WQD7001 Group Assignment

Group TUFL

12/26/2020

First round of data cleaning. Each team members has collected SDH related dataset from different source.

Health Expenditure

library("tabulizer")  
library("dplyr")

##   
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':  
##   
## filter, lag

## The following objects are masked from 'package:base':  
##   
## intersect, setdiff, setequal, union

HealthExpenditure <- read.csv('WIP/Health\_Exp.csv')  
HealthExpenditure[HealthExpenditure==""] <- NA  
HealthExpenditure <- HealthExpenditure[c(-1,-2,-3),] #remove 1st 3 inrelevant rows  
  
colnames(HealthExpenditure) <- HealthExpenditure[1,] #rename columns  
  
HealthExpenditure <- HealthExpenditure[-1,c(-1,-3)]  
  
#mean year >2015  
HealthExpenditure <- HealthExpenditure %>% mutate(ExpenditureMean = rowMeans(HealthExpenditure[,10:11], na.rm = TRUE, dims = 1))  
HealthExpenditure <- HealthExpenditure %>% mutate(sum\_exp = rowSums(HealthExpenditure[,10:11], na.rm = TRUE, dims = 1))  
HealthExpenditure %>% filter(sum\_exp>0 && is.nan(ExpenditureMean)) #to check if there is any country with data in any of the year in the range

## [1] Country Code 2008 2009 2010   
## [5] 2011 2012 2013 2014   
## [9] 2015 2016 2017 ExpenditureMean  
## [13] sum\_exp   
## <0 rows> (or 0-length row.names)

#HealthExpenditure <- select(HealthExpenditure, -sum\_exp)  
  
HealthExpenditure <- na.omit(HealthExpenditure)  
HealthExpenditure <- HealthExpenditure %>% mutate(ExpenditureLatest = HealthExpenditure[,11])  
HealthExpenditure %>% filter(ExpenditureLatest==0) #to check if there is any country with data in any of the year in the range

## [1] Country Code 2008 2009 2010   
## [5] 2011 2012 2013 2014   
## [9] 2015 2016 2017 ExpenditureMean   
## [13] sum\_exp ExpenditureLatest  
## <0 rows> (or 0-length row.names)

#HealthExpenditure <- HealthExpenditure[,-HealthExpenditure$sum\_exp]  
HealthExpenditure<-HealthExpenditure[,c(1,10:12,14)]  
write.csv(HealthExpenditure,"Cleaned/HealthExpenditure\_2020.csv",row.names = TRUE)

library(tidyr)  
library(dplyr)  
Doctors <- read.csv('WIP/NumbersDoc.csv')  
Doctors <- Doctors %>%   
 filter(TIME>2015) %>%   
 select(LOCATION,TIME,Value) %>%   
 spread(TIME,Value)   
Doctors <- Doctors %>% mutate(DoctorMean = rowMeans(Doctors[,2:5], na.rm = TRUE, dims = 1))  
Doctors <- Doctors %>% mutate(DoctorLatest=ifelse(!is.na(Doctors[,5]), Doctors[,5],  
 ifelse(!is.na(Doctors[,4]), Doctors[,4],  
 ifelse(!is.na(Doctors[,3]), Doctors[,3],  
 ifelse(!is.na(Doctors[,2]), Doctors[,2], NA)))))  
   
write.csv(Doctors,"Cleaned/Doctors\_2016\_2019.csv")  
  
  
Nurses <- read.csv('WIP/NumbersNurse.csv')  
Nurses <- Nurses %>%   
 filter(TIME>2015) %>%   
 select(LOCATION,TIME,Value) %>%   
 spread(TIME,Value)   
Nurses <- Nurses %>% mutate(NurseMean = rowMeans(Nurses[,2:5], na.rm = TRUE, dims = 1))  
Nurses <- Nurses %>% mutate(NurseLatest=ifelse(!is.na(Nurses[,5]), Nurses[,5],  
 ifelse(!is.na(Nurses[,4]), Nurses[,4],  
 ifelse(!is.na(Nurses[,3]), Nurses[,3],  
 ifelse(!is.na(Nurses[,2]), Nurses[,2], NA)))))  
write.csv(Nurses,"Cleaned/Nurses\_2016\_2019.csv", row.names = FALSE)  
  
  
  
Nurses2 <- read.csv('WIP/S\_NursesAndMidwives.csv')  
Nurses2 <- Nurses2 %>% mutate(Nurse2Mean = rowMeans(Nurses2[,2:5], na.rm = TRUE, dims = 1))  
Nurses2 <- Nurses2[complete.cases(Nurses2[, "Nurse2Mean"]),]  
  
