

# Evaluating the impact of the beach lifeguard service: a case study of beachgoers in Victoria, Australia

Peer reviewed

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**SUBMITTED**

10 January 2024

**ACCEPTED**

5 August 2024

**DOI**

[www.doi.org/10.47389/40.1.15](http://www.doi.org/10.47389/40.1.15)



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## Introduction

Coastal environments are one of Australia's leading drowning locations, recently contributing to almost half of the yearly drowning fatalities in the financial year 2022–23 (Royal Life Saving Society - Australia 2023). Estimates of non-fatal drowning incidents in Australia indicate that 3 non-fatal drownings occur for every one fatality (Mahony and Pidgeon 2021). In Victoria, the majority of non-fatal incidents occur in coastal waterways (Matthews et al. 2017; Life Saving Victoria 2023). Research by Matthews et al. (2017) found that, despite higher incidences in coastal environments, drowning in inland waterways (i.e. non-coastal open water such as rivers, creeks and lakes) was more likely to be fatal. This suggests that survival is likely, in part, due to the provision of lifesaving services in select coastal locations.

Lifeguards and lifesavers (hereafter referred to as lifeguards) play an important role in the prevention of fatal and non-fatal drowning as well as other aquatic incidents. Data highlighted that lifeguards conduct anywhere from 49 to 147 preventative actions for every rescue (Deloitte Access Economics 2020; Navarra and Connolly 2014; United States Lifesaving Association 2021). The 2022–23 *Life Saving Victoria drowning report* (Life Saving Victoria 2023) indicated lifeguards performed 689 rescues that year at patrolled beaches and a further 231 first aid responses. Despite this vital contribution, people still choose to aquatically recreate at unpatrolled beaches (Surf Life Saving Australia 2022; Williamson et al. 2011; Uebelhoer et al. 2022). While numerical data exists regarding lifeguard rescues and their preventative actions, there is little evidence in the literature that has investigated the wider impact of the lifeguard service, particularly at the local

## Abstract

In Australia, lifeguards provide an essential service in preventing aquatic-related injury and death and are often first responders to emergency aquatic incidents. Following increases in coastal drownings in Victoria, lifeguard beach patrols were supplemented and evaluated to establish the value of these services to the community. Beachgoers (aged 18+ years) completed surveys and their behaviours were recorded. Of the 176 beachgoers surveyed, the majority highly valued the lifeguard service. However, most (60.8%) were observed recreating outside of flagged lifeguarded areas. Surveyed beachgoers accompanying children, those situated between the lifeguard flags and non-swimmers placed statistically significantly more importance on the service as did beachgoers at surf beaches compared to those at bay beaches. Lifeguard presence enhanced feelings of safety among beachgoers and this was also associated with economic benefits to the local beach precinct. Lifeguard service expansion should be considered in peak visitor times. Targeted education demonstrating the need for lifeguard services at bay beaches is required. Promotion of lifeguarded beach locations could incorporate the economic and social benefits to local communities, and also enhance public awareness of the role of the lifeguards.

community level, to determine the value of the lifeguard service. This would be relevant for local precincts, the public and stakeholders to understand what modifications can be made to improve the use of patrolled coastal locations. This aligns with recommendations from the literature that confirm the importance of evaluating injury prevention efforts in that it ensures effectiveness and, by continual review, enhances implementation (Mock 2001).

The aim of this project was to study lifeguarded coastal sites in Victoria to determine the value of the lifeguard service to local communities and beachgoers and to identify any potential improvements or future considerations.

## Material and methods

### Design

This study incorporated a mixed methods approach of a survey and observations of beachgoer activities and behaviours on the beach. Figure 1 shows the 8 sites in Victoria selected and attended by researchers in the summer months of 2019. The locations were 3 calm water (bay) beaches in metropolitan areas and 5 surf beaches in regional areas (2 west and 3 east of Melbourne) as shown in Figure 1. Beach visits lasted between 30 and 105 minutes. All researchers had over 3 years research and evaluation experience or had a research-based tertiary qualification and were trained in the use of each of the measurement tools.

### Ethics

The *National Statement on Ethical Conduct in Human Research 2023* (National Health and Medical Research Council 2023) details the criteria for low-risk research. This research aligned with these guidelines as it carried a low risk to participants and because all participants were aged 18 years or over. This study only collected anonymous surveys and observations of public behaviour. Observations were counts only and no identifiable information was collected through observations or surveys. All participants provided informed consent prior to participating in the survey. Accordingly, ethics approval was deemed not required for this research.

