

Drinking cultures and social occasions

Alcohol harms in the context of major public
holidays and cultural events

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Drinking cultures and social occasions:

Alcohol harms in the context of major public
holidays and cultural events

Belinda Lloyd
Sharon Matthews
Michael Livingston
Harindra Jayasekara

December 2011

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We thank the project expert advisory group for agreeing to contribute their knowledge and expertise to this project.

Acronyms

ABS	Australian Bureau of Statistics
ED	Emergency department
PCR	patient care record
SRI	Serious road incident
VACIS	Victorian Ambulance Clinical Information System
VAED	Victorian Admitted Episode Dataset
VEMD	Victorian Emergency Minimum Dataset

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Summary

Harms associated with alcohol consumption in the context of public holidays and social events were explored in terms of general patterns, gender patterns and age patterns. A range of alcohol-related harms were considered, including acute intoxication requiring medical attention, assaults, and motor vehicle accidents. The use of time series analysis allows exploration of the levels of harms associated with specific events after controlling for the impact of seasonal and temporal variations in alcohol-related harms.

Acute Alcohol Intoxication

Across all populations examined, the peak months of the year for ambulance attendances, emergency department presentations, and hospital admissions attributed to acute alcohol intoxication were November and December, with February also being identified as a peak month among males. Consistent with the literature, Fridays and Saturdays were the days with the highest concentrations of alcohol intoxication related attendances, presentations and admissions.

For all demographic groups included in analyses, there were significantly elevated cases of acute alcohol intoxication occurring on the day preceding most public holidays. When examining acute intoxication cases for all patients, increased harms occurred on New Year's Day and ANZAC Day, whilst for males and females separately New Year's Day was the only public holiday where there were significantly elevated cases of acute intoxication, with significantly reduced numbers of cases of intoxication occurring on Boxing Day. Among youths, New Year's Day, Australia Day and ANZAC Day represented days with elevated numbers of cases of acute alcohol intoxication. On the day following Boxing Day, there were significantly fewer cases of acute intoxication on the day following Boxing Day.

Among all population groups, there was a significant increase in alcohol intoxication cases on the last working day before Christmas, which reflects an increase in acute intoxication cases among males on this day. St Patrick's Day also represented an occasion with significantly elevated occurrences of acute intoxication cases for males. There was a significantly lower number of cases of acute intoxication cases than predicted on the day following the last working day before Christmas across all patients, males, females and youths.

Assault

Consistent with previous research, the warmer months of the year represent peak times for assaults among all groups examined. Similarly, Friday and Saturday are the days of the week with the most assaults recorded across emergency department and hospital measures examined for all groups, with Sundays also being a peak day for females. In terms of police recorded assaults and family incidents, Saturdays and Sundays represented the peak days.

There were significantly elevated cases of assault on the day before all public holidays other than Christmas Day for all population groups examined other than females, who experienced increased numbers of assaults on the day before New Year's Day, Labour Day and Good Friday. In terms of family incidents, New Year's Eve represented a day of increased harms for all population groups examined. For all groups, New Year's Day, Australia Day and ANZAC Day represented days of significantly elevated numbers of assault presentations, with significantly lower numbers of assaults noted on Good Friday. Among all presentations and males, there were significantly lower numbers of assault presentations than predicted on the day following Boxing Day.

The last working day before Christmas was shown as a day of significantly elevated assault cases for all groups. St Patrick's Day also represented a day of elevated assaults for all emergency department and hospital presentations, males and youths, whilst among youths, there were significant increases in assaults during the St Kilda festival. On the day following the last working day before Christmas, there were significantly lower numbers of assaults than predicted among all groups other than females.

Motor Vehicle Accidents

Smaller effects were noted for motor vehicle accidents in measures of incidents and also hospitalisations.

The warmer months of the year were the peak times for motor vehicle accidents. For all groups, Friday and Saturday were found to be peak days of elevated cases of motor vehicle accidents, with elevated events also occurring on Thursdays among males.

The day preceding Good Friday was the only lead up day to a public holiday where motor vehicle accident cases were significantly elevated for all groups explored. For 'all' patients the day preceding Australia Day was also associated with increased motor vehicle accident cases – which is likely to be due to an elevation in cases among males who also experienced increase events on New Year's Eve. Among youths, the day before ANZAC Day and the day before the Queen's Birthday holiday were also associated with increased cases. Across the groups included in analyses, there was variation in effects, with increased numbers of motor vehicle accident cases on some public holidays such as New Year's Day and Easter, and significantly reduced numbers of harms on other public holidays such as Good Friday. A reduction in motor vehicle accidents was noted for the day following Boxing Day.

There were no significant effects found for motor vehicle accident presentations and social events for any of the groups examined.

Chapter 1: Introduction

Background

Increasing media and public interest has focused on problematic alcohol consumption, and particularly binge drinking and the link with violence, usually assaults. Whilst this attention has included concern regarding perceived harms associated with public social events, there is little evidence to assess the relationship between major social events, and alcohol-related harms.

Alcohol consumption and intoxication

A substantial literature exists that examines drinking behaviour and associated harms by 'time' – such as seasonal, monthly, day of the week and time of day trends. (Abel, Strasburger, & Zeidenberg, 1985; Briscoe & Donnelly, 2001; Brower & Carroll, 2007; Budd, 2000; Pridemore, 2004; Silm & Ahas, 2005; Stockwell et al., 1998; Young, 2004). Often the focus is on intoxication, violence and road injury. While seasons and monthly associations have provided inconsistent results internationally, day of the week has been a consistent predictor. Weekends and evenings tend to show higher prevalence of alcohol harms variously defined (Briscoe & Donnelly, 2001; Brower & Carroll, 2007; Budd, 2000; Young, 2004). At the extreme, homicide has been shown to have a day of week effect in New York (Abel et al., 1985). Weekends in Russia have a higher incidence of homicide (Pridemore, 2004). While 'time' is an important factor, the general association of alcohol and violence is unequivocal (Brinkman, Chikritzhs, Stockwell, & Mathewson, 2001; Mosher & Jernigan, 2001) (Bushman & Cooper, 1990; Zhang, Wieczorek, & Welte, 1997).

Although weekends and evenings equate to social times and would overlap with social, cultural and even sporting events, surprisingly there is only a modest literature that examines these events explicitly in relation to alcohol consumption and associated harms. Where the literature does examine these events the focus is usually on a particular holiday or event, with a minority examining a combination. For instance, in Finland alcohol poisonings were shown to peak during weekends and during celebrations on May Day, Midsummer Day and Christmas Day (Poikolainen, Leppanen, & Vuori, 2002).

Others have focused on rock concerts as a 'single day mass gathering event' to assess the impact on emergency medical services demand and subsequent response in general. Feldman (2004) showed very little alcohol harm. Out of a total 450,000 who attended a Rolling Stones concert in Toronto, 1870 sought medical care and only 30 were seen for alcohol or drug intoxication. In contrast, Erickson et al (1996) examined first aid station presentations across five rock concerts at a single venue in Chicago: 42% were seen for trauma, 17% for alcohol intoxication, 15% drug intoxication. 48% of those treated admitted to using alcohol or drugs while attending the concert. Yet others have focused on particular venues and events, such as music dance events or football at a particular stadium. Furr-Holden et al (2006) for instance surveyed music dance event attendees in two US cities on alcohol and drug use and intent to drive post event. Even though driving status reduced

alcohol consumption, 62% of those who reported their intention to drive away from the event were positive for drugs or alcohol on leaving.

Emergency department presentations during and after music and sporting events have also been examined, while alcohol often is not considered or measured (Grange, Baumann, & Vaezazizi, 2003; McGreevy et al., 2010), others have found associations. Chan and Quinn (2003) demonstrated following rock concerts there was a higher incidence of alcohol or drug use presentations to the emergency department compared to pop concerts and wrestling events at the same stadium in the US. They showed that alcohol and drug related presentations occupied the most time in the emergency department.

Violence

Many of these studies have looked at alcohol consumption and intoxication in particular regarding attendance at music events as well as holiday periods. Although there is overlap, many have focused on violence and alcohol-related violence specifically.

In terms of family violence, White et al (1992) showed that victimisation patterns are different across gender. Women present to emergency departments more on Christmas day and New Year's Day whereas men have higher admissions to the emergency department on Thanksgiving. Victorian data over the period 2003 to 2009 indicates that the majority of victims of family violence incidents reported to police were female, with just under 25% of victims being male (Victoria Police, 2009).

Little research exists around the occurrence of road traffic accidents and social and sports events. As indicated earlier there is work around time of day and day of week but little else of relevance here.

Consuming alcohol in Australia is enmeshed with celebration and cultural traditions. There are certain expectations on how people should behave in certain social settings (particularly for young people) and this can involve the expectation of consuming a certain amount of alcohol. Australia's endemic drinking culture is demonstrated through large scale music events such as the Big Day Out, which is partnered with Australia Day. These events have been associated with drinking to excess (Roche et al., 2007).

Objectives

The purpose of this study is to develop an understanding of the relationships between public events and alcohol-related harms. Identification of the timing of major social events (cultural and public holidays), and their association with alcohol-related harms will be achieved through analysis of ambulance attendances, traffic accidents hospital emergency department presentations and hospital admissions in terms of timing and proximity to major events occurring in Melbourne. Importantly, this study also enables examination of the role of age and gender in the experience of alcohol-related harms in the context of public holidays and social events.

Rationale

There has been little analysis of the occurrence of alcohol-related harm in relation to major public and social events in Victoria. This project will provide valuable evidence in terms of alcohol-related harms for different populations in the context of timing of major social events. Such evidence will be invaluable in contributing to policy in relation to public health initiatives, emergency services (ambulance and police) and hospital staffing and resource planning, and event planning.

Chapter 2: Methods

The current report examines the pattern of alcohol and other drug related harms associated with major public holidays and social events in metropolitan Melbourne for the nine year period 2001-09. Categories and dates of these events were derived from Victorian State Government calendars (public holidays) and online databases (social events) (see Table A1 in Appendix). The report consists of three separate sections for harms in terms of alcohol intoxication (ambulance attendances, emergency department presentations & hospital admissions), assaults (police recorded assaults and family incidents, emergency department presentations & hospital admissions) and motor vehicle accidents (serious road incidents & hospital admissions). The results are presented for all cases, males, females and youths under each section. These findings have been complemented with graphical descriptions of the variation in alcohol-related harms in relation to day of the week and month of the year in order to allow consideration of temporal and seasonal variations.

Data utilised in the analyses were derived from the Ambo Project dataset (which includes all drug and alcohol-related ambulance attendances), VicRoads serious road incident data (detailing motor vehicle accidents), the Victorian Emergency Minimum Dataset (detailing hospital emergency presentations), the Victorian Admitted Episodes Dataset (that includes all hospital separations) and the Victoria Police Law Enforcement Assistance Program (LEAP) database (that includes all police recorded offences).

Ambulance attendances

These data are derived from the *Ambo Project: Alcohol and Drug related Ambulance Attendances* (formerly known as the *Surveillance of Drug Related Events Attended by Ambulance in Melbourne* project). This project collates information from alcohol and other drug related non-fatal attendances by ambulance paramedics in metropolitan Melbourne. The data are obtained from the patient care records that are completed by the attending paramedics for every incident that they attend and for which they provide a service. These are coded and entered by specifically trained project staff into a database which contains information including demographic and location characteristics, clinical signs, treatment details and outcomes. Drug involvement in the attendance is determined by paramedic clinical assessment and information available at the scene, and cases are included where the drug played a causal role in the reason for the ambulance attendance.

Data were extracted from a database developed for examining nonfatal drug-related ambulance attendances in the Melbourne metropolitan area (Dietze et al., 2000). This database is a compilation of patient care records (PCRs) completed by paramedics for each ambulance attendance.

Paramedics document medications that are considered to be involved in the presentations. Cases were included in this database where alcohol had a causal role in the patient's presentation or was a significant contributor to the presentation, as determined through paramedic assessment. Details included presenting characteristics of cases (including demographic and clinical signs), treatments

provided, and transportation outcomes. For this study, cases were extracted where alcohol intoxication only was recorded on the case record from January 2000 to June 2009. As a consequence of paramedic industrial action, data were unavailable from October 2002 to February 2003 inclusive and June to July 2004 inclusive.

Serious Road Incidents - VicRoads Road Network Database (RNDB)

The VicRoads Road Network Database (RNDB) is compiled from Victoria Police information. Forms completed by police detailing each crash, where (according to LGA) and when it occurred, who was involved, vehicles involved and a description of the crash are entered into a police database. This information is transferred electronically and weekly to the VicRoads RNDB. Additional information from these forms, not entered by police, is added to the RNDB by VicRoads. Data for the financial years 1999/00 through to 2008/09 were obtained from VicRoads.

Emergency Department Presentations

Data on presentation to Emergency Departments came from the Victorian Emergency Minimum Dataset (VEMD). The VEMD contains detailed demographic, clinical and administrative information on all presentations to Victorian public hospitals with 24-hour emergency departments. VEMD data was available from January 2000 through to June 2009. The VEMD contains a range of information regarding the reason behind each presentation. This includes three fields for ICD10 diagnoses and a series of data items relating to injury surveillance.

Presentations relating to acute intoxication were extracted using the three diagnosis codes. If any of these three codes was 'F10.0 – acute intoxication due to alcohol use', then the presentation was counted as an intoxication presentation.

Assault presentations were extracted using the injury surveillance measures. Any injury presentation that had a human intent entry of 'assault – not otherwise specified' was included in the analysis as an assault presentation. This excludes sexual assault, domestic violence and child maltreatment. The VEMD was the subject of a validation study in 2000, which found that approximately 17.5% of cases were not recorded at all and that there was an error rate of around 11% in the human intent field that we have used to identify assault-related presentations. The review also found some bias in the data, with more missing data on Sunday presentations, although it was not clear whether the missing or erroneous data would be more likely around public holidays or major events (Stokes et al., 2000). Unfortunately the data does not allow cases to be determined where alcohol and assault co-presented. The two 'diagnoses' in terms of the dataset are mutually exclusive.

Hospital admissions

Information on alcohol-related hospital admissions was obtained from the Victorian Admitted Episodes Dataset (VAED) for the 1999/00 through to 2008/09 financial years. The VAED is a database maintained by the Victorian Department of Health and contains details of all acute hospital

separations in Victoria including information on the cause of the admission (according to ICD coding), as well as the age, sex and resident LGA of the admitted patient. The term ‘acute hospitals’ refers to public, private and denominational hospitals, acute facilities in rehabilitation and extended care (sub acute) facilities, day procedure centres and designated acute psychiatric units in public hospitals. Residential care (nursing homes), hostels, supported residential services and state managed psychiatric institutions are not included in the VAED.

Police recorded assaults and family incidents

The Victoria Police Law Enforcement Assistance Program (LEAP) database system captures information on crime reported to Victoria Police. Information is available across various crime categories including reported assault and family incidents. Data have been collected through the LEAP system since the 1993-94 financial year. However, owing to Victoria Police privacy protocols, unit record data are not released to external agencies. Only tabulated data are available from this system. LEAP was designed primarily for operational policing purposes and is a dynamic database. That is, Victoria Police updates existing records with new information as it becomes available. Records are also revised when investigations identify additional information. The Central Data Entry Bureau also amends records when quality control checks identify inaccurate or incomplete information. Because of the dynamic nature of LEAP, data extracted over time for the same time period can feasibly give rise to varying results. Data on assaults and family incidents from the LEAP database are used in this report.

Assaults

Assaults in the LEAP database can be variously defined – victim assaults, offenders, incidents and police assaults. Victim assaults equate to those who have been assaulted – there can be many victims involved in one incident or per offender. Police assaults relate to where members of Victoria Police have been assaulted. Victim assaults are included in this report. Police assault data are excluded owing to the potential biased nature of these data.

Family incidents

The LEAP data on family incidents is synonymous with family violence. The data included in this report incorporates all police recorded family incidents, regardless of assessment of alcohol involvement. The data refers to the principal victim of the family incident.

Statistical analysis

As the records are from a daily time-series, there is likely to be serial auto-correlation present in the data. Serial auto-correlation occurs when observations at a particular point in time are related to observations at a specified number of time points away. Commonly, this occurs when observations from two time points are correlated. The use of ordinary least square (OLS) regression on time-series data with serial auto-correlation results in auto-correlated residuals and inefficient estimation. We have used Auto-Regressive Integrated Moving-Average (ARIMA) methods which provide a range of

options for dealing with the interdependence of time-series data (Yaffee and McGee, 2000). Because we were interested in assessing the impact of day of week and month of year on alcohol-related presentations, the modelling process focussed on ensuring the model residuals were free from auto-correlation and trends, rather than the original dataset. Separate models were developed for alcohol intoxication, assaults and motor vehicle accidents. These analyses also included investigation of lead and lag effects in relation to selected events.

To ensure that the daily data meaningfully reflected harms related to particular events, days were recorded so that they ran from 6 am to 6 am (rather than midnight to midnight). Thus, a presentation for intoxication at 1 am on a Sunday morning was coded as a Saturday presentation as the alcohol consumption related to the presentation would have taken place on Saturday night. As this report is focussed on the alcohol and other drug related harms associated with major events in Melbourne, only presentations from hospitals within the Melbourne metropolitan regions were examined.

For each of the analyses undertaken, graphs of significant results are presented in the Results chapters. Full tabulated results are included in the Appendices for reference.

Chapter 3: Alcohol Intoxication

In order to explore the relationship between alcohol intoxication and public holidays and social events three measures of acute alcohol intoxication were utilised in analyses – ambulance attendances for acute alcohol intoxication with no other drugs present, hospital emergency presentations for alcohol intoxication and hospital admissions for alcohol intoxication.

Results are presented for all cases, males and females separately, and for youth (persons aged less than 25 years).

All cases

Seasonal and time of week patterns

As shown in Figure 1, peaks in ambulance attendances, emergency department presentations and hospital admissions for alcohol intoxication occur in the warmer months of the year, with November and December being the months with the highest numbers of cases. In terms of the distribution of alcohol intoxication cases over the course of the week, Friday and Saturday are shown as the days of the week with the greatest concentration of alcohol intoxication attendances, presentations and admissions (Figure 2).

Figure 1: Mean number of ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication by month

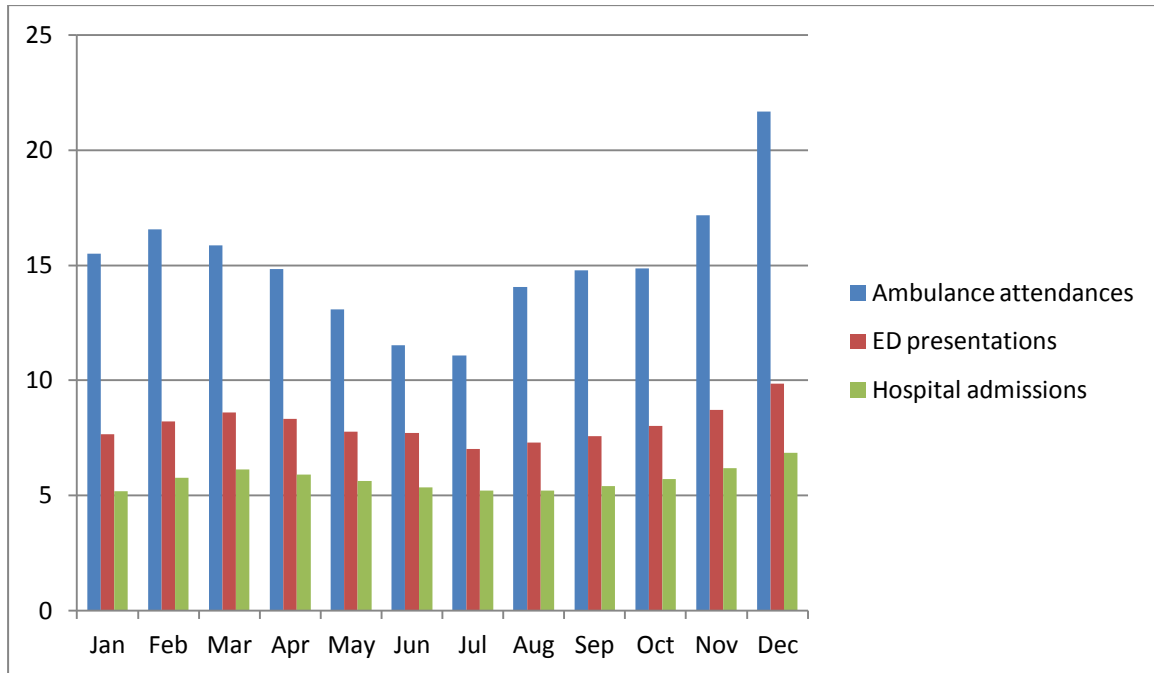
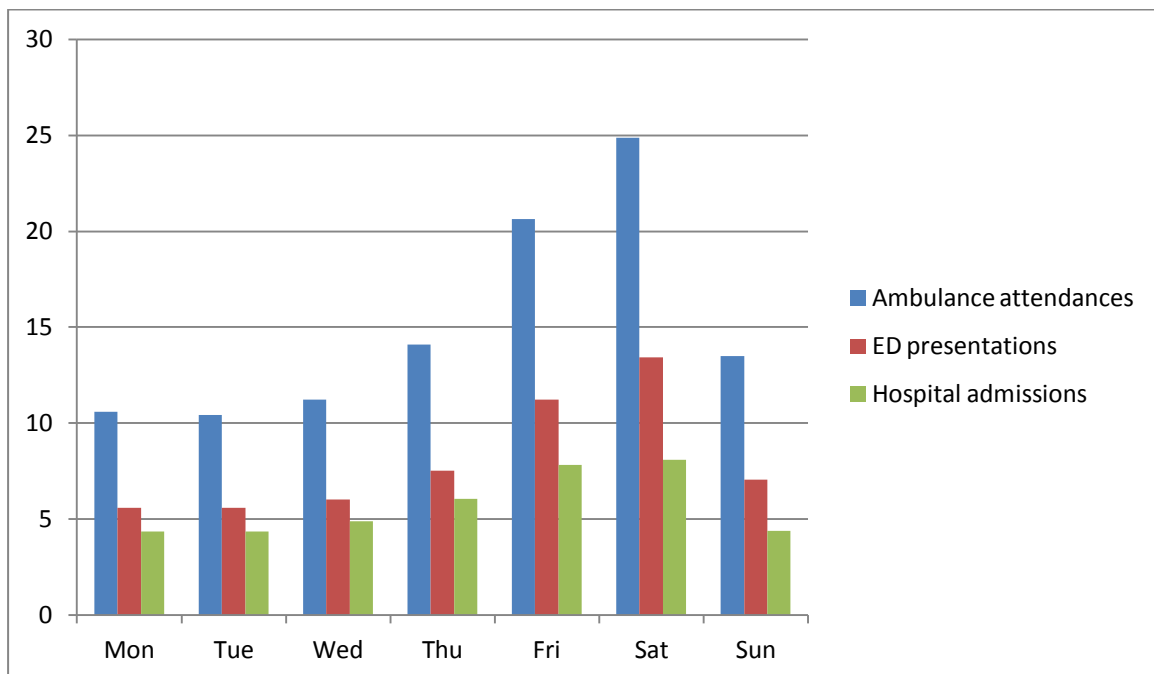


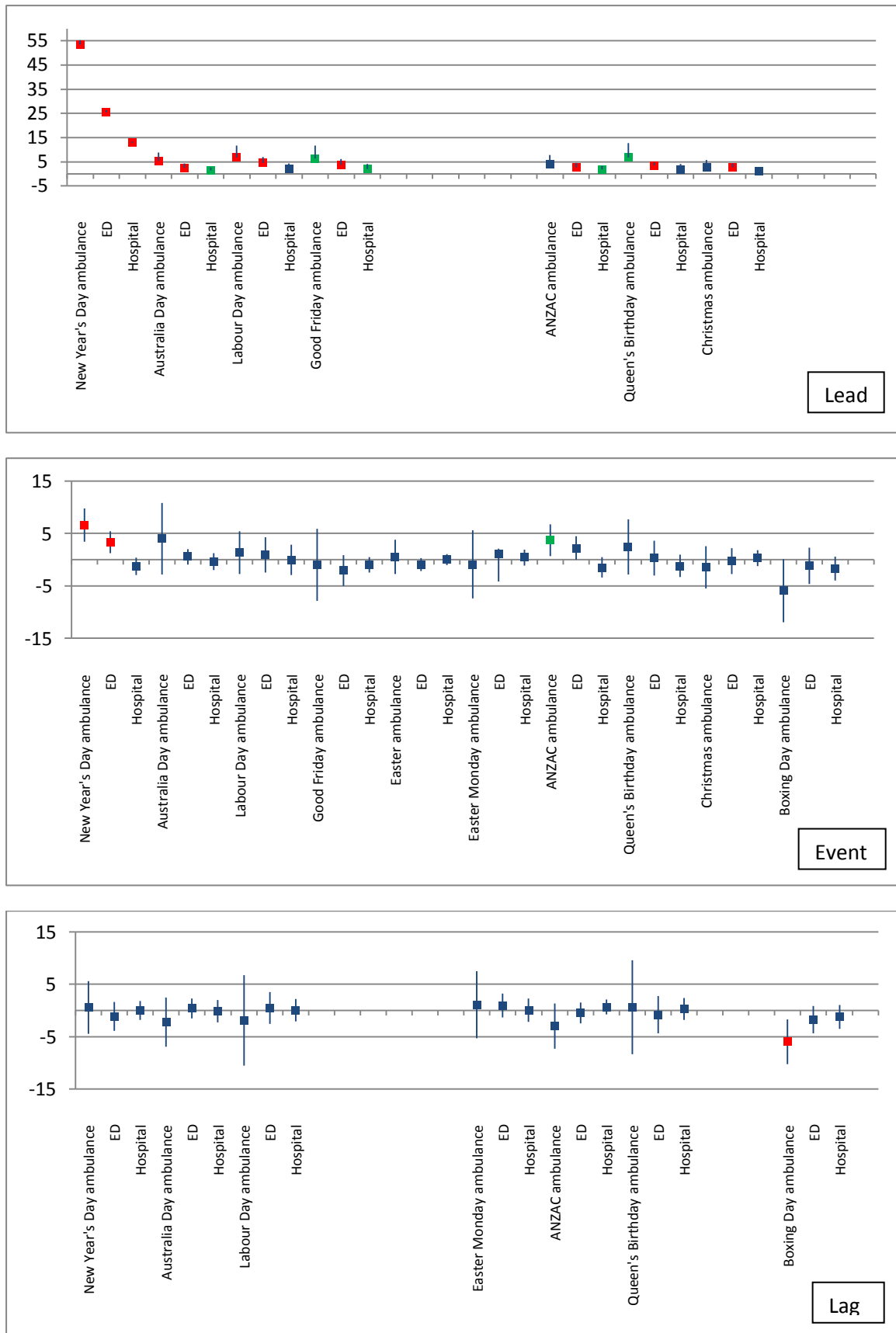
Figure 2: Mean number of ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication by day of week



Alcohol intoxication and public holidays

Increased cases of alcohol intoxication were found for the day preceding most public holidays (Figure 3). Significant increases in alcohol intoxication occurred on New Year's Day (ambulance attendances and emergency presentations), and also ANZAC Day (ambulance attendances). The only significant effect occurring on the day following a public holiday was for the day following Boxing Day, where there were significantly fewer ambulance attendances than predicted.

