**Table 1 : Studies with data on the association between each factor and favourable vs. poor outcome**

**Table 1-A: Studies with data on the association between age and good vs. poor outcome (n=12)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author, year | Study Location | Study Design | Study Population | Sample Size | Factors considered | Definition of the Outcome | Risk Ratio for Favourable outcome | Percent Poor Outcome |
| Anderson, K.C. 1991 | Kentucky, U.S.A. | Cohort | Children hospitalized following Fresh water submersion accidents, during a five year period  | 39 | Age (≤3 vs. >3) | Survival vs. Neurological impairment or death  | 0.85 (95% CI: 0.65, 1.11) | ≤3: 22.22%>3: 8.33% |
| Al-Mofadda, S. M. 2001 | Saudi Arabia | Cohort | Children ≤13 years, hospitalized,10-year period ending in June 1998 | 28 | Age (≤6 vs. >6) | Full recovery vs. severe neurological damage or brain death | 3.00 (95% CI: 0.48, 18.83) | ≤6: 50.00%>6: 83.33% |
| Blasco, 2004 | Spain | Cohort | Children hospitalizedJanuary 1995 – April 2003 | 62 | Age (<4 vs. ≥4) | Recovery vs. Irreversible sequelae or death  | 1.14 (95% CI: 0.88, 1.47) | <4: 14.71%≥4: 25.00% |
| Kyriacou, D. N., 1994 | California, U.S.A | Cohort | Children <15 years, hospitalized after a submersion event which resulted in apnea or significant altered respiration, May 1984 – August 1992 | 166 | Age (<5 vs. ≥5) | Neurologically normal vs. severe neurological impairment or death  | 0.89 (95% CI: 0.76, 1.05) | <5: 19.31%≥5: 9.52% |
| Lee, L. K., 2006 | Massachusetts, U.S.A | Cohort | Children 0-19 years, unintentional submersion injury, state death data registry and hospital discharge datafrom 1994 – 2000 | 267 | Age (<5 vs. ≥5) | Discharge home, with or without intravenous therapy or access to a home health aid vs. discharge to chronic care facility or death | 1.59 (95% CI: 1.24, 2.03) | <5: 38.14%≥5: 61.07% |
| Mizuta, R., 1993 | Japan | Cohort | Children <14 years, hospitalized, reports from questionnaires to 49 hospitals in the country, 1983-1990 | 342 | Age (<5 vs. ≥5) | Survival vs. death | 1.01 (95% CI: 0.90, 1.13) | <5: 21.63%≥5: 22.39% |
| Mosayebi, Z., 2011 | Iran | Cohort | Children ≤15 years hospitalized,1993 – 2005  | 47 | Age (<5 vs. ≥5) | Survival vs. death | 0.88 (95% CI: 0.66, 1.16) | <5: 19.05%≥5: 0.00% |
| Nitta, M., 2013 | Japan | Cohort | All ages with OHCA due to drowning treated by EMS and hospitalized January 1, 1999 – December 31, 2010, excluded patients from 2004 | 1737  | Age (<5 vs. ≥5) | Neurologically intact vs. death | 7.88 (95% CI: 1.83, 33.91) | <5: 94.44%≥5: 99.29% |
| Niu, Y., 1991 | Taiwan | Cohort | Children <15 years, received first aid from practitioners and hospitalizedJanuary 1, 2983 – December 31, 1990 | 47 | Age (<6 vs. ≥6) | Intact survival vs. neurological damage or death  | 0.60 (95% CI: 0.33, 1.08) | <6: 57.50%≥6: 28.57% |
| Orlowski, J. P., 1979 | Australia, India, California, Ohio | Cohort | Children <20 years, hospitalized, four hospitals, three countries, between 1972 – 1976 | 93 | Age (<3 vs. ≥3) | Survival vs. death | 0.66 (95% CI: 0.53, 0.84) | <3: 38.46%≥3: 7.32% |
