

**Application of Census Data:
Updating of Population Estimates
and Population Projections**

A paper prepared for
the 20th Population Census Conference
19–21 June 2002
Ulaanbaatar, Mongolia

by
Frederick W H HO
Commissioner for Census and Statistics
Hong Kong Special Administrative Region, China

INTRODUCTION

1. It has been established practice since 1961 for Hong Kong¹ to conduct a population census once every ten years and a by-census in the middle of the intercensal period. A population census is a complete headcount of the population. A population by-census differs from a population census in that during a by-census, only a large sample of the population is enumerated to obtain their detailed characteristics (for instance, in the 1996 Population By-census, a 1-in-7 sample was used). The size and characteristics of the entire population are then inferred from the sample results in accordance with statistical theory.

2. The 2001 Population Census, which was conducted in the thirteen-day period from 15 to 27 March 2001, comprised a simple enumeration on six-sevenths of households to provide basic information like age and sex of household members and a detailed enquiry to the remaining one-seventh on a broad range of demographic and socio-economic characteristics of household members.

3. Statistics compiled from the information collected in population censuses/by-censuses are vital to government planning and policy formulation. Data on small areas form the basis of district development and service planning programmes of the government, while comprehensive information on population sub-groups, such as the elderly and single parent families, facilitates the planning of welfare policy and social service programmes. The statistics are also much sought after by various researchers and by the business sector for a wide variety of purposes. Most important of all, results of the censuses/by-censuses are the benchmark data for the compilation of population estimates in the Population Data System.

4. The system for compiling population estimates on a regular basis

¹ The Government of the People's Republic of China (PRC) resumed its exercise of sovereignty over Hong Kong on 1 July 1997. On this date, the Hong Kong Special administrative Region (HKSAR) was formed under the "One Country, Two Systems" principle. As stipulated in the Basic Law of the HKSAR, the Region would operate with a high degree of autonomy. All references to "Hong Kong" pertaining to the period after 1 July 1997 refer to the HKSAR. Similarly, the government refers to the HKSAR Government. In respect of statistical work, HKSAR maintains its separate statistical systems and continues to compile and disseminate statistical data about the HKSAR. Census and Statistics Department (C&SD) is the official statistical agency of HKSAR and has no administrative relationship with the counterpart departments of the Government of the PRC.

(half-yearly) is complex and requires data from a wide variety of sources. The results of the population censuses/by-censuses form the corner-stone of the system. These benchmark data are taken together with statistical data generated from the administrative systems (such as births, deaths and passenger movement records) and sample surveys (in particular the continuous General Household Survey which is carried out to obtain information about unemployment situation in Hong Kong) to form a population statistical database which serves a multitude of purposes, among which the compilation of population estimates and population projections are the key ones.

5. This paper discusses the two important areas in which the population census data are used for benchmarking purposes, viz. updating of population estimates and the compilation of population projections.

CONCEPTUAL FRAMEWORK

6. In Population Censuses/By-censuses prior to that of 1996, the de facto enumeration approach was adopted. All persons who were present in Hong Kong at the census moment were enumerated.

7. In view that there had been a trend of more and more Hong Kong residents spending much of their time outside Hong Kong for various reasons, in particular in neighbouring economies such as the mainland of China (hereafter referred to as Mainland) and Macao, the de jure enumeration approach was adopted in the 1996 Population By-census. Under this approach, members of the household who usually lived in Hong Kong in the six-month period either before or after the census moment, and those who usually worked in Mainland or Macao were enumerated.

8. With the passage of time, a new residency and mobility pattern of the Hong Kong Population has become obvious. With the close proximity between Hong Kong and Mainland/Macao, some Hong Kong residents are spending a considerable proportion of time in Mainland and Macao. Also, as a cosmopolitan city and with a history of a considerable number of persons having emigrated to overseas countries

yet maintaining a rather close link with Hong Kong, the application of the “resident population” method with suitable refinements to reflect the local situation needs to be adopted to better represent the actual situation.

9. “Resident population” is a clear-cut concept among international statistical standards but the practical definitions adopted vary from place to place, as the residency and mobility patterns unique to each place need to be given adequate consideration. International statistical organizations have pointed out in particular that, owing to business and social development, the “mobility” of residents of certain countries/territories is rather high. In handling the population statistics of these countries/territories, the appropriate authorities should carefully consider the situation.

10. In the case of Hong Kong, following the conduct of in-depth studies, the statistical authority has decided to define the “resident population” of Hong Kong (which we refer to as the “Hong Kong Resident Population”) to include “Usual Residents” and “Mobile Residents”. “Usual Residents” refer to two categories of people: (1) Hong Kong Permanent Residents who have stayed in Hong Kong for at least three months during the six months before or for at least three months during the six months after the reference moment, regardless of whether they are in Hong Kong or not at the reference moment; and (2) Hong Kong Non-permanent Residents who are in Hong Kong at the reference moment.

