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## Program Name: Unified Estimated Fetal Weight Calculator
## Authors: Daniel He, Zhen Chen, Katherine Grantz
## Date: 01/23/2026
## Description:
## The unified estimated fetal weight was calculated after weighting for
Race/Ethnicity.

## Race
race_index= c("Pooled","White", "Black" ,"Hispanic", "Asian")
Race=1 #"Pooled"
## Ultrasonography
ultra_index= c( "EFW1" , "EFW2" , "EFW3" , "EFW4" , "AC" , "BPD" , "FL",
"HC","HUMERUS" )

##### Inputs
#####
#set values at here ...
# GA "BPD" ,"HC", "AC" ,"FL", "HUMERUS" are:
meas1= c(
  30,
  75.8,
  262.9,
  259.4,
  56.2,
  45.3
)

# calculate EFW3
GA = meas1[1]
BPD1= meas1[2]
HC1= meas1[3]
AC1= meas1[4]
FL1= meas1[5]
HUMERUS1= meas1[6]

# Estimated Fetal Weight (grams)
EFW3_1 = 10 ** (1.326-
0.00326*0.1*0.1*AC1*FL1+0.0107*0.1*HC1+0.0438*0.1*AC1+0.158*0.1*FL1)

uv1=c(1,2,EFW3_1,4,AC1,BPD1,FL1,HC1,HUMERUS1)

for (ulr in c(6,8,5,7,9, 3)) {
  # # 1-EFW1, 2-EFW2, 3-EFW3, 4-EFW4, 5-AC, 6-BPD, 7-FL, 8-HC, 9-HUMERUS
  Ultra=ulr

  Ultra_value=uv1[Ultra]

  # generate the results
  for (w in 1) {

    Ultra_value=log(Ultra_value)*w
  }
}

```

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##### call files
#####
# call the parameter estimates file
# call the percentile calculator file
# source("Parameter_Estimates_Pooled_Standard_FetalGrowth_02282022")
# ("EFW1", "EFW2", "EFW3", "EFW4", "AC", "BPD", "FL", "HC", "HUMERUS"),
(only need 3,5:9)
# 1= pooled standard; 0= fake data
# the 1, 2, 4th rows are fake data to make up 9 rows

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-0.00000004435348786754, 0.00000005415816707159, -0.00000002228035549350,  
0.00000003485799605219, -0.00000418028752345374, 0.00000075680574114222,  
-0.00000004435348786754, 0.0000000084581857766, -0.0000000103780054085,  
0.0000000044175481698, -0.0000000070264466333, 0.00000505257874791157,  
-0.00000091931366945052, 0.00000005415816707159, -0.0000000103780054085,  
0.00000000129728375215, -0.0000000063385833864, 0.00000000109753567315,  
-0.00000193659710049101, 0.00000036477496967601, -0.00000002228035549350,  
0.0000000044175481698, -0.0000000063385833864, 0.0000000065497905590,  
-0.00000000173280475708, 0.00000293765158361764, -0.00000056152282152170,  
0.00000003485799605219, -0.0000000070264466333, 0.00000000109753567315,  
-0.00000000173280475708, 0.00000000672878436579
```

```
)  
PE= matrix(PE,nrow=9,byrow = T)  
index= (Race-1)*10+Ultra;  
info= PE[index,]  
fcoef=info[3:9]; sigma=info[10];Sigmab=  
matrix(info[11:26],4,4);Zeta=info[27:29];varfixed=  
matrix(info[30:78],7,7)  
  
#source("Parameter_Estimates_Pooled_Standard_FetalGrowth_02282022")  
i = GA  
int <- 1  
t1 <- i  
t2 <- i**2  
t3 <- i**3  
tt1 <- (i - Zeta[1])**3 * (i > Zeta[1])  
tt2 <- (i - Zeta[2])**3 * (i > Zeta[2])  
tt3 <- (i - Zeta[3])**3 * (i > Zeta[3])  
  
Fxx = cbind(int, t1, t2, t3, tt1, tt2, tt3)  
Rxx = cbind(int, t1, t2, t3)  
  
mean <- Fxx**%fcoef  
var <- sigma**2 + Rxx**%Sigmab**%t(Rxx) + Fxx**%varfixed**%t(Fxx)  
std <- sqrt(var)
```

```
percentile = pnorm(Ultra_value,mean,std)

##### Outputs
#####
options(digits=3)
cat("percentile is ", 100*percentile,"% ", "(",race_index[Race],"",
    ",ultra_index[Ultra],":",
    exp(Ultra_value)," ", "GA:",GA,")",sep=" ", " ")

}
}
```