Nurses2 <- Nurses2 %>% mutate(Nurse2\_Latest=ifelse(!is.na(Nurses2[,5]), Nurses2[,5],  
 ifelse(!is.na(Nurses2[,4]), Nurses2[,4],  
 ifelse(!is.na(Nurses2[,3]), Nurses2[,3],  
 ifelse(!is.na(Nurses2[,2]), Nurses2[,2], NA)))))  
write.csv(Nurses2,"Cleaned/S\_Nurses\_2016\_2019.csv", row.names = FALSE)  
  
Physicians <- read.csv('WIP/S\_Physicians.csv')  
Physicians <- Physicians %>% mutate(PhysicianMean = rowMeans(Physicians[,2:5], na.rm = TRUE, dims = 1))  
Physicians <- Physicians[complete.cases(Physicians[, "PhysicianMean"]),]  
  
Physicians <- Physicians %>% mutate(PhysicianLatest=ifelse(!is.na(Physicians[,5]), Physicians[,5],  
 ifelse(!is.na(Physicians[,4]), Physicians[,4],  
 ifelse(!is.na(Physicians[,3]), Physicians[,3],  
 ifelse(!is.na(Physicians[,2]), Physicians[,2], NA)))))  
write.csv(Physicians,"Cleaned/S\_Physicians\_2016\_2019.csv", row.names = FALSE)  
  
DF\_Merged=merge(Nurses2,Physicians,by=1,all=TRUE)  
DF\_Merged=merge(DF\_Merged,Nurses,by=1,all=TRUE)  
DF\_Merged=merge(DF\_Merged,Doctors,by=1,all=TRUE)

Health Ranking

library("tabulizer")  
library("dplyr")  
  
# Location of pdf file  
location <- '191CountriesTables.pdf' #Source from WHO:https://www.who.int/healthinfo/paper30.pdf  
out <- extract\_tables(location)  
  
str(out)

## List of 4  
## $ : chr [1:57, 1:5] "" "Rank" "" "1" ...  
## $ : chr [1:64, 1:9] "" "55" "56" "57" ...  
## $ : chr [1:64, 1:9] "116" "117" "118" "119" ...  
## $ : chr [1:16, 1:9] "177" "178" "179" "180" ...

page1 <- out[[1]]  
page1 <- data.frame(page1[,c(1,3,4)])  
colnames(page1) <- c("Rank", "Country\_Name","Index")  
  
page2 <- out[[2]]  
page2 <- data.frame(page2[,c(1,5,6)])  
colnames(page2) <- c("Rank", "Country\_Name","Index")  
  
page3 <- out[[3]]  
page3 <- data.frame(page3[,c(1,5,6)])  
colnames(page3) <- c("Rank", "Country\_Name","Index")  
  
page4 <- out[[4]]  
page4 <- data.frame(page4[,c(1,5,6)])  
colnames(page4) <- c("Rank", "Country\_Name","Index")  
  
Ranking191 <- dplyr::bind\_rows(page1,page2,page3,page4)  
Ranking191[Ranking191==""] <- NA  
Ranking191 <- na.omit(Ranking191)  
Ranking191 <- Ranking191[-1,]  
Ranking191[,"Country\_Name"] = toupper(Ranking191[,"Country\_Name"])  
Ranking191