### Measures

A standardised format was used to record observations of all beachgoers on the researcher’s arrival and departure at each beach including definitions of measures to ensure inter-rater reliability. Observations recorded beachgoers within the predetermined beach boundary (encompassing patrolled and unpatrolled locations) as outlined in Table 1.

A questionnaire was developed to capture beachgoer attitudes towards the lifeguard service and use of the beach and precinct. Measures were developed in

consultation with lifeguard service delivery providers based on their desire to evaluate the lifeguard service. For example, ‘When you decided to come to this beach, how important was the presence of lifeguards?’. Also, what other effects did the lifeguard service have for the local community. For example, ‘Approximately how much money are you spending in the local area during your visit today?’.

In addition, questions addressed gaps identified in the literature regarding the broader community impact of beach usage on beachgoers, ‘How important are your visits to this beach for your overall health and wellbeing?’ and ‘How important do you believe this beach is, as a place for the community to be social and connected’. Response options included a 10-point rating scale, open-ended and multiple-choice answers. The survey was paper-based for ease of participant completion and took approximately 10 minutes to complete. Following survey completion, researchers recorded whether the participant was settled on the beach between or outside of the lifeguard red and yellow flags. In Australia, red and yellow flags at patrolled beaches indicate the safest swimming area deemed appropriate for beachgoers to avoid hazards such as rip currents. Water safety messaging encourages beachgoers to ‘swim between the flags’ to highlight the safe area to recreate in the water.

### Procedure and participants

A convenience sample of beachgoers was captured for this study. Two researchers arrived at the beach at the same time and walked the length of the predetermined beach boundary and systematically recorded beachgoer observations (see Table 1). This process was repeated twice by each researcher simultaneously on arrival and departure

Table 1: Observation measures and definitions.

Measure	Definition
Number of beachgoers swimming/recreating in the water between the lifeguard flags	Number of people bathing between the red and yellow lifeguard flags indicating a patrolled zone (swimming or head in water)
Number of beachgoers swimming/recreating in the water outside of the lifeguard flags	Number of people bathing outside of the red and yellow lifeguard flags (swimming or head in water)
Number of beachgoers standing in the water between the lifeguard flags	Number of people standing in the water between the lifeguard flags (just wading – head not in water)
Number of beachgoers standing in the water outside of the lifeguard flags	Number of people standing in water outside the lifeguard flags (just wading – head not in water)
Total number of beachgoers	A headcount of every person using the beach within the predetermined beach boundary



Figure 1. Locations of the beaches along Victoria’s southern coastline for this research.

to increase reliability and validity of records and resulted in 8 records of behaviour observations for each location.

Following arrival observations, researchers started at the edge of the beach boundary and approached beachgoers who were settled on the beach within the beach boundaries to voluntarily undertake the survey. Beachgoers approached were those assumed to be over 18 years. No other demographic filter was applied to ensure diversity in the sample. Beachgoers remained in their existing location to complete the survey after providing informed consent. People under 18 years of age were excluded from the survey as were people with limited English language proficiency (determined by their inability to respond in English to a greeting by the researcher). This exclusion was due to difficulty of explaining the study purpose and obtaining informed consent. Once a survey or group of surveys was completed, the researcher moved onto the next closest person or group on the beach. Data collection for the surveys continued until researcher time allocation (2 hours in peak visitation period) at the beach was reached or until all beachgoers had been approached.

### Data analysis

The survey raw data and observation recordings were entered into a Microsoft Excel file and transferred to an IBM SPSS Statistics 24 file for analysis. The data was checked for accuracy and was cleaned through the screening of descriptive (mean and standard deviation) and frequency statistics and the identification and correction/removal of anomalies. Independent samples t-tests compared the means of continuous variables with 2 independent samples (e.g. gender), chi square tests of 2 proportions analysed ordinal variables. Variables with 3 or more independent samples (i.e. swim ability and age) were not normally distributed, as assessed by Shapiro-Wilk’s test

( $p < .05$ ), therefore non-parametric analysis was undertaken using Kruskal-Wallis H test.

## Results

### Demographics

A total of 176 beachgoers completed the community survey. There was an 83% response rate for the survey across all sites. Table 2 presents participant demographic details. The majority of participants (66.5%) were born in Australia, and 16.5% of the total sample spoke a language other than English.

Overall, 4,156 beachgoer observations were recorded across the 8 beaches including both arrival and departure counts – 83.7% at calm water (bay) beaches. Among all beachgoers, 1,492 people (36%) were recorded to be either swimming or standing in the water at the time of the arrival and departure counts. Of those in the water, 27.5% were in the water in front and between the red and yellow flags and 72.5% were recreating in the water outside of or away from the red and yellow flagged area.