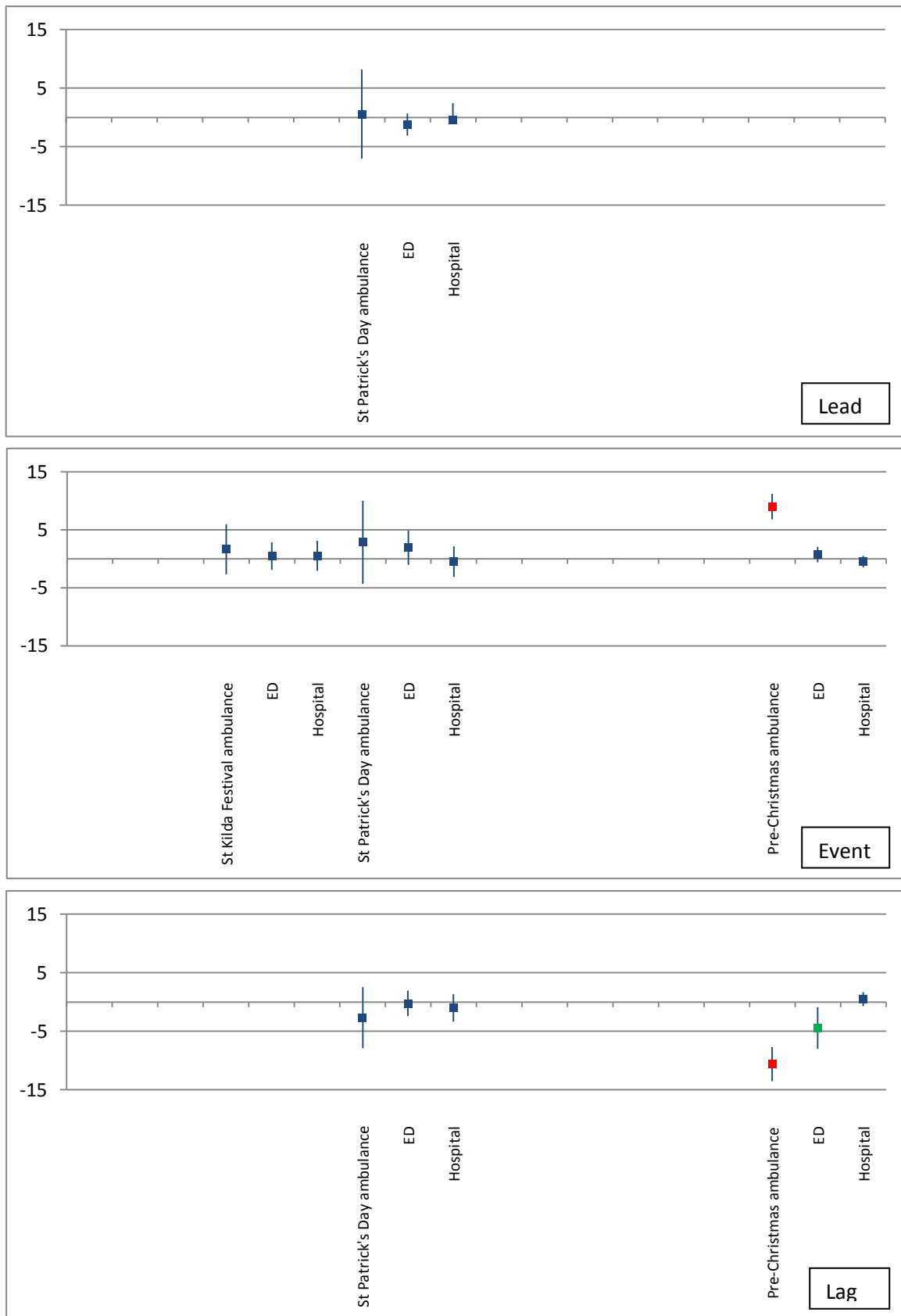
Figure 3: ARIMA model parameters for ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication – Public Holidays



Alcohol intoxication and major social events

As displayed in Figure 4, a significant increase in alcohol intoxication related ambulance attendances was noted on the last working day before Christmas. The numbers of alcohol-related ambulance attendances and emergency department presentations were significantly lower than predicted on the day following the last working day before Christmas.

Figure 4: ARIMA model parameters for ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication – Social Events



Males

Seasonal and time of week patterns

Alcohol-related ambulance attendances, emergency department presentations and hospital admissions for male patients peaked in the warmer months of the year, with February, November and December being the months with the highest numbers of cases (Figure 5). As shown in Figure 6, the distribution of alcohol intoxication cases over the course of the week indicates that Friday and Saturday were the days of the week with the greatest concentration of alcohol intoxication attendances, presentations and admissions.

Figure 5: Mean number of ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication for males by month

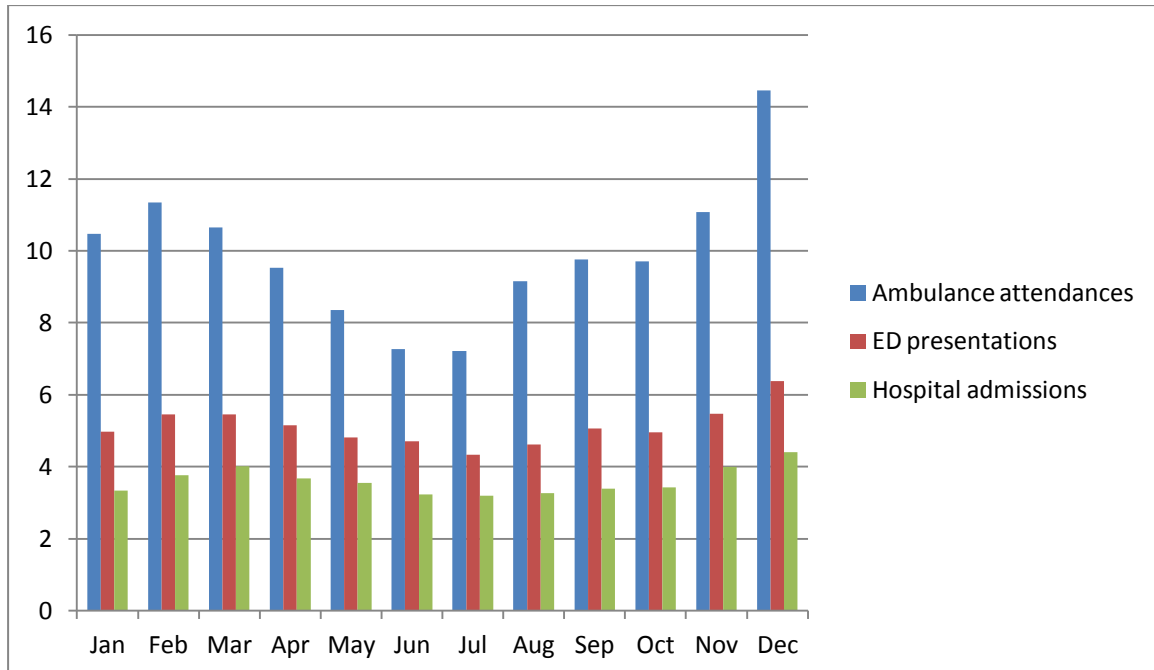
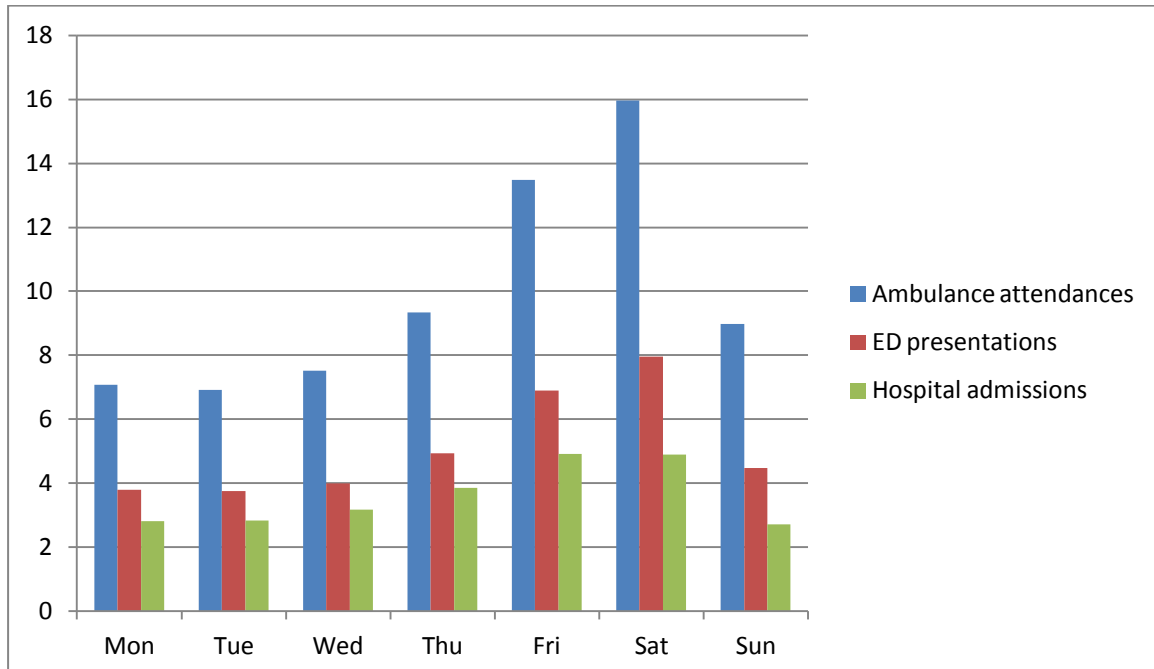


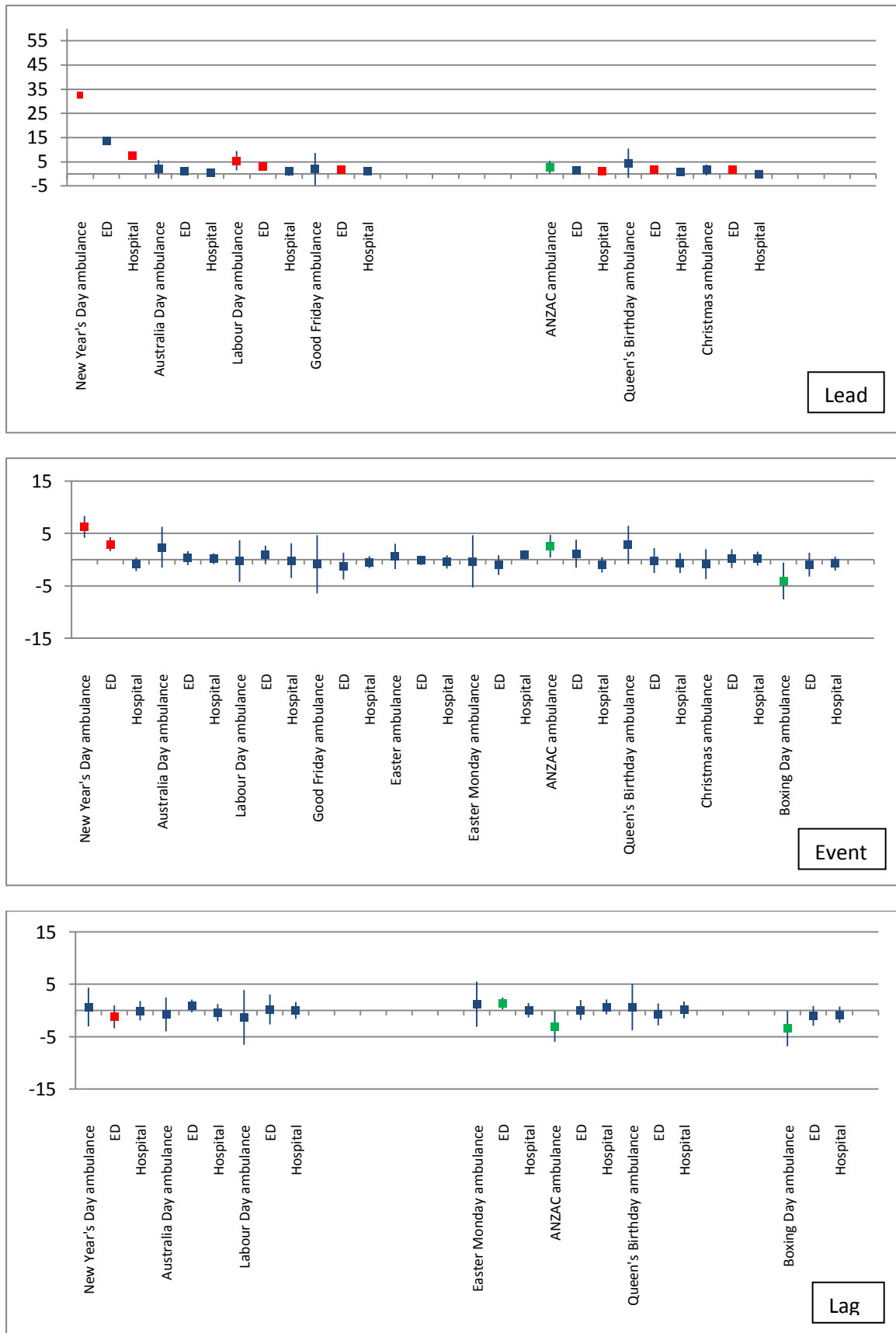
Figure 6: Mean number of ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication for males by day of week



Alcohol intoxication and public holidays

Increased cases of alcohol intoxication were found for the day preceding most public holidays (Figure 7). Significant increases in alcohol intoxication occurred on New Year's Day (ambulance attendances and emergency presentations), while there was a significantly lower number of ambulance attendances than predicted occurring on Boxing Day. There were significantly lower numbers of alcohol intoxication cases occurring on the day following a public holiday for ANZAC Day and Boxing Day (ambulance attendances), with a significant increase in the number of emergency department presentations on the day following Easter Monday.

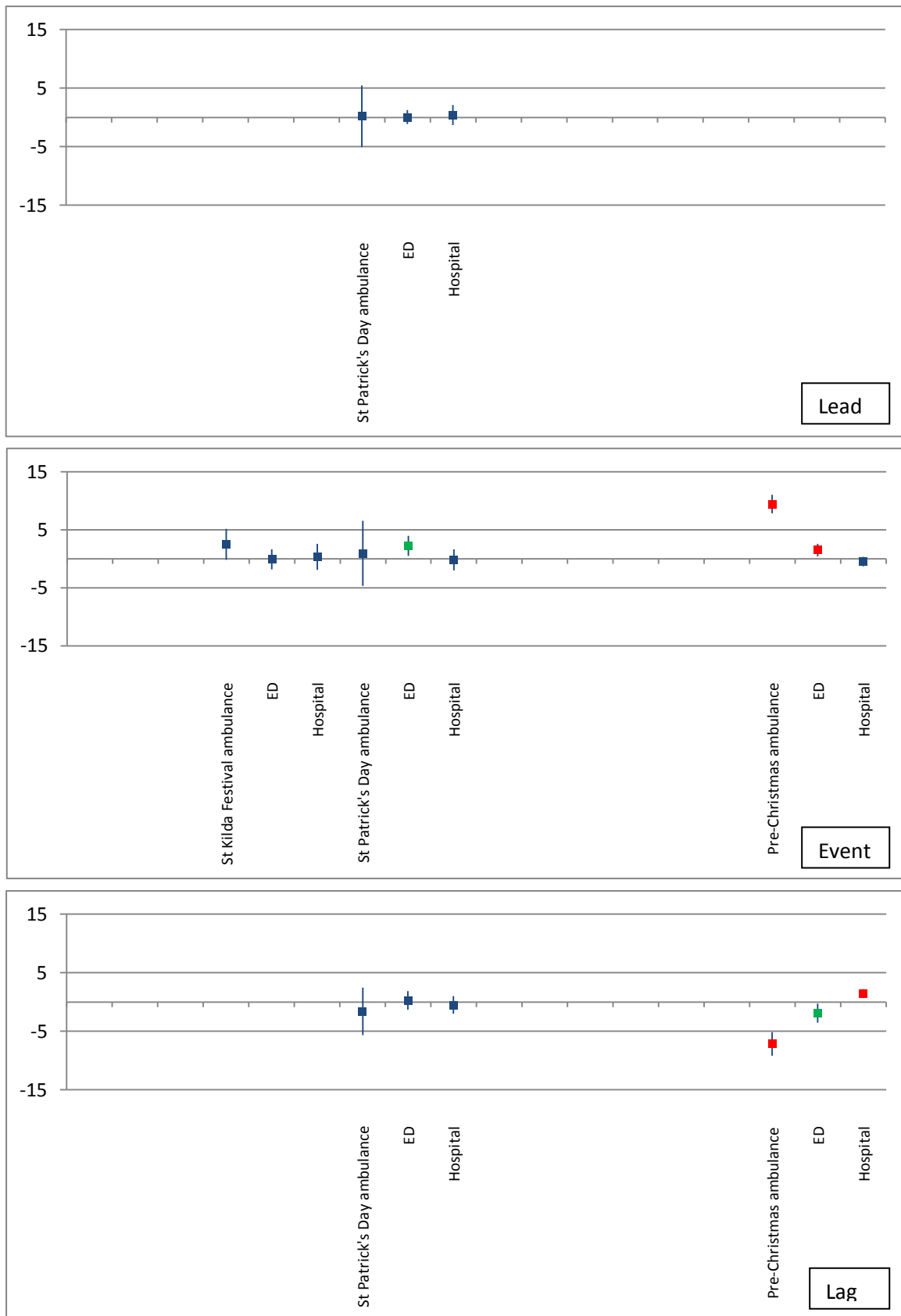
Figure 7: ARIMA model parameters for ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication for males – Public Holidays



Alcohol intoxication and major social events

Significant increases in alcohol intoxication related ambulance attendances and emergency department presentations were found for males on the last working day before Christmas, and a significant increase in emergency department presentations on St Patrick's Day (see Figure 8). The numbers of alcohol-related ambulance attendances and emergency department presentations were significantly lower than predicted on the day following the last working day before Christmas, whilst alcohol intoxication related hospital admissions were significantly higher than predicted.

Figure 8: ARIMA model parameters for ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication for males – Social Events



Females

Seasonal and time of week patterns

Alcohol-related ambulance attendances, emergency department presentations and hospital admissions for female patients peaked in the warmer months of the year, with November and December being the months with the highest numbers of cases (Figure 9). As shown in Figure 10, the distribution of alcohol intoxication cases over the course of the week indicates that Friday and Saturday were the days of the week with the greatest concentration of alcohol intoxication attendances, presentations and admissions.

