NSW Recorded Crime Statistics January 1995 to June 2015

Number of incidents of non-domestic assault recorded by the NSW Police Force by assault type: Kings Cross Local Area Command, Greater Sydney Statistical Area and NSW

Time Period	Kings Cross Local Area Command				Greater Sydney Statistical Area		
	Assault - Actual Bodily Harm	Assault - Assault Common	Assault - Grievous Bodily Harm	Total	Assault - Actual Bodily Harm	Assault - Assault Common	Assault - Grievous Bodily Harm
1995/Jan	17	33	3	53	330	975	58
1995/Feb	23	33	6	62	335	957	63
1995/Mar	19	35	5	59	331	1066	60
1995/Apr	17	24	1	42	336	913	62
1995/May	13	24	2	39	334	896	52
1995/Jun	14	23	7	44	283	883	62
1995/Jul	8	27	1	36	314	924	49
1995/Aug	13	32	4	49	292	997	58
1995/Sep	16	31	4	51	363	1019	64
1995/Oct	23	47	4	74	400	1122	65
1995/Nov	11	33	6	50	353	1062	62
1995/Dec	13	56	5	74	410	1207	83
1996/Jan	12	39	5	56	374	1106	71
1996/Feb	15	33	3	51	351	1132	66
1996/Mar	20	57	2	79	436	1290	77
1996/Apr	23	42	7	72	348	1090	85
1996/May	20	43	2	65	306	1106	74
1996/Jun	22	43	9	74	341	1077	80
1996/Jul	8	47	3	58	288	1062	69
1996/Aug	14	36	1	51	336	1151	66
1996/Sep	14	27	2	43	396	1206	69
1996/Oct	21	35	1	57	376	1233	84
1996/Nov	21	42	2	65	350	1238	78
1996/Dec	24	53	5	82	411	1384	79
1997/Jan	14	36	6	56	378	1178	79
1997/Feb	17	57	3	77	363	1212	82
1997/Mar	23	41	8	72	476	1441	92
1997/Apr	24	48	2	74	355	1196	73
1997/May	17	29	5	51	335	1156	69
1997/Jun	23	43	4	70	340	1063	58
1997/Jul	19	31	3	53	324	1101	57
1997/Aug	17	35	4	56	403	1188	65
1997/Sep	21	29	3	53	364	1260	84
1997/Oct	19	38	3	60	395	1262	85
1997/Nov	19	37	1	57	464	1399	91
1997/Dec	30	47	3	80	491	1457	89
1998/Jan	20	49	9	78	412	1273	84
1998/Feb	15	34	4	53	413	1265	78
1998/Mar	17	42	7	66	442	1473	83
1998/Apr	23	25	5	53	392	1153	70

1998/May	22	32	2	56	380	1259	63
1998/Jun	14	33	4	51	346	1163	55
1998/Jul	11	30	0	41	361	1207	43
1998/Aug	29	25	2	56	453	1297	69
1998/Sep	13	28	4	45	400	1245	76
1998/Oct	18	47	3	68	415	1339	86
1998/Nov	18	39	8	65	412	1347	61
1998/Dec	18	34	2	54	435	1385	70
1999/Jan	15	37	3	55	439	1326	94
1999/Feb	17	31	1	49	468	1278	69
1999/Mar	23	34	3	60	487	1399	61
1999/Apr	18	27	2	47	412	1127	67
1999/May	21	40	2	63	371	1254	66
1999/Jun	24	32	4	60	369	1163	56
1999/Jul	18	18	3	39	373	1085	72
1999/Aug	14	22	2	38	370	1201	60
1999/Sep	23	36	4	63	380	1232	71
1999/Oct	21	26	6	53	417	1236	72
1999/Nov	15	25	3	43	401	1258	79
1999/Dec	27	51	2	80	508	1368	88
2000/Jan	15	26	4	45	443	1228	90
2000/Feb	17	34	2	53	398	1286	83
2000/Mar	21	52	2	75	478	1507	74
2000/Apr	14	55	5	74	409	1192	90
2000/May	10	29	2	41	374	1152	56
2000/Jun	21	41	4	66	392	1197	64
2000/Jul	17	37	3	57	414	1245	72
2000/Aug	21	35	3	59	412	1239	87
2000/Sep	19	46	0	65	422	1275	65
2000/Oct	16	41	6	63	438	1320	68
2000/Nov	16	34	5	55	467	1393	84
2000/Dec	29	48	8	85	520	1409	86
2001/Jan	28	28	8	64	505	1349	88
2001/Feb	22	32	4	58	479	1365	93
2001/Mar	30	37	5	72	511	1460	76
2001/Apr	24	41	5	70	425	1307	91
2001/May	27	48	5	80	406	1319	66
2001/Jun	26	55	0	81	455	1366	89
2001/Jul	20	43	5	68	385	1241	73
2001/Aug	27	51	1	79	436	1298	75
2001/Sep	34	49	4	87	479	1402	91
2001/Oct	27	48	2	77	447	1424	67
2001/Nov	23	42	5	70	466	1435	85
2001/Dec	30	46	4	80	567	1494	98
2002/Jan	32	43	3	78	516	1374	87
2002/Feb	24	36	5	65	447	1298	82
2002/Mar	32	40	4	76	543	1459	88
2002/Apr	14	37	2	53	468	1279	93
2002/May	17	43	2	62	483	1353	70
2002/Jun	15	42	5	62	426	1214	72

2002/Jul	14	46	3	63	377	1271	87
2002/Aug	12	35	4	51	412	1394	73
2002/Sep	16	36	4	56	448	1388	82
2002/Oct	20	48	6	74	494	1476	86
2002/Nov	20	41	2	63	614	1518	78
2002/Dec	30	53	4	87	541	1484	92
2003/Jan	13	43	5	61	477	1420	94
2003/Feb	19	45	4	68	496	1498	88
2003/Mar	23	45	2	70	550	1679	94
2003/Apr	15	46	2	63	431	1377	74
2003/May	23	38	4	65	435	1336	63
2003/Jun	26	36	2	64	431	1306	67
2003/Jul	8	28	4	40	390	1266	73
2003/Aug	18	31	1	50	398	1306	73
2003/Sep	20	41	5	66	469	1393	76
2003/Oct	22	40	2	64	438	1359	90
2003/Nov	10	35	3	48	468	1399	80
2003/Dec	25	55	3	83	558	1479	87
2004/Jan	23	38	5	66	439	1280	85
2004/Feb	15	27	3	45	469	1397	93
2004/Mar	31	31	4	66	498	1383	81
2004/Apr	29	34	2	65	454	1218	74
2004/May	22	33	3	58	385	1265	73
2004/Jun	16	41	1	58	367	1224	66
2004/Jul	21	32	0	53	435	1200	74
2004/Aug	15	45	2	62	454	1255	70
2004/Sep	16	37	4	57	437	1234	59
2004/Oct	14	31	7	52	455	1338	80
2004/Nov	27	39	2	68	474	1419	82
2004/Dec	19	40	3	62	523	1417	105
2005/Jan	25	44	10	79	472	1427	105
2005/Feb	22	29	4	55	467	1308	80
2005/Mar	23	46	4	73	484	1434	82
2005/Apr	26	43	2	71	442	1352	83
2005/May	17	43	1	61	444	1312	68
2005/Jun	20	40	5	65	439	1212	90
2005/Jul	23	39	1	63	437	1270	84
2005/Aug	12	30	4	46	465	1233	69
2005/Sep	22	38	6	66	465	1269	81
2005/Oct	14	62	3	79	517	1383	73
2005/Nov	20	50	6	76	500	1441	93
2005/Dec	25	49	7	81	595	1483	104
2006/Jan	17	47	6	70	476	1307	102
2006/Feb	26	40	2	68	461	1462	88
2006/Mar	20	37	2	59	540	1438	105
2006/Apr	17	38	2	57	500	1283	96
2006/May	15	33	4	52	419	1178	84
2006/Jun	16	29	5	50	368	1167	71
2006/Jul	21	48	4	73	471	1276	85
2006/Aug	19	43	5	67	405	1316	84

2006/Sep	27	23	4	54	477	1298	82
2006/Oct	26	42	5	73	522	1322	79
2006/Nov	29	44	6	79	522	1398	104
2006/Dec	30	58	4	92	567	1389	118
2007/Jan	24	40	4	68	521	1245	103
2007/Feb	25	36	5	66	473	1302	99
2007/Mar	36	55	7	98	618	1549	95
2007/Apr	20	51	4	75	521	1288	93
2007/May	36	57	3	96	501	1382	62
2007/Jun	19	29	1	49	454	1180	86
2007/Jul	21	31	4	56	490	1270	73
2007/Aug	22	29	6	57	492	1384	107
2007/Sep	26	47	4	77	553	1357	93
2007/Oct	24	60	9	93	492	1383	86
2007/Nov	25	37	9	71	585	1391	111
2007/Dec	28	48	5	81	615	1336	104
2008/Jan	17	51	12	80	555	1348	109
2008/Feb	19	35	1	55	549	1399	97
2008/Mar	31	50	3	84	656	1543	119
2008/Apr	28	32	2	62	530	1192	89
2008/May	25	42	6	73	506	1430	115
2008/Jun	26	41	5	72	502	1288	97
2008/Jul	22	23	2	47	465	1240	66
2008/Aug	23	27	8	58	503	1395	107
2008/Sep	18	28	2	48	529	1360	98
2008/Oct	22	36	3	61	584	1421	91
2008/Nov	22	45	2	69	604	1452	110
2008/Dec	23	42	5	70	569	1283	93
2009/Jan	12	43	6	61	570	1262	99
2009/Feb	17	31	5	53	504	1213	92
2009/Mar	25	40	3	68	639	1442	109
2009/Apr	27	35	2	64	515	1274	83
2009/May	20	35	4	59	489	1237	73
2009/Jun	15	36	6	57	416	1110	68
2009/Jul	19	31	3	53	434	1049	66
2009/Aug	23	37	3	63	508	1278	97
2009/Sep	12	40	1	53	445	1251	73
2009/Oct	23	38	11	72	534	1307	107
2009/Nov	32	36	5	73	561	1340	93
2009/Dec	33	38	2	73	582	1413	100
2010/Jan	29	29	5	63	634	1301	103
2010/Feb	29	36	14	79	499	1330	85
2010/Mar	30	35	6	71	563	1442	89
2010/Apr	28	44	5	77	450	1187	89
2010/May	25	32	4	61	487	1209	74
2010/Jun	27	20	4	51	433	1141	66
2010/Jul	21	27	4	52	428	1119	63
2010/Aug	27	42	8	77	486	1286	67
2010/Sep	18	30	4	52	480	1291	59
2010/Oct	19	46	5	70	518	1310	75

2010/Nov	25	50	6	81	517	1314	66
2010/Dec	28	44	5	77	542	1307	91
2011/Jan	24	44	3	71	497	1254	87
2011/Feb	16	30	2	48	470	1259	71
2011/Mar	25	40	2	67	534	1359	72
2011/Apr	20	35	6	61	465	1164	63
2011/May	16	29	3	48	399	1165	52
2011/Jun	19	32	5	56	423	1172	59
2011/Jul	23	41	7	71	408	1131	68
2011/Aug	18	29	1	48	400	1213	61
2011/Sep	15	30	4	49	425	1145	64
2011/Oct	16	31	3	50	438	1236	76
2011/Nov	21	31	3	55	415	1142	80
2011/Dec	29	41	5	75	453	1205	67
2012/Jan	27	53	3	83	412	1188	71
2012/Feb	13	44	3	60	377	1173	57
2012/Mar	20	38	3	61	429	1216	52
2012/Apr	26	44	3	73	442	1074	62
2012/May	22	40	2	64	384	1061	67
2012/Jun	24	31	2	57	360	1028	60
2012/Jul	16	35	7	58	374	958	58
2012/Aug	23	38	3	64	400	1096	52
2012/Sep	17	24	3	44	383	1166	80
2012/Oct	18	34	1	53	447	1128	63
2012/Nov	19	39	4	62	402	1210	48
2012/Dec	18	41	6	65	441	1227	87
2013/Jan	15	42	4	61	415	1145	78
2013/Feb	30	44	4	78	427	1015	60
2013/Mar	21	39	2	62	462	1252	60
2013/Apr	13	31	3	47	396	1021	48
2013/May	20	39	4	63	343	1099	51
2013/Jun	19	34	1	54	384	1058	59
2013/Jul	18	36	1	55	353	997	41
2013/Aug	19	36	2	57	349	1121	49
2013/Sep	15	49	4	68	378	1060	59
2013/Oct	21	34	2	57	379	1118	57
2013/Nov	12	32	4	48	398	1077	62
2013/Dec	23	47	3	73	459	1261	64
2014/Jan	13	36	0	49	404	1074	64
2014/Feb	8	20	0	28	382	975	31
2014/Mar	14	36	2	52	397	1200	47
2014/Apr	10	28	1	39	312	999	40
2014/May	15	36	0	51	331	1032	55
2014/Jun	11	32	1	44	309	939	46
2014/Jul	7	26	0	33	317	964	39
2014/Aug	16	31	1	48	283	985	39
2014/Sep	10	25	1	36	313	1052	38
2014/Oct	7	33	0	40	369	1156	52
2014/Nov	6	31	2	39	409	1213	37
2014/Dec	6	24	2	32	378	1093	61

2015/Jan	11	21	0	32	374	1023	43
2015/Feb	16	36	0	52	337	1066	55
2015/Mar	9	16	0	25	402	1094	57
2015/Apr	8	13	1	22	358	922	43
2015/May	14	24	3	41	328	990	37
2015/Jun	3	24	1	28	339	898	40

Source: NSW Bureau of Crime Statistics and Research
Reference: sr15-13517
Please retain this reference number for future correspondence
NOTE: *Data sourced from the NSW Bureau of Crime Statistics and Research must be acknowledged in any acknowledgement should take the form of* **Source: NSW Bureau of Crime Statistics and Research**

* Greater Sydney includes: Central Coast, Baulkham Hills and Hawkesbury, Blacktown, City and Inner Soutl Sydney and Hornsby, Northern Beaches, Outer South West, Outer West and Blue Mountains, Parramatta,

a*	NSW			
Total	Assault - Actual Bodily Harm	Assault - Assault Common	Assault - Grievous Bodily Harm	Total
1363	593	1717	104	2414
1355	557	1625	92	2274
1457	543	1749	88	2380
1311	529	1536	89	2154
1282	507	1530	90	2127
1228	499	1541	97	2137
1287	511	1547	81	2139
1347	533	1703	88	2324
1446	619	1682	105	2406
1587	658	1841	101	2600
1477	591	1854	110	2555
1700	734	2096	128	2958
1551	659	1929	120	2708
1549	610	1843	109	2562
1803	712	2150	116	2978
1523	555	1752	125	2432
1486	528	1905	111	2544
1498	598	1851	114	2563
1419	476	1719	98	2293
1553	582	1938	107	2627
1671	636	1986	97	2719
1693	648	2062	116	2826
1666	661	2056	114	2831
1874	740	2244	120	3104
1635	673	1979	124	2776
1657	612	2024	125	2761
2009	798	2371	140	3309
1624	565	1927	107	2599
1560	539	1939	100	2578
1461	549	1841	89	2479
1482	560	1892	87	2539
1656	681	2028	112	2821
1708	621	2058	125	2804
1742	679	2173	148	3000
1954	767	2359	133	3259
2037	849	2472	151	3472
1769	780	2330	149	3259
1756	708	2187	107	3002
1998	760	2469	124	3353
1615	622	2009	110	2741

1702	613	2185	103	2901
1564	624	2012	97	2733
1611	631	2133	78	2842
1819	780	2215	94	3089
1721	678	2283	119	3080
1840	762	2408	129	3299
1820	755	2436	108	3299
1890	822	2503	125	3450
1859	812	2448	147	3407
1815	800	2274	110	3184
1947	819	2401	110	3330
1606	644	2018	95	2757
1691	658	2242	108	3008
1588	592	1993	86	2671
1530	651	1955	103	2709
1631	673	2162	111	2946
1683	674	2311	122	3107
1725	739	2334	118	3191
1738	735	2278	130	3143
1964	837	2458	136	3431
1761	822	2396	139	3357
1767	693	2338	141	3172
2059	809	2665	116	3590
1691	719	2186	135	3040
1582	635	2108	87	2830
1653	678	2193	98	2969
1731	688	2173	123	2984
1738	715	2263	131	3109
1762	720	2212	124	3056
1826	735	2456	114	3305
1944	794	2490	121	3405
2015	924	2598	153	3675
1942	897	2590	138	3625
1937	820	2544	141	3505
2047	864	2711	138	3713
1823	727	2327	135	3189
1791	703	2322	120	3145
1910	800	2387	135	3322
1699	696	2213	120	3029
1809	770	2388	126	3284
1972	813	2559	134	3506
1938	862	2616	135	3613
1986	839	2725	131	3695
2159	969	2786	143	3898
1977	949	2631	153	3733
1827	818	2478	120	3416
2090	961	2809	144	3914
1840	802	2407	144	3353
1906	774	2471	118	3363
1712	717	2269	115	3101