## Rank Country\_Name Index  
## 4 1 FRANCE 0.994  
## 5 2 ITALY 0.991  
## 6 3 SAN MARINO 0.988  
## 7 4 ANDORRA 0.982  
## 8 5 MALTA 0.978  
## 9 6 SINGAPORE 0.973  
## 10 7 SPAIN 0.972  
## 11 8 OMAN 0.961  
## 12 9 AUSTRIA 0.959  
## 13 10 JAPAN 0.957  
## 14 11 NORWAY 0.955  
## 15 12 PORTUGAL 0.945  
## 16 13 MONACO 0.943  
## 17 14 GREECE 0.933  
## 18 15 ICELAND 0.932  
## 19 16 LUXEMBOURG 0.928  
## 20 17 NETHERLANDS 0.928  
## 21 18 UNITED KINGDOM 0.925  
## 22 19 IRELAND 0.924  
## 23 20 SWITZERLAND 0.916  
## 24 21 BELGIUM 0.915  
## 25 22 COLOMBIA 0.910  
## 26 23 SWEDEN 0.908  
## 27 24 CYPRUS 0.906  
## 28 25 GERMANY 0.902  
## 29 26 SAUDI ARABIA 0.894  
## 30 27 UNITED ARAB EMIRATES 0.886  
## 31 28 ISRAEL 0.884  
## 32 29 MOROCCO 0.882  
## 33 30 CANADA 0.881  
## 34 31 FINLAND 0.881  
## 35 32 AUSTRALIA 0.876  
## 36 33 CHILE 0.870  
## 37 34 DENMARK 0.862  
## 38 35 DOMINICA 0.854  
## 39 36 COSTA RICA 0.849  
## 40 37 UNITED STATES OF AMERICA 0.838  
## 41 38 SLOVENIA 0.838  
## 42 39 CUBA 0.834  
## 43 40 BRUNEI DARUSSALAM 0.829  
## 44 41 NEW ZEALAND 0.827  
## 45 42 BAHRAIN 0.824  
## 46 43 CROATIA 0.812  
## 47 44 QATAR 0.812  
## 48 45 KUWAIT 0.810  
## 49 46 BARBADOS 0.808  
## 50 47 THAILAND 0.807  
## 51 48 CZECH REPUBLIC 0.805  
## 52 49 MALAYSIA 0.802  
## 53 50 POLAND 0.793  
## 54 51 DOMINICAN REPUBLIC 0.789  
## 55 52 TUNISIA 0.785  
## 56 53 JAMAICA 0.782  
## 57 54 VENEZUELA, BOLIVARIAN 0.775  
## 59 55 ALBANIA 0.774  
## 60 56 SEYCHELLES 0.773  
## 61 57 PARAGUAY 0.761  
## 62 58 REPUBLIC OF KOREA 0.759  
## 63 59 SENEGAL 0.756  
## 64 60 PHILIPPINES 0.755  
## 65 61 MEXICO 0.755  
## 66 62 SLOVAKIA 0.754  
## 67 63 EGYPT 0.752  
## 68 64 KAZAKHSTAN 0.752  
## 69 65 URUGUAY 0.745  
## 70 66 HUNGARY 0.743  
## 71 67 TRINIDAD AND TOBAGO 0.742  
## 72 68 SAINT LUCIA 0.740  
## 73 69 BELIZE 0.736  
## 74 70 TURKEY 0.734  
## 75 71 NICARAGUA 0.733  
## 76 72 BELARUS 0.723  
## 77 73 LITHUANIA 0.722  
## 78 74 SAINT VINCENT AND THE\rGRENADINES 0.722  
## 80 75 ARGENTINA 0.722  
## 81 76 SRI LANKA 0.716  
## 82 77 ESTONIA 0.714  
## 83 78 GUATEMALA 0.713  
## 84 79 UKRAINE 0.708  
## 85 80 SOLOMON ISLANDS 0.705  
## 86 81 ALGERIA 0.701  
## 87 82 PALAU 0.700  
## 88 83 JORDAN 0.698  
## 89 84 MAURITIUS 0.691  
## 90 85 GRENADA 0.689  
## 91 86 ANTIGUA AND BARBUDA 0.688  
## 92 87 LIBYAN ARAB JAMAHIRIYA 0.683  
## 93 88 BANGLADESH 0.675  
## 94 89 THE FORMER YUGOSLAV\rREPUBLIC OF MACEDONIA 0.664  
## 96 90 BOSNIA AND HERZEGOVINA 0.664  
## 97 91 LEBANON 0.664  
## 98 92 INDONESIA 0.660  
## 99 93 IRAN, ISLAMIC REPUBLIC OF 0.659  
## 100 94 BAHAMAS 0.657  
## 101 95 PANAMA 0.656  
## 102 96 FIJI 0.653  
## 103 97 BENIN 0.647  
## 104 98 NAURU 0.647  
## 105 99 ROMANIA 0.645  
