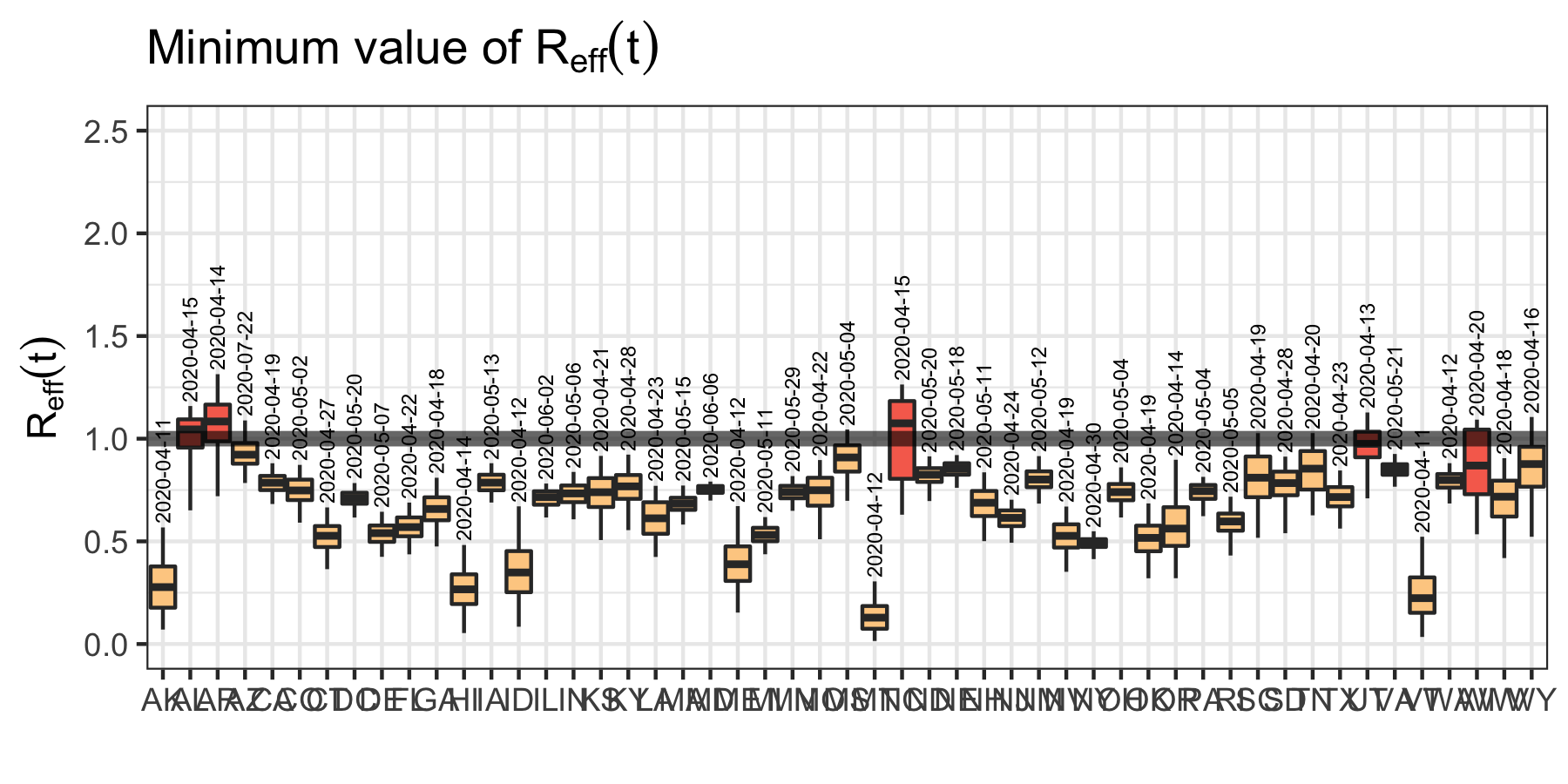
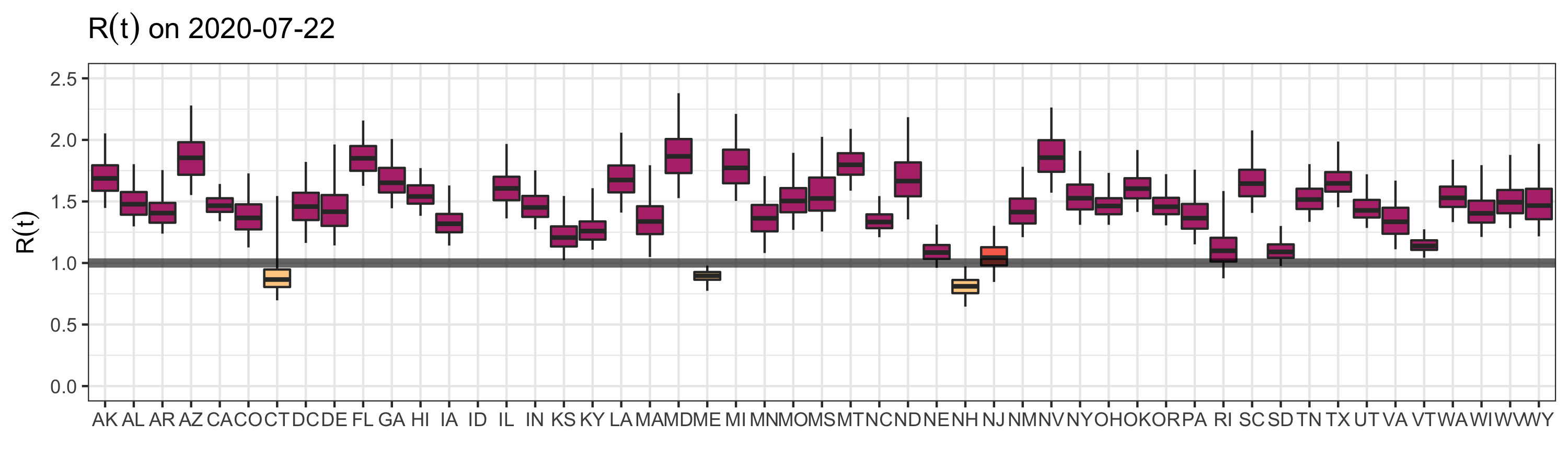
ReffRebound Figures

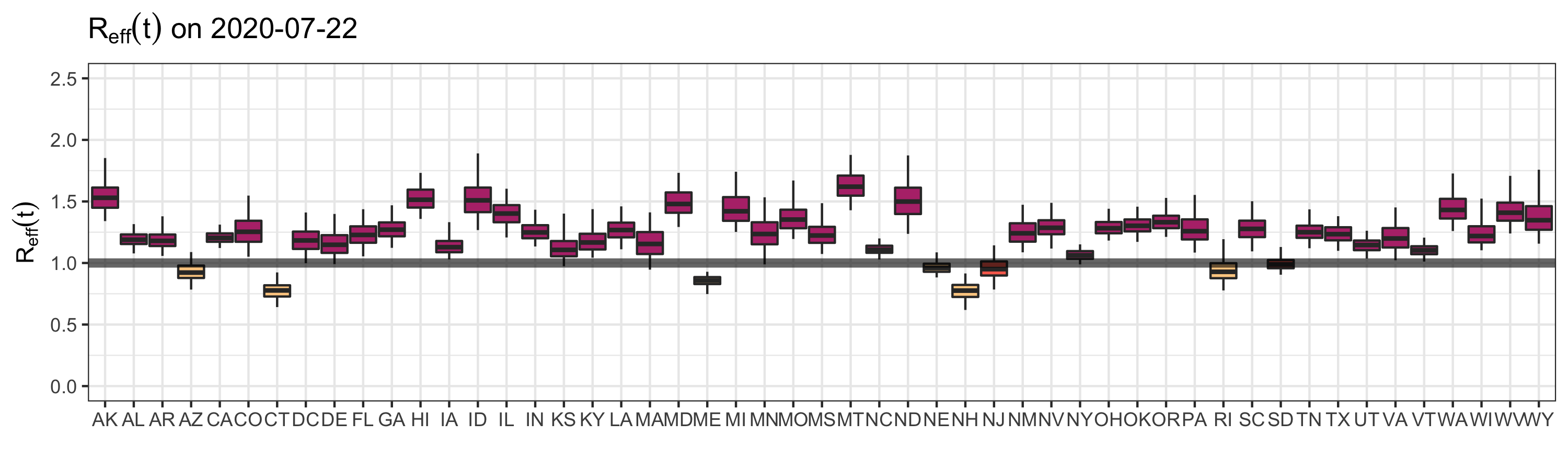
Weihsueh Chiu

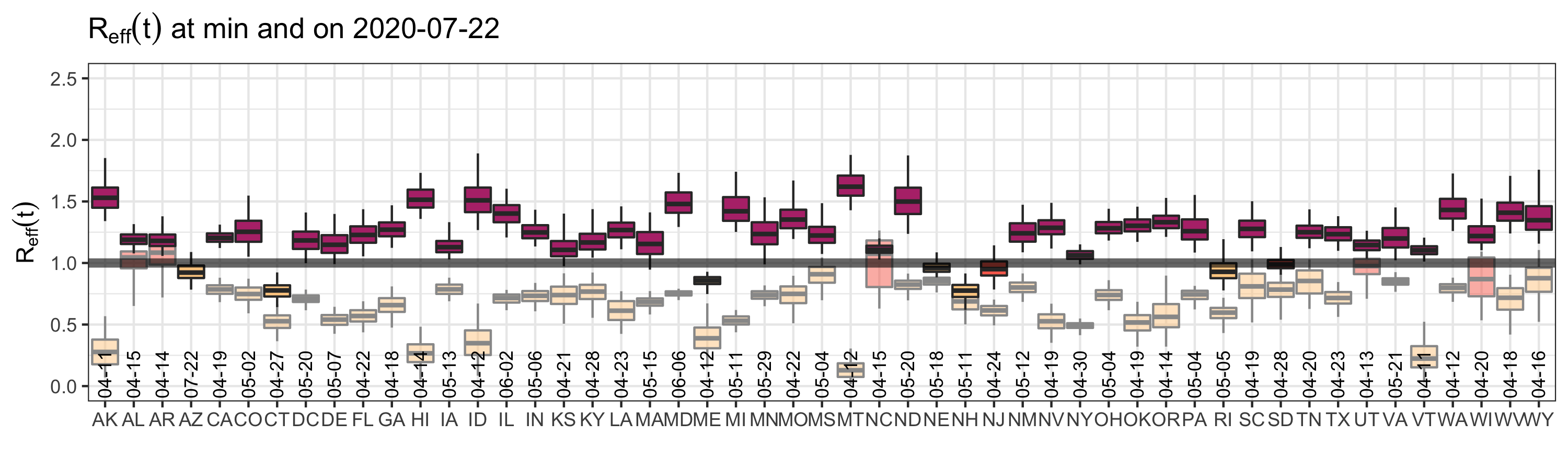
2020-07-28

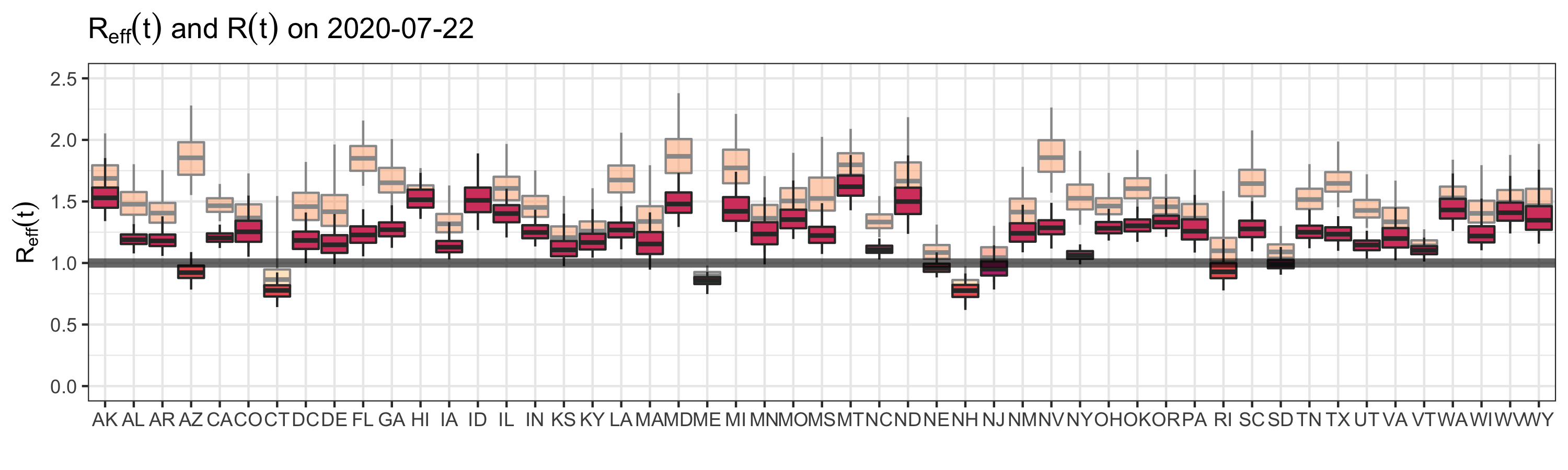
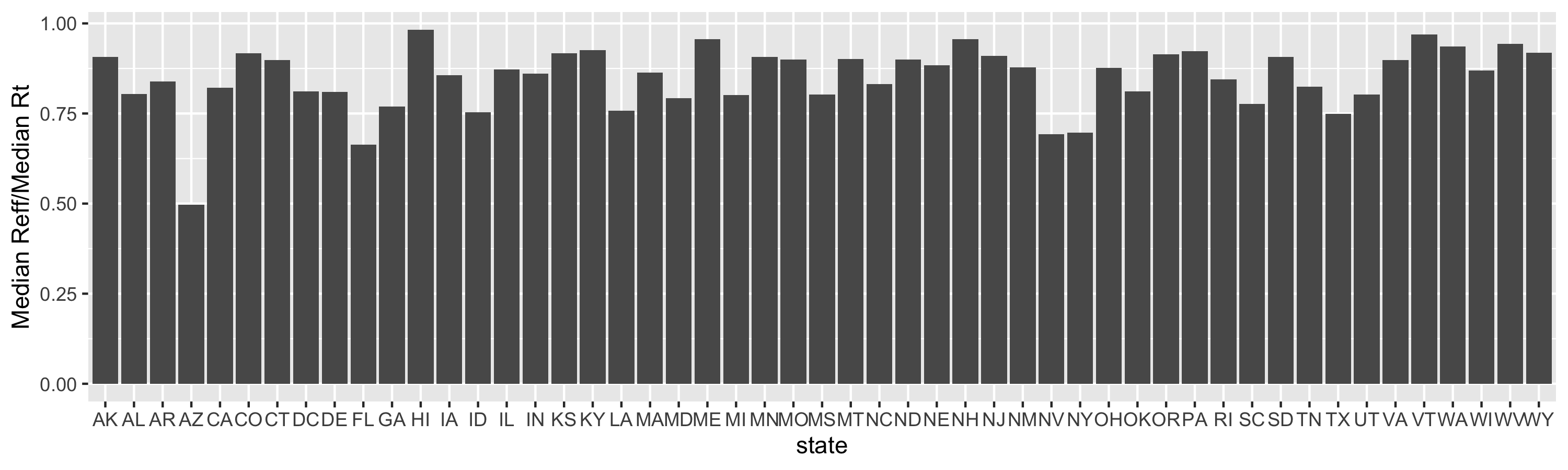
## Load results

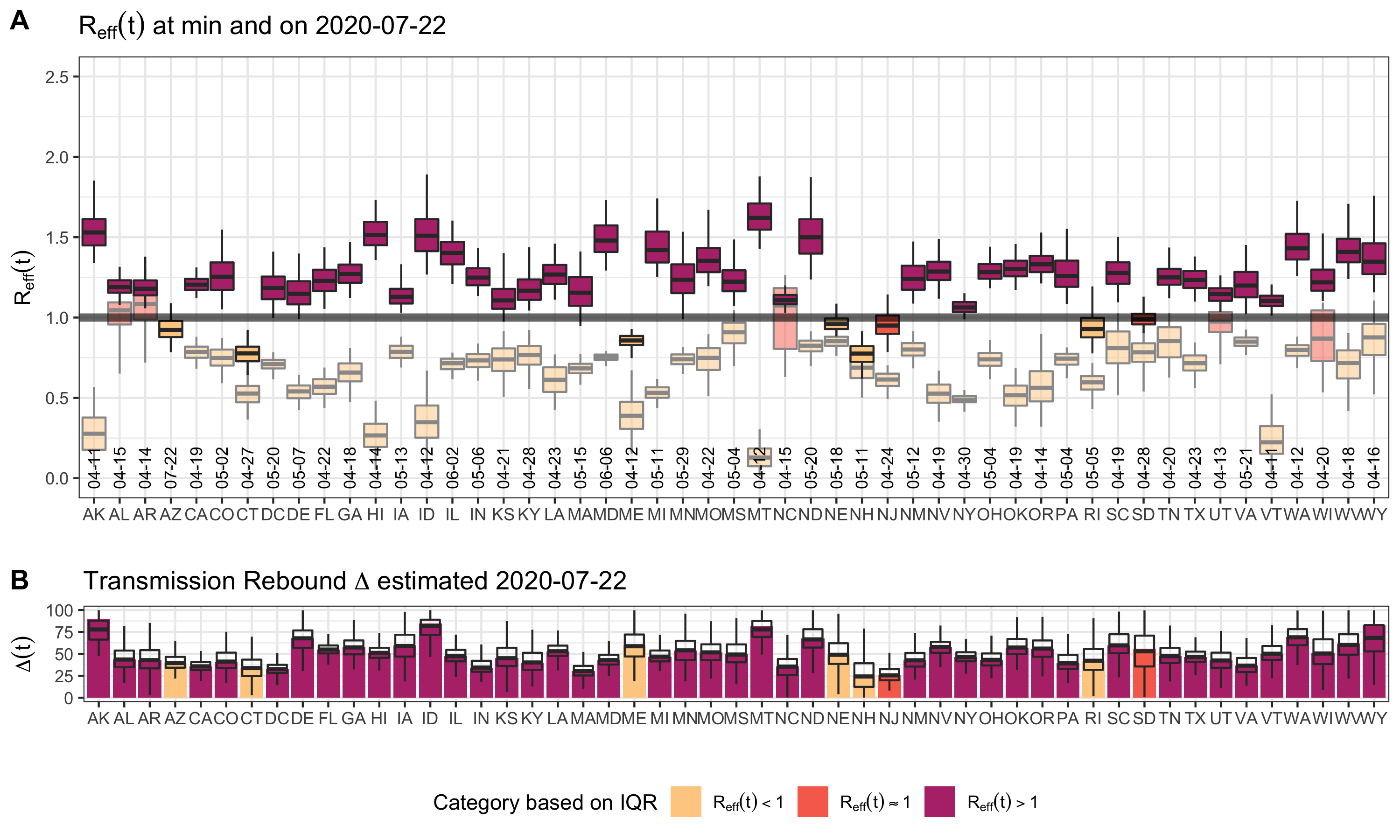
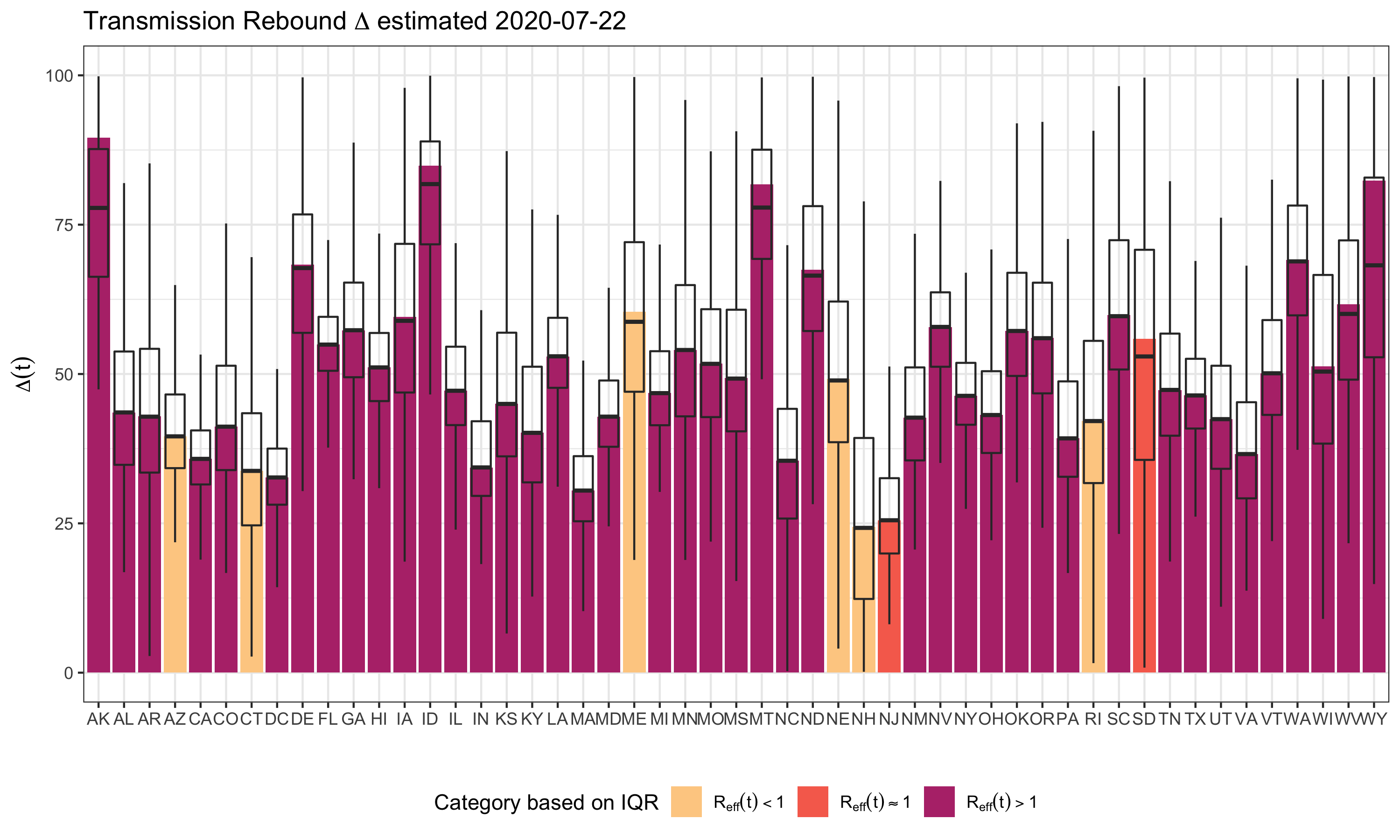
## Refft at min





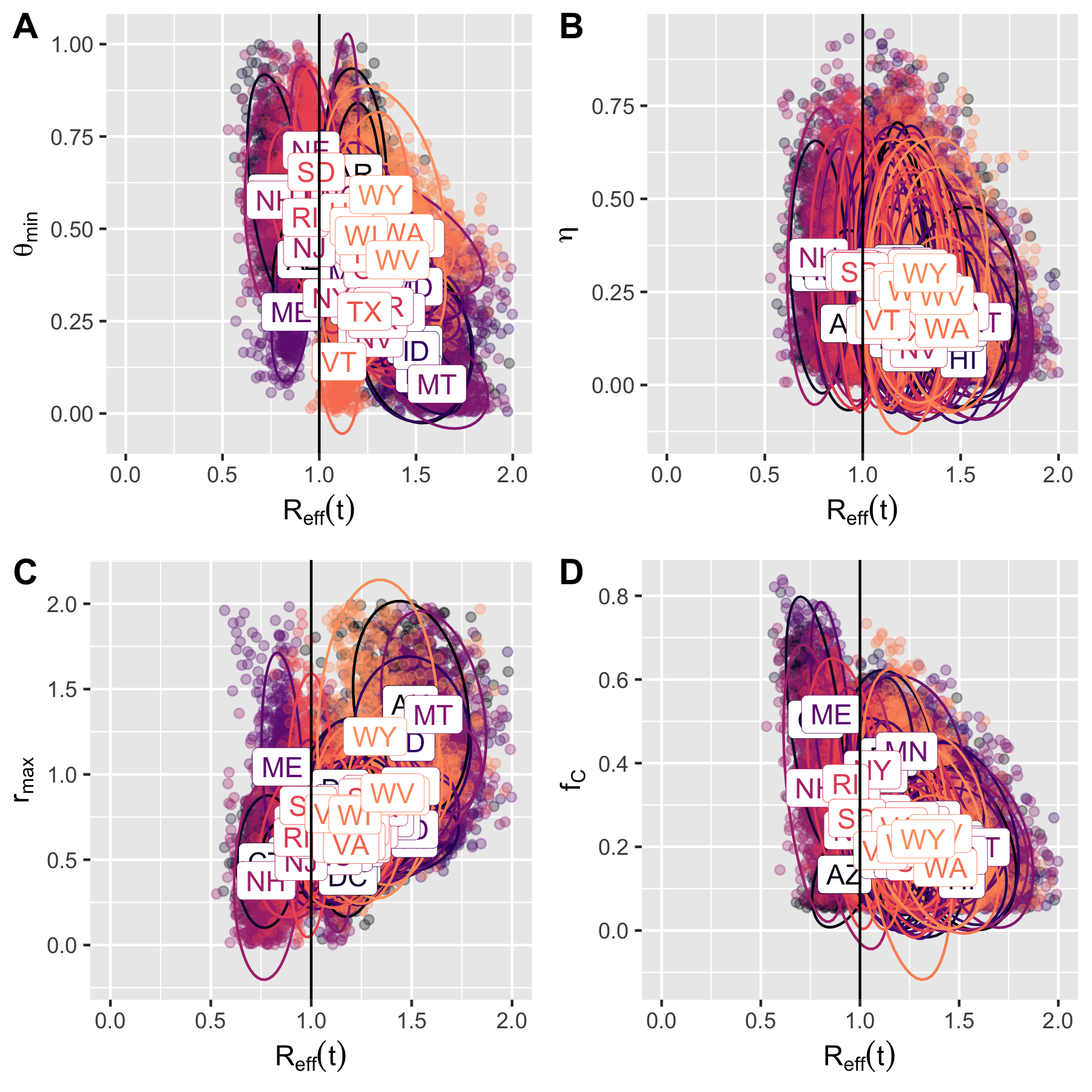




folder <- "../SEIR.reopen.state.2020.07.22"  
numDate <- as.numeric(as.Date("2020-07-22"))-as.numeric(as.Date(datezero))  
t <- numDate  
if (file.exists("scenparms\_OneTime-2020-07-22.RData")) load("scenparms\_OneTime-2020-07-22.RData") else {  
 scenparms <- data.frame()  
 for (statenow in statesarr) {   