1735	674	2283	133	3090
1879	749	2569	116	3434
1918	829	2597	118	3544
2056	851	2726	134	3711
2210	1050	2875	112	4037
2117	966	2827	151	3944
1991	893	2688	153	3734
2082	881	2803	145	3829
2323	941	2994	154	4089
1882	767	2340	121	3228
1834	748	2407	98	3253
1804	738	2429	102	3269
1729	685	2259	109	3053
1777	722	2371	116	3209
1938	826	2541	114	3481
1887	803	2491	128	3422
1947	872	2533	131	3536
2124	956	2697	135	3788
1804	806	2421	159	3386
1959	900	2511	146	3557
1962	893	2556	116	3565
1746	753	2203	121	3077
1723	674	2303	112	3089
1657	656	2227	109	2992
1709	768	2155	120	3043
1779	821	2280	112	3213
1730	767	2291	115	3173
1873	838	2442	141	3421
1975	865	2513	118	3496
2045	965	2616	161	3742
2004	885	2526	177	3588
1855	831	2397	134	3362
2000	923	2677	140	3740
1877	794	2415	129	3338
1824	796	2330	112	3238
1741	778	2168	133	3079
1791	811	2267	132	3210
1767	818	2250	109	3177
1815	800	2287	123	3210
1973	894	2485	119	3498
2034	913	2649	149	3711
2182	1065	2695	171	3931
1885	916	2479	174	3569
2011	905	2570	121	3596
2083	1021	2660	175	3856
1879	871	2285	147	3303
1681	757	2153	140	3050
1606	747	2119	120	2986
1832	846	2229	132	3207
1805	797	2319	121	3237

1857	893	2321	126	3340
1923	966	2359	145	3470
2024	977	2531	166	3674
2074	1117	2543	204	3864
1869	964	2356	167	3487
1874	950	2337	153	3440
2262	1135	2827	164	4126
1902	959	2344	141	3444
1945	894	2425	112	3431
1720	829	2084	128	3041
1833	886	2165	120	3171
1983	908	2387	153	3448
2003	986	2379	157	3522
1961	931	2415	155	3501
2087	1026	2398	174	3598
2055	1142	2462	169	3773
2012	1049	2490	182	3721
2045	986	2473	158	3617
2318	1165	2710	198	4073
1811	867	2108	138	3113
2051	932	2530	176	3638
1887	902	2238	162	3302
1771	827	2125	117	3069
2005	912	2411	158	3481
1987	933	2364	145	3442
2096	1024	2500	143	3667
2166	1111	2607	179	3897
1945	1088	2333	151	3572
1931	1086	2334	170	3590
1809	971	2166	153	3290
2190	1131	2527	164	3822
1872	910	2195	133	3238
1799	890	2224	130	3244
1594	824	2015	118	2957
1549	791	1922	108	2821
1883	957	2310	150	3417
1769	868	2243	120	3231
1948	979	2282	169	3430
1994	1062	2455	155	3672
2095	1137	2459	162	3758
2038	1177	2440	173	3790
1914	930	2331	136	3397
2094	1025	2538	153	3716
1726	839	2073	135	3047
1770	843	2104	124	3071
1640	816	2059	105	2980
1610	768	2018	97	2883
1839	886	2269	103	3258
1830	864	2236	109	3209
1903	903	2338	128	3369

1897	926	2372	114	3412
1940	984	2421	143	3548
1838	982	2285	151	3418
1800	889	2261	105	3255
1965	962	2416	136	3514
1692	849	2064	101	3014
1616	751	2066	89	2906
1654	805	2072	105	2982
1607	746	1963	103	2812
1674	741	2109	106	2956
1634	796	2114	99	3009
1750	799	2241	127	3167
1637	778	2040	124	2942
1725	894	2201	116	3211
1671	871	2158	114	3143
1607	825	2150	96	3071
1697	858	2282	94	3234
1578	802	1986	109	2897
1512	758	1963	105	2826
1448	688	1807	93	2588
1390	719	1830	99	2648
1548	759	1981	84	2824
1629	725	2076	121	2922
1638	816	2034	99	2949
1660	778	2124	90	2992
1755	851	2319	142	3312
1638	837	2015	128	2980
1502	762	1922	110	2794
1774	843	2239	107	3189
1465	714	1821	87	2622
1493	688	1990	91	2769
1501	739	1851	108	2698
1391	681	1762	71	2514
1519	683	2018	96	2797
1497	733	1928	92	2753
1554	753	1927	105	2785
1537	773	1987	108	2868
1784	908	2146	106	3160
1542	810	1963	116	2889
1388	688	1832	69	2589
1644	756	2142	80	2978
1351	634	1717	76	2427
1418	625	1918	91	2634
1294	611	1623	72	2306
1320	586	1644	64	2294
1307	594	1769	64	2427
1403	571	1825	73	2469
1577	689	2024	93	2806
1659	738	2068	87	2893
1532	762	1985	104	2851

1440	748	1884	72	2704
1458	666	1861	93	2620
1553	735	1958	82	2775
1323	640	1611	65	2316
1355	603	1758	69	2430
1277	580	1557	69	2206

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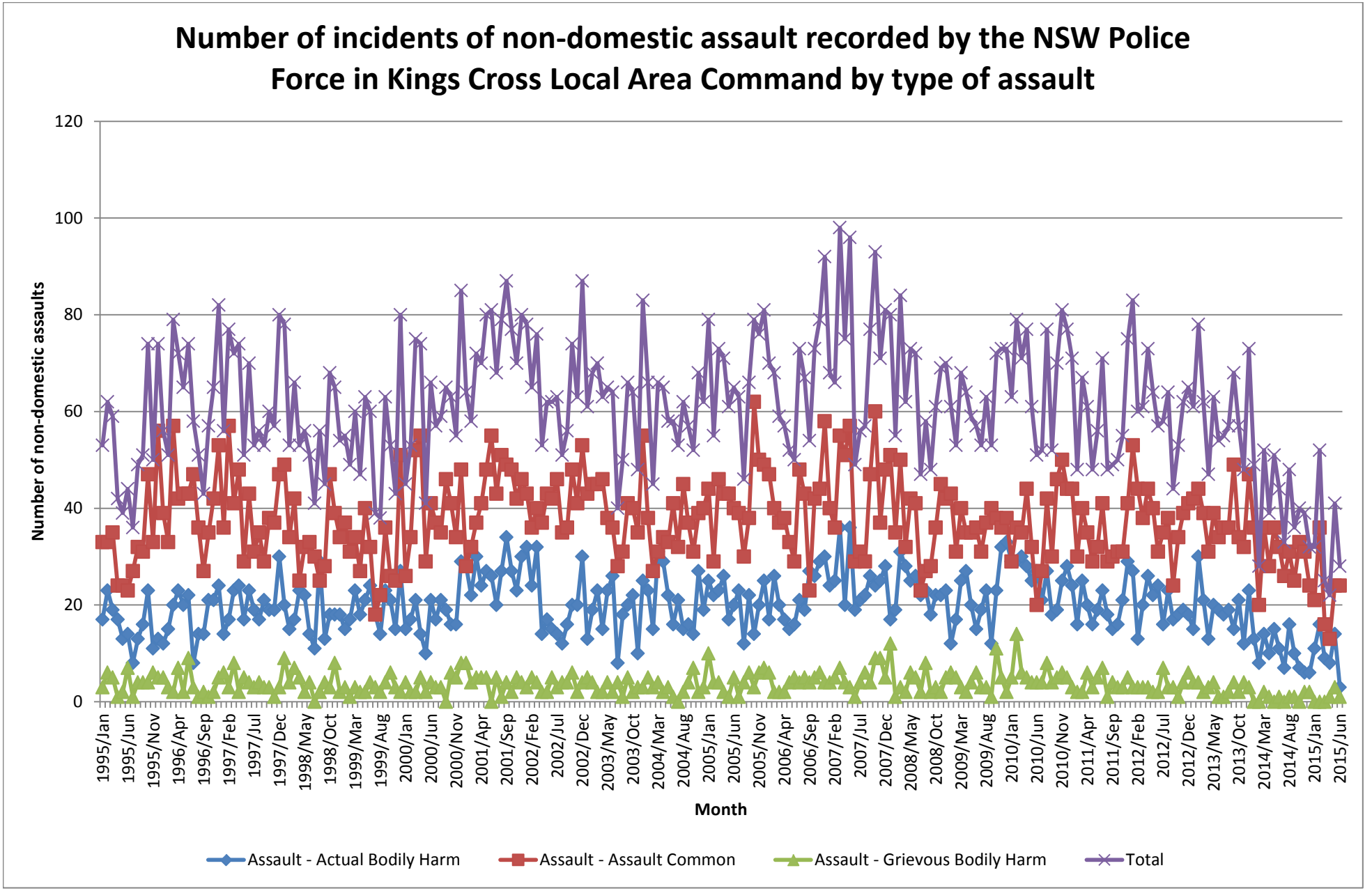
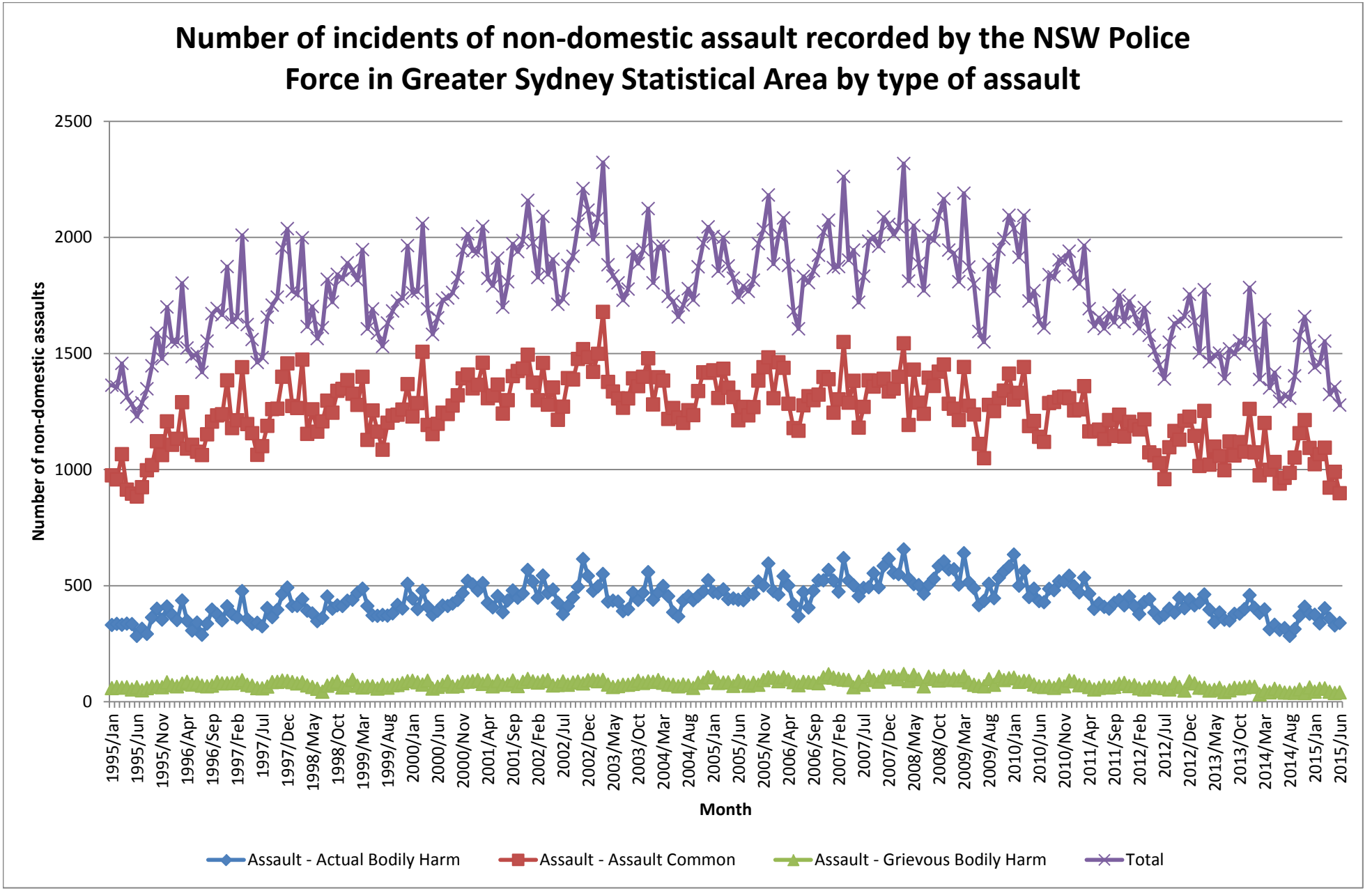
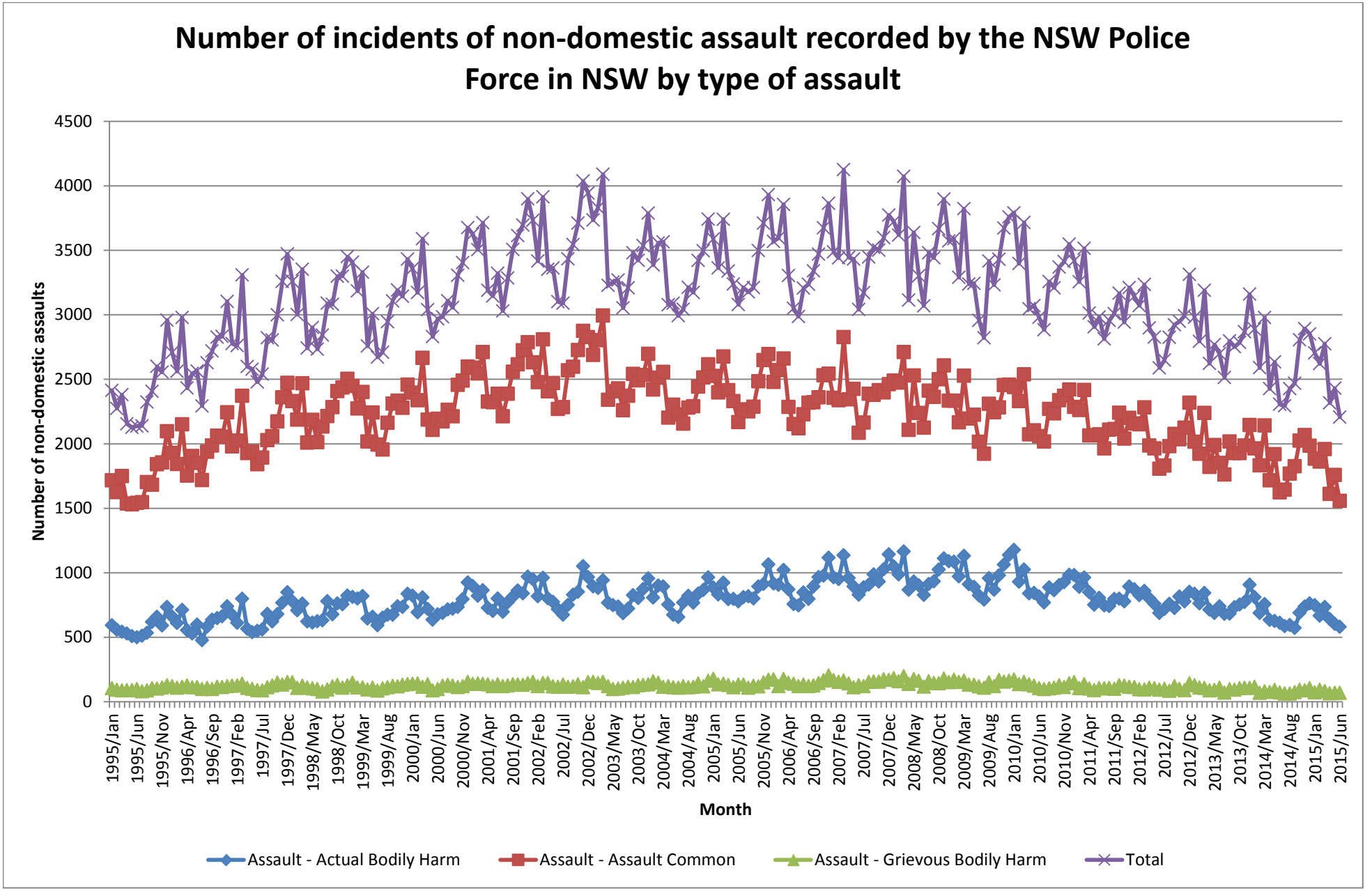
Ryde, South West and Sutherland


