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| **2015** | **2019** |
| * Population estimates from **2015-2100** * ***High fertility***: Under the high variant, fertility is projected to remain 0.5 children above the fertility in the medium variant over most of the projection period * ***Low fertility:*** Under the low variant, fertility is projected to remain 0.5 children below the fertility in the medium variant over most of the projection period * ***Constant-fertility assumption***: fertility in all countries remains constant at the level estimated for 2010-2015 * ***Instant-replacement assumption:*** for each country fertility is set to the level necessary to ensure a net reproduction rate of 1 starting in 2015-2020. Fertility varies over the remainder of the projection period in such a way that the net reproduction rate always remains equal to one thus ensuring, over the long-run, the replacement of the population * ***Normal-mortality assumption:*** Assumptions are made in terms of life expectancy at birth by sex * ***Constant-mortality assumption:*** mortality over the projection period is maintained constant for each country at the level estimated for 2010-2015 | * Population estimates from **2020-2100** * ***High fertility***: fertility is projected to remain 0.5 births above the fertility in the medium variant over the entire projection period except for the initial years. * ***Low fertility***: fertility is projected to remain 0.5 births below the fertility in the medium variant over most of the projection period * ***Constant-fertility***: fertility in all countries remains constant at the level estimated for 2015-2020. Meanwhile, mortality and migration assumptions are the same as those in the medium fertility variant. * ***Instant-replacement*** assumption: Under the instant-replacement variant, for each country, fertility is set to the level necessary to ensure a net reproduction rate of 1.0 starting in 2020-2025. Fertility varies over the remainder of the projection period in such a way that the net reproduction rate always remains equal to one ensuring, over the long run, the replacement of the population21. Mortality and migration assumptions are the same as those in the medium fertility variant. * ***Normal mortality assumption:*** Assumptions for the projection of mortality are specified in terms of life expectancy at birth by sex. As part of the probabilistic population projections, the Population Division publishes 80 and 95 per cent prediction intervals for future levels of life expectancy at birth, along with the median trajectory derived from a statistical model describing mortality change over time. The median trajectory provides the mortality trend used in the high-, medium- and low-, instant-replacement-fertility, and zero-migration variants. Only one variant of future mortality trends for each country was used for these variants, which reflect variation in fertility alone. As in previous revisions, life expectancy was generally assumed to rise over the projection period. * ***Constant mortality assumption:*** mortality over the projection period is kept constant for each country at the level estimated for 2015-2020. * New ***MOMENTUM*** variant illustrates the impact of age structure on long-term population change. The variant combines elements of three existing variants: the instant-replacement-fertility variant, the constant-mortality variant, and the zero-migration variant. Under this variant, for each country, fertility is set to the level necessary to ensure a net reproduction rate of 1.0 starting in 2020-2025, while the mortality is kept constant as of 2015-2020 and net international migration is set to zero from 2020-2025 onwards |
| **Main updates in 2019 revision**  ***Fertility***   * In the 2019 revision, the projection of fertility in countries with fertility levels below 2.1 live births per woman was based on the experience of 40 countries or areas that have had levels of fertility below 2.1 and that have experienced an increase in the level of fertility over at least two consecutive five-year periods after reaching their lowest level. The number of low-fertility countries that experienced such a recovery in the level of fertility has risen since the 2017 revision, when 36 countries or areas met both criteria, and the 2012 revision, when 25 met both criteria. * The model used to project the age patterns of fertility was also updated to include new empirical evidence. The projection model combines past national trends of the age pattern of fertility with a trend leading towards a global model age pattern of fertility. The global model pattern is an unweighted average of the proportionate age-specific fertility rates with seven five-year age groups, ranging from 15-19 to 45-49. This global model pattern was updated to include a larger number of countries with fertility below 2.1 live births per woman that have experienced a recovery over at least two consecutive five-year periods after having reached their lowest level and where the mean age at childbearing reaches 30 years or above in 2015-2020. In the 2019 revision, 24 countries50 were used to compute the global model pattern, compared to only nine in the 2017 revision. * In five countries with fertility below 2.1 live births per woman, that is, Finland, Italy, Japan, Luxembourg and Ukraine, the level of fertility projected for 2020-2025 and 2025-2030 was adjusted to smooth the transition between a recent downward trend in fertility and an expected future increase. For each of these countries, where a recent downward trend in total fertility followed a period of sustained increase, the recent decline in fertility during the estimation period contrasted with an immediate increase in the first projection period   ***Mortality***   * Due to political upheaval, armed conflict, public health concerns and similar events, twenty countries51 have experienced a recent slow-down or reversal in progress in life expectancy at birth for one or both sexes. In the projection of life expectancy at birth, the 2019 revision assumed that these countries would experience slower progress for the next 5 to 10 years, after which they would resume a ‘normal’ trajectory of progress in life expectancy. * As in previous revisions, the 2019 revision made explicit modelling assumptions to incorporate the demographic impact of the HIV/AIDS epidemic on mortality for 21 countries where HIV prevalence among persons aged 15 to 49 was at least four per cent at some point between 1980 and 2018. The 2019 revision took, however, a different approach than in previous revisions by using model life tables accounting for the effect of HIV on mortality (Sharrow and others, 2014), which were recalibrated using the latest UNAIDS epidemiological data. The age-specific mortality patterns up to 2015-2020 were estimated as a function of adult HIV prevalence, child mortality, adult mortality and coverage of antiretroviral treatment (ART) of both children and adults. * For the projection of the levels of mortality for the 58 countries or areas having ever experienced adult HIV prevalence of one per cent or more among males or females during the period 1980 to 2018, the 2019 revision used a different approach compared to the 2017 revision. In the latest revision, the levels of life expectancy at birth were projected using the existing Bayesian probabilistic life expectancy projection methods (United Nations, 2017c) extended to account for past and expected levels and trends in HIV prevalence and adult ART coverage (Godwin and Raftery, 2017). * For the countries that have experienced adult HIV prevalence of four per cent or more at any point between 1980 and 2018, the age patterns of mortality were projected using a model of typical age-specific patterns of mortality improvement by level of mortality estimated from individual country experiences included in the Human Mortality Database (HMD) (Andreev and others, 2013).   ***International migration***   * The 2019 revision assumed that net international migration from 2050 to the end of the 21st century would remain constant at the level projected in 2045-2050. In the previous revision, it was assumed that net international migration would, by 2095-2100, reach half the level projected for 2045-2050. | |