| Quan, L. 2014 | Washington, U.S.A. | Cohort | All ages with Open water drowning, hospitalized and/or died, in a regional drowning database January 1, 1974 – June 30, 1996 | 1094 | Age (<5 vs. ≥5) | Neurologically intact vs. severe neurological sequelae or death | 3.19 (95% CI: 2.66, 3.82) | <5: 36.96%≥5: 80.23% |
| Vahatalo, R., 2014 | Finland | Cohort | Children <16 years hospitalized or died due to drowning, between January 1997 – December 2007 | 53 | Age (<5 vs. ≥5) | Survival vs. Death within 1 year  | 1.49 (95% CI: 0.91, 2.44) | <5: 33.33%≥5: 55.17% |

 **Table 1-B: Studies with data on the association between EMS response time and favourable vs. poor outcome (n=2)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author, year | Study Location | Study Design | Study Population | Sample Size | Factors considered | Definition of the Outcome | Risk Ratio | Percent Poor Outcome |
| Claesson, A. 2012 | Sweden | Cohort | All ages, post cardiac arrest cared for by EMS, two EMS cardiac arrest registries, , 1996 - 2010 | 232 | Interval between call for the and SFAR arrival (<9 min vs. ≥9 min) | Survival to 1 month vs. Death | 2.48 (95% CI: 0.69, 8.93) | <9 min: 92.92%≥9 min: 97.14% |
|  Dyson, K. 2013 | Australia | Cohort | All ages with OHCA due to drowning, in EMS Cardiac Arrest Registry,October 1999 – December 2011 | 145 | EMS Response time (<9 min vs ≥9 min) | Survival vs. death | 3.39 (95% CI: 0.77, 14.91) | <9 min: 88.10%≥9 min: 96.49% |

**Table 1-C: Studies with data on the association between salinity and favourable vs. poor outcome (n=7)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author, year | Study Location | Study Design | Study Population | Sample Size | Factors considered | Definition of the Outcome | Risk Ratio | Percent Poor Outcome |
| Bierens, J.J., 1990 | Netherlands | Cohort | All ages, hospitalized between January 1, 1979 – December 31, 1985 | 83 | Salinity (Salt vs. Fresh) | Survival vs. death | 1.22 (95 Ci: 0.95, 1.56) | Salt: 10.00%Fresh: 26.03% |
| Blasco, J., 2004 | Spain | Cohort | Children hospitalized January 1995 – April 2003 | 62 | Salinity (Salt vs. Fresh) | Recovery vs. Irreversible sequelae or death  | 1.25 (95% CI: 1.03, 1.52) | Salt: 0.00%Fresh: 23.08% |
| Dyson, K. 2013 | Australia | Cohort | All ages, treated by EMSEMS Cardiac Arrest Registry, October 1999 – December 2011 | 145 | Salinity (Salt vs. Fresh) | Survival to hospital discharge vs. death | 0.19 (95% CI: 0.03, 1.43) | Salt: 97.87%Fresh: 88.78% |
| Forler, J., 2010 | France | Cohort | Children hospitalized for accidental drowning, 10 year period | 83 | Salinity (Salt vs. Other) | Survival vs. death | 1.07 (95% CI: 0.95, 1.20) | Salt: 4.17%Fresh: 10.17% |
| Mizuta, R., 1993 | Japan | Cohort | Children <14 years, hospitalized, reports from questionnaires to 49 hospitals in the country, 1983-1990 | 603 | Salinity (Sea vs. Other) | No or mild impairment vs. severe impairment or death | 1.20 (95% CI: 1.07, 1.36) | Sea: 18.75%Fresh: 32.50% |
| Orlowski, J. P., 1979 | Australia, India, California, Ohio | Cohort | Children <20 years, hospitalized, four hospitals, three countries, between 1972 – 1976 | 93 | Salinity (Salt vs. Fresh) | Survival vs. death | 1.22 (95% CI: 0.89, 1.67) | Salt: 0.00%Fresh: 25.84% |
| Quan, L. 2014 | Washington, U.S.A. | Cohort | All ages with Open water drowning, hospitalized and/or died, in a regional drowning database January 1, 1974 – June 30, 1996 | 1094 | Salinity (Salt vs. Fresh) | Neurologically intact vs. severe neurological sequelae or death | 1.13 (95% CI: 0.90, 1.43) | Salt: 72.27%Fresh: 75.54% |