11. As for “Mobile Residents”, they are Hong Kong Permanent Residents who have stayed in Hong Kong for at least one month but less than three months during the six months before or for at least one month but less than three months during the six months after the reference moment, regardless of whether they are in Hong Kong or not at the reference moment. The amount of time of stay in Hong Kong of “Mobile Residents” is less than that of the “Usual Residents”. Nevertheless, the “Mobile Residents” have a close link with Hong Kong and most probably they have a regular residence in Hong Kong and utilize much of Hong Kong’s facilities and services. In this regard, they should be considered as part of the Hong Kong Population.

12. Below is an illustration of the situations of different Mobile Residents:

- (a) Persons staying 5 to 6 days each week in the Mainland and staying regularly in Hong Kong during the weekends. At the 2001 Population Census moment, there were some 45 700 such persons. They are mainly those working in the Mainland and returning to Hong Kong to stay with their families during the weekends.
- (b) Persons staying for a major proportion of time in Mainland/Macao and returning to Hong Kong from time to time. There were some 82 600 such persons at the 2001 Population Census moment. Presumably they maintain residences in both Mainland/Macao and Hong Kong, and travel frequently between these places for business, work or family reasons.
- (c) Elderly persons (aged 60 and over) staying for a major proportion of time in Mainland/Macao. There were some 12 100 such persons. Many of them have retired and settled in the Mainland but come back to Hong Kong frequently to visit children or relatives.
- (d) Persons in school-attending age returning from overseas to stay in Hong Kong for several periods of time in a year. There were some 5 800 such persons at the 2001 Population Census moment. These are mainly Hong Kong students studying abroad and spending their vacations in Hong Kong.
- (e) Besides, there are persons staying in overseas countries/territories but also staying frequently in Hong Kong for business, work or family reasons. There were some 38 300 such persons at the 2001 Population Census moment.

13. Figure 1 provides a diagrammatic presentation of the residency/mobility profiles.

14. The Hong Kong Resident Population at the 2001 Population

Census moment (i.e. 14 March 2001) was 6 708 400. Within the total population, 6 523 900 were Usual Residents while the remaining 184 500 were Mobile Residents.

UPDATING OF POPULATION ESTIMATES

Introduction

15. Population estimates constitute a major type of Hong Kong population statistics. The estimates furnish essential statistical information for the derivation of statistical indicators, such as birth rates, fertility rates, death rates, per capita GDP, hospital beds per 1 000 population and so on. They are also required by government administrators in formulating, evaluating and administering policies in such areas as education, housing, transport, health and social welfare services. Equally useful are the estimates to planning and researches in the private and business sectors, which are often required as important parameters for decision making.

16. Population estimates are updated at half-yearly intervals, corresponding to the mid-year and end-year reference time-points. Provisional population estimates are released about one and a half months after the reference time-point. Revised estimates will be released a further six months later.

Methodology

17. In general, the population estimates are updated from one time point to another as described below.

18. A population base is established at each population census (or by-census) moment. Under the current method for compiling population estimates, i.e. the “resident population” method, the population base includes both Usual Residents and Mobile Residents.

19. The population estimate at any reference time-point (t) is brought forward from that of a previous time point, starting with that at a

certain census (or by-census) moment by the following population equation:

$$\begin{aligned} &\text{Population (at reference time-point } t) \\ &= \text{Population (at census moment } c) \\ &\quad + \text{births (from } c \text{ to } t) - \text{deaths (from } c \text{ to } t) \\ &\quad + \text{inflows (from } c \text{ to } t) - \text{outflows (from } c \text{ to } t). \end{aligned}$$

20. The computation of the “resident population” method of Hong Kong relies on the arrival and departure records of individual persons linked for statistical computation (*albeit* the records are anonymised and un-identifiable to the individuals). The amount of time being spent in Hong Kong by a person within a period of time could then be calculated. This information is then used to ascertain whether an individual should be counted as a member of the Hong Kong Resident Population and whether he/she should be classified as a Usual Resident or Mobile Resident.

21. Owing to the fact that the required data on passenger movement are not available for dates earlier than 1996, the estimates of the “Hong Kong Resident Population” in the statistical series are only provided in respect of reference time-points from 1996 onwards. Nevertheless, according to a comparison of major statistical indicators between the extended de facto population and the Hong Kong Resident Population in 1999, the differences of values between the two methods are relatively small, indicating that the pre-1996 series based on the old method could still be broadly analysed along with the new series.

Results

22. Referring to the population estimates at mid-years (Table 1), the population of Hong Kong increased from 4.04 million in 1971 to 6.72 million in 2001. The increase of 2.68 million constituted an average growth rate of 1.7% per annum. For some of the years in the early 1970’s and early 1980’s annual growth rates exceeded 2%. For the recent several years, the annual growth rate was just below 1%.

23. The provisional end-2001 population estimate is 6.76 million.

Retrojections

24. When a new population base is available, the difference between the new population base and the one compiled by updating the previous population base can be computed. This is called the “intercensal error”. As the new population base will be used in future updating of the population estimates, a “retrojection” process is carried out to finalize the population estimates in respect of the intervening reference time-points between the current and previous census/by-census moments. This ensures that there will not be a break in continuity for reference time-points before and after the new population base.

