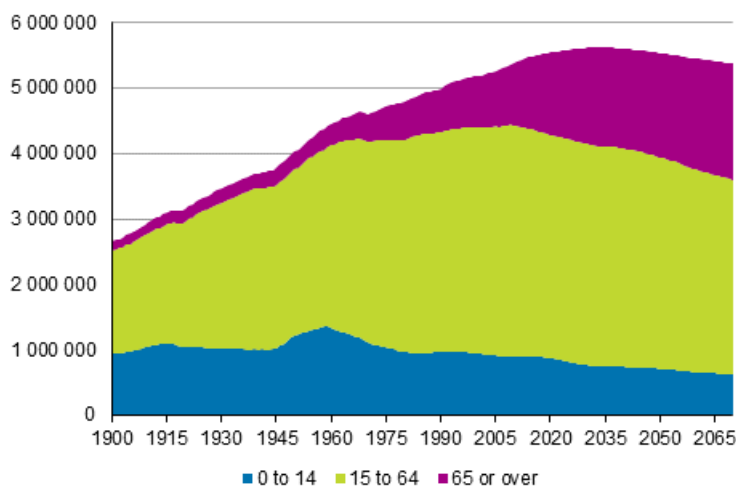


# Population projection 2018–2070

## Number of young people in danger of diminishing considerably due to the decrease in birth rate

According to Statistics Finland's latest population projection, there would be 760,000 persons aged under 15 in Finland in 2030, if the birth rate remains at the current level. In the 2050s the number would already drop under 700,000 young people. In Finland the number of persons aged under 15 has last been this low at the end of the 1870s, when Finland's population was less than two million. In the 1970s there were still one million persons aged under 15 in Finland.

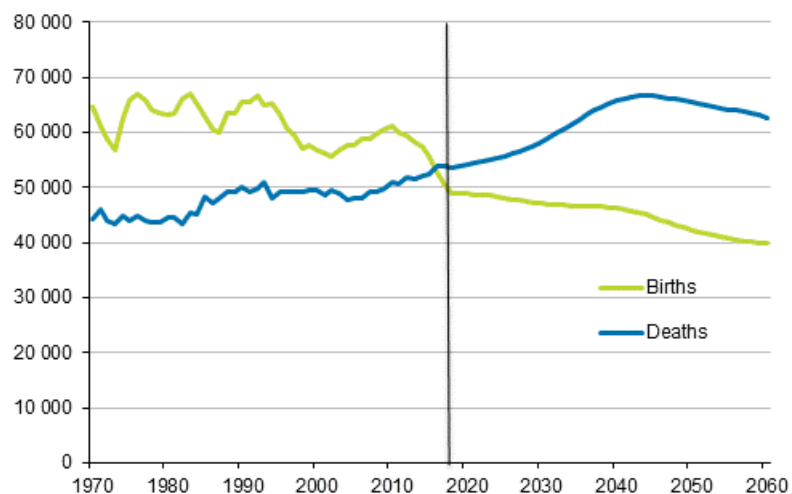
**Population by age 1900–2017 and projection 2018–2070**



## Population is projected to turn to a decline in 2035

The year 2018 will be the third year in a row when deaths exceed births in Finland. According to the projection, the number of births will continue to decrease and the number of deaths will increase despite the lengthened life expectancy. According to the projection, net immigration would sustain population growth until 2035, when Finland's population would be 5.62 million. After this, population would turn to a decline and in the 2050s Finland's population would already be below the current number, according to the projection.

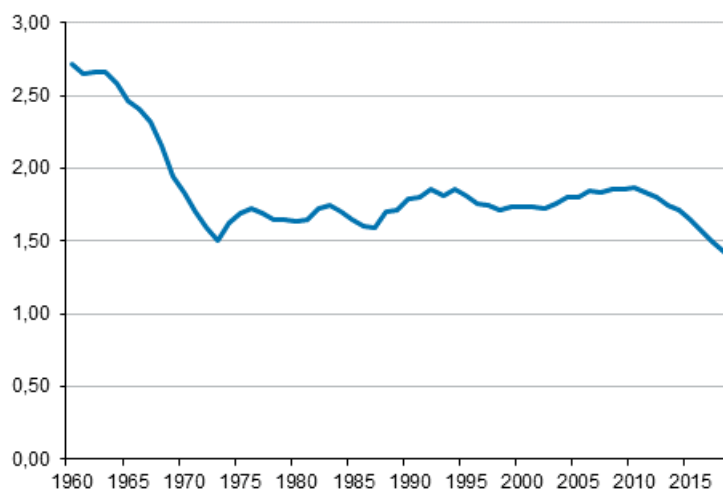
### Number of births and deaths 1970–2017 and projected number 2018–2060



