	318.50

node), split, n, deviance, yval

* denotes terminal node

- 1) root 893 1696000 25.750
- 2) DIST.REG < 3.54669 336 944300 32.330
- 4) GENDER:2 193 428300 25.620
 - 8) AGE < 1.5 31 228900 45.470 *
 - 9) AGE > 1.5 162 184800 21.820
- 18) DIST.REG < 2.10637 79 144700 27.320
 - 36) DIST.REG < 1.19975 36 76610 21.860 *
 - 37) DIST.REG > 1.19975 43 66170 31.880 *
- 19) DIST.REG > 2.10637 83 35430 16.600
 - 38) DIST.REG < 2.6985 44 19340 15.560 *
 - 39) DIST.REG > 2.6985 39 15990 17.770 *
- 5) GENDER:1 143 495700 41.380
 - 10) INCOME < 4.5 56 295400 55.200 *

```

11) INCOME>4.5 87 182700 32.490
22) AGE<2.5 40 30160 21.350 *
23) AGE>2.5 47 143400 41.980 *
3) DIST.REG>3.54669 557 728800 21.780
6) INCOME<5.5 322 613100 26.540
12) DIST.REG<4.41869 43 9750 12.120 *
13) DIST.REG>4.41869 279 593000 28.760
26) MARITAL:Engaged,Not Specified,Separated,Widow/er 35 28460 13.900 *
27) MARITAL:De facto,Divorced,Married,Single 244 555700 30.890
54) DIST.REG<12.8874 213 541000 32.730
108) DIST.REG<8.96003 166 371900 28.500
216) DIST.REG<7.97837 125 330300 32.550
432) GENDER:2 72 108000 24.510
864) AGE<2.5 30 27380 17.430 *
865) AGE>2.5 42 78090 29.560 *
433) GENDER:1 53 211300 43.480 *
217) DIST.REG>7.97837 41 33240 16.150 *
109) DIST.REG>8.96003 47 155700 47.650 *
55) DIST.REG>12.8874 31 9082 18.290 *
7) INCOME>5.5 235 98420 15.260
14) AGE<2.5 97 19460 10.530
28) MARITAL:Divorced,Married 55 7611 7.964 *
29) MARITAL:De facto,Engaged,Single 42 11010 13.880 *
15) AGE>2.5 138 75260 18.590
30) DIST.REG<8.54188 93 61250 22.000
60) DIST.REG<5.97344 47 39950 25.120 *
61) DIST.REG>5.97344 46 20380 18.820 *
31) DIST.REG>8.54188 45 10690 11.540 *