 sampfile <- list.files(path=file.path(folder,statenow),  
 pattern="\*OneTime.out",  
 full.names=TRUE)  
 parms <- read.delim(sampfile,as.is=TRUE,sep="\t")  
 names(parms)<-gsub("\_1.1","",names(parms))  
 names(parms)<-gsub("GM\_","",names(parms))  
 parms$state <- factor(statenow,levels=(sort(statesarr)))  
   
 ## Time dependent parameters, evaluated at last day  
 parms$ThetaFit <- (parms$ThetaMin -   
 (parms$ThetaMin - 1)\*  
 exp(-((t-60)/parms$TauTheta)^parms$PwrTheta));  
 ## Reopening - increase contacts/day  
 parms$TimeReopen = 60+parms$TauTheta+parms$TauS;  
 parms$ReopenStart = (1 - 1/(1 + exp(4\*(t - parms$TimeReopen))));  
 parms$ReopenStop = (1 - 1/(1 + exp(4\*(t - (parms$TimeReopen+parms$TauR)))));  
 parms$ReopenPct = ((t - parms$TimeReopen)\*(parms$rMax/parms$TauR)\*(parms$ReopenStart-parms$ReopenStop)+parms$rMax\*parms$ReopenStop);  
 ## Contacts/day  
 parms$c = parms$c0 \* (parms$ThetaFit + (1 - parms$ThetaMin) \* parms$ReopenPct);   
 ## Hygiene - reduce infection probability/infected contact  
 parms$HygieneFit <- parms$ThetaFit^parms$HygienePwr;  
 parms$beta <- parms$beta0 \* parms$HygieneFit; # infection probability/infected contact  
 parms$Delta <- (parms$c\*parms$beta -  
 parms$c0\*parms$beta0\*  
 parms$ThetaMin^(1+parms$HygienePwr))/  
 (parms$c0\*parms$beta0 -  
 parms$c0\*parms$beta0\*  
 parms$ThetaMin^(1+parms$HygienePwr))  
 ## Time dependence of testing/contact tracting  
 parms$TestingTimeDep <- (1-1/(1+exp((t-parms$T50Testing)/parms$TauTesting)));   
 ## Contact tracing  
 parms$FTraced <- parms$FracTraced \* parms$TestingTimeDep;  