COMPILATION OF POPULATION PROJECTIONS

Introduction

25. Population projections of Hong Kong by age and sex are compiled at intervals of two to three years: one following each population census or by-census and another round during the intercensal years. Following the release of the results of the 2001 Population Census, a new set of population projections, covering the coming 30 years, has been prepared.

26. This new set of population projections will form a common basis for Government planning in the various programme areas. They will also be widely used by the private sector.

Projection methodology

27. The “component method”, which is commonly used internationally, is adopted for making the population projections. Under this method, the population of a base year is brought forward by age and sex under separate projections of fertility, mortality and migration, year after year until the end of the projection period.

28. The starting point for the projections is the population situation in 2001. Based on the assumptions made on fertility, mortality and

migration for each projection year (i.e. from mid-year of a calendar year to mid-year of the following calendar year), the size and age-sex structure of the population at the end of that projection year are worked out by applying the following algorithm:

- (1) The projected forward survival ratios by age and sex are applied to the Usual Residents of the base/projected population at the beginning of a projection year to derive the surviving population at the end of that projection year.
- (2) The assumed net balance of migration among Usual Residents is added to the surviving population at the end of that projection year.
- (3) The projected age specific fertility rates are applied to the respective average numbers of women in individual childbearing ages 15–49 to obtain the total number of births. These births, after being divided into males and females by an average sex ratio at birth, are subjected to their respective projected forward survival ratios. The surviving population aged 0 by sex at the end of that projection year is then derived.
- (4) The projected number of Mobile Residents in Hong Kong is added in to give the total population.

Projection assumptions

29. Statistical studies using modelling methods as far as possible are made on the past trends and recent developments pertaining to the socio-economic conditions in Hong Kong to generate the fertility, mortality and migration assumptions. Where government policies are involved, it is taken that existing policies will continue to apply.

Fertility

30. Hong Kong's fertility has experienced a marked and continuous decline in the past two decades. The total fertility rate decreased by about 52% from 1 933 births per 1 000 women in 1981 to 929 in 2001.

The decline in the fertility rate in the past decade was associated with factors like marriage postponement, increased prevalence of spinsterhood, delay in low-order births and curtailment of high-order births. This decline was very significant compared with the experience of some developed economies with low fertility. The current fertility level of Hong Kong has already fallen below those experienced in low fertility economies such as Japan and the Netherlands.

31. The projection of the future fertility rate has made reference to the following points: (i) Births within marriage account for the great majority of total births in Hong Kong; (ii) there is a decreasing trend in the proportion of currently married females in our society; (iii) married females are giving births at an older maternal age; and (iv) more common knowledge that higher maternal age carries a higher risk of foetal malformation.

32. Upon decomposing the age specific fertility rate into the proportion of currently married females and age specific marital fertility rate, it is observed that the proportion of currently married females has been following a declining trend, while the age specific marital fertility rate has had peaks and troughs, lacking a clear increasing or decreasing trend. With this observation, we assume that the age specific marital fertility rate would rebound to a slightly higher level (i.e. to a level somewhat similar to those in 1991–95), whereas the proportion of current married females would continue its decreasing trend in the near future. The net effect would be a slight rebound in the total fertility rate. The total fertility rate is projected to increase from 929 births per 1 000 women in 2001 to 1 117 in 2010 and remain at that level for the rest of the projection period. (Figure 2)

Mortality

33. Hong Kong has experienced a continuous decline in mortality during the past two decades, with a corresponding increase in life expectancy. Many factors contributed to the continuous decline in mortality over the past two decades. Society has become more affluent, and people are better educated and more health conscious. Further improvement in mortality will depend on people's awareness to

environment protection, smoking hazards, balanced diets and physical fitness. In 2001, the provisional figure for the expectation of life at birth was 78.2 years for males and 84.1 years for females. Compared with other economies, Hong Kong enjoys a very low mortality. The expectations of life at birth for both sexes are close to those of low mortality economies like Japan, Switzerland and Sweden. Further medical advancement and continuing socio-economic development would lead to further decline in mortality, though the rate of decline would be smaller.

34. The future mortality level of Hong Kong is projected using the Lee-Carter method, which is a statistically modelling technique based on the historical age-sex specific mortality rates. A good reference on the Lee-Carter method can be found in Lee and Carter (1992). After testing Hong Kong's data, it was found that the Lee-Carter model fits the data well. The expectation of life at birth is projected to increase to 82.3 years for males and 87.8 years for females in 2031. (Figure 3)

Migration

35. Figure 4 shows the migration flows of Hong Kong residents. Separate assumptions are made in respect of the five migration components:

- Net flow of Hong Kong Permanent Residents into the Usual Residents category;
- Legal entrants from the Mainland;
- Net flow of Hong Kong Non-permanent Residents other than legal entrants from the Mainland, foreign domestic helpers and imported workers (net change in number of persons from visitor status to resident status is included);
- Net flow of foreign domestic helpers and imported workers; and
- Net flow of Mobile Residents.

36. Basically, the recent trends of the residency and mobility patterns of the Hong Kong population provide the basis for formulating the assumptions on migration components.