Number of incidents of non-domestic assault recorded by the NSW Police Force in Kings Cross Local Area Command by type of assault
Number of non-domestic assaults
120
100
80
60
40
20
0
1995/Jan
1995/Jun
1995/Nov
1996/Apr
1996/Sep
1997/Feb
1997/Jul
1997/Dec
1998/May
1998/Oct
1999/Mar
1999/Aug
2000/Jan
2000/Jun
2000/Nov
2001/Apr
2001/Sep
2002/Feb
2002/Jul
2002/Dec
2003/May
2003/Oct
2004/Mar
2004/Aug
2005/Jan
2005/Jun
2005/Nov
2006/Apr
2006/Sep
2007/Feb
2007/Jul
2007/Dec
2008/May
2008/Oct
2009/Mar
2009/Aug
2010/Jan
2010/Jun
2010/Nov
2011/Apr
2011/Sep
2012/Feb
2012/Jul
2012/Dec
2013/May
2013/Oct
2014/Mar
2014/Aug
2015/Jan
2015/Jun
Month
Assault - Actual Bodily Harm
Assault - Assault Common
Assault - Grievous Bodily Harm
Total


Number of incidents of non-domestic assault recorded by the NSW Police Force in Greater Sydney Statistical Area by type of assault
Number of non-domestic assaults
2500
2000
1500
1000
500
0
1995/Jan
1995/Jun
1995/Nov
1996/Apr
1996/Sep
1997/Feb
1997/Jul
1997/Dec
1998/May
1998/Oct
1999/Mar
1999/Aug
2000/Jan
2000/Jun
2000/Nov
2001/Apr
2001/Sep
2002/Feb
2002/Jul
2002/Dec
2003/May
2003/Oct
2004/Mar
2004/Aug
2005/Jan
2005/Jun
2005/Nov
2006/Apr
2006/Sep
2007/Feb
2007/Jul
2007/Dec
2008/May
2008/Oct
2009/Mar
2009/Aug
2010/Jan
2010/Jun
2010/Nov
2011/Apr
2011/Sep
2012/Feb
2012/Jul
2012/Dec
2013/May
2013/Oct
2014/Mar
2014/Aug
2015/Jan
2015/Jun
Month
Assault - Actual Bodily Harm
Assault - Assault Common
Assault - Grievous Bodily Harm
Total


Number of incidents of non-domestic assault recorded by the NSW Police Force in NSW by type of assault
Number of non-domestic assaults
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1995/Jan
1995/Jun
1995/Nov
1996/Apr
1996/Sep
1997/Feb
1997/Jul
1997/Dec
1998/May
1998/Oct
1999/Mar
1999/Aug
2000/Jan
2000/Jun
2000/Nov
2001/Apr
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2010/Nov
2011/Apr
2011/Sep
2012/Feb
2012/Jul
2012/Dec
2013/May
2013/Oct
2014/Mar
2014/Aug
2015/Jan
2015/Jun
Month
Assault - Actual Bodily Harm
Assault - Assault Common
Assault - Grievous Bodily Harm
Total

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Lockouts and last drinks:

The impact of the January 2014 liquor licence reforms on assaults in NSW, Australia

***Patricia Menéndez*[*], *Don Weatherburn*[*], *Kypros Kypri*[§] *and Jacqueline Fitzgerald*[*]**

[*] NSW Bureau of Crime Statistics and Research, [§] School of Medicine & Public Health, University of Newcastle, Australia

Aims: *To determine (1) whether the January 2014 reforms to the NSW Liquor Act reduced the incidence of assault in the Kings Cross and Sydney CBD Entertainment Precincts. (2) Whether the incidence of assault increased in areas proximate to these Precincts or in nightspots further away but still within easy reach of these Precincts. (3) If there is evidence of displacement, and whether the reduction in assaults in the Kings Cross and Sydney CBD Entertainment Precincts was larger than the increase in the number of assaults in the displacement areas.*

Method: *We examine the effects of the legislative reforms introduced in January 2014 using time series structural models. These models are used to estimate the underlying long term dynamics of the time series of police recorded non-domestic assaults in NSW between January 2009 and December 2013. The effect of the January 2014 reform is captured by including terms in the models reflecting the timing of the change. Separate analyses are carried out for: the Kings Cross Precinct (KXP); the Sydney CBD Entertainment Precinct (CBD); an area contiguous with KXP and CBD that we refer to as the proximal displacement area (PDA); a group of entertainment areas not far from the Kings Cross or the Sydney CBD Precincts, which we refer to as the distal displacement area (DDA) and the rest of NSW.*

Results: *Following the reforms statistically significant and substantial reductions in assault occurred in both the Kings Cross (down 32%) and Sydney CBD Entertainment Precinct (down 26 %) (including a 40% decline in the sub-section George Street – South). A smaller but still significant reduction in assault occurred across the rest of NSW (9% decrease). The January 2014 reforms were also associated with small decreases in assault in the PDA and the DDA but neither of these changes was statistically significant. There was some evidence that assaults increased in and around The Star casino, however the effects are not statistically significant and the reduction in assault elsewhere was much larger than the increase around The Star casino.*

Conclusion: *The January 2014 reforms appear to have reduced the incidence of assault in the Kings Cross and CBD Entertainment Precincts. The extent to which this is due to a change in alcohol consumption or a change in the number of people visiting the Kings Cross and Sydney Entertainment Precincts remains unknown.*

Keywords: *alcohol, assault, trading-hours, liquor licence, Kings Cross, Sydney, time series structural models, displacement.*

INTRODUCTION

On New Year's Eve, 2013, a young man named Daniel Christie was assaulted in Kings Cross; dying 11 days later as a result of his injuries. The incident sparked immediate calls for tougher regulation of licensed premises, especially in Kings Cross and the Sydney Central Business District (CBD) (Roth, 2014). On the 21st of January, 2014 the New South Wales (NSW) State Government announced new restrictions (hereafter referred to as the January 2014 reforms) on licensed premises to curb alcohol-related violence[1]. The new restrictions (contained in the Liquor Amendment Act, 2014) imposed by the State Government took effect on the 24th of February 2014[2] and included:

1. 1.30am lockouts[3] at hotels, registered clubs, nightclubs and karaoke bars in two designated areas: the Sydney CBD Entertainment Precinct and Kings Cross Precinct;
2. 3.00am cessation of alcohol service in venues in these Precincts;
3. A freeze on new liquor licences and approvals for existing licences across the Sydney CBD Entertainment Precinct and continuation of the existing freeze in the Kings Cross Precinct[4];
4. A ban on takeaway alcohol sales after 10.00pm across NSW;
5. The extension of temporary and long-term banning orders issued to designated 'trouble-makers' to prevent them entering most licensed premises in the Kings Cross and Sydney CBD entertainment precincts;

This bulletin has been independently peer reviewed.

6. The introduction of a new risk based licence fee for all licensed premises in which the annual fee payable by a particular venue depends upon its licence type, compliance history and trading hours;
7. The suspension of on-line responsible service of alcohol training.

Our aim in this study was to address three questions: (1) Have the January 2014 reforms reduced the incidence of assault in the Kings Cross and Sydney CBD Entertainment Precincts? (2) Has the incidence of assault increased in areas proximate to these Precincts or in nightspots further away but still within easy reach of these Precincts (3). If there is evidence of displacement, is the reduction in assaults in the Kings Cross and Sydney CBD Entertainment Precincts larger than the rise in the number of assaults in the displacement areas?

In answering these questions we make no attempt to isolate the separate effects of the 1.30am lockouts, the 3.00am cessation of alcohol service and the introduction of temporary banning orders for 'trouble makers' in the Sydney CBD Entertainment Precinct. Our focus here is solely on the joint impact of the initiatives just mentioned.

THE CURRENT STUDY

Past research suggests that trading hours have a powerful influence on levels of alcohol-related crime. A number of studies have found that longer trading hours for licensed premises are associated with higher levels of alcohol-related violence (e.g. Chikritzhs & Stockwell, 2002. See also the review by Stockwell & Chikritzhs, 2009). Several studies have also found that liquor licence restrictions reduce alcohol-related violence (Douglas, 1998; Voas, Lange & Johnson, 2002; Voas, Romano, Kelly-Baker & Tippetts, 2006; Duailibi, Ponicki, Grube, Pinsky, Laranjeira & Raw, 2007; Kypri, Jones, McElduff & Barker, 2011). Kypri et al. (2011), for example, found that the introduction of lockouts and earlier closing times across 14 licensed premises in Newcastle (a coastal city located some 160km north of Sydney) in 2008, was associated with a substantial fall in assaults, without resulting in any displacement of violence into a neighbouring 'control' area.

Although the Newcastle study and other similar studies provide support for a policy of restricting liquor licensed trading hours, there are some significant differences between Newcastle and Sydney that might blunt the effects of similar restrictions in the Kings Cross and Sydney CBD Entertainment Precincts. To begin with, the annual number of assaults recorded in the Sydney Local Government Area (LGA) is more than three times the number recorded in Newcastle LGA, while the number of licensed premises in the Sydney LGA (2,285) is nearly six times the number in Newcastle LGA (398) (NSW Office of Liquor, Gaming and Racing, 2014). Even without any displacement this could make enforcement of the new laws potentially more difficult. Secondly, and more importantly, drinkers unable to consume alcohol in the Kings Cross and Sydney CBD Entertainment Precincts only have to travel a short distance to reach licensed premises unaffected by the restrictions (see Figure 1). Drinkers in Newcastle showed no propensity to travel to Hamilton (a nearby suburb without the same liquor license restrictions) but the range of alternative licensed venues is far larger in Sydney than in Newcastle.

Studies of the impact of spatially concentrated crime control initiatives sometimes report geographical displacement (the crime problem shifts to an area outside the target areas) and sometimes report a diffusion of benefits (the crime problem reduces in the target area and in areas surrounding the target area). The available evidence suggests that diffusion of crime benefits is more common than crime displacement (Bowers et al., 2011). There are at least two ways, nonetheless, in which spatial displacement might manifest itself in response to the January 2014 reforms. The first is an increase in violence in areas contiguous to the Kings Cross and Sydney CBD Entertainment Precincts (e.g. The Star casino, Ultimo, Surry Hills). The second is an increase in violence in nightspots some distance away from the Kings Cross and Sydney CBD Entertainment Precincts but within easy reach of those Precincts (e.g. Double Bay, Newtown, and Bondi among others).

With one exception, the January 2014 reforms listed above were targeted at the Kings Cross and Sydney CBD Entertainment Precincts. The exception is item four: the ban on takeaway alcohol sales after 10.00pm which applies across NSW. For the purposes of our analysis of the impact of the January 2014 reforms on violence, NSW is divided into six regions (see Figures 1 and 2). The first is the Kings Cross Precinct (KXP). The second is the Sydney CBD Entertainment Precinct (CBD). The third is George Street – South (GSt) which is a non-domestic assault hotspot within the the Sydney CBD Entertainment Precinct .The fourth consists of an area contiguous with KXP and CBD and referred to hereafter as the proximal displacement area (PDA). The fifth comprises a group of entertainment areas not far from the Kings Cross or the Sydney CBD Precincts and referred to hereafter as the distal displacement area (DDA). The sixth region consists of the rest of NSW (and will be referred to as such). The first five regions are highlighted in Figure 1, which shows the target Precincts in green and red and George Street South in purple; the PDA in yellow and The Star Casino in pink. Figure 2 shows the DDA in yellow. The rest of NSW is not shown.

If the January 2014 reforms achieve their intended purpose, we would expect to see a reduction in assault in the target areas (i.e. the KXP and CBD). Because four out of the five reforms apply only in the target areas, we would expect any reduction in

Figure 1. The two target areas, Sydney CBD Entertainment including George Street South and Kings Cross Precincts, together with the proximal displacement area

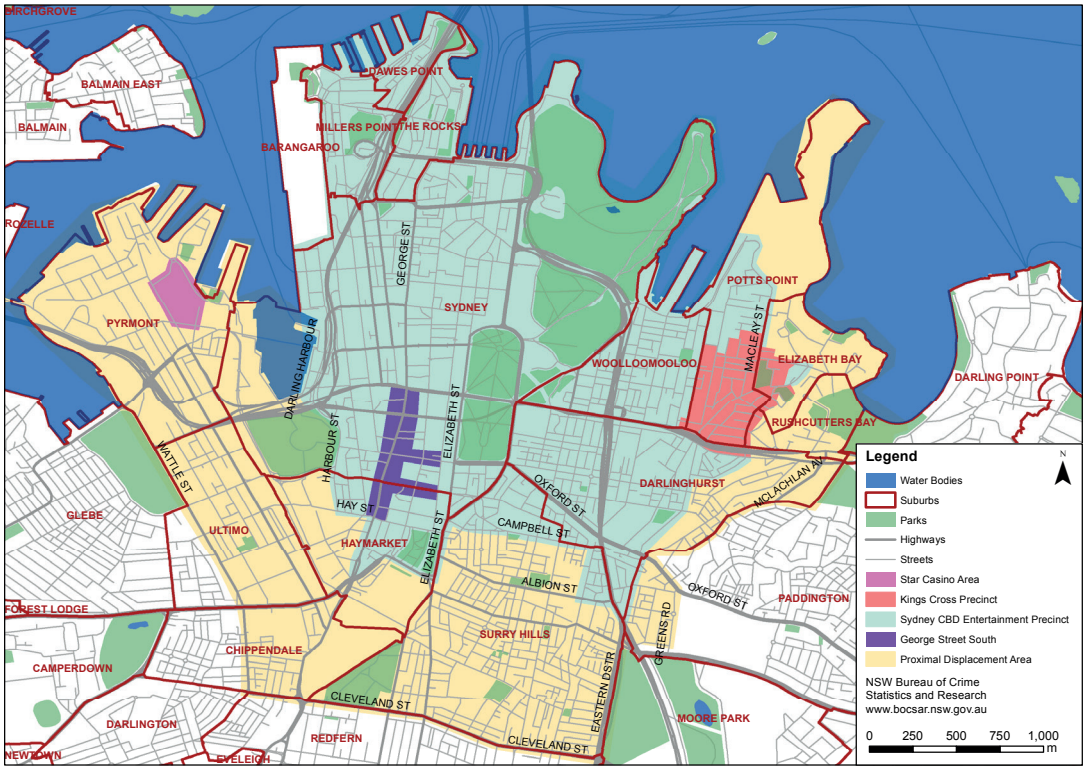


Figure 2. Distal displacement areas in orange including Bondi Beach, Coogee, Double Bay and Newtown