```

```

graph TD
    Root["DIST.REG<6.02512"]
    Root --> Node1["AGE<3.5"]
    Root --> Node2["AGE<1.5"]
    
    Node1 --> Node3["INCOME<3.5"]
    Node1 --> Node4["DIST.REG<2.40011"]
    
    Node3 --> Node5["AGE<1.5"]
    Node3 --> Node6["MARITAL:acd"]
    
    Node5 --> Node7["MARITAL:df"]
    Node7 --> Node8["DIST.REG<2.13975"]
    Node7 --> Node9["DIST.REG<3.6342"]
    
    Node6 --> Node10["INCOME<5.5"]
    Node10 --> Node11["DIST.REG<2.0795"]
    Node10 --> Node12["DIST.REG<3.458"]
    
    Node4 --> Node13["75.9301"]
    
    Node2 --> Node14["GENDER:1"]
    Node2 --> Node15["DIST.REG<7.13306"]
    
    Node14 --> Node16["DIST.REG<7.01425"]
    Node16 --> Node17["DIST.REG<7.01425"]
    Node16 --> Node18["DIST.REG<10.8214"]
    
    Node15 --> Node19["DIST.REG<7.01425"]
    Node19 --> Node20["DIST.REG<7.01425"]
    Node19 --> Node21["DIST.REG<10.8214"]
    
    Node8 --> Node22["33.95914"]
    Node9 --> Node23["36.8679"]
    Node11 --> Node24["43.6970"]
    Node12 --> Node25["34.58"]
    Node13 --> Node26["75.9301"]
    Node16 --> Node27["18.32642"]
    Node17 --> Node28["18.32642"]
    Node18 --> Node29["21.715"]
    Node20 --> Node30["31.29"]
    Node21 --> Node31["29.63"]
    Node22 --> Node32["25.49"]
    Node23 --> Node33["33.95914"]
    Node24 --> Node34["43.6970"]
    Node25 --> Node35["34.58"]
    Node26 --> Node36["75.9301"]
    Node27 --> Node37["18.32642"]
    Node28 --> Node38["18.32642"]
    Node29 --> Node39["21.715"]
    Node30 --> Node40["31.29"]
    Node31 --> Node41["29.63"]
    
```

```

Regression tree:
tree(formula = POKITIME ~ AGE + MARITAL + INCOME + GENDER + DIST.REG, data =
  pokietugdata.spluss, na.action=na.exclude, mincut = 30, minsize = 60,
  mindev = 0.01)
Number of terminal nodes: 24
Residual mean deviance: 1983 = 1726000 / 870
Distribution of residuals:
  Min. 1st Qu. Median Mean 3rd Qu. Max.
-75.92 -27.27 -11.29  0.00  13.05 306.40
node), split, n, deviance, yval
  * denotes terminal node

1) root 894 1934000 42.59
2) DIST.REG<6.02512 529 1438000 49.44
4) AGE<3.5 465 1192000 46.73
8) INCOME<3.5 129 222800 37.97
16) AGE<1.5 43 19310 25.49 *
17) AGE>1.5 86 193400 44.22
34) MARITAL:Married,Separated 51 89000 33.97 *
35) MARITAL:De facto,Divorced,Single,Widow/er 35 91260 59.14 *
9) INCOME>3.5 336 955600 50.10
18) MARITAL:De facto,Engaged,Married 260 637500 46.81
36) INCOME<7.5 213 395300 44.46
72) DIST.REG<5.06638 182 284900 42.25

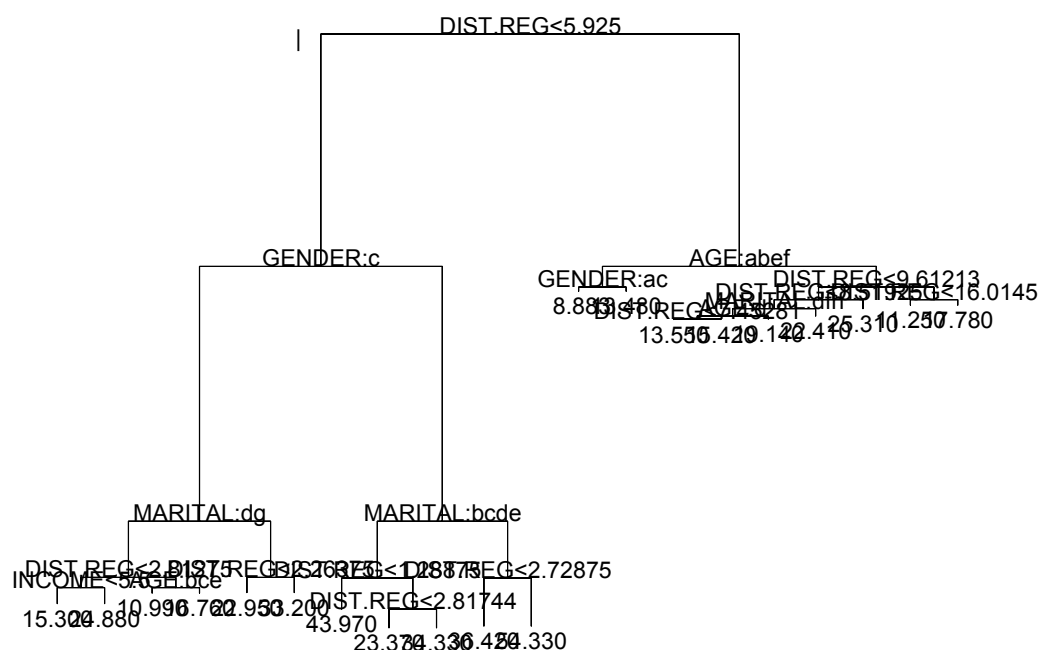
```

```

144) INCOME<5.5 65 43820 33.58
288) DIST.REG<2.43975 30 22640 36.83 *
289) DIST.REG>2.43975 35 20600 30.79 *
145) INCOME>5.5 117 233500 47.07
290) DIST.REG<3.631 87 187800 51.38
580) DIST.REG<2.0795 45 78610 43.61 *
581) DIST.REG>2.0795 42 103600 59.70 *
291) DIST.REG>3.631 30 39380 34.58 *
73) DIST.REG>5.06638 31 104300 57.42 *
37) INCOME>7.5 47 235700 57.46 *
19) MARITAL:Divorced,Not Specified,Separated,Single,Widow/er 76 305700
61.35
38) DIST.REG<2.79213 38 166400 53.62 *
39) DIST.REG>2.79213 38 134700 69.08 *
5) AGE>3.5 64 217600 69.06
10) DIST.REG<2.40011 30 120500 75.92 *
11) DIST.REG>2.40011 34 94530 63.01 *
3) DIST.REG>6.02512 365 435800 32.66
6) AGE<1.5 63 34790 22.44
12) GENDER:2 31 7440 18.32 *
13) GENDER:0,1 32 26320 26.42 *
7) AGE>1.5 302 393000 34.79
14) DIST.REG<7.13306 53 32060 27.51 *
15) DIST.REG>7.13306 249 357500 36.34
30) DIST.REG<8.07375 69 126000 43.99
60) DIST.REG<7.63375 34 35910 38.90 *
61) DIST.REG>7.63375 35 88390 48.93 *
31) DIST.REG>8.07375 180 225900 33.41
62) MARITAL:Divorced,Engaged,Single 31 10480 21.78 *
63) MARITAL:De facto,Married,Separated,Widow/er 149 210400 35.83
126) AGE<3.5 115 192000 37.67
252) AGE<2.5 41 36480 31.29 *
253) AGE>2.5 74 152900 41.20
506) DIST.REG<10.8214 44 63540 37.27 *
507) DIST.REG>10.8214 30 87730 46.95 *
127) AGE>3.5 34 16690 29.63 *