37. Assumptions on fertility, mortality and migration entail a certain degree of uncertainty. These assumptions will hence be revised in a roll-forward manner in each round of population projections conducted at intervals of two to three years.

Projection results

Trend of the total population

38. The Hong Kong Resident Population is projected to increase at an average annual rate of 0.9%, from 6.72 million in mid-2001 to 8.72 million in mid-2031. (Tables 2 and 3)

39. The number of Usual Residents is projected to increase at an average annual rate of 0.8% from 6.54 million in mid-2001 to 8.32 million in mid-2031, and the number of Mobile Residents at an average annual rate of 2.7% from 182 000 to 405 000. Along with the ever-closer economic ties between Hong Kong and the Mainland, a faster growth rate is projected for Mobile Residents.

Trend of births and deaths

40. Since we assume a mild fertility rebound in the coming ten years, the number of births would increase from 50 500 in 2002 to 53 200 in 2010 and then remain at about 53 000 per annum.

41. The number of deaths is projected to increase from about 33 000 per year currently to about 65 000 at the end of the projection period. The increase in the number of deaths is mainly attributable to the growing proportion of elderly in the population despite a higher life expectancy (which implies a lower level of mortality). As a result, it is projected that there would be less births than deaths each year from 2023 onwards.

Trend of migration

42. A net inward migration of about 60 000 person per annum is projected. Entrants for the purpose of family re-union from the Mainland continue to be the main source of inward migration. Under

the current policy of admitting 150 entrants from the Mainland per day, about 54 000 entrants settle in Hong Kong per year. Of these persons, about 40% are aged below 15.

Aging trend

43. The population is projected to follow a continuous aging trend. In 2001, 16% of the population were aged under 15. This is projected to decrease to 12% in 2031. On the other hand, the proportion of those aged 65 and over is projected to rise from 11% in 2001 to 14% in 2016 and then markedly to 24% in 2031.

44. The dependency ratio is a ratio reflecting age composition of the population. The child dependency ratio would decrease from 227 per thousand persons aged 15–64 in 2001 to 182 in 2031. Even though we project a mild fertility rebound, the growth of the working age population is faster than the growth of the young age population.

45. As regards the elderly dependency ratio, it would increase moderately from 155 in 2001 to 198 in 2016 and then rise sharply to 380 in 2031. In Hong Kong, a baby boom occurred in the 1950s and 1960s. These people would reach 65 as from 2016. Hence, the number of persons aged 65 or over would increase at a fast pace after 2016.

46. Adding the child dependency ratio and the elderly dependency ratio gives the overall dependency ratio. The overall dependency ratio exhibits a U-shape that falls from 382 in 2001 to 344 in 2011 and then rises to 562 in 2031.

Sex ratio of the population

47. The sex ratio (i.e. number of males per 1 000 females) of the population is projected to fall noticeably, from 956 in 2001 to 771 in 2031. Yet there will be variations in the sex ratio by age group. In particular, the sex ratio for the age group 25–44 is expected to be much affected by the presence of foreign domestic helpers comprising mostly females. With foreign domestic helpers excluded, the sex ratio is projected to come down, from 1 021 in 2001 to 836 in 2031.

Changes in the population pyramid

48. The population pyramid is a commonly used chart for presenting the population structure concisely. Putting the population pyramids of 2001, 2016 and 2031 side by side facilitates comparison. For the lower age groups, the number of males is slightly more than the number of females, reflecting the biological norm that there are more male births than female births. For the middle age groups, there are more females than males owing to the presence of foreign domestic helpers comprising mostly females and the continued entry of persons from the Mainland envisaged in the coming years with a high proportion of females. For the higher age groups, it may be noted that females have a longer life expectancy than males. (Figure 5)