## Birth rate diminished by one-fifth in seven years

The total fertility rate, which describes the birth rate level, was 1.87 in Finland in 2010. Last year the total fertility rate was at its lowest in Finland's history, 1.49. The birth rate has diminished by 20 per cent. The year 2018 will be the eighth year in a row when the birth rate decreases in Finland. According to the estimate, the total fertility rate will be 1.43 this year. The birth rate has last diminished this many years in a row in Finland in the 1960s.

### Total fertility rate 1960–2018\*



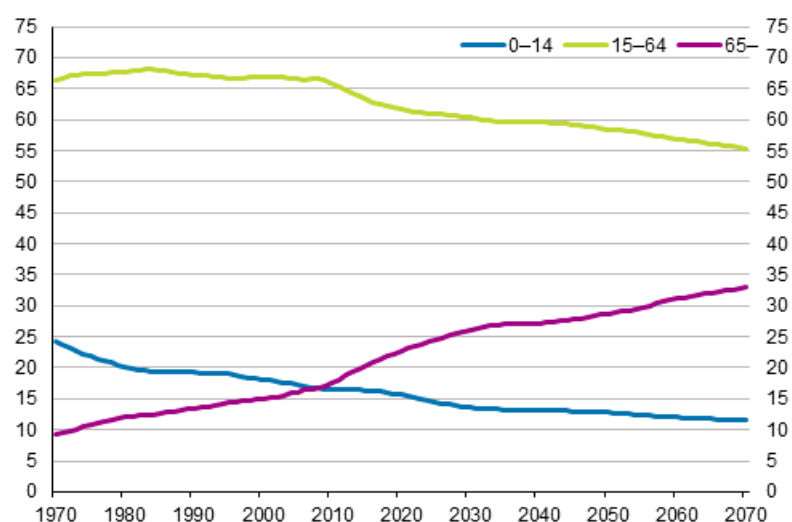
\*) 2018 estimate

## Decrease in birth rate is reflected in the population of working age at a delay

The number of the population of working age has fallen by 100,000 persons during the last eight years in Finland. According to the projection, the population of working age is expected to decrease by 57,000 persons by 2030 from the present. The proportion of people of working age (persons aged 15 to 64) in the population would diminish from the present 62 per cent to 60 per cent by 2030 and to 58 per cent by 2050. In 2050, the population of working age will have decreased by good 200,000 from the present.

The so-called self-sufficiency forecast describes a situation where there would be no immigration and emigration at all and only the birth rate and mortality would influence the age structure. According to the self-sufficiency forecast, the number of people of working age would go down by the year 2030 by 217,000 persons and by the year 2050 by 630,000 persons.

### Age groups' share of the population 1970–2017 and projected share 2018–2070, per cent



## Demographic dependency ratio weakens more slowly than in earlier projections

The demographic dependency ratio, that is, the number of persons aged 15 or under and 65 or over per 100 working age persons was 60 at the end of 2017. According to the projection, the dependency ratio will rise in future decades, but more slowly than in earlier projections. The reason for this is the decrease in birth rate and as a result, the decrease in number of young dependants. In 2020 the dependency ratio would be 62, in 2030, 66 and in 2050, 71. In the short term, the demographic dependency ratio weakens more slowly than in earlier projections.

In the long term, the demographic dependency ratio weakens more than in earlier projections. In 2070, the demographic dependency ratio is projected to be 81.

## Assumptions of the 2018 population projection

Statistics Finland's latest population projection assumes that the birth rate would remain constant in future. The imputed number of children that women give birth to during their lifetime, i.e. the total fertility rate, is assumed to be 1.45.

