

# InterLymph meta-analysis

August 31, 2016

Load libraries:

```
library(mvmeta)

## This is mvmeta 0.4.7. For an overview type: help('mvmeta-package').

library(xtable)
```

## 1 Load study-level results

Load the effect sizes and covariance matrices from the RData file:

```
load("InterLymph_summary_stats.RData")

##names of variables
Var1 <- "Wine"
Var2 <- "Liquor"
Var3 <- "Beer"
Var4 <- "Smoking"
```

## 2 Fixed effects meta-analyses

We fit the MVMA and UVMA fixed effects models:

```
##MVMA
MVMA.FE <- coef(summary(mvmeta(EffSizes, S = CovMats,
                              method="fixed"))))
MVMA.FE[, -c(2,4)] <- round(MVMA.FE[, -c(2,4)], 2)
MVMA.FE[, 4] <- round(MVMA.FE[, 4], 2)

##UVMA can be done by assuming the within-study correlations are 0:
CovMatsInd <- lapply(CovMats, function(x) {diag(diag(x))})
UVMA.FE <- coef(summary(mvmeta(EffSizes, S = CovMatsInd,
                              method="fixed"))))
UVMA.FE[, -c(2,4)] <- round(UVMA.FE[, -c(2,4)], 2)
UVMA.FE[, 4] <- round(UVMA.FE[, 4], 2)
```

Save all the results in a table:

```

resFEtab <- data.frame(Variable = rep(c(Var1, Var2, Var3, Var4), times=2),
  Method = rep(c("MVMA", "UVMA"), each=4),
  Estimate = c(MVMA.FE[, "Estimate"], UVMA.FE[, "Estimate"]),
  Pvalue = c(MVMA.FE[, "Pr(>|z|)"], UVMA.FE[, "Pr(>|z|)"]),
  CI = c(paste("(", MVMA.FE[, "95%ci.lb"], ", ", MVMA.FE[, "95%ci.ub"], ")", sep=""),
    paste("(", UVMA.FE[, "95%ci.lb"], ", ", UVMA.FE[, "95%ci.ub"], ")", sep=""))

resFEtab$Pvalue <- as.character(resFEtab$Pvalue)
resFEtab$Pvalue[resFEtab$Pvalue == "0"] <- "<0.001"

```

Here is the table in a form that can be copied/pasted into a LaTeX document from the .tex file:

	Variable	Method	Estimate	Pvalue	CI
1	Wine	MVMA	-0.3300	0.06	(-0.67, 0.01)
2	Liquor	MVMA	-0.3100	0.55	(-1.31, 0.69)
3	Beer	MVMA	-0.8200	<0.001	(-1.38, -0.27)
4	Smoking	MVMA	0.3200	<0.001	(0.17, 0.46)
5	Wine	UVMA	-0.4900	0.01	(-0.86, -0.12)
6	Liquor	UVMA	-0.1800	0.75	(-1.26, 0.9)
7	Beer	UVMA	-0.9600	<0.001	(-1.53, -0.4)
8	Smoking	UVMA	0.3200	<0.001	(0.18, 0.47)

### 3 Random effects meta-analyses

We fit the MVMA and UVMA random effects models (using REML):

```

##MVMA
MVMA.RE <- coef(summary(mvmeta(EffSizes, S = CovMats,
  method="reml")))
MVMA.RE[, -c(2,4)] <- round(MVMA.RE[, -c(2,4)], 2)
MVMA.RE[, 4] <- round(MVMA.RE[, 4], 2)

##UVMAs have to be fit separately for RE case
UVMA.RE1 <- mvmeta(EffSizes[,1,drop=FALSE],
  S = sapply(CovMats, function(x){x[1,1,drop=FALSE]}),
  method="reml")
UVMA.RE2 <- mvmeta(EffSizes[,2,drop=FALSE],
  S = sapply(CovMats, function(x){x[2,2,drop=FALSE]}),
  method="reml")
UVMA.RE3 <- mvmeta(EffSizes[,3,drop=FALSE],
  S = sapply(CovMats, function(x){x[3,3,drop=FALSE]}),
  method="reml")
UVMA.RE4 <- mvmeta(EffSizes[,4,drop=FALSE],
  S = sapply(CovMats, function(x){x[4,4,drop=FALSE]}),
  method="reml")
UVMA.RE <- rbind(coef(summary(UVMA.RE1)), coef(summary(UVMA.RE2)),
  coef(summary(UVMA.RE3)), coef(summary(UVMA.RE4)))

UVMA.RE[, -c(2,4)] <- round(UVMA.RE[, -c(2,4)], 2)
UVMA.RE[, 4] <- round(UVMA.RE[, 4], 2)

