

R code used for figures in main text and Supporting Information:
“Ambient Air Pollution Exposure Estimation for the Global Burden of Disease 2013”

#install and load ‘ggplot2’, ‘directlabels’, ‘proto’, ‘quadprog’ and ‘grid’ packages

```
library(ggplot2)
```

```
library(directlabels)
```

```
library(proto)
```

```
library(quadprog)
```

```
library(grid)
```

#import dataset provided in Supporting Information as csv file

```
all_air_pm_O3_with.regions_final <- read.csv("LOCAL FILE LOCATION/all_air_pm_O3_with  
regions_final.csv")
```

```
mydata <- all_air_pm_O3_with.regions_final
```

#Create subset of data for 10 most populous countries

```
TOP10data <- subset(mydata, ISO3=="CHN" | ISO3=="IND" | ISO3=="USA" | ISO3=="IDN" | ISO3=="BRA" |  
ISO3=="PAK" | ISO3=="NGA" | ISO3=="BGD" | ISO3=="RUS" | ISO3=="JPN",)
```

PM2.5 plot (Figure 3 in paper)

```
p <- ggplot(TOP10data, aes(year, PM_mean)) +
```

```
geom_ribbon(aes(ymin = PM_lower, ymax = PM_upper, fill = Country), alpha = .25) +
```

```
geom_line(aes(colour = Country), size = 1) +
```

```
labs(x = "Year", y = "Pop-weighted PM2.5") +
```

```
theme_bw(base_size=17)
```

```
> direct.label(p, "last.bumpup") + theme(legend.position="none") + scale_x_continuous(limits=c(1990,  
2015))
```

#code for Ozone plot (Figure 4 in paper)

```
> p <- ggplot(TOP10data, aes(year, O3_mean)) +
```

```

geom_ribbon(aes(ymin = O3_lower, ymax = O3_upper, fill = Country), alpha = .25) +
geom_line(aes(colour = Country), size = 1) +
labs(x = "Year", y = "Pop-weighted Ozone") +
theme_bw(base_size=17)

> direct.label(p,"last.bumpup") + theme(legend.position="none") + scale_x_continuous(limits=c(1990,
2015))

```

add an additional country (e.g. Canada) to the Top10 plot

```

TOP10plusdata <- subset(mydata, ISO3=="CHN" | ISO3=="IND" | ISO3=="USA" | ISO3=="IDN" |
ISO3=="BRA" | ISO3=="PAK" | ISO3=="NGA" | ISO3=="BGD" | ISO3=="RUS" | ISO3=="JPN" | ISO3=="CAN",)

p <- ggplot(TOP10plusdata, aes(year, PM_mean)) +

geom_ribbon(aes(ymin = PM_lower, ymax = PM_upper, fill = Country), alpha = .25) +

geom_line(aes(colour = Country), size = 1) +

labs(x = "Year", y = "Pop-weighted PM2.5") +

theme_bw(base_size=17)

> direct.label(p,"last.bumpup") + theme(legend.position="none") + scale_x_continuous(limits=c(1990,
2015))

```

#plots for specific regions (Figures S5 – S25 in Supporting Information)

#subset data by regions (e.g. Region 1, Region 21, other subsets as desired)

```
R1data <- subset(mydata, REGION ==1,)
```

```
R21data <- subset(mydata, REGION ==21,)
```

plot for all countries within a region

```

p <- ggplot(R21data, aes(year, PM_mean)) +

geom_ribbon(aes(ymin = PM_lower, ymax = PM_upper, fill = Country), alpha = .25) +

geom_line(aes(colour = Country), size = 1) +

labs(x = "Year", y = "Pop-weighted PM2.5") +

theme_bw(base_size=17)

```

```
> direct.label(p, list("last.bumpup", cex=.84)) + theme(legend.position="none") +  
scale_x_continuous(limits=c(1990, 2015))
```