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A 10-year descriptive analysis of UK maritime and Coastguard on lifejacket use and drowning prevention

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ABSTRACT

The study investigated if incidences of death by drowning in the UK could have been prevented through the use of lifejackets over a ten year period. This study was a retrospective analysis of fatal maritime incident data collected by the Maritime and Coastguard Agency (MCA) between the years 2007 and 2016. A Casualty Review Panel (CRP) met annually to categorise incidents into five groups based on the likelihood of a lifejacket preventing death. Descriptive analyses were performed on the overall fatalities, data were stratified by year, sex, age, and activity. Ten year data were categorised based on the outcome of the CRP, these data were further stratified by year and activity, with trends being reported. Potentially 180 lives (82% of all cases successfully categorised) could have been saved if a lifejacket had been worn. An 18% reduction in the number of cases referred to the CRP was observed from the first 5 years (2007–2011 = 59% of all referrals) to the last 5 years (2007–2011 = 41% of all referrals), with 42% less cases referred in 2016 compared to 2007. The data generated by the CRP over the ten years has provided a unique insight into coastal deaths, it has provided a clear rationale for the use of lifejackets and has helped target national and activity-specific campaigns for water safety and lifejacket use.

1. Introduction

Drowning is the third leading cause of unintentional death worldwide, accounting for approximately 7% of all injury related deaths (World Health Organization (WHO), 2016). It is suggested that the global annual estimate of 372,000 deaths by drowning may significantly underestimate the associated public health problem (WHO, 2016). Statistics for the United States found that 53% of all male and 26% of all female drowning deaths occurred in natural bodies of water, with 48% more likely to occur at the weekends (Xu, 2014). The data for drowning death ignore the larger numerical problem of those who survive but suffer life-long morbidity.

Prevention has greater potential to save more lives at lower cost than rescue or treatment (Schmidt et al., 2016; Szpilman et al., 2016). One of these interventions is the use of a lifejacket, also commonly known as a personal floatation device or life vest (Cassell and Newstead, 2014). The aim of a lifejacket is to prevent drowning and increase the chances of survival and rescue by keeping the wearer afloat and the airways clear of the water (Cassell and Newstead, 2014). They can also reduce cardiovascular strain and slow cooling by reducing the need for exercise on immersion (Golden and Tipton, 2002). US Coast Guard data from 2013 showed drowning to be the cause of death in more than 75% of all fatal boating accidents, of these fatalities 85% were not wearing a lifejacket (United States Coast Guard, 2013). Similarly, data from New Zealand identified that in the fatal boating incidents where it was known if a lifejacket was worn, 76% of victims did not wear a lifejacket (Water Safety, New Zealand, 2012). Data supporting the function of lifejackets in reducing the number of fatalities caused through drowning is abundant (Bugeja et al., 2014; Cummings et al., 2011; Driscoll et al., 1994; O'Connor and O'Connor, 2005; Quistberg et al., 2014); with one study suggesting lifejackets may halve the number of drowning's (Cummings et al., 2011). Compulsory wear regulations for the use of lifejackets were implemented in Australia in 2005 in the year post-regulation, wearing rate increased from 22% to 63% (Bugeja et al., 2014; Cassell and Newstead, 2014). Retrospective data analysis before and after the compulsory regulations demonstrated a significant reduction in drowning deaths from recreational boating of 59 in the 6 years preceding the regulations to 16 in the 5 years following the implementation of lifejacket regulations (Bugeja et al., 2014). Therefore it has been strongly recommended that properly fitted

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lifejackets, meeting regulatory specifications, should be available and worn by individuals engaging in any boating or water sport activities (Schmidt et al., 2016).

In 2007 a Casualty Review Panel (CRP) was set up by the Maritime and Coastguard Agency (MCA) with the aim of annually reviewing fatal incidents and the potential impact of the use of lifejackets in those incidents. The aim of this study was to undertake a 10-year analysis of the conclusions of the CRP.

2. Methods

A retrospective analysis of fatal maritime incident data collected by the MCA between 2007 and 2016 was undertaken. In the UK Her Majesty's Coastguard (HMCG) maintains a database of fatal maritime (coastal and inland) incidents in the UK Search and Rescue Region. The information from this database was supplemented by reports from the press, Coastguard, Coroners, Marine Accident Investigation Branch and Police. These data were sifted to exclude: 1. Non UK search and rescue incidents and commercial vessel incidents, with the exception of fishing vessels (Sift 1); 2. Incidents where it was clear that the wearing of a lifejacket would not have been appropriate, for example coastal walkers or swimmers (Sift 2); 3. Any other inappropriate circumstances for example if a Coroner's report stated the cause of death was clearly not drowning (Sift 3). The records of incidents left following Sift 3 were then passed to the CRP to be assessed.

