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Beyond Deaths per Capita: Comparative CoViD-19 Mortality Indicators

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Contributorship Statement

Patrick Heuveline designed the study, compiled the necessary demographic data and drafted this manuscript. Mike Tzen wrote the webscraping routine that provides regularly updated data on CoViD-19 global estimates and projections, and US age-and-sex pattern.

Acknowledgment

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Abstract

Objectives: Following well-established practices in demography, this article discusses several measures based on the number of CoViD-19 deaths to facilitate comparisons over time and across populations.

Settings: National populations in 186 UN countries and territories and populations in first-level sub-national administrative entities in Brazil, Italy, Mexico, Spain, and the US.

Participants: None (death statistics only).

Primary and Secondary Outcome Measures: The first measure is an unstandardized occurrence/exposure rate comparable to the Crude Death Rate. The second measure is an indirectly age-and-sex standardized rate that can be derived even when the breakdown of CoViD-19 deaths by age and sex required for direct standardization is unavailable. The last measure is the reduction in life expectancy at birth corresponding to the number of CoViD-19 deaths projected for 2020.

Results: To date, the highest unstandardized rate has been in New York, where at its peak it exceeded the state 2017 Crude Death Rate. For populations with a breakdown of CoViD-19 deaths by age and sex that allows for direct standardization, we show that direct and indirect standardization yield similar results. Populations compare differently after standardization: while New Jersey now has the highest unstandardized rate, Baja California (Mexico) has the highest standardized rate. US life expectancy is projected to decline this year by more (-.68 years) than the worst year of the HIV epidemic, or the worst three years of the opioid crisis, and to reach its lowest level since 2008. Substantially larger reductions, exceeding two years, are projected for Ecuador, Chile, New York, New Jersey and Peru.

Conclusions: With lesser demand on data that direct standardization, indirect standardization is a valid alternative to adjust international comparisons for differences in population distribution by sex and age-groups. Reductions in 2020 life expectancies will be substantial by recent historical standards, in a number of populations.

Article Summary

- This article describes how to derive indicators of CoViD-19 mortality that follow well established practices in demography, making them comparable to standard indicators of overall mortality such as the Crude Death Rate or Life Expectancy at Birth
- In particular, this article shows that a technique known as indirect standardization allows to take into account differences in age and sex distributions when comparing CoViD-19 death rates across populations, even when only the total numbers of CoViD-19 deaths (not broken down by sex and age-group) are available for those populations
- Using global estimates of CoViD-19 deaths by countries and first sub-national entities in several countries, the article illustrates how age-and-sex standardization corrects comparisons across populations.
- However, both unstandardized and standardized rates remain dependent on the duration/stage of the epidemic diffusion of the population and on the geographical scale (i.e., country, region, agglomeration)

- Life expectancy at birth estimates demand more data (extant life tables) but yields the most intuitive mortality measures (in years, rather than deaths or deaths per capita) and allows for comparison of mortality impacts but past public health crises

Data Sharing Statement

Additional data are available on the Github repository:

https://github.com/statsccpr/ind-cov-mort

Ethics

This study has no human subjects. Analyses are based solely on publicly available online data on anonymous, deceased individuals.

Funding

The authors benefited from facilities and resources provided by the California Center for Population Research at UCLA (CCPR), which receives core support (P2C-HD041022) from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD).

Beyond Deaths per Capita

Background

As of June 1st, deaths from the novel coronavirus disease 2019 (CoViD-19) had been reported in 186 of the 235 countries and territories of the United Nations system (UN). As with previous pandemics,[1] the disease progression can be more reliably tracked with death than with case counts. Cumulative CoViD-19 death counts at a given time depend on the determination of the cause of death, delays in reporting deaths to central reporting agencies—different for deaths at home, in hospitals and other institutions—and delays in verification, consolidation and publication at reporting agencies. In the US, for instance, the grim milestone of 100,000 cumulative CoViD-19 deaths was reached at the end of May, when data from the Center for Disease Control and Prevention (CDC) suggested that the number of deaths in the country exceeded expectations based on past trends by about 130,000.[2] While CoViD-19 deaths might not be fully reported, the death undercount is both easier to estimate and an order-of-magnitude smaller than the proportion of unreported cases. CDC data from large-scale seroprevalence surveys suggest than the number of actual cases might be as much as 10 times the number of confirmed cases[3]—a situation in no way unique to the US.[4] CoViD-19 mortality indicators are also more pertinent for assessing public-health measures that were intended less to reduce the eventual number of cases than to "flatten the curve" and eventually limit the number of CoViD-19 deaths by keeping the need for emergency hospitalizations below local hospital capacity.

For comparative purposes, cumulative death counts are affected by several demographic characteristics such as, most obviously, population size. The deaths per capita ratio, however, represent the first rather than the only adjustment that can be taken towards more meaningful CoViD-19 mortality comparisons. Following well-established practices in demography,[5] this article presents additional indicators that can be derived with additional demographic data. The corresponding measures are discussed using results for the 186 UN countries and territories with at least one death by June 1st. To illustrate issues of scale, the measures are also calculated at the first sub-national administrative level in China, the US, Brazil, Mexico, Italy and Spain—a total of 362 national and subnational populations.

Methods and Data

We first calculate an occurrence/exposure *rate*, the period Crude CoViD-19 Death Rate (*CCDR*):

$$CCDR[t_1,t] = \frac{D^C[t_1,t]}{N(t_m).(t - t_1)}$$

where t_1 is an initial time, $D^C[t_1,t]$ a cumulative CoViD-19 deaths count between times t_1 and t, and $N(t_m)$ an estimate of the total population size at time t_m between time t_1 and time t. The difference between this period rate and the deaths per capita ratio is easy to miss when the deaths count in the numerator, identical for both, is an annual number of deaths. In that case, the number of person-years in the denominator of the occurrence/exposure rate can indeed be approximated by population size at some point during the year. However, the two are no longer directly comparable, and the metric of the ratio difficult to interpret, when the deaths counts correspond to periods of different durations. On the contrary, the *CCDR* is expressed in deaths per person-*year* and remains directly comparable to the annual Crude Death Rate (*CDR*) available for most populations. We first calculate the *CCDR* for the period starting on the day of the first death in the population, which was obtained from World Health Organization (WHO) daily situation reports,[6] and ending on June 12. The estimated deaths count on that day was obtained from Johns Hopkins University's Center for Systems Science and Engineering (CSSE)[7] and total population size was obtained from the UN.[8] (Additional sources used for sub-national units are referenced in the Technical Appendix.) Using projections from the University of

Washington's Institute for Health Metrics and Evaluation (IHME),[9] we also calculate a *CCDR* for the period ending on October 1.

As age and sex variations in CoViD-19 mortality have been clearly established,[10] the period rates should be adjusted to take into account differences in age and sex distributions. Direct age-and-sex standardization requires data on CoViD-19 deaths by age and sex, which are unavailable or unreliable for a majority of UN countries and territories and most sub-national populations. An alternative approach, known as indirect standardization, borrows an age-and-sex pattern of mortality from a well-documented population so that only the age-and-sex distribution of the populations of interest is required. Based on this approach, we calculate the Comparative CoViD-19 Mortality Ratio (*CCMR*):

$$CCMR[t_1,t] = \frac{D^C[t_1,t]}{\sum_j \sum_i {}^{US}M_{ij}^C . N_{ij}(t_m)}$$

where ${}^{US}M_{ij}{}^C$ is the CoViD-19 death rate specific to age group i and sex j in the US and $N_{ij}(t_m)$ is the size of the age group i for sex j in the population of interest. The reference age-and-sex death rates were obtained from the Centers for Disease Control and Prevention (CDC) weekly-updated distribution of CoViD-19 deaths by age and sex in the US,[11] selected because this is to date the largest number of CoViD-19 deaths distributed by age and sex. Unavailable only for the 13 countries/territories whose population size is less than 90,000, population age-and-sex distributions were taken from the UN data and, for subnational populations, national statistics.

Multiplying a population *CCMR* by the US *CCDR* yields an Indirectly age-and-sex Standardized CoViD-19 Death Rate (*ISCDR*) for that population, with the US age-and-sex population distribution as the standard:

$$ISCDR[t_1,t] = \sum_j \sum_i \left({}^{US}M_{ij}^C . CCMR[t_1,t]\right) . {}^{US}N_{ij}(t_m)$$

CCMR and *ISCDR* are again calculated both for CSSE current estimates and IHME October-1 projections.

Last, life expectancy at birth provides a summary indicator of mortality in a population in a more intuitive metric (years) than these rates. A standard demographic technique allows to estimate the impact that *eliminating* a cause of death would have on life expectancy at birth. When a prior period life table (i.e., not factoring CoViD-19 mortality) is available, applying this technique backward allows to translate a cumulative CoViD-19-deaths forecast for the same period into a CoViD-19-induced *reduction* in male and female life expectancies at birth. Although they pertain to October 1st, the IHME projections were used as conservative projections of the cumulative number of CoViD-19 deaths in 2020 to derive new male and female life expectancies at birth in 244 populations with extant life tables (153 countries, plus Italian regions, Spanish autonomous communities and US states). Calculations required a previous projection of the male and female year-2020 life tables in these populations. For countries, these were again derived from UN data, by interpolation between the 2015-20 estimates and 2020-25 projections. For sub-national populations, life tables available from national statistical institutes were extrapolated to 2020. Additional details on their calculation are described in the online supplementary materials of this article.

Patient and Public Involvement: This research was done without patient involvement. Patients were not invited to comment on the study design and were not consulted to develop patient relevant outcomes or interpret the results. Patients were not invited to contribute to the writing or editing of this document for readability or accuracy.

Results

To illustrate the properties of these indicators, we briefly describe results from the July-3 updates of the CCSE, IHME and CDC data. (Full results for that week, ranked on *CCMR* values, are also available in the online supplementary materials of this article). Across countries, Belgium has the highest current-period *CCDR* value (2.78 per thousand), followed by the United Kingdom, Spain, Sweden, Italy, France and the US (1.15 per thousand). Four Italian regions, 4 Spanish autonomous communities and 6 US states have higher current-period *CCDR* value than Belgium, with the highest *CCDR* currently in New Jersey (5.58 per thousand).

The main motivation for the *CCDR* is not to compare CoViD-19 mortality across populations, however, but rather to compare CoViD-19 and overall mortality. The highest *CCDR* value to date has been reached in New York (9.44 per thousand on 4/25) where it exceeded the state's most recent annual *CDR* (7.83 per thousand in 2017).[12]. The period *CCDR* remained above the 2017 *CDR* until May 20 (Figure 1). Ignoring seasonality and period trends in overall mortality, this indicates roughly equivalent mortality from CoViD-19 and from all other causes combined between March 14 (first death) and May 20.

Figure 1 here

Figure 1: Estimated value of the period *CCDR*, New York (in deaths per 1,000 person-years, period starting on March 14 and ending on day shown on the horizontal axis)

Sources: CDC (*CDR*) and authors' calculations (*CCDR*, see technical appendix)

The effects of indirect age-standardization are illustrated in Figure 2, comparing current-period *CCDR* and *ISCDR* values for selected national and subnational populations. By construction, the *CCMR* equals 1 and the *CCDR* and *ISCDR* are the same in the US, but the standardized *ISCDR* is lower than the unstandardized *CCDR* in Europe, whereas the standardized rate can be two to three times the unstandardized rate in Mexico and South American countries. Baja California (Mexico) currently has the highest standardized rate. Several other Mexican (e.g., Mexico City) and Brazilian States (e.g., Ceara, Rio de Janeiro) have standardized rates lower than New Jersey and New York, but higher than Lombardy or Madrid.

Figure 2 here

Figure 2: Estimated value of the *CCDR* and *ISCDR* (in deaths per 1,000 person-years), by country and subnational unit (countries and subnational units with the largest *ISCDR* values and a population size over 10 million plus subnational units with the largest *ISCDR* in their respective countries)

Sources: Authors' calculations (see technical appendix)

As for the future mortality impact, the largest projected reductions in 2020 life expectancies at birth are in South America and the US, exceeding two years in Ecuador, Chile, New York, New Jersey and Peru. Excluding countries still early in the diffusion of the virus and for which projections remain unstable (defined as below the current *CCDR* threshold of .5 deaths per thousand person-years), Figure 3 shows reductions exceeding 1.3 years are also projected for Brazil, Mexico, four additional US states, as well as subnational populations in Italy (Lombardy and Aosta Valley) and Spain (Community of Madrid).

Figure 3 here

Figure 3: Estimated reduction in life expectancy at birth for year 2020, both sexes (in years), by country and subnational unit (countries and subnational units with a current *CCDR* equal or larger than .5 deaths per thousand person-years)

Sources: Authors' calculations (see technical appendix)

Reduction in life expectancy at birth is both an age standardized and an easily interpretable metric. In particular, it allows for comparing the mortality impact of CoViD-19 with prior public health crises that might have interrupted the secular increase in life expectancies. While the projected reduction in the US (-.68 years) is much lower than in the populations shown in Figure 3, for instance, CoViD-19 would still reduce life expectancy this year by more than the worst year of the HIV epidemic (from 75.8 years in 1992 to 75.5 years in 1993), or the worst three years of the opioid-overdose crisis (from 78.9 years in 2014 to 78.6 years in 2017).[13] As illustrated in Figure 4, CoViD-19 is projected to reduce US life expectancy at birth in 2020 to its lowest level since 2008.

Figure 4 here

Figure 4: Estimated life expectancy at birth, U.S. population, both sexes, by year

Sources: CDC (2009-2017), UN and authors' calculations (2017-2020, see technical appendix)

Discussion

The results above illustrate the properties of different comparative indicators of CoViD-19 mortality. For comparisons across populations, the *ISCDR*, and *CCMR* on which it builds, control for 3 important factors that contribute to the cumulative count of CoViD-19 deaths in a population: the length of the period over which these deaths are cumulated, the size of the population, and its age-and-sex composition.

With respect to the first of these three factors, both the unstandardized and standardized rates are period indicators that increase and decrease as waves of the pandemic develop. Contrary to the death per capita ratio, which can only increase over time, the period rates begin to decline when the daily number of additional deaths drops below its average for the period. This property of the period rates accurately reflects for CoViD-19 mortality a temporal dimension that can often be neglected for overall mortality. This also implies, however, that comparing *ISCDR* values across populations at too different durations of exposure to CoViD-19 would not be meaningful. As shown in Figure 1, this is more problematic early in the diffusion of the epidemic.

With respect to the second factor, comparing *ISCDR* values at the national or sub-national levels illustrate that dividing for population size does not completely remove the effects of scale. To illustrate this, we estimated standardized rates at the first sub-national administrative level in several countries, selected for both their size and within-country differences in CoViD-19 mortality. This showed that if Belgium, followed by 5 other European countries, still have the highest period *CCDR* values, several sub-national populations in Brazil, Italy, Mexico, Spain and the US with populations over 10 million have higher *CCDR* values than Belgium (with 11.6 million inhabitants).

Disaggregation to smaller administrative units may allow for more meaningful comparisons, but might be impeded by data availability. In this respect, indirect standardization has the advantage of not requiring data on CoViD-19 deaths by age and sex that may not be available or reliable for smaller areas. As a breakdown of CoViD-19 deaths *is* available from a number of European countries[14] and US states, the *ISCDR* can actually be compared to a Directly age-and-sex Standardized CoViD-19 Death Rate (*DSCDR*) with the US age-and-sex population distribution as the standard. Comparing unstandardized with directly and indirectly standardized rate 7 European countries and 6 states, Figure 5 shows that indirect standardization is a valid alternative to direct standardization.

Figure 5 here

Figure 5: Estimated value of the *CCDR*, *ISCDR* and *DSCDR* (in deaths per 1,000 person-years), by country and state (countries and subnational units with a population size over 10 million and the largest *ISCDR* values)

Sources: CDC, Ined and authors' calculations (see technical appendix)

Substantial uncertainties remain as regards the direct and indirect mortality impact of the pandemic. The direct impact concerns the number of CoViD-19 deaths, for which the main factors of uncertainty are (1) the degree to which CoViD-19 deaths have been properly reported as the cause of death and (2) the future diffusion and fatality rate of the virus. With respect to the latter, the CDC currently tracks no less than 15 forecasting models.[15] Our choice of the IHME projections among those to illustrate the properties of the different indicators was not based on a quality assessment, which would be beyond our expertise. The IHME projections have a broader international coverage and longer time horizon that made them more suitable to illustrate the various indicators than other models. Comparisons with other models when populations and horizons overlap do not show the IHME projections as particularly alarmist. Adding that the current projections do not include any "second wave" of CoViD-19 deaths, the cumulative number of CoViD-19 deaths in 2020 appears more likely to be higher than lower than the numbers used here to calculate future rates and life expectancy reductions.

The indirect impact refers to the "downstream" effects of the pandemic and mitigating policies on mortality from other causes. As mentioned above, recent CDC data suggest that the cumulative number of CoViD-19 deaths does not fully account for the overall increase in mortality, which could be due to under-reporting of CoViD-19 as a cause of death or an increase in other-cause mortality. All else equal, 2020 life-expectancy reductions would be under-estimated, regardless of whether CoViD-19 deaths are under-reported or mortality from other causes increases, because reductions are estimated on the assumption that mortality from other causes remains unchanged. We cannot rule out, however, a decline of mortality from other causes that would have been hidden initially by under-reporting of CoViD-19 deaths. In this case, the indirect impact would partially compensate the direct mortality impact of CoViD-19.[16]

To be sure, the rapidly evolving data and understanding of CoViD-19 mortality will likely continue to require frequent updates and flexibility. We update the values of the indicators discussed above weekly from updates of the CCSE, IHME and CDC data and shared them on a Github repository.[17] These calculations can easily be customized for different periods, different geographical scales, or to accommodate uncertainty across different sources of estimates and forecast.

Summary

What is already known? The number of CoViD-19 deaths more reliably tracks the progression of the disease across populations than the number of confirmed cases. Substantial age and sex differences in CoViD-19 death rates imply that the number of deaths should be adjusted not just for the total size of the population, but also for its age-and-sex distribution.

What are the new findings? Indirect standardization produces results quite comparable to those resulting from direct standardization without requiring CoViD-19 deaths by age and sex. Applying indirect standardization, Baja California (Mexico) appears to have the highest CoViD-19 death rate. When available, extant life tables allow to measure the CoViD-19-induced reduction in life expectancy at birth, which according to current projections will exceed two years in Ecuador, Chile, New York, New Jersey and Peru. To put these in perspective, the .68-year reduction projected for the US would reduce life expectancy this year by more than the worst year of the HIV epidemic, or the worst three years of the opioid crisis, and down to its lowest level since 2008.

What do the new findings imply? Age-and-sex standardization reveals the emergence of Mexico

and several South American countries as the most affected by CoViD-19 mortality. Reductions in 2020 life expectancy in these countries and some US states will be substantial.

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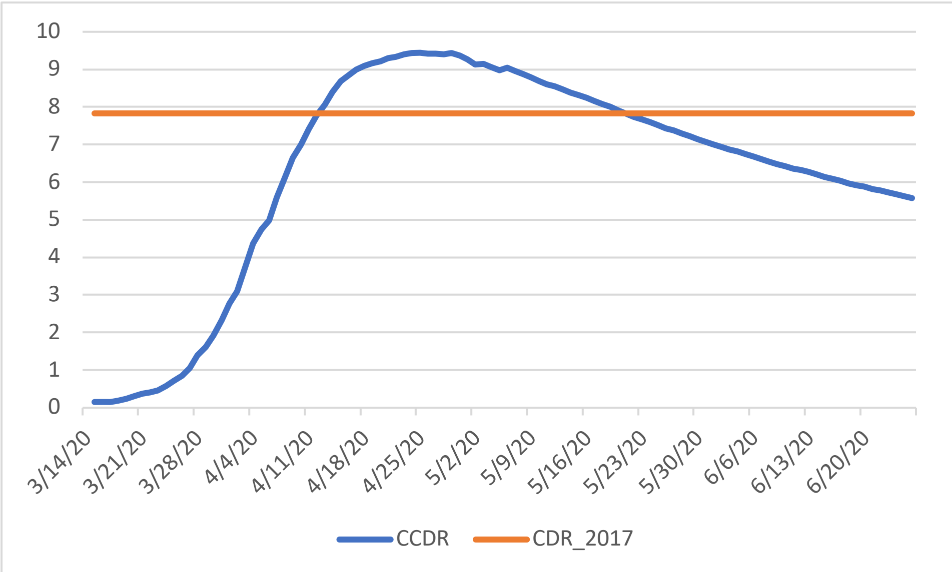
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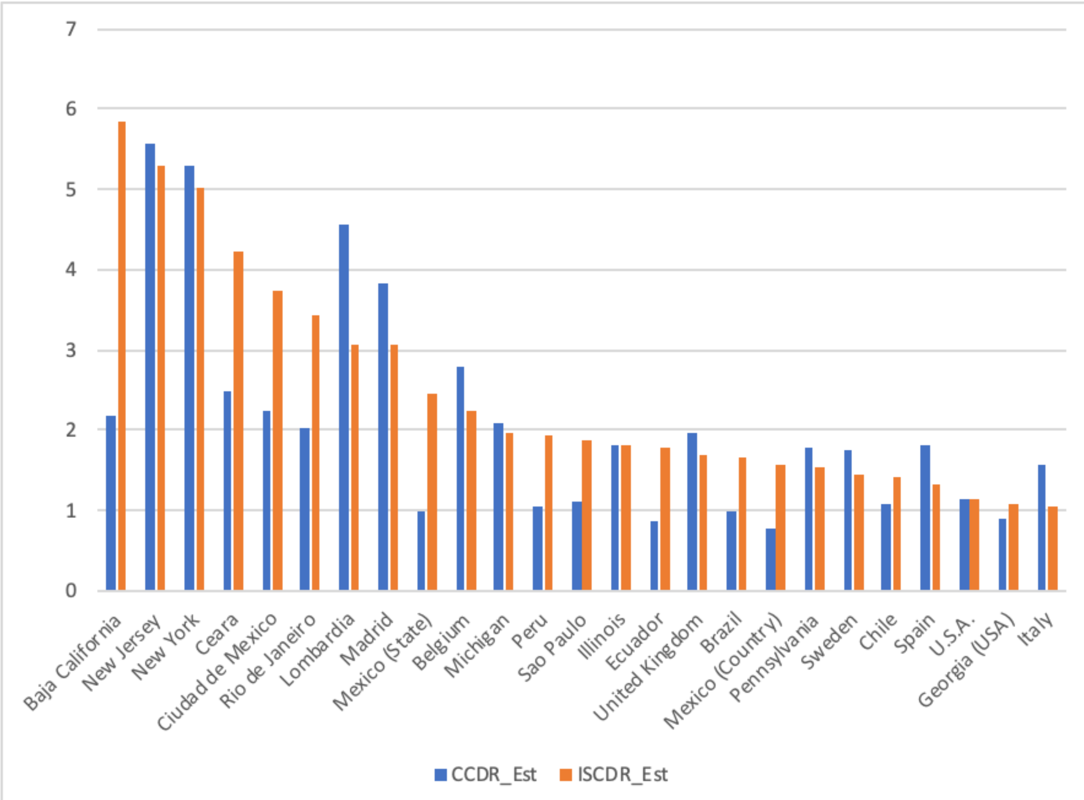
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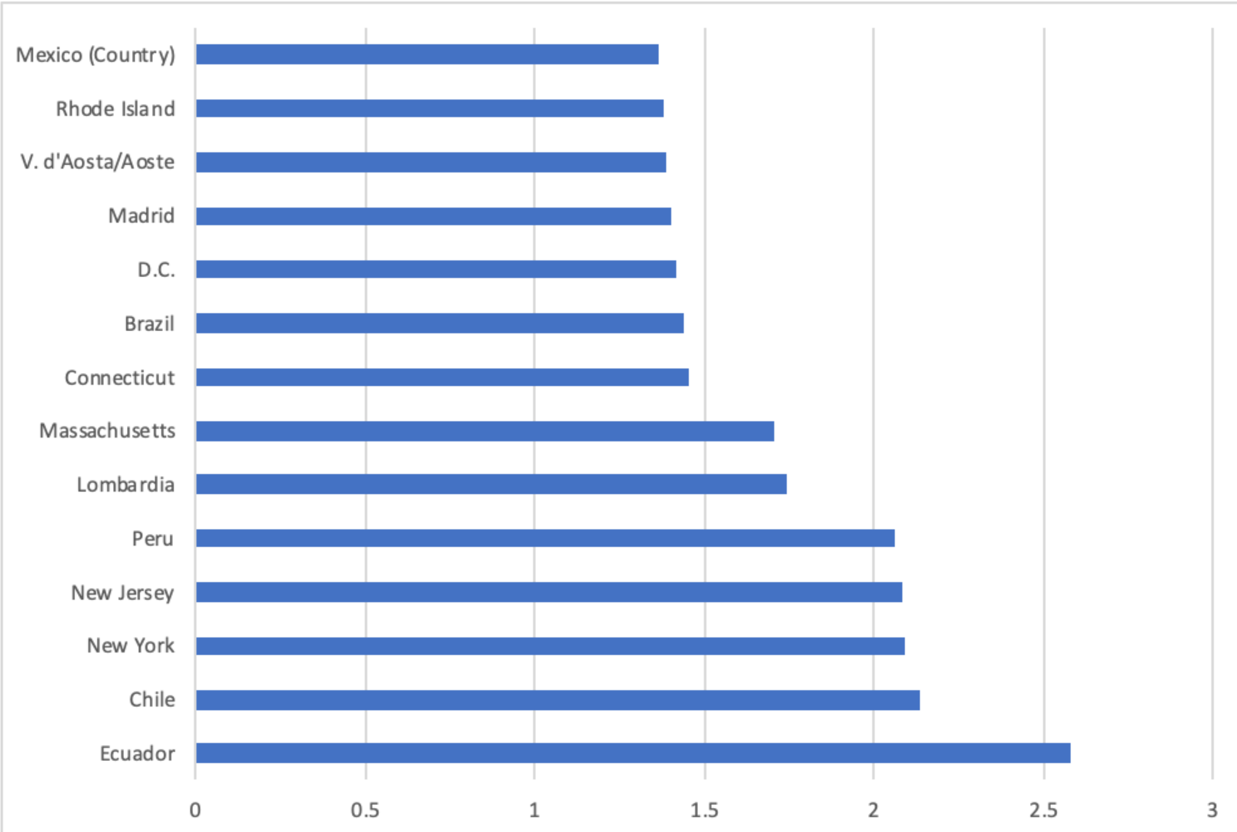
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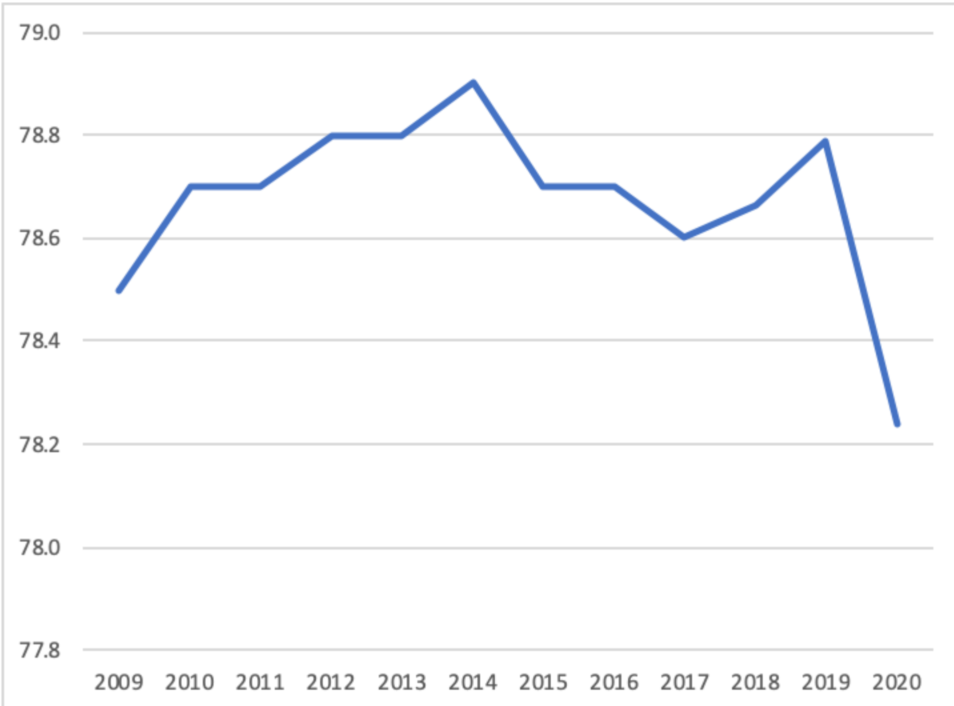
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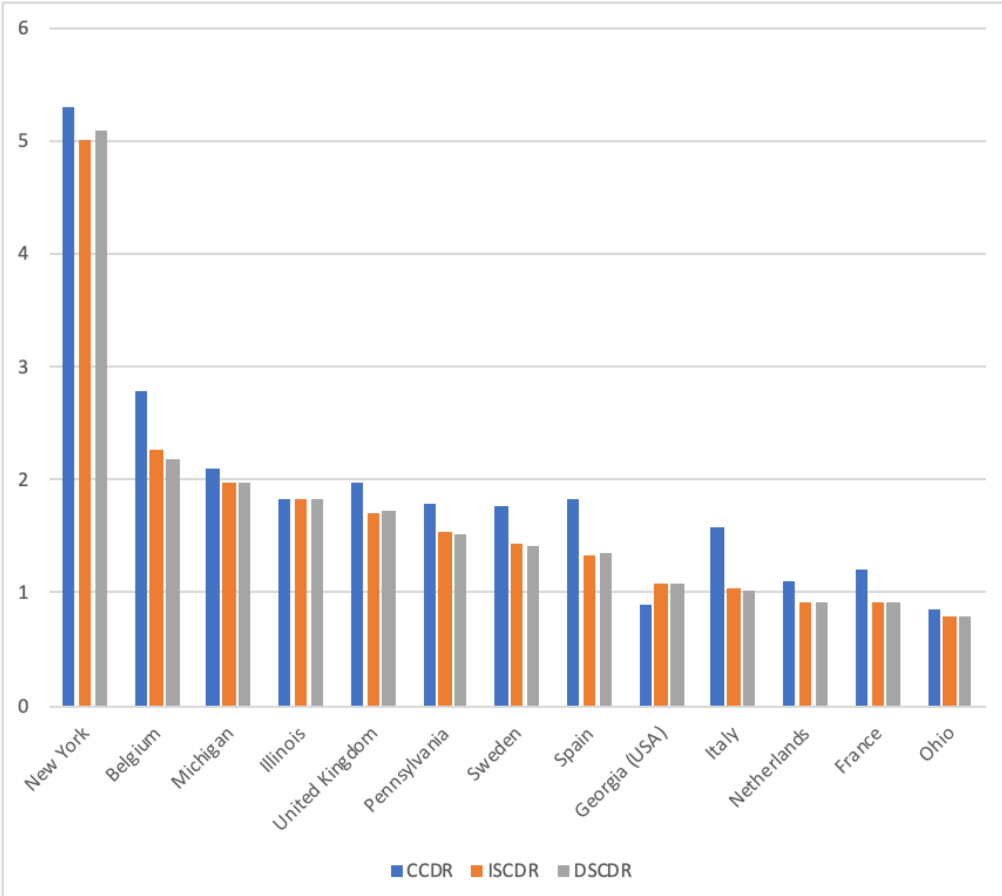
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Beyond Deaths per Capita:

Technical Appendix

Updated Version, 7/7/2020

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Part A. Mortality Indicators

Section 1. Period Crude Covid-19 Death Rate (*CCDR*)