```

Save all the results in a table:

```

resREtab <- data.frame(Variable = rep(c(Var1, Var2, Var3, Var4), times=2),
  Method = rep(c("MVMA", "UVMA"), each=4),
  Estimate = c(MVMA.RE[, "Estimate"], UVMA.RE[, "Estimate"]),
  Pvalue = c(MVMA.RE[, "Pr(>|z|)"], UVMA.RE[, "Pr(>|z|)"]),
  CI = c(paste("(", MVMA.RE[, "95%ci.lb"], ", ", MVMA.RE[, "95%ci.ub"], ")", sep=""),
    paste("(", UVMA.RE[, "95%ci.lb"], ", ", UVMA.RE[, "95%ci.ub"], ")", sep=""))

resREtab$Pvalue <- as.character(resREtab$Pvalue)
resREtab$Pvalue[resREtab$Pvalue == "0"] <- "<0.001"

```

Here is the table in a form that can be copied/pasted into a LaTeX document from the .tex file:

	Variable	Method	Estimate	Pvalue	CI
1	Wine	MVMA	-0.5900	0.01	(-1.01, -0.18)
2	Liquor	MVMA	0.0600	0.94	(-1.56, 1.68)
3	Beer	MVMA	-0.7500	0.05	(-1.48, -0.01)
4	Smoking	MVMA	0.2600	0.01	(0.06, 0.47)
5	Wine	UVMA	-0.4900	0.01	(-0.86, -0.12)
6	Liquor	UVMA	0.2600	0.76	(-1.39, 1.92)
7	Beer	UVMA	-0.9200	0.03	(-1.75, -0.09)
8	Smoking	UVMA	0.2600	0.01	(0.06, 0.46)

## 4 Make table combining results from fixed- and random-effects

Make combined table for manuscript:

```

##put point estimates and CIs in the same cell
resFETab$EstCI <- paste(resFETab$Estimate, resFETab$CI, sep=" ")
resREtab$EstCI <- paste(resREtab$Estimate, resREtab$CI, sep=" ")

resTab <- data.frame(Variable = resFETab$Variable[1:4],
  FE.MVMA = resFETab$EstCI[resFETab$Method == "MVMA"],
  FE.UVMA = resFETab$EstCI[resFETab$Method == "UVMA"],
  RE.MVMA = resREtab$EstCI[resREtab$Method == "MVMA"],
  RE.UVMA = resREtab$EstCI[resREtab$Method == "UVMA"])

colnames(resTab) <- c("FE: MVMA", "FE: UVMA", "RE: MVMA", "RE: UVMA")

```

Here is the table in a form that can be copied/pasted into a LaTeX document from the .tex file:

	FE: MVMA	FE: UVMA	RE: MVMA	RE: UVMA	NA
Wine	-0.33 (-0.67, 0.01)	-0.49 (-0.86, -0.12)	-0.59 (-1.01, -0.18)	-0.49 (-0.86, -0.12)	
Liquor	-0.31 (-1.31, 0.69)	-0.18 (-1.26, 0.9)	0.06 (-1.56, 1.68)	0.26 (-1.39, 1.92)	
Beer	-0.82 (-1.38, -0.27)	-0.96 (-1.53, -0.4)	-0.75 (-1.48, -0.01)	-0.92 (-1.75, -0.09)	
Smoking	0.32 (0.17, 0.46)	0.32 (0.18, 0.47)	0.26 (0.06, 0.47)	0.26 (0.06, 0.46)	