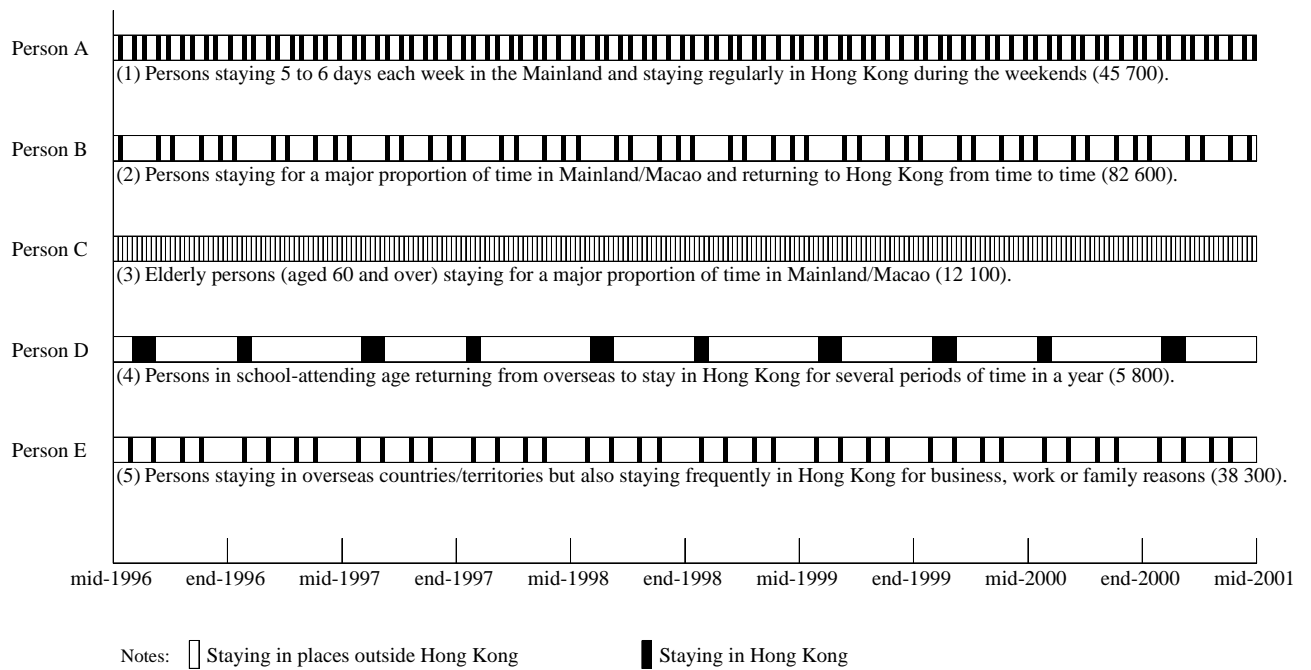
CONCLUDING REMARKS

49. We have discussed two major uses of the results of the 2001 Population Census of Hong Kong — the updating of population estimates and the compilation of population projections. These are very important endeavours, as described earlier. The quality of the outputs from such work depend greatly on the quality of the Population Census data. It is therefore very important that we keep on improving our census methods.

REFERENCE

Lee, R. and Carter, L. (1992). Modeling and Forecasting U.S. Mortality. *Journal of the American Statistical Association*, **87(419): 659–671**.

Figure 1 Examples of residency/mobility profile of Mobile Residents



Figures in brackets refer to the Mobile Residents at the 2001 Population Census moment