 **Table 1-D: Studies with data on the association between short submersion duration and favourable vs. poor outcome (n=15)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author, year | Study Location | Study Design | Study Population | Sample Size | Factors considered | Definition of the Outcome | Risk Ratio | Percent Poor Outcome |
| Al-Mofadda, S. M. 2001 | Saudi Arabia | Cohort | Children ≤13 years, hospitalized10-year period ending in June 1998 | 28 | Short Submersion Time (<5 min) | Full recovery vs. severe neurological damage or brain death | 32.69 (95% CI: 2.13, 502.73) | <5 min: 0.00%≥5 min: 100.00% |
| Anderson, K.C. 1991 | Kentucky, U.S.A. | Cohort | Children hospitalized, following Fresh water submersion accidents, during a five year period  | 39 | Short Submersion Time (≤5 min) | Survival vs. neurological impairment or death  | 1.79 (95% CI: 1.07, 2.97) | ≤5 min: 3.85%>5min: 46.15% |
| Bierens, L. M., 1990 | Netherlands | Cohort | All ages, hospitalized January 1, 1979 – December 31, 1985 | 70 | Short Submersion Time (<5 min) | Survival vs. death | 2.08 (95% CI: 1.13, 3.84) | <5 min: 10.71%≥5 min: 57.14% |
| Blasco, J., 2004 | Spain | Cohort | Children hospitalizedJanuary 1995 – April 2003 | 47 | Short Submersion Time (<5 min) | Recovery vs. Irreversible sequelae or death  | 3.72 (95% CI: 1.68, 8.22) | <5 min: 0.00%≥5 min: 75.00% |
| Graf, W. D., 1995 | Seattle, Washington, U.S.A. | Cohort | Children <21 years, hospitalized January 1, 1980 – March 31, 1991 | 65 | Short submersion time (<6 min) | Normal vs. Vegetative state or death  | 4.61 (95% CI: 1.84, 11.57) | <6 min: 47.62%≥6 min: 88.64% |
| Kaukinen, L., 1984 | Finland | Cohort | All ages hospitalized, fresh water drownings1969 – 1980 | 41 | Short Submersion Time (<6 min) | Survival vs. death | 3.37 (95% CI: 1.40, 8.16) | <6 min: 0.00%≥6 min: 72.73% |
| Kieboom, J. K., 2015 | Netherlands | Cohort | Children ≤16 years, hospitalized post cardiac arrest after drowning and hypothermic at admission,1993-2012 | 105 | Short Submersion Time (≤5 min) | Good, mild or moderate neurological outcomes vs. severe neurological outcome, coma, or death  | 2.30 (95% CI: 0.38, 13.70) | ≤5 min: 75.00%>5min: 89.11% |
| Kruus. S., 1979 | Finland | Cohort | Children <14 years, hospitalized 1971 - 1976 | 19 | Short Submersion Time (≤5 min) | Favorable outcome vs. severe sequelae or death vs | 1.88 (95% CI: 1.06, 3.32) | ≤5 min: 0.00%>5min: 50.00% |
| Kyriacou, D. N., 1994 | California, U.S.A | Cohort  | Children <15 years, hospitalized after a submersion event resulted in apnea or significant altered respiration May 1984 – August 1992 | 132 | Short Submersion Time (<5 min) | Neurologically normal vs. severe neurological impairment or death  | 1.65 (95% CI: 1.27, 2.16) | <5 min: 5.56%≥5 min: 42.86% |
| Mizuta, R., 1993 | Japan | Cohort | Children <14 years, hospitalized, reports from questionnaires to 49 hospitals in the country, 1983-1990 | 398 | Short Submersion Time (<5 min) | No or mild impairment vs. severe impairment or death | 2.88 (95% CI: 2.01, 4.10) | <5 min:16.77%≥5 min:71.05% |