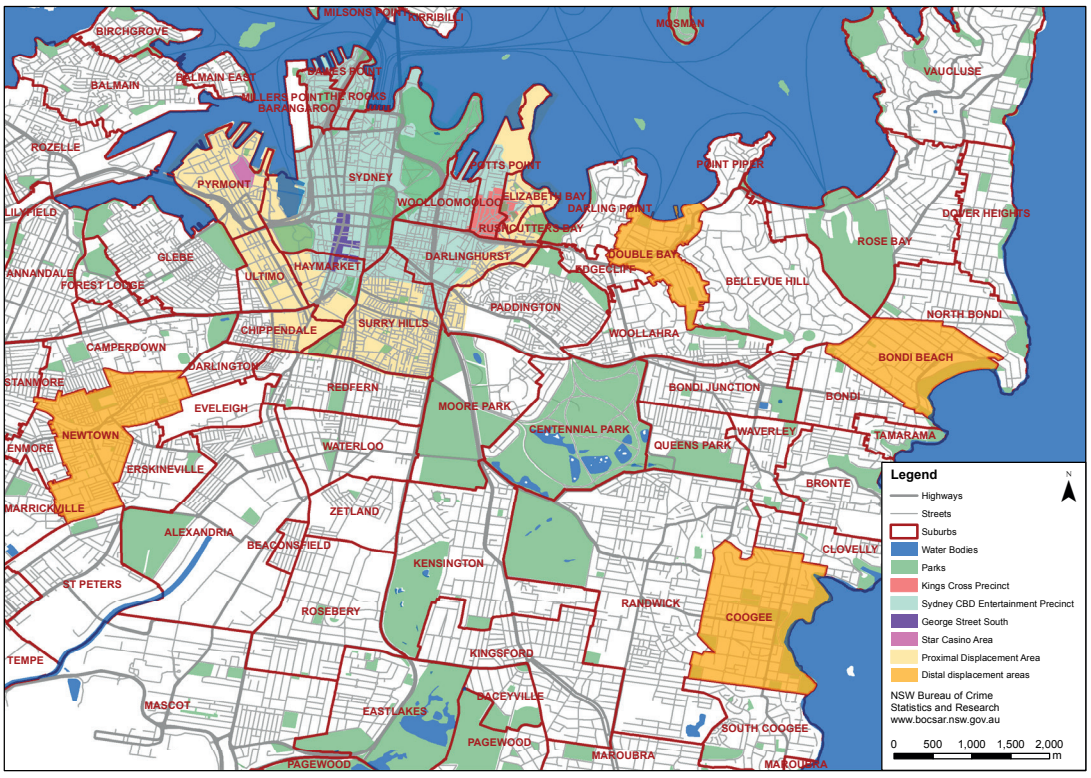
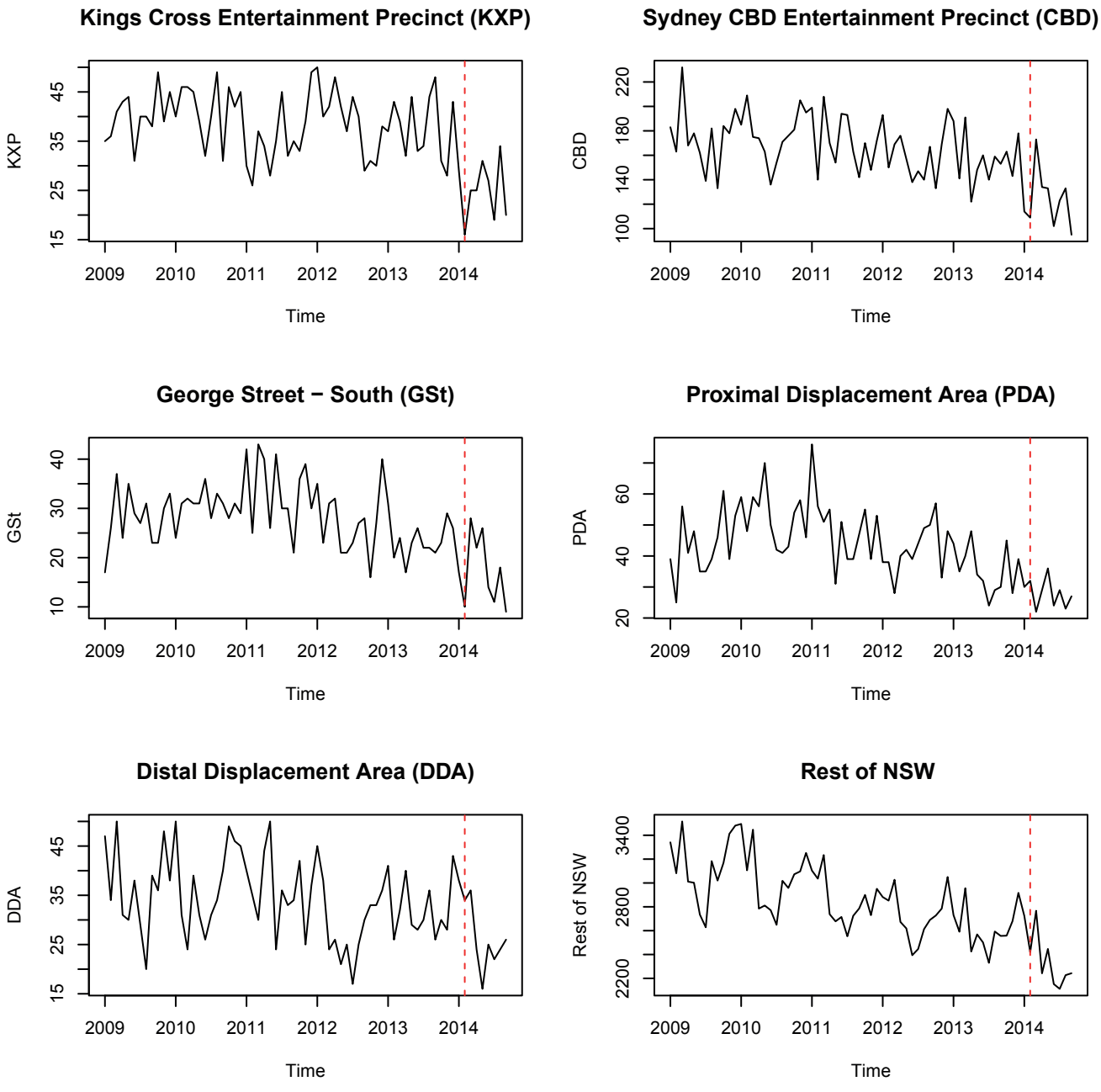


Figure 3.Time series of the number of assaults for Kings Cross Precinct, Sydney CBD Entertainment Precinct, proximal and distal displacement areas together with the rest of NSW



assault in the target area to be larger than the reduction in assault in the rest of NSW. If the reforms result in a displacement of assault to the PDA or DDA, we would expect to see an increase in assault or, at the very least, a deceleration in the downward trend in assault in one or both of these areas. If there is an increase in assault in the PDA or DDA, we can assess the size of the problem by comparing the increase in assault in these areas to the increase in the target area. If a diffusion of benefits occurs we would expect to see a reduction in assault in one or both the PDA and DDA. If a diffusion of benefits occurs to the PDA and displacement occurs to the DDA, we would expect to see a fall in assault in KXP, CBD, GSt and PDA and a rise in the DDA.

METHODS

DATA SETS

The outcome measure used in this study is the monthly count of non-domestic assaults recorded by the NSW police between January 2009 and September 2014. Figure 3 shows the number of assaults over this period in the six locations of this study: KXP, CBD, GSt, PDA, DDA and rest of NSW.

ANALYSIS

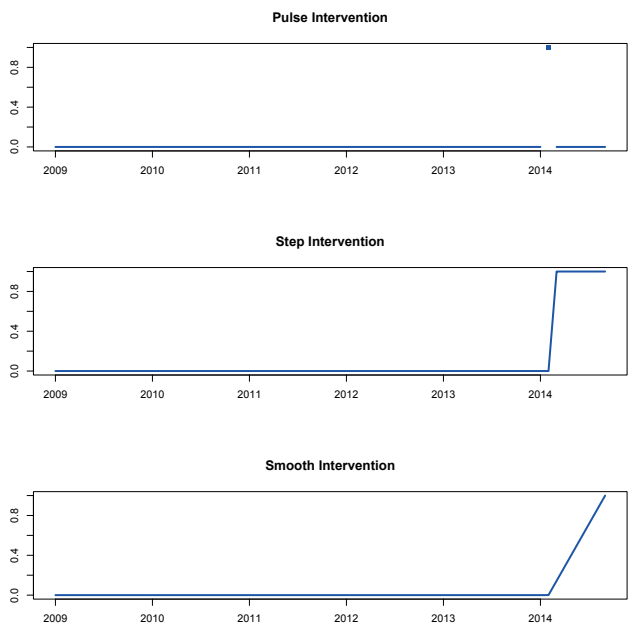
Generalized linear models (GLM, McCullagh & Nelder, 1989) such as Poisson or Negative Binomial regression are often used

to model count data. Models such as these are appropriate when strong autocorrelation is not present and when simple time trends are adequate to model the outcome of interest. However, if strong autocorrelation and complex time dependent trends are present in the data, Poisson and Negative Binomial regression can produce biased estimates.

Because of the presence of autocorrelation and highly non-linear trends in our data, we use an approach based on time series structural models (Harvey, 1989) and their representation as state space models for count data (Durbin & Koopman, 2012). State space models produce a dynamic picture of the different building blocks of a time series, namely, the trend, cycle and seasonal components. A further advantage of these models is that additional variables of interest can easily be included.

There are several ways in which the January 2014 reforms might influence assaults. One possibility is an instantaneous but transitory effect after which assaults return to previous levels. This is known as a pulse intervention effect (see top panel of Figure 4).

Figure 4. Intervention variables representing pulse, step and smooth intervention effects



Letting τ_1 represent the time when the intervention was introduced, the pulse intervention variable can be modelled as follows:

$$x_t = \begin{cases} 0 \text{ if } t \neq \tau_1 \\ 1 \text{ if } t = \tau_1. \end{cases}$$

Another possibility is a step intervention. In this case the change takes the form of a permanent and immediate shift in the level in assaults. The step intervention variable (see the middle panel of Figure 4) can be described as:

$$x_t = \begin{cases} 0 \text{ if } t < \tau_1 \\ 1 \text{ if } t \geq \tau_1 \end{cases}$$

A third possibility is a slow changing response or smooth step intervention effect (see bottom panel of Figure 4). This sort of change might be expected if the reforms have a slow but steady effect that starts when new reforms are introduced and continues until the number of assaults reaches a steady level. The model for such an effect is:

$$x_t = \begin{cases} 0 & \text{if } t \leq \tau_1 \\ (t - \tau_1)/(\tau_2 - \tau_1) & \text{if } t \in (\tau_1, \tau_2) \\ 1 & \text{if } t \geq \tau_2 \end{cases}$$

where τ_1 and τ_2 represent the onset and termination of the intervention effect. In this study, τ_2 was set beyond the end of the available data as it is possible that the full effect of the intervention has not yet been reached.

We have little *a priori* basis on which to determine which model is more appropriate and, at this stage, too little post-intervention data to arbitrate between the possibilities. Our approach, therefore, is to consider a number of models (including combinations of the above intervention variables) and use the Akaike Information Criterion (AIC) to select the best-fitting model. The AIC balances the goodness of fit of a model against its complexity (Akaike, 1974, Durbin & Koopman, 2012). The smaller the AIC value, the better the model. The independence assumption of the residuals will be checked via the Box-Ljung test based on the first 24 autocorrelations (Ljung & Box, 1978) of the Pearson residuals. The detailed models used in this study are described in Appendix A.

All the analyses in this study were done using R version 3.1.2 (R core team, 2015) and in particular, the zoo (Zeileis et al., 2014) and KFAS (Helske, 2014) packages.

RESULTS

Three sets of analyses were carried out in this investigation. In the first, we investigated the possibility of a sudden and permanent change in the monthly count of assaults after the new reforms. In the second, we evaluated the possibility that the reforms triggered a slow change in assault incidence. Finally, we examine the possibility that the intervention effect was transient followed by a slow effect and that was modelled via a pulse plus a smooth step intervention.

Table 1. Results for model comparison via Akaike Information Criterion (AIC)

	KXP	CBD	GSt	PDA	DDA	Rest of NSW
Step Intervention	8.025	10.495	7.779	8.617	8.150	14.026
Smooth Intervention	8.110	10.300	7.741	8.604	8.123	14.023
Pulse + Smooth intervention	8.152	10.308	7.777	8.712	8.256	14.200

Table 2. Model comparison between the selected models with and without seasonal component

Model	KXP	CBD	GSt	PDA	DDA	Rest of NSW
Seasonal Model	8.025	10.300	7.741	8.604	8.123	14.023
Non-Seasonal Model	6.991	10.427	6.890	7.791	7.314	14.123
Intervention	Step	Smooth	Smooth	Smooth	Smooth	Smooth

Table 3. Final model estimates of changes in assault by area

	KXP	CBD	GSt	PDA	DDA	Rest of NSW
β	-0.390	-0.300	-0.525	-0.078	-0.381	-0.09
C.I	(-0.609, -0.171)	(-0.535,-0.065)	(-0.995,-0.056)	(-0.707,0.551)	(-1.107,0.345)	(-0.104,-0.076)
pval	<0.001	0.018	0.028	0.809	0.304	<0.001
Box-Ljung	0.333	0.067	0.425	0.246	0.558	0.178
loglik	-237.186	-351.360	-233.719	-264.783	-248.333	-467.097
AIC	6.991	10.300	6.890	7.791	7.314	13.655
Reduction	-32.270%	-25.929%	-40.851%	-7.471%	-31.675%	-8.630%
Intervention	Step	smooth	smooth	Smooth	Smooth	Smooth

The results of the model assessments are shown in Table 1. Each cell in the table contains the AIC value for the model in each of the six locations. The locations are the two target sites (KXP and CBD), the George Street South sub-section (GSt), the proximal displacement area (PDA), the distal displacement area (DDA) and the rest of NSW. Smaller AIC values indicate a better fitting model. The best model for KXP is a step intervention effect while the other areas are better characterised by a smooth step intervention effect.

The data for the rest of NSW show obvious seasonality as displayed in Figure 3, but the other data (KXP, CBD, GSt, PDA and DDA) only show a weak seasonality. We therefore estimated the same selected models in Table 1 without the seasonal component and the AIC results for model comparison are displayed in Table 2. The AIC values indicate that models without seasonal components were a better fit for all the data except for the Sydney CBD Entertainment Precinct and for the rest of NSW.

The final selected model results are presented in Table 3. The first row shows the estimated effect of the January 2014 reforms. The second row presents the parameter estimate 95% confidence intervals. The third row shows the results of a two-tailed t-test with H0: β=0 (p-value). The fourth row presents the results from the Box-Ljung portmanteau test to check the

Figure 5. Estimated assault trend for the Kings Cross Precinct (KXP): Jan 2009-Sep 2014

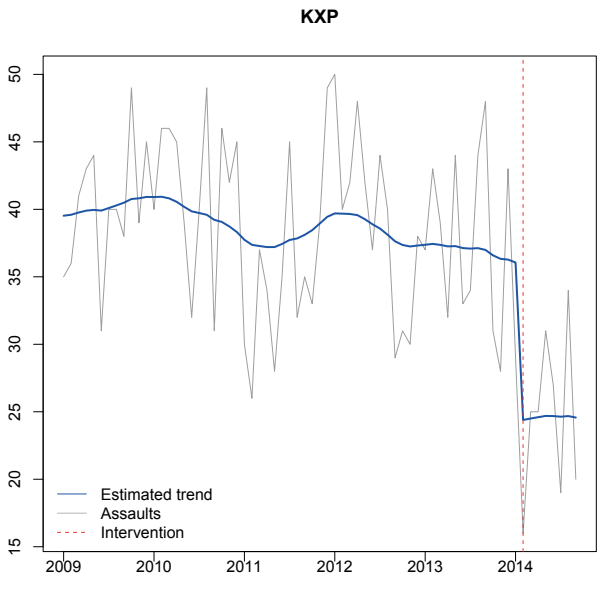


Figure 6. Estimated assault trend for the Sydney CBD Entertainment Precinct (CBD): Jan 2009-Sep 2014

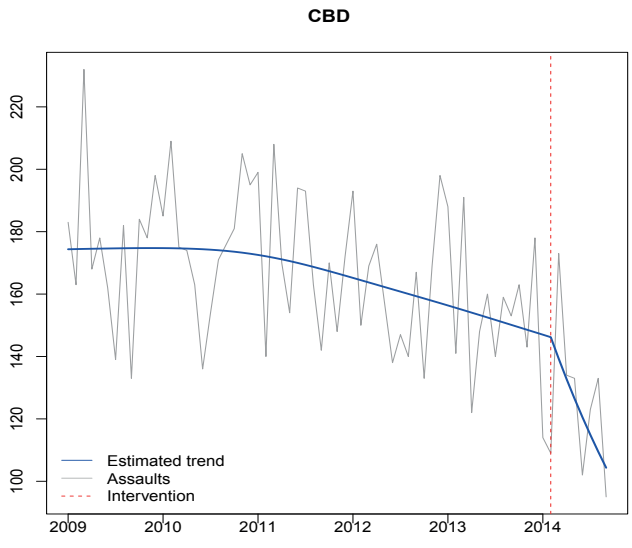


Figure 7. Estimated trend for the number of assaults for the George Street South (GSt): Jan 2009-Sep 2014

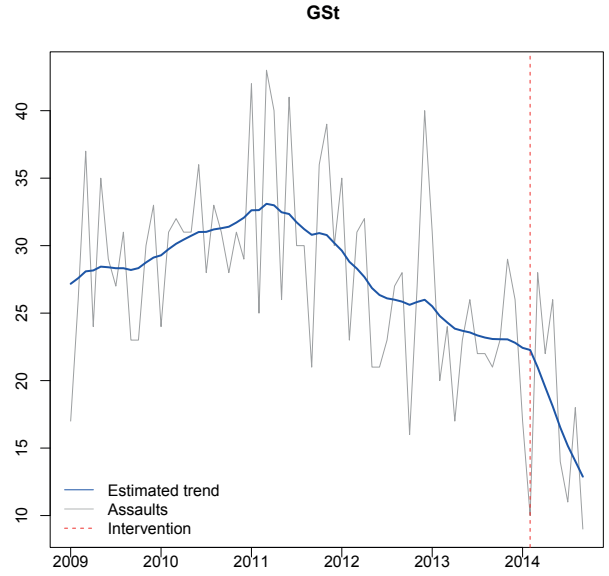


Figure 8. Estimated trend in assaults for the Proximal Displacement Area (PDA): Jan 2009-Sep 2014