1.1 Get current estimate date & cumulative number of covid-19 deaths by UN country/territory, and first subnational administrative units in Brazil, China, Italy, Mexico, Spain and U.S. state with at least one reported case by June 1, 2020 (all locations thereafter) from: https://coronavirus.jhu.edu/

1.2 Get projection end date & projected number of covid-19 deaths by country & U.S. state from: https://covid19.healthdata.org/

1.3 Get date of first CoViD-19 case and first CoViD-19 death and total mid-2020 population size for all locations in (1.1) (see Part B for example)

1.4 Calculate exposure in person-years for all locations in (1.1) as:

$$N.T$$

where N is total population size in (1.3) & T is year-to-date duration in year converted from dates in (1.1), (1.2) & (1.3)

1.5 Calculate the estimated period Crude Covid-19 Death Rate (*CCDR*) for all locations in (1.1) & projected *CCDR* for all locations in (1.2) as ratios of deaths in (1.1) & (1.2) to exposure in (1.4)

Section 2. Comparative Covid-19 Mortality Ratio (*CCMR*)

2.1 Get report date and number of registered covid-19 deaths by sex and age group from: https://data.cdc.gov/NCHS/Provisional-COVID-19-Death-Counts-by-Sex-Age-and-S/9bhg-hcku

2.2 Get the mid-2020 population size by age groups, ${}_nN_x$, for each sex and the same age groups as in (2.1) for all locations in (1.1) (see part B for example)

2.3 Calculate age-and-sex-specific covid-19 death rates for the U.S.A. using the estimate date of first CoViD-19 death and estimated number of covid-19 deaths in the country in (1.1), the distribution of deaths by sex and age group in (2.1) and the mid-2020 population by sex and age group in the country in (2.2) as:

$$ {}_nD_x^C \,/\, {}_nN_x.T $$

where (separately for males and females) ${}_nN_x$ is the mid-2020 population in age group x to $x+n$ in (2.2), T is the duration of exposure in (1.4) & ${}_nD_x^C$ is the number of covid-19 deaths in (1.1) multiplied by the ratio of deaths in the age group to total deaths in (2.1)

2.4 Calculate estimated and projected counterfactual numbers of covid-19 deaths for all locations in (1.1) & (1.2) using the sex and age-specific covid-19 death rates for the U.S.A. in (2.3) and the mid-2020 population by sex and age group in (2.2)

2.5 Calculate the Comparative Covid-19 Mortality Ratio (CCMR) for estimated and projected numbers of covid-19 deaths for all locations in (1.1) & (1.2) as the ratio of the actual estimate in (1.1) or projected number in (1.2) to the corresponding counterfactual number in (2.4)

Section 3. Projected Reduction in 2020-Life Expectancies

3.1 Get period life-table age-specific death rates (${}_nm_x$) and survival probabilities (${}_np_x$) for year-2020 for each country in (1.1) (see Part B for example)

3.2 Calculate the age-specific ratio of updated to previously projected deaths from all causes in 2020 for each country in (1.1) as:

$$ {}_nR_x = \frac{{}_nm_x.\left({}_nN_x - \left((1-\overline{t_m}).\ {}_nD_x^C\right)\right) + {}_nD_x^C}{{}_nm_x.\ {}_nN_x} $$

where ${}_nm_x$ is the age-specific death rate in the previously projected year-2020 life table from (3.1), ${}_nN_x$ is the mid-2020 population by age group from (2.2), ${}_nD_x^C$ is the projected number of covid-19 deaths in the age group obtained by multiplying the total for the Country in (1.2) by the ratio of deaths in the age group to total deaths in the U.S.A. in (2.1) & $\overline{t_m}$ is the fraction of a year corresponding to the average time of covid-19 deaths estimated here as the mid-point between the first CoViD-19 death in the country and the end date of the projection (October 1, 2020 as of this writing)

3.3 Calculate age-specific survival probabilities in the new projected year-2020 life table for each country in (1.1) from (3.1) & (3.2) using Chiang (1968) formula:

$$ {}_n^{*}p_x = {}_np_x^{\ {}_nR_x} $$

3.4 Calculate the age-specific number of years lived after age x for individuals dying in the age interval in the new projected year-2020 life table for each country in (1.1) from its corresponding value in the previously projected year-2020 life table derived from (3.1) and the life table relationship:

$$ {}_na_x = \frac{1}{{}_nm_x} - n.\frac{{}_np_x}{1-{}_np_x} $$

& from (3.2) and (3.3) using the Preston et al. (2001: 84) formula:

$$ {}_n^{*}a_x = n + \left({}_nR_x.\frac{{}_nq_x}{{}_n^{*}q_x}.\left({}_na_x - n\right)\right) $$

and

$$ {}^{*}a_{85+} = \frac{a_{85+}}{R_{85+}} $$

3.5 Calculate new values of life expectancies (e_x^o values) in the year-2020 life table for all locations in (1.2) starting with e_x^o=$*a_{85+}$ in (3.4) and then using values in (3.3) & (3.4) with the life table relationship:

$$e_x^o = {}_np_x.(e_{x+n}^o + n) + {}_na_x.(1 - {}_np_x)$$

3.6 Calculate the difference between the new values of life expectancies in year-2020 life table in (3.5) and the original values derived from values in (3.1) for all locations in (1.2) and the life table relationship:

$$e_x^o = ({}_np_x.e_{x+n}^o) + \frac{1}{{}_nm_x}.(1 - {}_np_x)$$

Part B. Demographic Parameters

Section 1. Mid-2020 Population Size

1.1 (Step 1.3 in part A) Total mid-2020 population size for each UN country and territory was obtained from the "Total Population" file at:
https://population.un.org/wpp/Download/Standard/Population/
1.1.a For provinces in China, population size was multiplied by the ratio of the 2019-year-end total population estimates for the province divided by the corresponding estimates for the country obtained at:
http://data.stats.gov.cn
1.1.b For U.S. states, the size of each age group was multiplied by the ratio of the 2018-age-group sizes estimated for the state divided by the corresponding estimate for the country obtained at:
https://data.census.gov/cedsci/table?q=United%20States&g=0100000US&tid=ACSDP1Y2018.DP05&hidePreview=true&table=DP05
1.1.c For Brazilian states, population size was multiplied by the ratio of the 2019-year-end total population estimates for the state divided by the corresponding estimates for the country obtained from the Brazil Statistical Office (IBGE) at:
https://www.ibge.gov.br/en/cities-and-states.html?view=municipio
1.1.d For Italian regions, the size of each age group was multiplied by the ratio of the 2019-age-group sizes estimated for the region divided by the corresponding estimate for the country obtained from IStat at:
http://demo.istat.it/tvm2016/index.php
1.1.e For Spanish autonomous communities, the size of each age group was multiplied by the ratio of the 2019-age-group sizes estimated for the community divided by the corresponding estimate for the country obtained from Instituto Nacional Estadistica (INE) at:
https://www.ine.es/dyngs/INEbase/en/categoria.htm?c=Estadistica_P&cid=1254734710984
1.1.f For Mexican states, the size of each age group was multiplied by the ratio of the 2010-age-group sizes estimated for the state divided by the corresponding estimate for the country obtained from Instituto Nacional de Estadistica y Geografía (INEGI) at:

https://en.www.inegi.org.mx/temas/estructura/default.html#Tabulados

1.2 (Step 1.3 in part A) Dates of first CoViD-19 case and death for UN countries and territories and for provinces in China were retrieved from the World Health Organization's daily situation reports at https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/

1.2.a. For other sub-national populations, dates were obtained from the Institute for Health Metrics and Evaluation at https://covid19.healthdata.org.

1.3 (step 2.2. in part A) For UN countries and territories with a population size over 90,000,mid-2020 population size by age group was obtained from the "Population by Age and Sex" file at: https://population.un.org/wpp/Download/Standard/Population/
with the following adjustments:

1.3.a Number of infants (under age 1) for each of these UN countries and territories was obtained from the "Annual Population by Age – Both Sexes" file at: https://population.un.org/wpp/Download/Standard/Interpolated/

1.3.b Number in age group 1-4 for each of these UN countries and territories was obtained as the difference between the number in the first age group (age 0-4) in the population by 5-year age groups in (1.3) above & the number of infants in (1.3.a) above

1.3.c Numbers in age groups 5-14 to 75-84 for each of these UN countries and territories were obtained by adding the numbers in two consecutive age groups (e.g., ages 5-14 & ages 15-24) in the population by 5-year age groups in (1.3) above

1.3.d Number in age group 85 and over for each of these UN countries and territories was obtained by adding the numbers in the last four age groups (i.e., ages 85-89, 90-94, 95-99 & 100+) in the population by 5-year age groups in (1.3) above

1.3.e For sub-national populations, population size in each group was multiplied by the ratio of the UN mid-2020 estimates for the country to total population estimates for country from (1.1) above

Section 2. Calendar-Year-2020 Period Life Table Values

2.1 (Step 3.1 in part A) The period life-table age-specific survival probabilities (${}_np_x$) for year-2020 for each country in (1.3) above are obtained from the corresponding values in the estimated 2015-20 & projected 2020-25 life tables in the "Life table survivors (lx) at exact age x - Both Sexes" file at:
https://population.un.org/wpp/Download/Standard/Mortality/

2.1.a Age-specific survival probabilities (${}_np_x$) in the estimated 2015-20 & projected 2020-25 life tables for each country in (1.3) above are obtained from the number of survivors by age (l_x) and the life table relationship:

$${}_np_x = \frac{l_{x+n}}{l_x}$$

2.1.b Period life-table age-specific survival probabilities (${}_np_x$) for year-2020 for each country in (1.3) above are obtained as:

$${}_np_x[2020] = \sqrt[2]{{}_np_x[2015-2020].\ {}_np_x[2020-2025]}$$

2.2 (step 3.1 in part A) The period life-table age-specific death rates (${}_nm_x$) for year-2020 for each country in (1.3) above are obtained from the corresponding values in the estimated 2015-20

& projected 2020-25 life tables in the "Life table survivors l(x) at exact age x" & "life expectancy at exact age x" files at: https://population.un.org/wpp/Download/Standard/Mortality/

2.2.a Age-specific death rates (${}_nm_x$) in the estimated 2015-20 & projected 2020-25 life tables for each country in (1.3) above are obtained the male/female number of survivors by age (l_x) & the male/female life expectancy by age (e_x^o) and the life table relationships:

$$ {}_nm_x = \frac{l_x - l_{x+n}}{(l_x.e_x^o) - (l_{x+n}.e_{x+n}^o)} $$

&

$$ m_{x+} = \frac{1}{e_x^o} $$

2.2.b Period life-table male/female age-specific death rates (${}_nm_x$) and survival probabilities (${}_np_x$) for year-2020 for each country in (1.3) above are obtained as:

$$ {}_nm_x[2020] = ({}_nm_x[2015\text{-}20] + {}_nm_x[2020\text{-}25]) /2 $$

2.2.c For U.S. states, age-specific death rates (${}_nm_x$) for 2016 at ages above age 25 were obtained from: https://wonder.cdc.gov/controller/datarequest/D140. Under age 25, age-specific death rates are unreliable in some states and the rates in all states were thus assumed to equal the rate at the same age in the country (the assumption should have negligible impact on CoViD-19 mortality assessments). The 2016 age-specific death rates for each sex, age group and state were thus prorated using the ratio of 2020/2016 age-specific death rate for the same sex and age group in the country.

2.2.d For Italian regions and Spanish autonomous communities, 2018 (Italy) and 2019 (Spain) life tables were obtained from IStat and INE (see 1.1 above). The 2018 (or 2019) age-specific death rates for each sex, age group and region/community were prorated using the ratio of 2020/2018 (or 2019) age-specific death rate for the same sex and age group in the country. The 2020 life tables were then completed assuming no change in the ${}_na_x$ from 2018 (or 2019)

LocID	Location	Loc_type	Mid_2020_pop	PopDensity	CDR_year
MX02	Baja California	Mexico	3,605.789	50.5	4.88
MX23	Quintana Roo	Mexico	1,497.403	33.4	3.35
US34	New Jersey	U.S.A.	9,008.043	468.8	8.31
US36	New York	U.S.A.	19,779.540	161.7	7.83
BR23	Ceara	Brazil	9,236.905	62.0	NA
BR13	Amazonas	Brazil	4,192.173	2.7	NA
BR14	Roraima	Brazil	612.715	2.7	NA
MX27	Tabasco	Mexico	2,555.914	103.3	4.98
US25	Massachusett	U.S.A.	6,985.561	344.1	8.57
BR15	Para	Brazil	8,701.617	7.0	NA
MX09	Ciudad de Me	Mexico	10,298.920	6,888.8	6.23
US09	Connecticut	U.S.A.	3,613.794	288.0	8.73
US11	District of Colu	U.S.A.	712.330	4,477.2	7.15
BR33	Rio de Janeiro	Brazil	17,463.128	399.2	NA
BR16	Amapa	Brazil	855.439	6.0	NA
ES08	Castilla-La Ma	Spain	2,021.012	25.4	9.54
MX25	Sinaloa	Mexico	3,215.596	56.0	5.59
BR26	Pernambuco	Brazil	9,666.777	98.6	NA
IT03	Lombardia	Italy	10,073.686	422,224.8	9.90
ES13	Madrid (Comu	Spain	6,611.809	823.6	7.06
BR12	Acre	Brazil	892.059	5.4	NA
US44	Rhode Island	U.S.A.	1,070.329	395.5	9.59
BR32	Espirito Santo	Brazil	4,064.780	88.2	NA
US22	Louisiana	U.S.A.	4,713.234	41.8	9.78
MX15	Mexico (State	Mexico	17,378.187	777.5	4.50
MX29	Tlaxcala	Mexico	1,345.008	336.5	4.73
IT02	Valle d'Aosta/	Italy	125.953	38,701.3	11.70
ES17	Rioja, La	Spain	315.741	62.6	10.00
MX17	Morelos	Mexico	2,047.959	419.8	5.49
BEL	Belgium	Cntry/Terr	11,589.616	382.7	9.78
MX26	Sonora	Mexico	3,077.474	17.1	5.60
BR11	Rondonia	Brazil	1,797.626	7.6	NA
BR27	Alagoas	Brazil	3,375.667	121.2	NA
MX04	Campeche	Mexico	945.785	16.4	4.64
BR28	Sergipe	Brazil	2,325.083	106.0	NA
BR24	Rio Grande do	Brazil	3,547.108	67.2	NA
US26	Michigan	U.S.A.	10,114.528	68.7	9.80
PER	Peru	Cntry/Terr	32,971.846	25.8	5.67
ES07	Castilla y Leon	Spain	2,401.521	25.5	11.91
BR21	Maranhao	Brazil	7,156.397	21.7	NA
US24	Maryland	U.S.A.	6,109.605	241.3	8.25
BR35	Sao Paulo	Brazil	46,446.155	187.1	NA

ES15	Navarra (C. Fo	Spain	651.019	62.7	8.51
US17	Illinois	U.S.A.	12,887.403	89.5	8.57
ECU	Ecuador	Cntry/Terr	17,643.060	71.0	5.15
MX12	Guerrero	Mexico	3,882.954	61.1	4.86
MYT	Mayotte	Cntry/Terr	272.813	727.5	2.75
US10	Delaware	U.S.A.	979.254	193.4	9.54
ES09	Catalunia	Spain	7,623.414	237.4	8.41
GBR	United Kingdo	Cntry/Terr	67,886.004	280.6	9.42
BR25	Paraiba	Brazil	4,064.251	72.0	NA
IT01	Piemonte	Italy	4,369.052	172,347.8	12.30
BRA	Brazil	Cntry/Terr	212,559.409	25.4	6.63
MX08	Chihuahua	Mexico	3,832.828	15.5	7.58
IT08	Emilia-Romag	Italy	4,468.697	164,493.2	11.20
MX13	Hidalgo	Mexico	3,072.136	147.6	4.87
STP	Sao Tome and	Cntry/Terr	219.161	228.3	4.74
MX21	Puebla	Mexico	6,612.709	192.8	5.37
IT22	Trento (Provir	Italy	541.866	87,334.4	9.30
MEX	Mexico (Coun	Cntry/Terr	128,932.753	66.3	6.14
MX31	Yucatan	Mexico	2,269.237	57.4	5.71
US42	Pennsylvania	U.S.A.	12,966.170	111.7	10.59
IT07	Liguria	Italy	1,557.702	192,215.6	14.30
BR22	Piaui	Brazil	3,310.800	13.2	NA
SWE	Sweden	Cntry/Terr	10,099.270	24.6	9.14
CHL	Chile	Cntry/Terr	19,116.209	25.7	6.36
US28	Mississippi	U.S.A.	3,019.798	24.9	10.82
US18	Indiana	U.S.A.	6,767.587	72.8	9.84
ESP	Spain	Cntry/Terr	46,754.783	93.7	9.26
ES02	Aragon	Spain	1,315.017	27.6	10.26
BR53	Distrito Feder	Brazil	3,049.880	529.4	NA
IT21	Bolzano (Provi	Italy	531.191	71,779.7	8.30
IRL	Ireland	Cntry/Terr	4,937.796	71.7	6.27
BR51	Mato Grosso	Brazil	3,524.464	3.9	NA
MX22	Queretaro	Mexico	2,094.397	179.0	4.36
MX30	Veracruz	Mexico	8,831.401	122.9	5.90
MX18	Nayarit	Mexico	1,255.449	45.1	5.47
MX01	Aguascaliente	Mexico	1,360.852	242.3	4.37
MX07	Chiapas	Mexico	5,412.679	73.8	4.53
US08	Colorado	U.S.A.	5,762.204	21.4	6.79
USA	United States	Cntry/Terr	331,002.647	36.2	8.93
MX03	Baja California	Mexico	727.007	9.8	3.82
IT11	Marche	Italy	1,529.183	162,674.8	11.20
US13	Georgia (USA)	U.S.A.	10,628.510	70.9	7.97
GNQ	Equatorial Gui	Cntry/Terr	1,402.985	50.0	8.94

KWT	Kuwait	Cntry/Terr	4,270.563	239.7	2.97
ITA	Italy	Cntry/Terr	60,461.828	205.6	10.70
BR17	Tocantins	Brazil	1,590.921	5.7	NA
ES11	Extremadura	Spain	1,063.076	25.5	10.56
MX06	Colima	Mexico	749.741	133.2	4.95
US33	New Hampshi	U.S.A.	1,372.567	59.1	9.31
US27	Minnesota	U.S.A.	5,677.124	27.5	9.96
NLD	Netherlands	Cntry/Terr	17,134.873	508.2	8.96
MX28	Tamaulipas	Mexico	3,689.743	45.9	5.26
FRA	France	Cntry/Terr	65,273.512	119.2	9.39
MX20	Oaxaca	Mexico	4,386.373	46.8	5.71
CHI	Channel Islanc	Cntry/Terr	173.859	915.0	7.89
BOL	Bolivia (Plurin	Cntry/Terr	11,673.029	10.8	6.79
US35	New Mexico	U.S.A.	2,121.624	6.7	8.94
PAN	Panama	Cntry/Terr	4,314.768	58.0	5.16
IRN	Iran (Islamic R	Cntry/Terr	83,992.953	51.6	4.85
BR29	Bahia	Brazil	15,043.792	26.6	NA
US04	Arizona	U.S.A.	7,262.286	24.7	8.23
ARM	Armenia	Cntry/Terr	2,963.234	104.1	9.80
ES06	Cantabria	Spain	579.733	109.0	10.33
US39	Ohio	U.S.A.	11,827.215	111.5	10.61
DJI	Djibouti	Cntry/Terr	988.002	42.6	7.05
US51	Virginia	U.S.A.	8,614.990	84.0	8.10
GUF	French Guiana	Cntry/Terr	298.682	3.6	3.00
IT05	Veneto	Italy	4,914.725	267,218.0	10.00
US19	Iowa	U.S.A.	3,194.037	22.1	9.71
IRQ	Iraq	Cntry/Terr	40,222.503	92.6	4.74
US01	Alabama	U.S.A.	4,944.686	37.6	10.92
MKD	North Macedo	Cntry/Terr	2,083.380	82.6	10.25
MDA	Republic of M	Cntry/Terr	4,033.963	122.8	11.81
BHR	Bahrain	Cntry/Terr	1,701.583	2,238.9	2.47
IT13	Abruzzo	Italy	1,314.662	121,463.4	11.20
ES10	Comunitat Val	Spain	4,976.319	214.0	8.81
CAN	Canada	Cntry/Terr	37,742.157	4.2	7.83
HND	Honduras	Cntry/Terr	9,904.608	88.5	4.48
US32	Nevada	U.S.A.	3,070.509	10.8	8.22
QAT	Qatar	Cntry/Terr	2,881.060	248.2	1.32
MX05	Coahuila	Mexico	3,150.456	20.7	5.31
MX14	Jalisco	Mexico	8,442.704	107.4	5.33
MX16	Michoacan	Mexico	4,992.690	85.1	5.55
SAU	Saudi Arabia	Cntry/Terr	34,813.867	16.2	3.58
LUX	Luxembourg	Cntry/Terr	625.976	241.7	7.11
MX19	Nuevo Leon	Mexico	5,360.737	83.5	4.97

ES04	Balears (Illes)	Spain	1,137.723	227.9	6.70
OMN	Oman	Cntry/Terr	5,106.622	16.5	2.45
MX10	Durango	Mexico	1,858.666	15.0	5.65
ES03	Asturias (Princ	Spain	1,024.060	96.6	12.64
CHE	Switzerland	Cntry/Terr	8,654.618	219.0	8.11
US29	Missouri	U.S.A.	6,200.300	34.7	10.12
ZAF	South Africa	Cntry/Terr	59,308.690	48.9	9.45
IT09	Toscana	Italy	3,740.109	295,717.2	11.60
US06	California	U.S.A.	40,011.015	99.0	6.78
MX11	Guanajuato	Mexico	6,295.742	205.6	4.95
MRT	Mauritania	Cntry/Terr	4,649.660	4.5	7.06
US31	Nebraska	U.S.A.	1,952.141	9.8	8.79
US53	Washington	U.S.A.	7,627.572	44.2	7.70
US45	South Carolina	U.S.A.	5,145.408	66.0	9.84
IT06	Friuli-Venezia	Italy	1,218.962	155,147.8	11.90
ARE	United Arab E	Cntry/Terr	9,890.400	118.3	1.62
US37	North Carolina	U.S.A.	10,501.123	83.2	9.07
CAF	Central Africa	Cntry/Terr	4,829.764	7.8	11.86
BR52	Goias	Brazil	7,098.918	20.9	NA
DOM	Dominican Re	Cntry/Terr	10,847.904	224.5	6.25
GTM	Guatemala	Cntry/Terr	17,915.567	167.2	4.72
ES01	Andalucia	Spain	8,349.380	95.3	8.33
US21	Kentucky	U.S.A.	4,519.893	43.9	10.82
COL	Colombia	Cntry/Terr	50,882.884	45.9	5.73
US55	Wisconsin	U.S.A.	5,882.866	41.8	9.09
US12	Florida	U.S.A.	21,586.295	154.3	9.70
AFG	Afghanistan	Cntry/Terr	38,928.341	59.6	6.21
ES12	Galicia	Spain	2,697.559	91.2	11.57
US46	South Dakota	U.S.A.	893.132	4.5	9.19
MX32	Zacatecas	Mexico	1,713.503	22.8	5.62
TUR	Turkey	Cntry/Terr	84,339.067	109.6	5.51
BR41	Parana	Brazil	11,565.208	58.0	NA
US38	North Dakota	U.S.A.	769.967	4.3	8.49
GNB	Guinea-Bissau	Cntry/Terr	1,967.998	70.0	9.32
US48	Texas	U.S.A.	28,999.321	42.7	7.00
PRT	Portugal	Cntry/Terr	10,196.707	111.3	10.87
US40	Oklahoma	U.S.A.	3,989.492	22.4	10.29
MDV	Maldives	Cntry/Terr	540.542	1,801.8	2.79
MX24	San Luis Potos	Mexico	2,972.710	48.6	5.14
BR43	Rio Grande do	Brazil	11,507.839	40.9	NA
US20	Kansas	U.S.A.	2,945.539	13.9	9.29
US47	Tennessee	U.S.A.	6,847.752	64.1	10.44
YEM	Yemen	Cntry/Terr	29,825.968	56.5	5.97

US05	Arkansas	U.S.A.	3,049.575	22.6	10.85
BR31	Minas Gerais	Brazil	21,411.788	36.5	NA
ES14	Murcia (Regio	Spain	1,479.460	130.8	7.65
BR42	Santa Catarina	Brazil	7,247.033	75.7	NA
IT12	Lazio	Italy	5,885.980	341,707.9	9.70
US49	Utah	U.S.A.	3,194.497	15.0	5.81
DNK	Denmark	Cntry/Terr	5,792.203	136.5	9.88
EGY	Egypt	Cntry/Terr	102,334.403	102.8	5.77
CPV	Cabo Verde	Cntry/Terr	555.988	138.0	5.56
ROU	Romania	Cntry/Terr	19,237.682	83.6	13.21
IT16	Puglia	Italy	4,034.220	206,586.8	9.60
GAB	Gabon	Cntry/Terr	2,225.728	8.6	6.69
RUS	Russian Feder	Cntry/Terr	145,934.460	8.9	12.89
US50	Vermont	U.S.A.	634.325	26.5	9.63
PAK	Pakistan	Cntry/Terr	220,892.331	286.5	6.86
CMR	Cameroon	Cntry/Terr	26,545.864	56.2	8.95
DEU	Germany	Cntry/Terr	83,783.945	240.4	11.45
COM	Comoros	Cntry/Terr	869.595	467.3	7.09
CN17	Hubei	China	60,772.884	326.9	7.00
ES05	Canarias	Spain	2,136.113	286.8	7.05
BHS	Bahamas	Cntry/Terr	393.248	39.3	6.97
US23	Maine	U.S.A.	1,355.887	17.0	10.99
ATG	Antigua and B	Cntry/Terr	97.928	222.6	6.51
VIR	United States	Cntry/Terr	104.423	298.4	9.05
SLV	El Salvador	Cntry/Terr	6,486.201	313.0	7.11
ES18	Ceuta	Spain	83.673	4,183.6	6.29
BR50	Mato Grosso (	Brazil	2,810.886	7.9	NA
BIH	Bosnia and He	Cntry/Terr	3,280.815	64.3	11.08
AUT	Austria	Cntry/Terr	9,006.400	109.3	9.93
SUR	Suriname	Cntry/Terr	586.634	3.8	7.46
US16	Idaho	U.S.A.	1,774.655	8.3	8.16
SLE	Sierra Leone	Cntry/Terr	7,976.985	110.5	11.38
SDN	Sudan	Cntry/Terr	43,849.269	24.8	7.06
IT15	Campania	Italy	5,801.773	424,534.7	9.20
SWZ	Eswatini	Cntry/Terr	1,160.164	67.5	9.17
BLR	Belarus	Cntry/Terr	9,449.321	46.6	12.56
HUN	Hungary	Cntry/Terr	9,660.350	106.7	12.74
US54	West Virginia	U.S.A.	1,828.890	29.3	12.82
IT20	Sardegna	Italy	1,643.577	68,239.9	9.90
ISR	Israel	Cntry/Terr	8,655.541	400.0	5.32
US56	Wyoming	U.S.A.	584.633	2.3	8.23
AZE	Azerbaijan	Cntry/Terr	10,139.175	122.7	6.89
GUM	Guam	Cntry/Terr	168.783	312.6	5.36

IT10	Umbria	Italy	884.495	104,653.3	11.40
ABW	Aruba	Cntry/Terr	106.766	593.1	9.38
FIN	Finland	Cntry/Terr	5,540.718	18.2	9.90
US41	Oregon	U.S.A.	4,244.225	17.1	8.84
DZA	Algeria	Cntry/Terr	43,851.043	18.4	4.73
TCD	Chad	Cntry/Terr	16,425.859	13.0	11.75
COG	Congo	Cntry/Terr	5,518.092	16.2	6.62
EST	Estonia	Cntry/Terr	1,326.539	31.3	11.89
SEN	Senegal	Cntry/Terr	16,743.930	87.0	5.52
KGZ	Kyrgyzstan	Cntry/Terr	6,524.191	34.0	5.93
PRI	Puerto Rico	Cntry/Terr	2,860.840	322.5	9.83
MLI	Mali	Cntry/Terr	20,250.834	16.6	9.23
IT14	Molise	Italy	306.556	68,830.7	12.10
SVN	Slovenia	Cntry/Terr	2,078.932	103.2	10.20
NOR	Norway	Cntry/Terr	5,421.242	14.8	7.95
LBR	Liberia	Cntry/Terr	5,057.677	52.5	7.34
TJK	Tajikistan	Cntry/Terr	9,537.642	68.1	4.75
ARG	Argentina	Cntry/Terr	45,195.777	16.5	7.61
SRB	Serbia	Cntry/Terr	8,737.370	99.9	13.23
SOM	Somalia	Cntry/Terr	15,893.219	25.3	10.54
IT19	Sicilia	Italy	5,005.165	193,904.0	10.40
GUY	Guyana	Cntry/Terr	786.559	4.0	7.67
NIC	Nicaragua	Cntry/Terr	6,624.554	55.0	5.10
HTI	Haiti	Cntry/Terr	11,402.533	413.7	8.42
POL	Poland	Cntry/Terr	37,846.605	123.6	10.37
SSD	South Sudan	Cntry/Terr	11,193.729	18.3	10.23
ES19	Melilla	Spain	85.187	7,098.9	5.78
IT18	Calabria	Italy	1,949.987	128,147.1	10.10
IT17	Basilicata	Italy	564.286	56,076.9	11.10
BGD	Bangladesh	Cntry/Terr	164,689.383	1,265.2	5.54
GLP	Guadeloupe	Cntry/Terr	400.127	245.8	8.49
IND	India	Cntry/Terr	1,380,004.385	464.1	7.33
ISL	Iceland	Cntry/Terr	341.250	3.4	6.79
CZE	Czechia	Cntry/Terr	10,708.982	138.6	10.68
US02	Alaska	U.S.A.	745.469	0.5	5.96
MTQ	Martinique	Cntry/Terr	375.265	354.0	9.40
UKR	Ukraine	Cntry/Terr	43,733.759	75.5	15.19
BRB	Barbados	Cntry/Terr	287.371	668.3	9.14
ALB	Albania	Cntry/Terr	2,877.800	105.0	8.26
BGR	Bulgaria	Cntry/Terr	6,948.445	64.0	15.51
IDN	Indonesia	Cntry/Terr	273,523.621	151.0	6.60
PHL	Philippines	Cntry/Terr	109,581.085	367.5	6.00
KAZ	Kazakhstan	Cntry/Terr	18,776.707	7.0	7.24