```

Appendix 9 Full output for decision tree analysis based on EGM session expenditure



*** Tree Model ***

Regression tree:

```
tree(formula = B4CSPEND ~ AGE + MARITAL + INCOME + GENDER + DIST.REG, data =
  DT.data, na.action=na.exclude, mincut = 30, minsize = 60, mindev =
  0.01)
```

Number of terminal nodes: 20

Residual mean deviance: 1065 = 930700 / 874

Distribution of residuals:

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
	-51.330	-13.200	-5.298	0.000	4.702	456.000

node), split, n, deviance, yval

* denotes terminal node

- 1) root 894 1055000 22.760
- 2) DIST.REG<5.925 518 919900 28.160
- 4) GENDER:2 298 165600 20.670
- 8) MARITAL:Married,Single 207 60890 17.090
- 16) DIST.REG<2.81275 107 45940 19.780
- 32) INCOME<5.5 57 8426 15.300 *
- 33) INCOME>5.5 50 35070 24.880 *
- 17) DIST.REG>2.81275 100 13360 14.220
- 34) AGE:1,2,4 44 2063 10.990 *
- 35) AGE:3,5 56 10480 16.760 *
- 9) MARITAL:De facto,Divorced,Engaged,Not Specified,Separated,Widow/er 91 96000 28.810
- 18) DIST.REG<2.26375 39 20270 22.950 *