 ## Testing  
 parms$lambda <- parms$TestingTimeDep \* parms$lambda0;   
 parms$lambda\_C <- parms$TestingTimeDep \* parms$lambda0\_C;   
 parms$rho\_C <- parms$TestingTimeDep \* parms$rho0\_C;  
 parms$fracpos = parms$FTraced\*parms$lambda\_C/(parms$lambda\_C + parms$rho\_C)+(1-parms$FTraced)\*parms$lambda/(parms$lambda+parms$rho); # fraction of infected that are tested and positive  
 ## Case fatality  
 parms$fracposmin <- parms$IFR / 0.9; # max 90% of cases fatal  
 parms$CFR <- ifelse(parms$fracpos > parms$fracposmin, parms$IFR/parms$fracpos, 0.9); # Adjust infected fatality to (tested) case fatality  
 parms$delta <- parms$rho \* parms$CFR/(1-parms$CFR);  
 scenparms <- rbind(scenparms,parms)  
 }  
 scenparms<-scenparms[,!duplicated(names(scenparms))]  
 scenparms.med<-aggregate(.~state,data=scenparms,median)  
}

##   
## Call:  
## lm(formula = Refft ~ ., data = scenparms[, c("R0", "HygienePwr",   
## "ThetaMin", "rMax", "FracTraced", "FAsymp", "lambda", "rho",   
## "Refft")])  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.79529 -0.08169 0.00929 0.09017 0.62280   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 0.620840 0.010708 57.977 < 2e-16 \*\*\*  
## R0 0.147459 0.001931 76.383 < 2e-16 \*\*\*  
## HygienePwr -0.388909 0.006514 -59.700 < 2e-16 \*\*\*  
## ThetaMin 0.110864 0.008121 13.651 < 2e-16 \*\*\*  
## rMax 0.440123 0.003699 118.978 < 2e-16 \*\*\*  
## FracTraced -0.902707 0.007874 -114.649 < 2e-16 \*\*\*  
## FAsymp -0.017208 0.005912 -2.911 0.00361 \*\*   
## lambda -0.125860 0.028262 -4.453 8.49e-06 \*\*\*  
## rho 0.362210 0.025216 14.364 < 