| Mosayebi, Z., 2011 | Iran | Cohort | Children ≤15 years hospitalized,1993 – 2005 | 35 | Short Submersion Time (≤5 min) | Survival vs. death | 1.27 (95% CI: 0.98, 1.66) | ≤5 min: 0.00%>5min: 22.22% |
| Niu, Y., 1991 | Taiwan | Cohort | Children <15 years, received first aid from practitioners and then hospitalizedJanuary 1, 2983 – December 31, 1990 | 29 | Short Submersion Time (≤5 min) | Intact survival vs. neurological damage or death intact | 2.66 (95% CI: 1.13, 6.25) | ≤5 min: 30.00%>5min: 73.68% |
| Orlowski, J. P., 1979 | Australia, India, California, Ohio | Cohort | Children <20 years in four hospitals, three countries, 1972 – 1976 | 80 | Short Submersion Time (≤5 min) | Survival vs. death | 2.81 (95% CI: 1.46, 5.41) | ≤5 min: 6.45%>5min: 66.67% |
| Quan, L., 2014 | Washington, U.S.A. | Cohort | All ages with Open water drowning, hospitalized and/or died, in a regional drowning database January 1, 1974 – June 30, 1996 | 583 | Short Submersion Time (<6 min) | Neurologically intact vs. severe neurological sequelae or death | 27.74 (95% CI: 16.20, 47.52) | <6 min: 13.10%≥6 min: 96.87% |
| Veenhuizen, L., 1994 | Netherlands | Cohort | Children ≤13 years, hospitalized January 1,1986 - December 31, 1992 | 26 | Short Submersion Time (<5 min) | Survival vs. death | 1.20 (95% CI: 0.70, 2.04) | <5 min:20.00%≥5 min: 33.33% |

**Table 1-E: Studies with data on the association between intermediate submersion duration and favourable vs. poor outcome (n=12)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author, year | Study Location | Study Design | Study Population | Sample Size | Factors considered | Definition of the Outcome | Risk Ratio | Percent Poor Outcome |
| Bierens, J. J., 1990 | Netherlands | Cohort | All ages, hospitalized,January 1, 1979 – December 31, 1985 | 70 | Intermediate submersion (≤10 min) | Survival vs. death | 14.13 (95% CI: 0.96, 207.10) | ≤10 min: 11.111%>10 min: 100.00% |
| Graf, W. D., 1995 | Seattle, Washington, U.S.A. | Cohort | Children <21 years, hospitalized, January 1, 1980 – March 31, 1991 | 65 | Intermediate submersion (≤10 min) | Normal vs. vegetative state or death  | 2.22 (95% CI: 0.71, 6.97) | ≤10 min: 69.77%>10 min: 86.36% |
| Kieboom, J. K., 2015 | Netherlands | Cohort | Children ≤16 years, hospitalized post cardiac arrest after drowning and hypothermic at admission,1993-2012 | 105 | Intermediate submersion (≤10 min) | Good, mild or moderate neurologic outcomes vs. severe neurological outcome, coma, or death vs. | 2.57 (95% CI: 1.30, 5.09) | ≤10 min: 50.00%>10 min: 80.56% |
| Kruus. S., 1979 | Finland | Cohort | Children <14 years, hospitalized1971 - 1976 | 19 | Intermediate submersion (≤10 min) | Favourable outcome vs. severe sequelae or death  | 2.42 (95% CI: 0.97 6.05) | ≤10 min: 9.09%>10 min: 62.50% |
| Kyriacou, D. N., 1994 | California, U.S.A | Cohort | Children <15 years, hospitalized after a submersion event which resulted in apnea or significant altered respiration, May 1984 – August 1992 | 132 | Intermediate submersion (<10 min) | Neurologically normal vs. severe neurological impairment or death  | 2.28 (95% CI: 0.93, 5.59) | <10 min: 14.52%≥10 min: 62.50% |
| Mizuta, R., 1993 | Japan | Cohort | Children <14 years, hospitalized, reports from questionnaires to 49 hospitals in the country, 1983-1990 | 398 | Intermediate submersion (<10 min) | No or mild impairment vs. severe impairment or death | 8.00 (95% CI: 3.48, 18.39) | <10 min: 18.34%≥10 min: 89.80% |