The projection also assumes that net immigration to Finland will be 15,000 persons per year. Mortality is assumed to continue declining similarly to what has been detected when comparing the mortality for 1987 to 1991 and 2013 to 2017.

## Regional projection will be published in autumn 2019

The compilation of regional population projection is postponed to autumn 2019. The regional projection will not be compiled in autumn 2018, because the migration statistics for 2017 were not available in time to compile the projection. Statistics Finland did not want to compile a regional population projection based on outdated migration statistics. In this case, the latest observed regional development in migration would have been left unnoticed and unanalysed.

## The projection is a trend calculation and gives decision-makers a chance to react

Statistics Finland's population projections are demographic trend calculations based on observations on past development in the birth rate, mortality and migration. The projections do not seek to estimate the effect of economic, socio-political regional policy and other such factors on population development.

According to the character of trend calculations, the projection expects past developments to continue into the future. The projections do not take a stand on how the size of the population should develop. Therefore, population projection figures should be examined bearing in mind that the projection only indicates the expected population development if the past development continues unchanged into the next decades.

The task of a population projection is to provide tools with which decision-makers can assess whether measures need to be taken to try to influence the population development. Decision-makers should assess the advisability of the population development indicated by the projection and, if necessary, take action to prevent the materialisation of the projection if the population development indicated by the projection is not desired.

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## Appendix tables

**Appendix table 1. Population by age 1900 - 2070 (years 2020 to 2070: projection) Corrected on 18 December 2018**

**Corrected on 18 December 2018.** The corrected number are indicated in red.

Year	Age group						
	Age groups total	0 - 14	15 - 64	65 -	0 - 14 %	15 - 64 %	65 - %
1900	2 655 900	930 900	1 583 300	141 700	35,1	59,6	5,3
1910	2 943 400	1 049 400	1 724 500	169 500	35,7	58,6	5,8
1920	3 147 600	1 051 000	1 908 300	188 300	33,4	60,6	6,0
1930	3 462 700	1 018 300	2 227 200	217 200	29,4	64,3	6,3
1940	3 695 617	995 599	2 464 107	235 911	26,9	66,7	6,4
1950	4 029 803	1 208 799	2 554 354	266 650	30,0	63,4	6,6
1960	4 446 222	1 340 187	2 778 234	327 801	30,1	62,5	7,4
1970	4 598 336	1 118 550	3 052 298	427 488	24,3	66,4	9,3
1980	4 787 778	965 209	3 245 187	577 382	20,2	67,8	12,1
1990	4 998 478	964 203	3 361 310	672 965	19,3	67,2	13,5
2000	5 181 115	936 333	3 467 584	777 198	18,1	66,9	15,0
2010	5 375 276	887 677	3 546 558	941 041	16,5	66,0	17,5
2020	5 543 221	866 686	3 418 618	1 257 917	15,6	61,7	22,7
2030	5 611 987	759 847	3 386 705	1 465 435	13,5	60,3	26,1
2040	5 601 713	734 583	3 342 578	1 524 552	13,1	59,7	27,2
2050	5 531 725	705 723	3 235 599	1 590 403	12,8	58,5	28,8
2060	5 448 354	653 939	3 099 634	1 694 781	12,0	56,9	31,1
2070	5 370 501	623 820	2 970 706	1 775 975	11,6	55,3	33,1

**Appendix table 2. Population and demographic dependency ratio at the end of 2030 in population projections compiled in different years**