## 106 100 SAINT KITTS AND NEVIS 0.643  
## 107 101 REPUBLIC OF MOLDOVA 0.639  
## 108 102 BULGARIA 0.639  
## 109 103 IRAQ 0.637  
## 110 104 ARMENIA 0.630  
## 111 105 LATVIA 0.630  
## 112 106 YUGOSLAVIA 0.629  
## 113 107 COOK ISLANDS 0.628  
## 114 108 SYRIAN ARAB REPUBLIC 0.628  
## 115 109 AZERBAIJAN 0.626  
## 116 110 SURINAME 0.623  
## 117 111 ECUADOR 0.619  
## 118 112 INDIA 0.617  
## 119 113 CAPE VERDE 0.617  
## 120 114 GEORGIA 0.615  
## 121 115 EL SALVADOR 0.608  
## 122 116 TONGA 0.607  
## 123 117 UZBEKISTAN 0.599  
## 124 118 COMOROS 0.592  
## 125 119 SAMOA 0.589  
## 126 120 YEMEN 0.587  
## 127 121 NIUE 0.584  
## 128 122 PAKISTAN 0.583  
## 129 123 MICRONESIA, FEDERATED\rSTATES OF 0.579  
## 131 124 BHUTAN 0.575  
## 132 125 BRAZIL 0.573  
## 133 126 BOLIVIA 0.571  
## 134 127 VANUATU 0.559  
## 135 128 GUYANA 0.554  
## 136 129 PERU 0.547  
## 137 130 RUSSIAN FEDERATION 0.544  
## 138 131 HONDURAS 0.544  
## 139 132 BURKINA FASO 0.543  
## 140 133 SAO TOME AND PRINCIPE 0.535  
## 141 134 SUDAN 0.524  
## 142 135 GHANA 0.522  
## 143 136 TUVALU 0.518  
## 144 137 CÔTE D'IVOIRE 0.517  
## 145 138 HAITI 0.517  
## 146 139 GABON 0.511  
## 147 140 KENYA 0.505  
## 148 141 MARSHALL ISLANDS 0.504  
## 149 142 KIRIBATI 0.495  
## 150 143 BURUNDI 0.494  
## 151 144 CHINA 0.485  
## 152 145 MONGOLIA 0.483  
## 153 146 GAMBIA 0.482  
## 154 147 MALDIVES 0.477  
## 155 148 PAPUA NEW GUINEA 0.467  
## 156 149 UGANDA 0.464  
## 157 150 NEPAL 0.457  
## 158 151 KYRGYZSTAN 0.455  
## 159 152 TOGO 0.449  
## 160 153 TURKMENISTAN 0.443  
## 161 154 TAJIKISTAN 0.428  
## 162 155 ZIMBABWE 0.427  
## 163 156 UNITED REPUBLIC OF TANZANIA 0.422  
## 164 157 DJIBOUTI 0.414  
## 165 158 ERITREA 0.399  
## 166 159 MADAGASCAR 0.397  
## 167 160 VIET NAM 0.393  
## 168 161 GUINEA 0.385  
## 169 162 MAURITANIA 0.384  
## 170 163 MALI 0.361  
## 171 164 CAMEROON 0.357  
## 172 165 LAO PEOPLE'S DEMOCRATIC\rREPUBLIC 0.356  
## 174 166 CONGO 0.354  
## 175 167 DEMOCRATIC PEOPLE'S\rREPUBLIC OF KOREA 0.353  
## 177 168 NAMIBIA 0.340  
## 178 169 BOTSWANA 0.338  
## 179 170 NIGER 0.337  
## 180 171 EQUATORIAL GUINEA 0.337  
## 181 172 RWANDA 0.327  
## 182 173 AFGHANISTAN 0.325  
## 183 174 CAMBODIA 0.322  
## 184 175 SOUTH AFRICA 0.319  
## 185 176 GUINEA-BISSAU 0.314  
## 186 177 SWAZILAND 0.305  
## 187 178 CHAD 0.303  
## 188 179 SOMALIA 0.286  
## 189 180 ETHIOPIA 0.276  
## 190 181 ANGOLA 0.275  
## 191 182 ZAMBIA 0.269  
## 192 183 LESOTHO 0.266  
## 193 184 MOZAMBIQUE 0.260  
## 194 185 MALAWI 0.251  
## 195 186 LIBERIA 0.200  
## 196 187 NIGERIA 0.176  
## 197 188 DEMOCRATIC REPUBLIC OF THE\rCONGO 0.171  
## 199 189 CENTRAL AFRICAN REPUBLIC 0.156  
## 200 190 MYANMAR 0.138  
## 201 191 SIERRA LEONE 0.000