Figure 9: Mean number of ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication for females by month

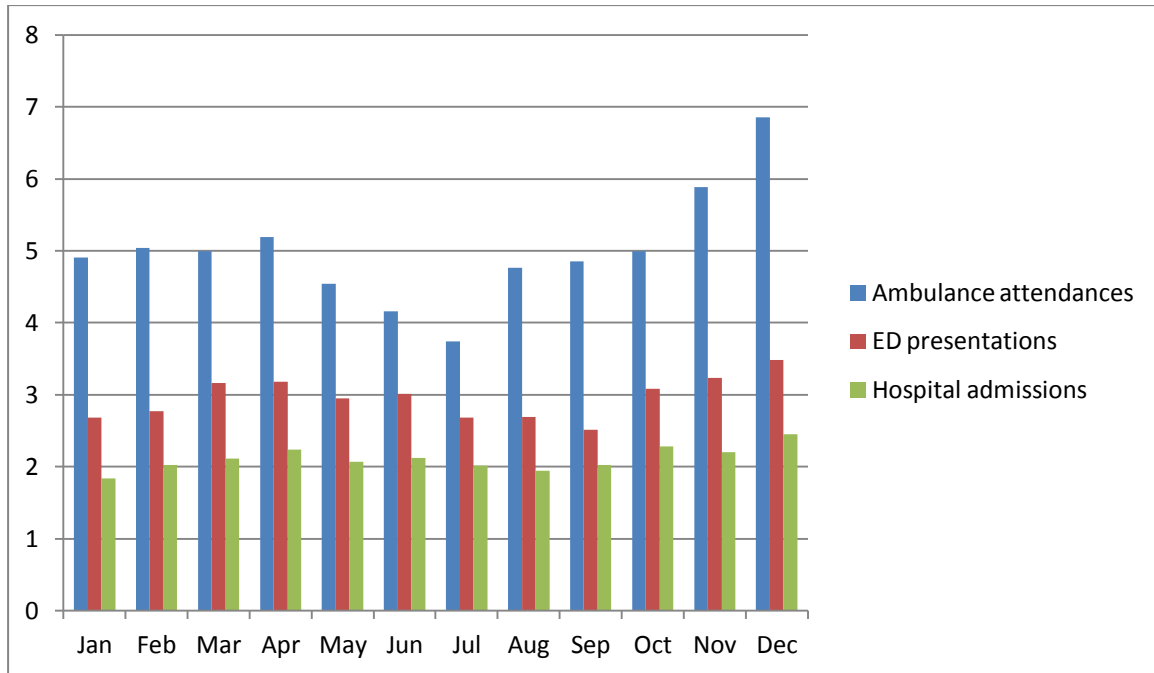
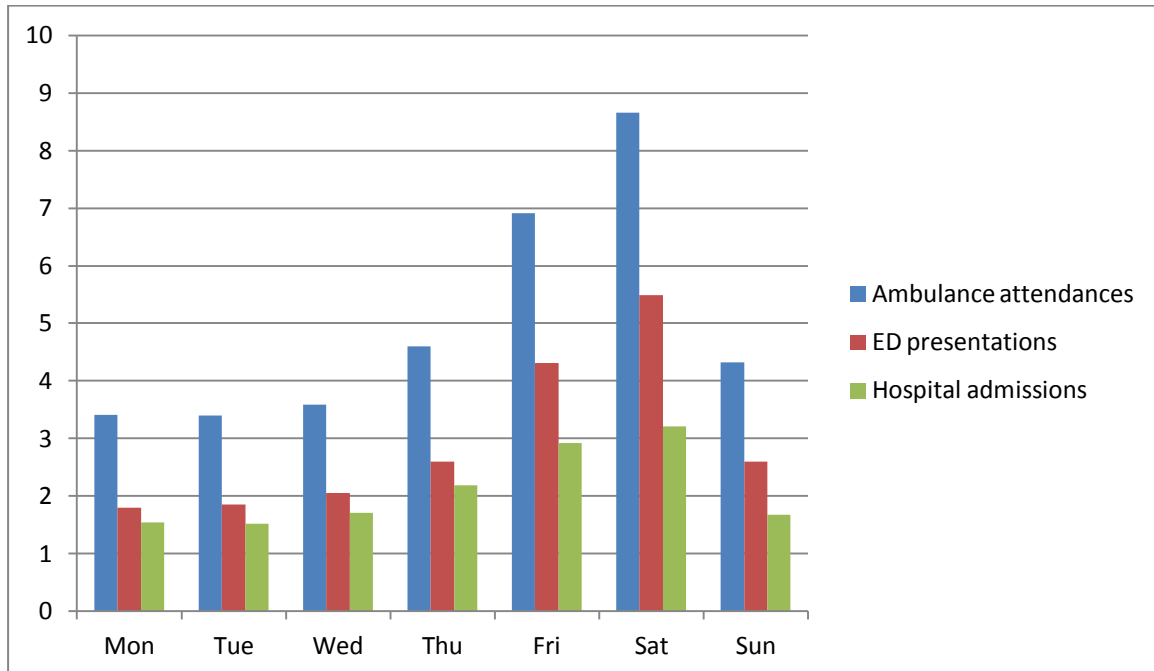


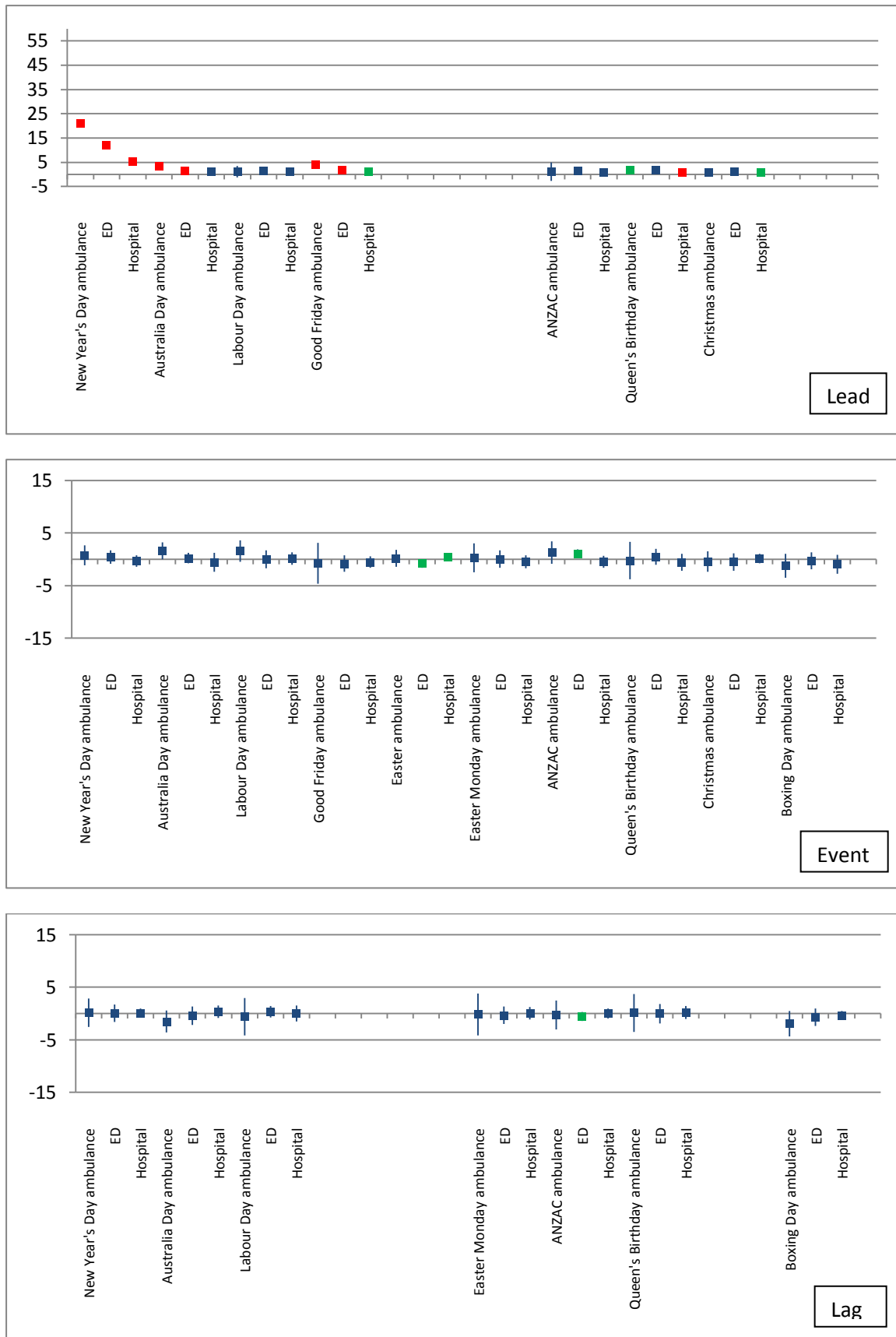
Figure 10: Mean number of ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication for females by day of week



Alcohol intoxication and public holidays

As shown in Figure 11, increased cases of alcohol intoxication were found for the day preceding most public holidays for females. Significant increases in alcohol intoxication occurred on ANZAC Day (emergency presentations), while there was a significantly lower number of emergency presentations and a significantly higher number of hospital admissions than predicted occurring on Easter Sunday.

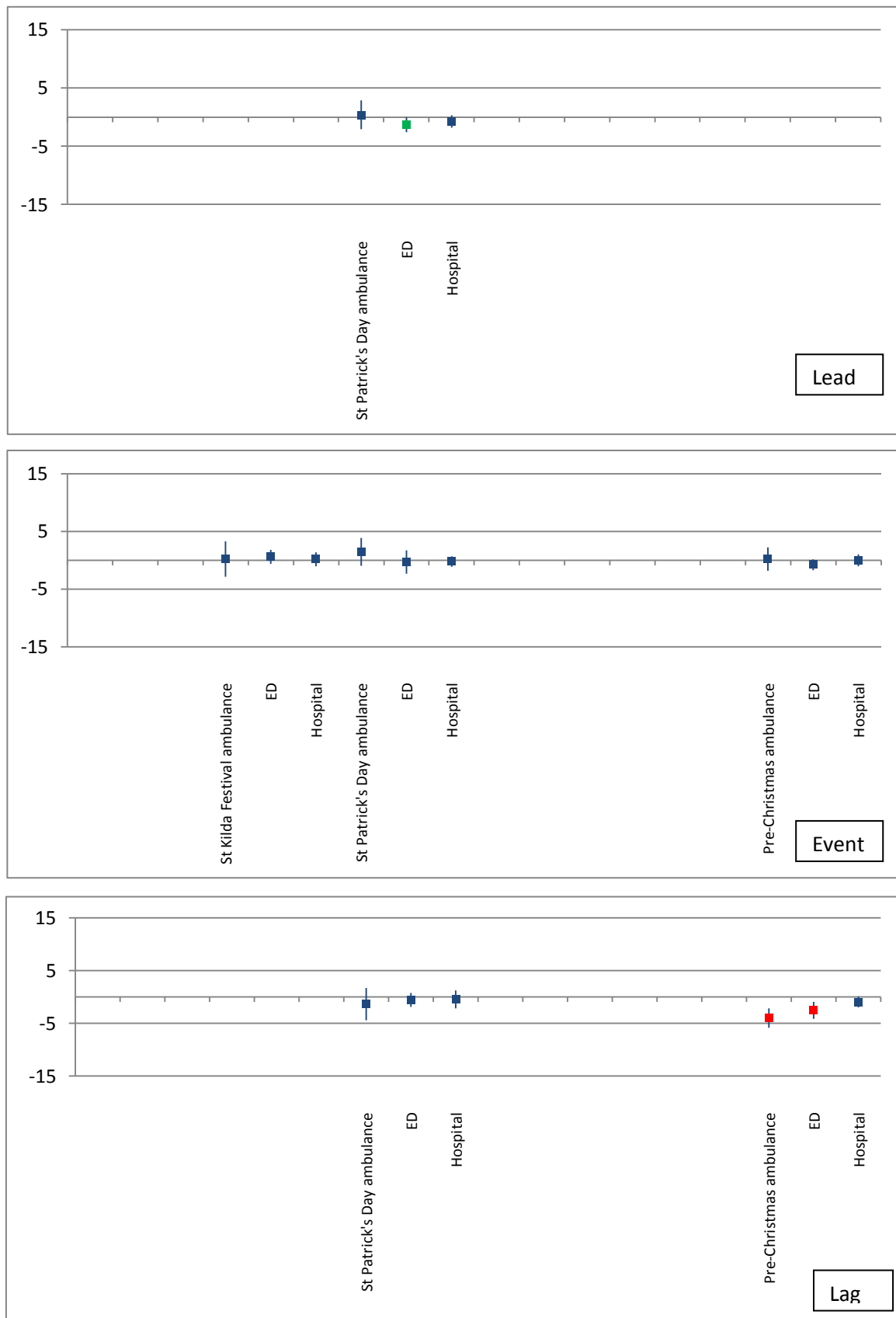
Figure 11: ARIMA model parameters for ambulance attendances, ED presentations and hospital admissions due to alcohol intoxication for females – Public Holidays



Alcohol intoxication and major social events

As shown in Figure 12, the numbers of alcohol-related ambulance attendances and emergency department presentations among females were significantly lower than predicted on the day following the last working day before Christmas.

Figure 12: ARIMA model parameters for ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication for females – Social Events



Youths

Seasonal and time of week patterns

Alcohol-related ambulance attendances, emergency department presentations and hospital admissions among youths peaked in the warmer months of the year, with November and December being the months with the highest numbers of cases (Figure 13). As shown in Figure 14, the distribution of alcohol intoxication cases over the course of the week indicates that Friday and Saturday were the days of the week with the greatest concentration of alcohol intoxication attendances, presentations and admissions.

Figure 13: Mean number of ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication for youths by month

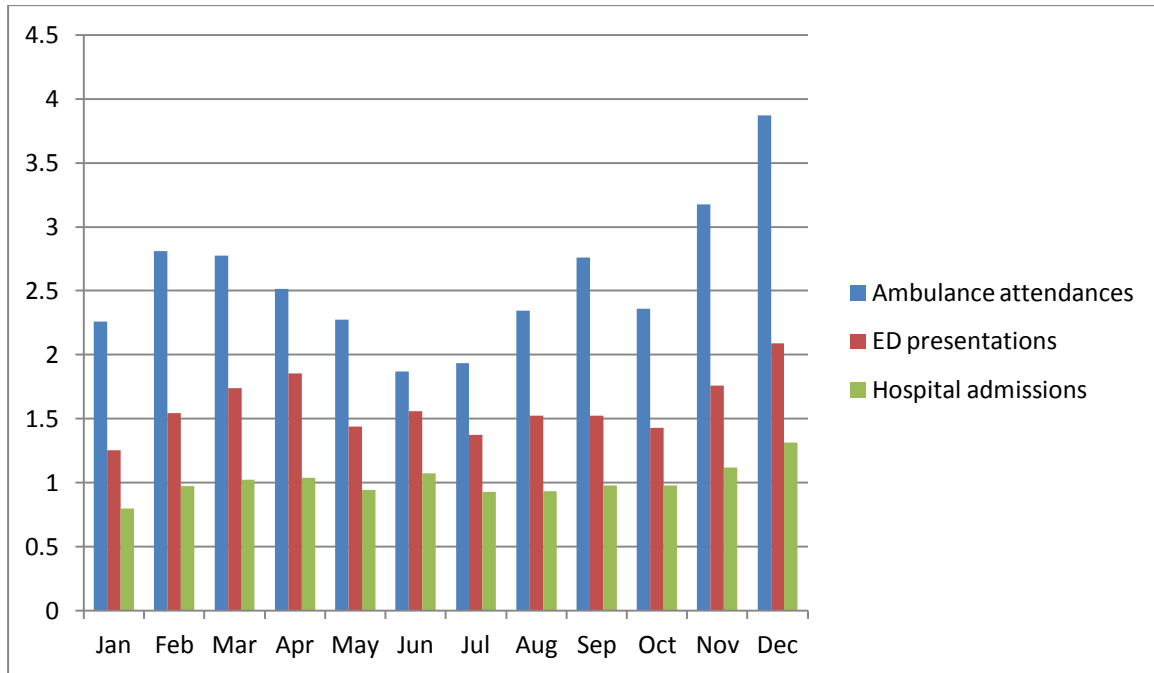
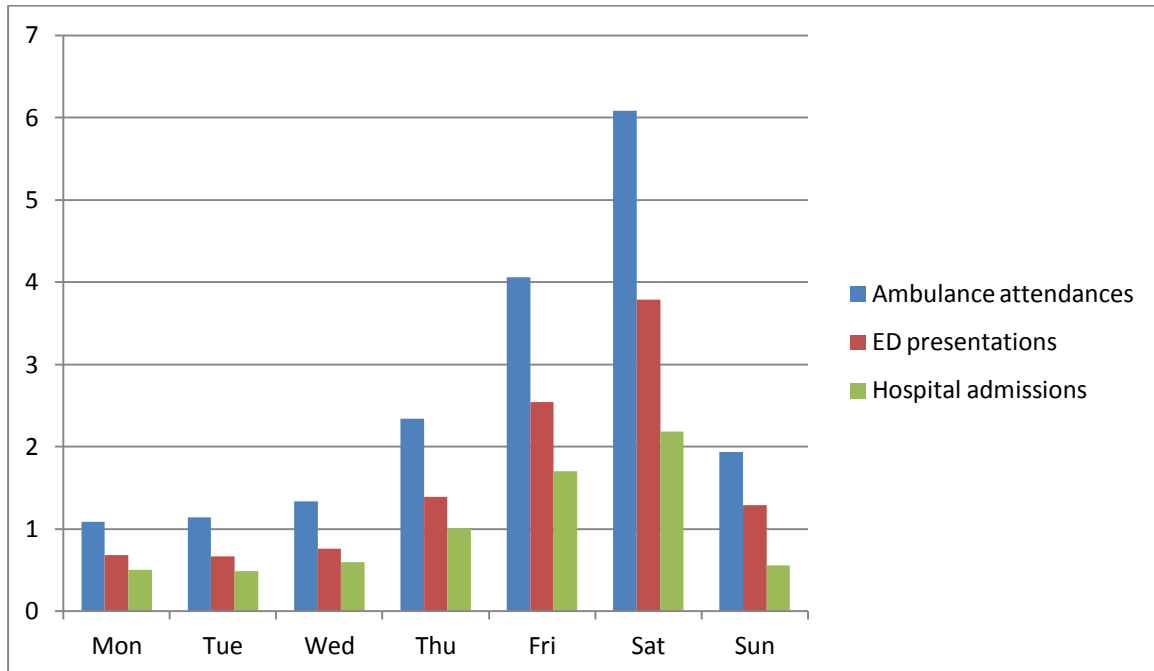


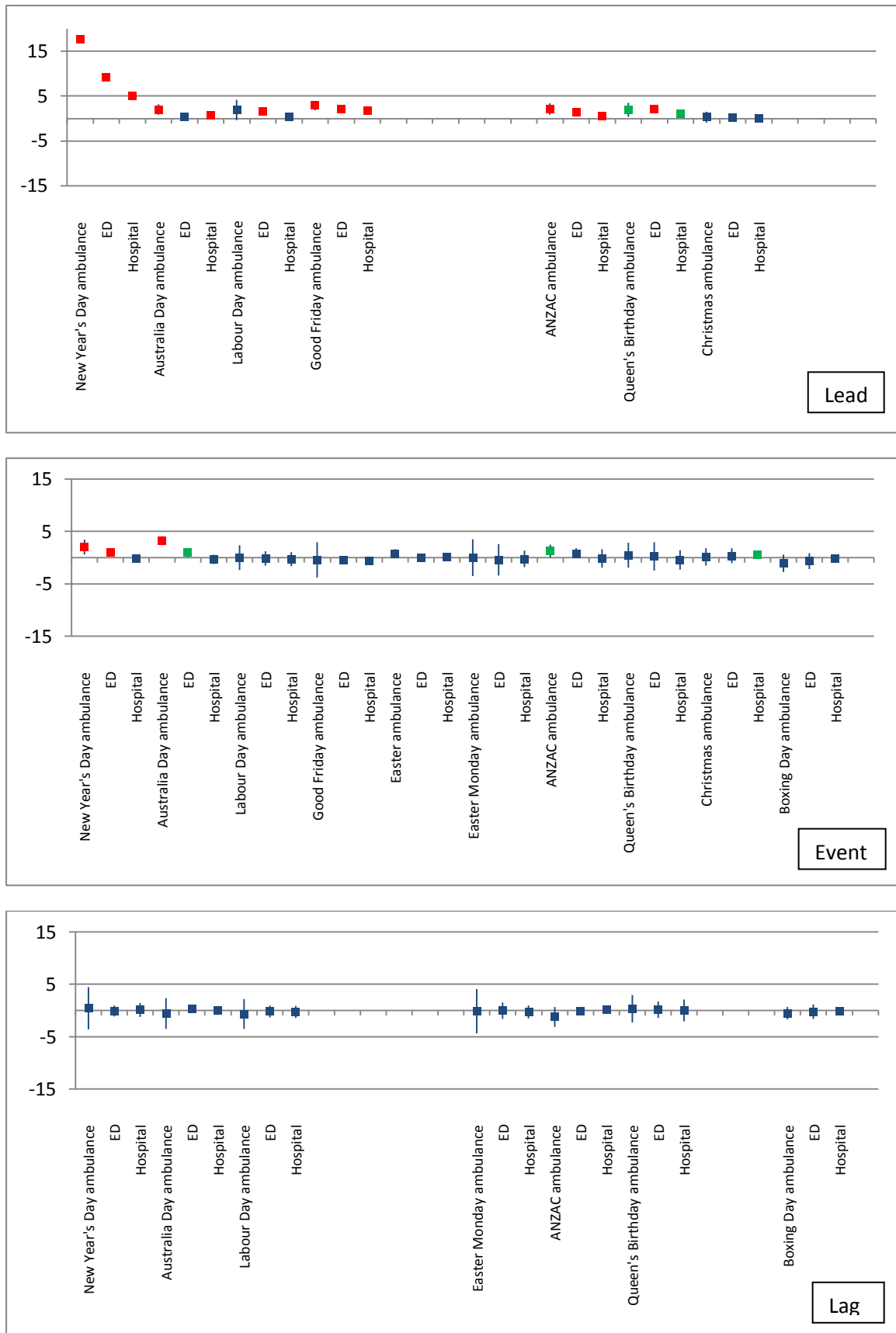
Figure 14: Mean number of ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication for youths by day of week



Alcohol intoxication and public holidays

As shown in Figure 15, among youths there were increased cases of alcohol intoxication for the day preceding most public holidays. Significant increases in alcohol intoxication occurred on New Year's Day and Australia Day (ambulance attendances and emergency presentations), and also ANZAC Day (ambulance attendances).

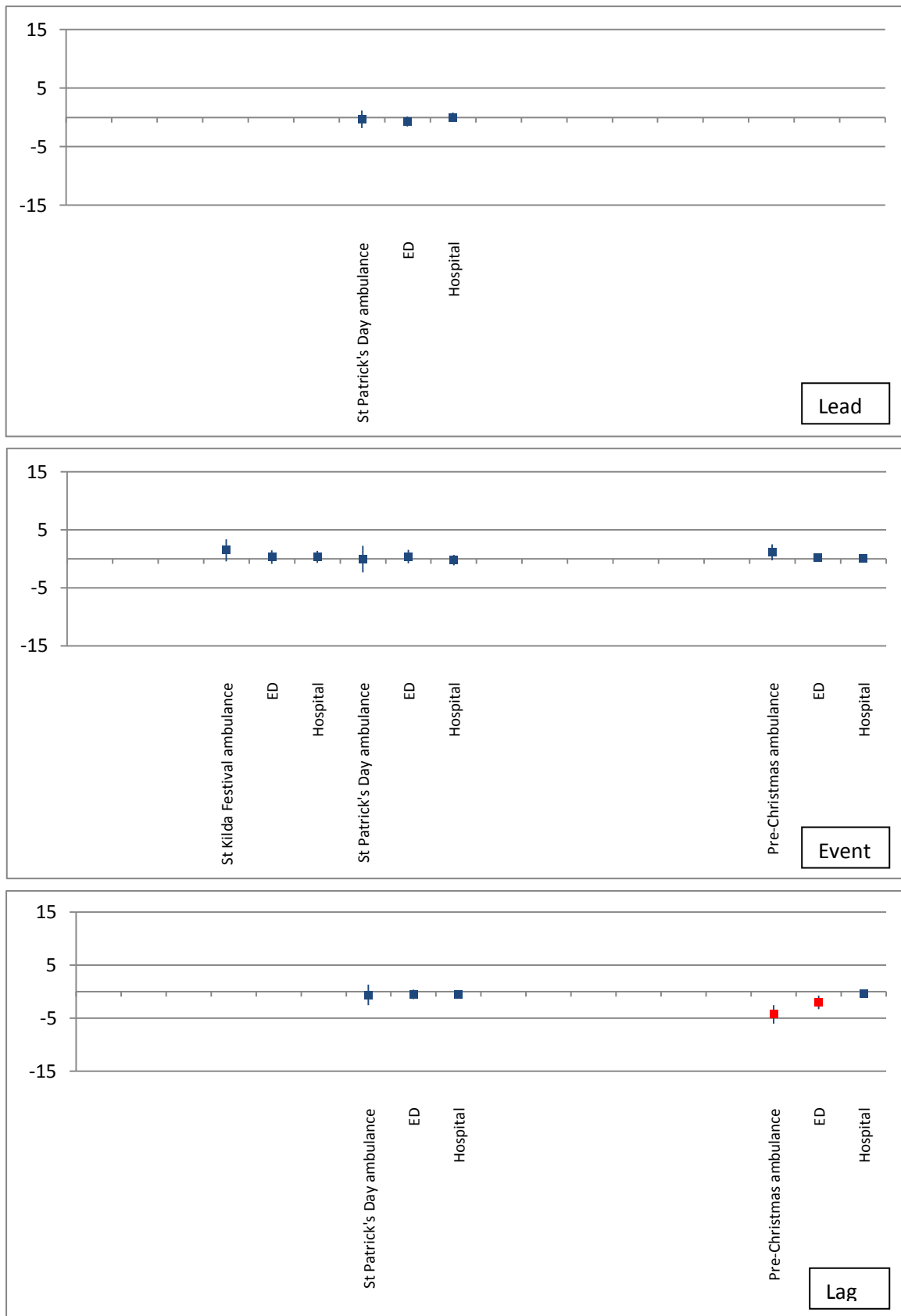
Figure 15: ARIMA model parameters for ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication for youths – Public Holidays



Alcohol intoxication and major social events

As shown in Figure 16, the numbers of alcohol-related ambulance attendances and emergency department presentations among youths were significantly lower than predicted on the day following the last working day before Christmas.

Figure 16: ARIMA model parameters for ambulance attendances, emergency department presentations and hospital admissions due to alcohol intoxication for youths – Social Events



Chapter 4: Assault

Four measures of assault were utilised in analyses of the relationship between public holidays and social events and harms – police recorded assaults, police recorded family incidents (domestic violence), hospital emergency presentations for assault and hospital admissions for assault.

Results are presented for all cases, males and females separately, and for youth (persons aged less than 25 years).

All cases

Seasonal and time of week patterns

Police recorded assaults and family incidents, assault-related emergency department presentations and hospital admissions peaked in the warmer months of the year, with the highest numbers of cases occurring between November and March (Figure 17). As shown in Figure 18, the distribution of assault cases over the course of the week indicates that Friday and Saturday were the days of the week with the greatest concentration of police recorded assaults, emergency department assault presentations and hospital admissions, while Saturday and Sunday represented the days of the week with the highest numbers of police recorded family incidents.