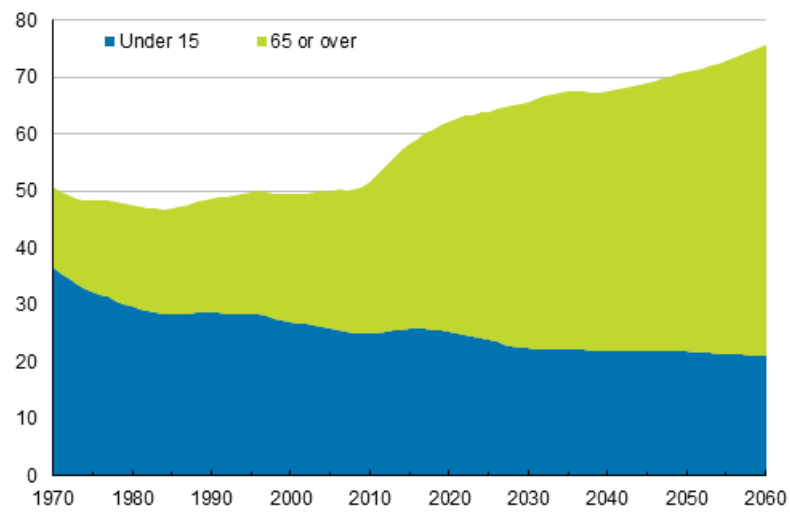
Population in population projections compiled in different years	Year of compilation									
	1995	1998	2001	2004	2007	2009	2012	2015	2018	
Population at the end of 2030	5 095 169	5 249 755	5 290 563	5 442 841	5 683 182	5 850 097	5 847 678	5 769 032	5 611 987	
Dependency ratio	67,4	70,1	70,9	71,8	73,3	73,0	71,2	69,2	65,7	
Number of persons aged 65 and over	1 219 963	1 348 502	1 389 126	1 420 395	1 494 360	1 525 155	1 495 624	1 478 426	1 465 435	
Proportion of persons aged 65 and over (per cent)	23,9	25,7	26,3	26,1	26,3	26,1	25,6	25,6	26,1	
Number of persons aged 85 and over	125 602	152 754	169 022	178 503	220 505	242 156	226 001	219 209	216 624	
Proportion of persons aged 85 and over (per cent)	2,5	2,9	3,2	3,3	3,9	4,1	3,9	3,8	3,9	

**Appendix table 3. Demographic dependency ratio and population in 1970 to 2070 (years 2020 to 2070: projection)**

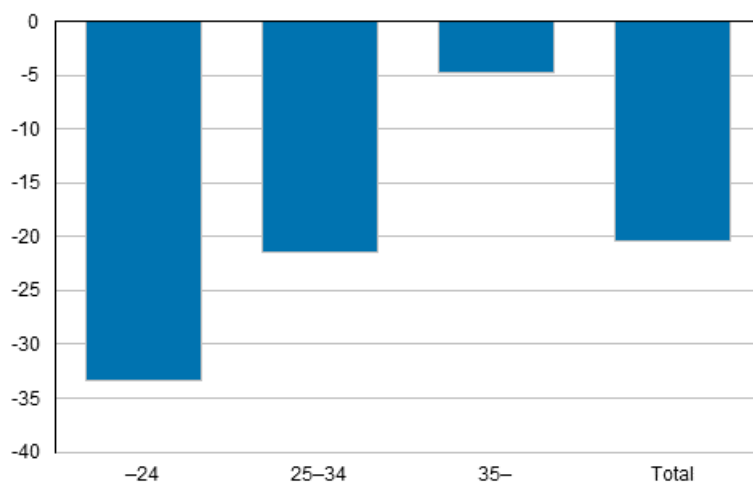
Year	Demographic dependency ratio	Population, total	Aged under 15 and aged 65 and over	Aged 15 to 64
1970	50,7	4 598 336	1 546 038	3 052 298
1980	47,5	4 787 778	1 542 591	3 245 187
1990	48,7	4 998 478	1 637 168	3 361 310
2000	49,4	5 181 115	1 713 531	3 467 584
2010	51,6	5 375 276	1 828 718	3 546 558
2017	60,1	5 513 130	2 069 742	3 443 388
2020	62,1	5 543 221	2 124 603	3 418 618
2030	65,7	5 611 987	2 225 282	3 386 705
2040	67,6	5 601 713	2 259 135	3 342 578
2050	71,0	5 531 725	2 296 126	3 235 599
2060	75,8	5 448 354	2 348 720	3 099 634
2070	80,8	5 370 501	2 399 795	2 970 706