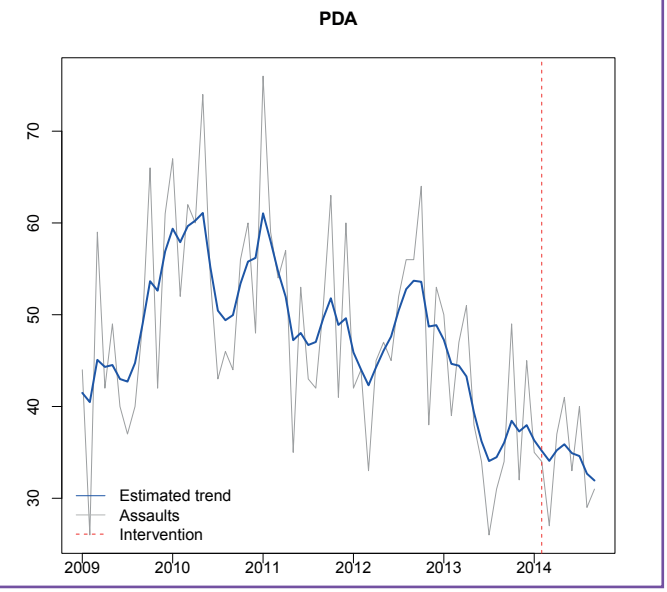


Figure 9. Estimated trend for the number of assaults for the Distal Displacement Area (DDA)

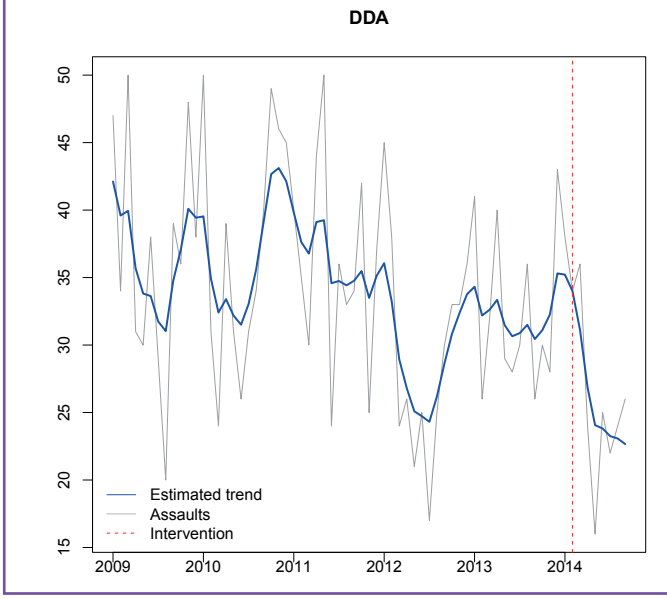
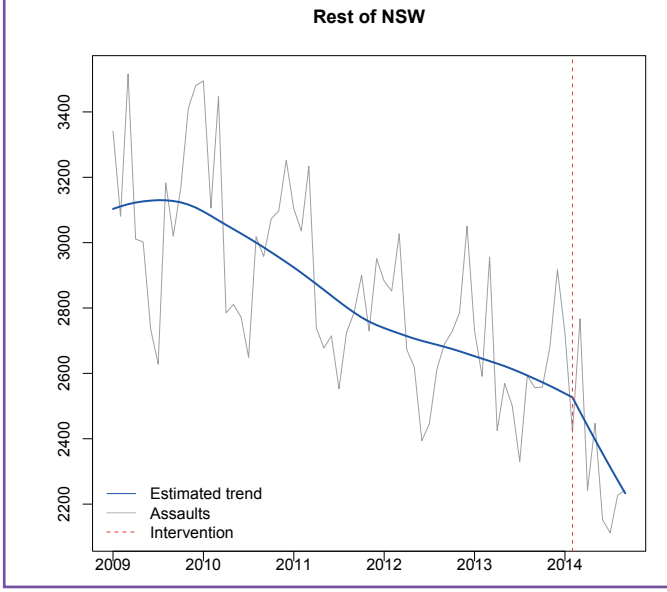


Figure 10. Estimated trend for the number of assaults in the rest of NSW which excludes the targeted areas and displacement areas



presence of autocorrelation in the model residuals (p-value). The fifth and sixth rows provide, respectively, the log-likelihood and AIC values associated with each model. The seventh row displays the percentage reduction in assault associated with the January 2014 reforms. The final row shows the intervention variable included in each of the models.

Results for KXP and CBD, shown in Table 3, indicate that there are substantial statistically significant reductions in assault in both the Kings Cross (down 32%) and Sydney CBD Entertainment Precinct (down 26%). The identified assault hotspot along George Street – South, a subsection of the CBD Entertainment precinct, showed a 40 per cent reduction. The first (KXP) effect has a narrower confidence interval than the second and third one, as shown in the table. The negative coefficients on the intervention variable, displayed in the columns headed 'PDA' and 'DDA', suggest that the January 2014 reforms were associated with a small decrease in assault incidence in the proximal displacement area and a larger decrease in assault incidence in the distal displacement areas, but the confidence intervals in both cases are wide with effects that are not statistically significant at a 5 per cent level. The column labelled

'Rest of NSW' indicates that the January 2014 reforms were associated with a smaller but still significant reduction in assault across the rest of NSW (9% decrease).

The effects can be seen clearly if we examine the estimated trend in assaults for each of the models. We do this in Figures 5 to 10. The raw data on assaults are plotted and the solid line shows the estimated trend in assaults, while the dotted line marks the beginning of the intervention.

In Kings Cross (Figure 5), we observe an immediate drop in the number of assaults following the January 2014 reforms, after which the assault level appears to stabilise at a new lower level.

In the Sydney CBD and George St – South (Figures 6 and 7) there are clear downward trends in the number of assaults in the three years prior to the January 2014 reforms; however the slope of the downward trend is much steeper following the introduction of the reforms than before.

The estimated trend for the proximal displacement area (PDA) is displayed in Figure 8. There is a declining trend in assaults in the period leading up to the January 2014 reforms. However, the intervention effects are not statistically significant at a 5 per cent level.

One key licensed venue, which is included in the proximal displacement area and which has been the subject of a number of media reports concerning alcohol related violence (e.g. SMH, 30 August 2014), is The Star casino. The Star Casino has a 24-hour liquor licence and is not subject to the January 2014 reforms. A separate analysis was conducted of assaults specifically occurring at The Star Casino and in the surrounding streets (see Figure 11, Appendix B) to test the possibility of displacement to this site.

This analysis revealed some evidence of displacement (for details, see Table B1 and Figure 12 in Appendix B). Between February and September 2013 the number of assaults at The Star casino averaged 3.5 per month, whereas for the same period in 2014 it averaged 6.3 per month. There are three points to note about this. Firstly, but for the increase in assaults at The Star casino, the trend in assaults in the PDA would probably have continued the downward trajectory that exhibited prior to the January 2014 reforms (see Figure 8). Secondly, the confidence intervals around the parameter estimates for The Star casino analysis are rather large and the effect appears to be not significant (see Appendix B for model details); thus raising doubts about whether the change in assault incidence at The Star casino after the January 2014 reforms was due to random fluctuation. Finally, even if we take the apparent increase in assaults at The Star casino at face value, the increase in absolute terms (i.e., 2.8 per month) was much smaller than the decreases in the Kings Cross (from 39.6 in 2013 to 24.6 in 2014) and Sydney CBD Entertainment (from 151.8 in 2013 to 125.3 in 2014) Precincts (41.5 assaults per month across the two Precincts).

Figure 9 shows the estimated trend in assaults in the distal displacement area (DDA). In this case, the intervention effects are not statistically significant and thus no further conclusions can be drawn. A longer follow-up period will be necessary to get a clearer picture of the trend in the DDA.

Figure 10 shows the trend in assault for the rest of New South Wales. The trend is somewhat similar to that observed for the CBD model; a pre-existing downward trend that accelerates following the introduction of the January 2014 reforms.

DISCUSSION

Our aim in this study was to address three questions: (1) Have the January 2014 reforms reduced the incidence of assault in the Kings Cross and Sydney Entertainment Precincts? (2) Has the incidence of assault increased in areas proximate to these Precincts or in nightspots further away but still within easy reach of these Precincts? (3) If there is evidence of geographical displacement was the reduction in assaults in the Kings Cross and Sydney Entertainment Precincts larger than the increase in the number of assaults in the displacement areas? (i.e., what is the net effect?)

The results show that the January 2014 reforms were associated with immediate and substantial reductions in assault in Kings Cross and less immediate but substantial and perhaps ongoing reductions in the Sydney CBD. These Precincts were the focus of the January 2014 reforms and the decline in assault in these areas was larger than anywhere else. There is little evidence that assaults were displaced to areas adjacent to these Precincts or to entertainment areas within easy reach of these Precincts. The only exception to this was The Star casino, where the number of assaults increased following the January 2014 reforms. As we have already noted, the increase in assaults around the casino was much smaller in absolute terms than the fall in assaults in the Kings Cross and Sydney CBD Entertainment Precincts. The net result, therefore, appears to have been a 'diffusion of benefits' (Johnson, Guerette & Bowers, 2014). All these findings are consistent with evidence reviewed in the introduction to this bulletin; evidence which suggests that restrictions on liquor trading hours are an effective way of reducing alcohol-related violence.

Notwithstanding the consistency of the current findings with past studies examining restrictions on alcohol availability, it is important to remember that the restrictions on liquor licence trading hours were not the only component of the January 2014 reforms capable of producing a reduction in violence. Other key elements included the extension of temporary and long-term banning orders issued to designated 'trouble-makers' to prevent them entering most licensed premises in the Kings Cross and Sydney CBD Entertainment Precincts, and the introduction of a new risk based licence fee for all licensed premises in which the annual fee payable by a particular venue depends upon its

licence type, compliance history and trading hours. The first of these initiatives might have helped reduce the number of assaults on licensed premises. The second is unlikely to have had much effect as the scheme had not been implemented during the period covered by this analysis.

It is also possible that other factors associated with the January 2014 reforms were partly responsible for the fall in assault that occurred following the reforms. The fall in assault, after all, was not limited to the areas that were the principal target of the January 2014 reforms. The deaths of Thomas Kelly (July 2012) and Daniel Christie (January 2014) focussed a great deal of public and media attention on alcohol related violence in Kings Cross and the Sydney CBD. It is possible this adverse publicity, either alone or (more likely) in conjunction with new restrictions on late-night drinking (introduced in July 2014 under the CBD plan of management) (OLGR, 2015), discouraged people from going to Kings Cross and the Sydney CBD. The NSW Legislative Assembly Law and Safety Committee's Enquiry into Alcohol and Drug-Related Violence heard evidence from business groups suggesting that the number of visitors to Kings Cross and the Sydney CBD had declined; with business revenue allegedly falling by between 20 and 50 per cent (NSW Legislative Assembly, 2014, p. 44). This suggestion that the number of visitors to Kings Cross has declined is supported by transport data. Between 2013 and 2014, counts of the number of passenger crossings in Kings Cross Station certainly declined, whereas over the same period rail patronage at all other City rail stations increased (see Table C1, Appendix C). Taxi patronage at the Bayswater Road secure taxi-rank (a major taxi-rank in Kings Cross) also shows a decline, although taxi patronage at the Darlinghurst Road secure Taxi Rank (another taxi-rank in Kings Cross) slightly increased (see Table C2, Appendix C).

We will have a clearer picture of the mechanisms underpinning the fall in assaults once we have examined their temporal and spatial dimensions more closely. If the January 2014 reforms are responsible for the reduction in assault, we should expect to see a significant fall in the incidence of assault at times when licensed premises would normally have continued to serve alcohol (viz. prior to the January 2014 reforms). We might also expect to see a larger reduction in assault on licensed premises than in assaults in the street, although this will depend on overall visitor levels in Kings Cross and the CBD. If the January 2014 reforms reduced the incidence of assaults, not because they reduced alcohol consumption in Kings Cross and the CBD during hours when assault rates normally peak, but because the reforms discouraged people from visiting these areas, we might expect to see a general reduction in assault, even at times where there are no restrictions on sales of alcohol. It is still too soon to examine these issues in any detail. The follow-up period in the current study is quite short. Further monitoring will be necessary to assess the durability of the effects reported here and to obtain sufficient data to conduct a detailed analysis of changes in the temporal patterning of assaults on and off licensed premises.

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NOTES

1. A more detailed description of the reforms can be accessed in the second reading speech to the Bill (Second-Reading Speech, Liquor Amendment Bill 2014; Hansard, 30th January, 2014 http://www.parliament.nsw.gov.au/prod/parlment/nswbills.nsf/0/bb87f6864d9693c1ca257c6f007fec0e/$FILE/2R%20Crimes%20and%20Liquor.pdf and here: http://www.olgr.nsw.gov.au/news_New_Initiatives_Announced.asp.
2. Although we refer to the reforms as the January 2014 reforms, it should be noted that further restrictions were placed on the 18th of July 2014 under the CBD Plan of Management.
3. A 'lockout' law is a law which permits licensed premises to continue serving alcohol to people on the premises past a specified hour but which prohibits anyone seeking to enter or re-enter the premises after that hour.
4. This change only applied to higher risk premises

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APPENDIX A

The model is based on the Poisson distribution with mean $\exp(\theta_t)$, that is, $y_t \sim$ Poisson $(\exp(\theta_t)$ where the probability of y_t can be written as follows:

$$\text{prob}\,(y_t = k) = \exp\{k\theta_t - \exp(\theta_t) - \log k!\}, \; t = 1,...,n$$

Our objective is to model θ_t. In order to do that the chosen model can be written as

$$\theta_t = \mu_t + \gamma_t + \beta_t x_t$$

where μ_t represents the level, γ_t the seasonal component and x_t the intervention variable with effect or intervention parameter which measures the effect of the January 2014 intervention: β_t.

The level μ_t is modelled by a local linear level model

$$\mu_t = \mu_{t-1} + \nu_t + \eta_t$$
$$\nu_t = \nu_{t-1} + \zeta_t$$

with $\eta_t \sim N(0, \sigma_\eta^2)$ and $\zeta_t \sim N(0, \sigma_\zeta^2)$. The monthly seasonality γ_t is described by

$$\sum_{j=0}^{11} \gamma_{t+1-j} = \varpi_t$$

with $\varpi_t \sim N(0, \sigma_\varpi^2)$.

All the disturbances in the model η_t, ζ_t, ϖ_t are independent.

The estimated trend displayed in Figures 5-8 is calculated as $\mu_t + \beta_t x_t$ and in Figure 9 as $\mu_t + \gamma_t + \beta_t x_t$ for t varying between January 2009 and September 2013.

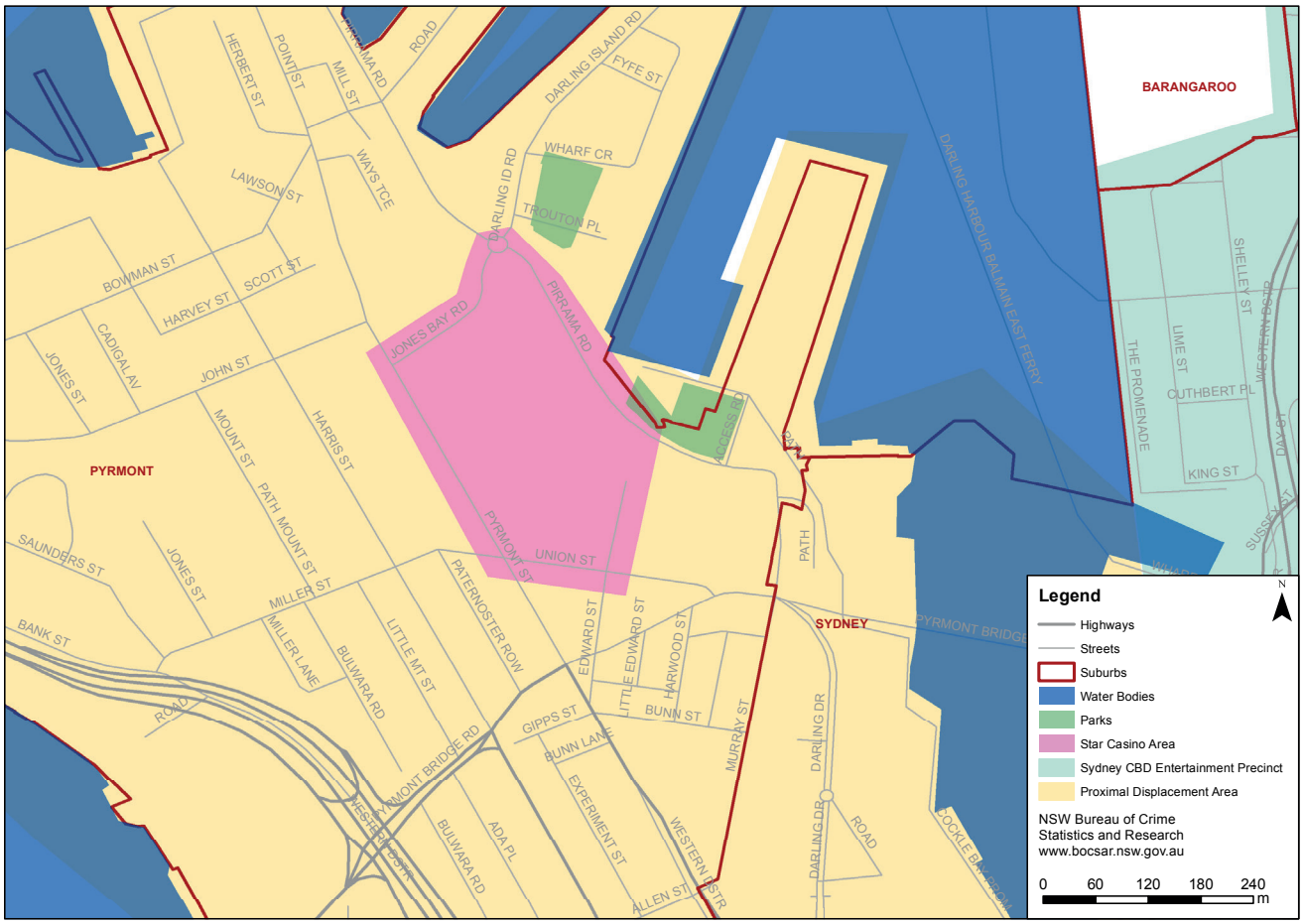
APPENDIX B

Figure 11 displays The Star casino and surrounding streets considered in this study.