Figure 17: Mean number of police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault by month

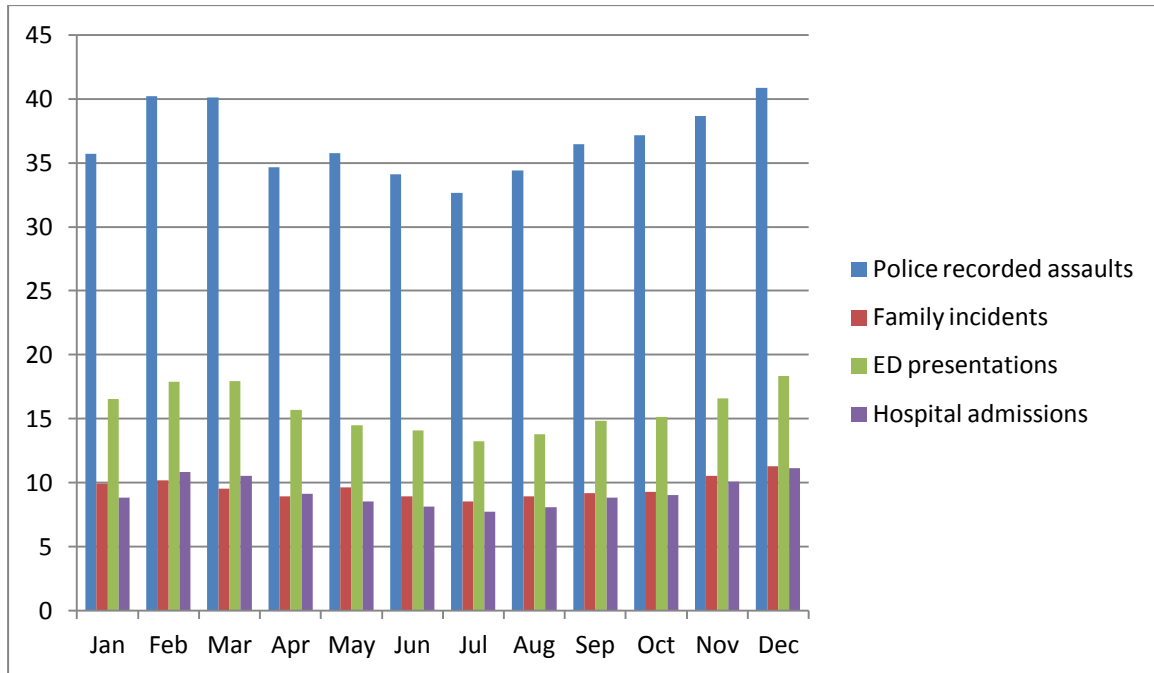
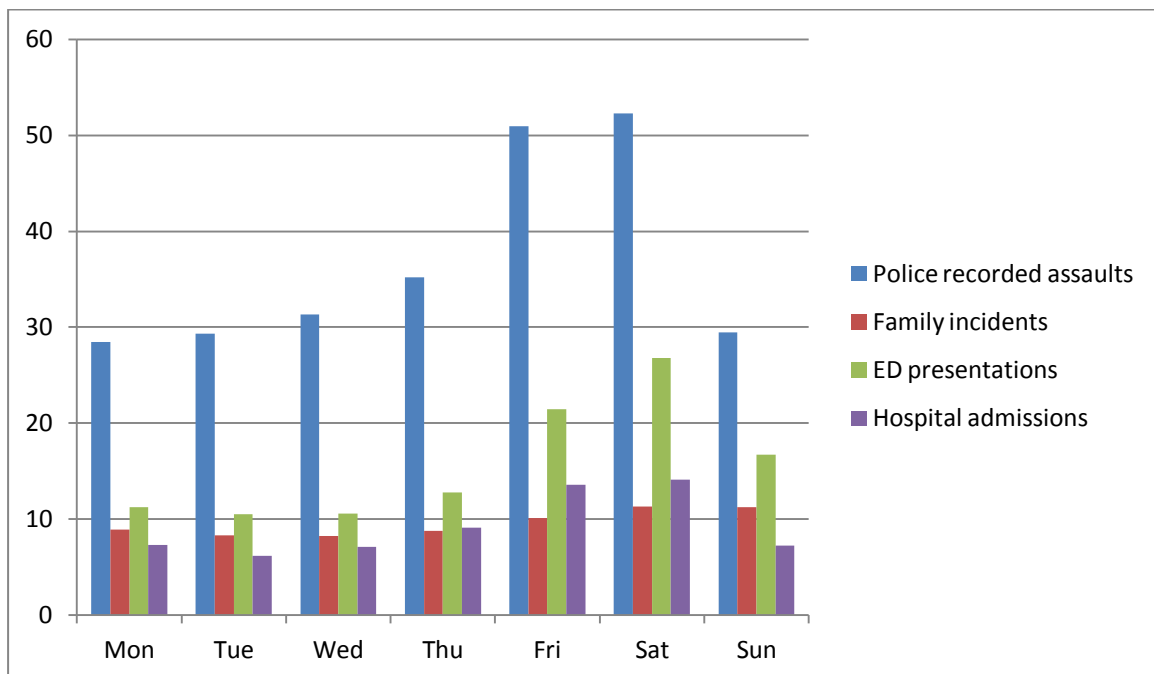


Figure 18: Mean number of police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault by day of week



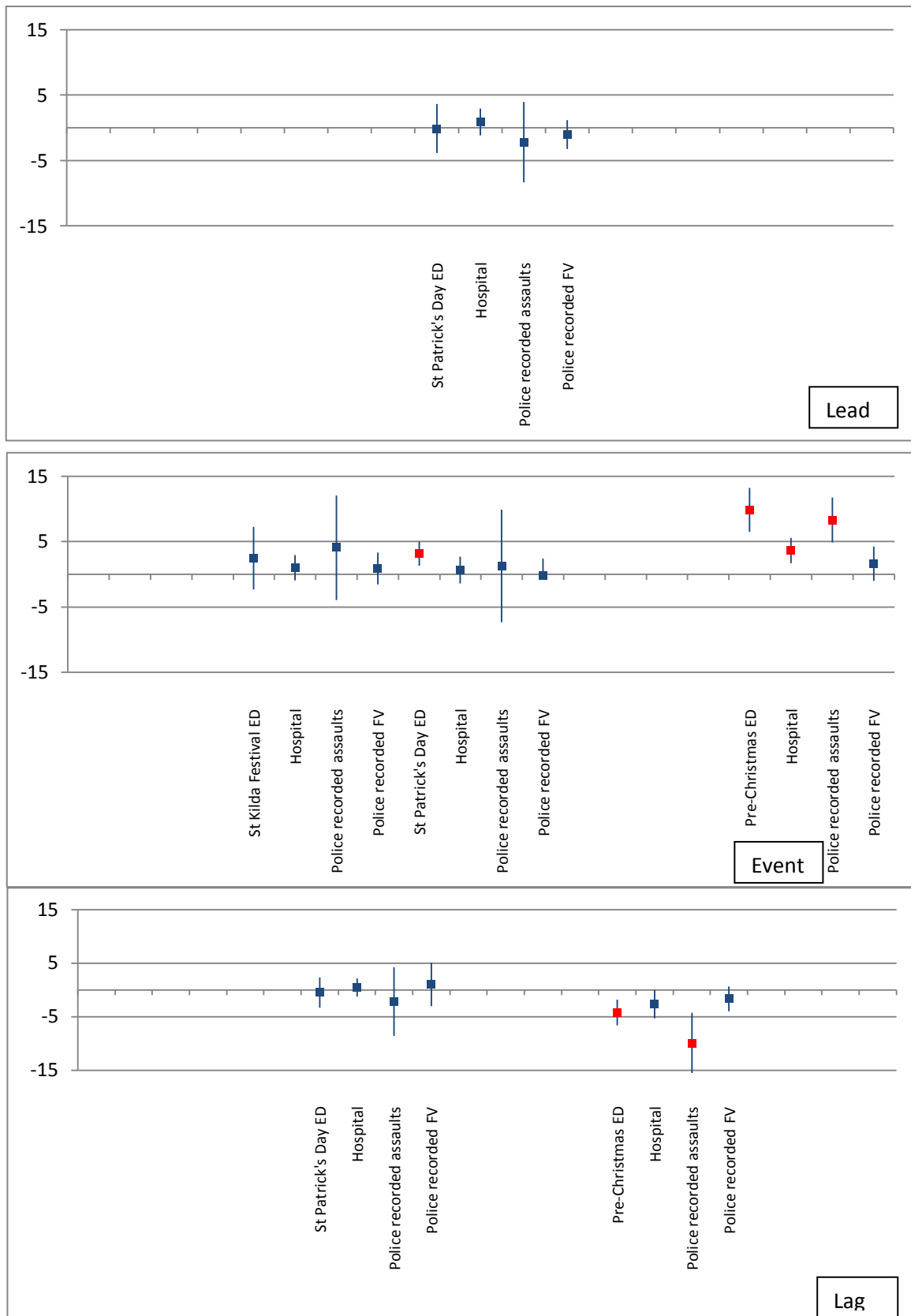
Assaults and public holidays

As shown in Figure 19, increased cases of ED and hospital recorded assaults were found on the day preceding every public holiday with the exception of Christmas Day. In terms of police recorded violence, significant increases were noted for assaults on the day preceding every public holiday except the Queen's Birthday and Christmas Day, while significant increases in family incidents were only seen the lead-up to New Year's Day. Significant increases in emergency department assault presentations occurred on New Year's Day, Australia Day and ANZAC Day. Police recorded assaults were also significantly higher on ANZAC Day. Police recorded family incidents were significantly higher than predicted on New Year's Day, Christmas Day and Boxing Day. In contrast, there were significantly lower numbers of police recorded assaults, emergency department assault presentations and hospital admissions than predicted occurring on Good Friday, with significantly lower police recorded assaults also noted for Easter Sunday. There were significantly lower numbers of police recorded assaults and emergency department assault cases occurring on the day following Boxing Day.

Assaults and major social events

As shown in Figure 20, there was a significant increase in police recorded assaults, emergency department assault presentations and hospital admissions on the last working day before Christmas, and a significant increase in emergency assault presentations on St Patrick's Day. The numbers of assault related police recorded assaults, emergency presentations and hospital admissions were significantly lower than predicted on the day following the last working day before Christmas.

Figure 20: ARIMA model parameters for police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault – Social Events



Males

Seasonal and time of week patterns

Police recorded assaults and family incidents, and assault related emergency department presentations and hospital admissions peaked in the warmer months of the year, with the highest numbers of cases occurring between November and March (Figure 21). As shown in Figure 22, the distribution of assault cases for males over the course of the week indicates that Friday and Saturday were the days of the week with the greatest concentration of assault related offences, presentations and admissions.

Figure 21: Mean number of police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault for males by month

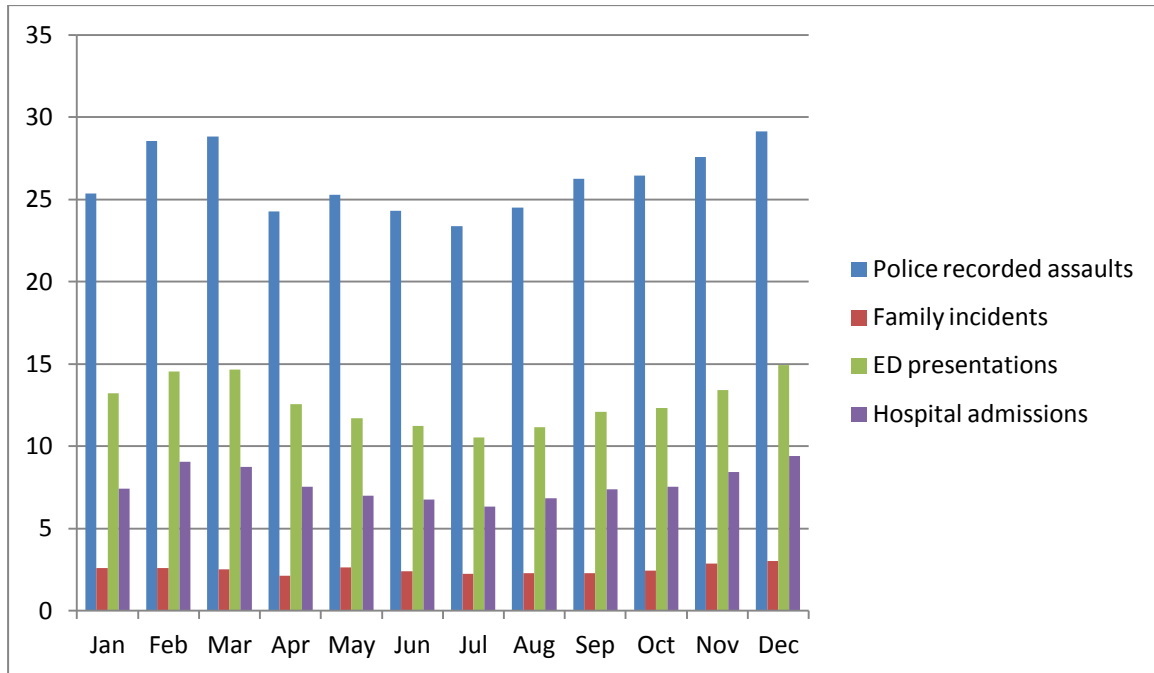
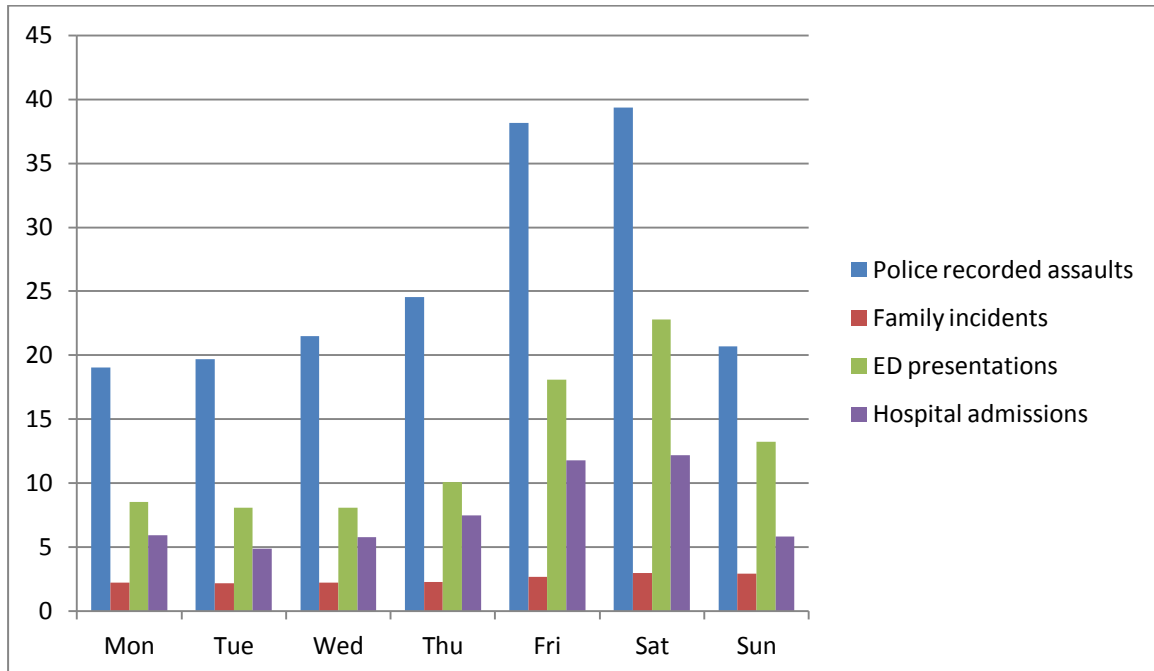


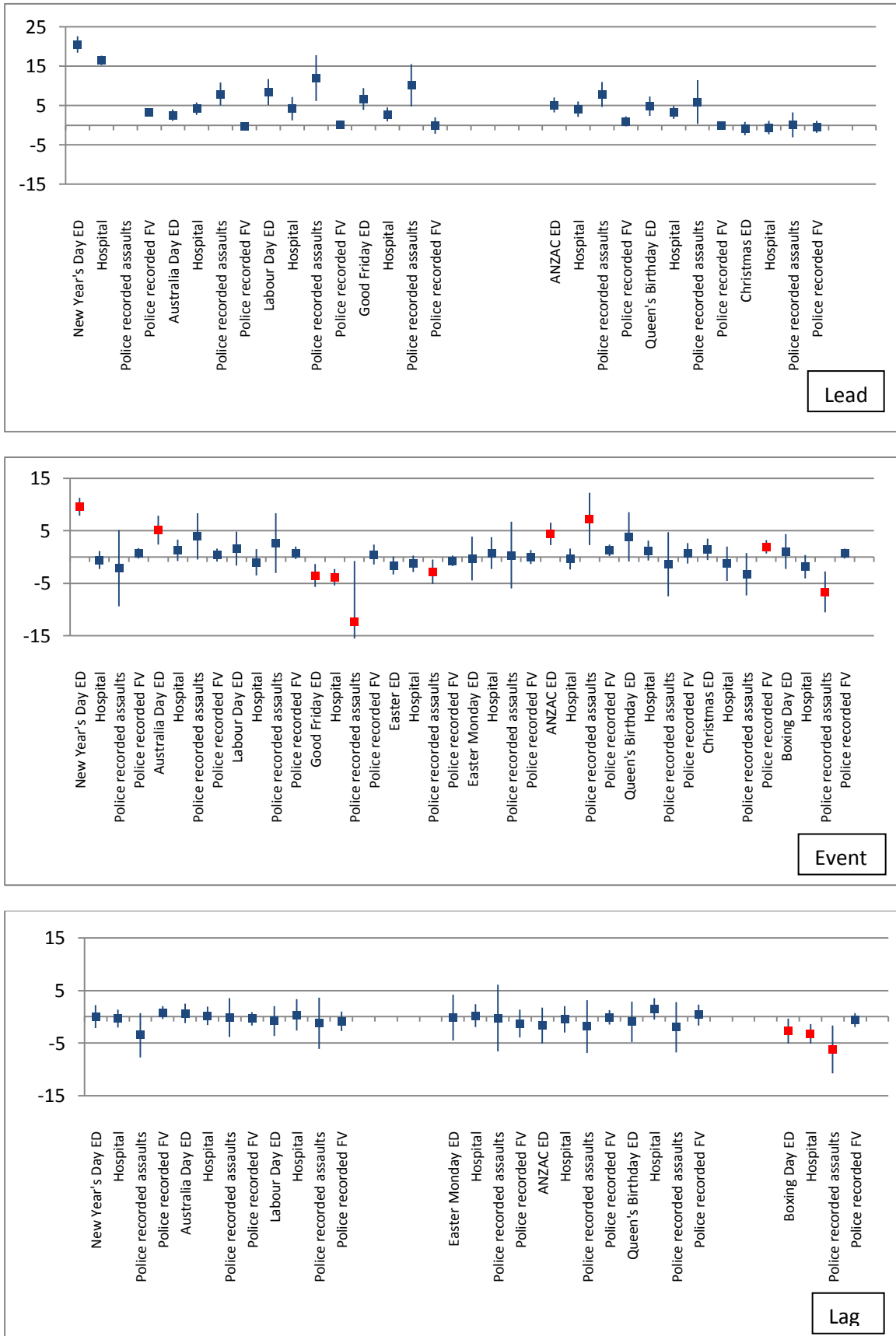
Figure 22: Mean number of police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault for males by day of week



Assaults and public holidays

As shown in Figure 23, increased offences and presentations by males for cases of assault were found on the day preceding every public holiday with the exception of Christmas Day, with family incidents significantly higher on New Year's Eve. Significant increases in emergency department assault presentations occurred on New Year's Day, Australia Day and ED and police recorded assault and family incident cases on ANZAC Day, while there was a significant increase in police recorded family incidents on Christmas Day. There were significantly lower numbers of police recorded assaults, emergency department assault presentations and hospital admissions than predicted occurring on Good Friday and significantly lower police recorded assaults on Boxing Day. There were significantly lower numbers of police recorded assaults, emergency department assault cases occurring on the day following Boxing Day.

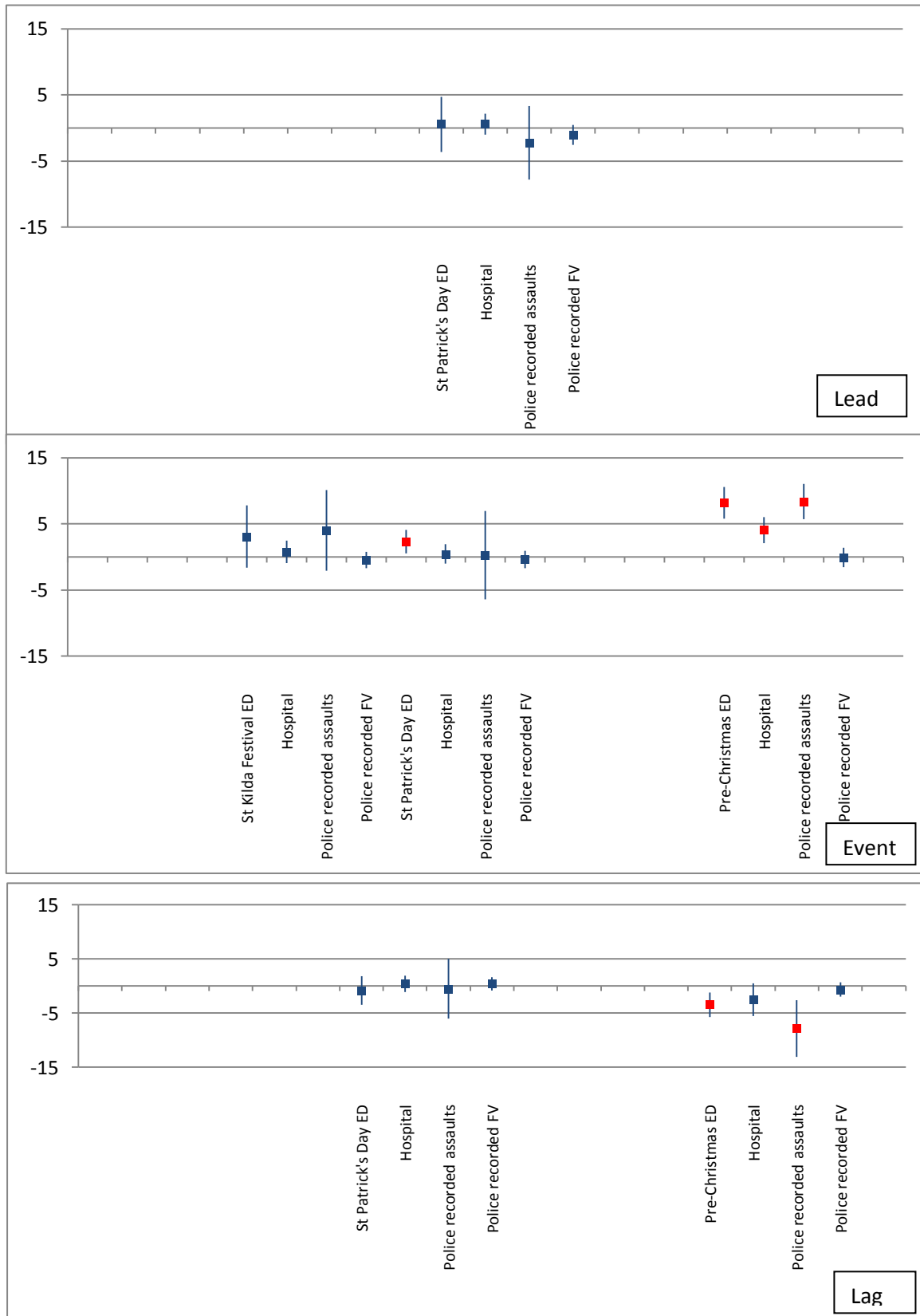
Figure 23: ARIMA model parameters for police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault for males – Public Holidays



Assaults and major social events

As shown in Figure 24, there was a significant increase in police recorded assaults, emergency department assault presentations and hospital admissions on the last Working day before Christmas, and a significant increase in emergency assault presentations on St Patrick's Day. The numbers of police recorded assaults and assault related emergency presentations were significantly lower than predicted on the day following the last working day before Christmas.

