

SimDrink parameters and references

Variable	Description	Value	Source	Comments
Setup				
N_seeds	Number of seeds to start the model.	300	Sensitivity analysis	Combine with friend distribution for total population size.
p_male	Proportion of men.	0.5	Sensitivity analysis	
p_young	Proportion of 18-21 year olds (versus 21-25 year olds).	0.5	Sensitivity analysis	
p_inner	Proportion from the Inner City.	0.5	Sensitivity analysis	
N_public	Number of public (Inner City) venues.	100	Sensitivity analysis	
N_privateOU	Number of private Outer Urban venues.	500	Sensitivity analysis	No impact, not shown.
N_privateIC	Number of private Inner City venues.	500		
p_ICpub0	Proportion of Inner City residents starting in public venue.	0.31	YAAS (Dietze, Livingston, Callinan, & Room, 2014)	Proportion of Yarra residents starting in public venues.
p_OUpub0	Proportion of Outer Urban residents starting in public venue.	0.27	YAAS (Dietze et al., 2014)	Proportion of Hume residents starting in public venues.
Agent properties				
dist(friend)	Distribution of number of friends.	Poisson(5.69)	POINTED (Miller et al., 2013)	Fit to survey results.

dist(length)	Distribution of the planned length of nights.	Poisson(8)	YAAS (Dietze et al., 2014)	Poisson curve fitted to Hume and Yarra residents' total time out.
dist(start)	Distribution of starting times for night out.	Gamma(78.313,4.094)	YAAS (Dietze et al., 2014)	Fit to the time of first drink for Hume and Yarra residents, truncated to be between 5pm and 11pm.
dist(dlim18M)	Distribution of 18-21 year old drinking limits, men.	Poisson(20)	Sensitivity analysis	Authors' estimate. Consumption limits for young and old assumed to be the same (however they behave differently).
dist(dlim22M)	Distribution of 22-25 year old drinking limits, men.	Poisson(20)		
dist(dlim18F)	Distribution of 18-21 year old drinking limits, women.	Poisson(15)		
dist(dlim22F)	Distribution of 22-25 year old drinking limits, women.	Poisson(15)		
dist(spend18)	Distribution of 18-21 year old spending money.	Gamma(3.456,0.026)	YAAS (Dietze et al., 2014)	Fit to total spent on night out, by 18-21 year old participants from Hume and Yarra who spent >=\$50. Similarly for 22-25 year olds.
dist(spend22)	Distribution of 22-25 year old spending money.	Gamma(3.279,0.024)		
dist(drate18M)	Distribution of 18-21 year old drinking rates, men.	Gamma(2.634,1.006)	YAAS (Dietze et al., 2014)	For male 18-21 year old Hume and Yarra residents who attended a private venue first. Fit to distribution of: Total drinks/time in in first venue. Similarly for other age/sex categories.
dist(drate22M)	Distribution of 22-25 year old drinking rates, men.	Gamma(2.643,1.238)		
dist(drate18F)	Distribution of 18-21 year old drinking rates, women.	Gamma(1.744,0.970)		
dist(drate22F)	Distribution of 22-25 year old drinking rates, women.	Gamma(4.451,2.707)		
s_pri_rate	Drink rate scaling factor in private venues.	1	YAAS (Dietze et al., 2014)	Definition.
s_com_rate	Drink rate scaling factor in commercial venues.	1.46	YAAS (Dietze et al., 2014)	For Hume and Yarra residents, at first venue attended, determine: mean drinking rate of (18-21 year old male) participants in commercial venues / mean drinking rate of (18-21 year old male) participants in private
s_nic_rate	Drink rate scaling factor in niche venues.	1.00		