### Perceptions and awareness of the lifeguard service

Most survey participants (84%) were aware of lifeguards patrolling the beach at the time of survey completion. Participants at surf beaches were significantly more aware of lifeguard presence (89.6%) compared to those at the calm water (bay) beaches (76.3%),  $t(89.343) = -118, p = .037$ . No other significant differences were recorded in lifeguard patrol awareness between groups.

Participants placed high importance on lifeguard presence when deciding which beach to visit (mean 7.02 (SD 3.56)) and reported feeling safer because of lifeguard presence

(mean 8.59 (SD 2.32)). Significantly greater importance was recorded among participants accompanying children ( $t(160.361)=4.694, p < .001$ ), participants positioned between the flags ( $t(101.119)=2.016, p = .046$ ) or participants at surf beaches ( $t(86.835)=4.638, p < .001$ ) (see Table 1). There was a statistically significant difference in the importance participants placed on lifeguard presence based on their self-reported swimming ability,  $\chi^2(2)=6.470, p = .039$ . Perceived importance of lifeguards was lowest among participants identifying as strong swimmers (median rating 3.5/10) and highest among non-swimmers (median rating 9.0/10) and average swimmers (median rating 8.0/10). However, post hoc analysis revealed no significant differences in scores between the non and average swimmers ( $p=1.00$ ), non and strong swimmers ( $p = .142$ ) and strong and average swimmers ( $p = .068$ ). There was a significant difference in the importance placed on lifeguards by age groups  $\chi^2(5)=19.786, p = .001$ . Post hoc analysis revealed significant differences in median scores

between 25–34 (6.5) and 45–54 year olds (10;  $p = .009$ ) and 18–24 (7) and 45–54 year olds ( $p = .006$ ).

Participants felt significantly safer because of the lifeguard presence if they were accompanying children ( $t(144.765)=3.787, p < .001$ ), were positioned between the lifeguard flags ( $t(127.602)=2.344, p = .021$ ), identified as female ( $t(108.641)= -2.328, p = .022$ ) or were at surf beaches ( $t(83.011)=3.160, p = .002$ ). Feeling of safety did not differ significantly between swimming ability groups,  $\chi^2(2)=4.020, p = .134$ . However, significant differences were recorded by age groups  $\chi^2(5)=15.308, p = .009$ . Post hoc analysis showed significant differences between 25–34 (8) and 45–54 year olds (10;  $p = .022$ ) and 18–24 (9) and 45–54 year olds ( $p = .039$ ).

### Wider impact of the lifeguard service

The wider impacts of the lifeguard service on the immediate beach community precinct were investigated.

Table 2: Participant demographic information and associated survey responses split by variables with 2 samples or 3 or more samples.

Participant demographic information	Number of participants	Importance of lifeguards, 10-point rating <sup>1</sup>	Feeling of safety with lifeguards, 10-point rating <sup>1</sup>	Importance of beach visits for health and wellbeing <sup>1</sup>	Importance of beach visits for community to be social and connected <sup>1</sup>
<b>Two sample variables</b>		<b>Mean (SD)</b>	<b>Mean (SD)</b>	<b>Mean (SD)</b>	<b>Mean (SD)</b>
Gender:					
Male	69 (39.2%)	6.60 (3.83)	8.06 (2.75)*	7.85 (2.33)	8.29 (1.91)
Female	101 (57.4%)	7.42 (3.32)	8.96 (1.92)*	7.96 (2.28)	8.69 (1.66)
Other	0				
Accompanying children:					
Yes	75 (42.6%)	8.31 (2.28)*	9.27 (1.29)*	8.21 (2.16)	8.44 (1.92)
No	101 (57.4%)	6.04 (4.03)*	8.07 (2.76)*	7.64 (2.46)	8.57 (1.68)
Position on beach:					
Between flags	40 (22.7%)	7.70 (2.66)*	9.05 (1.43)*	8.10 (1.66)	7.95 (1.83)*
Outside flags	107 (60.8%)	6.57 (3.84)*	8.23 (2.69)*	7.64 (2.5)	8.67 (1.72)*
Beach type:					
Surf beach	116 (66%)	7.97 (2.76)*	9.03 (1.87)*	8.28 (2.12)*	8.46 (1.88)
Bay beach	60 (34%)	5.20 (4.18)*	7.72 (2.84)*	7.10 (2.66)*	8.62 (1.58)
<b>Three or more sample variables</b>		<b>Median</b>	<b>Median</b>	<b>Median</b>	<b>Median</b>
Self-reported swimming ability:					
Non-swimmer	12 (6.8%)	9.0	10.0	7.0	8.5
Average swimmer	34 (19.3%)	8.0	10.0	10.0	10.0
Strong swimmer	26 (14.8%)	3.5	8.0	8.0	9.0
Age group (years):					
18–24	38 (21.6%)	7.0*	9.0*	7.0*^	9.0
25–34	21 (11.9%)	6.5^	8.0^	7.0#	9.0
35–44	32 (18.2%)	8.0	10.0	8.0	8.0
45–54	53 (30.1%)	10.0*^	10.0*^	10.0*#	10.0
55–64	22 (12.5%)	8.0	10.0	9.0^	10.0
65 and over	7 (4%)	10.0	10.0	10.0	10.0