Figure 24: ARIMA model parameters for police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault for males – Social Events



Females

Seasonal and time of week patterns

Police recorded assaults, family incidents, assault related emergency department presentations and hospital admissions peaked in the warmer months of the year. The highest numbers of police recorded assaults and family incidents occurred between November and March, with cases occurring between December and March for emergency presentations, and in February and March for hospital admissions (Figure 25). As shown in Figure 26, the distribution of assault cases for females over the course of the week indicates that Friday, Saturday and Sunday were the days of the week with the greatest concentration of emergency department presentations for assault, with Friday and Saturday the peak days for hospital admissions, and Saturday and Sunday being the peak days for police recorded assaults and family incidents.

Figure 25: Mean number of police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault for females by month

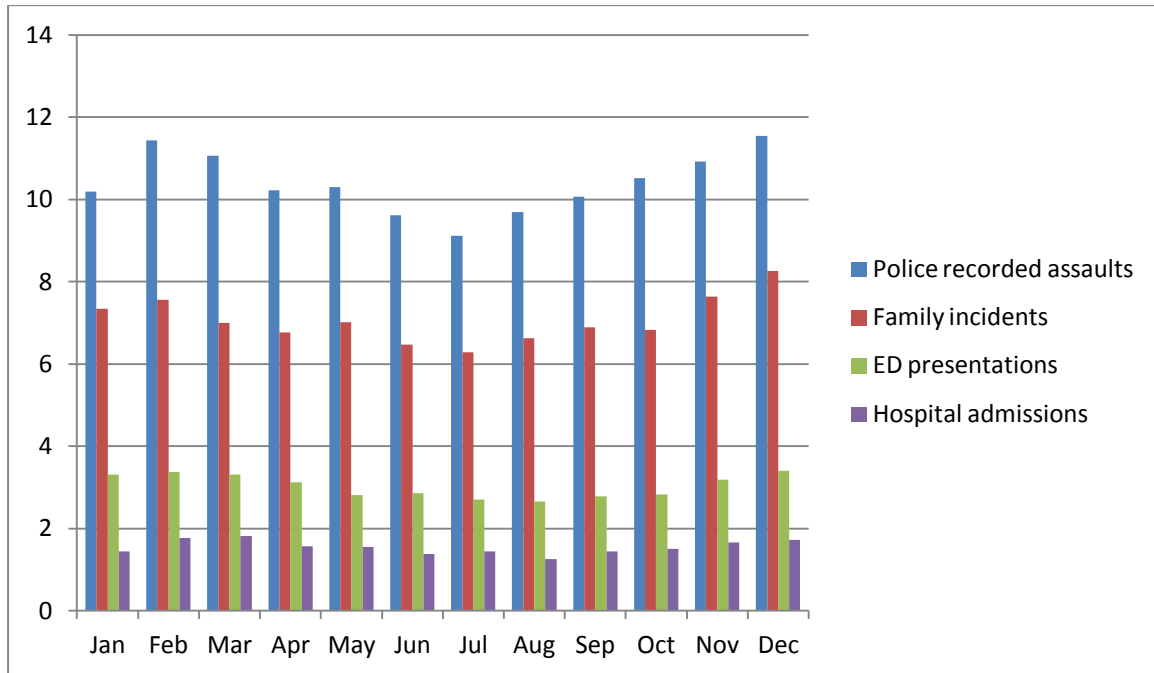
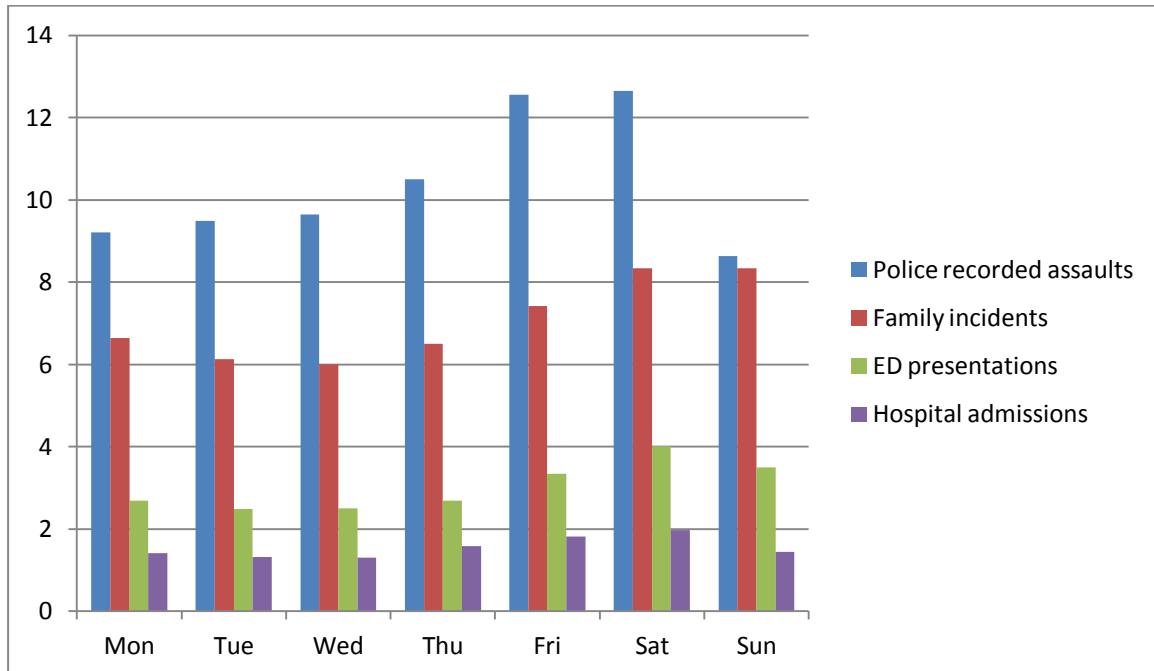


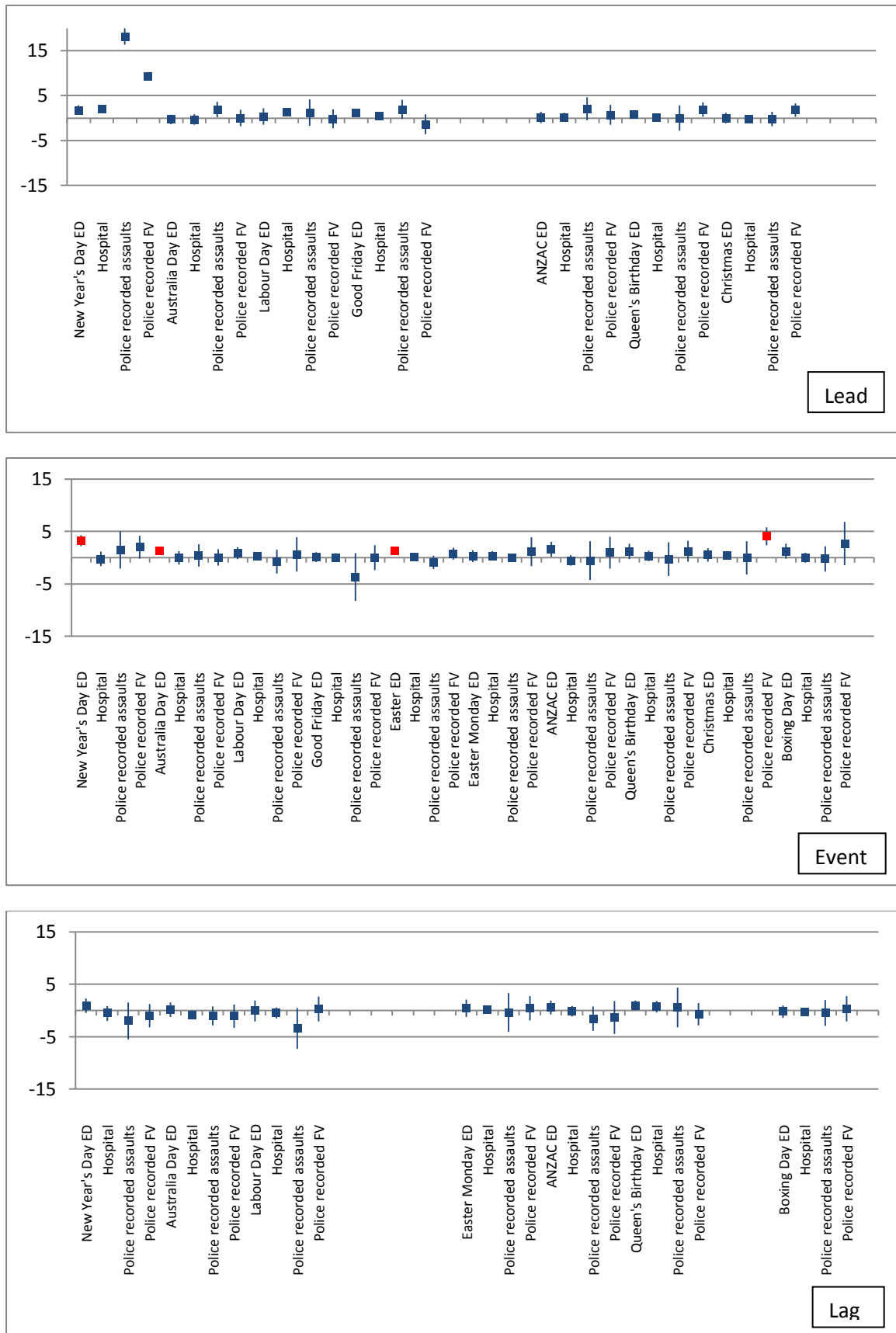
Figure 26: Mean number of police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault for females by day of week



Assaults and public holidays

As shown in Figure 27, there were significantly higher police recorded assaults, family incidents, assault related emergency presentations and hospital admissions on the day preceding New Year's Day, significantly higher police recorded assaults on the day preceding Australia Day, significantly higher hospital admissions on the day preceding Labour Day, significantly higher emergency presentations on the day preceding Good Friday, and significantly higher family incidents on the day preceding Queen's Birthday and Christmas Day. Significant increases in emergency department assault presentations occurred on New Year's Day, Australia Day, ANZAC Day and Easter Sunday, while there was a significant increase in family incidents on Christmas Day.

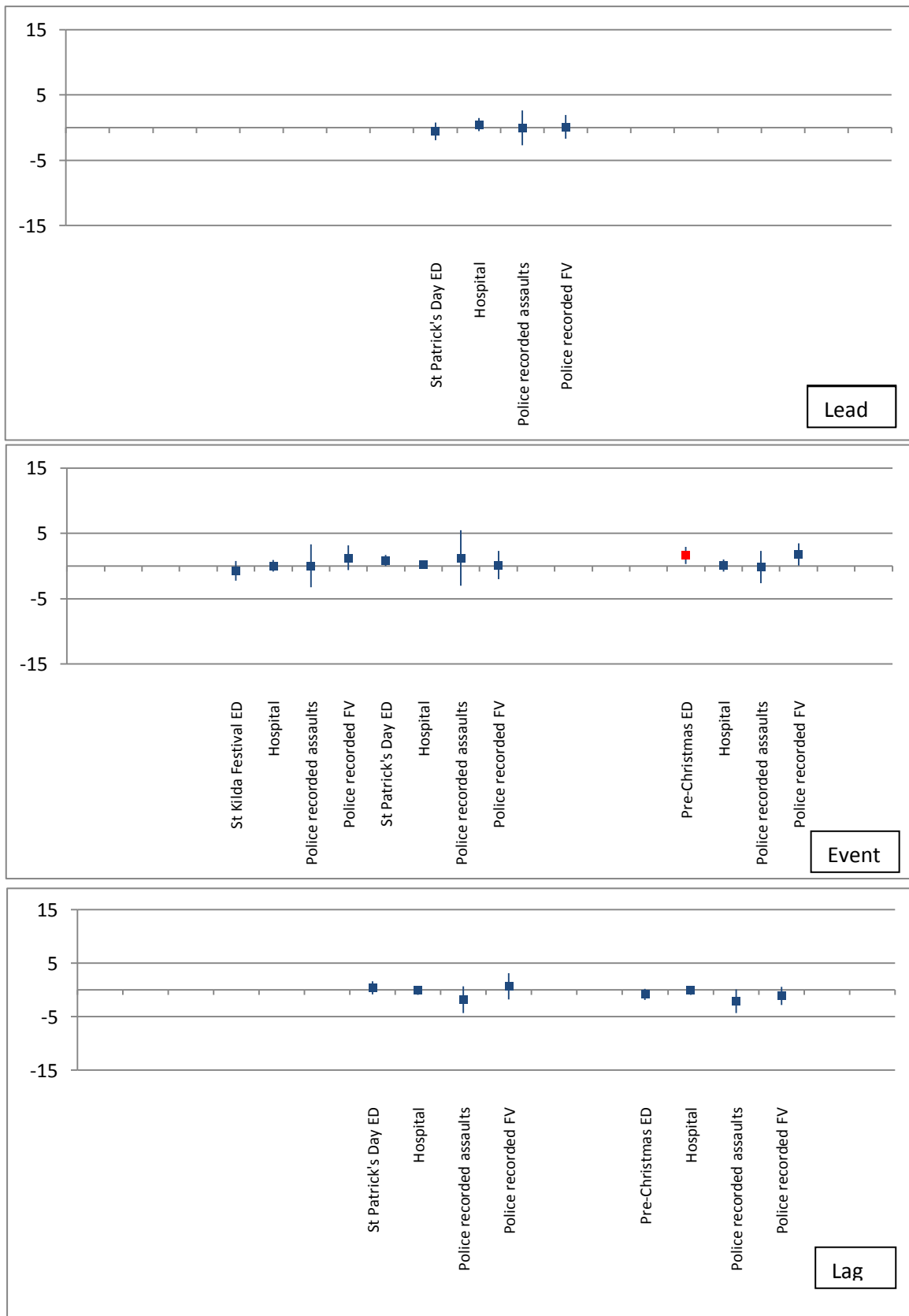
Figure 27: ARIMA model parameters for police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault for females – Public Holidays



Assaults and major social events

As shown in Figure 28, there were significant increases in family incidents and emergency department assault presentations on the last working day before Christmas.

Figure 28: ARIMA model parameters for police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault for females – Social Events



Youths

Seasonal and time of week patterns

Assault related emergency department presentations and hospital admissions peaked in the warmer months of the year, with the highest numbers of cases occurring between December and March for emergency presentations, and in November, December, February and March for police recorded assaults, family incidents and hospital admissions (Figure 29). As shown in Figure 30, the distribution of assault cases for youths over the course of the week indicates that Friday and Saturday were the days of the week with the greatest concentration of police recorded assaults, emergency department presentations and hospital admissions for assaults, with the highest numbers of family incidents occurring on Saturdays and Sundays.

Figure 29: Mean number of police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault for youths by month

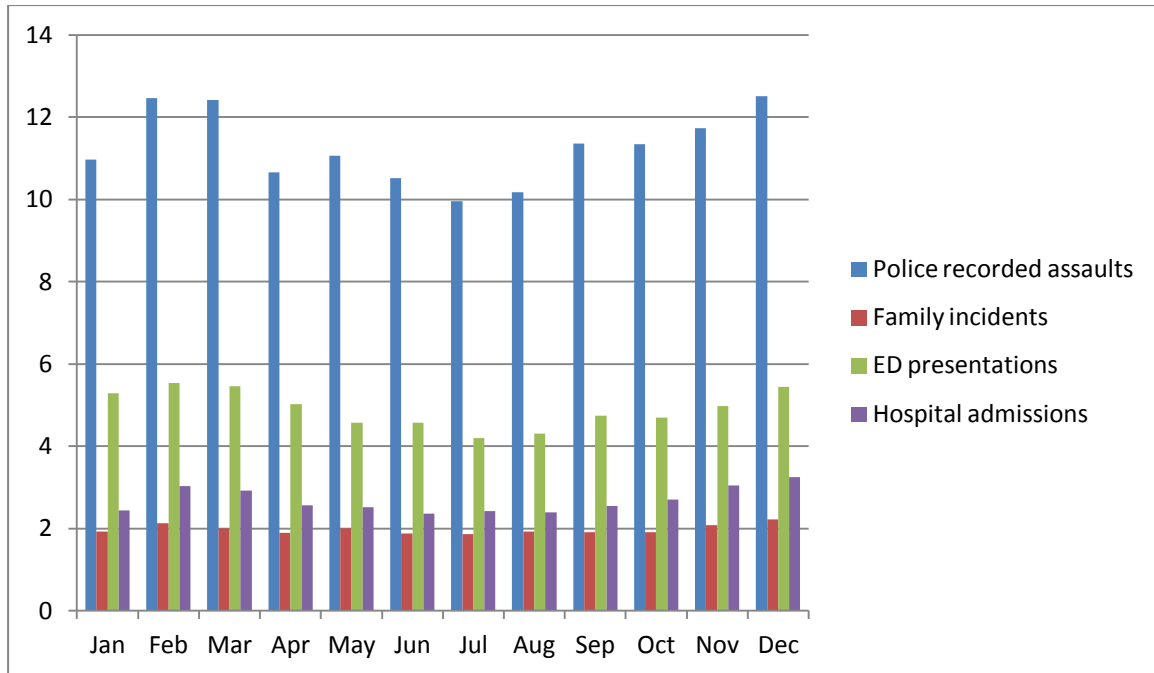
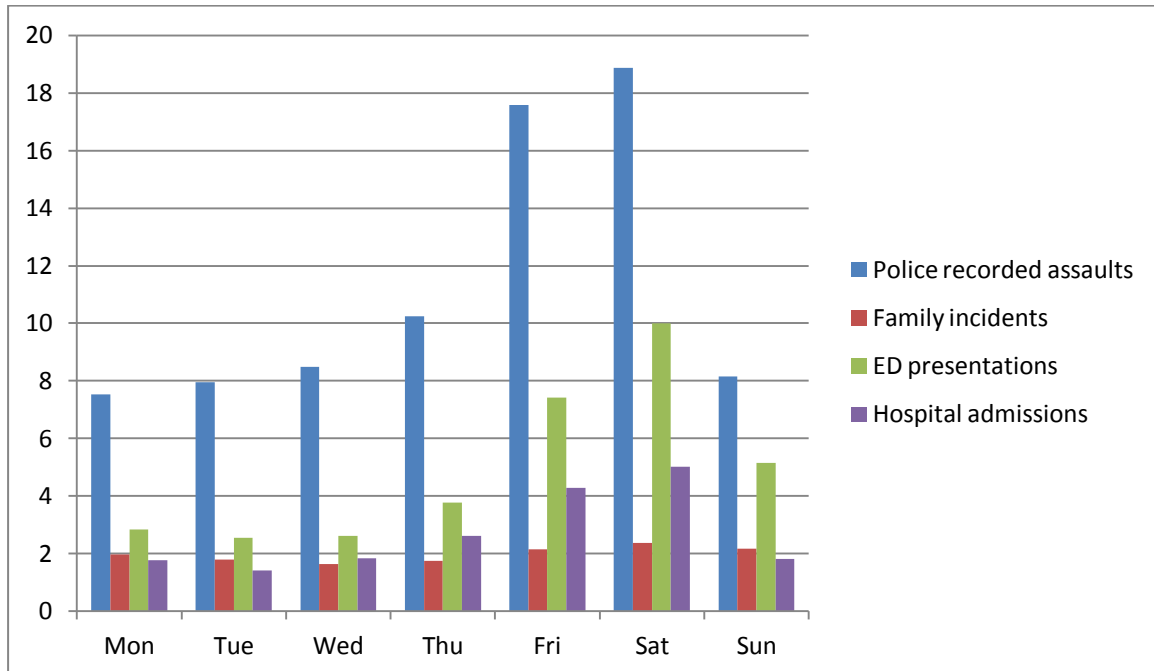


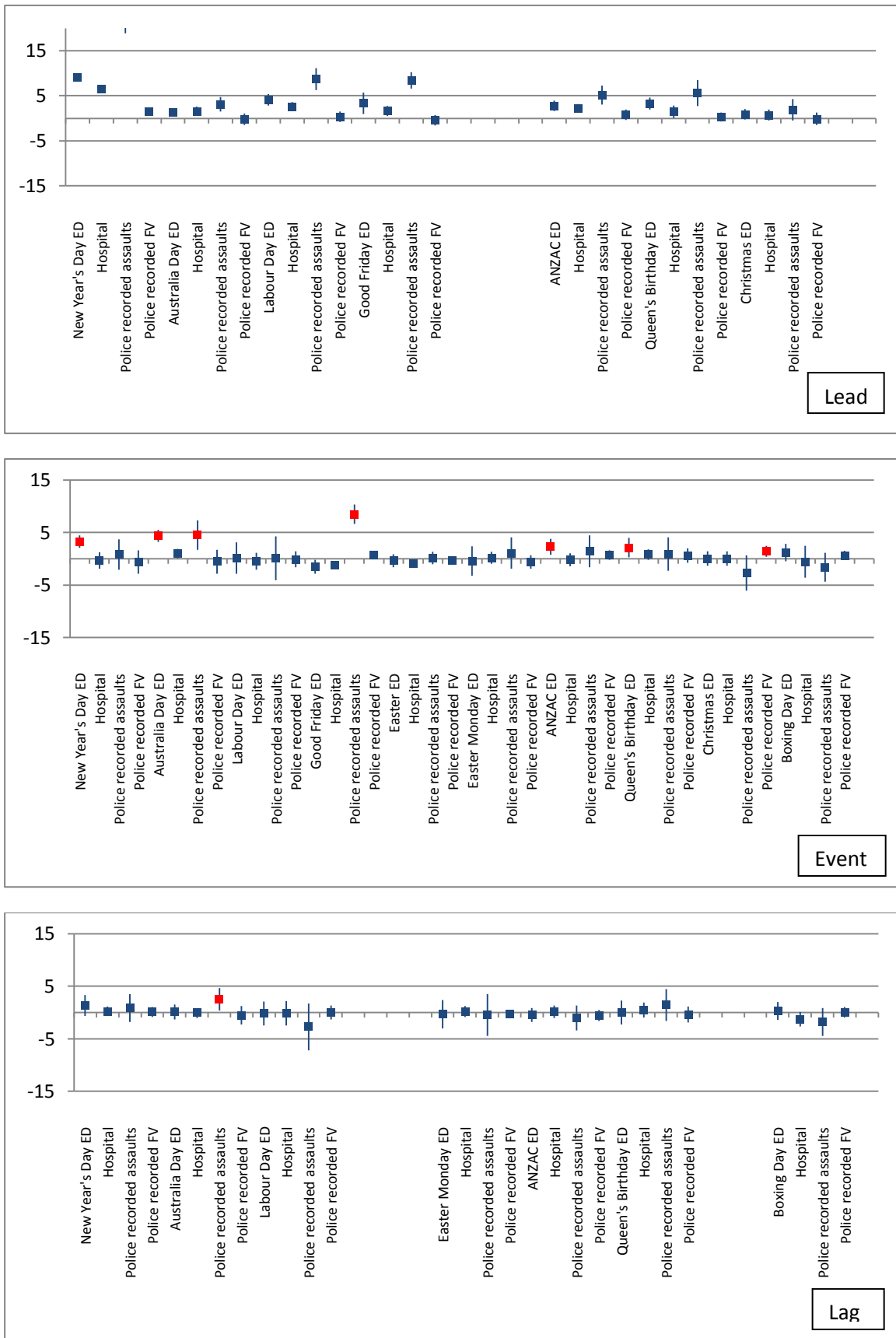
Figure 30: Mean number of police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault for youths by day of week



Assaults and public holidays

As shown in Figure 31, increased police recorded assaults and presentations by youths for cases of assault were found on the day preceding every public holiday with the exception of Christmas Day, with a significant increase in family incidents on the day preceding New Year's Day. Significant increases in emergency department assault presentations occurred on New Year's Day, Australia Day, Queen's Birthday and ANZAC Day, with a significant increase in police recorded assaults on Australia Day and a significant increase in family incidents on Christmas Day. There was a significantly lower number of police recorded assaults, emergency department assault presentations and hospital admissions than predicted occurring on Good Friday and a significantly lower number of hospital admissions on Easter Sunday.