The CRP consists of 12 members selected for their expert knowledge, including in the areas of lifejackets and other protective equipment, maritime accidents and search and rescue; boating, fishing, canoeing, sea survival, human physiology and responses to immersion. The CRP is represented by core individuals from the: Royal National Lifeboat Institution; Royal Yachting Association; Marine Accident Investigation Branch; MCA; University of Portsmouth; the Lifejacket Industry and the British Canoe Union. Other experts that have been in attendance during the 10 years 2007–2016 include: the National Water Safety Forum; Angling Trust and the Scottish Fisherman's Federation.

The CRP meet annually to assess the previous year's data. During each meeting panel members were provided with; an incident summary, the incident location (with a picture of the geographical location), a press report, weather conditions and any associated warnings for the incident locations and if appropriate the published Marine Accident Investigation Branch (MAIB) report. All MCA data provided to the CRP is anonymised, however press reports often contain the personal information of the deceased. That is, all available information on the incidents and the conditions surrounding them. At the annual meeting, each incident is read aloud and discussed, a vote is taken with the majority view recorded. Trends for the year's incidents are examined and discussed by the CRP. Following each meeting a press release is produced summarising the annual meeting findings, including a targeted and general safety message about the importance of wearing a lifejacket.

Following interrogation of each incident, the members of the CRP voted independently on the lifesaving potential of a lifejacket had it been worn. The conclusion of each independent member was recorded and the majority view taken as the result for that incident. Thus, the causal link between an incident and the potential benefit of a lifejacket was determined independently by subject matter experts on the basis of the information available for each incident. The incidents were catagorised according to one of the following:

i. **Probably** - The casualty would *probably* (high likelihood) have been saved by wearing a lifejacket or buoyancy aid that was correctly maintained, correctly worn and fit for purpose.
ii. **Possibly** - The casualty *possibly* would have been saved by wearing a lifejacket or buoyancy aid that was correctly maintained, correctly worn and fit for purpose.
iii. **Unlikely** - It is *unlikely* that the casualty would have been saved by wearing a lifejacket or buoyancy aid that was correctly maintained, correctly worn and fit for purpose.
iv. **No information** - There was not enough information to make a judgement.
v. **Not appropriate** - Wearing a lifejacket was *not appropriate* for the situation i.e. on a houseboat, or the casualty was wearing a lifejacket and still died or it was *not appropriate* for the casualty to have been wearing a lifejacket for the activity taking place.
vi. **Not relevant** - It was not relevant for the case to be included in the review.

3. Data analyses

Descriptive analyses were performed on the overall fatalities, data were stratified by year, sex, age, and activity. Ten-year data were categorised based on the outcome of the CRP, these data were further stratified by year, activity and activity by year with trends being reported.

4. Results

In the last 10 years there have been a total 3957 reported deaths in coastal waters, 1278 of these were maritime accidents, of these: 176 were removed as they were deemed non-UK search and rescue incidents and commercial vessel incidents, with the exception of fishing vessels; 518 were removed as it was evident that the wearing of a lifejacket would not have been appropriate; and 192 were removed as a result of inappropriate circumstances (Fig. 1). This left 392 fatalities to be considered by the CRP.

4.1. Annual data

The annual data presented in Table 1 shows the highest percentage of referrals (cases that survived all sifts to be voted on by the CRP) occurred in the first three years (2007–2009). An 18% reduction in the number of cases referred to the CRP was observed from the first 5 years (2007–2011 = 59% of all referrals) to the last 5 years (2012–2016 = 41% of all referrals), with 42% less cases referred in 2016 compared to 2007. From 2010 to 2016 a fluctuation (5%, 6%, 9% and 8% respectively) in referred cases to the CRP was demonstrated.

Of the 392 fatalities considered by the CRP in the 10-year span, 24% (93) were categorised "Probably" i.e. The casualty *probably* would have been saved by wearing a lifejacket or buoyancy aid that was correctly maintained, correctly worn and fit for purpose; 22% (87) were

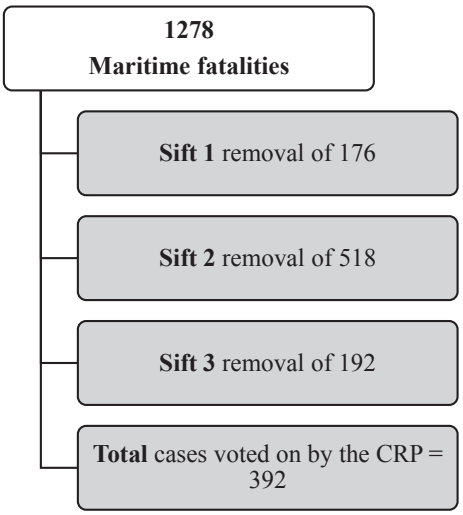

Fig. 1. Schematic of the sift process used to determine the number of cases reviewed by the Casualty Review Panel over 10 years.