# Appendix figures

**Appendix figure 1. Demographic dependency ratio 1970–2060**

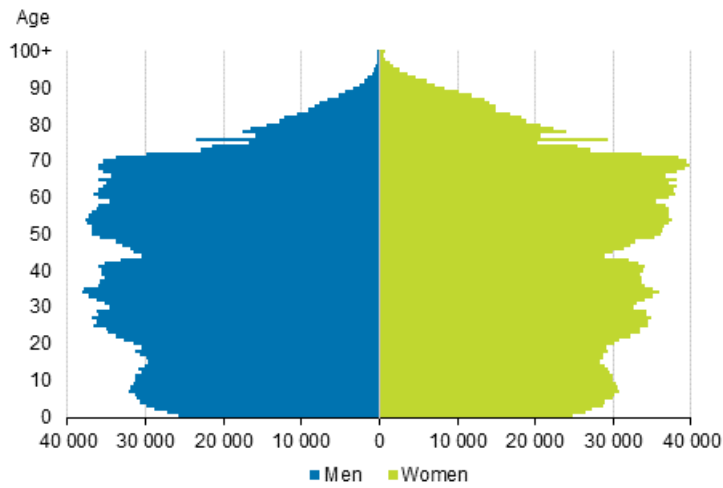


**Appendix figure 2. Difference in age specific fertility rates year 2017 compared to 2010, per cent**

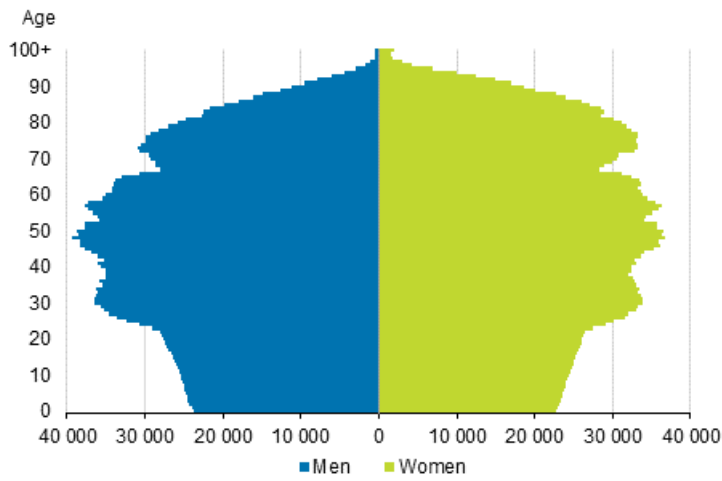




**Appendix figure 3. Population by age and gender 2017**



**Appendix figure 4. Population by age and gender 2040, projection 2018**



# Quality description: Population projection 2018–2070

## 1. Relevance of statistical information

The basic population for this population projection has been population at the end of 20174 by 1-year age group according to gender.

There are two calculations of the projection:

- A calculation including migration (calculation 1), where account is taken of the effect of the birth rate, mortality and migration on population development.
- The self-sufficiency calculation (calculation 2) expresses what the future population development would be like without migration. The calculation takes only the impact of the birth rate and mortality on population development into account. The assumptions concerning birth rate and mortality are the same as in calculation 1. The numbers of births are, however, different in these calculations, as migrants assume the fertility of the receiving area in the calculation including migration.

The Central Statistical Office of Finland published the first population projection concerning Finland's future population development in 1934. In 1956 the memorandum of the statistical committee set up in 1953 proposed that population projections should be compiled at regular intervals. The first projections related to the population development of the whole country. Preparation of regional projections started in the 1960s.

In 1973 the so-called population projection group established by the Prime Minister's Office published its report "On arrangement of compilation of population projections" ("Väestöennusteiden laadinnan järjestäminen", Valtioneuvoston kanslian julkaisuja 1973:1). In the report population projections were defined as follows: "Population projections are calculations based on the past development of the factors influencing population development, which do not include population development planned by the compiler of the projection or any expressions of intent related to regional policy."

According to the report, population projections "...indicate to decision-makers primarily what the development will lead to if social policy stays unchanged. Decision-makers have to assess the advisability of the development and consider on that basis whether the projections can be used as foundation for decisions on investments and on measurement of activities."

## 2. Methodological description of survey

The population projection method used is a so-called demographic component model in which the future population number and structure are calculated by means of age-specific birth rate, mortality and migration coefficients. The coefficients are calculated on the basis of demographic statistics for the last few years.

### Birth rate

Age-specific fertility rates (women aged 14 to 50) have been calculated for the years 2013 to 2017. In the projection the fertility rates have been kept constant throughout the projection period. For the whole country the average total fertility rate, that is, the average number of children born to each individual woman during her lifetime is 1.45.