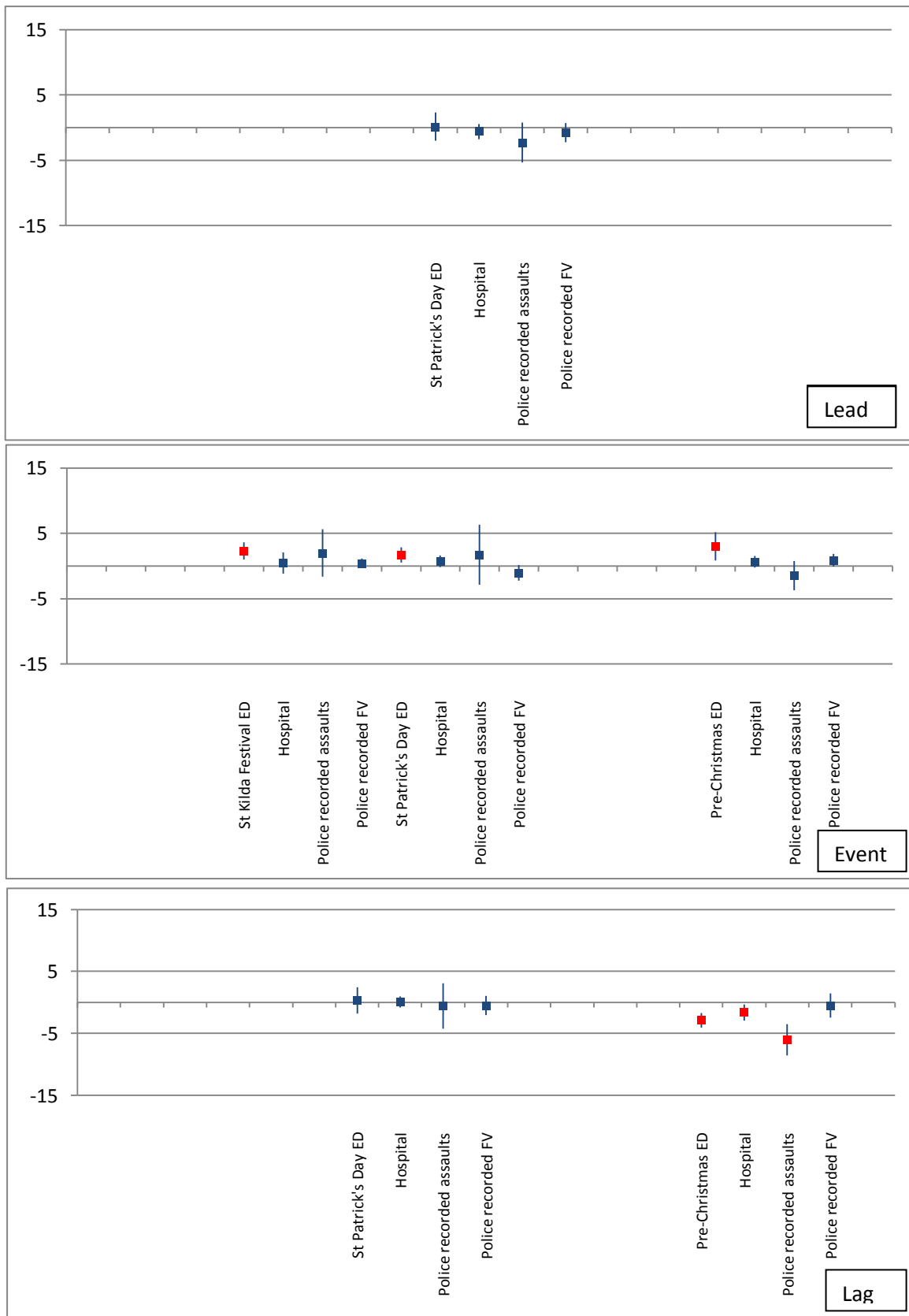
Figure 31: ARIMA model parameters for police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault for youths – Public Holidays



Assaults and major social events

As shown in Figure 32, there were significant increases in emergency department assault presentations on the last working day before Christmas, St Patrick's Day and during the St Kilda Festival. The numbers of police recorded assaults, assault related emergency presentations and hospital admissions were significantly lower than predicted on the day following the last working day before Christmas.

Figure 32: ARIMA model parameters for police recorded assaults, family incidents, and emergency department presentations and hospital admissions due to assault for youths – Social Events



Chapter 5: Motor Vehicle Accidents

Relationships between motor vehicle accidents and public holidays and social events were examined. Two measures of harms associated with road accidents were utilised in analyses – serious road incident data and hospital admissions for motor vehicle accidents.

Results are presented for all cases, males and females separately, and for youth (persons aged less than 25 years).

All cases

Seasonal and time of week patterns

Serious road incidents and motor vehicle accident related hospital admissions peaked in the warmer months of the year, with the highest numbers of cases occurring between October and December, and also in March (Figure 33). As shown in Figure 34, the distribution of motor vehicle accident cases over the course of the week indicates that Friday and Saturday were the days of the week with the greatest concentration of serious road incidents and hospital admissions.

Figure 33: Mean number of serious road incidents and hospital admissions due to motor vehicle accidents by month

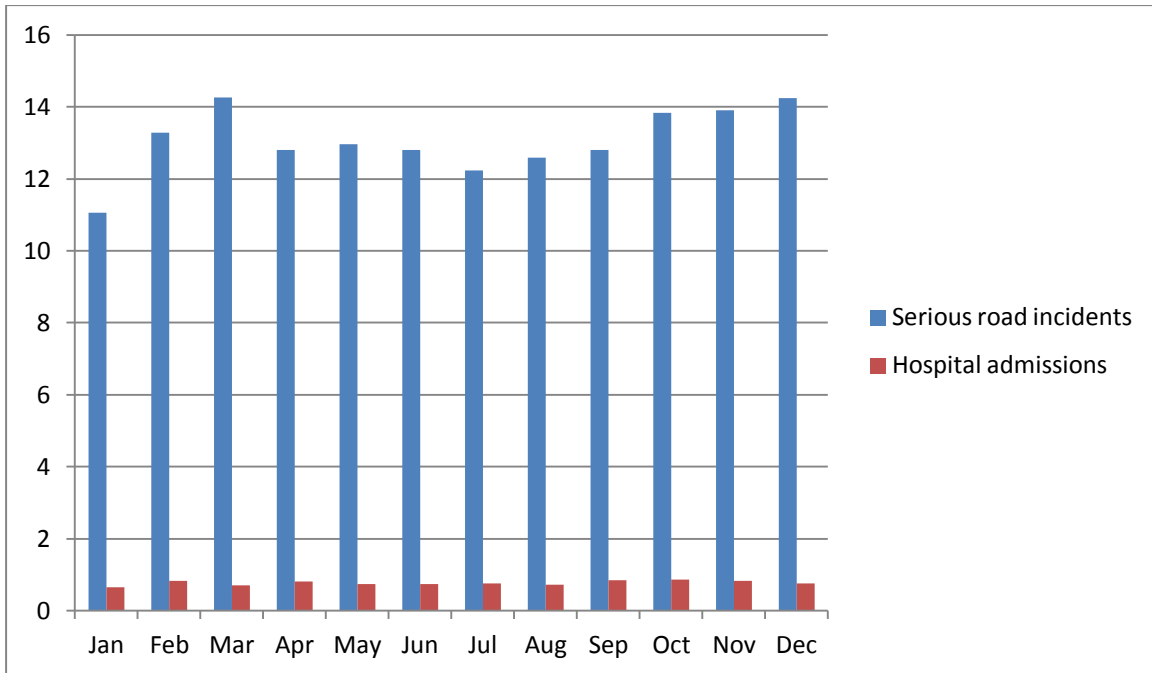
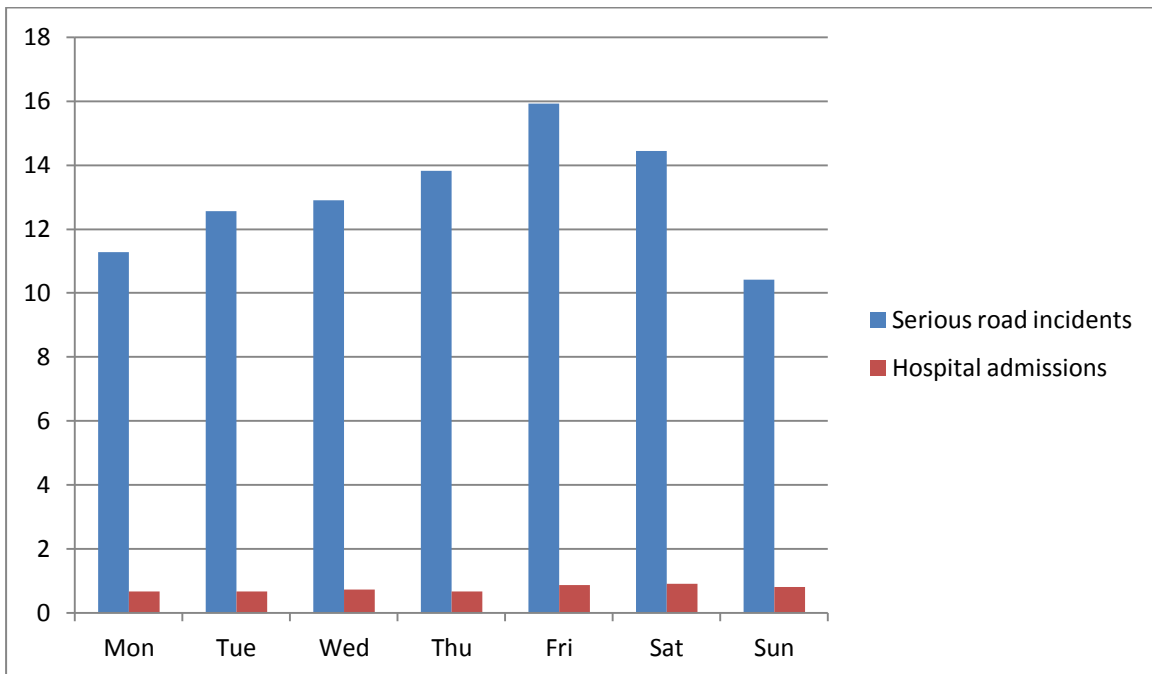


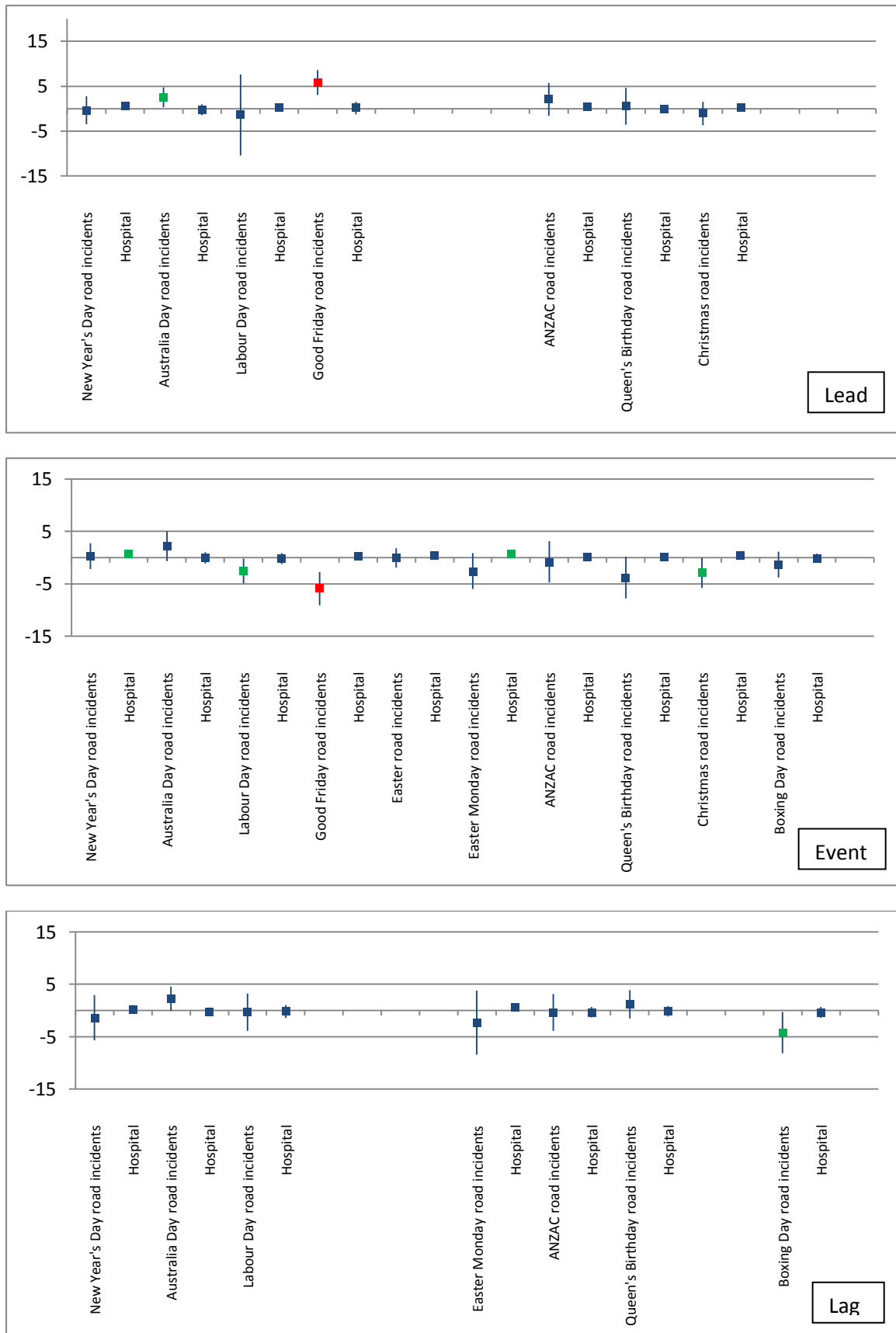
Figure 34: Mean number of serious road incidents and hospital admissions due to motor vehicle accidents by day of week



Motor vehicle accidents and public holidays

As shown in Figure 35, increased serious road incidents were found on the day preceding Australia Day and Good Friday. Significant increases occurred for hospital admissions for motor vehicle accidents on New Year's Day and Easter Monday, whilst there were significantly lower numbers of serious road incidents than predicted occurring on Labour Day, Good Friday, Queen's Birthday, Christmas Day and Boxing Day. Significantly fewer serious road incidents occurred on the day following Boxing Day than predicted.

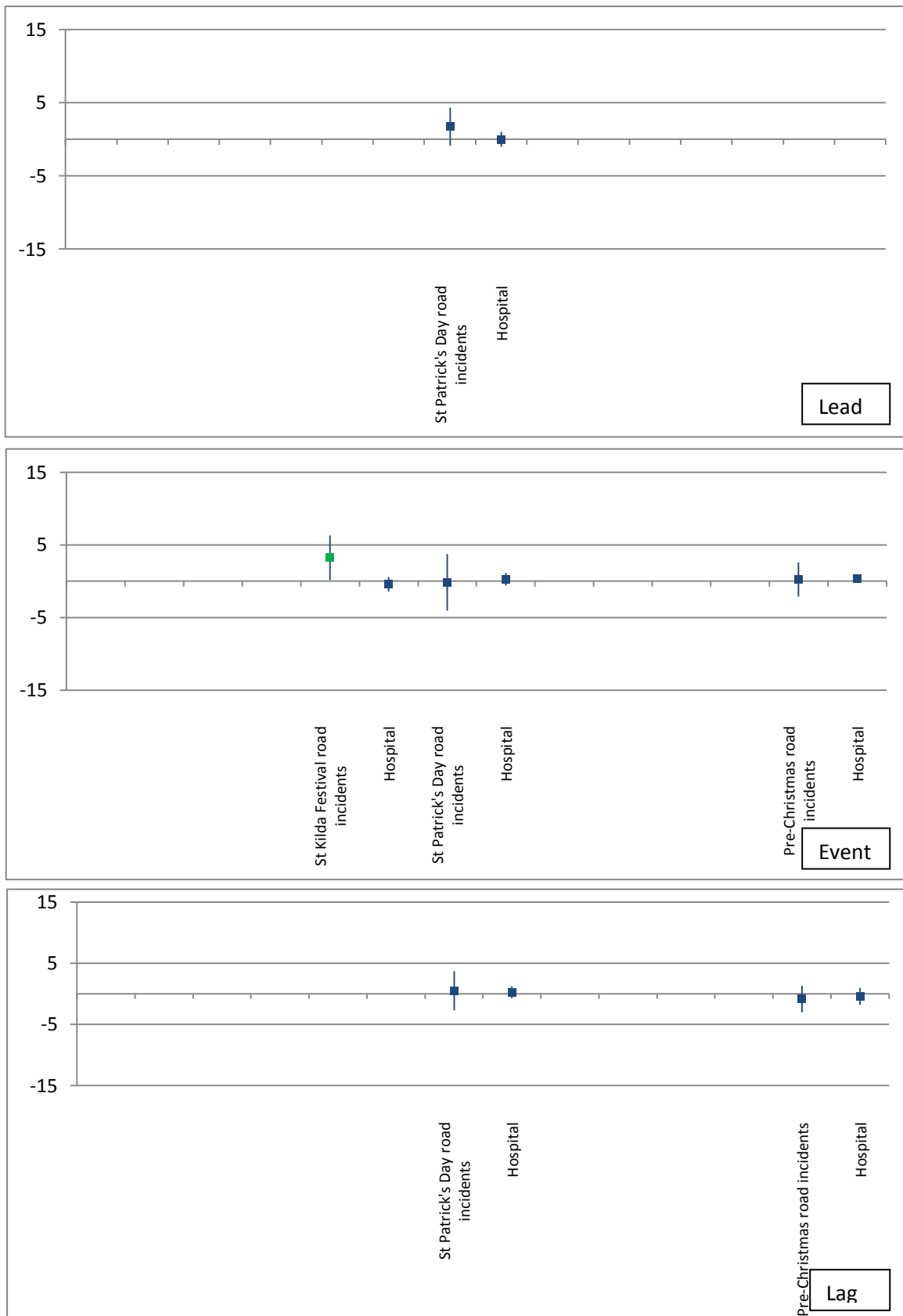
Figure 35: ARIMA model parameters for serious road incidents and hospital admissions due to motor vehicle accidents – Public Holidays



Motor vehicle accidents and major social events

As shown in Figure 36, there was a significant increase in serious road incidents during the St Kilda Festival.

Figure 36: ARIMA model parameters for serious road incidents and hospital admissions due to motor vehicle accidents – Social Events



Males

Seasonal and time of week patterns

Serious road incidents and motor vehicle accident related hospital admissions peaked in the warmer months of the year, with the highest numbers of cases occurring between October and December, and also in March (Figure 37). As shown in Figure 38, the distribution of motor vehicle accident cases over the course of the week indicates that Thursday, Friday and Saturday were the days of the week with the greatest concentration of serious road incidents, and Friday and Saturday were the peak days for motor vehicle accident related hospital admissions.

Figure 37: Mean number of serious road incidents and hospital admissions due to motor vehicle accidents for males by month

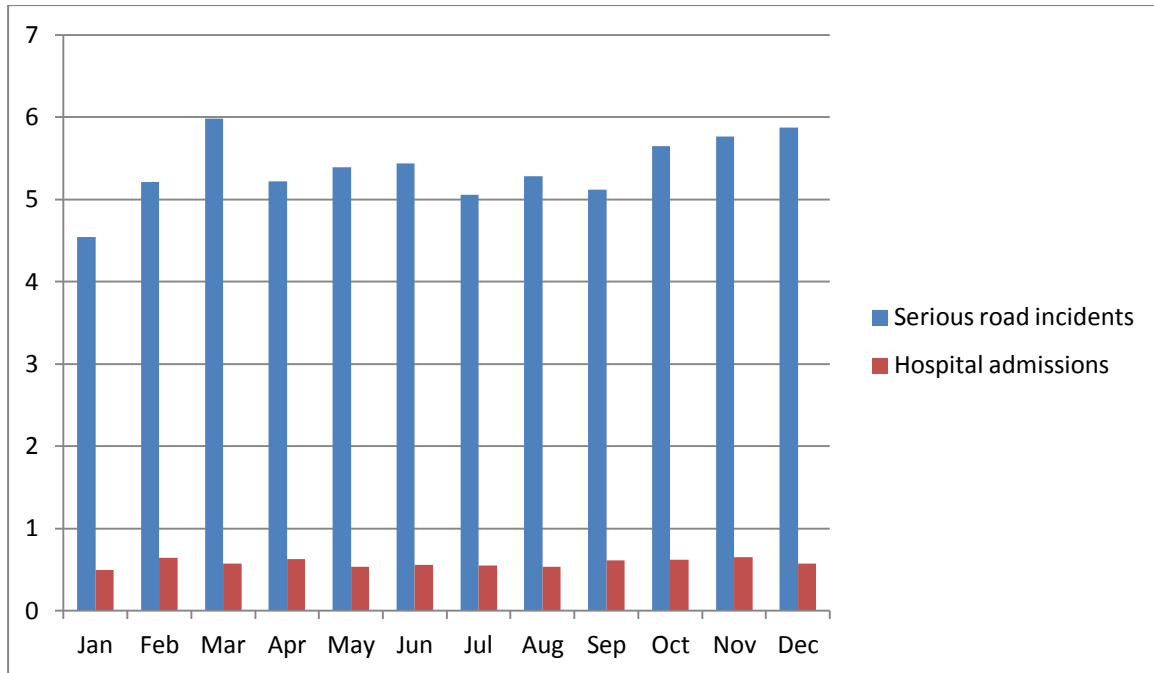
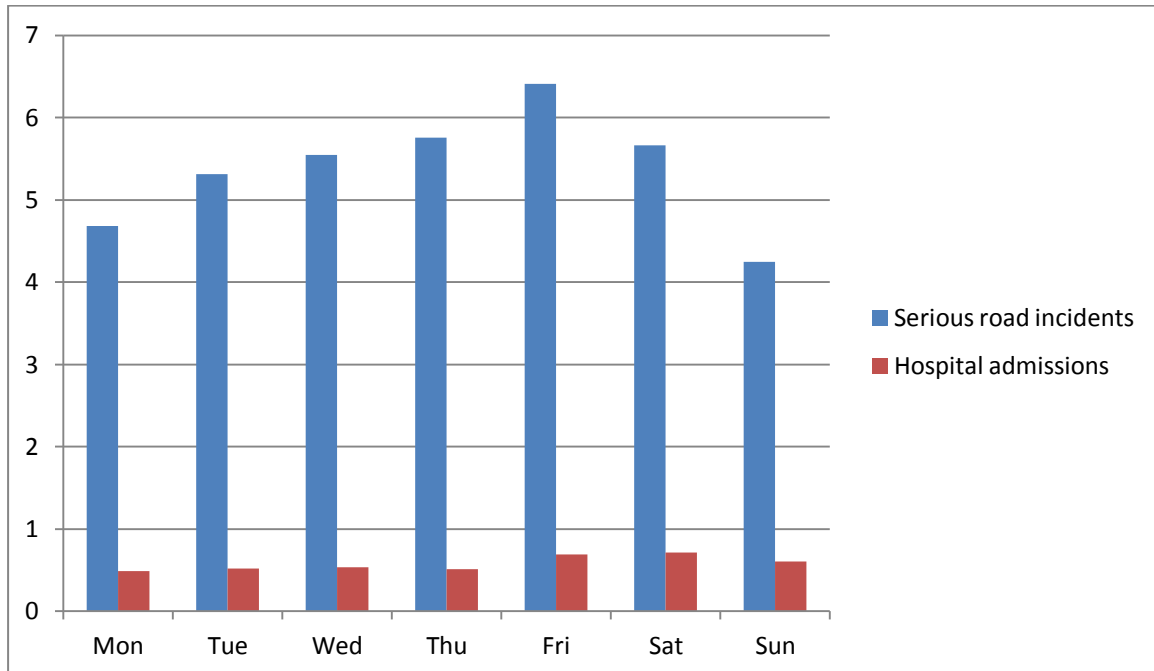


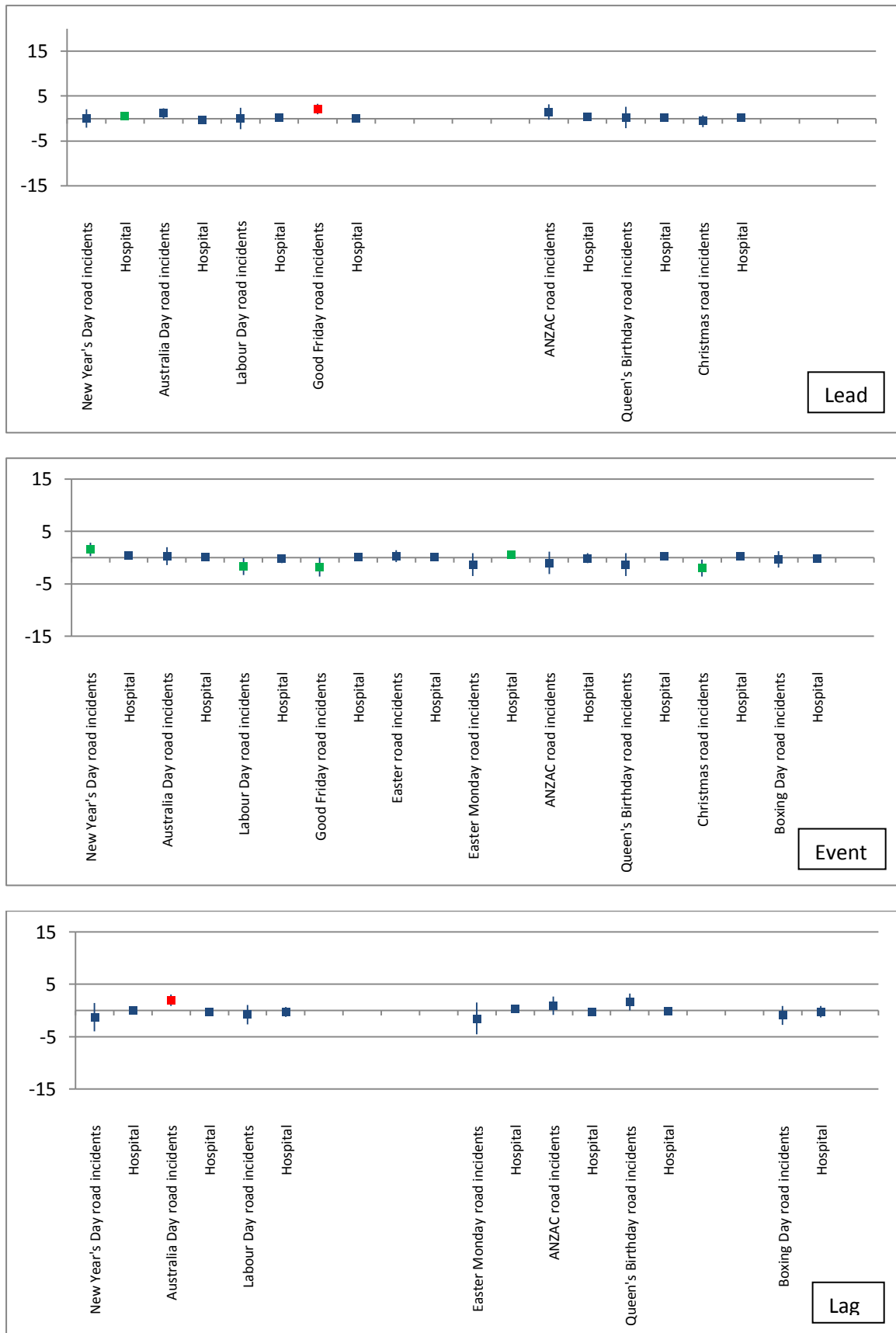
Figure 38: Mean number of serious road incidents and hospital admissions due to motor vehicle accidents for males by day of week



Motor vehicle accidents and public holidays

As shown in Figure 39, increased serious road incidents were found on the day preceding Australia Day and Good Friday, with a significant increase in motor vehicle accident related hospital admissions occurring on the day preceding New Year's Day. Significant increases occurred for serious road incidents on New Year's Day and for hospital admissions for motor vehicle accidents on Easter Monday. There were significantly lower numbers of serious road incidents than predicted occurring on Labour Day, Good Friday and Christmas Day. Significantly fewer serious road incidents occurred on the day following Australia Day than predicted, and a significant elevation in numbers on the day following the Queen's Birthday public holiday.