The intervention analysis results for The Star casino and surrounding streets are shown in Table B1 together with the analysis of the proximal displacement area without including The Star casino. The rows of Table B1 represent the same values as those in Table 3 with the only difference here being the specification of the intervention variable for the analysis of The Star casino. Now, we assume that the intervention effect at the Star casino was also gradual but in this case the effect starts in February 2014 and finishes in June 2014. The reason for selecting this particular model was based on statistical model selection considerations based on the AIC criterion.

Whereas these results suggest an increasing trend in the number of assaults happening at The Star Casino and neighbouring streets, they also show a decrease on the number of assaults in the proximal displacement area (without

Figure 11. Zoomed view of The Star Casino and surrounding streets



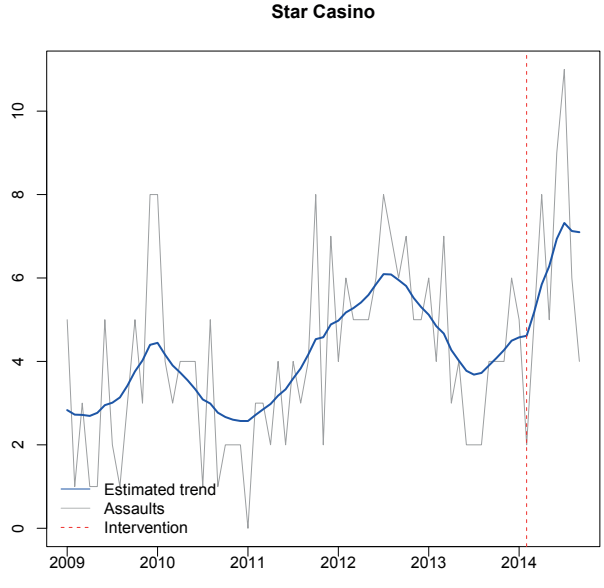
including The Star casino); indicating that the increase in the proximal displacement area (with the Casino and surrounding streets included) reported earlier was mostly driven by the assaults happening at The Star Casino and bordering streets. However the effects are not statistically significant and thus solid conclusions cannot be made at this stage.

Table B1. Final model estimates of changes in assault at The Star casino in Pyrmont

	The Star casino and surrounding streets	PDA without casino and surrounding areas
β	0.790	-0.105
C.I	(-0.145,1.725)	(-0.672,0.461)
pval	0.097	0.715
Box-Ljung	0.979	0.308
loglik	-163.534	-275.385
AIC	5.233	8.475
Reduction	120.396%	-10.009%
Intervention	Smooth (Feb-May)	Smooth (Feb-Sep)

Figure 12 displays the estimated trend in assaults for The Star Casino showing an increasing trend following the January 2014 reforms.

Figure 12. Estimated trend for the number of assaults in The Star Casino between Jan 2009-Sep 2014



APPENDIX C

Train passenger data have been provided by the NSW Bureau of Transport Statistics. The data consist of monthly counts of the number of gate entries and exits on Fridays and Saturdays between February 2013 and September 2014 in Kings Cross train station along with Central, Town Hall, Museum, St James, Martin Place and Wynyard counted between 8:00pm and 3:00am.

The average number of passengers crossing the validation gates on Fridays and Saturdays (from 8:00pm until 3am) between February to September in 2013 and 2014 Saturday are shown in Table C1.

These figures show that the number of passengers crossing Kings Cross Station has declined in 2014 with respect to 2013. However, over the same period, rail patronage at all other city rail stations increased.

Taxi rank patronage data on the Darlinghurst Road and Bayswater Road secure taxi ranks (both located in the Kings Cross Entertainment Precinct) was provided by the Department of Transport. The average number of patrons during the weekends (Friday and Saturday) between February and December 2013 and 2014 (from 9pm and 6am) are displayed in Table C2. The averages shown in the table show a decline in taxi patronage at the Bayswater Road secure taxi-rank in 2014 with respect to 2013, whereas taxi patronage at the Darlinghurst Road secure taxi rank has increased in 2014.

Table C1. Average number of passengers crossings the validation gates each month on Friday and Saturdays between 8:00pm and 3:00am from February to September in 2013 and 2014

Weekend Averages	Entries 2013	Entries 2014	Exits 2013	Exits 2014
Central	6587.48	8008.96	3480.70	4092.94
Kings Cross	1241.02	1204.24	2063.85	2016.54
Martin Place	521.13	680.84	206.44	239.76
Museum	180.61	314.94	249.20	322.94
St. James	52.69	281.71	29.41	107.49
Town Hall	7603.98	9534.59	3553.13	4299.32
Wynyard	2097.53	2885.31	980.49	1283.60

Table C2. Average number of patrons using the secure taxi ranks in Kings Cross each month on Friday and Saturdays between 9:00pm and 3:00am from February to September in 2013 and 2014

Taxi Ranks	2013	2014
Darlinghurst Road	2495.87	2668.87
Bayswater Road	7488.12	4108.50

NSW Bureau of Crime Statistics and Research - Level 1, Henry Deane Building, 20 Lee Street, Sydney 2000
bcsr@agd.nsw.gov.au • www.bocsar.nsw.gov.au • Ph: (02) 8346 1100 • Fax: (02) 8346 1298
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That's entertainment: Trends in late-night assaults and acute alcohol illness in Sydney's Entertainment Precinct

Kit Leung,[1] Clare Ringland,[2] Allison Salmon,[3] Julia Chessman,[4] and David Muscatello[5]

[1] NSW Public Health Training Program, NSW Ministry of Health
[2] NSW Bureau of Crime Statistics and Research
[3] NSW Ambulance Service
[4] NSW Biostatistics Training Program, NSW Ministry of Health
[5] Centre for Epidemiology and Evidence, NSW Ministry of Health

Aim: *To assess the role of administrative police and health databases in monitoring trends in, and epidemiology of, alcohol-related violence and acute alcohol illness associated with the night time economy in the Sydney central business district (CBD) "Entertainment Precinct", prior to the introduction of 2014 government reforms addressing "alcohol-fuelled violence".*

Method: *We examined annual trends in police-recorded incidents of grievous bodily harm, ambulance Triple Zero (000) calls for assault, and acute alcohol illness emergency department presentations that occurred between 10 p.m. and 6 a.m. over a 10-year period (2004–2013). Trends were examined among persons of all ages and young adults (18 to 29 year olds) in the CBD. The rest of metropolitan Sydney provided a comparison area to evaluate whether trends were CBD-specific.*

Results: *Among persons of all ages, there were 913 police-recorded incidents of grievous bodily harm, 10,427 ambulance calls for assault and 14,106 emergency department presentations for acute alcohol illness in the CBD over the 10-year period. Young adults accounted for between 62 per cent and 78 per cent of assault incidents and 58 per cent of alcohol emergency department presentations. Between 2004 and 2008, the annual number of assaults and acute alcohol illness increased two-fold. Alcohol illness emergency department presentation trends subsequently stabilised, while assaults in 2013 were at the lowest levels in 10 years. Similar trends were observed in the rest of metropolitan Sydney.*

Conclusion: *The majority of alcohol-related assaults and emergency department presentations involved young adults. Ambulance and police administrative data sources provided a consistent picture of a recent decline in late-night assault trends. Alcohol-related emergency department presentation trends suggested other alcohol harms may be continuing at relatively high levels both in the CBD and in metropolitan Sydney. While violence appears to be declining in the CBD and across Sydney, continuing alcohol harm remains to be addressed.*

Keywords: *administrative databases, alcohol, assault, emergency services, health, Sydney, young adults*

INTRODUCTION

Alcohol-related violence has long been an issue of public concern in Australia, particularly in recent years in NSW following a number of fatalities from "coward punches" (a single punch to the head knocking someone out or down). While the relationship between alcohol and violence is complex, a high blood alcohol concentration level is a risk factor for violence. Australian research suggests that alcohol is a factor in 23–73 per cent of assaults (Briscoe & Donnelly, 2001; Doherty & Roche, 2003; Poynton, Donnelly, Weatherburn, Fulde, & Scott, 2005), and that rates for harmful drinking behaviours and involvement in alcohol-related violence are higher in persons aged 18 to 29 years (Australian Institute of Health and Welfare [AIHW], 2014), and in and around licensed premises (Burgess & Moffatt, 2011; Livingston, 2008; Moffatt, Mason, Borzycki, & Weatherburn, 2009).

In 2014, the boundaries of the Sydney CBD Entertainment Precinct (herein referred to as the CBD) were defined in association with urgent reforms targeting alcohol-related violence (NSW Government, 2014a, 2014b; Office of Liquor Gaming and Racing [OLGR], 2014). The CBD contains highly urbanised neighbourhoods and has a thriving "night-time economy" with a

This bulletin has been independently peer reviewed.

high number of food, drink and entertainment venues in close proximity which have a large patronage including residents and visitors to the city. The 2014 reforms included specific mechanisms to tackle violence, such as management of venues where incidents are concentrated and increased sanctions for offenders, as well as mechanisms that target both violence and excessive alcohol consumption, such as reduced trading hours and limits on the number of drink sales per patron before closing.

It is important to identify data sources that are sufficiently timely and relevant to monitoring and evaluating trends over time. Administrative databases for emergency services are readily available for use by government. In NSW, timely data are routinely collected and reported by police, ambulance and public hospital emergency department services. These databases have previously been used to describe and evaluate alcohol and violence problems in the population (Gale et al., 2015; Kypri, Jones, McElduff, & Barker, 2011; Muscatello, Thackway, Belshaw, & McGrath, 2009) and correlation between time series of police records of violence and of emergency department alcohol presentations has been demonstrated (Descallar, Muscatello, Weatherburn, Chu, & Moffatt, 2012).

Administrative data sources may be influenced by operational factors that make interpretation difficult. For example, police-recorded data may be influenced by changes in factors other than actual crime levels, such as levels of proactive policing or the willingness of the public to report crime. Thus, the reported decline in the number of non-domestic assault incidents in Kings Cross and the CBD, particularly since 2010 (NSW Bureau of Crime Statistics and Research [BOCSAR], 2015) may reflect less willingness of the public to report an assault. While interpretation of trends in administrative data can have limitations, comparing and presenting information from carefully chosen, multiple independent data sources can enhance interpretation and provide a more nuanced picture of the alcohol harm landscape (Langley, Kypri, Cryer, & Davie, 2008; World Health Organisation [WHO], 2000).

In this study, we compare trends in alcohol-related violence and acute alcohol illness associated with the night time economy in the Sydney CBD Entertainment Precinct. Where possible, we also examined trends among young adults who are over-represented among persons with a single drinking occasion risk of harm (AIHW, 2014).

METHOD

SETTING

The Sydney CBD Entertainment Precinct is an area in the City of Sydney local government area approximately 22km^2 in size with an estimated resident population of 66,200[1] (Australian Bureau of Statistics [ABS], 2011; Figure 1). In 2014, the Entertainment Precinct contained 1,314 licensed premises, including 425 premises authorised to trade after midnight and 210 authorised to trade after 3 a.m. (City of Sydney & NSW Government, 2014). Licence types range from small bars and restaurants to large hotels and registered clubs. The Entertainment Precinct captures areas with the highest density of licensed premises in the City of Sydney, including Kings Cross, Oxford Street, and The Rocks (City of Sydney & NSW Government, 2014). While estimates of the numbers of visitors to the Entertainment Precinct are not available, pedestrian counts, and transport and taxi rank data provide some indication that many thousands of people visit the Entertainment Precinct on Friday and Saturday nights (City of Sydney, 2013; Menéndez, Weatherburn, Kypri, & Fitzgerald, 2015).

The Sydney metropolitan area (Sydney Statistical Division of the Australian Standard Geographical Classification) is approximately 17,600km^2 in size and has an estimated resident population of 4,627,345 (ABS, 2012; Figure 2). The Sydney CBD Entertainment Precinct represents 0.1 per cent of the Sydney metropolitan area.

DATA SOURCES

Three administrative data sources were used in this study - the NSW Police Force Computerised Operational Policing System (COPS; via BOCSAR), the NSW Ambulance Computer-aided Dispatch (CAD) database, and the NSW Emergency Department Data Collection (EDDC). The health related databases were obtained from Secure Analytics for Population Health Research and Intelligence. Information on the identities of individuals was not obtained.

INCLUSION CRITERIA

We included information on persons of all ages; recorded by police as being involved in an incident of grievous bodily harm (as a person of interest proceeded against or as a victim), having requested paramedic assistance following an assault, or presented to an emergency department for an acute alcohol illness. The period of interest was 1 January 2004 to 31 December 2013. We defined late-night assaults as assaults reported to police or ambulance during the hours of 10 p.m. and 6 a.m. on any night of the week. These hours provide a proxy measure of assaults where alcohol was involved, an established approach to approximating trends in alcohol-related incidents (Kypri et al., 2011; WHO, 2000). For comparability, we only included emergency department presentations during the hours of 10 p.m. and 6 a.m. on any night of the week.

