# Risk factors associated with life jacket wear among adult canoers & kayakers in the U.S.

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## Data Sources, Funding, & Contact Information

**Data:** JSI National Wear Rate Study. (1999-2017). N.p. U.S. Coast Guard Office of Auxiliary & Boating Safety.
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**All data and analyses were produced under a grant from the Sport Fishing Restoration and Boating Trust Fund, administered by the U.S. Coast Guard.**

## Background

- Drowning is the most common cause of death in recreational boating, accounting for 91% of **canoer** and 80% of **kayaker** deaths
- Life jackets prevent at least 50% of drowning deaths for all boaters
- Life jacket wear rates have remained consistently low for all boat types
- **Canoes** and **kayaks** have some of the highest annual boating-related death rates despite overall low hours of use for each boat nationally
- Environmental, boat, & boater factors increase risk of drowning

## Methods

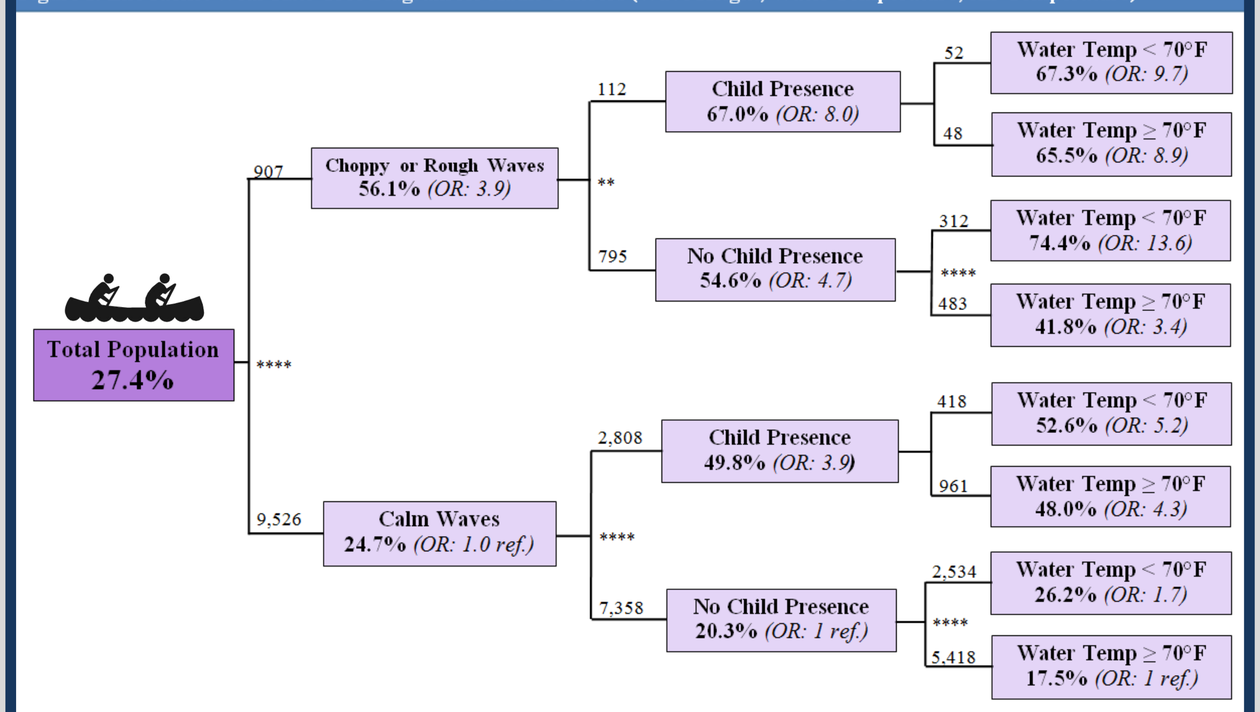
- 124 study sites (30 states) annually from 1999 - 2015
- Observations conducted by 2 observers in 4-hour blocks during Saturdays and Sundays in July and August

## Table 1. Risky Conditions: Canoes vs. Kayaks

| CANOES | | KAYAKS |
|---|---|---|
| 1 boater | vs. | 2 or more boaters |
| < 16 foot boat | vs. | 16+ foot boat |
| Wind speed 2+ knots | vs. | ns* |
| ns* | vs. | Air temperature < $70^0$F |
| Child present | = | Child present |
| Fishing/White water boating | = | Fishing/White water boating |
| Strong current | = | Strong current |
| Choppy or rough waves | = | Choppy or rough waves |
| Water temperature < $70^0$F | = | Water temperature < $70^0$F |
| Fair or poor visibility | = | Fair or poor visibility |
| Raining or stormy weather | = | Raining or stormy weather |