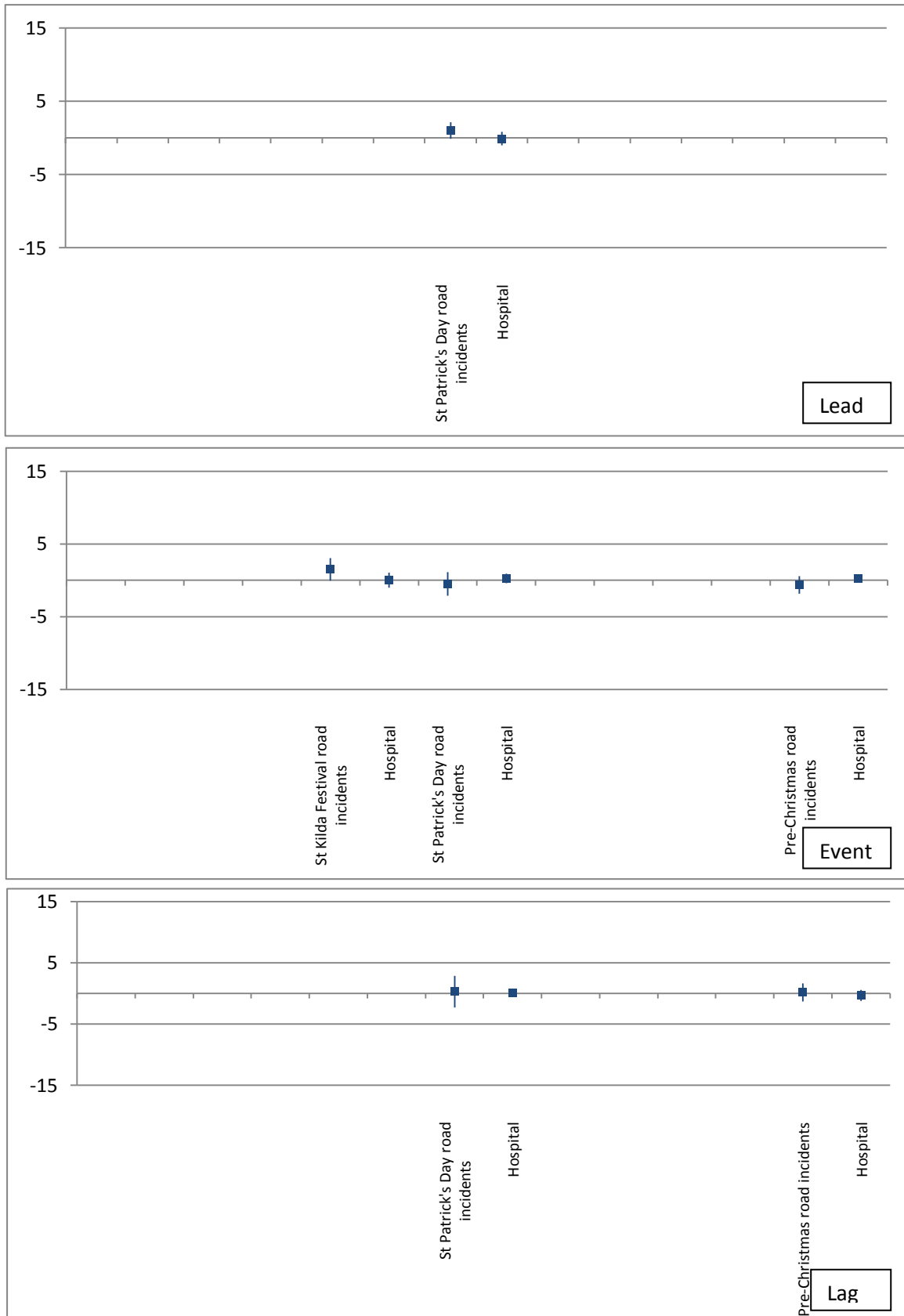
Figure 39: ARIMA model parameters for serious road incidents and hospital admissions due to motor vehicle accidents for males – Public Holidays



Motor vehicle accidents and major social events

As shown in Figure 40, there were no significant effects found for the social events examined in terms of motor vehicle accidents and hospitalisations among males.

Figure 40: ARIMA model parameters for serious road incidents and hospital admissions due to motor vehicle accidents for males – Social Events



Females

Seasonal and time of week patterns

Serious road incidents and motor vehicle accident related hospital admissions peaked in the warmer months of the year, with the highest numbers of cases occurring between October and December, and also in February and March (Figure 41). As shown in Figure 42, the distribution of motor vehicle accident cases over the course of the week indicates that Friday and Saturday were the days of the week with the greatest concentration of serious road incidents and motor vehicle accident related hospital admissions.

Figure 41: Mean number of serious road incidents and hospital admissions due to motor vehicle accidents for females by month

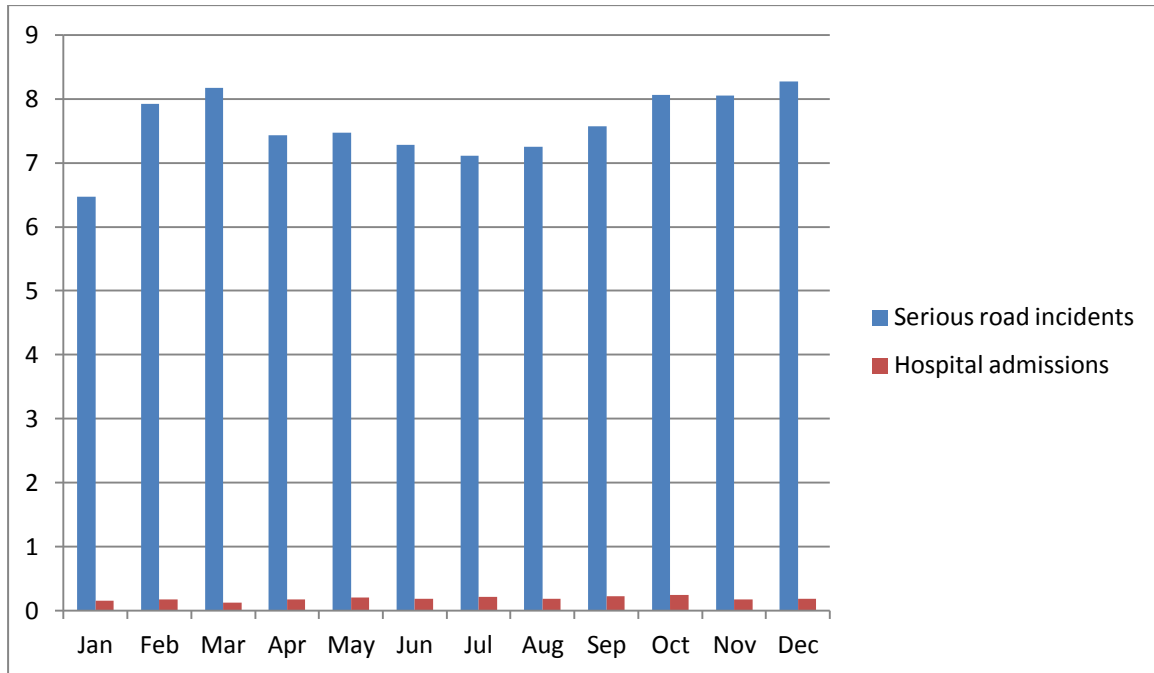
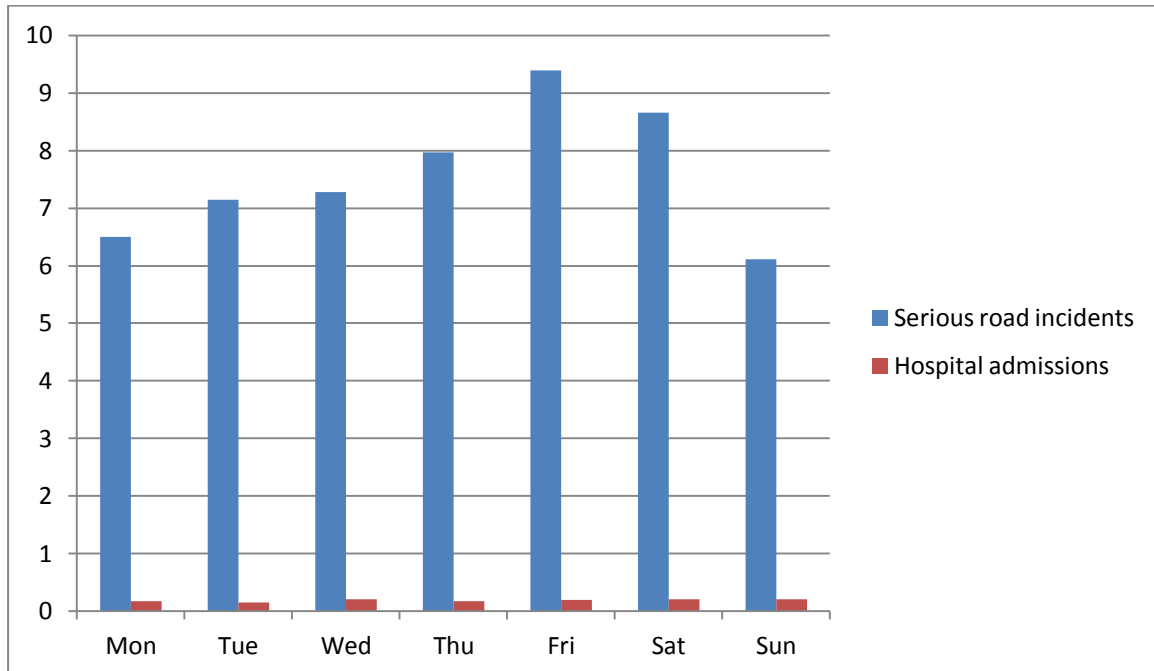


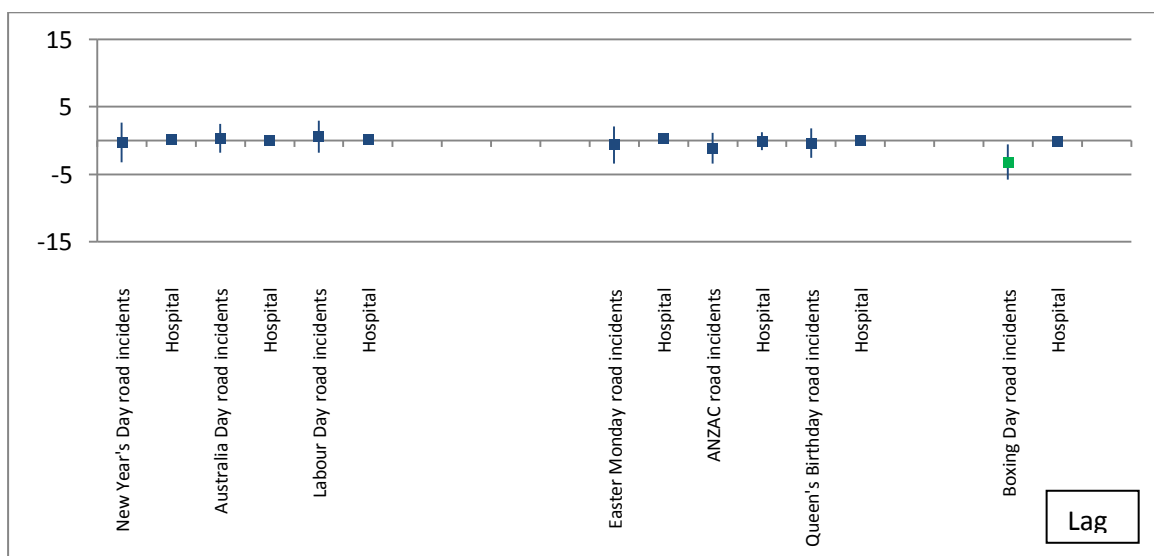
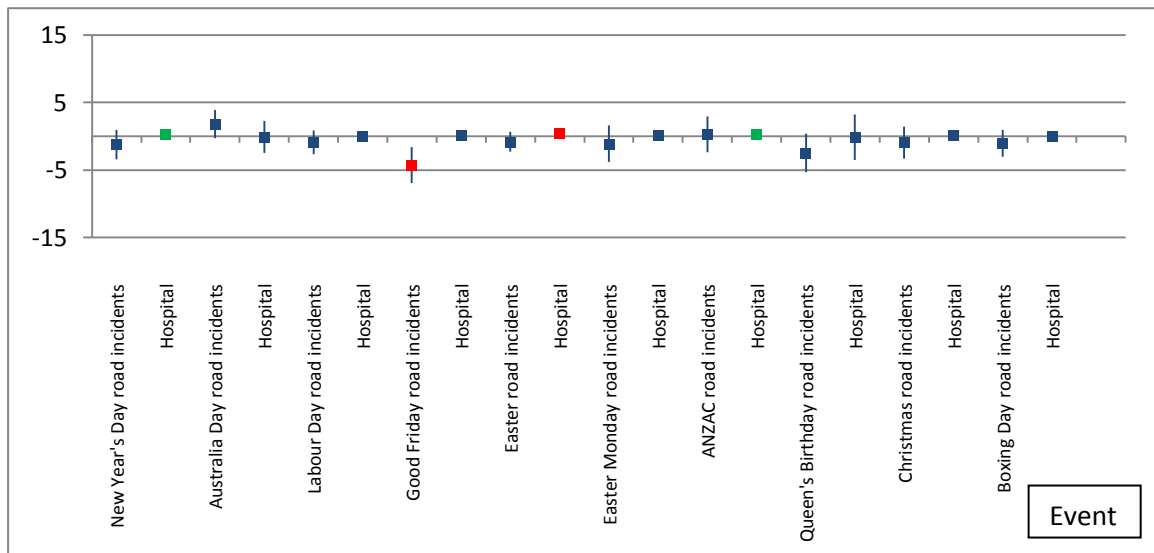
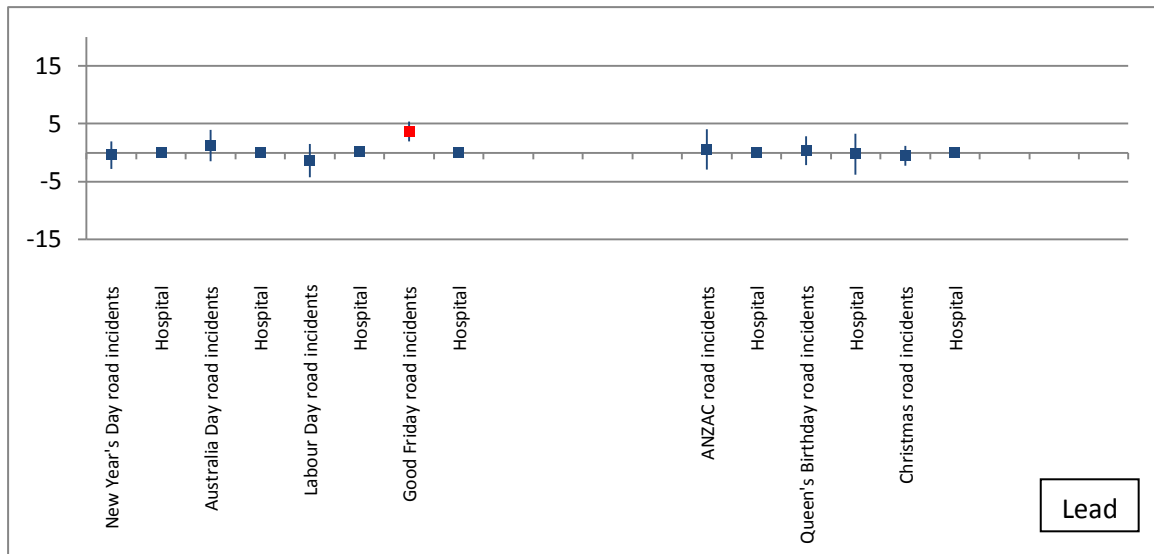
Figure 42: Mean number of serious road incidents and hospital admissions due to motor vehicle accidents for females by day of week



Motor vehicle accidents and public holidays

As shown in Figure 43, increased serious road incidents were found on the day preceding Good Friday for females. Significant increases occurred for hospital admissions for motor vehicle accidents on New Year's Day, ANZAC Day and Easter Sunday. There were significantly lower numbers of serious road incidents than predicted occurring on Good Friday. Significantly fewer serious road incidents occurred on the day following Boxing Day than predicted.

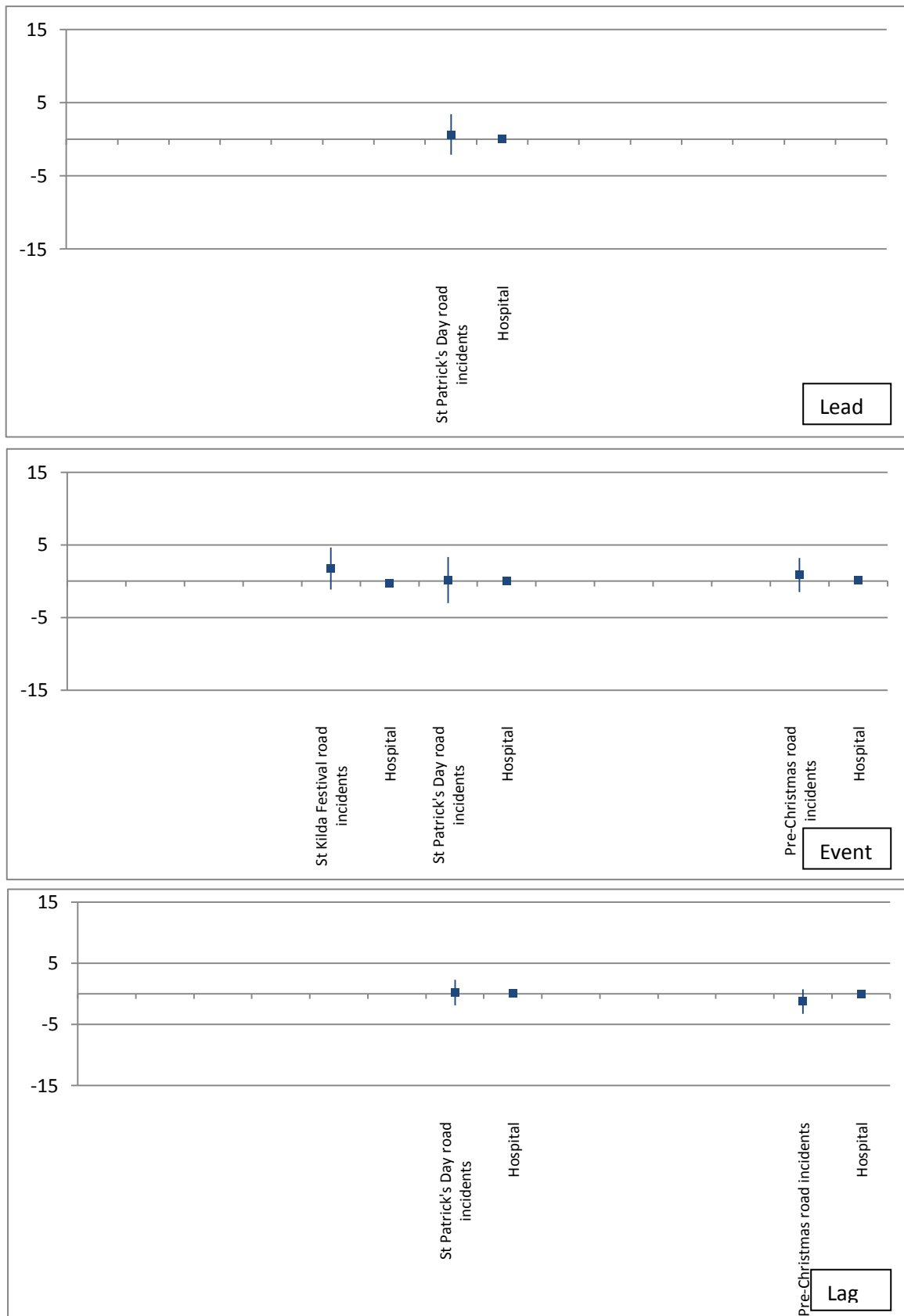
Figure 43: ARIMA model parameters for serious road incidents and hospital admissions due to motor vehicle accidents for females – Public Holidays



Motor vehicle accidents and major social events

As shown in Figure 44, there were no significant effects found for the social events examined in terms of motor vehicle accidents and hospitalisations among females.

Figure 44: ARIMA model parameters for serious road incidents and hospital admissions due to motor vehicle accidents for females – Social Events



Youths

Seasonal and time of week patterns

Serious road incidents and motor vehicle accident related hospital admissions peaked in the warmer months of the year, with the highest numbers of cases among youths occurring between October and December, and also in February and March (Figure 45). As shown in Figure 46, the distribution of motor vehicle accident cases over the course of the week indicates that Friday and Saturday were the days of the week with the greatest concentration of serious road incidents and motor vehicle accident related hospital admissions.