| Orlowski, J. P., 1979 | Australia, India, California, Ohio | Cohort | Children <20 years, hospitalized, four hospitals, three countries,between 1972 – 1976 | 80 | Intermediate submersion (≤10 min) | Survival vs. death | 6.62 (95% CI: 0.49, 88.60) | ≤10 min: 16.88%>10 min: 100.00% |
| Panzino, F., 2012 | Spain | Cohort | Children, hospitalized, June and September 2009 and 2010 | 53 | Intermediate submersion (≤10 min) | Survival vs. death | 2.40 (95% CI: 0.82, 7.02) | ≤10 min: 4.17%>10 min: 60.00% |
| Quan, L. 2014 | Washington, U.S.A. | Cohort | All ages, hospitalized and/or died, Open water drowning, regional drowning database,January 1, 1974 – June 30, 1996 | 583 | Intermediate submersion (≤10 min) | Neurologically intact vs. severe neurological sequelae or death | 289.82 (95% CI: 40.87, 2055.20) | ≤10 min: 23.53%>10 min: 99.74% |
| Suominen, P. K., 1996 | Finland | Cohort | Children <16 years hospitalized or died post OHCA,, January 1 1985 – December 31, 1994 | 48 | Intermediate submersion (≤10 min) | Good or mild disability vs. moderate, severe disability, vegetative state or death  | 16.80 (95% CI: 2.49, 113.13) | ≤10 min: 6.67%>10 min: 94.44% |
| Torres, S. F. 2009 | Argentina | Cohort | Children, hospitalized, between June 2000 – January 2008 | 30 | Intermediate submersion (≤10 min) | No neurological deficits vs. severe neurological deficits  | 5.75 (95% CI: 0.96, 207.10) | ≤10 min: 4.17%>10 min: 83.33% |
| Veenhuizen, L. 1994 | Netherlands | Cohort | Children ≤13 years, hospitalized,January 1, 1986 and December 31, 1992 | 26 | Intermediate submersion (≤10 min) | Survival vs. death | 1.29 (95% CI: 0.64, 2.59) | ≤10 min: 26.32%>10 min: 99.74% |

**Table 1- F: Studies with data on the association between prolonged submersion duration and favourable vs. poor outcome (n=4)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author, year | Study Location | Study Design | Study Population | Sample Size | Factors considered | Definition of the Outcome | Risk Ratio | Percent Poor Outcome |
| Kaukinen, L., 1984 | Finland | Cohort | All ages, hospitalized after fresh water drowning, 1969 – 1980 | 41 | Prolonged submersion (≤15 min) | Survival vs. death | 5.03 (95% CI: 0.40, 63.33) | ≤15 min: 15.38%>15 min: 100.00% |
| Kieboom, J. K., 2015 | Netherlands | Cohort | Children ≤16 years, hospitalized post cardiac arrest after drowning and hypothermic at admission,1993-2012 | 105 | Prolonged submersion (≤25 min) | Good, mild or moderate neurological outcomes vs. severe neurologic outcome, coma, or death | 14.93 (95% CI: 0.91, 245.31) | ≤25 min: 81.82%>25 min: 100.00% |
| Mizuta, R., 1993 | Japan | Cohort | Children <14 years, hospitalized, reports from questionnaires to 49 hospitals in the country, 1983-1990 | 398 | Prolonged submersion (≤20 min) | No or mild impairment vs. severe impairment or death | 21.87 (95% CI: 3.19, 149.98) | ≤20 min: 21.89%>20 min: 96.43% |
| Quan, L. 2014 | Washington, U.S.A. | Cohort | All ages with Open water drowning, hospitalized and/or died, in a regional drowning database January 1, 1974 – June 30, 1996 | 583 | Prolonged submersion (≤25 min) | Neurologically intact vs. severe neurological sequelae or death | 190.92 (95% CI: 26.91, 1354.54) | ≤25 min: 40.15%>25 min: 99.69% |