MNE	Montenegro	Cntry/Terr	628.062	46.7	10.77
HRV	Croatia	Cntry/Terr	4,105.268	73.4	13.22
LTU	Lithuania	Cntry/Terr	2,722.291	43.4	14.00
MLT	Malta	Cntry/Terr	441.539	1,379.8	8.60
US30	Montana	U.S.A.	1,076.137	2.9	9.71
GIN	Guinea	Cntry/Terr	13,132.792	53.4	8.11
BRN	Brunei Daruss	Cntry/Terr	437.483	83.0	4.68
NER	Niger	Cntry/Terr	24,206.636	19.1	7.89
GHA	Ghana	Cntry/Terr	31,072.945	136.6	7.19
CYP	Cyprus	Cntry/Terr	1,207.361	130.7	7.20
NGA	Nigeria	Cntry/Terr	206,139.587	226.3	11.48
KEN	Kenya	Cntry/Terr	53,771.300	94.5	5.43
BLZ	Belize	Cntry/Terr	397.621	17.4	4.81
BFA	Burkina Faso	Cntry/Terr	20,903.278	76.4	7.76
CIV	Cote d'Ivoire	Cntry/Terr	26,378.275	83.0	9.78
LVA	Latvia	Cntry/Terr	1,886.202	30.3	14.78
LBY	Libya	Cntry/Terr	6,871.287	3.9	5.15
ZMB	Zambia	Cntry/Terr	18,383.956	24.7	6.33
MAR	Morocco	Cntry/Terr	36,910.558	82.7	5.09
US15	Hawaii	U.S.A.	1,439.609	86.5	7.98
MUS	Mauritius	Cntry/Terr	1,271.767	626.5	8.71
GRC	Greece	Cntry/Terr	10,423.056	80.9	11.09
COD	Democratic Re	Cntry/Terr	89,561.404	39.5	9.17
TGO	Togo	Cntry/Terr	8,278.737	152.2	8.23
BEN	Benin	Cntry/Terr	12,123.198	107.5	8.58
LBN	Lebanon	Cntry/Terr	6,825.442	667.2	4.59
MDG	Madagascar	Cntry/Terr	27,691.019	47.6	5.85
TTO	Trinidad and T	Cntry/Terr	1,399.491	272.8	8.67
URY	Uruguay	Cntry/Terr	3,473.727	19.8	9.48
PSE	State of Palest	Cntry/Terr	5,101.416	847.4	3.46
MYS	Malaysia	Cntry/Terr	32,365.998	98.5	5.27
TUN	Tunisia	Cntry/Terr	11,818.618	76.1	6.28
CUB	Cuba	Cntry/Terr	11,326.616	106.4	9.29
NPL	Nepal	Cntry/Terr	29,136.808	203.3	6.31
REU	Reunion	Cntry/Terr	895.308	358.1	6.33
SVK	Slovakia	Cntry/Terr	5,459.643	113.5	10.12
PRY	Paraguay	Cntry/Terr	7,132.530	18.0	5.60
MWI	Malawi	Cntry/Terr	19,129.955	202.9	6.37
CUW	Curacao	Cntry/Terr	164.100	369.6	9.08
JAM	Jamaica	Cntry/Terr	2,961.161	273.4	7.63
SGP	Singapore	Cntry/Terr	5,850.343	8,357.6	4.83
GMB	Gambia	Cntry/Terr	2,416.664	238.8	7.55
CRI	Costa Rica	Cntry/Terr	5,094.114	99.8	5.24

GEO	Georgia	Cntry/Terr	3,989.175	57.4	12.77
NZL	New Zealand	Cntry/Terr	4,822.233	18.3	7.11
ETH	Ethiopia	Cntry/Terr	114,963.583	115.0	6.33
KOR	Republic of Kc	Cntry/Terr	51,269.183	527.3	6.40
VEN	Venezuela (Bc	Cntry/Terr	28,435.943	32.2	7.14
AGO	Angola	Cntry/Terr	32,866.268	26.4	7.89
JOR	Jordan	Cntry/Terr	10,203.140	114.9	3.93
RWA	Rwanda	Cntry/Terr	12,952.209	525.0	5.11
AUS	Australia	Cntry/Terr	25,499.881	3.3	6.66
JPN	Japan	Cntry/Terr	126,476.458	346.9	10.98
MOZ	Mozambique	Cntry/Terr	31,255.435	39.7	8.12
CHN	China	Cntry/Terr	1,439,323.774	153.3	7.47
UZB	Uzbekistan	Cntry/Terr	33,469.199	78.7	5.83
ZWE	Zimbabwe	Cntry/Terr	14,862.927	38.4	7.85
TZA	United Republ	Cntry/Terr	59,734.213	67.4	6.21
BWA	Botswana	Cntry/Terr	2,351.625	4.1	5.86
SYR	Syrian Arab Re	Cntry/Terr	17,500.657	95.3	4.80
LKA	Sri Lanka	Cntry/Terr	21,413.250	341.5	6.87
THA	Thailand	Cntry/Terr	69,799.978	136.6	7.95
BDI	Burundi	Cntry/Terr	11,890.781	463.0	7.66
CN21	Hainan	China	9,689.620	285.0	6.01
HKG	China, Hong K	Cntry/Terr	7,496.988	7,140.0	6.88
CN01	Beijing	China	22,086.180	1,314.7	5.58
MMR	Myanmar	Cntry/Terr	54,409.794	83.3	8.31
CN08	Heilongjiang	China	38,461.125	84.7	6.67
CN09	Shanghai	China	24,895.657	3,926.1	5.40
CN16	Henan	China	98,844.373	591.9	6.80
TWN	China, Taiwan	Cntry/Terr	23,816.775	672.6	7.83
CN02	Tianjin	China	16,016.070	1,416.7	5.42
CN22	Chongqing	China	32,032.139	389.2	7.54
CN31	Xinjiang	China	25,869.746	15.6	4.56
CN12	Anhui	China	65,274.199	467.2	5.96
CN27	Shaanxi	China	39,619.778	192.7	6.24
CN28	Gansu	China	27,141.188	59.7	6.65
CN07	Jilin	China	27,592.345	147.2	6.26
CN03	Hebei	China	77,845.071	414.7	6.38
CN15	Shandong	China	103,253.406	671.3	7.18
CN19	Guangdong	China	118,131.330	656.3	4.55
CN18	Hunan	China	70,934.167	337.8	7.08
CN24	Guizhou	China	37,148.668	211.1	6.85
CN06	Liaoning	China	44,623.518	305.9	7.39
CN05	Inner Mongoli	China	26,044.057	22.0	5.95
CN25	Yunnan	China	49,811.822	126.4	6.32

CN20	Guangxi	China	50,857.686	215.5	5.96
CN23	Sichuan	China	85,873.612	177.1	7.01
CN13	Fujian	China	40,737.416	335.1	6.20
CN14	Jiangxi	China	47,843.137	286.5	6.06
CN11	Zhejiang	China	59,983.359	588.1	5.58
AND	Andorra	Cntry/Terr	77.265	164.4	NA
BMU	Bermuda	Cntry/Terr	62.273	1,245.5	NA
CYM	Cayman Islanc	Cntry/Terr	65.720	273.8	NA
IMN	Isle of Man	Cntry/Terr	85.032	149.2	NA
IT04	NA	NA	1,073.057	78,895.1	8.80
LIE	Liechtenstein	Cntry/Terr	38.137	238.4	NA
MAF	Saint Martin (I	Cntry/Terr	38.659	729.4	NA
MCO	Monaco	Cntry/Terr	39.244	26,338.3	NA
MNP	Northern Mar	Cntry/Terr	57.557	125.1	NA
MSR	Montserrat	Cntry/Terr	4.999	50.0	NA
SMR	San Marino	Cntry/Terr	33.938	565.6	NA
SXM	Siint Maarten	Cntry/Terr	42.882	1,261.2	NA
TCA	Turks and Caic	Cntry/Terr	38.718	40.8	NA
VGB	British Virgin I	Cntry/Terr	30.237	201.6	NA

Days_Est	CCDR_Est	CCMR_Est	ISCDR_Est	Days_Proj	CCDR_Proj	CCMR_Proj
93	2.19	5.08	5.83	183	1.88	4.37
97	1.52	4.66	5.35	187	1.93	5.91
110	5.58	4.61	5.30	200	3.25	2.69
112	5.30	4.36	5.01	202	3.04	2.51
100	2.49	3.69	4.24	190	1.65	2.44
101	2.47	3.67	4.21	191	1.95	2.90
91	2.32	3.45	3.95	181	1.64	2.43
93	1.69	3.42	3.93	183	1.53	3.09
105	4.06	3.34	3.83	195	2.73	2.24
94	2.24	3.32	3.81	184	1.50	2.22
107	2.24	3.24	3.72	197	1.79	2.59
106	4.13	3.19	3.66	196	2.38	1.83
99	2.88	3.18	3.66	189	1.70	1.88
107	2.02	3.00	3.44	197	2.04	3.02
91	2.01	2.98	3.42	181	2.15	3.19
115	4.77	2.86	3.28	205	2.65	1.59
95	1.62	2.79	3.20	185	1.27	2.18
101	1.86	2.76	3.17	191	2.05	3.04
133	4.55	2.66	3.06	223	3.02	1.76
122	3.82	2.66	3.05	212	2.34	1.63
88	1.76	2.61	3.00	178	1.87	2.78
97	3.38	2.61	2.99	187	2.44	1.88
93	1.67	2.48	2.85	183	1.91	2.84
111	2.28	2.15	2.47	201	1.64	1.55
95	1.00	2.14	2.46	185	1.46	3.13
84	1.19	2.11	2.42	174	1.69	2.99
115	3.69	2.04	2.34	205	3.04	1.68
117	3.63	2.04	2.34	207	2.59	1.45
96	1.27	2.03	2.33	186	1.38	2.19
111	2.78	1.96	2.26	201	1.55	1.10
90	1.02	1.92	2.20	180	1.25	2.35
86	1.25	1.86	2.14	176	1.55	2.29
95	1.25	1.85	2.12	185	1.75	2.60
87	0.99	1.85	2.12	177	1.52	2.84
93	1.23	1.82	2.09	183	2.58	3.83
97	1.17	1.74	2.00	187	1.79	2.65
107	2.10	1.72	1.97	197	1.18	0.97
106	1.05	1.70	1.95	196	2.05	3.31
113	3.76	1.70	1.95	203	1.46	0.66
96	1.13	1.67	1.92	186	1.10	1.63
105	1.83	1.66	1.90	195	1.08	0.98
109	1.11	1.65	1.89	199	1.46	2.17

111	2.67	1.64	1.89	201	1.38	0.85
108	1.83	1.59	1.82	198	1.24	1.07
111	0.87	1.56	1.79	201	2.09	3.77
92	0.94	1.55	1.78	182	1.58	2.62
94	0.50	1.54	1.77	NA	NA	NA
99	1.93	1.53	1.76	189	1.14	0.90
118	2.31	1.51	1.74	208	1.33	0.87
120	1.98	1.48	1.70	210	1.23	0.92
94	1.00	1.48	1.70	184	1.55	2.30
121	2.84	1.46	1.68	211	1.90	0.98
109	0.98	1.45	1.66	199	1.44	2.13
85	0.73	1.44	1.66	175	1.41	2.78
129	2.71	1.44	1.65	219	1.73	0.92
97	0.86	1.43	1.64	187	1.14	1.91
65	0.33	1.42	1.63	155	0.11	0.48
96	0.81	1.41	1.62	186	1.38	2.41
114	2.40	1.41	1.62	204	1.58	0.93
107	0.77	1.37	1.58	197	1.27	2.25
89	0.84	1.35	1.55	179	1.61	2.56
106	1.79	1.34	1.54	196	1.17	0.88
123	2.98	1.33	1.53	213	2.15	0.96
87	0.89	1.31	1.51	177	1.52	2.25
111	1.77	1.25	1.44	201	1.04	0.73
105	1.08	1.24	1.43	195	2.49	2.86
102	1.30	1.21	1.39	192	1.24	1.16
108	1.33	1.18	1.36	198	0.81	0.72
122	1.82	1.16	1.34	212	1.06	0.68
118	2.15	1.16	1.33	208	1.13	0.61
97	0.78	1.16	1.33	187	1.28	1.90
114	1.76	1.15	1.32	204	1.06	0.69
115	1.12	1.14	1.31	205	0.65	0.66
92	0.76	1.13	1.29	182	1.95	2.89
95	0.54	1.12	1.28	185	1.33	2.73
95	0.71	1.11	1.27	185	1.38	2.14
92	0.66	1.04	1.20	182	1.44	2.26
83	0.50	1.03	1.18	173	1.53	3.17
84	0.47	1.02	1.17	174	1.25	2.71
108	1.00	1.00	1.15	198	0.68	0.68
124	1.15	1.00	1.15	214	0.91	0.79
93	0.43	0.99	1.13	183	1.37	3.16
124	1.91	0.98	1.12	214	1.22	0.63
109	0.90	0.94	1.08	199	0.90	0.94
74	0.18	0.93	1.07	164	0.95	4.91

92	0.33	0.92	1.05	182	0.82	2.25
133	1.58	0.91	1.05	223	1.13	0.65
80	0.60	0.89	1.02	170	1.32	1.96
116	1.54	0.88	1.01	206	0.87	0.50
78	0.49	0.83	0.95	168	0.34	0.58
93	1.08	0.82	0.94	183	1.12	0.86
100	0.96	0.82	0.94	190	0.62	0.53
120	1.09	0.80	0.92	210	0.65	0.48
90	0.44	0.80	0.92	180	1.35	2.46
140	1.20	0.79	0.91	230	0.74	0.49
95	0.53	0.78	0.89	185	1.48	2.17
100	0.99	0.76	0.87	NA	NA	NA
96	0.42	0.76	0.87	186	1.24	2.25
96	0.90	0.75	0.86	186	0.74	0.62
116	0.49	0.75	0.86	206	1.15	1.77
136	0.36	0.74	0.85	226	1.00	2.07
97	0.49	0.72	0.83	187	1.27	1.88
104	0.85	0.71	0.82	194	1.08	0.90
100	0.57	0.71	0.81	190	0.53	0.66
109	1.25	0.70	0.80	199	0.66	0.37
105	0.85	0.69	0.79	195	0.65	0.53
86	0.24	0.68	0.78	176	0.20	0.56
105	0.73	0.67	0.77	195	0.49	0.44
75	0.26	0.66	0.76	NA	NA	NA
131	1.15	0.66	0.76	221	0.92	0.53
100	0.82	0.65	0.75	190	0.50	0.39
122	0.16	0.64	0.73	212	0.93	3.70
100	0.73	0.63	0.73	190	0.75	0.65
104	0.54	0.61	0.70	194	1.19	1.34
106	0.48	0.61	0.70	196	1.01	1.28
111	0.18	0.61	0.70	201	0.81	2.71
116	1.11	0.60	0.69	206	0.80	0.44
118	0.89	0.60	0.69	208	0.50	0.33
116	0.73	0.58	0.66	206	0.47	0.37
100	0.22	0.57	0.65	190	0.96	2.51
104	0.60	0.57	0.65	194	0.58	0.55
98	0.15	0.56	0.64	188	0.40	1.48
96	0.29	0.56	0.64	186	1.08	2.09
102	0.32	0.56	0.64	192	0.75	1.29
98	0.36	0.55	0.63	188	1.16	1.77
102	0.18	0.52	0.60	192	1.07	3.07
113	0.57	0.52	0.60	203	0.33	0.30
90	0.27	0.51	0.59	180	1.45	2.72

115	0.63	0.51	0.58	205	0.37	0.30
95	0.14	0.51	0.58	185	0.56	1.99
105	0.28	0.50	0.57	195	1.14	2.03
115	1.04	0.50	0.57	205	0.61	0.29
121	0.69	0.49	0.56	211	0.44	0.32
106	0.58	0.48	0.55	196	0.50	0.41
99	0.18	0.48	0.55	NA	NA	NA
117	0.93	0.47	0.54	207	0.81	0.41
115	0.50	0.47	0.54	205	0.44	0.41
87	0.26	0.47	0.54	177	1.29	2.31
92	0.11	0.47	0.53	182	0.24	1.00
97	0.55	0.46	0.53	187	0.50	0.43
129	0.50	0.46	0.53	219	0.45	0.42
105	0.53	0.46	0.53	195	0.50	0.43
118	0.88	0.44	0.51	208	0.73	0.37
105	0.11	0.44	0.51	195	0.12	0.47
100	0.49	0.44	0.50	190	0.41	0.36
42	0.08	0.43	0.49	132	1.12	5.65
100	0.28	0.42	0.48	190	1.17	1.74
110	0.23	0.42	0.48	200	0.96	1.69
112	0.15	0.41	0.47	202	1.02	2.74
113	0.55	0.41	0.47	203	0.41	0.30
105	0.45	0.39	0.45	195	0.32	0.28
104	0.25	0.39	0.45	194	1.31	2.04
106	0.47	0.38	0.43	196	0.40	0.32
112	0.55	0.38	0.43	202	1.12	0.77
104	0.07	0.37	0.43	194	0.13	0.68
112	0.75	0.36	0.42	202	0.44	0.21
89	0.45	0.36	0.41	179	0.52	0.41
93	0.23	0.35	0.40	183	0.97	1.47
108	0.21	0.34	0.39	198	0.66	1.06
99	0.23	0.33	0.38	189	1.31	1.94
95	0.40	0.33	0.38	185	0.23	0.19
69	0.06	0.33	0.38	159	0.17	0.85
108	0.30	0.33	0.38	198	0.62	0.69
109	0.52	0.32	0.37	199	0.29	0.18
103	0.35	0.32	0.36	193	0.24	0.21
64	0.11	0.31	0.36	154	0.03	0.10
100	0.20	0.31	0.36	190	0.51	0.80
101	0.21	0.31	0.36	191	1.10	1.63
100	0.35	0.29	0.34	190	0.28	0.24
103	0.32	0.29	0.33	193	0.44	0.39
65	0.06	0.29	0.33	155	0.96	4.51

101	0.33	0.28	0.33	191	0.48	0.41
96	0.19	0.28	0.32	186	1.37	2.04
106	0.35	0.27	0.31	196	0.21	0.16
100	0.18	0.27	0.31	190	0.91	1.35
120	0.43	0.26	0.30	210	0.44	0.27
97	0.21	0.26	0.30	187	0.25	0.32
111	0.34	0.26	0.30	201	0.20	0.15
118	0.09	0.26	0.30	208	0.92	2.50
99	0.10	0.25	0.29	189	0.24	0.60
104	0.31	0.25	0.29	194	0.97	0.79
122	0.41	0.25	0.28	212	0.50	0.30
106	0.07	0.24	0.28	196	0.53	1.97
101	0.24	0.24	0.28	191	0.25	0.25
105	0.31	0.23	0.27	195	0.22	0.17
107	0.07	0.22	0.25	197	0.35	1.10
102	0.04	0.21	0.24	192	0.78	3.92
117	0.34	0.21	0.24	207	0.24	0.15
62	0.05	0.20	0.23	152	1.22	5.16
175	0.16	0.20	0.23	NA	NA	NA
113	0.25	0.20	0.23	203	0.23	0.18
93	0.11	0.20	0.23	183	0.13	0.24
98	0.29	0.20	0.23	188	0.17	0.12
87	0.13	0.20	0.22	177	0.22	0.33
89	0.24	0.19	0.22	179	0.14	0.11
94	0.11	0.19	0.22	184	1.34	2.24
99	0.18	0.19	0.21	189	0.14	0.15
95	0.12	0.18	0.21	185	1.20	1.78
105	0.20	0.18	0.21	195	0.11	0.10
114	0.25	0.18	0.21	204	0.17	0.12
89	0.09	0.18	0.20	179	2.43	4.68
99	0.19	0.17	0.20	189	0.13	0.12
74	0.04	0.17	0.20	164	0.03	0.16
111	0.05	0.17	0.20	201	0.21	0.81
115	0.24	0.17	0.20	205	0.19	0.14
79	0.04	0.17	0.19	169	0.32	1.21
94	0.17	0.16	0.18	184	0.12	0.11
111	0.20	0.16	0.18	201	0.11	0.09
89	0.21	0.15	0.18	179	0.15	0.11
111	0.27	0.15	0.17	201	0.18	0.10
106	0.13	0.15	0.17	196	0.07	0.08
74	0.17	0.15	0.17	164	0.09	0.08
108	0.08	0.15	0.17	198	0.13	0.25
104	0.10	0.15	0.17	194	0.07	0.09

113	0.29	0.15	0.17	203	0.27	0.13
80	0.13	0.14	0.16	NA	NA	NA
105	0.21	0.14	0.16	195	0.11	0.07
108	0.17	0.14	0.16	198	0.22	0.18
115	0.07	0.14	0.16	205	0.25	0.50
67	0.02	0.14	0.16	157	0.01	0.08
94	0.03	0.14	0.16	184	0.12	0.54
101	0.19	0.13	0.15	191	0.10	0.07
94	0.03	0.13	0.15	184	0.82	3.82
93	0.05	0.13	0.15	183	0.70	1.97
105	0.19	0.13	0.15	195	0.19	0.13
93	0.02	0.13	0.15	183	0.03	0.16
110	0.25	0.13	0.15	200	0.25	0.13
109	0.18	0.12	0.14	199	0.10	0.07
113	0.15	0.12	0.14	203	0.08	0.07
91	0.03	0.12	0.14	181	0.02	0.10
63	0.03	0.12	0.14	153	0.22	0.83
119	0.09	0.12	0.14	209	0.96	1.23
106	0.14	0.12	0.14	196	0.07	0.06
87	0.02	0.12	0.14	177	0.02	0.08
114	0.18	0.11	0.13	204	0.17	0.11
114	0.06	0.11	0.13	204	0.03	0.06
99	0.05	0.11	0.12	189	0.08	0.19
89	0.04	0.11	0.12	179	0.25	0.68
114	0.13	0.10	0.12	204	0.20	0.16
51	0.02	0.10	0.12	141	0.20	0.85
101	0.09	0.10	0.11	191	0.49	0.58
111	0.16	0.10	0.11	201	0.13	0.08
103	0.17	0.09	0.11	193	0.20	0.11
107	0.04	0.09	0.11	197	0.38	0.89
99	0.13	0.09	0.11	NA	NA	NA
114	0.04	0.09	0.11	NA	NA	NA
106	0.10	0.09	0.11	196	0.06	0.06
104	0.12	0.09	0.11	194	0.06	0.05
91	0.08	0.09	0.11	181	0.05	0.06
101	0.14	0.09	0.10	NA	NA	NA
113	0.09	0.08	0.10	203	0.31	0.29
89	0.10	0.08	0.09	179	0.32	0.27
113	0.08	0.08	0.09	203	0.82	0.85
116	0.11	0.08	0.09	206	0.23	0.17
116	0.03	0.08	0.09	NA	NA	NA
154	0.03	0.07	0.08	244	0.16	0.42
99	0.04	0.07	0.08	189	0.45	0.85

101	0.07	0.07	0.08	191	0.03	0.03
102	0.10	0.07	0.08	192	0.70	0.49
106	0.10	0.06	0.07	196	0.06	0.04
87	0.09	0.06	0.07	177	0.04	0.03
97	0.08	0.06	0.07	187	0.09	0.07
80	0.01	0.06	0.07	170	0.04	0.19
99	0.03	0.06	0.07	189	0.01	0.02
100	0.01	0.06	0.07	190	0.01	0.05
103	0.01	0.06	0.06	193	0.67	2.79
108	0.05	0.05	0.06	198	0.03	0.03
101	0.01	0.05	0.06	NA	NA	NA
100	0.01	0.05	0.06	190	0.21	1.06
89	0.02	0.05	0.06	179	0.10	0.25
108	0.01	0.05	0.06	198	0.01	0.04
93	0.01	0.05	0.05	183	0.14	0.67
92	0.06	0.04	0.05	182	0.03	0.02
93	0.01	0.04	0.05	183	0.08	0.22
93	0.01	0.04	0.04	183	0.03	0.18
116	0.02	0.04	0.04	206	0.03	0.06
93	0.05	0.04	0.04	183	0.08	0.06
102	0.03	0.04	0.04	192	0.05	0.06
115	0.06	0.03	0.04	205	0.03	0.02
105	0.01	0.03	0.04	195	0.35	1.64
97	0.01	0.03	0.03	187	0.01	0.02
89	0.01	0.03	0.03	179	0.39	1.67
116	0.02	0.03	0.03	206	0.09	0.16
48	0.01	0.03	0.03	138	0.02	0.09
101	0.02	0.03	0.03	191	0.60	0.80
95	0.03	0.03	0.03	185	0.19	0.17
101	0.01	0.03	0.03	191	0.00	0.01
108	0.01	0.03	0.03	198	0.01	0.01
106	0.01	0.02	0.03	NA	NA	NA
108	0.03	0.02	0.03	198	0.05	0.04
49	0.01	0.02	0.02	139	0.01	0.03
45	0.02	0.02	0.02	NA	NA	NA
89	0.02	0.02	0.02	179	0.01	0.01
105	0.01	0.02	0.02	195	0.07	0.15
88	0.00	0.02	0.02	178	0.36	1.92
105	0.02	0.02	0.02	NA	NA	NA
107	0.01	0.02	0.02	197	0.04	0.06
105	0.02	0.02	0.02	195	0.01	0.01
99	0.00	0.02	0.02	189	0.01	0.04
107	0.01	0.02	0.02	197	0.01	0.02

91	0.02	0.02	0.02	181	0.01	0.01
98	0.02	0.02	0.02	188	0.01	0.01
90	0.00	0.01	0.02	NA	NA	NA
136	0.01	0.01	0.02	226	0.01	0.01
98	0.01	0.01	0.02	188	0.20	0.35
95	0.00	0.01	0.01	185	0.09	0.53
99	0.00	0.01	0.01	189	0.01	0.03
35	0.00	0.01	0.01	125	0.00	0.01
125	0.01	0.01	0.01	215	0.01	0.01
142	0.02	0.01	0.01	232	0.01	0.01
40	0.00	0.01	0.01	130	0.01	0.06
175	0.01	0.01	0.01	NA	NA	NA
99	0.00	0.01	0.01	189	0.00	0.00
103	0.00	0.01	0.01	193	0.01	0.06
95	0.00	0.01	0.01	NA	NA	NA
94	0.00	0.01	0.01	184	0.01	0.02
97	0.00	0.01	0.01	187	0.00	0.01
97	0.00	0.00	0.00	187	0.00	0.00
125	0.00	0.00	0.00	215	0.00	0.00
76	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
95	0.00	0.00	0.00	185	0.00	0.00
162	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
139	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
142	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
136	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
162	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
142	0.00	0.00	0.00	NA	NA	NA
123	0.00	0.00	0.00	NA	NA	NA
136	0.00	0.00	0.00	NA	NA	NA

144	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
136	0.00	0.00	0.00	NA	NA	NA
144	0.00	0.00	0.00	NA	NA	NA
135	0.00	0.00	0.00	NA	NA	NA
103	2.39	NA	NA	193	1.30	NA
88	0.60	NA	NA	NA	NA	NA
111	0.05	NA	NA	NA	NA	NA
93	1.11	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA
91	0.11	NA	NA	NA	NA	NA
96	0.30	NA	NA	NA	NA	NA
79	0.47	NA	NA	169	0.27	NA
93	0.14	NA	NA	NA	NA	NA
70	1.05	NA	NA	NA	NA	NA
119	3.81	NA	NA	209	2.36	NA
93	1.38	NA	NA	NA	NA	NA
90	0.21	NA	NA	NA	NA	NA
76	0.16	NA	NA	NA	NA	NA

ISCDR_Proj	2020_e0_M	2020_e0_F	Diff_e0_M	Diff_e0_F
5.02	NA	NA	NA	NA
6.78	NA	NA	NA	NA
3.09	75.4	80.5	-2.23	-1.93
2.88	75.9	81.1	-2.19	-1.99
2.80	NA	NA	NA	NA
3.33	NA	NA	NA	NA
2.79	NA	NA	NA	NA
3.55	NA	NA	NA	NA
2.58	75.6	81.1	-1.80	-1.61
2.55	NA	NA	NA	NA
2.97	NA	NA	NA	NA
2.10	76.2	81.6	-1.53	-1.38
2.16	73.5	79.7	-1.39	-1.44
3.47	NA	NA	NA	NA
3.66	NA	NA	NA	NA
1.83	73.8	85.0	-0.96	-1.38
2.50	NA	NA	NA	NA
3.49	NA	NA	NA	NA
2.02	78.7	84.5	-1.81	-1.66
1.87	75.0	86.0	-1.13	-1.68
3.19	NA	NA	NA	NA
2.16	75.8	80.8	-1.45	-1.30
3.26	NA	NA	NA	NA
1.78	72.6	78.3	-1.07	-0.98
3.60	NA	NA	NA	NA
3.43	NA	NA	NA	NA
1.93	76.6	83.9	-1.44	-1.33
1.67	73.9	85.5	-0.86	-1.40
2.52	NA	NA	NA	NA
1.26	78.6	83.2	-0.95	-0.84
2.70	NA	NA	NA	NA
2.63	NA	NA	NA	NA
2.98	NA	NA	NA	NA
3.26	NA	NA	NA	NA
4.39	NA	NA	NA	NA
3.05	NA	NA	NA	NA
1.11	74.8	79.8	-0.73	-0.67
3.80	72.1	77.7	-2.15	-1.97
0.76	74.7	86.4	-0.42	-0.67
1.87	NA	NA	NA	NA
1.12	75.6	81.0	-0.80	-0.77
2.49	NA	NA	NA	NA

0.97	75.0	86.5	-0.53	-0.83
1.23	75.8	80.9	-0.87	-0.80
4.32	71.8	77.6	-2.72	-2.44
3.00	NA	NA	NA	NA
NA	NA	NA	NA	NA
1.04	75.2	80.7	-0.69	-0.66
1.00	73.7	85.8	-0.53	-0.83
1.06	78.9	82.4	-0.86	-0.71
2.64	NA	NA	NA	NA
1.12	78.8	84.5	-0.94	-0.84
2.45	71.0	78.2	-1.41	-1.47
3.19	NA	NA	NA	NA
1.05	79.8	85.1	-0.99	-0.88
2.19	NA	NA	NA	NA
0.55	67.9	72.6	-0.16	-0.34
2.77	NA	NA	NA	NA
1.06	80.0	85.7	-1.00	-0.90
2.59	70.9	76.7	-1.44	-1.29
2.94	NA	NA	NA	NA
1.01	74.9	80.3	-0.66	-0.63
1.11	79.0	84.6	-0.94	-0.87
2.58	NA	NA	NA	NA
0.84	80.5	84.1	-0.70	-0.59
3.29	75.7	80.6	-2.27	-1.99
1.33	71.6	77.6	-0.68	-0.67
0.83	74.1	79.4	-0.50	-0.50
0.78	80.2	85.7	-0.70	-0.66
0.70	74.0	86.1	-0.37	-0.61
2.18	NA	NA	NA	NA
0.79	79.7	85.8	-0.73	-0.66
0.76	80.2	83.5	-0.64	-0.52
3.32	NA	NA	NA	NA
3.14	NA	NA	NA	NA
2.45	NA	NA	NA	NA
2.60	NA	NA	NA	NA
3.63	NA	NA	NA	NA
3.12	NA	NA	NA	NA
0.78	77.3	82.0	-0.60	-0.56
0.91	75.8	80.8	-0.70	-0.66
3.63	NA	NA	NA	NA
0.72	80.5	85.7	-0.67	-0.61
1.08	74.5	79.7	-0.71	-0.65
5.64	56.9	58.9	-1.12	-1.35

2.58	73.8	76.0	-1.05	-0.69
0.75	80.8	85.0	-0.70	-0.63
2.25	NA	NA	NA	NA
0.57	73.0	85.4	-0.27	-0.45
0.67	NA	NA	NA	NA
0.99	75.7	81.3	-0.63	-0.61
0.61	78.0	82.5	-0.46	-0.44
0.55	80.3	83.7	-0.47	-0.39
2.83	NA	NA	NA	NA
0.56	79.3	85.1	-0.54	-0.54
2.49	NA	NA	NA	NA
NA	NA	NA	NA	NA
2.58	67.5	73.1	-1.42	-1.60
0.71	74.7	80.7	-0.49	-0.50
2.04	74.0	80.2	-1.68	-1.63
2.38	74.3	77.0	-1.39	-1.03
2.16	NA	NA	NA	NA
1.03	76.3	81.7	-0.82	-0.77
0.76	71.1	78.2	-0.32	-0.37
0.42	73.7	86.4	-0.21	-0.38
0.61	74.2	79.4	-0.38	-0.38
0.64	65.0	69.0	-0.22	-0.46
0.51	76.6	81.3	-0.37	-0.37
NA	NA	NA	NA	NA
0.61	80.3	85.7	-0.58	-0.53
0.45	76.6	81.4	-0.31	-0.32
4.25	67.0	71.4	-1.62	-1.39
0.74	72.5	78.1	-0.40	-0.41
1.53	73.2	77.4	-0.70	-0.60
1.47	67.3	75.6	-0.46	-0.58
3.11	74.9	77.3	-1.69	-1.20
0.50	79.5	85.4	-0.43	-0.41
0.38	73.3	85.3	-0.19	-0.31
0.43	80.3	84.1	-0.38	-0.37
2.88	71.5	76.2	-1.67	-1.55
0.63	75.5	80.6	-0.44	-0.43
1.70	78.1	81.0	-1.25	-1.14
2.40	NA	NA	NA	NA
1.48	NA	NA	NA	NA
2.03	NA	NA	NA	NA
3.52	72.5	75.8	-1.58	-1.17
0.35	80.0	84.2	-0.28	-0.27
3.13	NA	NA	NA	NA