Figure 45: Mean number of serious road incidents and hospital admissions due to motor vehicle accidents for youths by month

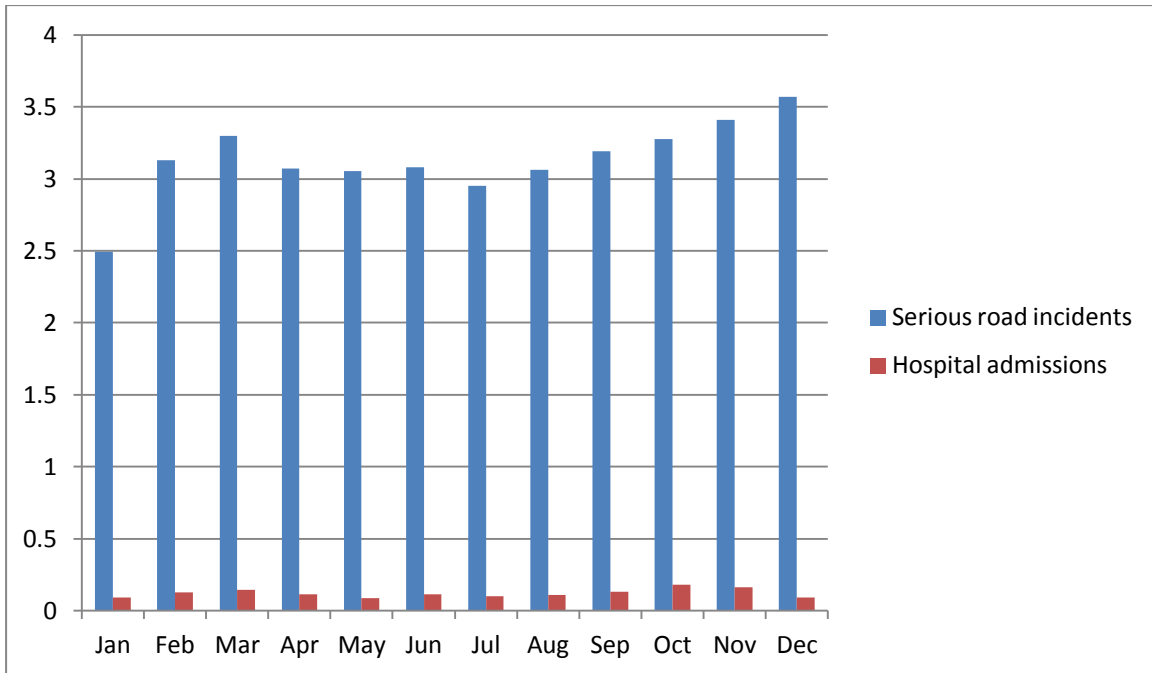
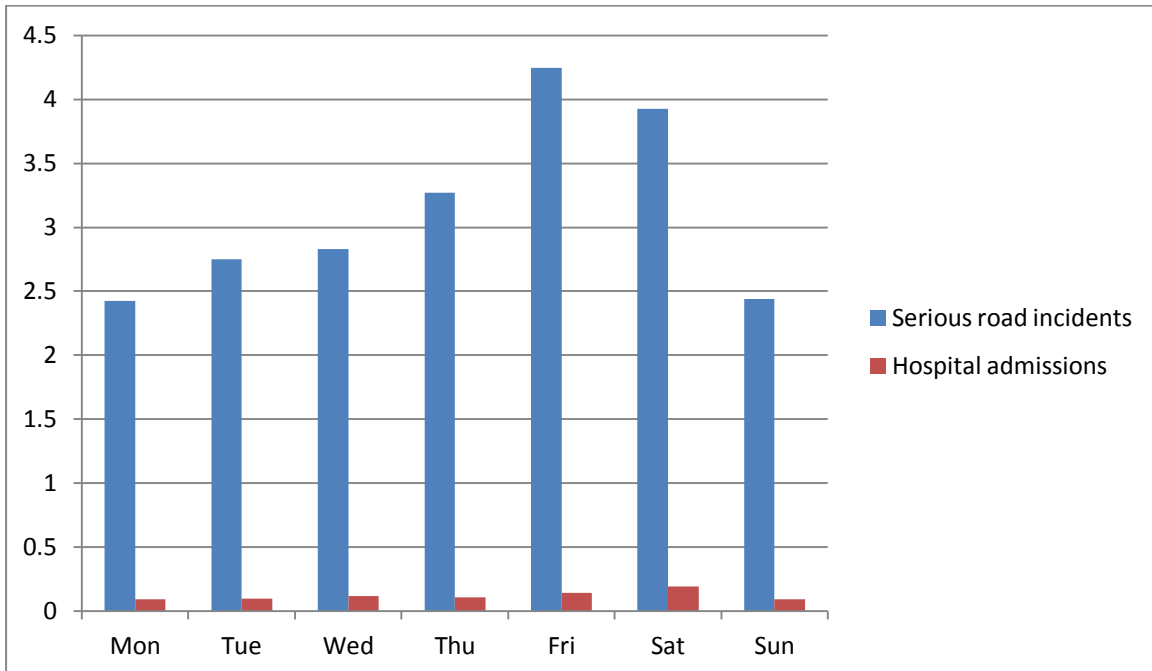


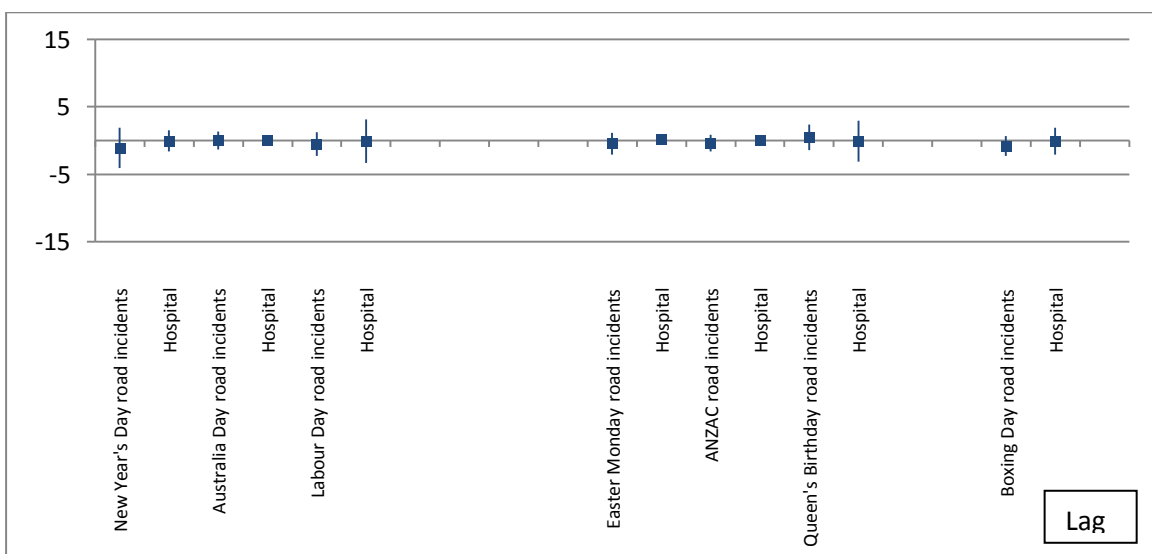
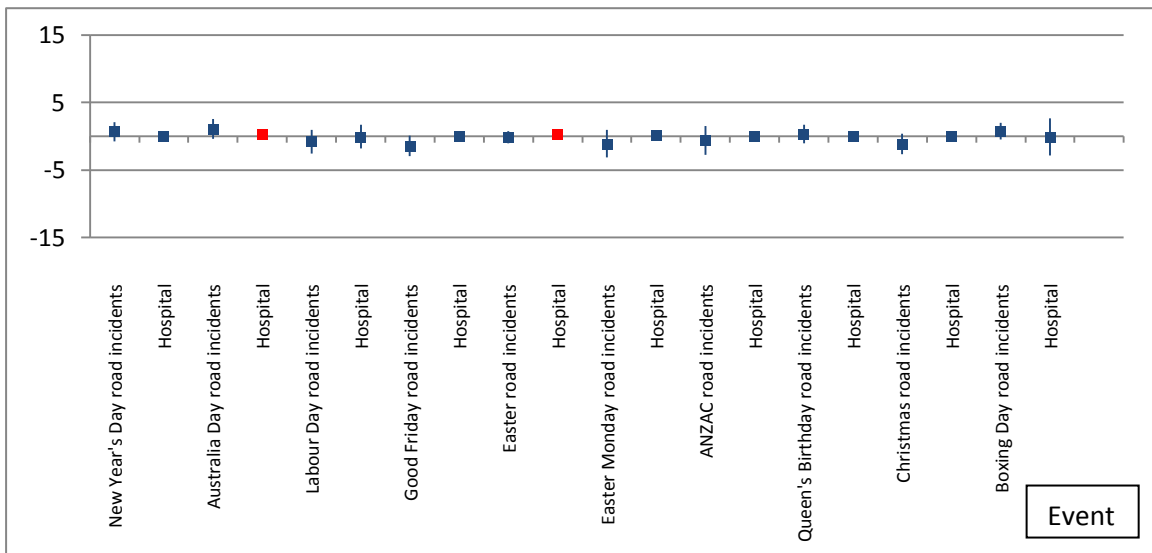
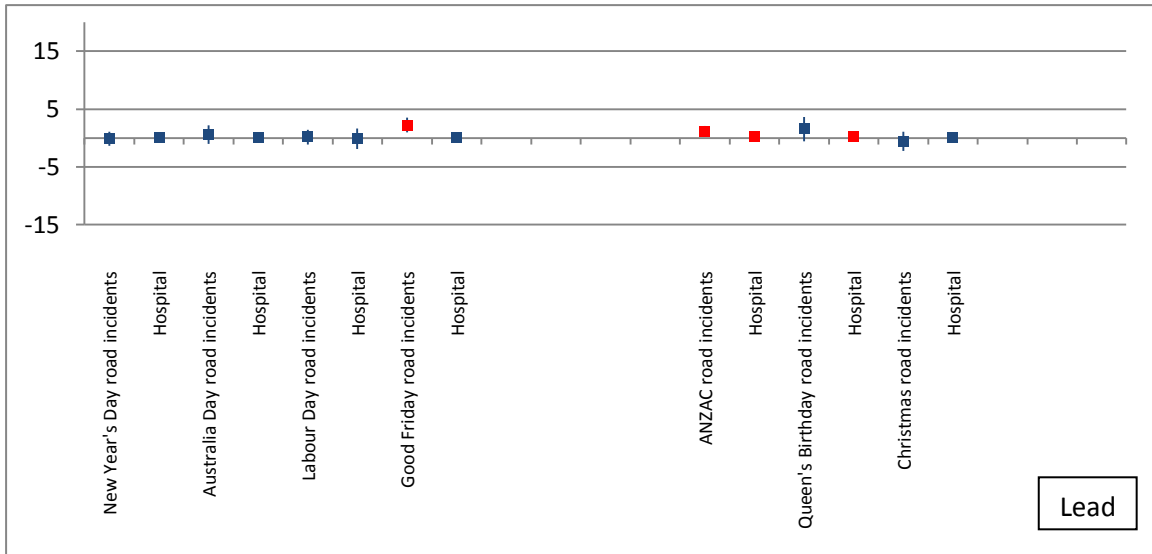
Figure 46: Mean number of serious road incidents and hospital admissions due to motor vehicle accidents for youths by day of week



Motor vehicle accidents and public holidays

As shown in Figure 47, increased motor vehicle accidents were found on the day preceding Good Friday (serious road incidents), ANZAC Day (serious road incidents and hospital admissions) and Queen's Birthday (motor vehicle accident related hospital admissions) for youths. Significant increases occurred for hospital admissions for motor vehicle accidents on Australia Day and Easter Sunday.

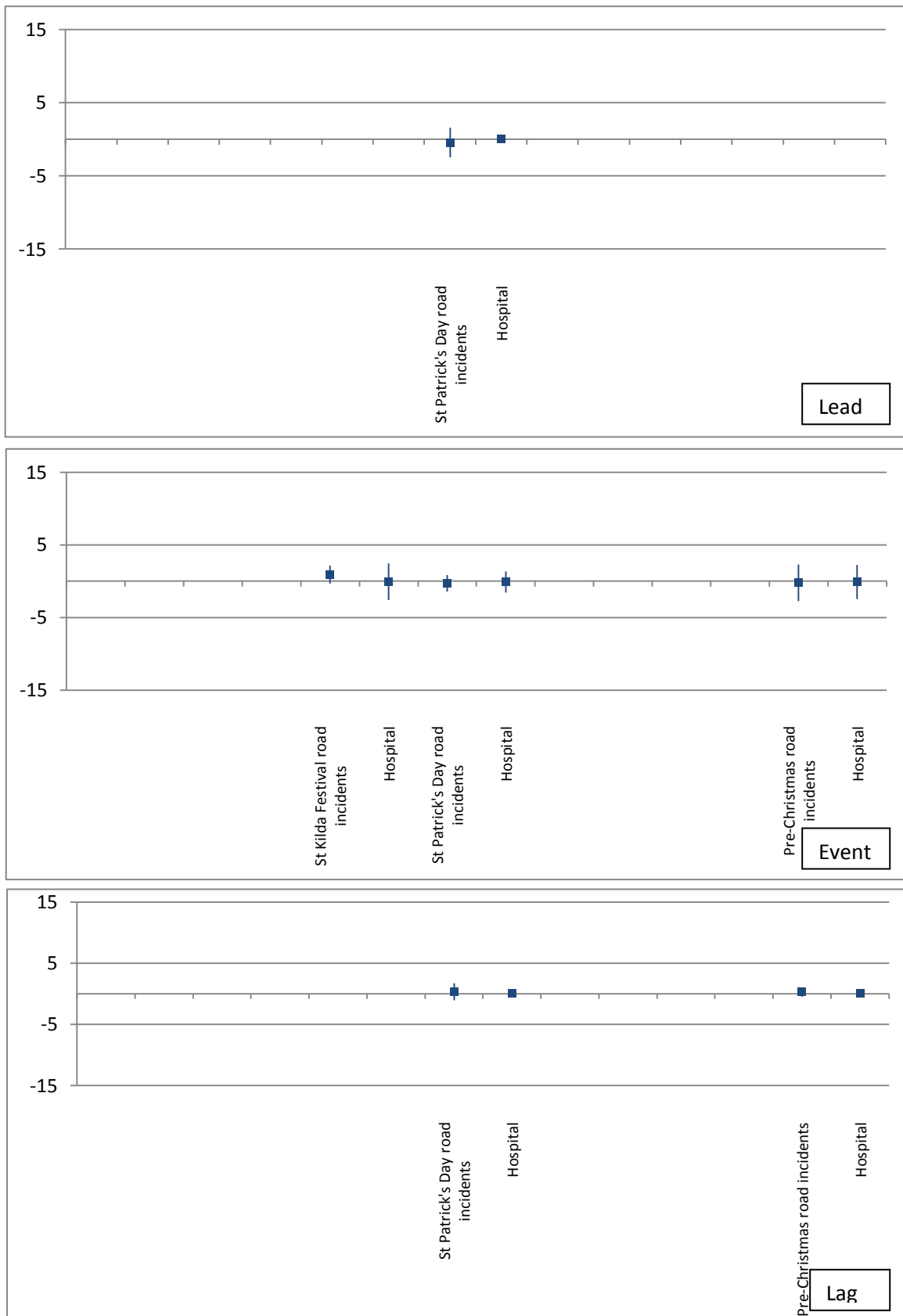
Figure 47: ARIMA model parameters for serious road incidents and hospital admissions due to motor vehicle accidents for youths – Public Holidays



Motor vehicle accidents and major social events

As shown in Figure 48, there were no significant effects found for the social events examined in terms of motor vehicle accidents and hospitalisations among youths.

Figure 48: ARIMA model parameters for serious road incidents and hospital admissions due to motor vehicle accidents for youths – Social Events



Chapter 6: Discussion

Harms associated with alcohol consumption in the context of public holidays and social events were explored in terms of general patterns, gender patterns and age patterns. A range of alcohol-related harms were considered, including acute intoxication requiring medical attention, assaults, and motor vehicle accidents. The use of time series analysis allows exploration of the levels of harms associated with specific events after controlling for the impact of seasonal and temporal variations in alcohol-related harms.

Findings

Acute Alcohol Intoxication

Across all populations examined, the peak months of the year for ambulance attendances, emergency department presentations, and hospital admissions attributed to acute alcohol intoxication were November and December, with February also being identified as a peak month among males. Consistent with the literature, Fridays and Saturdays were the days with the highest concentrations of alcohol intoxication related attendances, presentations and admissions.

For all demographic groups included in analyses, there were significantly elevated cases of acute alcohol intoxication occurring on the day preceding most public holidays. When examining acute intoxication cases for all patients, increased harms occurred on New Year's Day and ANZAC Day, whilst for males and females separately New Year's Day was the only public holiday where there were significantly elevated cases of acute intoxication, with significantly reduced numbers of cases of intoxication occurring on Boxing Day. Among youths, New Year's Day, Australia Day and ANZAC Day represented days with elevated numbers of cases of acute alcohol intoxication. On the day following Boxing Day, there were significantly fewer cases of acute intoxication on the day following Boxing Day.

Among all population groups, there was a significant increase in alcohol intoxication cases on the last working day before Christmas, which reflects an increase in acute intoxication cases among males on this day. St Patrick's Day also represented an occasion with significantly elevated occurrences of acute intoxication cases for males. There was a significantly lower number of cases of acute intoxication cases than predicted on the day following the last working day before Christmas across all patients, males, females and youths.

Assault

Consistent with previous research, the warmer months of the year represent peak times for assaults among all groups examined. Similarly, Friday and Saturday are the days of the week with the most assaults recorded across emergency department and hospital measures examined for all groups, with Sundays also being a peak day for females. In terms of police recorded assaults and family incidents, Saturdays and Sundays represented the peak days.

There were significantly elevated cases of assault on the day before all public holidays other than Christmas Day for all population groups examined other than females, who experienced increased numbers of assaults on the day before New Year's Day, Labour Day and Good Friday. In terms of family incidents, New Year's Eve represented a day of increased harms for all population groups examined. For all groups, New Year's Day, Australia Day and ANZAC Day represented days of significantly elevated numbers of assault presentations, with significantly lower numbers of assaults noted on Good Friday. Among all presentations and males, there were significantly lower numbers of assault presentations than predicted on the day following Boxing Day.

The last working day before Christmas was shown as a day of significantly elevated assault cases for all groups. St Patrick's Day also represented a day of elevated assaults for all emergency department and hospital presentations, males and youths, whilst among youths, there were significant increases in assaults during the St Kilda festival. On the day following the last working day before Christmas, there were significantly lower numbers of assaults than predicted among all groups other than females.

Motor Vehicle Accidents

Smaller effects were noted for motor vehicle accidents in measures of incidents and also hospitalisations.

The warmer months of the year were the peak times for motor vehicle accidents. For all groups, Friday and Saturday were found to be peak days of elevated cases of motor vehicle accidents, with elevated events also occurring on Thursdays among males.

The day preceding Good Friday was the only lead up day to a public holiday where motor vehicle accident cases were significantly elevated for all groups explored. For 'all' patients the day preceding Australia Day was also associated with increased motor vehicle accident cases – which is likely to be due to an elevation in cases among males who also experienced increase events on New Year's Eve. Among youths, the day before ANZAC Day and the day before the Queen's Birthday holiday were also associated with increased cases. Across the groups included in analyses, there was variation in effects, with increased numbers of motor vehicle accident cases on some public holidays such as New Year's Day and Easter, and significantly reduced numbers of harms on other public holidays such as Good Friday. A reduction in motor vehicle accidents was noted for the day following Boxing Day.

There were no significant effects found for motor vehicle accident presentations and social events for any of the groups examined.

Implications

The results presented indicate that alcohol-related harms are experienced and treated in patterns of peaks and troughs that are influenced by seasonal, temporal, social and cultural factors. The types and range of harms differ across public holidays and social events.

For all measures of alcohol-related harms, peaks in cases were noted for the warmer months of the year, and for Fridays and Saturdays. This is consistent with previous research as well as the feedback from emergency services staff, who have identified that troughs in alcohol-related harms in the cooler months tend to be 'filled' by presentations for non-alcohol-related conditions. However, the winter months are peak times of activity for some sectors – for example, as the football season runs from March to September, a significant focus for game planning and resourcing relates to minimising and responding to alcohol-related harms. Assessment and recognition of the impact of the timing of events and how alcohol-related harms may cluster are useful in terms of effective planning of events, as well as response to alcohol-related harms.

Whilst many service providers noted that public holidays were known to be peak periods of activity in responding to alcohol-related harms, the strongly significant findings in terms of elevated harms in the lead up to public holidays represented new information that can potentially provide information regarding where to direct prevention, screening and intervention opportunities. The clustering of different kinds of harms around different public holidays indicates that specific cultural and social aspects of drinking and acceptability of intoxication may play a key role in the risks and harms people experience.

A focus on specific events or occasions for public education may present good opportunities to target prevention and intervention. Limited resources play a role in the ability to target intervention, particularly during periods of high demand. Key experts identified the importance of communication and collaboration across services for planning, intervention and harm reduction. These linkages can aid in the development and maintenance of sustainable approaches to address the impact of alcohol on the community and on service delivery.

Limitations

It is inherently difficult to accurately measure alcohol-related trends in administrative datasets. As noted above, emergency presentation coding is somewhat problematic in terms of alcohol-related harms as it is not possible to code both intoxication and assault for a single presentation. The mutual exclusivity of the categories for coding mean that the opportunity to explore the nature of alcohol-related emergency presentations is limited. However, reasonable assumptions can be made regarding the involvement of alcohol in assaults coded for presentations, particularly given the consistent temporal and seasonal trends across the three measures presented.

Some events may overlap, thereby impacting on the ability to assess patterns in harms independently. For example, the Melbourne Cup is a major sporting event, and is also marked with a public holiday in Melbourne, which occurs on the first Tuesday in November. In addition, a number of sporting events are scheduled for public holidays, such as cricket international cricket matches occurring on Boxing Day or Australia Day. This means that effects may not be easily disentangled. These issues may need additional exploration and data collection, and this is being addressed in this project through qualitative data collection with key experts in service delivery and event planning.

Future Directions

The results of this project have highlighted some significant new evidence in relation to the relationships between public holidays and social events and a range of alcohol-related harms that have implications for research, policy and practice. Further questions and opportunities for exploration have emerged from this work, and warrant further consideration for future research.

The impact of weather conditions on patterns of alcohol consumption and harms is a potential factor that may influence drinking behaviour, and also harms. Further analysis of seasonal effects and also the relationships between social and cultural events in relation to meteorological variations in weather and precipitation would be useful – both in explaining some of the variations seen, and also in terms of opportunities for monitoring and prevention planning.

There are opportunities to extend the analyses undertaken here to include additional events of interest. These may include music and arts festivals, and also events such as ‘Schoolies’ week celebrations. Whilst there are limitations to the ability to explore many overlapping events, it would be beneficial to examine a range of events that may be related to intoxication related harms for specific populations of interest in the community, such as young people.

Conclusion

There has been little analysis of the occurrence of alcohol-related harm in relation to major public and social events in Victoria. There is a need for the development of an evidence base in terms of alcohol-related harms in the context of the timing and nature of major social events. Such evidence can inform the development and refinement of policy and intervention in relation to public health initiatives, emergency services and hospital staffing and resource planning, and also event planning. Targeting of prevention, intervention and treatment resources will provide a basis for reducing the extent of alcohol-related harms in the community.

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Appendix A

Table 1: Selected public holidays and cultural events examined in this report

Event	Description	Date
Last working day before Christmas	The last working day before holiday break	Last weekday before Christmas
Christmas Day	Public holiday (most licensed premises closed)	25 December (or following working day)
Boxing Day	Public holiday	26 December (or following working day)
New Years Day	Public holiday	1 January
Australia Day	Public holiday	26 January (or following working day)
ANZAC Day	Public holiday	25 April (or following working day)
Good Friday	First day of Easter holidays (most licensed premises closed)	Friday preceding Easter Sunday
Easter (Saturday – Monday)	Public holidays	Easter Sunday is the first Sunday after the first full moon after March 20
Labour Day	Public holiday	Second Monday in March
St Patrick's Day	Major social event	March 17
Queen's birthday	Public holiday	Second Monday in June
St Kilda Festival	Major social event	Second Sunday in February



Victorian Health Promotion Foundation
PO Box 154 Carlton South, VIC 3053 Australia
T +61 3 9667 1333 F +61 3 9667 1375
vichealth@vichealth.vic.gov.au
www.vichealth.vic.gov.au

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