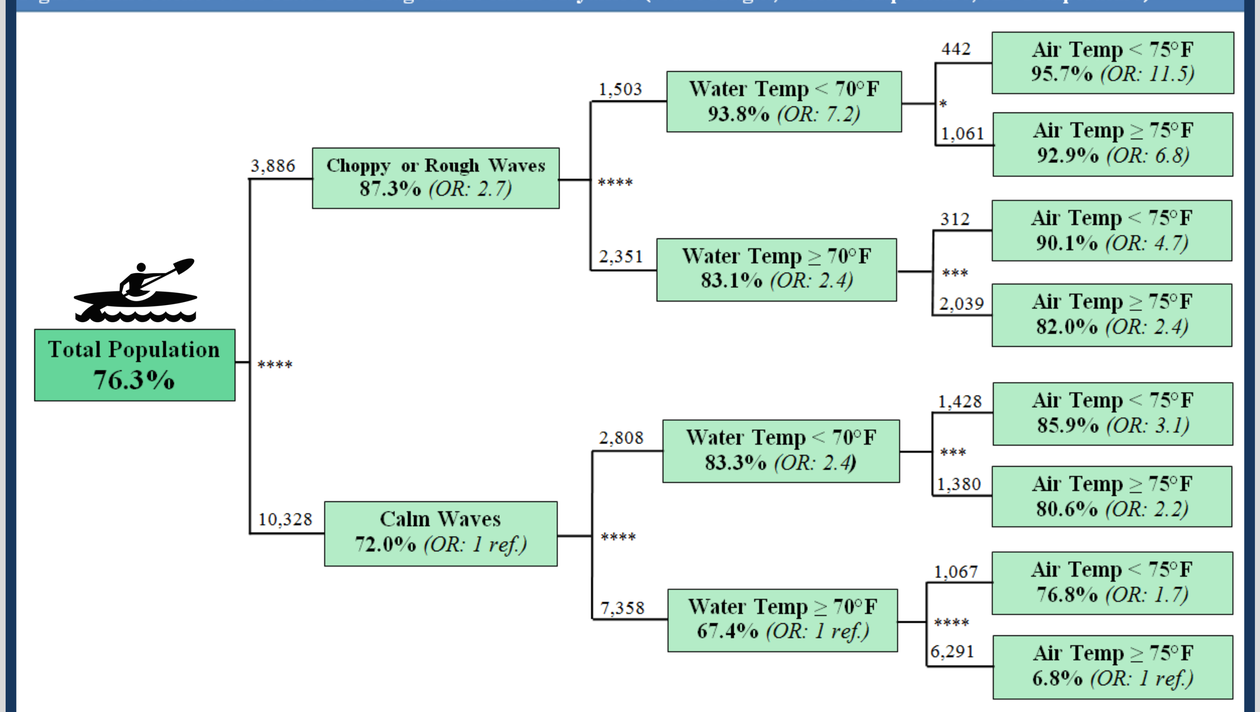
Results of Chi-Square tests ; significant at α=0.05 level; ns* represents a condition that is not statistically significant.

**Figure 1. Life Jacket Wear Rate Tree Diagram for Adult Canoers (Wave Height; Water Temperature; Air Temperature)**




*P-values for each branch derived from Chi-Square test with 1 degree of freedom; * = p <0.05; ** = p <0.01; *** = p <0.001; **** = p <0.0001*
*OR represents odds ratio against reference category of same branch level*