<sup>1</sup>Likert scale from 0-10 where 0 = not at all and 10 = extremely

\*^# indicate significant differences between responses  $p \leq .05$ .

The average dollar spend at local businesses was \$53.57 (\$72.98 per surf beachgoer and \$34.16 per calm water (bay) beachgoer). A Spearman's rank-order correlation found a statistically significant positive correlation between beachgoer perception of lifeguard importance and money spent  $r^s(172) = .260, p = .003$  and a statistically significant negative correlation for swimming ability and money spent  $r^s(130) = -.391, p = .003$ .

The study showed that 80% of beachgoers felt the lifeguard service reduced one or more negative behaviours occurring at the beach: unruly behaviour (67%), theft (52%), littering (47%) and vandalism (36%). No statistically significant differences were observed between participant groups as to perceptions of the lifeguard service impact on negative beach behaviours.

## Community impact of beach visits

There was an overall highly perceived importance of visiting a beach for health and wellbeing (Mean 7.88, SD 2.38) and for the community to be socially connected (Mean 8.52, SD 1.78). Importance for health and wellbeing differed significantly by age group  $\chi^2(5) = 23.916, p < .001$ . Post hoc analysis showed significant differences in median scores between 18–24 year olds (7) and 45–54 (10;  $p = .002$ ) and 55–64 (9;  $p = .031$ ) year olds and between 25–34 (7) and 45–54 year olds ( $p = .043$ ). Significantly higher importance for health and wellbeing was also recorded among participants on surf beaches ( $t(96.551) = 2.949, p = .004$ ). No other significant differences were recorded within demographic groups. For social connectedness, significantly higher importance was recorded among participants situated outside the lifeguard flags ( $t(140) = -2.139, p = .030$ ).

## Discussion

Coastal drownings have risen in Australia and many incidents occur at unpatrolled locations. The value and perceptions of the lifeguard service at coastal locations was unknown. Identifying this value and what improvements to the service could be made potentially increases visitation at patrolled beaches. This increases the safety of beachgoers. This study found that, in addition to the prevention of drowning, the Victorian lifeguard service had discernible positive social and economic impacts on beachgoers and for communities within the immediate precinct of the beaches.

Lifeguards were highly valued for their role in maintaining safety of beachgoers around water. They were also perceived to deter anti-social behaviour including theft, littering and vandalism. This result aligns with previous research which reported that lifeguard presence can prevent dangerous events and risky behaviours akin to how police deter crime (World Health Organization 2003;

Gilchrist and Branche 2016). Such perceived authority and ability may demonstrate how the lifeguard service is seen as an extension of other emergency responders, such as police and ambulance, and could influence how beachgoers behave. Nevertheless, it is clear from this and other research that the lifeguard's role involves more than preventing drowning and injury. Lifeguards could be provided with training to assist in other areas such as addressing unruly behaviour and theft.

In addition to the social benefits of the lifeguard service, the economic benefit was also positive. The survey showed that beachgoers attending patrolled beaches spent an average \$53.57 in local businesses. Incorporating this figure into a previous model developed with Deakin University, the overall estimated value of the lifeguard service was determined to be \$2.6 million per site per year with a benefit-cost ratio of 53.38 (Life Saving Victoria – Risk & Research Services 2020).