2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.1392 on 25491 degrees of freedom  
## Multiple R-squared: 0.572, Adjusted R-squared: 0.5718   
## F-statistic: 4258 on 8 and 25491 DF, p-value: < 2.2e-16

## Analysis of Variance Table  
##   
## Response: Refft  
## Df Sum Sq Mean Sq F value Pr(>F)   
## R0 1 72.40 72.404 3737.133 < 2.2e-16 \*\*\*  
## HygienePwr 1 57.91 57.913 2989.166 < 2.2e-16 \*\*\*  
## ThetaMin 1 100.31 100.308 5177.354 < 2.2e-16 \*\*\*  
## rMax 1 155.99 155.995 8051.610 < 2.2e-16 \*\*\*  
## FracTraced 1 268.03 268.026 13834.053 < 2.2e-16 \*\*\*  
## FAsymp 1 0.41 0.414 21.344 3.857e-06 \*\*\*  
## lambda 1 0.91 0.907 46.813 7.987e-12 \*\*\*  
## rho 1 4.00 3.998 206.330 < 2.2e-16 \*\*\*  
## Residuals 25491 493.87 0.019   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1



##   
## Call:  
## lm(formula = Rt ~ ., data = allparms[, c("R0", "HygienePwr",   
## "ThetaMin", "rMax", "FracTraced", "FAsymp", "lambda", "rho",   
## "Rt")])  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.94355 -0.07643 0.00075 0.07636 1.13525   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 0.122083 0.011108 10.99 <2e-16 \*\*\*  
## R0 0.314068 0.002002 156.84 <2e-16 \*\*\*  
## HygienePwr -0.840976 0.006757 -124.46 <2e-16 \*\*\*  
## ThetaMin 0.621163 0.008424 73.74 <2e-16 \*\*\*  
## rMax 0.693221 0.003837 180.66 <2e-16 \*\*\*  
## FracTraced -1.621546 0.008167 -198.54 <2e-16 \*\*\*  
## FAsymp 0.369897 0.006132 60.32 <2e-16 \*\*\*  
## lambda -3.248934 0.029315 -110.83 <2e-16 \*\*\*  
## rho 0.844522 0.026156 32.29 <2e-16 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.1444 on 25491 degrees of freedom  
## Multiple R-squared: 0.7736, Adjusted R-squared: 0.7735   
## F-statistic: 1.089e+04 on 8 and 25491 DF, p-value: < 2.2e-16

## Analysis of Variance Table  
##   
## Response: Rt  
## Df Sum Sq Mean Sq F value Pr(>F)   
## R0 1 313.19 313.19 15024.0 < 2.2e-16 \*\*\*  
## HygienePwr 1 183.42 183.42 8799.0 < 2.2e-16 \*\*\*  
## ThetaMin 1 137.06 137.06 6574.8 < 2.2e-16 \*\*\*  
## rMax 1 247.37 247.37 11866.6 < 2.2e-16 \*\*\*  
## FracTraced 1 590.89 590.89 28345.8 < 2.2e-16 \*\*\*  
## FAsymp 1 34.34 34.34 1647.3 < 2.2e-16 \*\*\*  
## lambda 1 287.87 287.87 13809.6 < 2.2e-16 \*\*\*  
## rho 1 21.73 21.73 1042.5 < 2.2e-16 \*\*\*  
## Residuals 25491 531.38 0.02   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