**Table 1-G: Studies with data on the association between water temperature and favourable vs. poor outcome (n=3)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author, year | Study Location | Study Design | Study Population | Sample Size | Factors considered | Definition of the Outcome | Risk Ratio | Percent Poor Outcome |
| Cut-off = 6◦C or 8◦C |  |  |  |  |  |  |  |
| Kieboom, J. K., 2015 | Netherlands | Cohort | Children ≤16 years, hospitalized post cardiac arrest after drowning and hypothermic at admission,1993-2012 | 160 | Season of the year (winter vs other) | Good, mild or moderate neurological outcomes vs. severe neurological outcome, coma, or death | 3.50 (95% CI: 1.41, 8.74) | Winter: 70.59%Other: 91.61% |
| Quan, L. 2014 | Washington, U.S.A. | Cohort | All ages with Open water drowning, hospitalized and/or died, in a regional drowning database January 1, 1974 – June 30, 1996 | 1094 | Water Temperature (<6C vs. ≥6C) | Neurologically intact vs. severe neurologic sequelae or death | 0.71 (95% CI: 0.57, 0.87) | <6C: 76.41%≥6C: 66.54% |
| Cut-off = 15◦ or 17◦C |  |  |  |  |  |  |  |
| Claesson, A. 2012 | Sweden | Cohort | All ages, post cardiac arrest cared for by EMS, two EMS cardiac arrest registries, , 1996 - 2010 | 241 | Water Temperature (<15C vs. >15C) | Survival at 1 month vs. Death | 1.06 (95% CI: 0.38, 2.97) | <15C: 94.03%>15C: 94.39% |
| Quan, L. 2014 | Washington, U.S.A. | Cohort | All ages with Open water drowning, hospitalized and/or died, in a regional drowning database January 1, 1974 – June 30, 1996  | 1094 | Water Temperature (<17C vs. ≥17C) | Neurologically intact vs. severe neurological sequelae or death | 0.75 (95% CI: 0.60, 0.94) | <17C: 76.50%≥17C: 68.72% |

**Table 1- H: Studies with data on the association between witnessed drowning and favourable vs. poor outcome (n=4)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Author, year | Study Location | Study Design | Study Population | Sample Size | Factors considered | Definition of the Outcome | Risk Ratio | Percent Poor Outcome |
| Claesson, A. 2012 | Sweden | Cohort | All ages, post cardiac arrest cared for by EMS, two EMS cardiac arrest registries, 1996 - 2010 | 208 | Witnessed (yes vs. no) | Survival vs. death at 1 month  | 1.51 (95% CI: 0.45, 5.04) | Witnessed: 93.98%Not Witnessed: 96.00% |
| Dyson, K. 2013 | Australia | Cohort | All ages with OHCA due to drowning, in EMS Cardiac Arrest Registry,October 1999 – December 2011 | 144 | Witnessed (yes vs. no) | Survival vs. death | 1.21 (95% CI: 0.39, 3.82) | Witnessed: 90.48%Not Witnessed: 92.16% |
| Nitta, M., 2013 | Japan | Cohort | All ages with hospitalized, post-OHCA due to drowning treated by EMS,January 1, 1999 – December 31, 2010, excluded patients from 2004 | 1737  | Witnessed (yes vs. no) | Neurologically intact vs. death | 15.45 (95% CI: 5.44, 43.89) | Witnessed: 94.20%Not Witnessed: 99.62% |
| Vahatalo, R., 2014 | Finland | Cohort | Children <16 years, hospitalized or died due to drowning, between January 1997 – December 2007 | 51 | Witnessed (yes vs. no) | Survival vs. death within 1 year | 1.08 (95% CI: 0.68, 1.73) | Witnessed: 33.33%Not Witnessed: 38.46% |