0.34	74.3	85.9	-0.18	-0.29
2.28	75.0	79.2	-1.30	-1.28
2.33	NA	NA	NA	NA
0.33	72.9	85.7	-0.16	-0.28
0.36	81.7	85.4	-0.34	-0.32
0.48	74.7	79.9	-0.31	-0.32
NA	NA	NA	NA	NA
0.47	80.6	85.7	-0.43	-0.40
0.47	78.3	83.1	-0.42	-0.42
2.65	NA	NA	NA	NA
1.15	63.1	65.9	-0.34	-0.78
0.49	77.1	81.5	-0.34	-0.34
0.48	77.5	82.1	-0.41	-0.40
0.49	74.1	79.6	-0.31	-0.32
0.42	80.5	85.5	-0.38	-0.37
0.54	77.1	79.2	-0.34	-0.28
0.42	75.3	80.3	-0.27	-0.28
6.48	50.6	54.3	-0.73	-1.40
1.99	NA	NA	NA	NA
1.94	69.9	76.2	-1.21	-1.30
3.15	69.7	75.7	-1.82	-1.62
0.35	72.4	84.6	-0.16	-0.26
0.33	72.8	77.8	-0.18	-0.21
2.35	73.2	78.8	-1.53	-1.34
0.37	76.9	81.4	-0.26	-0.28
0.88	76.4	82.0	-0.75	-0.74
0.78	63.4	66.0	-0.24	-0.64
0.25	73.4	86.3	-0.12	-0.22
0.47	76.4	81.7	-0.31	-0.34
1.68	NA	NA	NA	NA
1.22	74.2	80.0	-0.69	-0.70
2.23	NA	NA	NA	NA
0.22	77.3	82.0	-0.16	-0.19
0.98	56.4	59.8	-0.17	-0.69
0.79	76.0	80.9	-0.57	-0.55
0.20	79.1	84.8	-0.15	-0.16
0.24	73.6	78.5	-0.15	-0.18
0.11	77.7	80.9	-0.06	-0.10
0.91	NA	NA	NA	NA
1.87	NA	NA	NA	NA
0.27	76.1	80.8	-0.18	-0.21
0.45	73.5	78.6	-0.26	-0.27
5.18	63.3	66.7	-1.25	-1.29

	0.47	73.3	78.5	-0.27	-0.29
	2.34	NA	NA	NA	NA
	0.19	73.7	85.5	-0.09	-0.15
	1.55	NA	NA	NA	NA
	0.31	79.9	85.3	-0.28	-0.27
	0.36	77.3	81.2	-0.26	-0.25
	0.17	79.0	82.8	-0.13	-0.14
	2.87	68.8	73.5	-1.12	-1.01
	0.68	69.4	76.0	-0.26	-0.36
	0.90	72.3	79.2	-0.43	-0.43
	0.35	80.0	85.3	-0.32	-0.30
	2.26	63.8	67.9	-0.71	-0.83
	0.29	67.1	77.7	-0.10	-0.17
	0.19	76.7	81.7	-0.14	-0.17
	1.27	65.9	67.6	-0.50	-0.86
	4.50	57.2	59.6	-1.04	-1.28
	0.17	79.0	83.7	-0.14	-0.14
	5.92	61.4	64.9	-1.33	-1.41
NA		NA	NA	NA	NA
	0.21	72.9	85.0	-0.10	-0.19
	0.28	71.6	76.0	-0.12	-0.14
	0.14	76.0	81.0	-0.09	-0.13
	0.38	75.7	78.1	-0.21	-0.18
	0.13	78.1	83.1	-0.08	-0.15
	2.57	67.5	76.8	-1.16	-1.19
	0.17	72.1	82.8	-0.07	-0.11
	2.05	NA	NA	NA	NA
	0.11	75.0	79.9	-0.06	-0.09
	0.14	79.3	83.9	-0.11	-0.12
	5.37	66.8	73.4	-1.82	-1.78
	0.13	77.3	81.3	-0.09	-0.13
	0.18	54.1	55.0	-0.03	-0.81
	0.94	63.3	66.7	-0.35	-0.67
	0.16	78.2	84.1	-0.12	-0.13
	1.39	55.8	64.1	-0.23	-0.63
	0.13	69.7	79.5	-0.05	-0.08
	0.10	73.3	80.3	-0.05	-0.08
	0.13	72.4	77.8	-0.07	-0.11
	0.12	80.0	85.9	-0.11	-0.12
	0.09	81.4	84.5	-0.08	-0.09
	0.09	76.8	81.3	-0.06	-0.11
	0.28	70.4	75.3	-0.12	-0.27
	0.11	77.0	83.5	-0.06	-0.14

	0.15	81.3	86.1	-0.14	-0.15
NA	NA	NA	NA	NA	
	0.08	79.2	84.8	-0.06	-0.07
	0.21	77.1	81.7	-0.15	-0.18
	0.57	75.4	77.9	-0.40	-0.43
	0.09	53.0	55.1	-0.02	-0.85
	0.62	63.0	65.7	-0.17	-0.44
	0.08	74.4	82.7	-0.05	-0.06
	4.38	64.7	69.0	-1.30	-1.19
	2.26	66.9	74.9	-0.60	-0.81
	0.15	76.6	83.5	-0.11	-0.15
	0.19	58.8	59.7	-0.05	-0.73
	0.15	80.0	85.7	-0.12	-0.13
	0.08	78.7	84.1	-0.06	-0.07
	0.08	80.6	84.4	-0.06	-0.07
	0.11	62.8	65.2	-0.03	-0.53
	0.96	68.8	73.2	-0.27	-0.42
	1.41	72.6	79.3	-0.77	-0.84
	0.07	73.5	78.7	-0.03	-0.06
	0.09	55.9	58.6	-0.02	-0.80
	0.12	78.5	84.4	-0.10	-0.11
	0.07	66.9	72.9	-0.04	-0.26
	0.22	71.1	77.9	-0.12	-0.24
	0.78	61.8	65.7	-0.27	-0.77
	0.19	74.9	82.5	-0.12	-0.15
	0.98	56.4	58.8	-0.19	-0.81
	0.67	71.4	82.3	-0.27	-0.42
	0.09	79.0	85.1	-0.08	-0.10
	0.13	78.6	85.4	-0.10	-0.12
	1.02	70.6	74.2	-0.50	-0.64
NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	
	0.07	81.6	84.5	-0.06	-0.06
	0.06	76.9	82.0	-0.03	-0.05
	0.07	76.2	81.2	-0.04	-0.10
NA	NA	NA	NA	NA	
	0.33	67.1	76.8	-0.11	-0.18
	0.31	77.7	80.3	-0.24	-0.26
	0.98	76.5	79.8	-0.62	-0.51
	0.20	71.6	78.6	-0.09	-0.13
NA	NA	NA	NA	NA	
	0.48	67.2	75.2	-0.22	-0.43
	0.97	68.8	77.2	-0.35	-0.43

	0.04	74.6	79.4	-0.02	-0.04
	0.57	75.2	81.4	-0.30	-0.30
	0.04	70.4	81.4	-0.02	-0.07
	0.03	80.8	84.3	-0.02	-0.06
	0.08	76.6	80.9	-0.06	-0.10
	0.22	61.0	61.8	-0.05	-0.58
	0.03	74.8	77.2	-0.01	-0.08
	0.06	61.5	63.4	-0.02	-0.56
	3.20	62.3	64.5	-0.89	-0.90
	0.03	79.1	83.1	-0.02	-0.05
NA	NA	NA	NA	NA	
	1.22	64.0	68.6	-0.38	-0.60
	0.29	71.6	77.7	-0.16	-0.25
	0.05	61.1	62.1	-0.01	-0.57
	0.77	56.6	58.7	-0.16	-0.69
	0.03	70.4	80.0	-0.01	-0.06
	0.25	70.2	75.9	-0.09	-0.16
	0.20	60.9	66.5	-0.05	-0.47
	0.07	75.6	77.9	-0.04	-0.19
	0.07	79.0	85.2	-0.06	-0.12
	0.07	71.8	78.4	-0.04	-0.13
	0.02	80.0	84.7	-0.02	-0.04
	1.88	58.8	61.4	-0.57	-1.09
	0.03	60.4	61.7	-0.01	-0.51
	1.92	59.9	62.6	-0.55	-1.03
	0.18	77.2	80.8	-0.12	-0.19
	0.11	65.7	68.7	-0.03	-0.29
	0.92	70.5	75.8	-0.45	-0.55
	0.20	74.2	81.4	-0.11	-0.21
	0.02	72.6	75.8	-0.01	-0.16
	0.02	74.3	78.4	-0.01	-0.06
NA	NA	NA	NA	NA	
	0.05	76.9	80.8	-0.04	-0.07
	0.03	69.5	72.2	-0.01	-0.25
NA	NA	NA	NA	NA	
	0.01	74.2	81.0	-0.01	-0.04
	0.17	72.2	76.2	-0.10	-0.24
	2.20	60.8	66.9	-0.52	-0.79
NA	NA	NA	NA	NA	
	0.07	72.9	76.1	-0.04	-0.13
	0.01	81.6	85.8	-0.01	-0.02
	0.04	61.0	63.4	-0.01	-0.46
	0.02	78.0	82.9	-0.02	-0.08

	0.01	69.5	78.2	0.00	-0.07
	0.01	80.7	84.0	-0.01	-0.04
NA	NA	NA	NA	NA	
	0.01	80.0	86.0	-0.01	-0.03
	0.40	68.3	75.8	-0.18	-0.40
	0.60	58.5	63.6	-0.14	-0.68
	0.03	73.0	76.3	-0.01	-0.14
	0.01	67.0	71.1	0.00	-0.25
	0.01	81.6	85.5	-0.01	-0.03
	0.01	81.6	87.8	-0.01	-0.03
	0.07	58.0	63.4	-0.01	-0.52
NA	NA	NA	NA	NA	
	0.00	69.6	73.7	0.00	-0.20
	0.07	59.8	62.6	-0.02	-0.37
NA	NA	NA	NA	NA	
	0.02	66.4	72.0	-0.01	-0.27
	0.01	69.3	78.3	0.00	-0.10
	0.00	73.8	80.3	0.00	-0.06
	0.00	73.6	80.9	0.00	-0.07
NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	
	0.00	64.2	69.9	0.00	-0.33
NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	
NA	NA	NA	NA	NA	
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Beyond Deaths per Capita: Comparative CoViD-19 Mortality Indicators

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Beyond Deaths per Capita:

Comparative CoViD-19 Mortality Indicators

Abstract

Objectives: Following well-established practices in demography, this article discusses several measures based on the number of CoViD-19 deaths to facilitate comparisons over time and across populations.

Settings: National populations in 186 UN countries and territories and populations in first-level sub-national administrative entities in Brazil, China, Italy, Mexico, Peru, Spain, and the USA.

Participants: None (death statistics only).

Primary and Secondary Outcome Measures: An unstandardized occurrence/exposure rate comparable to the Crude Death Rate; an indirectly age-and-sex standardized rate that can be derived even when the breakdown of CoViD-19 deaths by age and sex required for direct standardization is unavailable; the reduction in life expectancy at birth corresponding to the 2020 number of CoViD-19 deaths.

Results: To date, the highest unstandardized rate has been in New York, at its peak exceeding the state 2017 Crude Death Rate. Populations compare differently after standardization: while parts of Italy, Spain and the USA have the highest unstandardized rates, parts of Mexico and Peru have the highest standardized rates. For several populations with the necessary data by age and sex for direct standardization, we show that direct and indirect standardization yield similar results. US life expectancy is estimated to have declined this year by more than a year (-1.26 years), far more than during the worst year of the HIV epidemic, or the worst three years of the opioid crisis, and to reach its lowest level since 2008. Substantially larger reductions, exceeding two years, are estimated for Panama, Peru, and parts of Italy, Spain, the USA, and especially, Mexico.

Conclusions: With lesser demand on data than direct standardization, indirect standardization is a valid alternative to adjust international comparisons for differences in population distribution by sex and age-groups. A number of populations have experienced reductions in 2020 life expectancies that are substantial by recent historical standards.

Strengths and limitations

- The CoViD-19 mortality indicators presented in this article are directly comparable with three well-established indicators of overall mortality: the Crude Death Rate, the Age-Standardized Death Rate and Life Expectancy at Birth
- In particular, this article demonstrates that when CoViD-19 deaths in a population are not tabulated by sex and age, indirect standardization techniques can still be used to improve comparisons of CoViD-19 mortality in this and other populations by accounting for differences in population distributions by age and sex
- While requiring additional data on mortality from other causes, translating cumulative numbers of CoViD-19 deaths into their impact on life expectancy at birth allows for comparison of CoViD-19 mortality with previous reversals in secular mortality declines
- The comparability of these CoViD-19 mortality indicators is affected by potential differences in identifying and reporting CoViD-19 as a cause of death across populations
- Further analyses are needed to assess potential changes in mortality from other causes induced by CoViD-19, as those would also contribute to the impact of CoViD-19 on life expectancy at birth.

Beyond Deaths per Capita

Background

As of June 1st, deaths from the novel coronavirus disease 2019 (CoViD-19) had been reported in 186 of the 235 countries and territories of the United Nations system (UN). As with previous pandemics,[1] the disease progression can be more reliably tracked with death than with case counts. Cumulative CoViD-19 death counts at a given time depend on the determination of the cause of death, delays in reporting deaths to central reporting agencies—different for deaths at home, in hospitals and other institutions—and delays in verification, consolidation and publication at reporting agencies. In the USA, for instance, the grim milestone of 100,000 cumulative CoViD-19 deaths was reached at the end of May, when data from the Center for Disease Control and Prevention (CDC) suggested that the number of deaths in the country exceeded expectations based on past trends by about 130,000.[2] While CoViD-19 deaths might not be fully reported, the death undercount is both easier to estimate and an order-of-magnitude smaller than the proportion of unreported cases. CDC data from large-scale seroprevalence surveys suggest that as much as 10 times more SARS-CoV-2 infections occurred than the number of reported CoViD-19 cases[3]—a situation in no way unique to the US.[4] CoViD-19 mortality indicators are also more pertinent for assessing public-health measures that were intended less to reduce the eventual number of cases than to "flatten the curve" and eventually limit the number of CoViD-19 deaths by keeping the need for emergency hospitalizations below local hospital capacity.

For comparative purposes, cumulative death counts are affected by several demographic characteristics such as, most obviously, population size. The deaths per capita ratio, however, represent the first rather than the only adjustment that can be taken towards more meaningful

CoViD-19 mortality comparisons. Following well-established practices in demography,[5] this article presents more refined indicators that can be derived with additional demographic data. The corresponding measures are discussed using results for the 186 UN countries and territories with at least one death by June 1st. To illustrate issues of scale, the measures are also calculated at the first sub-national administrative level (e.g., states or provinces) in selected countries, which were the largest countries in the successive "epicenters" of the pandemic over time: first China, then Italy and Spain, followed by the US, and now Brazil, Mexico and Peru. Altogether, at least one of the measures presented here is estimated for a total of 386 national and subnational populations.

Methods and Data

We first calculate an occurrence/exposure *rate* that relates the cumulative number of CoViD-19 deaths to the number of person-years lived in the population during the period. With the standard approximation for person-years, the period Crude CoViD-19 Death Rate (*CCDR*) can be measured as:

$$CCDR[t_1,t] = \frac{D^C[t_1,t]}{N(t_m).(t - t_1)}$$

where t_1 is an initial time, $D^C[t_1,t]$ a cumulative CoViD-19 deaths count between times t_1 and t, and $N(t_m)$ an estimate of the total population size at time t_m between time t_1 and time t. The difference between this period rate and the deaths per capita ratio is easy to miss when the deaths count in the numerator, identical for both, is an annual number of deaths. In that case, the number of person-years in the denominator of the occurrence/exposure rate can indeed be approximated by the population size at some point during the year. However, the two are no longer directly comparable, and the metric of the ratio difficult to interpret, when the deaths counts correspond to periods of different durations. On the contrary, the *CCDR* is expressed in deaths per person-*year* and remains directly comparable to the annual Crude Death Rate (*CDR*) available for most populations. We first calculate the *CCDR* for the period starting on the day of the first death in the population, which was obtained from World Health Organization (WHO) daily situation reports,[6] and ending on January 1st, 2021. The cumulative number of deaths reported up to that day was obtained from Johns Hopkins University's Center for Systems Science and Engineering (CSSE)[7] and total population size was obtained from the UN.[8] (Additional sources used for sub-national units are referenced in the online supplementary materials of this article, SI1: Technical Appendix.)

As age and sex variations in CoViD-19 mortality have been clearly established,[9] the period rates should be adjusted to take into account differences in age and sex distributions. Direct age-and-sex standardization requires data on CoViD-19 deaths by age and sex, which are unavailable or unreliable for a majority of UN countries and territories and most sub-national populations. An alternative approach, known as indirect standardization, borrows an age-and-sex pattern of mortality from a well-documented population so that only the age-and-sex distribution of the populations of interest is required. Based on this approach, we calculate the Comparative CoViD-19 Mortality Ratio (*CCMR*):

$$CCMR[t_1,t] = \frac{D^C[t_1,t]}{\sum_j \sum_i {}^{US}M_{ij}^C . N_{ij}(t_m)}$$

where ${}^{US}M_{ij}{}^C$ is the CoViD-19 death rate specific to age group *i* and sex *j* in the US and $N_{ij}(t_m)$ is the size of the age group *i* for sex *j* in the population of interest. The reference age-and-sex death rates selected here to illustrate the technique were obtained from the Centers for Disease Control and Prevention (CDC) weekly-updated distribution of CoViD-19 deaths by age and sex in the US,[10] to date the largest number of CoViD-19 deaths distributed by age and sex. Unavailable only for the 13 countries/territories whose population size is less than 90,000, population age-and-sex distributions were taken from the UN data and, for subnational populations, national statistics.

Multiplying a population *CCMR* by the US *CCDR* yields an Indirectly age-and-sex Standardized CoViD-19 Death Rate (*ISCDR*) for that population, with the US age-and-sex population distribution as the standard:

$$ISCDR[t_1,t] = CCMR[t_1,t].\sum_j\sum_i \frac{{}^{US}D_{ij}(t_m)}{{}^{US}N_{ij}(t_m)}.\frac{{}^{US}N_{ij}(t_m)}{{}^{US}N(t_m)} = CCMR[t_1,t].\sum_j\sum_i {}^{US}M^C_{ij}.{}^{US}C_{ij}(t_m)$$
$$= \sum_j\sum_i \left({}^{US}M^C_{ij}.CCMR[t_1,t]\right).{}^{US}C_{ij}(t_m)$$

CCMR and *ISCDR* are again calculated for the period starting on the day of the first death in the population and ending on January 1st, 2021.

Last, life expectancy at birth provides a summary indicator of mortality in a population in a more intuitive metric (years) than these rates. A standard demographic technique allows to estimate the impact that *eliminating* a cause of death would have on life expectancy at birth.[11 12] When a prior period life table (i.e., not factoring CoViD-19 mortality) is available, applying this technique backward allows to translate a cumulative CoViD-19-deaths forecast for the same period into a CoViD-19-induced *reduction* in male and female life expectancies at birth. The cumulative number of reported CoViD-19 deaths in 2020 were used to derive new male and female life expectancies at birth in 277 populations with extant life tables (155 countries, plus Italian regions, Spanish autonomous communities, Mexican and US states). Calculations required a previous projection of the male and female year-2020 life tables in these populations. For countries, these were again derived from UN data, by interpolation between the 2015-20 estimates and 2020-25 projections. For sub-national populations, life tables available from national statistical institutes were extrapolated to 2020. Additional details on their calculation are described in the online supplementary materials of this article (SI1: Technical Appendix; SI2a & SI2b: An Example).

Ethics

This study has no human subjects. Analyses are based solely on publicly available online data on anonymous, deceased individuals.

Patient and Public Involvement: This research was done without patient involvement. Patients were not invited to comment on the study design and were not consulted to develop patient relevant outcomes or interpret the results. Patients were not invited to contribute to the writing or editing of this document for readability or accuracy.

Results

To illustrate the properties of these indicators, we briefly describe results from the January 1st, 2021 updates of the CCSE and CDC data. (Full results for that day are available in the online supplementary materials of this article, SI4: Full Results; updated results will continue to be uploaded to https://github.com/statsccpr/ind-cov-mort). For the period starting on the day of the first CoViD-19 death observed in a population and ending on January 1st, 2021, the highest national values of the *CCDR* (given in deaths per thousand person-years) are found in five European nations (San Marino, 2.11; Belgium, 2.10; Slovenia, 1.63; Bosnia and Herzegovina, 1.57; North Macedonia, 1.54). Among the 20 nations with the highest values, only Peru (1.45), the USA (1.25), Mexico (1.24) and Argentina (1.16) are outside Europe. This list of nations, however, illustrates the issue of scale with small, densely populated nations exhibiting higher values than some larger nations, but possibly not than similarly-sized parts of these nations. If comparisons are based on subnational rather than national boundaries, *CCDR* values for populations of 5 million or more are higher for parts of Italy (Lombardy, 2.90), the USA (New Jersey, 2.65; New York, 2.39; Massachusetts, 2.27) and Spain (Madrid, 2.15) than for Belgium. Values for parts of Mexico (Mexico City, 2.06), Peru (Lima, 1.99), and Brazil (Rio de Janeiro, 1.85) and for five other US states (Illinois, Michigan, Pennsylvania, Arizona and Indiana) are also higher than for any nation besides Belgium (again among populations of 5 million or more).

The main motivation for the *CCDR* is not to compare CoViD-19 mortality across populations, however, but rather to compare CoViD-19 and overall mortality. Across the populations monitored here, the highest *CCDR* value to date for a period starting on the day of the first CoViD-19 death has been reached in New York (9.44 for the period ending on 4/25) where it exceeded the state's most recent annual *CDR* (7.83 in 2017).[13]. The period *CCDR* remained above the 2017 *CDR* until May 20 (Figure 1). Ignoring competing risks between CoViD-19 and other-cause mortality, and seasonality and period trends in other-cause mortality, this indicates roughly equivalent mortality from CoViD-19 and from all other causes combined between March 14 (first death) and May 20.

Figure 1 here

Figure 1: Estimated value of the period *CCDR*, New York (in deaths per 1,000 person-years, period starting on March 14 and ending on day shown on the horizontal axis)

Sources: CDC (*CDR*) and authors' calculations (*CCDR*, see SI1: Technical Appendix)

The effects of indirect age-standardization are illustrated in Figure 2, comparing current-period *CCDR* and *ISCDR* values for selected national and subnational populations (both in deaths per thousand person-years). By construction, the *CCMR* equals 1 and the *CCDR* and *ISCDR* are the same in the US, but the standardized *ISCDR* is lower than the unstandardized *CCDR* in Europe, whereas the standardized rate can be two to three times the unstandardized rate in Mexico and South American countries. The 20 highest values of the *ISCDR* are for eleven Mexican States and eight Peruvian *Departamentos*, ahead of Rio de Janeiro (Brazil). Among national and subnational units with a population size of 5 million or more shown in Figure 2, the highest value in Europe (Lombardy, 1.95) is lower than subnational values for Mexico (3.51) and four other Mexican states, Lima (Peru, 3.46), Rio de Janeiro (Brazil, 3.14) and four other Brazilian states, and New Jersey (2.52) and two other US states, as well as national values for Peru (2.68), Mexico (2.51), Bolivia (2.15) and Ecuador (2.05).

Figure 2 here

Figure 2: Estimated value of the *CCDR* and *ISCDR* (in deaths per 1,000 person-years), by national and subnational unit (20 *CCDR* and 20 largest *ISCDR* values for units with a population size of 5 million or more)

Sources: Authors' calculations (see SI1: Technical Appendix)

As for the mortality impact, reductions in 2020 life expectancies at birth of two years or more are estimated for two nations: Panama (2.22) and Peru (2.09). Subnational values were estimated within five nations and if reductions of two years or more were also estimated for Madrid (Spain), two Italian regions, two Peruvian *Departamentos*, and for four US states, values exceed two years for eleven Mexican states, foremost, Quintana Roo (includes Cancún, 3.93) and Baja California (includes Tijuana, 3.54, both values in years). Figure 3 shows reductions exceeding 1.3 years in 20 national and subnational units with a population size of 5 million or more.

Figure 3 here

Figure 3: Estimated reduction in life expectancy at birth for year 2020, both sexes (in years), by national and subnational unit (20 largest reductions for units with a population size of 5 million or more)

Sources: Authors' calculations (see SI1: Technical Appendix)

Period life expectancy at birth is a summary indicator of mortality conditions across the lifespan that is available for all nations and each year since 1950 from the United Nations, and for earlier periods in a number of nations. This allows for comparing the mortality impact of CoViD-19 with prior reversals in the secular increase in life expectancies. An examination of the United Nations times series, for instance, suggests that next to the exceptional declines induced by mass homicides in Cambodia (1975-78) and Rwanda (1994), the largest annual declines in life expectancy at birth since 1950 took place in Eswatini (formerly Swaziland) during the worse years of the HIV pandemic (2.10 years between 1997 and 1998). Inducing declines in life expectancies for close to two decades in some countries, the HIV pandemic has had a much larger cumulative impact than CoViD-19 to date, but the fact that life expectancy at birth may decline by a larger amount in 2020 in a few national and subnational populations than in the most affected countries in any year during the HIV pandemic puts in perspective values shown in Figure 3. Moreover, while the estimated reduction for the USA (1.26) is lower than for the populations shown in Figure 3, the US life expectancy drop in 2020 will still be the largest since World War II, far exceeding declines in the worst year of the HIV epidemic (from 75.8 years in 1992 to 75.5 years in 1993), or the worst three years of the opioid-overdose crisis (from 78.9 years in 2014 to 78.6 years in 2017).[14] As illustrated in Figure 4, CoViD-19 is estimated to reduce US life expectancy at birth in 2020 to its lowest level since 2005.

Figure 4 here

Figure 4: Estimated life expectancy at birth, US population, both sexes, by year

Sources: CDC (2005-2018), UN and authors' calculations (2019-2020, see SI1: Technical Appendix)

Discussion

The results above illustrate the properties of different comparative indicators of CoViD-19 mortality. For comparisons across populations, the *ISCDR*, and *CCMR* on which it builds, control for three important factors that contribute to the cumulative count of CoViD-19 deaths in a population: the length of the period over which these deaths are cumulated, the size of the population, and its age-and-sex composition.

With respect to the first of these three factors, both the unstandardized and standardized rates are period indicators that increase and decrease as waves of the pandemic develop. Contrary to the death per capita ratio, which can only increase over time, the period rates begin to decline when the daily number of additional deaths drops below its average for the period. This property of the period rates accurately reflects for CoViD-19 mortality a temporal dimension that can often be neglected for overall mortality. This also implies, however, that comparing *ISCDR* values across populations at too different durations of exposure to CoViD-19 would not be meaningful. As shown in Figure 1, this is more problematic early in the diffusion of the epidemic.

With respect to the second factor, comparing *ISCDR* values at the national or sub-national levels illustrates that dividing by population size does not make small and large populations fully comparable. National rates are but population-weighted averages of subnational rates. With person-to-person transmission and uneven population density, these rates can be expected to vary substantially across the territory of the largest countries, making it less likely that the national average will stand out in cross-national comparisons. While the national *ISCDR* is lower for Italy, Spain and the USA than for Belgium, each of these three nations has at least one subnational entity of roughly similar population size with a higher *ISCDR* than Belgium.

Disaggregation to smaller administrative units may allow for more meaningful comparisons, but might be impeded by data availability. In this respect, indirect standardization has the advantage of not requiring data on CoViD-19 deaths by age and sex that may not be available or reliable for smaller areas. As a reliable breakdown of CoViD-19 deaths *is* available from a number of European countries[15 16] and US states, the *ISCDR* can actually be compared to a Directly age-and-sex Standardized CoViD-19 Death Rate (*DSCDR*) with the US age-and-sex population distribution as the standard. Comparing unstandardized with directly and indirectly standardized rate for the three European nations and the three US states with the highest *ISCDR* values, Figure 5 shows that the values of the indirectly standardized rate are typically very close to the corresponding values of the directly standardized rate.

Figure 5 here

Figure 5: Estimated value of the *CCDR*, *ISCDR* and *DSCDR* (in deaths per 1,000 person-years), by selected nation and US state

Sources: Ined, CDC, *Registro Civil* (Brazil)[17] and authors' calculations (see SI3: Sensitivity Analysis)

Over time, sex- and age-specific rates of CoViD-19 mortality have become available for a larger and more diverse set of nations,[18] providing a wider choice of possible standards. As is the case with the values of directly standardized rates, the values of indirectly standardized rates depend on the choice of a standard. While it is theoretically possible that the choice of a standard would also affect the rankings of directly or indirectly standardized rates, empirical regularities in mortality patterns across populations make this quite unlikely. The age patterns of CoViD-19 death rates available so far similarly exhibit remarkable regularities, with some modest variation in the slope of these age patterns at the oldest ages, probably due to the number of fatalities in nursing homes across Europe and the USA.[19] Indirect standardization thus appears to provide a valid alternative to rank CoViD-19 mortality across populations when data limitations prevent direct standardization.

Variations in the slope of the age-specific rates of CoViD-19 mortality would also affect the estimated reductions in life expectancy at birth. If these rates increase less rapidly with age at the oldest ages in a population than they do in the USA, the age pattern of CoViD-19 deaths obtained here by multiplying the US age-specific rates and the population sizes of the different age groups would then be "older" than the actual age pattern. In turn, this would imply that the average number of years of life lost per CoViD-19 death and the total impact of CoViD-19 on life expectancy at birth is actually larger than estimated here. A simulation using the reported sex- and age-distribution of CoViD-19 for Brazil yielded a 1.67-year estimated reduction in life expectancy, however, only a 3% difference with the reduction estimated here (1.72 years, see Supplementary Information, SI3: Sensitivity Analysis).

Another source of uncertainty originates in the role of preexisting conditions in CoViD-19 mortality. While this role is well documented, data on CoViD-19 fatalities by preexisting conditions are even less commonly available than data CoViD-19 fatalities by age.[20] One study suggests that the average number of years of life lost per CoViD-19 death might be overestimated by about 10% when preexisting conditions are not accounted for.[21] This provides an order of magnitude for the upward bias that ignoring preexisting conditions might similarly induce in estimating reductions in life expectancies case here based solely on the age of CoViD-19 victims.