The age range of 18 to 29 years was selected to explore trends among an age group known to have above-average rates for single drinking occasion risk of harm (AIHW, 2014). The alcohol minimum purchasing age is 18 years in all Australian jurisdictions, including NSW. Trends in counts are reported. Rates are not reported due to the lack of an appropriate denominator since a large proportion of persons entering the

Figure 1. Map of Sydney Central Business District Entertainment Precinct (as of February 2014)

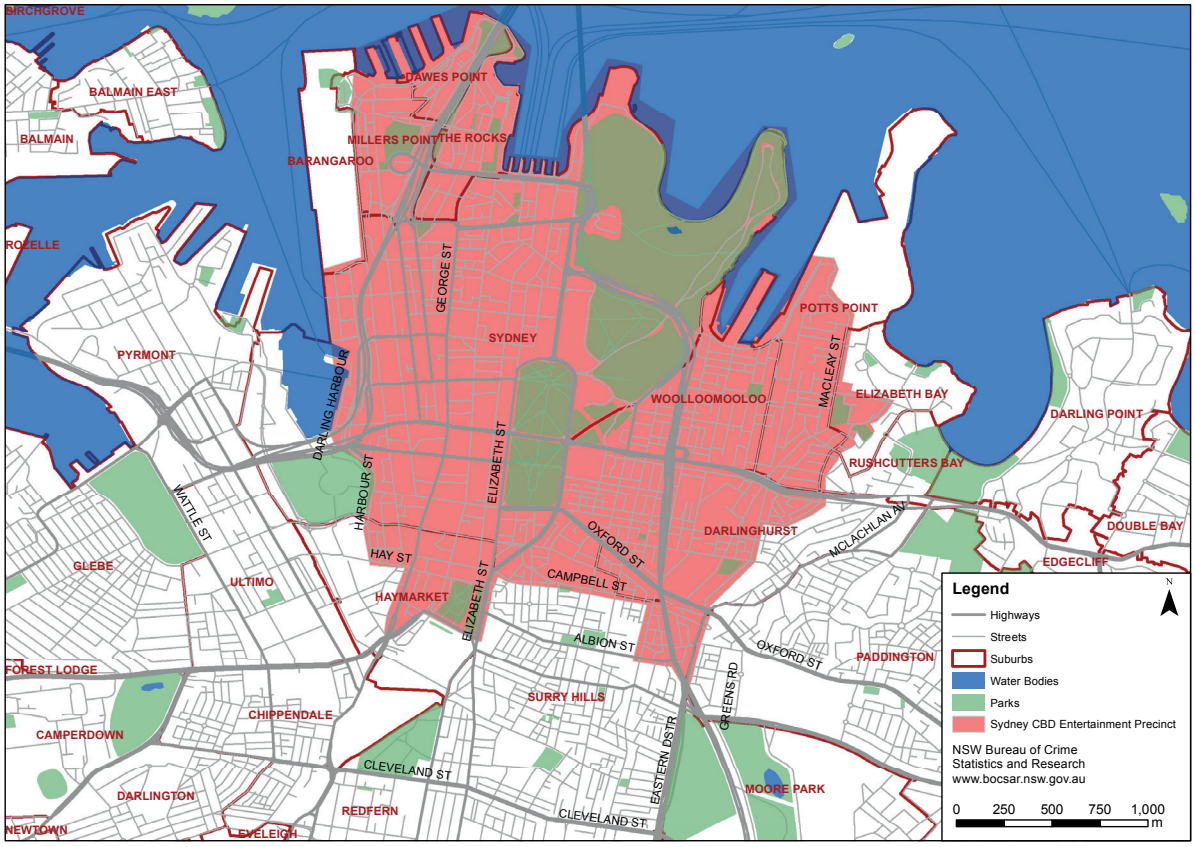
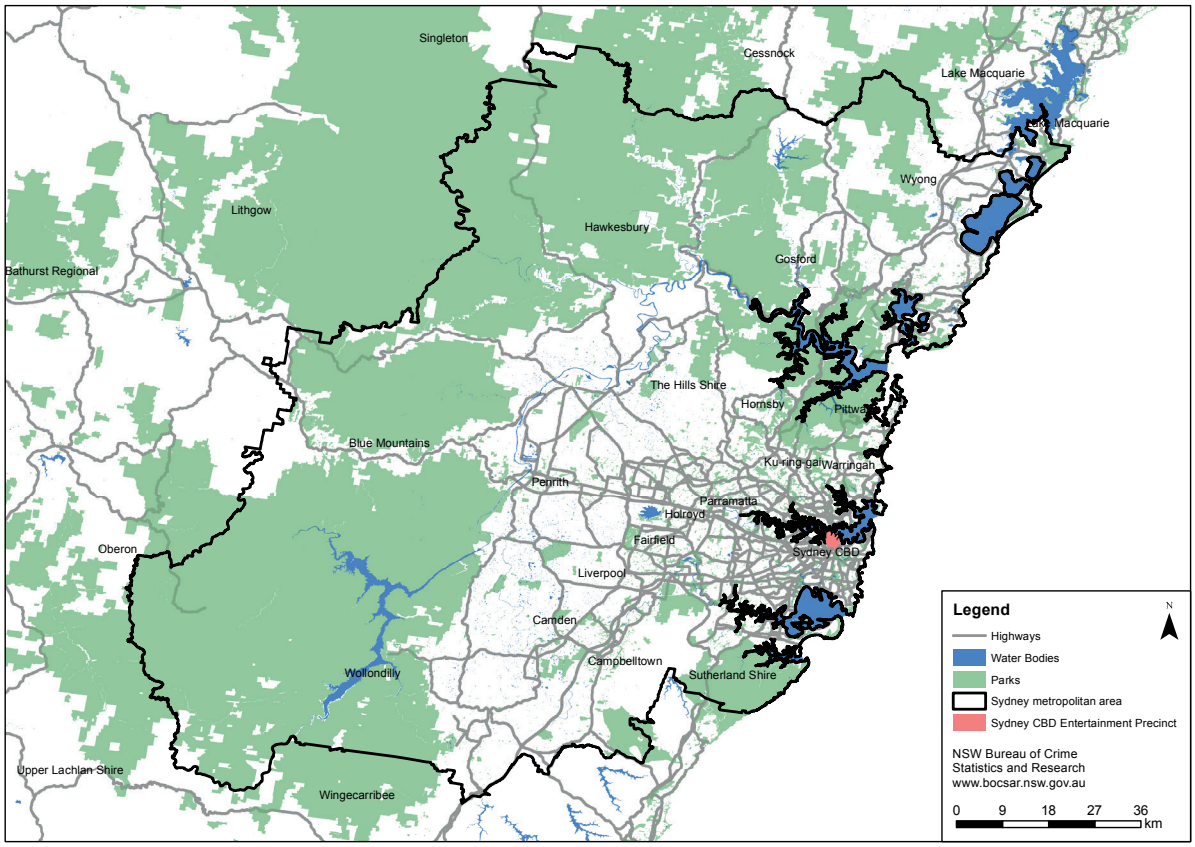


Figure 2. Map of Sydney metropolitan area



Entertainment Precinct are unlikely to reside there and patronage data are unavailable.

Data source-specific inclusion criteria are described in the following sections. A summary is provided in the Appendix (Table A1).

Police-recorded incidents of late-night grievous bodily harm

Assault incidents recorded in COPS by the NSW Police Force were extracted from data held by BOCSAR. Incidents included in this study were limited to those of grievous bodily harm (including malicious wounding), excluding domestic violence. Grievous bodily harm is considered the most serious kind of assault and is more likely to be recorded consistently over time than other forms of assault (e.g., common assault), as assaults resulting in injury are more likely to be reported to police than assaults not resulting in injury (Tarling & Morris, 2010).[2]

The recorded location of each incident was used to place it either in the CBD or elsewhere in metropolitan Sydney. In a small percentage of cases (between 1% and 4% each year), the location of the incident could not be determined with certainty; these incidents were omitted from the data presented.

While "counts" of incidents are reported, one incident could include a number of people recorded as a victim or a person of interest (i.e., an alleged offender). Incidents for 18 to 29 year olds were defined as those where either a person of interest proceeded against by police or a victim was recorded as being between 18 and 29 years of age.

Ambulance calls for incidents of late-night assault

Ambulance calls for incidents classified as assault were extracted from the NSW Ambulance CAD database. When an ambulance is requested (by calling Triple Zero "000"), the call-centre dispatcher, supported by CAD software, records a "problem type" from a controlled list based on caller information. For this study, incidents of assault were identified by searching the problem type field in the CAD database for problem categories including the term "assault". All types of assault, including sexual assault, were retained for analysis. Cases of domestic violence could not be excluded, as these are not explicitly classified in the CAD database. Not all Triple Zero (000) calls in 2004 were available for analysis so results are presented for 1 January 2005 to 31 December 2013 only.

The latitude and longitude of the incident location where the caller requested an ambulance were used to determine those that fell within the boundaries of the study. Where possible the age of the person requiring an ambulance was extracted. The caller is often not the person in need of assistance and so age is not always accurate, known or recorded. Indeed, it was not possible to accurately report on the number of assaults by age group or sex in the years 2005 to 2009 due to a large proportion of missing values (during this period, 19% of records were missing sex and 55% were missing age, compared with 20% of records missing sex and 6% missing age in 2010–2013).[3] Sex and age specific trends are included for 2010 to 2013 only.

Duplicate calls for the same incident were removed, but calls cancelled en route, or after the ambulance arrived, were included because these calls may have been made in relation to a genuine incident, and it was not possible to verify that this was not the case.

Emergency department presentations for acute alcohol illness

Combined counts of presentations to emergency departments at St Vincent's, Royal Prince Alfred and the Sydney Hospital were included. These three major public hospitals would receive the majority of patients from the CBD because they are located within the CBD or in close proximity.[4] Data from 22 of 23 other public hospital emergency departments located in the rest of metropolitan Sydney (Figure 2) were included to represent the comparison area.[5] Up to two private hospitals provided emergency department services in the rest of metropolitan Sydney. Private hospitals represent less than 2 per cent of emergency department presentations in NSW (calculated from ABS, 2015 and NSW Ministry of Health, 2014).

Emergency department presentations with a primary provisional diagnosis of alcohol intoxication, poisoning, dependence, withdrawal, elevated blood alcohol reading, medico-legal blood alcohol or drug test, and mental and behavioural disorders due to alcohol were included. Depending on the information system used by the hospital, diagnosis codes were recorded using the International Classification of Diseases (ICD), ninth revision (Australian clinical modification or ICD-9-CM), tenth revision, Australian clinical modification (ICD-10-AM) or the Systematized Nomenclature of Medicine, Clinical Terminology (SNOMED-CT). ICD-9 codes included were: 291.0, 291.3, 291.8, 291.9, 303.00, 303.90, 305.00, 790.3, 980.0, 980.8, V70.4. ICD-10 codes included were: F10.0, F10.2, F10.5, R78.0, T51, T51.0, T51.8, T51.9, Z72.1. SNOMED-CT concept identifiers are available from the authors on request. Presentations where alcohol may be a factor in the reason for presentation, such as traumatic injury following alcohol consumption, are unable to be systematically identified from the EDDC and therefore were not included.

Diagnosis information was available for 99 per cent and 94 per cent of patients in the CBD and the rest of the metropolitan Sydney area respectively. Due to missing information on age or sex, 32 and 33 records, respectively, were excluded from the CBD and the rest of metropolitan Sydney hospitals.

RESULTS

Police-recorded incidents of late-night grievous bodily harm

Figure 3 shows the annual number of incidents of grievous bodily harm over the 10-year period in the CBD and the rest of metropolitan Sydney. A total of 913 incidents were recorded for the CBD, while 4,113 incidents were recorded in the rest of metropolitan Sydney.

In the CBD, the annual number of incidents peaked in 2007 at 128 and then more than halved to 55 by 2013. The trend in assaults for 18 to 29 year olds showed the same pattern. In the rest of metropolitan Sydney, the annual number of incidents peaked in 2008 at 527, and almost halved to 266 by 2013.

Approximately 95 per cent of incidents in both the CBD, and the rest of metropolitan Sydney, involved males as victims or persons of interest, while only 8 per cent in the CBD and 12 per cent in the rest of metropolitan Sydney involved females.[6] An estimated 78 per cent of incidents in the CBD, and 65 per cent of incidents in the rest of metropolitan Sydney, involved a victim or an alleged offender aged 18 to 29 years. Approximately 21 per cent of late-night incidents of grievous bodily harm involving 18 to 29 year olds in the Sydney metropolitan area occurred in the CBD. These proportions are summarised in Table A2.

Ambulance calls for incidents of late-night assault

Figure 4 shows the total calls for incidents of assault in the CBD and the rest of metropolitan Sydney for the period 1 January 2005 to 31 December 2013.

Ambulance calls for assault in the CBD followed a similar trend to the police-recorded assault trend for all ages; calls increased sharply between 2005 and 2007 (from 1,189 to 1,624), and then declined by almost half between 2008 and 2012 (from 1,522 to 838). The number in 2013 was 29 per cent lower than in 2005. A similar trend was observed in the rest of metropolitan Sydney, however the decline was much greater than that seen in the CBD, with the number of calls for 2013 (3,779) less than half (48%) those observed in 2005 (7,895).

During 2010–2013, years with almost complete reporting of age and sex (94% and 80% non-missing, respectively), 42 per cent of calls in the CBD involved males aged 18 to 29 years and 8 per cent involved females of the same age. In the same period, the percentage of calls in the rest of metropolitan Sydney that involved young males (27%) was lower than that in the CBD (42%), while the percentage was similar for young females (10%).

During 2010–2013 the CBD accounted for 22 per cent of all emergency calls for alcohol-related assault involving 18 to 29 year olds in metropolitan Sydney (2010–2013).

Figure 3. Police-recorded incidents of grievous bodily harm between 10 p.m. and 6 a.m., by age and year, 2004–2013: Sydney CBD Entertainment Precinct and Remainder of Sydney metropolitan area

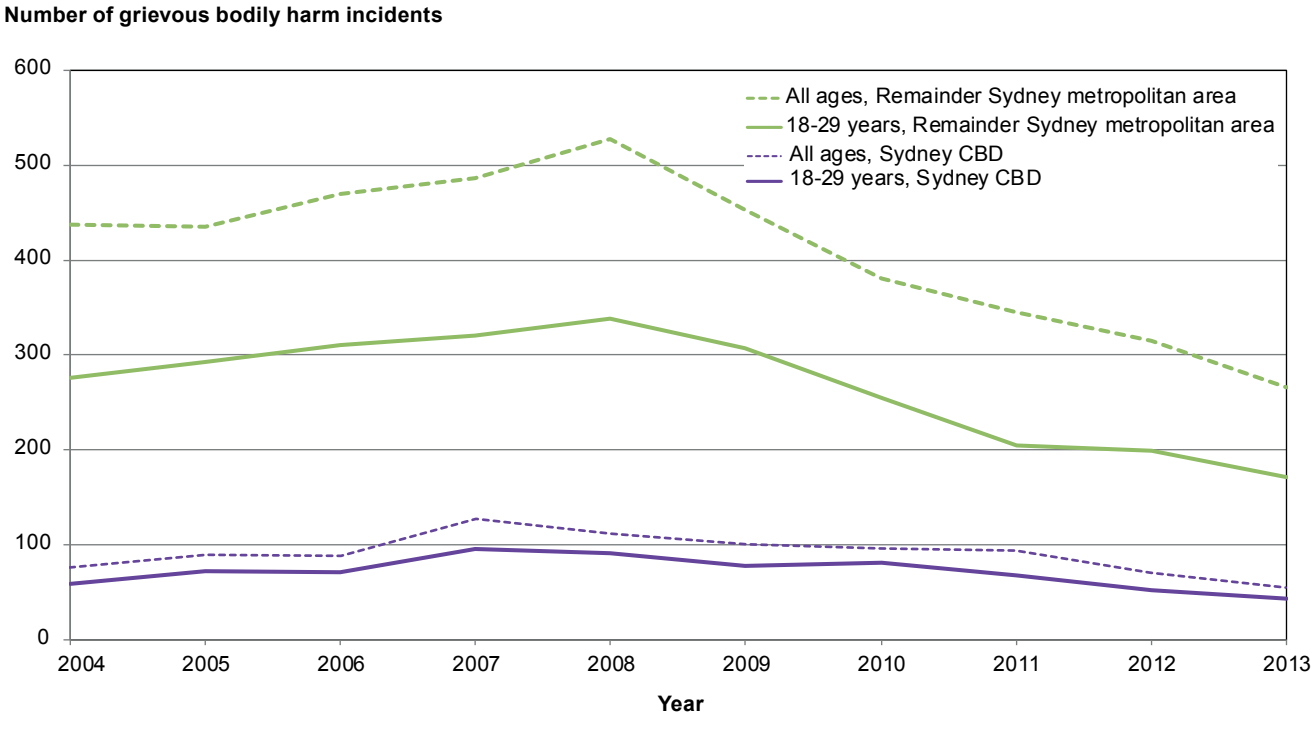


Figure 4. NSW Ambulance calls for assault between 10.p.m. and 6 a.m., by age and year, 2005–2013: Sydney CBD Entertainment Precinct and Remainder of Sydney metropolitan area

