

# Glacier Lake Outburst Floods: meta-analysis to pool mortality incidence rates

Periklis Charalampous, Institute of Health and Society, UCLouvain, Belgium

## Main meta-analysis

```
dta_1 <- metarate(Death, PTAR, data = dta_sorted, studlab = Country, method = "GLMM")
dta_1

# Forest plot for main meta-analysis
png("forest_plot_main_final.png", width = 700, height = 800)
forest(dta_1, fixed = FALSE, random = TRUE)
periodmeta<- metarate(Death,
                      PTAR,
                      data = dta_sorted,
                      studlab = Country,
                      method = "GLMM",
                      tau.common = FALSE,
                      hakn= TRUE,
                      method.tau="ML")

periodmeta

forest(periodmeta,
      sortvar = Country,
      col.square = "gray",
      col.square.lines = "gray",
      col.diamond.random = "black",
      col.diamond.lines.random = "black",
      allstudies = TRUE,
      comb.fixed= FALSE,
      comb.random = TRUE,
      col.label.left="red",
      col.label.right="blue",
      hetstat=FALSE,
      test.overall.random = TRUE,
      digits.mean=2,
      digits.sd=2,
      digits.weight = 0,
      weight.study = "random",
      test.effect.subgroup.random = TRUE,
      leftcols=c("studlab", "Year", "Death","PTAR"),
      leftlabs = c("Country", "Year", "Death","PTAR"),
      overall = TRUE,
      print.byvar = FALSE,
      col.by="navy",
```

```

addrow.subgroups=TRUE,
addrow.overall=TRUE,
addrow=TRUE,
label.test.effect.subgroup.random="Subgroup effect",
test.subgroup.random = TRUE)
dev.off()

# Plot results: main meta-analysis

```

## Sub-analysis\_\_1

```

# Sort data
dta$Region<-dta$Region
regionlmeta<- metarate(Death,
                        PTAR,
                        data = dta,
                        studlab = Country,
                        method = "GLMM",
                        byvar = Region,
                        tau.common = FALSE,
                        hakn= TRUE,
                        method.tau="ML")

dta_sorted <- dta %>%
  arrange(Region, Country, Year)

# metarate
png("forest_plot_sub_analysis.png", width = 700, height = 950)
forest(regionlmeta,
        sortvar = Country,
        col.square = "gray",
        col.square.lines = "gray",
        col.diamond.random = "black",
        col.diamond.lines.random = "black",
        allstudies = TRUE,
        comb.fixed= FALSE,
        comb.random = TRUE,
        col.label.left="red",
        col.label.right="blue",
        hetstat=FALSE,
        test.overall.random = TRUE,
        digits.mean=2,
        digits.sd=2,
        digits.weight = 0,
        weight.study = "random",
        test.effect.subgroup.random = TRUE,
        leftcols=c("studlab", "Year", "Death","PTAR"),
        leftlabs = c("Country", "Year", "Death","PTAR"),
        overall = TRUE,
        print.byvar = FALSE,
        col.by="navy",
        addrow.subgroups=TRUE,
        addrow.overall=TRUE,

```

```

        addrow=TRUE,
        label.test.effect.subgroup.random="Subgroup effect",
        test.subgroup.random = TRUE)
dev.off()

# Plot results: sub-analysis_1

```

## Sub-analysis\_\_2

```

# Sort data
dta$Period <- cut(dta$Year,
                 breaks = c(-Inf, 1900, 2000, Inf),
                 labels = c("Before 1900", "Between 1900 and 1999", "After 2000"))
dta_sorted <- dta %>%
  arrange(Country, Year)

periodmeta_2<- metarate(Death,
                        PTAR,
                        data = dta,
                        studlab = Country,
                        method = "GLMM",
                        byvar = Period,
                        tau.common = FALSE,
                        hakn= TRUE,
                        method.tau="ML")

# metarate
png("forest_plot_main_sub-analysis_2.png", width = 700, height = 950)
forest(periodmeta_2,
       sortvar = Country,
       col.square = "gray",
       col.square.lines = "gray",
       col.diamond.random = "black",
       col.diamond.lines.random = "black",
       allstudies = TRUE,
       comb.fixed = FALSE,
       comb.random = TRUE,
       col.label.left = "red",
       col.label.right = "blue",
       hetstat = TRUE,
       test.overall.random = TRUE,
       digits.mean = 2,
       digits.sd = 2,
       digits.weight = 0,
       weight.study = "random",
       test.effect.subgroup.random = TRUE,
       leftcols = c("studlab", "Year", "Death", "PTAR"),
       leftlabs = c("Country", "Year", "Death", "PTAR"),
       overall = TRUE,
       print.byvar = FALSE,
       col.by = "navy",
       addrow.subgroups = TRUE,

```

```
addrow.overall = TRUE,  
addrow = TRUE,  
label.test.effect.subgroup.random = "Subgroup effect",  
test.subgroup.random = TRUE)  
dev.off()  
  
## pdf  
## 2  
  
# Plot results: sub-analysis_2
```