write.csv(Ranking191,"HealthCareRanking\_2020.csv",row.names = FALSE)

Doctors, Nurses

library(dplyr)  
HospitalBed <- read.csv('WIP/hospital\_beds\_global\_v1.csv') #https://www.kaggle.com/ikiulian/global-hospital-beds-capacity-for-covid19?select=hospital\_beds\_global\_v1.csv  
  
HospitalBedByType <- HospitalBed %>% filter(year>2015) #retrieve last 5 years data only  
HospitalBed[,c(-4,-5)]

## Country\_Code type beds  
## 1 AND ICU 0.071000  
## 2 AND TOTAL 2.500000  
## 3 ARE TOTAL 1.200000  
## 4 AFG TOTAL 0.500000  
## 5 ATG TOTAL 3.800000  
## 6 ALB TOTAL 2.900000  
## 7 ARM TOTAL 4.200000  
## 8 AGO TOTAL 0.800000  
## 9 ARG TOTAL 5.000000  
## 10 AUT ACUTE 5.450000  
## 11 AUT ICU 0.218000  
## 12 AUT PSYCHIATRIC 0.610000  
## 13 AUT TOTAL 7.370000  
## 14 AUS PSYCHIATRIC 0.420000  
## 15 AUS TOTAL 3.840000  
## 16 AZE TOTAL 4.700000  
## 17 BIH TOTAL 3.500000  
## 18 BRB TOTAL 5.800000  
## 19 BGD ICU 0.007000  
## 20 BGD TOTAL 0.800000  
## 21 BEL ACUTE 4.980000  
## 22 BEL ICU 0.159000  
## 23 BEL PSYCHIATRIC 1.360000  
## 24 BEL TOTAL 5.640000  
## 25 BFA TOTAL 0.400000  
## 26 BGR ACUTE 6.168200  
## 27 BGR ICU 0.122000  
## 28 BGR TOTAL 6.800000  
## 29 BHR TOTAL 2.000000  
## 30 BDI TOTAL 0.800000  
## 31 BEN TOTAL 0.500000  
## 32 BMU TOTAL 6.300000  
## 33 BRN ICU 0.131000  
## 34 BRN TOTAL 2.700000  
## 35 BOL TOTAL 1.100000  
## 36 BRA ICU 0.210581  
## 37 BRA TOTAL 2.200000  
## 38 BHS TOTAL 2.900000  
## 39 BTN TOTAL 1.800000  
## 40 BWA TOTAL 1.800000  
## 41 BLR TOTAL 11.000000  
## 42 BLZ TOTAL 1.300000  
## 43 CAN ACUTE 1.950000  
## 44 CAN PSYCHIATRIC 0.340000  
## 45 CAN TOTAL 2.500000  
## 46 COD TOTAL 0.800000  
## 47 CAF TOTAL 1.000000  
## 48 COG TOTAL 1.600000  
## 49 CHE ACUTE 3.560000  
## 50 CHE ICU 0.110000  
## 51 CHE PSYCHIATRIC 0.930000  
## 52 CHE TOTAL 4.530000  
## 53 CIV TOTAL 0.400000  
## 54 CHL ACUTE 1.990000  
## 55 CHL PSYCHIATRIC 0.100000  
## 56 CHL TOTAL 2.110000  
## 57 CMR TOTAL 1.300000  
## 58 CHN ICU 0.036000  
## 59 CHN TOTAL 4.340000  
## 60 COL TOTAL 1.710000  
## 61 CRI TOTAL 1.130000  
## 62 CUB TOTAL 5.200000  
## 63 CPV TOTAL 2.100000  
## 64 CYP ACUTE 3.399600  
## 65 CYP ICU 0.114000  
## 66 CYP TOTAL 3.400000  
## 67 CZE ACUTE 4.110000  
## 68 CZE ICU 0.116000  
## 69 CZE PSYCHIATRIC 0.940000  
## 70 CZE TOTAL 6.630000  
## 71 DEU ACUTE 6.020000  
## 72 DEU ICU 0.431843  
## 73 DEU PSYCHIATRIC 1.280000  
## 74 DEU TOTAL 8.000000  
## 75 DJI TOTAL 1.400000  
## 76 DNK ACUTE 2.420000  
## 77 DNK ICU 0.067000  
## 78 DNK PSYCHIATRIC 0.470000  
## 79 DNK TOTAL 2.500000  
## 80 DMA TOTAL 3.800000  
## 81 DOM TOTAL 1.600000  
## 82 DZA TOTAL 1.900000  
## 83 ECU TOTAL 1.500000  
## 84 EST ACUTE 3.450000  
## 85 EST ICU 0.146000  
## 86 EST PSYCHIATRIC 0.530000  
## 87 EST TOTAL 4.690000  
## 88 EGY TOTAL 1.600000  
## 89 ERI TOTAL 0.700000  
## 90 ESP ACUTE 2.430000  
## 91 ESP ICU 0.103085  
## 92 ESP PSYCHIATRIC 0.360000  
## 93 ESP TOTAL 2.970000  
## 94 ETH TOTAL 0.300000  
## 95 FIN ACUTE 2.800000  
## 96 FIN ICU 0.061000  
## 97 FIN PSYCHIATRIC 0.390000  
## 98 FIN TOTAL 3.280000  
## 99 FJI TOTAL 2.300000  
## 100 FSM TOTAL 3.200000  
## 101 FRA ACUTE 3.090100  
## 102 FRA ICU 0.116000  
## 103 FRA PSYCHIATRIC 0.840000  
## 104 FRA TOTAL 5.980000  
## 