19) DIST.REG>2.26375 52 73390 33.200 *
 5) GENDER:1 220 715000 38.300
 10) MARITAL:Divorced,Engaged,Married,Not Specified 127 395100 32.900
 20) DIST.REG<1.28875 30 262300 43.970 *
 21) DIST.REG>1.28875 97 128000 29.470
 42) DIST.REG<2.81744 43 14520 23.370 *
 43) DIST.REG>2.81744 54 110600 34.330 *
 11) MARITAL:De facto,Separated,Single,Widow/er 93 311100 45.670
 22) DIST.REG<2.72875 45 112600 36.420 *
 23) DIST.REG>2.72875 48 191100 54.330 *
 3) DIST.REG>5.925 376 99620 15.330
 6) AGE:0,1,4,5 123 10950 11.160
 12) GENDER:0,2 62 2954 8.883 *
 13) GENDER:1 61 7343 13.480 *
 7) AGE:2,3 253 85500 17.350
 14) DIST.REG<9.61213 166 66190 19.370
 28) DIST.REG<8.51925 134 39120 17.950
 56) MARITAL:Married,Separated,Widow/er 94 25280 16.050
 112) AGE:3 62 11490 14.450
 224) DIST.REG<7.45281 32 6631 13.550 *
 225) DIST.REG>7.45281 30 4810 15.420 *
 113) AGE:2 32 13320 19.140 *
 57) MARITAL:De facto,Divorced,Engaged,Single 40 12710 22.410 *
 29) DIST.REG>8.51925 32 25660 25.310 *
 15) DIST.REG>9.61213 87 17350 13.510
 30) DIST.REG<16.0145 57 4726 11.250 *
 31) DIST.REG>16.0145 30 11790 17.780 *

```

graph TD
    Root["DIST.REG < 3.54669"]
    Root --> Left["GENDER:c"]
    Root --> Right["DIST.REG < 9.61213"]
    Left --> Left1["AGE < 1.5"]
    Left --> Left2["DIST.REG < 2.6525"]
    Left1 --> Left1a["MARITAL:dgh"]
    Left1a --> Left1a1["3121.0"]
    Left1a --> Left1a2["454.51256.0"]
    Left2 --> Left2a["DIST.REG < 1.04475"]
    Left2a --> Left2a1["3572.0"]
    Left2a --> Left2a2["DIST.REG < 1.94677"]
    Left2a2 --> Left2a2a["615.51765.0"]
    Right --> Right1["AGE < 2.53385"]
    Right1 --> Right1a["240.9"]
    Right1 --> Right1b["562.4"]
    Right1 --> Right1c["900.4"]
    Right1 --> Right1d["303.3"]
    Right1 --> Right1e["1571.0"]
    Right1 --> Right1f["645.6"]
    Right1 --> Right1g["1536.0"]
    Right1 --> Right1h["268.5"]
    Right --> Right2["GENDER:cat"]
    Right2 --> Right2a["DIST.REG < 8.82725"]
    Right2a --> Right2a1["1536.0"]
    Right2a --> Right2a2["268.5"]
    Right --> Right3["AGE < 1.5"]
    Right3 --> Right3a["1536.0"]
    Right3 --> Right3b["268.5"]
  
```

```
Regression tree:
tree(formula = SPENDTOT ~ AGE + MARITAL + INCOME + GENDER + DIST.REG, data =
  pokietugdata.spl, na.action=na.exclude, mincut = 30, minsize = 60,
  mindev = 0.01)
Variables actually used in tree construction:
[1] "DIST.REG" "GENDER" "AGE" "MARITAL"
Number of terminal nodes: 15
Residual mean deviance: 18840000 = 1.651e+010 / 876
Distribution of residuals:
  Min. 1st Qu. Median Mean 3rd Qu. Max.
-5915.00 -650.10 -293.30 0.00 -54.53 61430.00
node), split, n, deviance, yval
* denotes terminal node

1) root 891 1.790e+010 1061.0
2) DIST.REG<3.54669 335 1.526e+010 1858.0
4) GENDER:2 193 3.949e+009 1065.0
8) AGE<1.5 31 3.370e+009 3121.0 *
9) AGE>1.5 162 4.228e+008 672.1
18) MARITAL:Married,Single,Widow/er 118 9.691e+007 454.5 *
19) MARITAL:De facto,Divorced,Engaged,Not Specified,Separated 44
3.053e+008 1256.0 *
5) GENDER:1 142 1.103e+010 2935.0
10) DIST.REG<2.6525 112 6.156e+009 2135.0
20) DIST.REG<1.04475 42 5.207e+009 3572.0 *
```

21) DIST.REG>1.04475 70 8.096e+008 1272.0
42) DIST.REG<1.94677 30 2.672e+007 615.5 *
43) DIST.REG>1.94677 40 7.602e+008 1765.0 *
11) DIST.REG>2.6525 30 4.533e+009 5921.0 *
3) DIST.REG>3.54669 556 2.297e+009 580.3
6) DIST.REG<9.61213 424 2.245e+009 677.4
12) DIST.REG<8.82725 394 1.446e+009 612.1
24) GENDER:0,2 231 3.118e+008 452.2
48) AGE<2.5 96 4.091e+007 240.9 *
49) AGE>2.5 135 2.636e+008 602.4
98) AGE<3.5 105 2.480e+008 687.9
196) DIST.REG<6.9385 66 5.951e+007 562.4 *
197) DIST.REG>6.9385 39 1.857e+008 900.4 *
99) AGE>3.5 30 1.215e+007 303.3 *
25) GENDER:1 163 1.120e+009 838.7
50) AGE<1.5 34 9.365e+008 1571.0 *
51) AGE>1.5 129 1.605e+008 645.6 *
13) DIST.REG>8.82725 30 7.755e+008 1536.0 *
7) DIST.REG>9.61213 132 3.454e+007 268.5 *