

Using the Haddon Matrix to Define Risk Factors and Policy Strategies for Open Water Drowning in Washington State

	Personal Factors	Equipment	Physical Environment	Social Environment
Pre-Event	<ul style="list-style-type: none"> ▪ Lack of supervision ▪ Lack of knowledge about water risks ▪ Alcohol consumption by victim/caregivers ▪ Lack of education about open water or swimming lessons ▪ Developmental issues ▪ Gender (male) ▪ Medical condition, e.g. epilepsy ▪ Need to access water for functional purposes, e.g., fishing ▪ Transport on water ▪ Recreational use of water ▪ Cultural norms/beliefs ▪ Socioeconomic status ▪ Race/ethnicity <p style="color: #0070C0;">✓ PRIORITY AREA: Swimming Skills and Water Safety Education, Boating Under the Influence</p>	<ul style="list-style-type: none"> ▪ No life jacket available ▪ Life jacket for swimming not allowed in pools or lifeguarded areas ▪ Lack of life jackets or other life-saving devices in boat ▪ Lack of lifeguards ▪ Unprotected water hazards ▪ Unsafe/overloaded watercraft <p style="color: #0070C0;">✓ PRIORITY AREA: Safer Water Recreation Sites, Life Jackets</p>	<ul style="list-style-type: none"> ▪ No access to lifeguarded or regulated swim areas ▪ No life jacket loaner program ▪ Lack of barriers ▪ Lack of signage ▪ Lack regulation of site ▪ Lack of open container laws ▪ Attractive nuisance i.e., off shore buoy ▪ Unfamiliar environment; slippery, uneven, unstable or steep surfaces near or in water; ▪ Weather conditions, e.g., floods, strong sea currents ▪ Inadequate physical infrastructure, such as bridges or safe crossings ▪ Lack of warning of severe weather <p style="color: #0070C0;">✓ PRIORITY AREA: Safer Water Recreation Sites, Life Jackets, Boating Under the Influence, Surveillance</p>	<ul style="list-style-type: none"> ▪ Low adult use of life jacket ▪ Lack of supervision or child care; reliance on peer or older child supervision ▪ Failure of authorities to remove potential hazards; ▪ Lack of fencing legislation; I ▪ Lack of water safety instruction and community awareness programs ▪ Lack of agency oversight/prevention ▪ Lack of authority to close high-risk waterways ▪ Lack of marine patrol staffing ▪ Boating while intoxicated accepted <p style="color: #0070C0;">✓ PRIORITY AREA: Safer Water Recreation Sites, Life Jackets, Boating Under the Influence, Partnerships</p>
Event	<ul style="list-style-type: none"> ▪ Poor swimming ability ▪ Not wearing life jacket ▪ Rescuer unable to swim and/or lacks rescue skills ▪ Lack of swimming and/or water survival skills ▪ Overestimation of swimming ability ▪ Lack of comprehension of situation ▪ Panic response ▪ Swimming alone ▪ Lack of personal alerting devices or knowledge of emergency signals <p style="color: #0070C0;">✓ PRIORITY AREA: Life Jackets, Swimming Skills and Water Safety Education</p>	<ul style="list-style-type: none"> ▪ No life jacket use-child or adult <p style="color: #0070C0;">✓ PRIORITY AREA: Life Jackets</p>	<ul style="list-style-type: none"> ▪ No lifeguarded swim areas ▪ Variable water depth; unstable footing; snags in water ▪ Lack of escape mechanism e.g., ladder, ropes, flotation device ▪ Cold water; deep water ▪ River and rip currents ▪ Sneaker waves; big waves <p style="color: #0070C0;">✓ PRIORITY AREA: Safer Water Recreation Sites</p>	<ul style="list-style-type: none"> ▪ Low adult use of life jacket ▪ Poor access to information and resources for minimizing risk ▪ Inadequate infrastructure to call for emergency health services ▪ Beyond age of life jacket requirement ▪ Cultural belief that drowning is fate <p style="color: #0070C0;">✓ PRIORITY AREA: Life Jackets, Swimming Skills and Water Safety Education</p>
Post-Event	<ul style="list-style-type: none"> ▪ Lack of water survival skills ▪ Lack of CPR training ▪ Delay in rescue ▪ Inaccessible first-aid kits ▪ Lack of knowledge by caregiver about what to do immediately ▪ Lack of alerting mechanism (such as mobile phone, flares) <p style="color: #0070C0;">✓ PRIORITY AREA: Safer Water Recreation Sites, Swimming Skills and Information</p>	<ul style="list-style-type: none"> ▪ Victim carried away from shore by current <p style="color: #0070C0;">✓ PRIORITY AREA: None</p>	<ul style="list-style-type: none"> ▪ No lifeguards ▪ Long emergency or fire department response time <p style="color: #0070C0;">✓ PRIORITY AREA: Safer Water Recreation Sites</p>	<ul style="list-style-type: none"> ▪ Low adult use of life jacket ▪ Inadequate care; poor access to acute care hospitals and rehabilitation services; ▪ Little community support for victims and families ▪ Lack of standards for drowning death data collection ▪ Lack of enforcement or penalties for BUI <p style="color: #0070C0;">✓ PRIORITY AREA: Life Jackets, Boating Under the Influence, Surveillance</p>

Adapted from: Peden M, Oyegbite K, Ozanne-Smith J, Hyder A, Branche C, Rahman AKM, Rivara F, and Bartolomeos K (eds). World Report on Child Injury Prevention (2008).

Information on Haddon Matrix: Christoffel T and Gallagher SS. Injury Prevention and Public Health. Aspen Publishers, Inc. Gaithersburg, Maryland, 1999.

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