105 GAB TOTAL 6.300000  
## 106 GBR ACUTE 2.114000  
## 107 GBR ICU 0.066000  
## 108 GBR PSYCHIATRIC 0.380000  
## 109 GBR TOTAL 2.540000  
## 110 GRD TOTAL 3.700000  
## 111 GEO TOTAL 2.600000  
## 112 GHA TOTAL 0.900000  
## 113 GRL TOTAL 14.353400  
## 114 GMB TOTAL 1.100000  
## 115 GIN TOTAL 0.300000  
## 116 GNQ TOTAL 2.100000  
## 117 GRC ACUTE 3.602800  
## 118 GRC ICU 0.060000  
## 119 GRC PSYCHIATRIC 0.740000  
## 120 GRC TOTAL 4.210000  
## 121 GTM TOTAL 0.600000  
## 122 GNB TOTAL 1.000000  
## 123 GUY TOTAL 1.600000  
## 124 HKG ICU 0.071000  
## 125 HKG TOTAL 4.890900  
## 126 HND TOTAL 0.700000  
## 127 HRV ACUTE 3.505000  
## 128 HRV ICU 0.147000  
## 129 HRV TOTAL 5.600000  
## 130 HTI TOTAL 0.700000  
## 131 HUN ACUTE 4.270900  
## 132 HUN ICU 0.138000  
## 133 HUN PSYCHIATRIC 0.870000  
## 134 HUN TOTAL 7.020000  
## 135 IDN ICU 0.027000  
## 136 IDN TOTAL 1.040000  
## 137 IRL ACUTE 2.770000  
## 138 IRL ICU 0.065000  
## 139 IRL PSYCHIATRIC 0.340000  
## 140 IRL TOTAL 2.960000  
## 141 ISR ACUTE 2.190000  
## 142 ISR PSYCHIATRIC 0.400000  
## 143 ISR TOTAL 2.990000  
## 144 IND ICU 0.023000  
## 145 IND TOTAL 0.530000  
## 146 IRQ TOTAL 1.400000  
## 147 IRN ICU 0.046000  
## 148 IRN TOTAL 1.500000  
## 149 ISL ACUTE 2.370000  
## 150 ISL ICU 0.091000  
## 151 ISL PSYCHIATRIC 0.370000  
## 152 ISL TOTAL 2.910000  
## 153 ITA ACUTE 2.624700  
## 154 ITA ICU 0.084324  
## 155 ITA PSYCHIATRIC 0.090000  
## 156 ITA TOTAL 3.180000  
## 157 JAM TOTAL 1.700000  
## 158 JOR TOTAL 1.400000  
## 159 JPN ACUTE 7.790000  
## 160 JPN ICU 0.073000  
## 161 JPN PSYCHIATRIC 2.620000  
## 162 JPN TOTAL 13.050000  
## 163 KEN TOTAL 1.400000  
## 164 KGZ TOTAL 4.500000  
## 165 KHM TOTAL 0.800000  
## 166 KIR TOTAL 1.900000  
## 167 COM TOTAL 2.200000  
## 168 KNA TOTAL 2.300000  
## 169 PRK TOTAL 13.200000  
## 170 KOR ACUTE 7.140000  
## 171 KOR ICU 0.106000  
## 172 KOR PSYCHIATRIC 1.310000  
## 173 KOR TOTAL 12.270000  
## 174 KWT TOTAL 2.000000  
## 175 CYM TOTAL 3.000000  
## 176 KAZ ICU 0.213000  
## 177 KAZ TOTAL 6.700000  
## 178 LAO ICU 0.021000  
## 179 LAO TOTAL 1.500000  
## 180 LBN TOTAL 2.900000  
## 181 LCA TOTAL 1.300000  
## 182 LIE ACUTE 2.397100  
## 183 LKA ICU 0.023000  
## 184 LKA TOTAL 3.600000  
## 185 LBR TOTAL 0.800000  
## 186 LSO TOTAL 1.300000  
## 187 LTU ACUTE 5.472000  
## 188 LTU ICU 0.155000  
## 189 LTU PSYCHIATRIC 0.990000  
## 190 LTU TOTAL 6.560000  
## 191 LUX ACUTE 3.700000  
## 192 LUX ICU 0.248000  
## 193 LUX PSYCHIATRIC 0.740000  
## 194 LUX TOTAL 4.510000  
## 195 LVA ACUTE 3.300000  
## 196 LVA ICU 0.097000  
## 197 LVA PSYCHIATRIC 1.250000  
## 198 LVA TOTAL 5.570000  
## 199 LBY TOTAL 3.700000  
## 200 MAR TOTAL 1.100000  
## 201 MCO TOTAL 13.800000  
## 202 MDA TOTAL 5.800000  
## 203 MNE TOTAL 4.000000  
## 204 MDG TOTAL 0.200000  
## 205 MHL TOTAL 2.700000  
## 206 MKD ACUTE 2.861900  
## 207 MKD TOTAL 4.400000  
## 208 MLI TOTAL 0.100000  
## 209 MMR ICU 0.011000  
## 210 MMR TOTAL 0.900000  
## 211 MNG ICU 0.088000  
## 212 MNG TOTAL 7.000000  
## 213 MAC TOTAL 5.295300  
## 214 MRT TOTAL 0.400000  
## 215 MLT ACUTE 3.175200  
## 216 MLT TOTAL 4.700000  
## 217 MUS TOTAL 3.400000  
## 218 MDV TOTAL 4.300000  
## 219 MWI TOTAL 1.300000  
## 220 MEX ACUTE 1.380000  
## 