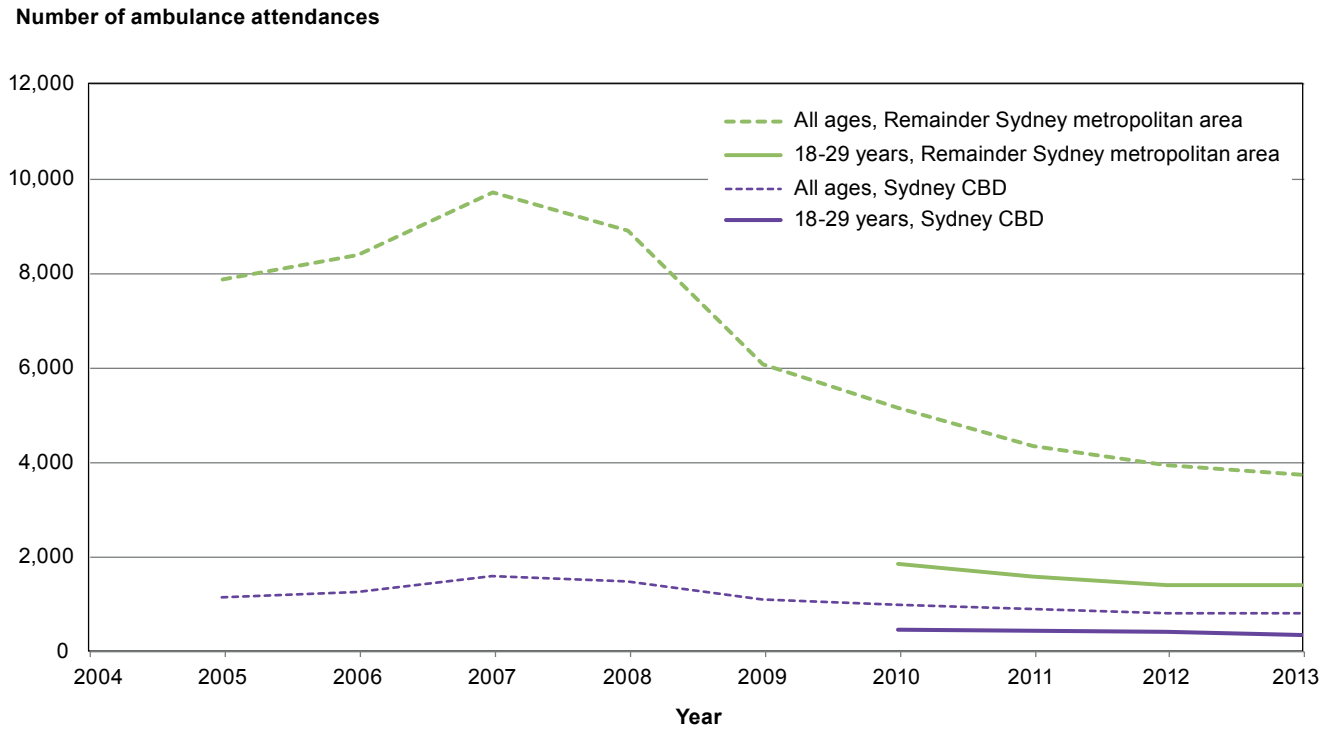
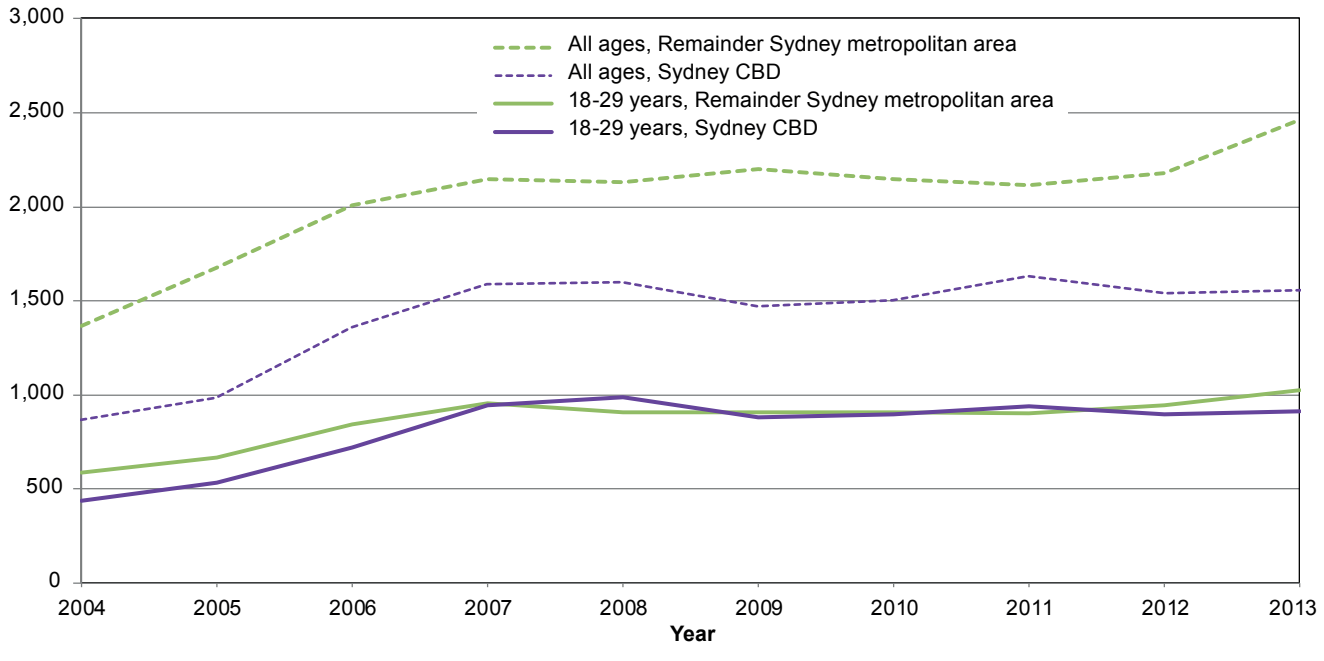


Figure 5. Emergency department presentations for acute alcohol illness between 10 p.m. and 6 a.m., by age and year, 2004–2013: Sydney CBD Entertainment Precinct and Remainder of Sydney metropolitan area



Emergency department presentations for acute alcohol illness

Presentations to emergency departments associated with the CBD almost doubled between 2004 and 2008; from 868 to 1,601 for all ages (Figure 5). Presentations declined slightly in 2009 and subsequently remained relatively stable, with 1,556 presentations in 2013. Presentations for 18 to 29 year olds followed a similar trend to that for all ages and accounted for about half of all the presentations (58%).

Also shown in Figure 5 are emergency department trends in the rest of metropolitan Sydney. Trends for all ages and 18 to 29 year olds were similar to those in the CBD. However presentations for 18 to 29 year olds in the rest of metropolitan Sydney accounted for a lower proportion (42%) of all presentations than in the CBD (58%).

In the study period, the three CBD-associated hospitals accounted for 41 per cent of all late-night presentations in metropolitan Sydney for acute alcohol illness for persons of all ages (14,106 of a total 34,538). Among 18 to 29 year olds, the three hospitals received almost half (48%) of all acute alcohol illness presentations in metropolitan Sydney (8,147 of 16,799).

DISCUSSION

This study is the first to examine trends in three independent datasets describing alcohol-related violence and harm associated with the newly defined Sydney CBD Entertainment Precinct (CBD). Between 2004 and 2008, the annual number of assaults recorded by police and ambulance services increased two-fold in the CBD. Similarly, between 2004 and 2008, alcohol-related presentations increased two-fold at the three emergency departments most likely to service the CBD. However, between 2008 and 2013, alcohol emergency department presentation trends stabilised around 2008 levels, while assaults dropped to their lowest levels in the 10 years of the study. Trends in police-recorded incidents of grievous bodily harm were mirrored by trends in ambulance calls for assault. Across all three data sources, trends in the rest of metropolitan Sydney, the comparison area for this study, were similar to those seen in the CBD, with the exception of police-recorded assault which started to decline a year earlier (2007) in the CBD compared to elsewhere (2008).

The CBD accounted for a high proportion of late-night incidents in metropolitan Sydney during the 10-year period, and young adults (aged 18–29 years) were associated with the majority of harms occurring within the CBD. This age group was involved in 78 per cent of late-night grievous bodily harm incidents recorded by police and 62 per cent of ambulance Triple Zero calls for incidents of assault in the CBD, and 58 per cent of alcohol-related emergency department presentations at the three public hospitals most likely to service the CBD.

The divergence in assault and emergency department alcohol trends from 2008 suggests that changing circumstances in the night-time economy such as government reforms, policing activity or other alcohol supply or service factors may have affected alcohol consumption and violence in different ways or to a different extent. Determining the drivers of change is extremely challenging. Numerous reforms were introduced concurrently or in close succession. Some were national, statewide, or more locally-specific, and occurred against a background of extensive political and public debate.

NSW government initiatives that may have contributed to change included: a freeze on granting 24-hour liquor licenses (2008); special license conditions (e.g., 2 a.m. lockouts and no shots or glass containers after midnight) for licensed premises with the highest numbers of violent incidents (OLGR, 2008); a freeze on new liquor licenses in parts of Sydney (2009); the “three strikes” disciplinary scheme for licensed premises, whereby a license can be suspended or cancelled (2011); small bar licenses to encourage diversity of licensed venues (2013); and a ban on takeaway alcohol sales after 10 p.m. across NSW (2014; Roth, 2014). A national government initiative was the introduction of the “alcopops” tax in 2008 (Parliament of Australia, 2009), and was associated with the levelling out of emergency department presentations for acute alcohol illness in NSW (Gale et al., 2015). Wider economic factors such as the “global financial crisis” (GFC) in 2008 and an associated decline in disposable income may have also contributed to the observed trends, although there is no local evidence to show this (Gale et al., 2015). Indeed, a study by Bor, Basu, Coutts, McKee, & Stuckler (2013) found that the GFC was associated with an increase in frequent “binge” drinking in the United States.

Other factors or drivers of change may be less well documented, including changes in policing activity or changes made by licensed establishments themselves, such as employing security guards. The consistency in trends between the CBD and the rest of metropolitan Sydney suggests geographically broad factors, rather than CBD-specific interventions, drove the observed trends. Indeed, during our study period, only liquor licensing restrictions introduced in Kings Cross in 2012 were locality-specific.

The geographic precision provided by police and ambulance data sources and the inclusion of a comparison area are major strengths of our study. A study by Menéndez, Tusell, and Weatherburn (2015) examined whether the liquor licensing reforms introduced in NSW between 2008 and 2013 had any effects on police-recorded incidents of serious assaults, and found that while there was a reduction in assaults, it was not possible to conclude that the drop in assaults was due to any particular liquor licensing reform, largely because of the lack of a suitable comparison site. However, the consistency in trends between the independent police and ambulance assault data suggests that police-recorded grievous bodily harm incidents

are a valid means of estimating trends in violence, and are not markedly influenced by factors such as police recording practices or the willingness of members of the public to report assaults.

This study has some limitations. Trends will be influenced by the number of persons entering the CBD as well as the amount of alcohol consumed. Suitable population denominators for participants in the night time economy were unavailable and thus population rates were unable to be calculated; neither patronage nor sales data were available and as resident population estimates do not adequately represent the population at risk of harm, rates based on these estimates could give a false impression of validity. Patronage and sales data by geographical area would allow for a more precise comparison area, where changes in service delivery variables (e.g., trading hours, number and size of venues) could be compared more accurately to better understand which interventions were effective. The use of the Sydney metropolitan area as the comparison in this study has its limitations as the area encompasses a range of entertainment venues and population density. The emergency department data offered limited value in drawing conclusions about alcohol illness associated with the CBD. Hospital patient catchment areas in NSW are not controlled or prescribed. The three hospitals included in this study service the CBD, but also receive patients from surrounding or more distant areas. Further, alcohol as a risk factor is not systematically recorded in the emergency department database, and use of diagnoses under-estimates alcohol-related harms such as injury in which alcohol is a risk factor (Humphrey, Casswell, & Han, 2003; Indig, Copeland, & Conigrave, 2009; Indig, Copeland, Conigrave, & Rotenko, 2008). The acute alcohol illness diagnoses available for analysis included dependence, which does not reflect an acute illness. On the other hand, an acute situation may have led to the patient presenting to the emergency department. Accuracy of emergency department diagnoses may have also been affected by recording practices and the information system used.

The study may have been strengthened by examining other outcome measures, such as emergency department presentations for injuries, recognised as a useful indicator of alcohol-related harm for young people (Young et al., 2004). A non-alcohol-related outcome could have been included from each database to understand whether the trends were being driven by alcohol- or non-alcohol-related factors.

In addition to extending the types of alcohol-related emergency department presentations examined, future studies could include a broader range of ambulance calls and police incidents types. In relation to police-recorded incidents, less serious assaults such as common assault and assault occasioning actual bodily harm could be examined, as well as incidents of domestic violence. The assumption that the period between 10 p.m. and 6 a.m. captures alcohol-related incidents could be further validated. Enhancement of ambulance data with human review of narrative information, as has been done in Victoria (Lloyd, Matthews, & Gao, 2014), may also be considered to improve the completeness and utility of ambulance data.

CONCLUSION

The number of records from all three data sources consistently increased prior to 2008. Subsequently, police and ambulance records of late-night assaults in the CBD declined in unison, while emergency department presentations for acute alcohol illness only levelled out. This suggests that, from 2008, there were changes in the night-time economy that led to a decline in the number of incidents of late-night violence in the CBD, while other alcohol harms persisted at levels similar to that of 2008. Further, the broad consistency of these trends with those in the rest of metropolitan Sydney suggest that factors driving the trends may not be specific to the CBD. These findings support a continued focus on preventing alcohol-related harms associated with the night-time economy. These harms continue to impose a substantial burden on society, particularly among young adults.

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NOTES

1 Sum of usual residents of three CBD postal areas (2000, 2010 and 2011) from the Australian Bureau of Statistics 2011 census statistics (ABS, 2011).

2 Tarling and Morris (2010) used self-reported data from the British Crime Survey 2007/08 to examine factors associated with whether a violent crime was reported to the police. Injury was defined by the question: “were you bruised, scratched, cut or injured in any way?”. The NSW Police Force definition of grievous bodily harm (including malicious wounding) states that the phrase “grievous bodily harm” should be given its ordinary meaning of really serious bodily harm. While it is more likely that grievous bodily harm would be consistently reported than other forms of assault, there could nevertheless have been differences in the interpretation and application of the definition over time.

3 It was likely that there would be systematic bias potentially related to the records with missing values (e.g., records with missing details more likely to involve calls by third parties and where multiple persons are involved).

4 While the majority of emergency department cases corresponding to activity in the CBD would result in presentations at these three hospitals, the three hospitals

included in the study may receive a number of patients from neighbouring areas not within the CBD boundaries. Patients from the CBD may also be transported to more distant hospitals depending on bed availability. Therefore data may over- or under-estimate the number of presentations.

5 Hospitals included in the remainder of metropolitan Sydney: Auburn; Bankstown-Lidcombe; Blacktown; Blue Mountains District Anzac Memorial; Camden; Campbelltown; Canterbury; Concord; Fairfield; Gosford; Hornsby and Ku-ring-gai; Liverpool; Manly; Mona Vale; Mount Druitt; Nepean; Prince of Wales; Royal North Shore; Ryde; St George; Sutherland; and Wyong Hospitals.

6 As stated in the Method section, the counts relate to incidents and each incident may have included one or more victims or persons of interest proceeded against. For example, an incident may have involved one male and one female. As such, the percentages do not add up to 100 per cent.

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APPENDIX

Table A1. Data sources and inclusion criteria

Data source	Managed by	Contributing sites	Data of interest	Location	Inclusion criteria	Time period
NSW Police Force Computerised Operational Policing System (COPS)	NSW Bureau of Crime Statistics and Research	Local Area Commands that attended incidents in the CBD and the Sydney metropolitan area	Incidents of grievous bodily harm not flagged as domestic violence	Geo-coded location of incident	Incidents occurring between 10 p.m. and 6 a.m. and involving a perpetrator proceeded against and/or victim of any age and those aged 18-29 years	1 January 2004 to 31 December 2013
NSW Ambulance Computer-aided Dispatch (CAD) Data	NSW Ambulance	NSW wide (all operational divisions) Triple Zero calls for incidents occurring in the CBD and the Sydney metropolitan area	Triple Zero calls where 'assault' is identified in the CAD 'problem type' field	Geo-coded location of incident	Persons of all ages and those aged 18-29 years for whom a triple zero call was made between 10 p.m. and 6 a.m. for an assault of any kind (including sexual assault and domestic violence)	1 January 2005 to 31 December 2013
Emergency Department Data Collection (EDDC)	NSW Ministry of Health	3 public hospitals associated with the Sydney CBD Entertainment Precinct (St. Vincent's, Royal Prince Alfred and Sydney), and 26 public hospitals in the remaining Sydney metropolitan area	Presentations to ED where acute alcohol illness[a] was recorded as the patient's primary provisional diagnosis	Hospital where emergency care was sought	Presentations between 10 p.m. and 6 a.m. in persons of all ages and those aged 18-29 years	1 January 2004 to 31 December 2013

[a] Diagnosis grouping of: ICD-9: 291.0, 291.3, 291.8, 291.9, 303.00, 303.90, 305.00, 790.3, 980.0, 980.8, V70.4; ICD-10: F10.0, F10.2, F10.5, R78.0, T51, T51.0, T51.8, T51.9, Z72.1; SNOWMED-CT: available on request.

Table A2. Comparison of selected features of the three data sources, incidents occurring between 10 p.m. and 6 a.m., 2004–2013

	Police-recorded incidents of late-night grievous bodily harm	Ambulance calls for incidents of late-night assault	Emergency department presentations for acute alcohol illness
Proportion of CBD incidents involving males	95%	84%[a]	56%
Proportion of incidents in the rest of metropolitan Sydney involving males	95%	70%[a]	58%
Proportion of CBD incidents involving 18–29 year-olds	78%	62%[a]	58%
Proportion of incidents in the rest of metropolitan Sydney involving 18–29 year-olds	65%	47%[a]	42%
Proportion of incidents in metropolitan Sydney occurring in CBD, all ages	18%	15%[b]	41%
Proportion of incidents in metropolitan Sydney occurring in CBD involving 18–29 year-olds	21%	22%[a]	48%

[a] 2010–2013 only
[b] 2005–2013 only

NSW Bureau of Crime Statistics and Research - Level 1, Henry Deane Building, 20 Lee Street, Sydney 2000
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