Moreover, the illustrative results presented here make no adjustment for potential biases in the number of confirmed CoViD-19 deaths. Estimates of life-expectancy reductions based on these also assume no "indirect" effect of the pandemic on other-cause mortality. In populations with complete and timely registration of deaths, the reporting biases and indirect effects can be jointly assessed from the increase in overall mortality over past "benchmark" mortality levels. As noted in the introduction, CDC data continues to suggest that the cumulative number of CoViD-19 deaths to date does not fully account for the overall increase in US mortality. However, the estimation of "excess" deaths directly or indirectly attributable to CoViD-19 can be quite sensitive to the choice of a benchmark period to represent past mortality conditions. Using the shiny app from the *Human Mortality Database*,[22] the number of excess deaths for the first half of 2020 in France, for instance, can be estimated to reach approximately 40,000 when years 2000 through 2019 are used to estimate benchmark mortality, whereas using only the most recent year, 2019, for that mortality benchmark, the estimate drops below 30,000—the number of confirmed CoViD-19 deaths over the same period.[23]

The results presented here to illustrate the properties of these period indicators can easily be customized for different periods, different geographical scales, or to assess their robustness to these different sources of uncertainty. For tracking the pandemic, for instance, estimating *CCDR* and *ISCDR* values for more recent periods than the period starting with the first CoViD-19 death and at a smaller scale than the first subnational division would be necessary. While this can be done with life-expectancy reductions as well, the value of life expectancy for a short period in a small geographical area becomes difficult to interpret and additional measures might become better suited to express the effect of CoViD-19 on longevity.[24] [25] [26] The *ISCDR* and life-expectancy reductions are the least data-demanding of the summary indicators of mortality conditions that allow for comparisons across populations, however, and as crude death rates and life expectancy estimates are widely available, the *CCDR* and life-expectancy reductions readily allow for temporal comparisons with other-cause mortality.

Contributorship Statement

Patrick Heuveline designed the study, compiled the necessary demographic data and drafted this manuscript. Mike Tzen wrote the webscraping routine that provides regularly updated data on CoViD-19 global estimates and projections, and US age-and-sex pattern.

Competing Interests

No competing interests.

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Data Sharing Statement

Additional data are available on the Github repository:

https://github.com/statsccpr/ind-cov-mort

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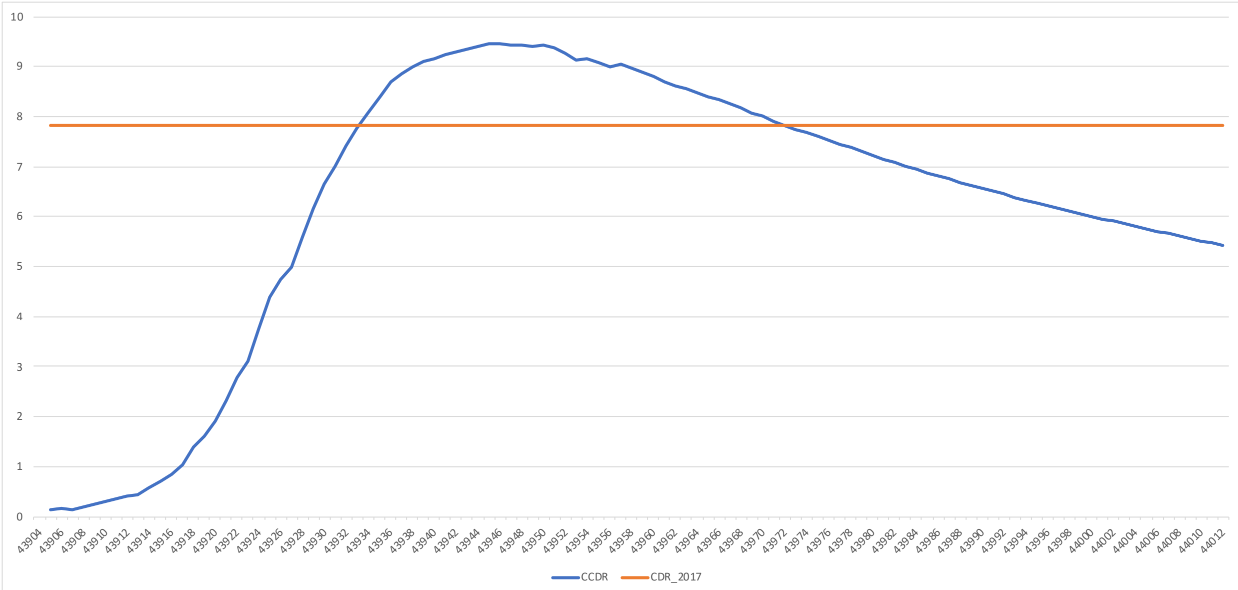
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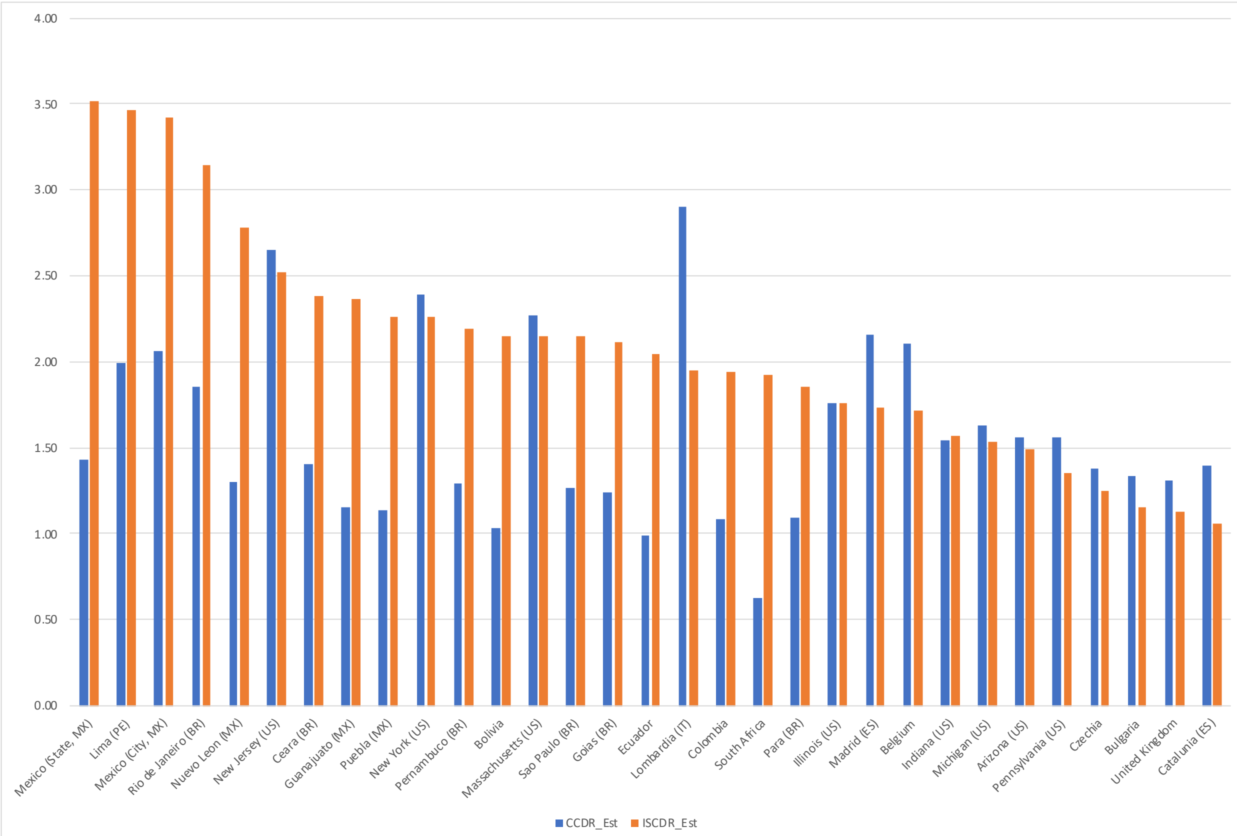

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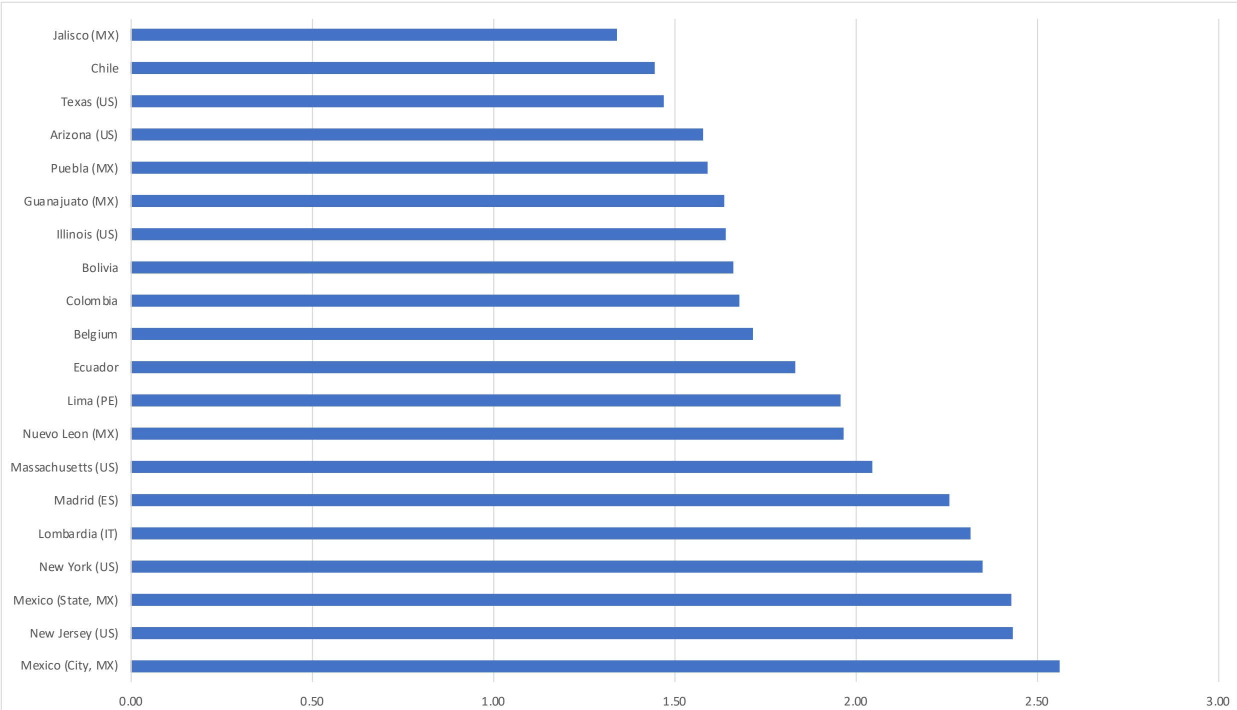
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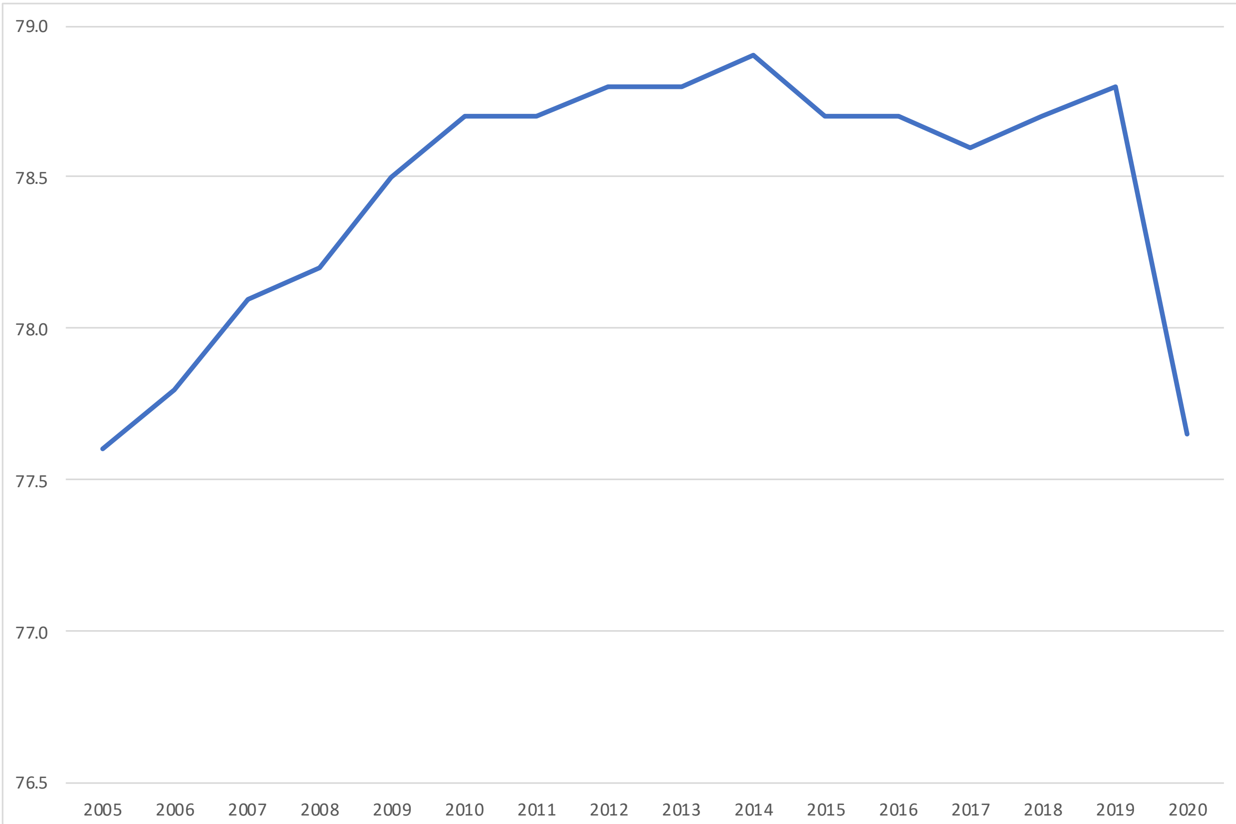
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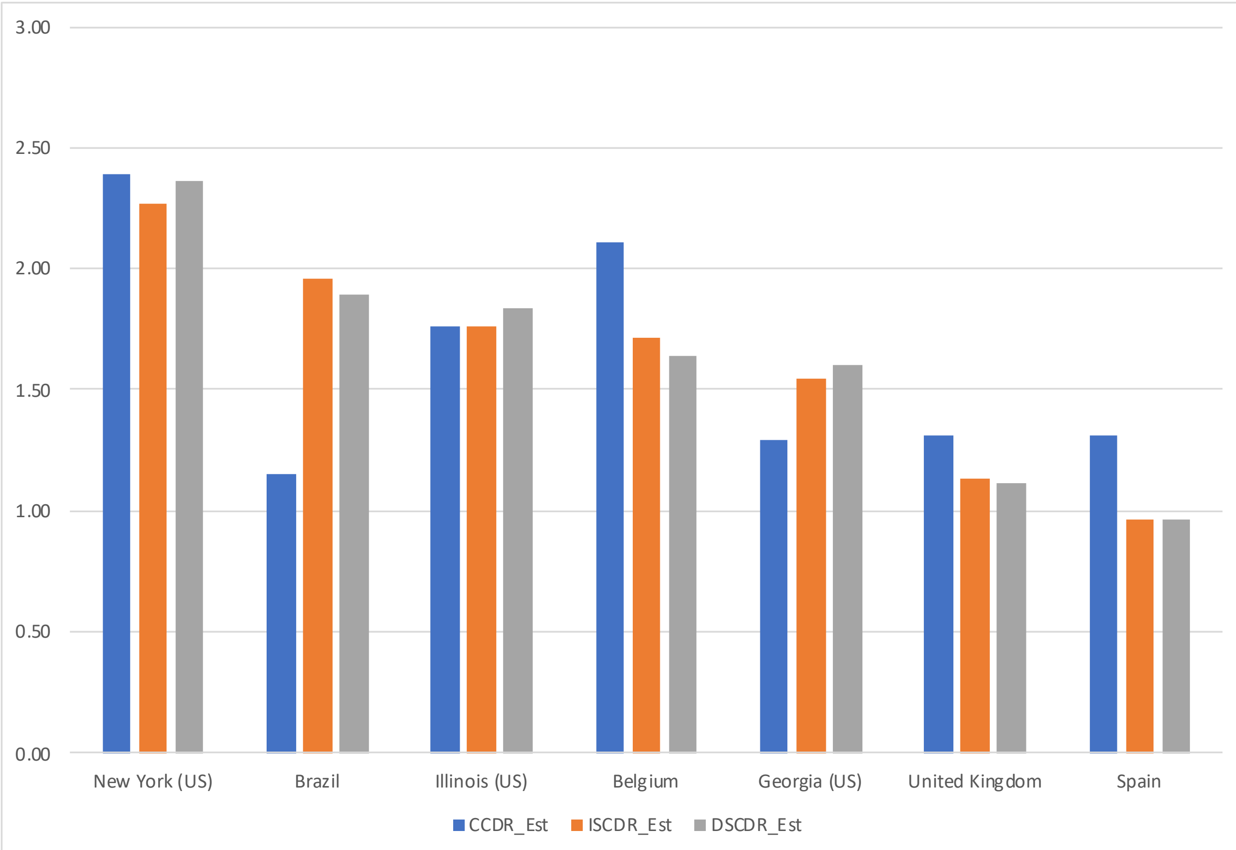
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Beyond Deaths per Capita:

Technical Appendix

Updated Version, 1/2/2021

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Part A. Mortality Indicators

Section 1. Period Crude CoViD-19 Death Rate (*CCDR*)

1.1 Get current estimate date and cumulative number of CoViD-19 deaths by UN country/territory, , and subnational entities with at least one reported case by June 1, 2020 in Brazil, China, Italy, Mexico, Peru, Spain and the USA (all locations thereafter) from: https://coronavirus.jhu.edu/

1.2 Get date of first CoViD-19 death and total mid-2020 population size for all locations in (1.1) (see part B for example)

1.3 Calculate exposure in person-years for all locations in (1.1) as:

$$N.T$$

where N is total population size in (1.3) and T is year-to-date duration in year converted from dates in (1.1) & (1.2)

1.4 Calculate the estimated period Crude CoViD-19 Death Rate (*CCDR*) for all locations in (1.1) and projected *CCDR* for all locations in (1.2) as ratios of deaths in (1.1) & (1.2) to exposure in (1.3)

Section 2. Comparative CoViD-19 Mortality Ratio (*CCMR*)

2.1 Get report date and number of reported CoViD-19 deaths by sex and age group from: https://data.cdc.gov/NCHS/Provisional-COVID-19-Death-Counts-by-Sex-Age-and-S/9bhg-hcku

2.2 Get the mid-2020 population size by age groups, ${}_nN_x$, for each sex and the same age groups as in (2.1) for all locations in (1.1) (see part B for example)

2.3 Calculate age-and-sex-specific CoViD-19 death rates for the USA using the estimate date of first CoViD-19 death and estimated number of CoViD-19 deaths in the country in (1.1), the distribution of deaths by sex and age group in (2.1) and the mid-2020 population by sex and age group in the country in (2.2) as:

$${}_nD_x^C / {}_nN_x.T$$

where (separately for males and females) ${}_nN_x$ is the mid-2020 population in age group *x* to *x+n* in (2.2), *T* is the duration of exposure in (1.4) and ${}_nD_x^C$ is the number of CoViD-19 deaths in (1.1) multiplied by the ratio of deaths in the age group to total deaths in (2.1)

2.4 Calculate estimated counterfactual numbers of CoViD-19 deaths for all locations in (1.1) using the sex and age-specific CoViD-19 death rates for the USA in (2.3) and the mid-2020 population by sex and age group in (2.2)

2.5 Calculate the Comparative CoViD-19 Mortality Ratio (CCMR) for estimated numbers of CoViD-19 deaths for all locations in (1.1) as the ratio of the actual estimate in (1.1) to the corresponding counterfactual number in (2.4)

Section 3. Estimated Reduction in 2020-Life Expectancies

3.1 Get period life-table age-specific death rates (${}_nm_x$) and survival probabilities (${}_np_x$) for year-2020 for each country in (1.1) (see part B for example)

3.2 Calculate the age-specific ratio of updated to previously projected deaths from all causes in 2020 for each country in (1.1) as:

$$ {}_nR_x = \frac{{}_nm_x . \left({}_nN_x - \left((1 - \overline{t_m}) . \, {}_nD_x^C \right) \right) + \, {}_nD_x^C}{{}_nm_x . \, {}_nN_x} $$

where ${}_nm_x$ is the age-specific death rate in the previously projected year-2020 life table from (3.1), ${}_nN_x$ is the mid-2020 population by age group from (2.2), ${}_nD_x^C$ is the estimated number of CoViD-19 deaths in the age group obtained by multiplying the total for the Country in (1.2) by the ratio of deaths in the age group to total deaths in the USA in (2.1) and $\overline{t_m}$ is the fraction of a year corresponding to the average time of CoViD-19 deaths estimated here as the mid-point between the first CoViD-19 death in the country and the end date of the projection (January 1, 2021 as of this writing)

${}_nD_x^C$ is obtained by multiplying ${}_nN_x$, first, by the corresponding age-and-sex-specific CoViD-19 death rate for the USA in (2.3) and, second, by a scaling factor, identical across all sex- and age-groups, to bring the sum of the estimated number of CoViD-19 deaths across all sex- and age-groups to equal the total estimated number of CoViD-19 deaths in the population. (The scaling factor is the ratio of the total estimated number of CoViD-19 deaths in the population divided by the sum of the products of ${}_nN_x$ by the corresponding age-and-sex-specific CoViD-19 death rate for the USA)

3.3 Calculate age-specific survival probabilities in the new projected year-2020 life table for each country in (1.1) from (3.1) & (3.2) using Chiang (1968) formula:

$$ {}_n^*p_x = \; {}_np_x^{\;{}_nR_x} $$

3.4 Calculate the age-specific number of years lived after age *x* for individuals dying in the age interval (${}_na_x$ values) in the new projected year-2020 life table for each country in (1.1) from its corresponding value in the previously projected year-2020 life table derived from (3.1) and the life table relationship:

$$ {}_na_x = \frac{1}{{}_nm_x} - n . \frac{{}_np_x}{1 - \, {}_np_x} $$

and from (3.2) & (3.3) using the Preston et al. (2001: 84) formula:

$$ {}_n^*a_x = n + \left({}_nR_x . \frac{{}_nq_x}{{}_n^*q_x} . \left({}_na_x - n \right) \right) $$

where ${}_nq_x$ is 1-${}_np_x$, and

$$ {}^*a_{85+} = \frac{a_{85+}}{R_{85+}} $$

3.5 Calculate new values of life expectancies (e_x^o values) in the year-2020 life table for all locations in (1.2) starting with $e_x^o = {}^*a_{85+}$ in (3.4) and then using values in (3.3) & (3.4) with the life table relationship:

$$ e_x^o = {}_np_x . (e_{x+n}^o + n) + {}_na_x . (1 - {}_np_x) $$

3.6 Calculate the difference between the new values of life expectancies in year-2020 life table in (3.5) and the original values derived from values in (3.1) for all locations in (1.2) and the life table relationship:

$$ e_x^o = \left({}_np_x . e_{x+n}^o \right) + \frac{1}{{}_nm_x} . (1 - {}_np_x) $$

Part B. Demographic Parameters

Section 1. Mid-2020 Population Size

1.1 (Step 1.3 in part A) Total mid-2020 population size for each UN country and territory was obtained from the "Total Population" file at: https://population.un.org/wpp/Download/Standard/CSV/

1.1.a For provinces in China, the mid-2020 population size for the country was multiplied by the ratio of the 2019-year-end total population estimates for the province divided by the corresponding estimates for the country obtained at: http://data.stats.gov.cn

1.1.b For US states, the total population size was obtained by adding across sex- and age-groups, with the mid-2020 size of each sex- and age-group for the country being multiplied by the ratio of the 2018-sex-and-age-group sizes estimated for the state divided by the corresponding estimate for the country obtained at: https://data.census.gov/cedsci/table?q=United%20States&g=0100000US&tid=ACSDP1Y2018.DP05&hidePreview=true&table=DP05

1.1.c For Brazilian states, the mid-2020 population size for the country was multiplied by the ratio of the 2019-year-end total population estimates for the state divided by the corresponding estimates for the country obtained from the Brazil Statistical Office (IBGE) at: https://www.ibge.gov.br/en/cities-and-states.html?view=municipio

1.1.d For Italian regions, the total population size was obtained by adding across sex- and age-groups, with the mid-2020 size of each sex- and age-group for the country being multiplied by the ratio of the 2019-age-group sizes estimated for the region divided by the corresponding estimate for the country obtained from IStat at: http://demo.istat.it/tvm2016/index.php

1.1.e For Spanish autonomous communities, the total population size was obtained by adding across sex- and age-groups, with the mid-2020 size of each sex- and age-group being multiplied by the ratio of the 2019-age-group sizes estimated for the community divided by the corresponding estimate for the country obtained from Instituto Nacional Estadistica (INE) at:
https://www.ine.es/dyngs/INEbase/en/categoria.htm?c=Estadistica_P&cid=1254734710984

1.1.f For Mexican states, the total population size was obtained by adding across sex- and age-groups, with the mid-2020 size of each sex- and age-group being multiplied by the ratio of the 2010-age-group sizes estimated for the state divided by the corresponding estimate for the country obtained from Instituto Nacional de Estadistica y Geografía (INEGI) at:
https://en.www.inegi.org.mx/temas/estructura/default.html#Tabulados

1.1.g For Peruvian *departamentos*, the total population size was obtained by adding across sex- and age-groups, with the mid-2020 size of each sex- and age-group being multiplied by the ratio of the 2017-age-group sizes estimated for the state divided by the corresponding estimate for the country obtained from El Instituto Nacional de Estadísticañ e Informática (INEI):
https://www.inei.gob.pe

1.2 (Step 1.2 in part A) Dates of first CoViD-19 case and death for UN countries and territories and for provinces in China were retrieved from the World Health Organization's daily situation reports at https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/

1.2.a. For other sub-national populations, dates were obtained from the Institute for Health Metrics and Evaluation at https://covid19.healthdata.org

1.2.b. For Peruvian *departamentos*, dates were not available from IHME and assumed to all be the same as the date of the first CoViD-19 death in the country.

1.3 (step 2.2. in part A) For UN countries and territories with a population size over 90,000,mid-2020 population size by sex- and age-group was obtained from the "Population by Age and Sex" file at: https://population.un.org/wpp/Download/Standard/CSV/
with the following adjustments:

1.3.a Number of infants (under age 1) for each of these UN countries and territories was obtained from the "Annual Population by Age – Both Sexes" file at:
https://population.un.org/wpp/Download/Standard/CSV/

1.3.b Number in age group 1-4 for each of these UN countries and territories was obtained as the difference between the number in the first age group (age 0-4) in the population by 5-year age groups in (1.3) above and the number of infants in (1.3.a) above

1.3.c Numbers in age groups 5-14 to 75-84 for each of these UN countries and territories were obtained by adding the numbers in two consecutive age groups (e.g., ages 5-9 and ages 10-14) in the population by 5-year age groups in (1.3) above

1.3.d Number in age group 85 and over for each of these UN countries and territories was obtained by adding the numbers in the last four age groups (i.e., ages 85-89, 90-94, 95-99 and 100+) in the population by 5-year age groups in (1.3) above

1.3.e For sub-national populations in Brazil and China, the total population size from (1.1.a) or (1.1.c) above was multiplied by the ratio of the national mid-2020 estimates for the sex- and age-group and for the total population (for the USA, Italy, Spain, Mexico and Peru, see (1.1.b), (1.1.d), (1.1.e), (1.1.f) and (1.1.g) above)

Section 2. Calendar-Year-2020 Period Life Table Values

2.1 (Step 3.1 in part A) The period life-table age-specific survival probabilities (${}_np_x$) for year-2020 for each country in (1.3) above are obtained from the corresponding values in the estimated 2015-20 and projected 2020-25 life tables in the "Life table survivors (lx) at exact age x - Both Sexes" file at: https://population.un.org/wpp/Download/Standard/CSV/

2.1.a Age-specific survival probabilities (${}_np_x$) in the estimated 2015-20 and projected 2020-25 life tables for each country in (1.3) above are obtained from the number of survivors by age (l_x) and the life table relationship:

$${}_np_x = \frac{l_{x+n}}{l_x}$$

2.1.b Period life-table age-specific survival probabilities (${}_np_x$) for year-2020 for each country in (1.3) above are obtained as:

$${}_np_x[2020] = \sqrt[2]{{}_np_x[2015-2020].\ {}_np_x[2020-2025]}$$

2.2 (step 3.1 in part A) The period life-table age-specific death rates (${}_nm_x$) for year-2020 for each country in (1.3) above are obtained from the corresponding values in the estimated 2015-20 and projected 2020-25 life tables in the "Life table survivors l(x) at exact age x" and "life expectancy at exact age x" files at: https://population.un.org/wpp/Download/Standard/CSV/

2.2.a Age-specific death rates (${}_nm_x$) in the estimated 2015-20 and projected 2020-25 life tables for each country in (1.3) above are obtained the male/female number of survivors by age (l_x) and the male/female life expectancy by age (e_x^o) and the life table relationships:

$${}_nm_x = \frac{l_x - l_{x+n}}{(l_x.e_x^o) - (l_{x+n}.e_{x+n}^o)}$$

and

$$m_{x+} = \frac{1}{e_x^o}$$

2.2.b Period life-table male/female age-specific death rates (${}_nm_x$) and survival probabilities (${}_np_x$) for year-2020 for each country in (1.3) above are obtained as:

$${}_nm_x[2020] = ({}_nm_x[2015\text{-}20] + {}_nm_x[2020\text{-}25])/2$$

2.2.c For US states, age-specific death rates (${}_nm_x$) for 2016 at ages above age 25 were obtained from: https://wonder.cdc.gov/controller/datarequest/D140. Under age 25, age-specific death rates are unreliable in some states and the rates in all states were thus assumed to equal the rate at the same age in the country (the assumption should have negligible impact on CoViD-19 mortality assessments). The 2016 age-specific death rates for each sex, age group and state were thus prorated using the ratio of 2020/2016 age-specific death rate for the same sex and age group in the country.

2.2.d For Italian regions and Spanish autonomous communities, 2018 (Italy) and 2019 (Spain) life tables were obtained from IStat and INE (see 1.1 above). The 2018 (or 2019) age-specific death rates for each sex, age group and region/community were prorated using the ratio of 2020/2018 (or 2019) age-specific death rate for the same sex and age group in the country. The 2020 life tables were then completed assuming no change in the $_na_x$ from 2018 (or 2019)

2.2.e For Mexican states, 2020 life tables were taken directly from those produced by Partida Bush & García Guerrero (2018) for the UN Population Fund:

Partida Bush, V.G. and García Guerrero, V. (2018). Proyecciones de la Población de México y sus Entidades Federativas 2016–2050. Consejo Nacional de Población, Fondo de Población de Naciones Unidas.