221 MEX PSYCHIATRIC 0.030000  
## 222 MEX TOTAL 1.380000  
## 223 MYS ICU 0.034000  
## 224 MYS TOTAL 1.900000  
## 225 MOZ TOTAL 0.700000  
## 226 NER TOTAL 0.300000  
## 227 NGA TOTAL 0.500000  
## 228 NIC TOTAL 0.900000  
## 229 NLD ACUTE 2.921400  
## 230 NLD ICU 0.064000  
## 231 NLD PSYCHIATRIC 0.910000  
## 232 NLD TOTAL 3.320000  
## 233 NOR ACUTE 3.200000  
## 234 NOR ICU 0.080000  
## 235 NOR PSYCHIATRIC 1.070000  
## 236 NOR TOTAL 3.600000  
## 237 NPL ICU 0.028000  
## 238 NPL TOTAL 0.300000  
## 239 NRU TOTAL 5.000000  
## 240 NZL ACUTE 2.590000  
## 241 NZL PSYCHIATRIC 0.300000  
## 242 NZL TOTAL 2.610000  
## 243 OMN ICU 0.146000  
## 244 OMN TOTAL 1.600000  
## 245 PAN TOTAL 2.300000  
## 246 PER TOTAL 1.600000  
## 247 PNG TOTAL 4.024200  
## 248 PHL ICU 0.022000  
## 249 PHL TOTAL 1.000000  
## 250 PAK ICU 0.015000  
## 251 PAK TOTAL 0.600000  
## 252 POL ACUTE 4.851400  
## 253 POL ICU 0.069000  
## 254 POL PSYCHIATRIC 0.650000  
## 255 POL TOTAL 6.620000  
## 256 PRI TOTAL 3.320000  
## 257 PSE TOTAL 1.200000  
## 258 PRT ACUTE 3.250000  
## 259 PRT ICU 0.042000  
## 260 PRT PSYCHIATRIC 0.640000  
## 261 PRT TOTAL 3.390000  
## 262 PLW TOTAL 4.800000  
## 263 PRY TOTAL 1.300000  
## 264 QAT TOTAL 1.200000  
## 265 ROU ACUTE 5.253300  
## 266 ROU ICU 0.214000  
## 267 ROU TOTAL 6.300000  
## 268 SRB ACUTE 4.641200  
## 269 SRB TOTAL 5.700000  
## 270 RUS TOTAL 8.050000  
## 271 RWA TOTAL 1.600000  
## 272 SAU ICU 0.228000  
## 273 SAU TOTAL 2.700000  
## 274 SLB TOTAL 1.400000  
## 275 SYC TOTAL 3.600000  
## 276 SDN TOTAL 0.800000  
## 277 SWE ACUTE 2.040000  
## 278 SWE ICU 0.051056  
## 279 SWE PSYCHIATRIC 0.430000  
## 280 SWE TOTAL 2.137969  
## 281 SGP ACUTE 1.986100  
## 282 SGP ICU 0.114000  
## 283 SGP PSYCHIATRIC 34.210000  
## 284 SGP TOTAL 2.676600  
## 285 SVN ACUTE 4.203500  
## 286 SVN ICU 0.064000  
## 287 SVN PSYCHIATRIC 0.660000  
## 288 SVN TOTAL 4.500000  
## 289 SVK ACUTE 4.910000  
## 290 SVK ICU 0.092000  
## 291 SVK PSYCHIATRIC 0.810000  
## 292 SVK TOTAL 5.820000  
## 293 SLE TOTAL 0.400000  
## 294 SMR TOTAL 3.800000  
## 295 SEN TOTAL 0.300000  
## 296 SOM TOTAL 0.900000  
## 297 SUR TOTAL 3.100000  
## 298 STP TOTAL 2.900000  
## 299 SLV TOTAL 1.300000  
## 300 SYR TOTAL 1.500000  
## 301 SWZ TOTAL 2.100000  
## 302 TCD TOTAL 0.400000  
## 303 TGO TOTAL 0.700000  
## 304 THA ICU 0.104000  
## 305 THA TOTAL 2.100000  
## 306 TJK TOTAL 4.800000  
## 307 TLS TOTAL 5.900000  
## 308 TKM TOTAL 7.400000  
## 309 TUN TOTAL 2.300000  
## 310 TON TOTAL 2.600000  
## 311 TUR ACUTE 2.781500  
## 312 TUR PSYCHIATRIC 0.050000  
## 313 TUR TOTAL 2.810000  
## 314 TTO TOTAL 3.000000  
## 315 TUV TOTAL 5.600000  
## 316 TWN ICU 0.285000  
## 317 TZA TOTAL 0.700000  
## 318 UKR TOTAL 8.800000  
## 319 UGA TOTAL 0.500000  
## 320 USA ACUTE 2.487640  
## 321 USA ICU 0.302904  
## 322 USA OTHER 0.242003  
## 323 USA PSYCHIATRIC 0.219750  
## 324 USA TOTAL 2.770000  
## 325 URY TOTAL 2.800000  
## 326 UZB TOTAL 4.000000  
## 327 VCT TOTAL 2.600000  
## 328 VEN TOTAL 0.800000  
## 329 VIR TOTAL 18.680000  
## 330 VNM TOTAL 2.600000  
## 331 VUT TOTAL 1.700000  
## 332 WSM TOTAL 1.000000  
## 333 YEM TOTAL 0.700000  
## 334 ZAF TOTAL 2.320000  
## 335 ZMB TOTAL 2.000000  
## 336 ZWE TOTAL 1.700000