				venues. Average across age and sex categories.	
				Similarly for niche venues.	
s_pri_rate_drunk	Drink rate scaling factor in private venues after drinking more than half personal drink limit.	0.76	YAAS (Dietze et al., 2014)	Average for Hume and Yarra residents of: drinking rate in last venue of evening (for people ending in a private venue, having attended two or more venues) / average drink rate in first venue (if it was private).	
s_com_rate_drunk	Drink rate scaling factor in commercial venues after drinking more than half personal drink limit.	0.63			
s_nic_rate_drunk	Drink rate scaling factor in niche venues after drinking more than half personal drink limit.	0.89		Similarly for nightclubs and pub/bar venues.	
Setting properties					
dist(CT_com)	Distribution of commercial venue closing times.	(2am, 3am, 4am, 5am, 6am, 7am)= (6, 167, 7, 32, 1, 77)/290	(Victorian Commission for Gambling and Liquor Regulation, 30 April 2015) (Victorian Commission for Gambling and Liquor Regulation, 30 April 2015)	Melbourne liquor licensing reports. Commercial venues considered to be venues with “Late night (general) Licence”; Niche bars considered to be venues with “General Licence – Trading to 12am/1am”, “On-Premises Licence – Trading to 12am/1am” or “Late night (on-premises) Licence”.	
dist(CT_nic)	Distribution of niche venue closing times.	(12am, 1am, 2am, 3am, 4am, 5am,6am,7am)= (120, 862, 16, 197, 13, 38, 2, 35)/1283			
p_commercial	Proportion of public venues that are commercial (vs niche).	0.18			
dist(QT_com)	Distribution of commercial venue queueing times (early).	0	Sensitivity analysis	Authors’ estimate. No queues for niche venues that close before 1am.	
dist(QT_com_late)	Distribution of commercial venue queueing times (late).	0.5 hour			
dist(QT_nic)	Distribution of niche venue queueing times (early).	0 hour			
dist(QT_nic_late)	Distribution of niche venue queueing times (late).	0.333 hour			

queue_time	Time of night that queues become longer.	10pm	Sensitivity analysis	Based on cover charges, drink deals.
dist(DL_com_young)	Distribution of commercial venue drink limits (18-21).	18	Sensitivity analysis	Authors' estimate. Older people are thought to be more in control when intoxicated (Demant & Järvinen, 2010).
dist(DL_com_old)	Distribution of commercial venue drink limits (22-25).	20		
dist(DL_nic_young)	Distribution of niche venue drink limits (18-21).	18		
dist(DL_nic_old)	Distribution of niche venue drink limits (22-25).	20		
p_freedrink	Proportion of private venues where drinks are free.	0.15	YAAS (Dietze et al., 2014)	Proportion of private venues visited by Hume and Yarra residents where drinks were consumed and no money was spent (including money spent on them by others).
\$_com	Drink price in commercial venues.	\$9.72	YAAS (Dietze et al., 2014)	Total amount spent by Hume and Yarra residents on drinks in commercial venues (including what others spent on them)/total drinks they consumed there. Only includes venues where spending >0. Similarly for niche and private venues.
\$_nic	Drink price in niche venues.	\$8.56		
\$_pri	Drink price in private venues.	\$5.08		
Movements				
money2goout	Average spending money of friends required for group to go to public venue.	\$30	Sensitivity analysis	Authors' estimate.
p_taxi	Probability of getting a taxi (per hour): number of taxis per 100 people in the model, assuming they are all available for one trip per hour. i.e. $pr(\text{getting taxi each hour}) = (\#people/100) * p_taxi * (1/taxiqueue)$.	1/100 people	Calibration	Parameter can be used to calibrate the percentage of people experiencing transport harms. Increases / decreases the number of taxis in the model.
v_pt	Public transport travel speed.	25km/h	Sensitivity analysis	Used to define movement times in model.
v_nopt	Travel speed with no public transport.	10km/h		

v_taxi	Taxi speed.	60 km/h		
taxi\$_OU	Cost of a taxi to Outer Urban private / home.	\$50		
taxi\$_IC	Cost of a taxi to Inner City private / home.	\$25		
d_OUpri2OUpri	Agents travelling Outer Urban private-Outer Urban private will preference venues in this radius when public transport is available.	15km		
d_OUpri2OUpri_noPT	Agents travelling Outer Urban private-Outer Urban private will preference venues in this radius when public transport is not available.	5km		
p_move	Probability of a group of friends moving each hour.	0.12	YAAS (Dietze et al., 2014)	Total venue changes / total time out of Hume and Yarra residents.
p_ICyoung_com	Probability that a public venue visited by an 18-21 year old Inner City resident is commercial.	0.38	YAAS (Dietze et al., 2014)	Number of commercial venues visited by 18-21 year old Yarra residents / number public venues visited by 18-21 year old Yarra residents. Similarly for 22-25 year olds and Hume residents.
P_ICold_com	Probability that a public venue visited by a 22-25 year old Inner City resident is commercial.	0.34		
p_OUyoung_com	Probability that a public venue visited by an 18-21 year old Outer Urban resident is commercial.	0.47		
p_OUold_com	Probability that a public venue visited by a 22-25 year old Outer Urban resident is commercial.	0.38		
p_bar2bar	Probability of moving public to public (vs public to private).	0.78	YAAS (Dietze et al., 2014)	Total public-public movements of Hume and Yarra residents/total public-public + public-private movements.
p_house2house	Probability of moving private to private (vs private to public).	0.26	YAAS (Dietze et al., 2014)	Total private-private movements of Hume and Yarra residents/total private-private + private-public movements.
t_transport	Time when public transport turns off.	1am	Public Transport Victoria (Public Transport Victoria, 2015)	Last outbound train from the city.