Figure 2 Total Fertility Rate of Hong Kong, 1981–2031

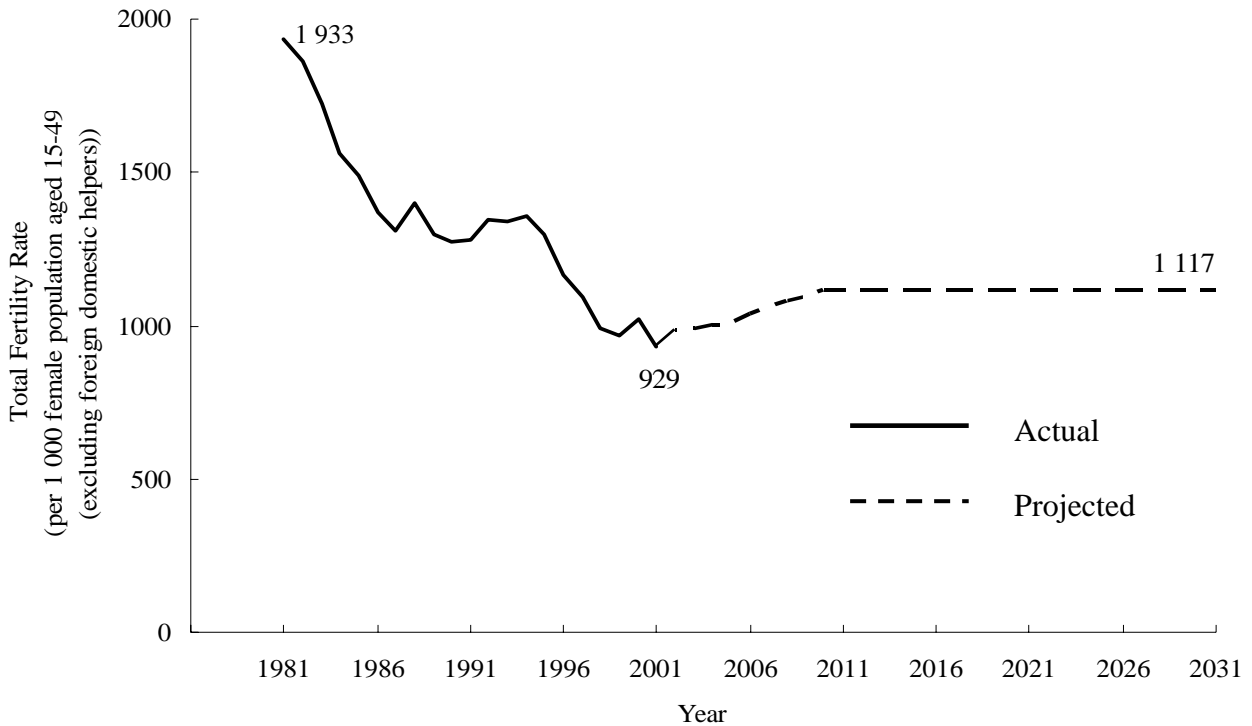


Figure 3 Expectation of Life at Birth of Hong Kong, 1981–2031

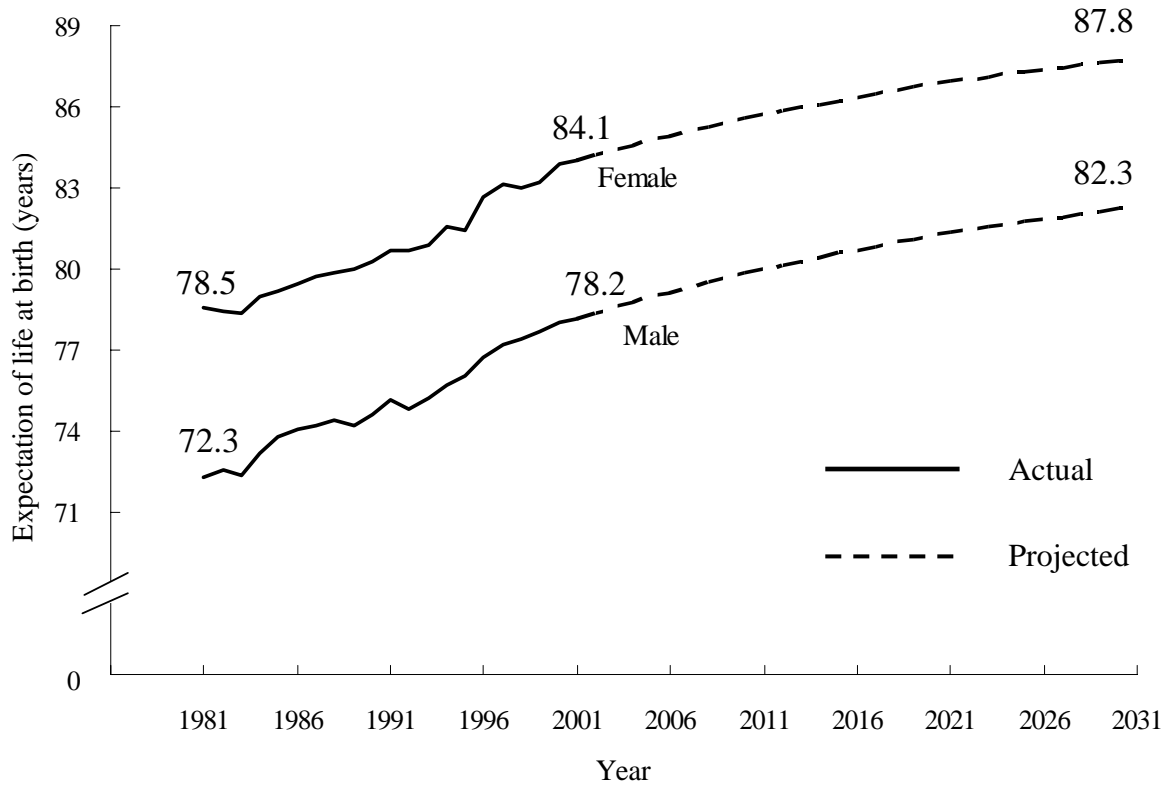
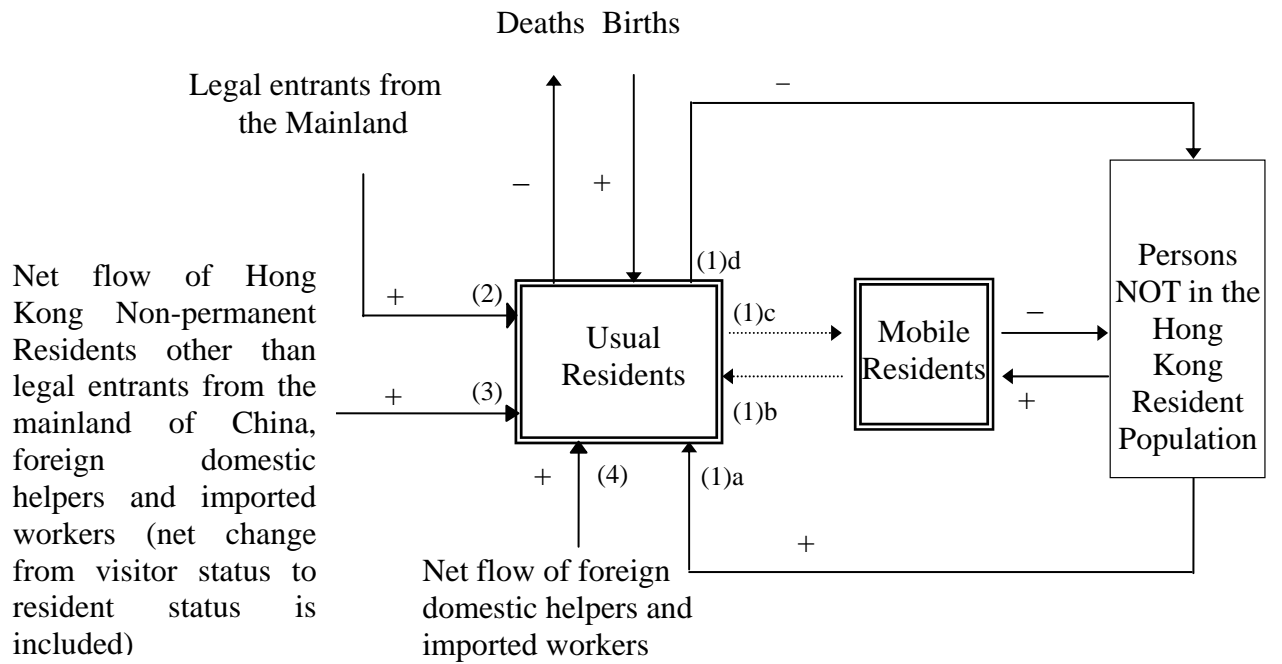