#spread dataset by bed type  
HospitalBedByType <- HospitalBedByType %>% spread(type,beds) %>% select(Country\_Code,ACUTE,ICU,OTHER,PSYCHIATRIC,TOTAL) %>% group\_by(Country\_Code)  
colSums(is.na(HospitalBedByType)) #remove type OTHER 77/78 obs is NA

## Country\_Code ACUTE ICU OTHER PSYCHIATRIC TOTAL   
## 0 34 50 77 41 35

HospitalBedByType[,-4]

## # A tibble: 78 x 5  
## # Groups: Country\_Code [69]  
## Country\_Code ACUTE ICU PSYCHIATRIC TOTAL  
## <chr> <dbl> <dbl> <dbl> <dbl>  
## 1 AUS NA NA 0.42 3.84  
## 2 AUT 5.45 NA 0.61 7.37  
## 3 BEL 4.98 NA 1.36 5.64  
## 4 BGD NA 0.007 NA NA   
## 5 BGR 6.17 NA NA NA   
## 6 BRA NA 0.211 NA NA   
## 7 BRN NA 0.131 NA NA   
## 8 CAN 1.95 NA 0.34 2.5   
## 9 CHE 3.56 NA 0.93 4.53  
## 10 CHL 1.99 NA 0.1 2.11  
## # … with 68 more rows

write.csv(HospitalBedByType,"Cleaned/HospitalBedByType\_2016\_2020.csv",row.names = TRUE)  
  
  
#total per 1000 inhabitants  
dfTotal <- HospitalBed %>% filter(HospitalBed$type=='TOTAL')  
dfTotal <- dfTotal[,-2]  
  
dfICU <- HospitalBed %>% filter(HospitalBed$type=='ICU')  
dfICU <- dfICU[,-2]  
  
dfAcute <- HospitalBed %>% filter(HospitalBed$type=='ACUTE')  
dfAcute <- dfAcute[,-2]  
  
dfPsychiatric <- HospitalBed %>% filter(HospitalBed$type=='PSYCHIATRIC')  
dfPsychiatric <- dfPsychiatric[,-2]  
  
dfOther <- HospitalBed %>% filter(HospitalBed$type=='OTHER')  
dfOther <- dfOther[,-2]

Covid Test

CovidTest <- read.csv('WIP/full-list-cumulative-total-tests-per-thousand-map.csv')  
  
#spread dataset by test type  
  
CovidTest <- CovidTest %>%   
 group\_by(Code,Annotations) %>%   
 summarise(SumTest = sum(TestNo))

## `summarise()` regrouping output by 'Code' (override with `.groups` argument)

CovidTest <- CovidTest %>% spread(Annotations,SumTest)

DFMerged <- read.csv('WIP/World\_Code3\_Name.csv')  
DFMerged <- merge(DFMerged,DF\_Merged,by=1,all=TRUE)  
DFMerged <- merge(DFMerged,HealthExpenditure,by=1,all=TRUE)  
DFMerged <- merge(DFMerged,HospitalBedByType,by=1,all=TRUE)  
  
Ranking2020 <- read.csv('Cleaned/HealthCareRanking\_2020.csv')  
DFMerged <- merge(DFMerged,Ranking2020,by=1,all=TRUE)  
DFMerged <- merge(DFMerged,CovidTest,by=1,all=TRUE)  
write.csv(DFMerged,"Cleaned/LW\_Datasets\_Merged.csv")