p_PTrush_OU_plan_\$	Pr of rushing for last train, Outer Urban resident, within hour of planned length, not enough left for taxi.	0.6	Sensitivity analysis	Authors' estimate.
p_PTrush_OU_plan	Pr of rushing for last train, Outer Urban resident, within hour of planned length.	0.4		
p_PTrush_OU_\$	Pr of rushing for last train, Outer Urban resident, not enough left for taxi.	0.2		
p_PTrush_OU	Pr of rushing for last train, Outer Urban resident.	0.1		
p_PTrush_IC_plan_\$	Pr of rushing for last train, Inner City resident, within hour of planned length, not enough left for taxi.	0.4		
p_PTrushIC_plan	Pr of rushing for last train, Inner City resident, within hour of planned length.	0.2		
p_PTrush_IC_\$	Pr of rushing for last train, Inner City resident, not enough left for taxi.	0.1		
p_PTrush_IC	Pr of rushing for last train, Inner City resident.	0		
p_ICtaxi	Probability of an Inner City resident trying to get a taxi home after public transport stops (compared to walking).	0.5		
p_lastchancetaxi_OU	Probability Outer Urban resident using the last of their money to get home.	0.5		
p_lastchancetaxi_IC	Probability Inner City resident using the last of their money to get home.	0.2		
p_close2home	Probability of going home after a venue closes.	0.5	Sensitivity analysis	Authors' estimate.
Harms				
harms_drinkthreshold	Above this many drinks consumed people are at greater risks of verbal fights.	12 (M) / 6 (F)	Sensitivity analysis	Authors' estimate.
s_pri_vfm	Verbal fight, scaling factor for private venue (relative to niche venue), men.	2.5	Sensitivity analysis	Authors' estimate.

s_com_vfm	Verbal fight, scaling factor for commercial venue (relative to niche venue), men.	5		
s_drunk_vfm	Verbal fight, scaling factor when consumed more than harms_drinkthreshold drinks, men.	5		
p_vfm	Verbal fight per person-hour, niche venue, men.	0.00127	YAAS (Dietze et al., 2014)	<p>Dependent on scaling factors and harms_drinkthreshold. Let time_nic_m and time_nic_m_drunk be the total person hours in YAAS spent by men in niche venues before and after harms_drinkthreshold drinks were consumed respectively. For venues where the drink threshold is crossed, all time is counted towards time_nic_m_drunk.</p> <p>Then</p> $p_vfm = \text{total verbal fights for men} / [\text{time_nic_m} + \text{time_pri_m} * s_pri_vfm + \text{time_com_m} * s_com_vfm + s_drunk_vfm * (\text{time_nic_m_drunk} + \text{time_pri_m_drunk} * s_pri_vfm + \text{time_com_m_drunk} * s_com_vfm)].$ <p>Uses participants from all LGAs.</p>
s_pri_vff	Verbal fight, scaling factor for private venue (relative to niche venue), women.	2.5	Sensitivity analysis	Authors' estimate.
s_com_vff	Verbal fight, scaling factor for commercial venue (relative to niche venue), women.	5		
s_drunk_vff	Verbal fight, scaling factor when consumed more than harms_drinkthreshold drinks, women.	5		
p_vff	Verbal fight per person-hour, niche venue, women.	0.00088	YAAS (Dietze et al., 2014)	Analogous to p_vfm. Uses participants from all LGAs.
p_verbalhome	Probability of going home after a friend has a verbal argument.	0.7	Sensitivity analysis	Authors' estimate.

References

- Demant, J., & Järvinen, M. (2010). Social capital as norms and resources: Focus groups discussing alcohol. *Addiction Research & Theory*, 19(2), 91-101.
- Dietze, P. M., Livingston, M., Callinan, S., & Room, R. (2014). The big night out: What happens on the most recent heavy drinking occasion among young Victorian risky drinkers? *Drug Alcohol Rev*, 33(4), 346-353.
- Miller, P., Pennay, A., Droste, N., Jenkinson, R., Quinn, B., & Chikritzhs, T. (2013). Patron offending and intoxication in night time entertainment districts (POINTED): final report. National Drug Law Enforcement Research Fund.
- Public Transport Victoria. (2015). <http://ptv.vic.gov.au/>.
- Victorian Commission for Gambling and Liquor Regulation. (30 April 2015). <http://www.vcglr.vic.gov.au/home/resources/data+and+research/victorian+liquor+licences+by+category>.