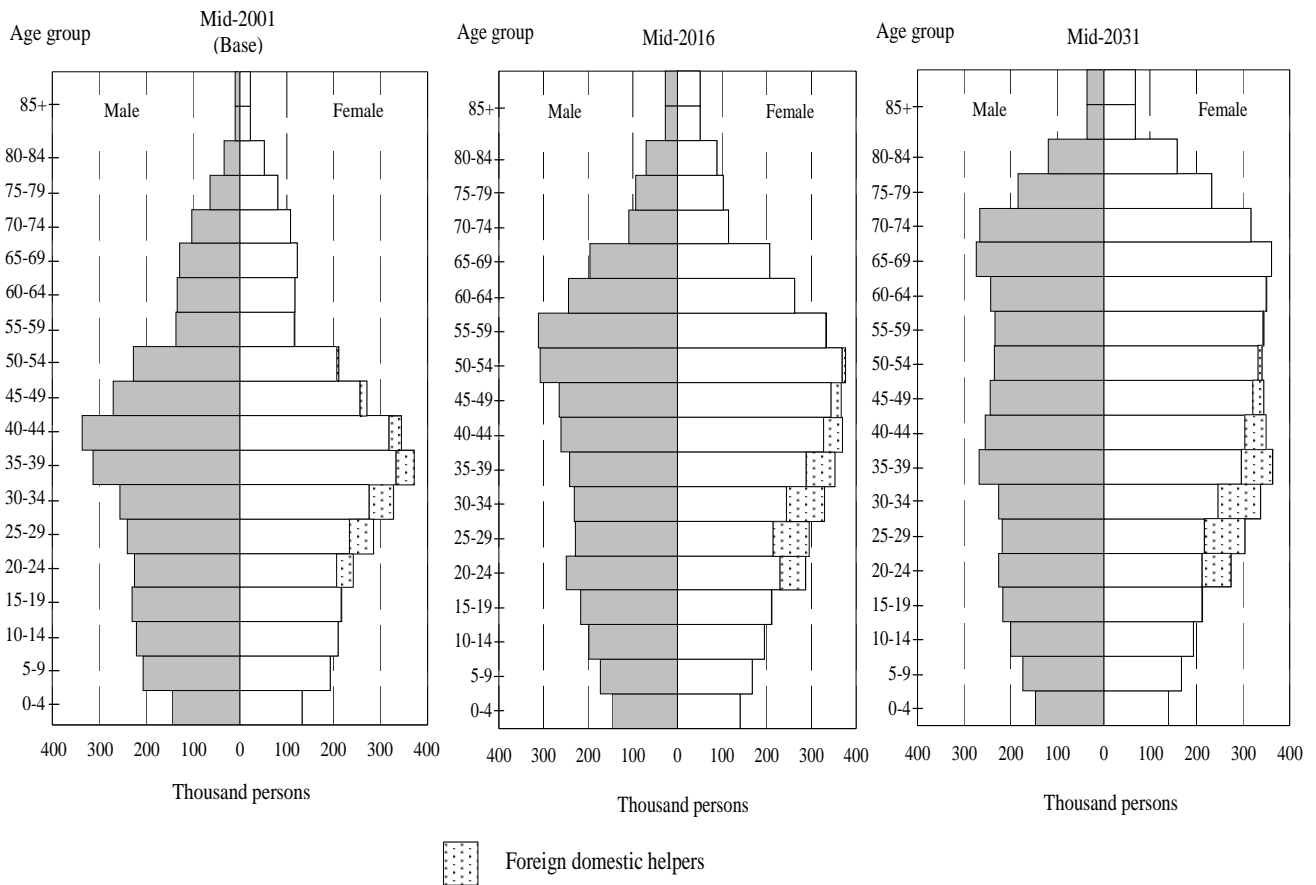
Figure 4 Migration Flows of Hong Kong Residents



 Hong Kong Resident Population (comprising Usual Residents and Mobile Residents)
 Persons NOT in the Hong Kong Resident Population

Note: (1) = Net flow of Hong Kong Permanent Residents into the Usual Residents category
 = (1)a + (1)b - (1)c - (1)d

Figure 5 Population Pyramid, 2001, 2016 and 2031



Note: A considerable number of foreign domestic helpers work in Hong Kong to relieve many families of household chores. The number of foreign domestic helpers as at end-March 2002 was 237 000, about 65 per cent of whom were from the Philippines while those from Indonesia and Thailand ranked second and third respectively.