2.2.f For Peruvian *departamentos*, 2020 life tables were interpolated as described in 2.2.a & 2.2.b from projected life tables for 2015-2020 and 2020-2025 obtained from El Instituto Nacional de Estadísticañ e Informática (INEI) at:

http://proyectos.inei.gob.pe/web/biblioineipub/bancopub/Est/Lib0901/index.htm

Beyond Deaths per Capita:

An Example (Brazil), part A

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This file and associated Excel spreadsheet illustrate the calculations of the indicators for Brazil

Fixed demographic parameters (Part B in Technical Appendix)

Section 1: Mid-2020 Population Size

Step 1.1: From the source https://population.un.org/wpp/Download/Standard/CSV/
Get the file for Total Population, All variants
Keep the estimates for 2020, medium variant, all countries and territories
Example: For Brazil, 1 number
Total population, 2020 See spreadsheet, row 15
Step 1.2: From the source https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/
Determine date of first CoViD-19 death for all UN countries and territories
Example: For Brazil, 1 date (month, day, year)
Date of first death See spreadsheet, row 19
Step 1.3: From the source https://population.un.org/wpp/Download/Standard/CSV/
Get the file for Population by Age and Sex, Medium variant, annual from 1950 to 2100
Keep the estimates for 2020, all countries and territories
Example: For Brazil, 2 vectors
Males, 2020 See spreadsheet, row 24
Females, 2020 See spreadsheet, row 25
Step 1.3.a: From the source https://population.un.org/wpp/Download/Standard/CSV/
Get the file for Population by Age and Sex, Medium variant, annual projections from 2020 to 2100
Keep the estimates for infants (age <1) & 2020, all countries and territories
Example: For Brazil, 2 numbers
Male infants, 2020 See spreadsheet, row 30
Female infants, 2020 See spreadsheet, row 31
Step 1.3.b: Get children 1-4 from children 0-4 & infants
Example: For Brazil, 2 numbers
Males 1-4, 2020 See spreadsheet, row 34
Females 1-4, 2020 See spreadsheet, row 35
Step 1.3.c: Get population 5-84 in 10-year age groups
Example: For Brazil, 2 vectors
Males 5-74, 2020 See spreadsheet, row 38
Females 5-74, 2020 See spreadsheet, row 39
Step 1.3.d: Get population 85+
Example: For Brazil, 2 numbers
Males 85+, 2020 See spreadsheet, row 42
Females 85+, 2020 See spreadsheet, row 43

Section 2: Calendar-Year-2020 Period Life Table Values
Step 2.1: From the source https://population.un.org/wpp/Download/Standard/CSV/
Get the file for Life Table, Medium variant
Keep the estimates for lx & ex, periods 2015-20 & 2020-25, all countries and territories

Example: For Brazil, 8 vectors
lx, males, 2015-20 See spreadsheet, row 49
lx, females, 2015-20 See spreadsheet, row 50
lx, males, 2020-25 See spreadsheet, row 51
lx, females, 2020-25 See spreadsheet, row 52
ex, males, 2015-20 See spreadsheet, row 53
ex, females, 2015-20 See spreadsheet, row 54
ex, males, 2020-25 See spreadsheet, row 55
ex, females, 2020-25 See spreadsheet, row 56
Step 2.1.a: Get npx from lx
Example: For Brazil, 4 vectors (10 values for x=0, 1, 5, 15, 25, 35, 45, 55, 65 & 75)
npx, males, 2015-20 See spreadsheet, row 59
npx, females, 2015-20 See spreadsheet, row 60
npx, males, 2020-25 See spreadsheet, row 61
npx, females, 2020-25 See spreadsheet, row 62
Step 2.1.b: Get npx for 2020 from npx for 2015-20 & npx for 2020-25
Example: For Brazil, 2 vectors
npx, males, 2020 See spreadsheet, row 65
npx, females, 2020 See spreadsheet, row 66
Step 2.2
Step 2.2.a: Get nmx from lx & ex
Example: For Brazil, 4 vectors (11 values for x=0, 1, 5, 15, 25, 35, 45, 55, 65, 75 & 85)
nmx, males, 2015-20 See spreadsheet, row 70
nmx, females, 2015-20 See spreadsheet, row 71
nmx, males, 2020-25 See spreadsheet, row 72
nmx, females, 2020-25 See spreadsheet, row 73
Step 2.2.b: Get nmx for 2020 from nmx for 2015-20 & nmx for 2020-25
Example: For Brazil, 2 vectors
nmx, males, 2020 See spreadsheet, row 76
nmx, females, 2020 See spreadsheet, row 77

Updated Mortality Indicators (Part A in Technical Appendix)

Note: indicators below based on 1/1/2021 data updates

Section 1: *CCDR*

Step 1.1: From the source https://coronavirus.jhu.edu/
Get current estimate date & cumulative number of covid-19 deaths
Keep the estimates for all UN countries and territories
Example: For Brazil, 1 number & 1 date (month/day/year)
Death estimate See spreadsheet, row 84
Date of estimate See spreadsheet, row 85
For USA, 1 number & 1 date (month/day/year)
Death estimate See spreadsheet, row 88
Date of estimate See spreadsheet, row 89
Step 1.2: From fixed demographic indicators

Get date of first CoViD-19 death and total mid-2020 population size for all locations in (1.1)

Example: For Brazil, 1 number & 1 date (month/day/year)
Total population, 2020 See spreadsheet, row 93 (from row 15)
Date of first death See spreadsheet, row 94 (from row 19)
Example: For USA, 1 number & 1 date (month/day/year)
Total population, 2020 See spreadsheet, row 96
Date of first death See spreadsheet, row 97
Note: Number & date for USA obtained as described above for Brazil
Step 1.3: Calculate exposure in person-years for all locations in (1.1)
Example: For Brazil, 1 number
Person-years See spreadsheet, row 100
Example: For USA, 1 number
Person-years See spreadsheet, row 102
Note: The number of days was calculated using the ISOdate function in R
Step 1.4: Calculate the estimated period Crude Covid-19 Death Rate (*CCDR*) for all locations in (1.1)
Example: For Brazil, 1 number
CCDR See spreadsheet, row 105

Section 2: *CCMR*
Step 2.1: From the source https://data.cdc.gov/NCHS/Provisional-COVID-19-Death-Counts-by-Sex-Age-and-S/9bhg-hcku
Get report date and number of reported covid-19 deaths by sex and age group
Example: 2 vectors & 1 date (month/day/year)
Male deaths See spreadsheet, row 110
Female deaths See spreadsheet, row 111
Date of estimate See spreadsheet, row 112
Step 2.2: From fixed demographic indicators
Get the mid-2020 population size by age groups for all locations in (1.1)
Example: For Brazil, 2 vectors
Males by age group, 2020 See spreadsheet, row 111 (from rows 30, 34, 38 & 42)
Females by age group, 2020 See spreadsheet, row 112 (from rows 31, 35, 39 & 43)
For USA, 2 vectors
Males by age group, 2020 See spreadsheet, row 119
Females by age group, 2020 See spreadsheet, row 120
Note: Vectors for USA obtained as described above for Brazil
Step 2.3: Calculate age-and-sex-specific covid-19 death rates for the USA
Example: For USA, 2 vectors
Male rates See spreadsheet, row 123
Female rates See spreadsheet, row 124
Step 2.4: Calculate estimated counterfactual numbers of covid-19 deaths for all locations in (1.1)
Example: For Brazil, 2 vectors
Male deaths by age group See spreadsheet, row 127
Female deaths by age group See spreadsheet, row 128

Step 2.5: Calculate the Comparative Covid-19 Mortality Ratio (CCMR) for estimated numbers of covid-19 deaths for all locations in (1.1)
Example: For Brazil, 1 number
CCMR See spreadsheet, row 131

Section 3: Estimated Reduction in 2020-Life Expectancies
Step 3.1: From fixed demographic indicators
Get period life-table age-specific death rates (nmx) and survival probabilities (npx) for year-2020 for each country in (1.1)
Example: For Brazil, 4 vectors
npx, males, 2020 See spreadsheet, row 136 (from row 65)
npx, females, 2020 See spreadsheet, row 137 (from row 66)
nmx, males, 2020 See spreadsheet, row 138 (from row 76)
nmx, females, 2020 See spreadsheet, row 139 (from row 77)
Step 3.2: Calculate the age-specific ratio of updated to previously projected deaths from all causes in 2020 for each country in (1.1)
Example: For Brazil, 2 vectors
nRx, males See spreadsheet, row 142
nRx, females See spreadsheet, row 143
Step 3.3: Calculate age-specific survival probabilities in the new projected year-2020 life table for each country in (1.1)
Example: For Brazil, 2 vectors
*npx, males See spreadsheet, row 146
*npx, females See spreadsheet, row 147
Step 3.4: Calculate the age-specific number of years lived after age *x* for individuals dying in the age interval in the new projected year-2020 life table for each country in (1.1)
Example: For Brazil, 2 vectors
*nax, males See spreadsheet, row 150
*nax, females See spreadsheet, row 151
Step 3.5: Calculate new values of life expectancies (e_x^o values) in the year-2020 life table for all locations in (1.2)
Example: For Brazil, 2 vectors
ex, males See spreadsheet, row 154
ex, females See spreadsheet, row 155
Step 3.6: Calculate the difference between the new values of life expectancies in year-2020 life table and the original values
Example: For Brazil, 3 vectors
Diff in ex, males See spreadsheet, row 154
Diff in ex, females See spreadsheet, row 155
Diff in ex, both sexes See spreadsheet, row 156

Beyond Deaths per Capita: Comparative CoViD-19 Mortality Indicators
Suplementary Information: An Example Brazil), part B

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This file and associated Word document illustrate the calculations of the indicators for Brazil based on 1/1/2021 data updates

Fixed demographic parameters (Part B in Technical Appendix)

Section 1 Mid-2020 Population Size

1.1 From the source https://population.un.org/wpp/Download/Standard/CSV/
Get the file for Total Population, All variants
Keep the estimates for 2020, medium variant, all countries

Example For Brazil, 1 number (in thousands)

Total population, 2020 212559.409

1.2 From the source https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/
Determine date of first CoViD-19 death for UN countries and territories

Example For Brazil, 1 date (month/day/year)

Date of first death 3 17 2020

1.3 From the source https://population.un.org/wpp/Download/Standard/CSV/
Get the file for Population by Age and Sex, Medium variant, annual from 1950 to 2010
Keep the estimates for 2020, all countries

Example For Brazil, 2 vectors

Males, 2020	7404.646	7464.84	7623.386	8253.31	8685.557	8534.004	8571.684	8593.722
Females, 2020	7070.447	7136.977	7319.056	7964.694	8466.492	8418.59	8576.223	8735.133

1.3.a From the source https://population.un.org/wpp/Download/Standard/CSV/
Get the file for Population by Age and Sex, Medium variant, annual from 1950 to 2010
Keep the estimates for 2020, all countries

Example For Brazil, 2 numbers

Male infants, 2020 1468.3
Female infants, 2020 1402.62

1.3.b Get children 1-4 from children 0-4 & infants

Example For Brazil, 2 numbers

Males 1-4, 2020	5936.346							
Females 1-4, 2020	5667.827							
1.3.c	Get population 5-74 in 10-year age groups							
Example	For Brazil, 2 vectors							
Males 5-84, 2020	15088.226	16938.867	17105.688	16298.25	12892.572	9931.736	5745.946	2402.447
Females 5-84, 2020	14456.033	16431.186	16994.813	16691.918	13731.053	11134.693	6992.176	3406.893
1.3.d	Get population 85+							
Example	For Brazil, 2 numbers							
Males 85+, 2020	627.405							
Females 85+, 2020	1214.414							
Section 2	Calendar-Year-2020 Period Life Table Values							
2.1	From the source https://population.un.org/wpp/Download/Standard/CSV/							
	Get the file for Life Table, Medium variant							
	Keep the estimates for lx & ex, periods 2015-20 & 2020-25, all countries							
Example	For Brazil, 8 vectors							
lx, males, 2015-20	1.00E+05	98579.735	98335.619	98198.045	98026.349	97196.061	95892.45	94701.252
lx, females, 2015-20	1.00E+05	98822.813	98621.471	98537.678	98404.742	98183.564	97899.232	97581.555
lx, males, 2020-25	1.00E+05	98798.839	98588.303	98467.29	98313.245	97554.476	96344.713	95227.117
lx, females, 2020-25	1.00E+05	98997.945	98823.323	98749.266	98629.531	98426.818	98162.535	97864.354
ex, males, 2015-20	71.899	71.9336	68.1082	63.2001	58.3064	53.7796	49.4757	45.0666
ex, females, 2015-20	79.272	79.2152	75.3739	70.4359	65.5276	60.6693	55.838	51.0113
ex, males, 2020-25	73.012	72.8987	69.0509	64.1327	59.2293	54.6672	50.3212	45.8825
ex, females, 2020-25	80.1448	79.9552	76.0938	71.149	66.2324	61.3633	56.5215	51.6858
2.1.a	Get npx from lx							
Example	For Brazil, 4 vectors (10 values for x=0, 1, 5, 15, 25, 35, 45, 55, 65 & 75)							
npx, males, 2015-20	9.86E-01	9.98E-01	9.97E-01	9.78E-01	9.74E-01	9.64E-01	9.33E-01	8.68E-01
npx, females, 2015-20	9.88E-01	9.98E-01	9.98E-01	9.95E-01	9.92E-01	9.84E-01	9.64E-01	9.22E-01
npx, males, 2020-25	9.88E-01	9.98E-01	9.97E-01	9.80E-01	9.76E-01	9.66E-01	9.37E-01	8.76E-01
npx, females, 2020-25	9.90E-01	9.98E-01	9.98E-01	9.95E-01	9.93E-01	9.85E-01	9.66E-01	9.27E-01
2.1.b	Get npx for 2020 from npx for 2015-20 & npx for 2020-25							
Example	For Brazil, 2 vectors							
npx, males, 2020	9.87E-01	9.98E-01	9.97E-01	9.79E-01	9.75E-01	9.65E-01	9.35E-01	8.72E-01
npx, females, 2020	9.89E-01	9.98E-01	9.98E-01	9.95E-01	9.92E-01	9.85E-01	9.65E-01	9.25E-01

2.2

2.2.a Get nmx from lx & ex

Example For Brazil, 4 vectors (11 values for x=0, 1, 5, 15, 25, 35, 45, 55, 65, 75 & 85)

nmx, males, 2015-20	1.44E-02	6.20E-04	3.15E-04	2.20E-03	2.61E-03	3.71E-03	6.88E-03	1.41E-02
nmx, females, 2015-20	1.19E-02	5.10E-04	2.20E-04	5.15E-04	7.90E-04	1.59E-03	3.65E-03	8.07E-03
nmx, males, 2020-25	1.21E-02	5.33E-04	2.79E-04	2.02E-03	2.44E-03	3.48E-03	6.44E-03	1.31E-02
nmx, females, 2020-25	1.01E-02	4.41E-04	1.96E-04	4.75E-04	7.42E-04	1.50E-03	3.43E-03	7.53E-03

2.2.b Get nmx for 2020 from nmx for 2015-20 & nmx for 2020-25

Example For Brazil, 2 vectors

nmx, males, 2020	0.01326754	0.00057671	0.00029717	0.00210824	0.00252603	0.00359544	0.00665761	0.01356478
nmx, females, 2020	0.01100635	0.00047573	0.00020812	0.00049471	0.00076566	0.00154808	0.0035403	0.0078015

Updated Mortality Indicators (Part A in Technical Appendix)

Section 1 *CCDR*

1.1 From the source https://coronavirus.jhu.edu/

Get current estimate date & cumulative number of covid-19 deaths

Keep the estimates for all UN countries and territories

Example For Brazil, 1 number & 1 date (month/day/year)

Death estimate	194949		
Date of estimate	1	1	2021

For USA 1 number & 1 date (month/day/year)

Death estimate	345737		
Date of estimate	1	1	2021

1.2 From fixed demographic indicators

Get date of first CoViD-19 death and total mid-2020 population size for all locations in (1.1)

Example For Brazil, 1 number (in thousands) & 1 date (month/day/year)

Total population, 2020	212559.409		
Date of first death	3	17	2020

For USA, 1 number (in thousands) & 1 date (month/day/year)

Total population, 2020	331002.647		
Date of first death	3	2	2020

1.3 Calculate exposure in person-years for all locations in (1.1)

Example For Brazil, 1 number (in thousands)

Person-years	169002

For USA, 1 number (in thousands)

Person-years	276740

1.4 Calculate the estimated period Crude Covid-19 Death Rate (*CCDR*) for all locations in (1.1)

Example For Brazil, 1 number (in deaths per thousand person-years)

CCDR	1.15352968

Section 2 *CCMR*

2.1 From the source https://data.cdc.gov/NCHS/Provisional-COVID-19-Death-Counts-by-Sex-Age-and-S/9bhg-hcku

Get report date and number of reported covid-19 deaths by sex and age group

Example 2 vectors & 1 date (month/day/year)

Male deaths	22	11	32	292	1332	3620	9748	23104
Female deaths	10	8	19	191	755	1778	4746	12877
Date of estimate	12	30	2020					

2.2 From fixed demographic indicators

Get the mid-2020 population size by age groups for all locations in (1.1)

Example For Brazil, 2 vectors (in thousands)

Males by age group, 2020	1468.3	5936.346	15088.226	16938.867	17105.688	16298.25	12892.572	9931.736
Females by age group, 202	1402.62	5667.827	14456.033	16431.186	16994.813	16691.918	13731.053	11134.693

For USA, 2 vectors (in thousands)

Males by age group, 2020	2039.37	8015.693	21023.906	22157.053	23846.969	20977.453	20288.634	20751.951
Females by age group, 202	1951.448	7669.821	20110.733	21344.6	23040.84	20932.937	20342.971	21459.462

2.3 Calculate age-and-sex-specific covid-19 death rates for the USA

Example For USA, 2 vectors (in deaths per thousand person-years)

Male rates	0.01478763	0.00188115	0.00208645	0.0180652	0.07656724	0.23655262	0.65861963	1.52616046
Female rates	0.00702449	0.0014298	0.00129508	0.01226641	0.04491802	0.11643232	0.31980504	0.82256044

2.4 Calculate estimated counterfactual numbers of covid-19 deaths for all locations in (1.1)

Example For Brazil, 2 vectors

Female deaths by age grou	17.2633594	8.8788082	25.029871	243.298299	1041.34693	3065.35408	6751.28026	12051.3935
Male deaths by age group	7.83369941	6.44325327	14.8853377	160.250029	606.944377	1545.22488	3491.41165	7282.12236

2.5 Calculate the Comparative Covid-19 Mortality Ratio (CCMR) for estimated numbers of covid-19 deaths for all locations i

Example For Brazil, 1 number (in deaths per thousand person-years)

CCMR	1.56700864

Section 3 Estimated Reduction in 2020-Life Expectancies

3.1 From fixed demographic indicators

Get period life-table age-specific death rates (nmx) and survival probabilities (npx) for year-2020 for each country in (1.1)

Example For Brazil, 4 vectors

npx, males, 2020	0.98689226	0.99769634	0.99703248	0.97910377	0.97504726	0.964638	0.93535103	0.87212003
npx, females, 2020	0.9891034	0.99809934	0.9979207	0.99506403	0.99236928	0.98462455	0.96513929	0.92453186
nmx, males, 2020	0.01326754	0.00057671	0.00029717	0.00210824	0.00252603	0.00359544	0.00665761	0.01356478
nmx, females, 2020	0.01100635	0.00047573	0.00020812	0.00049471	0.00076566	0.00154808	0.0035403	0.0078015

3.2 Calculate the age-specific ratio of updated to previously projected deaths from all causes in 2020 for each country in (1.1)

Example For Brazil, 2 vectors

nRx, males	1.00138135	1.00406304	1.0087466	1.01066705	1.03772699	1.0818541	1.12292859	1.13942177
nRx, females	1.00079169	1.00374383	1.00775227	1.03088616	1.07306933	1.09364783	1.11238789	1.1309569

3.3 Calculate age-specific survival probabilities in the new projected year-2020 life table for each country in (1.1)

Example For Brazil, 2 vectors

*npx, males	0.98687427	0.99768699	0.99700656	0.97888324	0.97411816	0.96179945	0.92769792	0.85564043
*npx, females	0.98909482	0.99809223	0.9979046	0.99491197	0.991814	0.98319684	0.96129813	0.91508011

3.4 Calculate the age-specific number of years lived after age x for individuals dying in the age interval in the new projected yea

Example For Brazil, 2 vectors

*nax, males	0.08110658	1.60991325	5.28729479	5.77473421	5.11743064	5.33412189	5.50442983	5.48014364
*nax, females	0.08485635	1.49391652	5.57429439	5.43728791	5.56616648	5.5718189	5.59769645	5.65219385

3.5 Calculate new values of life expectancies (e_x^o values) in the year-2020 life table for all locations in (1.1)

Example For Brazil, 2 vectors

ex, males	70.8076455	70.7483298	66.9086182	57.0936317	48.2006984	39.3453996	30.6962525	22.65963
ex, females	78.1103825	77.9706461	74.1168248	64.2607503	54.5615767	44.9659637	35.6392228	26.8486949

3.6 Calculate the difference between the new values of life expectancies in year-2020 life table and the original values

Example For Brazil, 3 vectors

Diff in ex, males	1.64122072	1.66171283	1.66490029	1.66824885	1.69203454	1.69313261	1.65089297	1.5415536
Diff in ex, females	1.59375157	1.61062505	1.61314637	1.61539917	1.61437525	1.59913747	1.56596075	1.4978324
Diff in ex, both sexes	1.61806504	1.63679196	1.63965448	1.64246852	1.65415196	1.64728132	1.60946262	1.52022618

7704.528	6721.639	6170.933	5508.456	4423.28	3394.482	2351.464	1480.939	921.508	423.007
7956.785	7079.054	6651.999	6089.814	5044.879	4034.221	2957.955	2011.193	1395.7	752.233

93421.833	91887.99	90018.099	87486.788	84010.341	79319.932	72901.013	64131.683	53579.501	40657.012
97128.793	96489.731	95591.475	94181.698	92153.999	89297.819	84964.87	78829.755	70191.912	58246.853
94018.919	92566.322	90795.125	88400.322	85115.544	80684.01	74603.737	66238.802	56043.892	43307.648
97436.95	96832.354	95982.892	94652.211	92742.5	90056.543	85979.982	80186.326	71961.344	60423.493
40.6489	36.2843	31.9839	27.8333	23.8762	20.1327	16.6737	13.5976	10.7666	8.3748
46.2368	41.5255	36.8907	32.4029	28.0576	23.87	19.9517	16.2986	12.9793	10.1045
41.4392	37.0491	32.721	28.5362	24.536	20.7393	17.2149	14.0595	11.1458	8.6677
46.9009	42.1773	37.527	33.017	28.6424	24.4174	20.4489	16.7351	13.3455	10.3928

7.35E-01	4.99E-01
8.26E-01	6.17E-01
7.51E-01	5.21E-01
8.37E-01	6.35E-01

7.43E-01	5.10E-01
8.32E-01	6.26E-01

3.03E-02	6.63E-02	0.15550407
1.88E-02	4.66E-02	0.12978754
2.81E-02	6.23E-02	0.1505752
1.76E-02	4.39E-02	0.12634398

0.02919471	0.06428998	0.15303963
0.01820512	0.04522272	0.12806576

39437	46138	39811
24917	36506	56317
5745.946	2402.447	627.405
6992.176	3406.893	1214.414
15110.793	7132.609	2441.585
17063.097	9056.327	4244.395
3.57757354	8.86711422	22.3513209
2.00175005	5.52565937	18.1884493
16344.1377	16937.4498	11149.6972
11128.4352	14967.6806	17562.0149

in (1.1)

0.7430472	0.51010334	
0.83152401	0.62587533	
0.02919471	0.06428998	0.15303963
0.01820512	0.04522272	0.12806576
1.15090904	1.16746247	1.1709303
1.13600533	1.14950624	1.1679704
0.7104796	0.45572398	
0.81091875	0.58352773	

r-2020 life table for each country in (1.1)

5.23508467	4.89517641	5.58039632
5.51992621	5.23312565	6.68551905
15.558071	9.76468738	5.58039632
18.8157407	11.9159148	6.68551905
1.38206161	1.18856733	0.95385881
1.38149726	1.24416135	1.12296928
1.38178632	1.21568636	1.03635172

161.001	37.722	5.675
349.826	96.88	15.475

26752.433	14359.584	5872.788	1613.615
43309.775	27310.5	13632.434	4476.96
29206.533	16167.993	6847.801	1951.199
45685.258	29447.489	15089.164	5098.862
6.4307	4.9084	3.6986	2.8377
7.7049	5.7626	4.1402	3.04
6.6412	5.047	3.7801	2.8715
7.9149	5.9015	4.223	3.0747

Beyond Deaths per Capita: Comparative CoViD-19 Mortality Indicators
Suplementary Information: Sensitivity Analysis

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This file illustrates alternate calculations of life expectancy reduction using the actual age distribution for Brazil (from 12/31/2020) and 1/1

Age distribution of CoViD-19 deaths in Brazil

1.1 From the source https://transparencia.registrocivil.org.br/especial-covid

For Brazil, 3 vectors

Male deaths	158	641	971	3316	7474	14634	25672	28900
Female deaths	154	536	849	2245	4453	8813	16502	20343
Unknown deaths	1	39	1	0	5	3	4	10

1.2 From the source https://coronavirus.jhu.edu/

Get current estimate date & cumulative number of covid-19 deaths

Example For Brazil, 1 number & 1 date (month/day/year)

Death estimate	194949		
Date of estimate	1	1	2021

1.3 Prorate to the current estimate for males and females

For Brazil, 2 vectors

Male deaths	163	680	997	3403	7672	15018	26345	29660
Female deaths	159	568	872	2304	4571	9044	16934	20878

Directly standardized rate

2.1 From the source https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/

Determine date of first CoViD-19 death for UN countries and territories

Example For Brazil, 1 date (month/day/year)

Date of first death	3	17	2020

2.2 From the source https://population.un.org/wpp/Download/Standard/CSV/

Get the file for Population by Age and Sex, Medium variant, annual from 1950 to 2010

Keep the estimates for 2020, all countries

Example For Brazil, 2 vectors

Males, 2020	7404.646	7464.84	7623.386	8253.31	8685.557	8534.004	8571.684	8593.722

Females, 2020	7070.447	7136.977	7319.056	7964.694	8466.492	8418.59	8576.223	8735.133
Example	For USA, 2 vectors							
Males, 2020	10055.063	10246.393	10777.513	10834.321	11322.732	12144.455	11702.514	10858.871
Females, 2020	9621.269	9798.759	10311.974	10408.587	10936.013	11690.875	11349.965	10756.92

2.3 Get population by age and sex with same age-groups as Covid-19 deaths from Brazil

Example	For Brazil, 2 vectors							
Males, 2020	14869.486	15876.696	17219.561	17165.406	14426.167	11679.389	7817.762	3832.403
Females, 2020	14207.424	15283.75	16885.082	17311.356	15035.839	12741.813	9079.1	4969.148
	For USA, 2 vectors							
Males, 2020	20301.456	21611.834	23467.187	22561.385	20087.681	21021.6	18515.16	10972.505
Females, 2020	19420.028	20720.561	22626.888	22106.885	20260.716	21098.477	19973.01	13110.092

2.4 Get sex- and age-specific rates of death from Covid-19 in Brazil

Example	For Brazil, 2 vectors							
Males, 2020	0.01093808	0.04280015	0.05789299	0.19822148	0.53183196	1.28584541	3.36983562	7.73936137
Females, 2020	0.01115798	0.03717768	0.05162182	0.13306858	0.30401662	0.70980389	1.86519929	4.20156921

2.5 Multiply sex- and age-specfic rates of death from Covid-19 in Brazil by proportion in sex- and age-group in USA

Example								
Males, 2020	0.00067087	0.00279451	0.00410446	0.01351092	0.03227548	0.08166257	0.18849712	0.25655439
Females, 2020	0.00065464	0.0023273	0.0035288	0.00888734	0.0186089	0.04524369	0.11254787	0.16641244

2.6 Sum across all sex- and age-groups and multiply by one over fraction of year

Example	For Brazil, 1 number
DSCDR	1.89262081

Reduction in life expectancy at birth

3.1 From the source https://population.un.org/wpp/Download/Standard/CSV/
Get the file for Life Table, Medium variant
Keep the estimates for lx & ex, periods 2015-20 & 2020-25, all countries

Example	For Brazil, 8 vectors							
lx, males, 2015-20	1.00E+05	98579.735	98335.619	98198.045	98026.349	97196.061	95892.45	94701.252
lx, females, 2015-20	1.00E+05	98822.813	98621.471	98537.678	98404.742	98183.564	97899.232	97581.555
lx, males, 2020-25	1.00E+05	98798.839	98588.303	98467.29	98313.245	97554.476	96344.713	95227.117
lx, females, 2020-25	1.00E+05	98997.945	98823.323	98749.266	98629.531	98426.818	98162.535	97864.354
ex, males, 2015-20	71.899	71.9336	68.1082	63.2001	58.3064	53.7796	49.4757	45.0666
ex, females, 2015-20	79.272	79.2152	75.3739	70.4359	65.5276	60.6693	55.838	51.0113

ex, males, 2020-25	73.012	72.8987	69.0509	64.1327	59.2293	54.6672	50.3212	45.8825
ex, females, 2020-25	80.1448	79.9552	76.0938	71.149	66.2324	61.3633	56.5215	51.6858

3.2 Get npx from lx

Example For Brazil, 4 vectors (10 values for x=0, 10, 20, 30, 40, 50, 60, 70, 80 & 90)

npx, males, 2015-20	9.82E-01	9.90E-01	9.74E-01	9.70E-01	9.52E-01	9.07E-01	8.09E-01	6.34E-01
npx, females, 2015-20	9.85E-01	9.96E-01	9.94E-01	9.89E-01	9.76E-01	9.48E-01	8.83E-01	7.39E-01
npx, males, 2020-25	9.85E-01	9.91E-01	9.76E-01	9.72E-01	9.55E-01	9.13E-01	8.21E-01	6.54E-01
npx, females, 2020-25	9.87E-01	9.97E-01	9.94E-01	9.89E-01	9.77E-01	9.51E-01	8.90E-01	7.54E-01

3.3 Get npx for 2020 from npx for 2015-20 & npx for 2020-25

Example For Brazil, 2 vectors

npx, males, 2020	9.83E-01	9.90E-01	9.75E-01	9.71E-01	9.54E-01	9.10E-01	8.15E-01	6.44E-01
npx, females, 2020	9.86E-01	9.97E-01	9.94E-01	9.89E-01	9.77E-01	9.50E-01	8.87E-01	7.46E-01

3.4 Get nmx from lx & ex

Example For Brazil, 4 vectors (10 values for x=0, 10, 20, 30, 40, 50, 60, 70, 80 & 90)

nmx, males, 2015-20	1.83E-03	1.02E-03	2.60E-03	3.01E-03	4.90E-03	9.74E-03	2.10E-02	4.42E-02
nmx, females, 2015-20	1.48E-03	3.60E-04	6.15E-04	1.12E-03	2.42E-03	5.31E-03	1.24E-02	2.96E-02
nmx, males, 2020-25	1.55E-03	9.30E-04	2.41E-03	2.83E-03	4.59E-03	9.09E-03	1.95E-02	4.13E-02
nmx, females, 2020-25	1.27E-03	3.27E-04	5.73E-04	1.06E-03	2.27E-03	4.96E-03	1.15E-02	2.77E-02

3.5 Get nmx for 2020 from nmx for 2015-20 & nmx for 2020-25

Example For Brazil, 2 vectors

nmx, males, 2020	0.0016929	0.00097656	0.00250775	0.00292208	0.00474457	0.00941498	0.02020965	0.04270665
nmx, females, 2020	0.00137368	0.00034345	0.00059398	0.00109197	0.00234504	0.00513461	0.01193996	0.02862141

3.6 Calculate the age-specific ratio of updated to previously projected deaths from all causes in 2020

Example For Brazil, 2 vectors

nRx, males	1.00645683	1.04381057	1.02306272	1.06775732	1.11188206	1.13606504	1.16540882	1.17815534
nRx, females	1.00811825	1.10823141	1.08688843	1.12180884	1.12952171	1.13795791	1.15547598	1.14513354

3.3 Calculate age-specific survival probabilities in the new projected year-2020 life table

Example For Brazil, 2 vectors

*npx, males	0.983219	0.98983851	0.97467337	0.96925272	0.94848628	0.89803377	0.78756703	0.59523245
*npx, females	0.98632478	0.9962	0.99356399	0.98781731	0.97381497	0.94306847	0.87013866	0.71513706