Research by Deloitte Access Economics (2020) investigated the economic value of the lifeguard service in terms of the value of lives saved and injuries avoided, physical and social benefits of volunteering and education and training benefits. However, this study is the first known that quantifies the immediate economic impact of patrolled beaches to local businesses. While such spending is likely seasonal, promoting the use of patrolled beaches as safer for beachgoers and supportive to local businesses could be a promotional method to explore to increase visitors to lifeguarded coastal locations. In conjunction with estimates by Deloitte Access Economics (2020) that the lifeguard service has a total net benefit of \$97 billion to the Australian community, this study showed how economically valuable and beneficial the lifeguard service is to Victorian coastal communities and possibly other patrolled locations around Australia. It is recommended that similar research be conducted in other patrolled beaches to determine if this benefit is observed.

Alongside social and economic benefits, this study identified that most surveyed beachgoers highly valued the lifeguard service and indicated their presence on the beach increased feelings of safety. Of note was the disparity in value placed on the lifeguard service between beachgoers at surf beaches and those at calm water (bay) beaches (Short 2007). Typically, beachgoers at surf beaches were more aware of a lifeguard presence, placed more value on the service and felt safer because of their presence than beachgoers at calm water (bay) beaches. A possible explanation could relate to the environmental differences between typical surf and calm water (bay) beaches and the associated dangers with aquatically recreating in these conditions. Surf beaches tend to be characterised by a vibrant natural environment of high-energy waves, strong swells and rip currents (Morgan 2011), the latter a particular focus of many drowning prevention messages in

Australia, alongside the ‘swim between the flags’ message (Wilks et al. 2007; Australian Water Safety Council 2021). It seems plausible that such prevention messages have been successful in establishing safer behaviours and attitudes towards surf environments among beachgoers (Wilks et al. 2007). Yet, the same is necessary when referring to calm water (bay) beaches and why visiting patrolled calm water (bay) beaches is also a necessary safety requirement. It is therefore a recommendation that material promoting the lifeguard service include references to lifeguard necessity at calm water (bay) beaches and the dangers of calmer looking water.

Of concern in this study was that most beachgoers were positioned and were aquatically recreating outside or away from the lifeguard beach flags but they still reported feeling safe because of the lifeguard presence. This feeling of safety is concerning because many drowning deaths in Australia’s coastal waters occur less than 1 km from beach flags (Surf Life Saving Australia 2022). This demonstrates that being close to the flags is not close enough and is certainly not as safe as being between the flags (Wilks et al. 2007).

Research has indicated that people are aware of the dangers of swimming outside of or away from beach flags but they have other reasons or excuses for doing so, including overcrowding (Uebelhoer et al. 2022; Wilks et al. 2007). This could likely be an explanation in this research as the study was completed in summer and, at some beaches, where beachgoer counts exceeded 1,000 with only one flagged lifeguarded area. Such large beachgoer numbers could also lead to group conformity as to where it is perceived safe to recreate (Eller and Frey 2019). Another reason for not swimming between the lifeguard flags includes not understanding why the flags are pitched and what they mean or signify (Kamstra et al. 2022). Therefore, it may be necessary to expand roving patrols at popular patrolled locations in order to monitor people recreating outside of the beach flags, demonstrate and enhance awareness of lifeguard presence and assist in distributing water safety messages to beachgoers across the beach. This is alongside additional education as to why lifeguard flags are positioned where they are, considering beach-specific hazards, to assist beachgoers in making more informed decisions about their aquatic recreation both at patrolled and unpatrolled beaches (Kamstra et al. 2022).

## Limitations

Limitations of this study may affect the interpretation and generalisability of the findings. Large crowds at several of the surveyed beaches made it difficult for researchers to conduct observations, particularly without assisting equipment or technology. This may have led to inaccuracy

in recording raw data related to beachgoer attendance and activities. As the surveys were conducted in English, this precluded non-English speakers who may have provided diverse perspectives and experiences with visiting Australian beaches. Surveys were also limited to weekdays in the summertime and the sample is unrepresentative of all beach users across different days and times of the year. Further research is required to survey varied beachgoers to verify the transferability of these results to other times of year and other beaches.

## Conclusions

Victorian beaches are a place for the community to enjoy many activities like swimming, socialising and relaxing. Lifeguards play a critical role in providing safe areas for aquatic recreation. The presence of lifeguards at the surveyed beaches was associated with increased beachgoer feelings of safety and likelihood of choosing to visit that beach. This research demonstrated that lifeguarded locations had a positive effect on the local economy and perceivably decreased antisocial behaviours. Concerningly, a lot of beachgoers were observed in the water outside of the lifeguard beach flags. Hence, expanded initiatives such as roving patrols are recommended to improve beachgoer compliance. Education should encompass the need for beachgoers to use lifeguard services at calm water (bay) and surf beaches to improve overall safety.

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