**Figure 2. Life Jacket Wear Rate Tree Diagram for Adult Kayakers (Wave Height; Water Temperature; Air Temperature)**

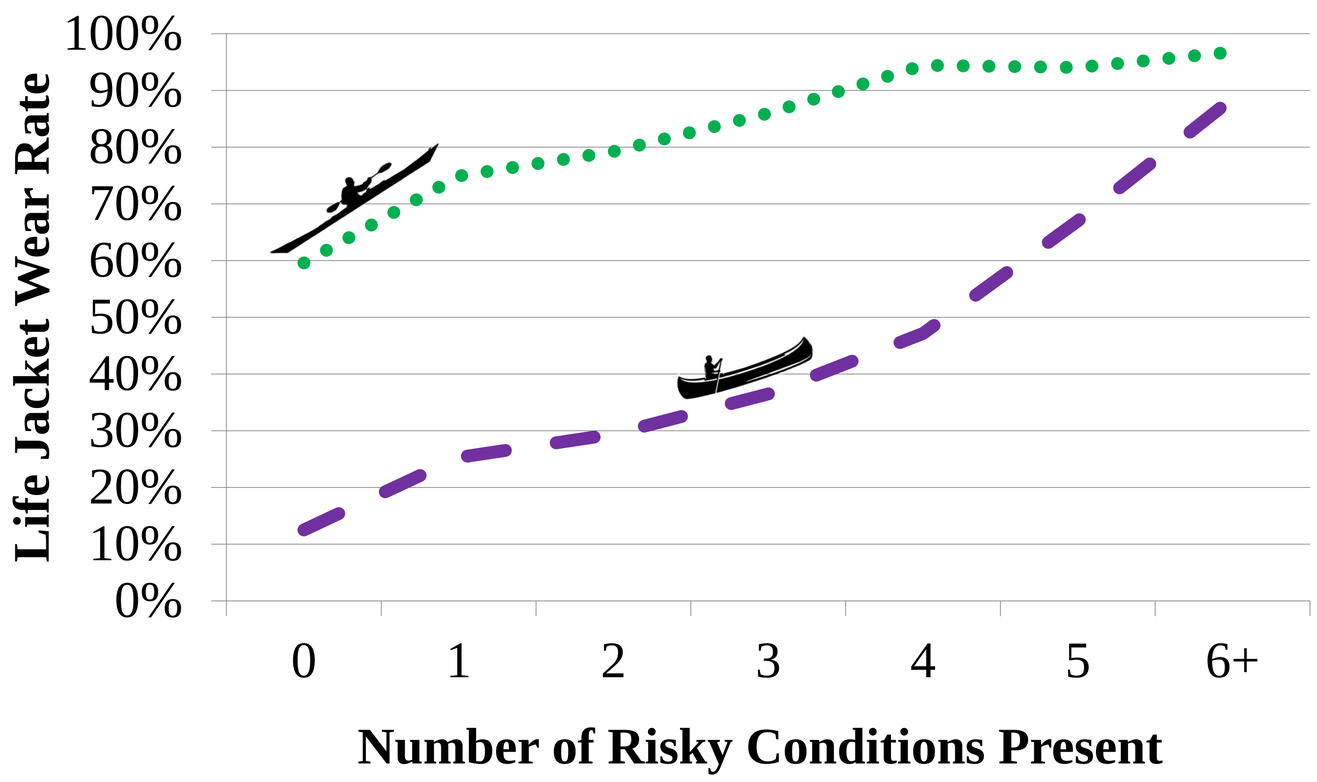



*P-values for each branch derived from Chi-Square test with 1 degree of freedom; * = p <0.05; ** = p <0.01; *** = p <0.001; **** = p <0.0001*
*OR represents odds ratio against reference category of same branch level*

## Results & Discussion

- Data were collected for **10,477 adult canoers** and **14,367 adult kayakers**
- Adult **kayakers** had higher average rates of life jacket wear than **canoers** in every situation observed (overall average: 76.3% vs. 27.4%, respectively)
- For both adult canoers and kayakers, in 10 of the 11 variables, life jacket wear rates in risky conditions were higher than in their less risky alternative
- As the number of boating risks increased, life jacket wear rates also increased (linearly) for both canoers and kayakers (Figure 3)
- Risk levels in trees have a stepwise additive effect; 56.9% spread (odds ratio: 13.6) in life jacket wear rates in **canoers**; 29.9% spread (odds ratio: 11.5) in **kayaks** from lowest to highest in different numbers and combinations of risk factors (Figures 1 & 2)

## Figure 3. Adult Life Jacket Wear Rate by Risk Count: Canoes vs. Kayaks




## Conclusion

- Adult **canoers** and **kayakers** have different life jacket wear rates both overall and in all individual boat, boater, and environmental situations observed in the study
- Life jacket wear promotional efforts should take into account the differences in both risks and behaviors related to the different types of boats
- People in canoes and kayaks appear to be conducting a **mental assessment of ris**k to determine whether or not to wear a life jacket while boating
- Adult life jacket wear rates rise with increasing number of boat, boater, and environmental risks
- Boating accidents, injuries, and deaths actually occur more frequently in generally low-risk situations
- Future educational efforts should focus on changing adult canoe and kayak boaters' seeming perceptions of risk to overcome the idea that there is only a risk for drowning in certain conditions
- Life jacket promotional efforts should teach that boaters should wear life jackets in **all** situations, not only those where there appear to be more risks