3.4 Calculate the age-specific number of years lived after age *x* for individuals dying in the age interval in the new projected yea

Example For Brazil, 2 vectors

*nax, males	9.76E-01	7.00E+00	4.93E+00	5.29E+00	5.48E+00	5.47E+00	5.44E+00	5.17E+00

*nax, females	8.24E-01	5.73E+00	5.24E+00	5.57E+00	5.72E+00	5.56E+00	5.55E+00	5.45E+00

3.5 Calculate new values of life expectancies (e_x^o values) in the year-2020 life table

Example	For Brazil, 2 vectors							
ex, males	70.6699538	61.859447	52.4226137	43.6566529	34.8737072	26.4700037	18.8541296	12.4735945
ex, females	78.1512328	69.2233562	59.4655567	49.8168095	40.3625479	31.2941625	22.8475841	15.4298419

3.6 Calculate the difference between the new values of life expectancies in year-2020 life table and the original values

Example	For Brazil, 2 vectors							
Diff in ex, males	1.77862005	1.80107639	1.79502682	1.81239945	1.78768793	1.70972343	1.57740644	1.35151234
Diff in ex, females	1.5526901	1.56534358	1.54703342	1.52808035	1.48525429	1.41231696	1.29293553	1.08442601
Diff in ex, both sexes	1.66841032	1.68608477	1.67405443	1.67370721	1.64015933	1.5646471	1.43864014	1.22122633

3.7 Difference with difference using CDC sex- and age-specific rates of death from Covid-19

Example	For Brazil, 3 numbers
Diff in diff in ex, males	0.13739933
Diff in diff in ex, females	-0.0410615
Diff in diff in ex, both sexe	0.05034528

3.8 Relative difference with difference using CDC sex- and age-specific rates of death from Covid-19

Example	For Brazil, 3 numbers
% diff in diff in ex, males	7.73%
% diff in diff in ex, female	-2.64%
% diff in diff in ex, both se	3.02%

/2021 data updates

21000	5673	256
19145	7687	495
7	3	0

21552	5822	263
19648	7889	508

7704.528	6721.639	6170.933	5508.456	4423.28	3394.482	2351.464	1480.939	921.508	423.007

7956.785	7079.054	6651.999	6089.814	5044.879	4034.221	2957.955	2011.193	1395.7	752.233

10118.582	9969.099	10319.535	10702.065	10049.886	8465.274	6645.519	4326.986	2805.623	1538.659
10176.017	10084.699	10258.272	10840.205	10619.257	9353.753	7709.344	5400.748	3655.579	2372.445

1344.515	198.723	5.675
2147.933	446.706	15.475

4344.282	882.134	20.792
6028.024	1795.638	76.312

16.0294873	29.2989751	46.2875686
9.14746233	17.6613084	32.8219826

0.21038083	0.07808283	0.00290756
0.16658816	0.09580986	0.00756704

93421.833	91887.99	90018.099	87486.788	84010.341	79319.932	72901.013	64131.683	53579.501	40657.012
97128.793	96489.731	95591.475	94181.698	92153.999	89297.819	84964.87	78829.755	70191.912	58246.853
94018.919	92566.322	90795.125	88400.322	85115.544	80684.01	74603.737	66238.802	56043.892	43307.648
97436.95	96832.354	95982.892	94652.211	92742.5	90056.543	85979.982	80186.326	71961.344	60423.493
40.6489	36.2843	31.9839	27.8333	23.8762	20.1327	16.6737	13.5976	10.7666	8.3748
46.2368	41.5255	36.8907	32.4029	28.0576	23.87	19.9517	16.2986	12.9793	10.1045

41.4392	37.0491	32.721	28.5362	24.536	20.7393	17.2149	14.0595	11.1458	8.6677
46.9009	42.1773	37.527	33.017	28.6424	24.4174	20.4489	16.7351	13.3455	10.3928

3.53E-01	1.12E-01
4.69E-01	1.64E-01
3.73E-01	1.21E-01
4.87E-01	1.73E-01

3.63E-01	1.16E-01
4.78E-01	1.68E-01

9.74E-02	1.93E-01	0.35239807
7.17E-02	1.59E-01	0.32894737
9.24E-02	1.87E-01	0.34825004
6.82E-02	1.54E-01	0.32523498

0.0948876	0.19023682	0.35032406
0.06997506	0.15641075	0.32709118

1.16258084	1.14240565	1.11378989
1.12710062	1.10591924	1.08734181

0.30797917	0.08573665
0.43521884	0.13951307

r-2020 life table for each country in (1.1)

4.48E+00	3.31E+00	2.56287112

4.93E+00	3.98E+00	2.81167477
7.44056406	4.10152939	2.56287112
9.40510835	5.21245068	2.81167477
1.07858502	0.87534353	0.29162883
0.84187688	0.61890552	0.24557677
0.96311764	0.75025182	0.26916441

161.001	37.722	5.675

349.826	96.88	15.475	
703.131	179.003	20.792	
1348.005	447.633	76.312	

26752.433	14359.584	5872.788	1613.615
43309.775	27310.5	13632.434	4476.96
29206.533	16167.993	6847.801	1951.199
45685.258	29447.489	15089.164	5098.862
6.4307	4.9084	3.6986	2.8377
7.7049	5.7626	4.1402	3.04

6.6412	5.047	3.7801	2.8715
7.9149	5.9015	4.223	3.0747

Location	loc_type_fin	Pop_Mid2020	Density_Mid2	CDR_Yr_Last	Days_Est	CCDR_Est
Afghanistan	Cntry/Terr	38,928.341	59.6	6.52	286	0.07
Albania	Cntry/Terr	2,877.800	105.0	7.82	295	0.51
Algeria	Cntry/Terr	43,851.043	18.4	4.72	297	0.08
Andorra	Cntry/Terr	77.265	164.4	NA	285	1.40
Angola	Cntry/Terr	32,866.268	26.4	8.33	277	0.02
Antigua and	Cntry/Terr	97.928	222.6	6.34	269	0.07
Argentina	Cntry/Terr	45,195.777	16.5	7.61	301	1.16
Armenia	Cntry/Terr	2,963.234	104.1	9.91	282	1.24
Aruba	Cntry/Terr	106.766	593.1	8.97	262	0.64
Australia	Cntry/Terr	25,499.881	3.3	6.60	307	0.04
Austria	Cntry/Terr	9,006.400	109.3	9.87	296	0.85
Azerbaijan	Cntry/Terr	10,139.175	122.7	6.75	290	0.33
Bahamas	Cntry/Terr	393.248	39.3	6.71	275	0.58
Bahrain	Cntry/Terr	1,701.583	2,238.9	2.38	293	0.26
Bangladesh	Cntry/Terr	164,689.383	1,265.2	5.55	289	0.06
Barbados	Cntry/Terr	287.371	668.3	8.98	271	0.03
Belarus	Cntry/Terr	9,449.321	46.6	12.55	276	0.20
Belgium	Cntry/Terr	11,589.616	382.7	9.79	293	2.10
Belize	Cntry/Terr	397.621	17.4	4.70	271	0.84
Benin	Cntry/Terr	12,123.198	107.5	8.96	271	0.00
Bermuda	Cntry/Terr	62.273	1,245.5	NA	270	0.22
Bolivia (Pluri	Cntry/Terr	11,673.029	10.8	6.79	278	1.03
Bosnia and H	Cntry/Terr	3,280.815	64.3	10.61	287	1.57
Botswana	Cntry/Terr	2,351.625	4.1	5.80	276	0.02
Brazil	Cntry/Terr	212,559.409	25.4	6.42	291	1.15
British Virgir	Cntry/Terr	30.237	201.6	NA	258	0.05
Brunei Darus	Cntry/Terr	437.483	83.0	4.40	281	0.01
Bulgaria	Cntry/Terr	6,948.445	64.0	15.38	298	1.34
Burkina Faso	Cntry/Terr	20,903.278	76.4	8.27	290	0.01
Burundi	Cntry/Terr	11,890.781	463.0	8.04	258	0.00
Cabo Verde	Cntry/Terr	555.988	138.0	5.64	281	0.26
Cameroon	Cntry/Terr	26,545.864	56.2	9.36	284	0.02
Canada	Cntry/Terr	37,742.157	4.2	7.71	298	0.51
Cayman Islar	Cntry/Terr	65.720	273.8	NA	293	0.04
Central Afric	Cntry/Terr	4,829.764	7.8	12.39	224	0.02
Chad	Cntry/Terr	16,425.859	13.0	12.24	249	0.01
Channel Islar	Cntry/Terr	173.859	915.0	7.81	282	0.43
Chile	Cntry/Terr	19,116.209	25.7	6.12	287	1.11
China	Cntry/Terr	1,439,323.774	153.3	7.12	357	0.00
China, Hong	Cntry/Terr	7,496.988	7,140.0	6.61	326	0.02
China, Taiwa	Cntry/Terr	23,816.775	672.6	7.50	321	0.00
Colombia	Cntry/Terr	50,882.884	45.9	5.53	286	1.09

Comoros	Cntry/Terr	869.595	467.3	7.27	244	0.02
Congo	Cntry/Terr	5,518.092	16.2	6.75	276	0.03
Costa Rica	Cntry/Terr	5,094.114	99.8	5.05	289	0.54
Cote d'Ivoire	Cntry/Terr	26,378.275	83.0	10.16	275	0.01
Croatia	Cntry/Terr	4,105.268	73.4	13.13	284	1.23
Cuba	Cntry/Terr	11,326.616	106.4	8.91	290	0.02
Curacao	Cntry/Terr	164.100	369.6	8.77	287	0.11
Cyprus	Cntry/Terr	1,207.361	130.7	6.99	290	0.12
Czechia	Cntry/Terr	10,708.982	138.6	10.50	286	1.38
Democratic I	Cntry/Terr	89,561.404	39.5	9.58	287	0.01
Denmark	Cntry/Terr	5,792.203	136.5	9.72	293	0.28
Djibouti	Cntry/Terr	988.002	42.6	7.08	268	0.08
Dominican R	Cntry/Terr	10,847.904	224.5	6.13	292	0.28
Ecuador	Cntry/Terr	17,643.060	71.0	5.10	293	0.99
Egypt	Cntry/Terr	102,334.403	102.8	5.83	300	0.09
El Salvador	Cntry/Terr	6,486.201	313.0	7.02	276	0.27
Equatorial G	Cntry/Terr	1,402.985	50.0	9.43	256	0.09
Estonia	Cntry/Terr	1,326.539	31.3	11.62	283	0.22
Eswatini	Cntry/Terr	1,160.164	67.5	9.42	261	0.25
Ethiopia	Cntry/Terr	114,963.583	115.0	6.66	272	0.02
Finland	Cntry/Terr	5,540.718	18.2	9.73	287	0.13
France	Cntry/Terr	65,273.512	119.2	9.27	322	1.13
French Guiar	Cntry/Terr	298.682	3.6	2.92	257	0.34
Gabon	Cntry/Terr	2,225.728	8.6	6.91	288	0.04
Gambia	Cntry/Terr	2,416.664	238.8	7.99	281	0.07
Georgia	Cntry/Terr	3,989.175	57.4	12.85	273	0.84
Germany	Cntry/Terr	83,783.945	240.4	11.16	299	0.49
Ghana	Cntry/Terr	31,072.945	136.6	7.35	285	0.01
Greece	Cntry/Terr	10,423.056	80.9	10.81	297	0.57
Guadeloupe	Cntry/Terr	400.127	245.8	8.19	281	0.50
Guam	Cntry/Terr	168.783	312.6	5.18	286	0.92
Guatemala	Cntry/Terr	17,915.567	167.2	4.75	294	0.33
Guinea	Cntry/Terr	13,132.792	53.4	8.54	262	0.01
Guinea-Bissa	Cntry/Terr	1,967.998	70.0	9.72	251	0.03
Guyana	Cntry/Terr	786.559	4.0	7.42	296	0.26
Haiti	Cntry/Terr	11,402.533	413.7	8.57	271	0.03
Honduras	Cntry/Terr	9,904.608	88.5	4.44	282	0.41
Hungary	Cntry/Terr	9,660.350	106.7	12.53	293	1.23
Iceland	Cntry/Terr	341.250	3.4	6.70	288	0.11
India	Cntry/Terr	1,380,004.385	464.1	7.24	296	0.13
Indonesia	Cntry/Terr	273,523.621	151.0	6.45	298	0.10
Iran (Islamic	Cntry/Terr	83,992.953	51.6	4.88	318	0.76
Iraq	Cntry/Terr	40,222.503	92.6	4.80	304	0.38

Ireland	Cntry/Terr	4,937.796	71.7	6.05	297	0.56
Isle of Man	Cntry/Terr	85.032	149.2	NA	275	0.39
Israel	Cntry/Terr	8,655.541	400.0	5.33	288	0.49
Italy	Cntry/Terr	60,461.828	205.6	10.47	315	1.43
Jamaica	Cntry/Terr	2,961.161	273.4	7.56	289	0.13
Japan	Cntry/Terr	126,476.458	346.9	10.43	324	0.03
Jordan	Cntry/Terr	10,203.140	114.9	3.86	281	0.49
Kazakhstan	Cntry/Terr	18,776.707	7.0	7.13	281	0.19
Kenya	Cntry/Terr	53,771.300	94.5	5.52	282	0.04
Kuwait	Cntry/Terr	4,270.563	239.7	2.67	274	0.29
Kyrgyzstan	Cntry/Terr	6,524.191	34.0	6.07	275	0.28
Latvia	Cntry/Terr	1,886.202	30.3	14.60	274	0.45
Lebanon	Cntry/Terr	6,825.442	667.2	4.31	298	0.26
Liberia	Cntry/Terr	5,057.677	52.5	7.60	273	0.02
Libya	Cntry/Terr	6,871.287	3.9	5.07	275	0.29
Liechtenstein	Cntry/Terr	38.137	238.4	NA	273	1.37
Lithuania	Cntry/Terr	2,722.291	43.4	13.56	288	0.68
Luxembourg	Cntry/Terr	625.976	241.7	7.14	295	0.98
Madagascar	Cntry/Terr	27,691.019	47.6	6.13	230	0.01
Malawi	Cntry/Terr	19,129.955	202.9	6.77	270	0.01
Malaysia	Cntry/Terr	32,365.998	98.5	5.05	290	0.02
Maldives	Cntry/Terr	540.542	1,801.8	2.84	246	0.13
Mali	Cntry/Terr	20,250.834	16.6	9.82	275	0.02
Malta	Cntry/Terr	441.539	1,379.8	8.24	269	0.67
Martinique	Cntry/Terr	375.265	354.0	9.07	283	0.14
Mauritania	Cntry/Terr	4,649.660	4.5	7.27	274	0.10
Mauritius	Cntry/Terr	1,271.767	626.5	8.30	284	0.01
Mayotte	Cntry/Terr	272.813	727.5	2.69	276	0.27
Mexico (Cou	Cntry/Terr	128,932.753	66.3	5.97	289	1.24
Monaco	Cntry/Terr	39.244	26,338.3	NA	261	0.11
Montenegro	Cntry/Terr	628.062	46.7	10.70	283	1.40
Montserrat	Cntry/Terr	4.999	50.0	NA	252	0.29
Morocco	Cntry/Terr	36,910.558	82.7	5.06	298	0.25
Mozambique	Cntry/Terr	31,255.435	39.7	8.62	222	0.01
Myanmar	Cntry/Terr	54,409.794	83.3	8.19	277	0.07
Nepal	Cntry/Terr	29,136.808	203.3	6.39	231	0.10
Netherlands	Cntry/Terr	17,134.873	508.2	8.72	302	0.82
New Zealand	Cntry/Terr	4,822.233	18.3	6.98	280	0.01
Nicaragua	Cntry/Terr	6,624.554	55.0	5.06	281	0.03
Niger	Cntry/Terr	24,206.636	19.1	8.41	282	0.01
Nigeria	Cntry/Terr	206,139.587	226.3	11.97	283	0.01
North Macec	Cntry/Terr	2,083.380	82.6	10.02	286	1.54
Northern Ma	Cntry/Terr	57.557	125.1	NA	275	0.05

Norway	Cntry/Terr	5,421.242	14.8	8.00	295	0.10
Oman	Cntry/Terr	5,106.622	16.5	2.44	277	0.39
Pakistan	Cntry/Terr	220,892.331	286.5	6.98	289	0.06
Panama	Cntry/Terr	4,314.768	58.0	5.06	298	1.14
Paraguay	Cntry/Terr	7,132.530	18.0	5.48	287	0.40
Peru	Cntry/Terr	32,971.846	25.8	5.45	288	1.45
Philippines	Cntry/Terr	109,581.085	367.5	5.83	336	0.09
Poland	Cntry/Terr	37,846.605	123.6	10.09	296	0.93
Portugal	Cntry/Terr	10,196.707	111.3	10.59	291	0.85
Puerto Rico	Cntry/Terr	2,860.840	322.5	9.35	287	0.67
Qatar	Cntry/Terr	2,881.060	248.2	1.19	280	0.11
Republic of K	Cntry/Terr	51,269.183	527.3	5.92	318	0.02
Republic of M	Cntry/Terr	4,033.963	122.8	11.62	288	0.94
Reunion	Cntry/Terr	895.308	358.1	6.21	227	0.08
Romania	Cntry/Terr	19,237.682	83.6	13.03	286	1.05
Russian Fede	Cntry/Terr	145,934.460	8.9	12.72	283	0.50
Rwanda	Cntry/Terr	12,952.209	525.0	5.32	217	0.01
Saint Martin	Cntry/Terr	38.659	729.4	NA	278	0.41
San Marino	Cntry/Terr	33.938	565.6	NA	301	2.11
Sao Tome ar	Cntry/Terr	219.161	228.3	4.87	247	0.11
Saudi Arabia	Cntry/Terr	34,813.867	16.2	3.47	284	0.23
Senegal	Cntry/Terr	16,743.930	87.0	5.81	276	0.03
Serbia	Cntry/Terr	8,737.370	99.9	13.17	288	0.66
Sierra Leone	Cntry/Terr	7,976.985	110.5	11.91	256	0.01
Siint Maarte	Cntry/Terr	42.882	1,261.2	NA	275	0.84
Singapore	Cntry/Terr	5,850.343	8,357.6	4.45	287	0.01
Slovakia	Cntry/Terr	5,459.643	113.5	9.87	271	0.53
Slovenia	Cntry/Terr	2,078.932	103.2	9.94	291	1.63
Somalia	Cntry/Terr	15,893.219	25.3	10.94	269	0.01
South Africa	Cntry/Terr	59,308.690	48.9	9.52	281	0.63
South Sudan	Cntry/Terr	11,193.729	18.3	10.56	233	0.01
Spain	Cntry/Terr	46,754.783	93.7	9.02	304	1.31
Sri Lanka	Cntry/Terr	21,413.250	341.5	6.62	279	0.01
State of Pale	Cntry/Terr	5,101.416	847.4	3.46	283	0.35
Sudan	Cntry/Terr	43,849.269	24.8	7.24	293	0.04
Suriname	Cntry/Terr	586.634	3.8	7.32	271	0.28
Sweden	Cntry/Terr	10,099.270	24.6	9.19	293	1.08
Switzerland	Cntry/Terr	8,654.618	219.0	8.01	303	1.07
Syrian Arab F	Cntry/Terr	17,500.657	95.3	5.52	279	0.05
Tajikistan	Cntry/Terr	9,537.642	68.1	4.90	245	0.01
Thailand	Cntry/Terr	69,799.978	136.6	7.61	307	0.00
Togo	Cntry/Terr	8,278.737	152.2	8.56	279	0.01
Trinidad and	Cntry/Terr	1,399.491	272.8	8.32	283	0.12

Tunisia	Cntry/Terr	11,818.618	76.1	6.26	288	0.50
Turkey	Cntry/Terr	84,339.067	109.6	5.40	290	0.31
Turks and Ca	Cntry/Terr	38.718	40.8	NA	272	0.21
Ukraine	Cntry/Terr	43,733.759	75.5	15.19	295	0.55
United Arab	Cntry/Terr	9,890.400	118.3	1.45	287	0.09
United Kingd	Cntry/Terr	67,886.004	280.6	9.38	302	1.31
United Repul	Cntry/Terr	59,734.213	67.4	6.50	277	0.00
United State	Cntry/Terr	331,002.647	36.2	8.69	306	1.25
United State	Cntry/Terr	104.423	298.4	8.47	271	0.30
Uruguay	Cntry/Terr	3,473.727	19.8	9.47	277	0.07
Uzbekistan	Cntry/Terr	33,469.199	78.7	5.77	281	0.02
Venezuela (E	Cntry/Terr	28,435.943	32.2	6.95	280	0.05
Yemen	Cntry/Terr	29,825.968	56.5	6.01	247	0.03
Zambia	Cntry/Terr	18,383.956	24.7	6.58	275	0.03
Zimbabwe	Cntry/Terr	14,862.927	38.4	8.07	285	0.03
Acre	Brazil	892.059	5.4	NA	270	1.21
Alagoas	Brazil	3,375.667	121.2	NA	277	0.97
Amapa	Brazil	855.439	6.0	NA	273	1.45
Amazonas (E	Brazil	4,192.173	2.7	NA	283	1.63
Bahia	Brazil	15,043.792	26.6	NA	279	0.80
Ceara	Brazil	9,236.905	62.0	NA	282	1.40
Distrito Fede	Brazil	3,049.880	529.4	NA	279	1.83
Espirito Sant	Brazil	4,064.780	88.2	NA	275	1.66
Goias	Brazil	7,098.918	20.9	NA	282	1.24
Maranhao	Brazil	7,156.397	21.7	NA	278	0.83
Mato Grosso	Brazil	3,524.464	3.9	NA	274	1.69
Mato Grosso	Brazil	2,810.886	7.9	NA	277	1.09
Minas Gerais	Brazil	21,411.788	36.5	NA	278	0.73
Para	Brazil	8,701.617	7.0	NA	276	1.10
Paraiba	Brazil	4,064.251	72.0	NA	276	1.20
Parana	Brazil	11,565.208	58.0	NA	281	0.90
Pernambuco	Brazil	9,666.777	98.6	NA	283	1.29
Piaui	Brazil	3,310.800	13.2	NA	269	1.17
Rio de Janeir	Brazil	17,463.128	399.2	NA	289	1.85
Rio Grande c	Brazil	3,547.108	67.2	NA	279	1.11
Rio Grande c	Brazil	11,507.839	40.9	NA	283	1.00
Rondonia	Brazil	1,797.626	7.6	NA	268	1.38
Roraima	Brazil	612.715	2.7	NA	273	1.71
Santa Catarii	Brazil	7,247.033	75.7	NA	282	0.94
Sao Paulo	Brazil	46,446.155	187.1	NA	291	1.27
Sergipe	Brazil	2,325.083	106.0	NA	275	1.42
Tocantins	Brazil	1,590.921	5.7	NA	262	1.08
Anhui	China	65,274.199	467.2	5.96	326	0.00

Beijing	China	22,086.180	1,314.7	5.58	326	0.00
Chongqing	China	32,032.139	389.2	7.54	326	0.00
Fujian	China	40,737.416	335.1	6.20	318	0.00
Gansu	China	27,141.188	59.7	6.65	326	0.00
Guangdong	China	118,131.330	656.3	4.55	326	0.00
Guangxi	China	50,857.686	215.5	5.96	326	0.00
Guizhou	China	37,148.668	211.1	6.85	326	0.00
Hainan	China	9,689.620	285.0	6.01	326	0.00
Hebei	China	77,845.071	414.7	6.38	344	0.00
Heilongjiang	China	38,461.125	84.7	6.67	344	0.00
Henan	China	98,844.373	591.9	6.80	326	0.00
Hubei	China	60,772.884	326.9	7.00	357	0.08
Hunan	China	70,934.167	337.8	7.08	326	0.00
Inner Mongo	China	26,044.057	22.0	5.95	305	0.00
Jiangxi	China	47,843.137	286.5	6.06	326	0.00
Jilin	China	27,592.345	147.2	6.26	326	0.00
Liaoning	China	44,623.518	305.9	7.39	324	0.00
Shaanxi	China	39,619.778	192.7	6.24	318	0.00
Shandong	China	103,253.406	671.3	7.18	326	0.00
Shanghai	China	24,895.657	3,926.1	5.40	326	0.00
Sichuan	China	85,873.613	177.1	7.01	326	0.00
Tianjin	China	16,016.070	1,416.7	5.42	326	0.00
Xinjiang	China	25,869.746	15.6	4.56	324	0.00
Yunnan	China	49,811.822	126.4	6.32	318	0.00
Zhejiang	China	59,983.359	588.1	5.58	317	0.00
Abruzzo	Italy	1,314.662	121.5	11.20	298	1.13
Basilicata	Italy	564.286	56.1	11.10	285	0.58
Bolzano (Pro	Italy	531.191	71.8	8.30	296	1.72
Calabria	Italy	1,949.987	128.1	10.10	293	0.30
Campania	Italy	5,801.773	424.5	9.20	297	0.60
Emilia-Roma	Italy	4,468.697	164.5	11.20	311	2.04
Friuli-Venezi	Italy	1,218.962	155.1	11.90	300	1.64
Lazio	Italy	5,885.980	341.7	9.70	302	0.78
Liguria	Italy	1,557.702	192.2	14.30	305	2.23
Lombardia	Italy	10,073.686	422.2	9.90	315	2.90
Marche	Italy	1,529.183	162.7	11.20	306	1.23
Molise	Italy	306.556	68.8	12.10	292	0.78
Piemonte	Italy	4,369.052	172.3	12.30	303	2.19
Puglia	Italy	4,034.220	206.6	9.60	304	0.74
Sardegna	Italy	1,643.577	68.2	9.90	293	0.57
Sicilia	Italy	5,005.165	193.9	10.40	296	0.60
Toscana	Italy	3,740.109	295.7	11.60	299	1.20
Trento (Provi	Italy	541.866	87.3	9.30	296	2.15

Umbria	Italy	884.495	104.7	11.40	295	0.88
Valle d'Aosta	Italy	125.953	38.7	11.70	297	3.71
Veneto	Italy	4,914.725	267.2	10.00	313	1.56
Aguascalient	Mexico	1,360.852	242.3	4.37	265	1.39
Baja Californ	Mexico	3,605.789	50.5	4.88	275	2.04
Baja Californ	Mexico	727.007	9.8	3.82	275	1.42
Campeche	Mexico	945.785	16.4	4.64	269	1.39
Chiapas	Mexico	5,412.679	73.8	4.53	266	0.31
Chihuahua	Mexico	3,832.828	15.5	7.58	267	1.58
Ciudad de Me	Mexico	10,298.920	6,888.8	6.23	289	2.06
Coahuila de Z	Mexico	3,150.456	20.7	5.31	278	1.75
Colima	Mexico	749.741	133.2	4.95	260	1.50
Durango	Mexico	1,858.666	15.0	5.65	287	1.06
Guanajuato	Mexico	6,295.742	205.6	4.95	269	1.15
Guerrero	Mexico	3,882.954	61.1	4.86	274	0.93
Hidalgo	Mexico	3,072.136	147.6	4.87	279	1.46
Jalisco	Mexico	8,442.704	107.4	5.33	284	0.92
Mexico (Stat	Mexico	17,378.187	777.5	4.50	277	1.44
Michoacan d	Mexico	4,992.690	85.1	5.55	280	0.72
Morelos	Mexico	2,047.959	419.8	5.49	278	0.93
Nayarit	Mexico	1,255.449	45.1	5.47	274	1.12
Nuevo Leon	Mexico	5,360.737	83.5	4.97	272	1.30
Oaxaca	Mexico	4,386.373	46.8	5.71	277	0.64
Puebla	Mexico	6,612.709	192.8	5.37	278	1.14
Queretaro	Mexico	2,094.397	179.0	4.36	277	1.19
Quintana Ro	Mexico	1,497.403	33.4	3.35	279	1.78
San Luis Poto	Mexico	2,972.710	48.6	5.14	282	1.34
Sinaloa	Mexico	3,215.596	56.0	5.59	277	1.74
Sonora	Mexico	3,077.474	17.1	5.60	272	1.82
Tabasco	Mexico	2,555.914	103.3	4.98	275	1.67
Tamaulipas	Mexico	3,689.743	45.9	5.26	272	1.20
Tlaxcala	Mexico	1,345.008	336.5	4.73	266	1.45
Veracruz de I	Mexico	8,831.401	122.9	5.90	277	0.95
Yucatan	Mexico	2,269.237	57.4	5.71	271	1.36
Zacatecas	Mexico	1,713.503	22.8	5.62	275	1.37
Amazonas (P	Peru	423.381	10.8	NA	288	0.76
Ancash	Peru	1,216.095	33.9	NA	288	1.58
Apurimac	Peru	453.951	21.7	NA	288	0.45
Arequipa	Peru	1,556.127	24.6	NA	288	1.33
Ayacucho	Peru	688.200	15.7	NA	288	0.70
Cajamarca	Peru	1,500.006	45.0	NA	288	0.52
Callao	Peru	1,119.096	7,669.8	NA	288	2.25
Cusco	Peru	1,350.177	18.8	NA	288	0.50

Huancavelica	Peru	387.386	17.5	NA	288	0.48
Huanuco	Peru	804.804	21.6	NA	288	0.78
Ica	Peru	954.364	44.7	NA	288	2.39
Junin	Peru	1,393.373	31.4	NA	288	0.88
La Libertad	Peru	1,990.970	78.1	NA	288	1.58
Lambayeque	Peru	1,340.725	92.6	NA	288	1.83
Lima	Peru	10,693.435	307.0	NA	288	1.99
Loreto	Peru	981.170	2.7	NA	288	1.30
Madre de Di	Peru	158.084	1.9	NA	288	1.25
Moquegua	Peru	197.521	12.6	NA	288	1.99
Pasco	Peru	284.581	11.4	NA	288	0.61
Piura	Peru	2,076.318	58.2	NA	288	1.36
Puno	Peru	1,316.375	18.3	NA	288	0.39
San Martin	Peru	909.611	17.7	NA	288	1.11
Tacna	Peru	371.146	23.1	NA	288	0.92
Tumbes	Peru	252.031	54.0	NA	288	1.74
Ucayali	Peru	552.917	5.4	NA	288	0.91
Andalucia	Spain	8,349.380	95.3	8.33	295	0.76
Aragon	Spain	1,315.017	27.6	10.26	300	2.44
Asturias (Pri	Spain	1,024.060	96.6	12.64	297	1.62
Balears (Illes	Spain	1,137.723	227.9	6.70	297	0.51
Canarias	Spain	2,136.113	286.8	7.05	295	0.24
Cantabria	Spain	579.733	109.0	10.33	291	0.85
Castilla y Leo	Spain	2,401.521	25.5	11.91	295	2.62
Castilla-La M	Spain	2,021.012	25.4	9.54	297	2.49
Catalunia	Spain	7,623.414	237.4	8.41	300	1.40
Ceuta	Spain	83.673	4,183.6	6.29	281	0.92
Comunitat V	Spain	4,976.319	214.0	8.81	300	0.72
Extremadura	Spain	1,063.076	25.5	10.56	298	1.23
Galicia	Spain	2,697.559	91.2	11.57	294	0.64
Madrid (Com	Spain	6,611.809	823.6	7.06	304	2.15
Melilla	Spain	85.187	7,098.9	5.78	283	0.65
Murcia (Regi	Spain	1,479.460	130.8	7.65	288	0.64
Navarra (C. F	Spain	651.019	62.7	8.51	293	1.84
Pais Vasco	Spain	2,202.966	304.5	9.89	304	1.62
Rioja, La	Spain	315.741	62.6	10.00	299	2.27
Alabama	USA	4,944.686	37.6	10.92	282	1.27
Alaska	USA	745.469	0.5	5.96	273	0.37
Arizona	USA	7,262.286	24.7	8.23	286	1.56
Arkansas	USA	3,049.575	22.6	10.85	283	1.56
California	USA	40,011.015	99.0	6.78	297	0.80
Colorado	USA	5,762.204	21.4	6.79	290	1.05
Connecticut	USA	3,613.794	288.0	8.73	288	2.11