### Mortality

Age-specific mortality rates have been calculated for the years 2013 to 2017. Coefficients by age and gender group for the annual change in mortality were derived by calculating how much mortality changed when comparing 1987 to 1991 with 2013 to 2017. Mortality was not inflated for any age group, however.

### Migration

In the calculation containing migration, the net immigration for the whole country is assumed to be 15,000 persons per year. Net immigration is obtained by adding the assumed net immigration to the emigration

for the whole country. The age distribution of immigration was calculated on the basis of immigration during 2012 to 2016.

### 3. Correctness and accuracy of data

Municipal projections should be compiled for all municipalities with the same principles. It would be impossible to treat municipalities "individually", and therefore there have always been and will always be cases where e.g. the calculation period of the projection coefficients has somehow been exceptional for a municipality, which causes the projection to differ from the trend development in either direction.

The projection deviations for small municipalities are primarily due to their projection coefficients not corresponding to the actual level of out-migration, in-migration, fertility or mortality. Small municipalities must be combined into larger entities in order to reduce random variation.

In previous population projections the whole country was divided into four mortality areas. The number of mortality areas used now is much higher. The number of mortality areas has been increased so that regional differences in the level can better be taken into account. The population projection by municipality has always had some over-mortality. In order to reduce random variation, mortality coefficients have been calculated for a longer period and mortality coefficients for the whole country have been used for certain age groups (0 to 17 and 90 to 104+).

### 4. Timeliness and promptness of published data

Statistics Finland has prepared population projections by municipality at intervals of roughly three years. In the intervening years, projection calculations were made concerning the whole country on the basis of various assumptions, e.g. the low, average and high alternative. In recent years alternative calculations have been made mainly only as chargeable assignments, in which case the calculations have been based on the assumptions specified by the customer.

In connection with the 1998 projection a so-called stochastic forecast was calculated for the whole country with the PEP software (Program for Error Propagation) developed at the University of Joensuu. In it the population change components vary like they have varied in the past, and from the produced projection database e.g. the range of some statistical information can be derived with the desired probability. (For further information, see Juha M. Alho: A Stochastic Forecast of the Population of Finland. *Katsauksia* 1998:4).

The 2018 projection extends to the year 2070.

### 5. Accessibility and transparency/clarity of data

Up to 1972, population projections by municipality were published in the "Tilastollisia tiedonantoja" series, then until 1985 in the "Tilastotiedotus VÄ" series and after that in the OSF Population series. Municipalities' projected figures by age group were published as a separate volume of the 1969 projection, while age group data by municipality from later projections were available as photocopies. In the 1990s the data were mainly supplied as Excel tables. Previous projection files by municipality were not retained. Data on the population projections made in 2001, 2004, 2007, 2009, 2012 and 2015 are available in electronic format.

Data from the latest projection are available free of charge from the Px-Web StatFin service on the Internet at [http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin\\_\\_vrm\\_\\_vaenn/?tablelist=true](http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__vrm__vaenn/?tablelist=true)

### 6. Comparability of statistics

Statistics Finland's population projections are long-term projections. Therefore, they do not always give a reliable picture of e.g. the number of births or deaths in the coming years. Since the 1970s the birth rate has fluctuated up and down so that the total fertility rate has varied between 1.49 (2017) and 1.87 (2010). In population projections fertility has been kept constant at some average or initial level, because it would

be impossible to guess the turning points in development. Likewise, mortality has fallen quickly at times and slowly at others. In the projections, the change coefficients for mortality have been calculated for around 20-year periods so that they would include periods of both quick and slower lowering.

When comparing different projections, differences in the projection assumptions should be taken into account. Many municipalities prepare their own population projections, whose assumptions may deviate greatly from those used in Statistics Finland's projections. In addition to Statistics Finland, population projections concerning the whole of Finland are produced by e.g. Eurostat and the UN.

## 7. Coherence and consistency/uniformity

In Statistics Finland's population projections, the population figures for each year refer to the situation on 31 December. In the projections by Eurostat and many municipalities, the figures refer to the situation on 1 January. In the UN projections, the figures represent the situation in the middle of the year.

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