Delaware	USA	979.254	193.4	9.54	281	1.23
District of Co	USA	712.330	4,477.2	7.15	281	1.44
Florida	USA	21,586.295	154.3	9.70	294	1.25
Georgia (US/	USA	10,628.510	70.9	7.97	291	1.29
Hawaii	USA	1,439.609	86.5	7.98	275	0.27
Idaho	USA	1,774.655	8.3	8.16	281	1.05
Illinois	USA	12,887.403	89.5	8.57	290	1.76
Indiana	USA	6,767.587	72.8	9.84	290	1.54
Iowa	USA	3,194.037	22.1	9.71	282	1.58
Kansas	USA	2,945.539	13.9	9.29	282	1.21
Kentucky	USA	4,519.893	43.9	10.82	287	0.74
Louisiana	USA	4,713.234	41.8	9.78	293	1.98
Maine	USA	1,355.887	17.0	10.99	280	0.33
Maryland	USA	6,109.605	241.3	8.25	287	1.23
Massachuset	USA	6,985.561	344.1	8.57	287	2.27
Michigan	USA	10,114.528	68.7	9.80	289	1.63
Minnesota	USA	5,677.124	27.5	9.96	282	1.23
Mississippi	USA	3,019.798	24.9	10.82	284	2.04
Missouri	USA	6,200.300	34.7	10.12	288	1.17
Montana	USA	1,076.137	2.9	9.71	279	1.17
Nebraska	USA	1,952.141	9.8	8.79	279	1.11
Nevada	USA	3,070.509	10.8	8.22	286	1.30
New Hampsl	USA	1,372.567	59.1	9.31	275	0.74
New Jersey	USA	9,008.043	468.8	8.31	292	2.65
New Mexico	USA	2,121.624	6.7	8.94	278	1.54
New York	USA	19,779.540	161.7	7.83	294	2.39
North Carolir	USA	10,501.123	83.2	9.07	282	0.83
North Dakota	USA	769.967	4.3	8.49	277	2.22
Ohio	USA	11,827.215	111.5	10.61	287	0.97
Oklahoma	USA	3,989.492	22.4	10.29	285	0.80
Oregon	USA	4,244.225	17.1	8.84	290	0.44
Pennsylvania	USA	12,966.170	111.7	10.59	288	1.56
Rhode Island	USA	1,070.329	395.5	9.59	279	2.18
South Carolir	USA	5,145.408	66.0	9.84	287	1.31
South Dakota	USA	893.132	4.5	9.19	271	2.25
Tennessee	USA	6,847.752	64.1	10.44	285	1.30
Texas	USA	28,999.321	42.7	7.00	290	1.22
Utah	USA	3,194.497	15.0	5.81	279	0.52
Vermont	USA	634.325	26.5	9.63	287	0.27
Virginia	USA	8,614.990	84.0	8.10	287	0.74
Washington	USA	7,627.572	44.2	7.70	311	0.53
West Virgini	USA	1,828.890	29.3	12.82	271	0.99
Wisconsin	USA	5,882.866	41.8	9.09	288	1.13

Wyoming	USA	584.633	2.3	8.23	256	1.07

CCMR_Est	ISCDR_Est	CDR_2020	CCDR_2020	e0_2020_B	e0_Diff_B	Location
0.33	0.42	6.31	0.06	65.0	-0.16	Afghanistan
0.48	0.60	8.87	0.41	78.2	-0.48	Albania
0.14	0.18	4.92	0.06	76.9	-0.16	Algeria
NA	NA	NA	NA	NA	NA	Andorra
0.08	0.11	7.87	0.01	61.3	-0.03	Angola
0.10	0.12	6.65	0.05	77.0	-0.09	Antigua and
1.37	1.71	8.65	0.96	75.4	-1.32	Argentina
1.41	1.76	10.44	0.95	73.9	-1.02	Armenia
0.65	0.81	10.01	0.46	75.8	-0.49	Aruba
0.03	0.04	6.90	0.04	83.5	-0.06	Australia
0.56	0.70	10.66	0.69	80.9	-0.72	Austria
0.59	0.74	7.15	0.26	72.6	-0.40	Azerbaijan
0.95	1.19	7.53	0.43	73.2	-0.69	Bahamas
0.79	0.99	2.67	0.21	76.8	-0.70	Bahrain
0.12	0.16	5.68	0.05	72.8	-0.11	Bangladesh
0.02	0.03	9.23	0.02	79.2	-0.03	Barbados
0.18	0.22	12.81	0.15	74.4	-0.13	Belarus
1.37	1.72	11.60	1.68	80.0	-1.72	Belgium
1.89	2.37	5.56	0.62	73.1	-1.71	Belize
0.02	0.02	8.60	0.00	62.0	-0.01	Benin
NA	NA	NA	NA	NA	NA	Bermuda
1.72	2.15	7.72	0.79	70.1	-1.66	Bolivia (Pluri
1.31	1.64	12.34	1.23	76.3	-1.13	Bosnia and H
0.07	0.09	5.96	0.02	69.2	-0.04	Botswana
1.57	1.96	7.69	0.92	74.4	-1.62	Brazil
NA	NA	NA	NA	NA	NA	British Virgin
0.02	0.02	4.76	0.01	76.0	-0.02	Brunei Darus
0.93	1.16	16.63	1.09	74.4	-0.71	Bulgaria
0.03	0.03	7.78	0.00	61.8	-0.01	Burkina Faso
0.00	0.00	7.66	0.00	61.8	0.00	Burundi
0.61	0.76	5.84	0.20	72.5	-0.41	Cabo Verde
0.10	0.12	8.97	0.02	59.5	-0.04	Cameroon
0.37	0.46	8.45	0.41	82.0	-0.55	Canada
NA	NA	NA	NA	NA	NA	Cayman Islar
0.10	0.12	11.82	0.01	53.4	-0.02	Central Africa
0.05	0.06	11.73	0.01	54.4	-0.01	Chad
0.31	0.38	8.40	0.33	82.7	-0.44	Channel Islar
1.17	1.46	7.36	0.87	78.8	-1.45	Chile
0.00	0.01	7.67	0.00	77.1	0.00	China
0.02	0.02	7.27	0.02	84.9	-0.03	China, Hong I
0.00	0.00	8.09	0.00	80.6	0.00	China, Taiwa
1.55	1.94	6.69	0.85	75.7	-1.68	Colombia

0.07	0.08	7.13	0.01	64.5	-0.03	Comoros
0.11	0.14	6.68	0.02	64.6	-0.05	Congo
0.67	0.84	5.83	0.43	79.5	-0.91	Costa Rica
0.03	0.04	9.82	0.01	58.0	-0.01	Cote d'Ivoire
0.80	1.00	14.26	0.95	77.8	-0.74	Croatia
0.01	0.02	9.49	0.01	78.9	-0.02	Cuba
0.09	0.11	9.41	0.09	78.7	-0.11	Curacao
0.12	0.15	7.53	0.10	80.9	-0.14	Cyprus
1.00	1.25	11.96	1.08	78.4	-1.01	Czechia
0.04	0.04	9.17	0.01	60.9	-0.02	Democratic F
0.19	0.24	10.19	0.22	80.7	-0.24	Denmark
0.22	0.27	7.17	0.06	67.1	-0.12	Djibouti
0.45	0.57	6.57	0.22	73.7	-0.52	Dominican R
1.64	2.05	6.05	0.80	75.3	-1.83	Ecuador
0.23	0.28	5.85	0.07	72.0	-0.15	Egypt
0.41	0.52	7.40	0.20	72.9	-0.36	El Salvador
0.41	0.52	8.95	0.06	59.0	-0.14	Equatorial Gu
0.15	0.18	12.40	0.17	78.4	-0.15	Estonia
0.85	1.06	9.46	0.18	60.0	-0.29	Eswatini
0.08	0.10	6.40	0.02	66.8	-0.05	Ethiopia
0.08	0.10	10.19	0.10	81.9	-0.11	Finland
0.69	0.86	10.62	0.99	81.6	-1.10	France
0.79	0.98	3.34	0.24	79.3	-0.78	French Guiar
0.13	0.16	6.78	0.03	66.5	-0.06	Gabon
0.32	0.41	7.63	0.05	62.2	-0.13	Gambia
0.79	0.99	13.23	0.63	73.2	-0.52	Georgia
0.28	0.35	12.03	0.40	81.1	-0.38	Germany
0.05	0.06	7.23	0.01	64.3	-0.02	Ghana
0.31	0.39	11.93	0.46	81.9	-0.44	Greece
0.34	0.42	9.19	0.39	81.5	-0.52	Guadeloupe
1.18	1.48	6.21	0.72	79.0	-1.30	Guam
0.82	1.02	5.09	0.27	73.6	-0.82	Guatemala
0.04	0.05	8.16	0.01	61.7	-0.02	Guinea
0.15	0.19	9.38	0.02	58.4	-0.05	Guinea-Bissa
0.47	0.58	7.80	0.21	69.6	-0.45	Guyana
0.07	0.09	8.49	0.02	64.2	-0.04	Haiti
0.98	1.22	4.88	0.32	74.4	-1.01	Honduras
0.90	1.13	13.90	0.99	76.0	-0.80	Hungary
0.09	0.11	7.07	0.08	83.0	-0.13	Iceland
0.27	0.33	7.55	0.11	69.7	-0.18	India
0.20	0.25	6.76	0.08	71.7	-0.14	Indonesia
1.43	1.78	5.57	0.66	75.6	-1.24	Iran (Islamic
1.39	1.73	5.09	0.32	69.8	-0.86	Iraq

	0.52	0.65	6.85	0.45	81.7	-0.71	Ireland
NA	NA	NA	NA	NA	NA		Isle of Man
	0.52	0.65	5.85	0.38	82.3	-0.75	Israel
	0.76	0.95	12.13	1.23	82.4	-1.16	Italy
	0.18	0.22	7.73	0.10	74.4	-0.15	Jamaica
	0.01	0.02	11.62	0.03	84.6	-0.03	Japan
	1.44	1.80	4.35	0.38	73.7	-1.02	Jordan
	0.33	0.41	7.42	0.15	73.1	-0.23	Kazakhstan
	0.19	0.23	5.50	0.03	66.6	-0.10	Kenya
	0.74	0.93	3.29	0.22	75.3	-0.47	Kuwait
	0.71	0.89	6.07	0.21	71.1	-0.39	Kyrgyzstan
	0.28	0.35	15.46	0.34	74.9	-0.25	Latvia
	0.44	0.55	4.87	0.22	78.6	-0.47	Lebanon
	0.08	0.10	7.41	0.02	64.2	-0.04	Liberia
	0.72	0.90	5.42	0.22	72.6	-0.46	Libya
NA	NA	NA	NA	NA	NA		Liechtensteir
	0.41	0.52	15.09	0.54	75.4	-0.42	Lithuania
	0.83	1.03	8.08	0.79	81.2	-1.10	Luxembourg
	0.06	0.07	5.93	0.01	67.3	-0.03	Madagascar
	0.06	0.08	6.41	0.01	64.4	-0.03	Malawi
	0.03	0.04	5.41	0.01	76.3	-0.03	Malaysia
	0.36	0.44	2.81	0.09	79.0	-0.33	Maldives
	0.09	0.11	9.24	0.01	59.6	-0.03	Mali
	0.45	0.57	9.34	0.50	82.0	-0.57	Malta
	0.08	0.11	9.92	0.11	82.3	-0.13	Martinique
	0.38	0.48	7.15	0.07	64.8	-0.18	Mauritania
	0.01	0.01	8.88	0.01	75.1	-0.01	Mauritius
	0.75	0.94	3.03	0.20	78.7	-0.89	Mayotte
	2.01	2.51	7.18	0.98	73.3	-1.83	Mexico (Cour
NA	NA	NA	NA	NA	NA		Monaco
	1.29	1.61	11.92	1.09	75.9	-1.01	Montenegro
NA	NA	NA	NA	NA	NA		Montserrat
	0.44	0.55	5.40	0.20	76.5	-0.37	Morocco
	0.04	0.05	8.16	0.01	60.9	-0.01	Mozambique
	0.14	0.18	8.47	0.05	67.1	-0.07	Myanmar
	0.24	0.30	6.44	0.06	70.8	-0.12	Nepal
	0.55	0.69	9.82	0.67	81.6	-0.75	Netherlands
	0.01	0.01	7.26	0.01	82.4	-0.01	New Zealanc
	0.07	0.09	5.22	0.02	74.5	-0.07	Nicaragua
	0.03	0.04	7.90	0.00	62.7	-0.01	Niger
	0.04	0.05	11.47	0.01	54.9	-0.01	Nigeria
	1.57	1.96	11.52	1.20	74.8	-1.14	North Maced
NA	NA	NA	NA	NA	NA		Northern Ma

0.08	0.09	8.09	0.08	82.4	-0.11	Norway
1.28	1.60	2.79	0.29	77.0	-1.33	Oman
0.16	0.21	6.98	0.05	67.3	-0.10	Pakistan
1.61	2.02	6.24	0.93	76.5	-2.22	Panama
0.78	0.97	5.99	0.32	73.7	-0.70	Paraguay
2.14	2.68	7.07	1.14	74.8	-2.09	Peru
0.22	0.27	6.13	0.08	71.2	-0.19	Philippines
0.69	0.87	11.34	0.75	78.0	-0.78	Poland
0.48	0.61	11.92	0.68	81.4	-0.63	Portugal
0.43	0.53	10.87	0.53	79.5	-0.57	Puerto Rico
0.38	0.48	1.46	0.09	80.2	-0.51	Qatar
0.02	0.02	6.74	0.02	82.9	-0.03	Republic of K
1.09	1.37	12.68	0.74	71.2	-0.65	Republic of M
0.08	0.10	6.43	0.05	80.6	-0.09	Reunion
0.78	0.97	14.05	0.82	75.4	-0.65	Romania
0.46	0.58	13.24	0.39	72.1	-0.33	Russian Fede
0.05	0.06	5.25	0.01	69.1	-0.02	Rwanda
NA	NA	NA	NA	NA	NA	Saint Martin
NA	NA	NA	NA	NA	NA	San Marino
0.45	0.56	4.76	0.08	70.2	-0.23	Sao Tome an
0.61	0.76	3.87	0.18	75.0	-0.46	Saudi Arabia
0.14	0.17	5.57	0.02	67.9	-0.07	Senegal
0.53	0.66	13.74	0.52	75.7	-0.41	Serbia
0.06	0.07	11.40	0.01	54.9	-0.02	Sierra Leone
NA	NA	NA	NA	NA	NA	Siint Maarter
0.01	0.01	5.09	0.00	83.7	-0.01	Singapore
0.46	0.58	10.68	0.39	77.1	-0.40	Slovakia
1.04	1.31	11.82	1.30	80.1	-1.24	Slovenia
0.05	0.06	10.56	0.01	57.6	-0.02	Somalia
1.54	1.92	9.99	0.48	63.6	-0.64	South Africa
0.03	0.04	10.24	0.01	58.0	-0.01	South Sudan
0.77	0.97	10.77	1.09	82.4	-1.18	Spain
0.02	0.02	7.01	0.01	77.0	-0.01	Sri Lanka
1.33	1.66	3.77	0.27	73.3	-0.93	State of Pale
0.14	0.18	7.15	0.03	65.4	-0.09	Sudan
0.49	0.62	7.74	0.21	71.5	-0.33	Suriname
0.70	0.88	10.05	0.86	81.9	-0.96	Sweden
0.70	0.88	9.20	0.88	82.7	-1.07	Switzerland
0.13	0.17	5.07	0.04	73.7	-0.10	Syrian Arab R
0.05	0.06	4.74	0.01	71.2	-0.02	Tajikistan
0.00	0.00	8.17	0.00	77.2	0.00	Thailand
0.05	0.06	8.27	0.01	61.3	-0.02	Togo
0.14	0.18	8.89	0.09	73.5	-0.12	Trinidad and

0.74	0.92	6.78	0.40	76.2	-0.63	Tunisia
0.46	0.58	5.90	0.25	77.3	-0.46	Turkey
NA	NA	NA	NA	NA	NA	Turks and Cai
0.48	0.59	15.40	0.44	71.6	-0.31	Ukraine
0.32	0.40	1.77	0.07	78.1	-0.32	United Arab
0.91	1.13	10.59	1.08	80.2	-1.18	United Kingd
0.00	0.00	6.26	0.00	65.6	0.00	United Repul
1.00	1.25	10.10	1.04	77.7	-1.26	United State:
0.22	0.28	9.53	0.22	80.4	-0.25	United State:
0.06	0.07	9.71	0.05	77.8	-0.06	Uruguay
0.06	0.07	5.90	0.02	71.7	-0.04	Uzbekistan
0.08	0.10	7.33	0.04	72.2	-0.06	Venezuela (B
0.13	0.16	6.00	0.02	66.1	-0.06	Yemen
0.15	0.19	6.35	0.02	63.8	-0.07	Zambia
0.13	0.17	7.84	0.02	61.3	-0.05	Zimbabwe
1.64	2.05	NA	NA	NA	NA	Acre
1.32	1.65	NA	NA	NA	NA	Alagoas
1.97	2.46	NA	NA	NA	NA	Amapa
2.21	2.77	NA	NA	NA	NA	Amazonas (B
1.08	1.35	NA	NA	NA	NA	Bahia
1.91	2.38	NA	NA	NA	NA	Ceara
2.49	3.11	NA	NA	NA	NA	Distrito Fede
2.26	2.82	NA	NA	NA	NA	Espirito Sant
1.69	2.11	NA	NA	NA	NA	Goias
1.12	1.40	NA	NA	NA	NA	Maranhao
2.29	2.87	NA	NA	NA	NA	Mato Grosso
1.49	1.86	NA	NA	NA	NA	Mato Grosso
0.99	1.24	NA	NA	NA	NA	Minas Gerais
1.49	1.86	NA	NA	NA	NA	Para
1.63	2.03	NA	NA	NA	NA	Paraiba
1.22	1.52	NA	NA	NA	NA	Parana
1.75	2.19	NA	NA	NA	NA	Pernambuco
1.58	1.98	NA	NA	NA	NA	Piaui
2.52	3.14	NA	NA	NA	NA	Rio de Janeir
1.50	1.88	NA	NA	NA	NA	Rio Grande d
1.35	1.69	NA	NA	NA	NA	Rio Grande d
1.88	2.34	NA	NA	NA	NA	Rondonia
2.32	2.90	NA	NA	NA	NA	Roraima
1.28	1.60	NA	NA	NA	NA	Santa Catarir
1.72	2.15	NA	NA	NA	NA	Sao Paulo
1.93	2.41	NA	NA	NA	NA	Sergipe
1.47	1.84	NA	NA	NA	NA	Tocantins
0.00	0.00	NA	NA	NA	NA	Anhui

0.00	0.00	NA	NA	NA	NA	Beijing
0.00	0.00	NA	NA	NA	NA	Chongqing
0.00	0.00	NA	NA	NA	NA	Fujian
0.00	0.00	NA	NA	NA	NA	Gansu
0.00	0.00	NA	NA	NA	NA	Guangdong
0.00	0.00	NA	NA	NA	NA	Guangxi
0.00	0.00	NA	NA	NA	NA	Guizhou
0.00	0.00	NA	NA	NA	NA	Hainan
0.00	0.00	NA	NA	NA	NA	Hebei
0.00	0.00	NA	NA	NA	NA	Heilongjiang
0.00	0.00	NA	NA	NA	NA	Henan
0.09	0.11	NA	NA	NA	NA	Hubei
0.00	0.00	NA	NA	NA	NA	Hunan
0.00	0.00	NA	NA	NA	NA	Inner Mongol
0.00	0.00	NA	NA	NA	NA	Jiangxi
0.00	0.00	NA	NA	NA	NA	Jilin
0.00	0.00	NA	NA	NA	NA	Liaoning
0.00	0.00	NA	NA	NA	NA	Shaanxi
0.00	0.00	NA	NA	NA	NA	Shandong
0.00	0.00	NA	NA	NA	NA	Shanghai
0.00	0.00	NA	NA	NA	NA	Sichuan
0.00	0.00	NA	NA	NA	NA	Tianjin
0.00	0.00	NA	NA	NA	NA	Xinjiang
0.00	0.00	NA	NA	NA	NA	Yunnan
0.00	0.00	NA	NA	NA	NA	Zhejiang
0.57	0.71	12.66	0.92	82.0	-0.83	Abruzzo
0.30	0.37	12.09	0.45	81.7	-0.42	Basilicata
1.04	1.29	10.34	1.39	81.8	-1.57	Bolzano (Pro
0.17	0.21	11.00	0.24	81.8	-0.24	Calabria
0.40	0.50	10.18	0.49	80.7	-0.53	Campania
1.00	1.25	13.28	1.73	81.8	-1.54	Emilia-Roma
0.77	0.96	13.55	1.35	82.2	-1.16	Friuli-Venezi
0.43	0.54	10.94	0.64	82.2	-0.65	Lazio
0.92	1.16	16.50	1.86	81.3	-1.33	Liguria
1.56	1.95	12.90	2.49	80.9	-2.32	Lombardia
0.58	0.73	12.89	1.03	82.8	-0.91	Marche
0.37	0.46	13.23	0.62	82.4	-0.54	Molise
1.04	1.30	14.58	1.81	81.0	-1.45	Piemonte
0.42	0.52	10.82	0.61	82.2	-0.63	Puglia
0.30	0.37	11.06	0.45	82.6	-0.46	Sardegna
0.35	0.43	11.30	0.48	81.0	-0.47	Sicilia
0.57	0.71	13.01	0.98	82.7	-0.86	Toscana
1.17	1.46	11.47	1.74	82.0	-1.81	Trento (Provi

0.40	0.51	12.77	0.71	83.1	-0.63	Umbria
1.89	2.36	15.30	3.01	79.2	-2.36	Valle d'Aosta
0.83	1.03	11.77	1.33	82.2	-1.29	Veneto
2.63	3.28	6.25	1.01	73.6	-2.23	Aguascalient
4.32	5.40	6.30	1.53	72.4	-3.54	Baja Californ
3.00	3.74	5.87	1.07	73.3	-2.60	Baja Californ
2.37	2.96	7.08	1.02	72.8	-1.96	Campeche
0.61	0.76	5.74	0.22	73.7	-0.54	Chiapas
2.83	3.54	6.78	1.15	73.1	-2.37	Chihuahua
2.73	3.42	8.48	1.63	73.9	-2.56	Ciudad de Me
3.09	3.85	6.96	1.33	73.1	-2.64	Coahuila de Z
2.33	2.91	7.37	1.07	73.6	-1.93	Colima
1.72	2.15	7.03	0.83	73.5	-1.58	Durango
1.89	2.36	6.95	0.85	73.5	-1.64	Guanajuato
1.41	1.76	8.03	0.70	72.1	-1.13	Guerrero
2.23	2.79	7.70	1.11	73.1	-1.91	Hidalgo
1.45	1.81	6.99	0.71	74.1	-1.34	Jalisco
2.81	3.51	6.34	1.09	73.0	-2.43	Mexico (State
1.01	1.26	7.67	0.55	73.9	-0.93	Michoacan de
1.36	1.69	7.53	0.71	74.0	-1.22	Morelos
1.61	2.01	7.64	0.84	73.9	-1.42	Nayarit
2.23	2.78	6.67	0.96	74.0	-1.97	Nuevo Leon
0.86	1.08	8.10	0.48	73.3	-0.76	Oaxaca
1.81	2.26	7.26	0.86	73.1	-1.59	Puebla
2.24	2.80	6.23	0.90	73.6	-2.00	Queretaro
4.96	6.20	5.33	1.35	71.6	-3.93	Quintana Roo
1.91	2.39	8.02	1.03	73.2	-1.67	San Luis Poto
2.73	3.41	7.73	1.32	72.8	-2.30	Sinaloa
3.12	3.90	7.24	1.35	72.8	-2.58	Sonora
3.09	3.85	6.83	1.25	72.5	-2.55	Tabasco
1.99	2.49	6.98	0.89	73.5	-1.72	Tamaulipas
2.35	2.94	7.16	1.05	73.2	-1.98	Tlaxcala
1.35	1.68	7.97	0.72	73.3	-1.16	Veracruz de I
1.99	2.48	7.95	1.01	73.0	-1.66	Yucatan
1.88	2.35	8.10	1.03	73.4	-1.65	Zacatecas
1.25	1.56	13.72	0.60	68.3	-0.68	Amazonas (P
2.03	2.53	16.52	1.25	69.9	-1.33	Ancash
0.60	0.75	16.52	0.35	68.4	-0.34	Apurimac
1.85	2.31	13.46	1.05	71.7	-1.35	Arequipa
1.00	1.25	15.46	0.55	68.7	-0.57	Ayacucho
0.74	0.92	14.55	0.41	70.4	-0.46	Cajamarca
3.28	4.10	13.04	1.77	71.9	-2.31	Callao
0.80	1.00	13.71	0.39	68.2	-0.46	Cusco

0.67	0.83	16.70	0.38	68.2	-0.35	Huancavelica
1.28	1.60	13.14	0.61	68.8	-0.79	Huanuco
3.56	4.45	13.34	1.88	71.0	-2.46	Ica
1.37	1.71	13.73	0.69	68.8	-0.84	Junin
2.32	2.89	13.60	1.24	70.9	-1.63	La Libertad
2.55	3.19	13.86	1.44	71.0	-1.82	Lambayeque
2.77	3.46	13.64	1.57	71.8	-1.96	Lima
2.66	3.32	11.08	1.03	68.5	-1.46	Loreto
3.42	4.28	7.48	0.98	68.2	-1.99	Madre de Dic
2.65	3.30	14.57	1.56	70.9	-1.81	Moquegua
1.11	1.39	11.91	0.48	68.8	-0.68	Pasco
2.12	2.65	13.05	1.07	70.2	-1.34	Piura
0.54	0.68	15.30	0.31	68.2	-0.33	Puno
2.11	2.64	11.55	0.88	68.4	-1.20	San Martin
1.55	1.94	11.19	0.73	70.6	-1.03	Tacna
3.04	3.79	11.54	1.37	69.7	-1.86	Tumbes
2.03	2.54	9.72	0.71	68.0	-1.16	Ucayali
0.52	0.65	9.94	0.61	81.5	-0.68	Andalucia
1.22	1.53	13.52	2.00	82.0	-1.81	Aragon
0.72	0.89	15.13	1.31	82.0	-1.02	Asturias (Prir
0.38	0.47	7.89	0.41	83.1	-0.57	Balears (Illes
0.18	0.23	8.16	0.19	82.3	-0.26	Canarias
0.44	0.55	11.86	0.68	83.1	-0.66	Cantabria
1.10	1.37	15.35	2.12	82.6	-1.71	Castilla y Leo
1.38	1.73	12.47	2.02	81.9	-1.98	Castilla-La M
0.85	1.06	10.51	1.14	82.5	-1.27	Catalunia
0.90	1.12	7.61	0.71	80.0	-1.04	Ceuta
0.44	0.56	10.29	0.59	82.3	-0.64	Comunitat Va
0.65	0.82	12.62	1.00	82.1	-0.92	Extremadura
0.29	0.36	13.52	0.51	83.0	-0.44	Galicia
1.39	1.73	9.62	1.79	82.8	-2.26	Madrid (Com
0.71	0.88	6.95	0.50	79.9	-0.79	Melilla
0.47	0.58	8.75	0.50	82.4	-0.63	Murcia (Regi
1.05	1.31	11.03	1.47	82.9	-1.58	Navarra (C. F
0.84	1.04	12.17	1.35	82.7	-1.30	Pais Vasco
1.18	1.48	12.76	1.86	82.3	-1.76	Rioja, La
1.01	1.26	12.34	0.98	74.7	-0.94	Alabama
0.41	0.51	7.01	0.28	78.2	-0.51	Alaska
1.19	1.49	9.84	1.22	78.2	-1.58	Arizona
1.22	1.53	12.37	1.21	74.9	-1.17	Arkansas
0.69	0.86	7.89	0.65	80.0	-1.02	California
0.97	1.21	8.08	0.84	78.9	-1.24	Colorado
1.50	1.87	10.92	1.66	78.4	-1.85	Connecticut

0.90	1.12	10.97	0.95	77.5	-1.03	Delaware
1.46	1.83	8.80	1.10	76.2	-1.72	District of Co
0.79	0.98	11.14	1.00	78.7	-1.15	Florida
1.24	1.55	9.47	1.03	76.4	-1.34	Georgia (USA
0.18	0.22	8.62	0.20	81.8	-0.30	Hawaii
0.88	1.10	9.35	0.81	78.3	-1.01	Idaho
1.41	1.76	10.45	1.40	77.5	-1.64	Illinois
1.26	1.57	11.38	1.22	75.9	-1.28	Indiana
1.15	1.43	11.15	1.22	77.9	-1.30	Iowa
0.94	1.17	10.59	0.93	77.5	-1.05	Kansas
0.60	0.75	12.06	0.58	74.8	-0.56	Kentucky
1.72	2.14	11.57	1.59	74.7	-1.71	Louisiana
0.21	0.26	12.03	0.26	78.3	-0.24	Maine
1.02	1.28	9.58	0.96	77.8	-1.25	Maryland
1.72	2.15	10.67	1.78	77.9	-2.05	Massachuset
1.23	1.53	11.59	1.29	76.6	-1.33	Michigan
0.97	1.21	9.27	0.95	79.4	-1.21	Minnesota
1.75	2.18	12.59	1.59	73.7	-1.52	Mississippi
0.89	1.11	11.35	0.92	76.6	-0.97	Missouri
0.84	1.05	10.79	0.89	77.8	-0.97	Montana
0.87	1.09	9.89	0.85	78.6	-1.02	Nebraska
1.12	1.40	9.77	1.02	77.1	-1.29	Nevada
0.52	0.65	10.59	0.55	78.5	-0.60	New Hampsh
2.02	2.52	10.94	2.11	77.6	-2.43	New Jersey
1.17	1.47	10.62	1.17	76.7	-1.39	New Mexico
1.81	2.26	10.45	1.92	78.2	-2.35	New York
0.68	0.86	10.15	0.64	77.2	-0.75	North Carolir
1.70	2.13	10.54	1.68	77.7	-2.02	North Dakota
0.72	0.91	11.67	0.76	76.3	-0.76	Ohio
0.66	0.82	11.27	0.62	75.5	-0.66	Oklahoma
0.33	0.42	9.59	0.35	79.1	-0.42	Oregon
1.08	1.35	12.18	1.23	77.0	-1.20	Pennsylvania
1.55	1.94	11.39	1.66	77.8	-1.79	Rhode Island
1.04	1.29	11.36	1.03	76.0	-1.08	South Carolir
1.66	2.08	11.16	1.67	77.4	-1.85	South Dakota
1.06	1.33	11.74	1.01	75.2	-1.03	Tennessee
1.24	1.55	8.23	0.96	77.5	-1.47	Texas
0.60	0.76	6.61	0.40	78.8	-0.70	Utah
0.19	0.24	10.36	0.21	79.1	-0.23	Vermont
0.62	0.78	9.16	0.58	78.5	-0.76	Virginia
0.45	0.57	8.39	0.45	79.5	-0.63	Washington
0.67	0.83	14.10	0.73	74.6	-0.59	West Virginia
0.84	1.05	10.44	0.89	78.4	-0.99	Wisconsin

0.87	1.09	9.43	0.75	78.1	-0.98	Wyoming

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