Table 1 Population growth of Hong Kong since 1971

Year	Population estimate at mid-year⁽¹⁾	Growth rate compared with the previous year	Year	Population estimate at mid-year⁽¹⁾	Growth rate compared with the previous year
1971	4 045 300	2.2%	1987	5 580 500	1.0%
1972	4 123 600	1.9%	1988	5 627 600	0.8%
1973	4 241 600	2.9%	1989	5 686 200	1.0%
1974	4 377 800	3.2%	1990	5 704 500	0.3%
1975	4 461 600	1.9%	1991	5 752 000	0.8%
1976	4 518 000	1.3%	1992	5 800 500	0.8%
1977	4 583 700	1.5%	1993	5 901 000	1.7%
1978	4 667 500	1.8%	1994	6 035 400	2.3%
1979	4 929 700	5.6%	1995	6 156 100	2.0%
1980	5 063 100	2.7%	1996	6 435 500	2.5% ⁽²⁾
1981	5 183 400	2.4%	1997	6 489 300	0.8%
1982	5 264 500	1.6%	1998	6 543 700	0.8%
1983	5 345 100	1.5%	1999	6 606 500	1.0%
1984	5 397 900	1.0%	2000	6 665 000	0.9%
1985	5 456 200	1.1%	2001	6 724 900	0.9%
1986	5 524 600	1.3%			

Notes: (1) The figures from 1971 to 1995 are compiled based on the “extended de facto” method and those from 1996 onwards are compiled based on the “resident population” method.

(2) The growth rate is compiled based on the mid-1996 population estimate of 6 311 000 under the “extended de facto” method.

Table 2 Significant Characteristics of the Hong Kong Resident Population for Selected Years

	Mid-2001 (Base)	Mid-2006	Mid-2011	Mid-2016	Mid-2021	Mid-2026	Mid-2031
Population	6 724 900	7 121 800	7 527 700	7 896 500	8 228 300	8 492 400	8 721 500
<i>Usual Residents</i>	6 542 300	6 890 900	7 245 100	7 562 000	7 841 800	8 096 100	8 316 100
<i>Mobile Residents</i>	182 600	230 900	282 600	334 500	386 500	396 300	405 400
Average annual growth rate over a 5-year period	-	1.2%	1.1%	1.0%	0.8%	0.6%	0.5%
Sex ratio (males per 1 000 females)							
<i>Including foreign domestic helpers</i>	956	904	866	837	814	792	771
<i>Excluding foreign domestic helpers</i>	1 021	979	943	913	885	859	836
Percentage of population							
<i>Aged 0–14</i>	16%	15%	13%	13%	13%	12%	12%
<i>Aged 15–64</i>	72%	73%	74%	73%	70%	67%	64%
<i>Aged 65 and over</i>	11%	12%	12%	14%	17%	21%	24%
Dependency ratio							
<i>Child</i>	227	203	180	178	179	180	182
<i>Elderly</i>	155	162	164	198	245	313	380
<i>Overall</i>	382	365	344	376	424	493	562
Median age	37	39	41	42	44	45	46

Table 3 Components of population growth

Reference time-point (Mid-year)	Hong Kong Resident Population	Usual Residents	Mobile Residents	Compared with the previous reference time-point	From the previous reference time-point to this reference time-point		Net balance of migration
				Population growth	Births	Deaths	
2001 ⁽¹⁾	6 724 900	6 542 300	182 600	-	-	-	-
2002	6 799 800	6 608 100	191 700	74 900	50 500	34 400	58 800
2003	6 877 600	6 676 400	201 200	77 700	50 700	35 100	62 100
2004	6 957 700	6 746 800	210 900	80 200	50 600	35 900	65 400
2005	7 040 000	6 819 100	220 800	82 300	50 400	36 700	68 600
2006	7 121 800	6 890 900	230 900	81 900	50 700	37 500	68 600
2007	7 203 800	6 962 700	241 000	81 900	51 700	38 400	68 600
2008	7 285 500	7 034 200	251 300	81 700	52 200	39 300	68 800
2009	7 366 800	7 105 100	261 700	81 300	52 700	40 200	68 800
2010	7 447 700	7 175 600	272 100	80 900	53 200	41 100	68 800
2011	7 527 700	7 245 100	282 600	80 000	53 200	42 100	68 900
2012	7 605 600	7 312 400	293 100	77 800	53 000	43 100	67 900
2013	7 681 200	7 377 700	303 500	75 600	52 900	44 200	66 900
2014	7 754 800	7 441 000	313 800	73 600	52 900	45 200	65 900
2015	7 826 600	7 502 400	324 200	71 800	53 000	46 200	64 900
2016	7 896 500	7 562 000	334 500	69 900	53 100	47 200	64 000
2017	7 964 500	7 619 700	344 800	68 100	53 200	48 200	63 100
2018	8 031 700	7 676 500	355 200	67 200	53 300	49 200	63 100
2019	8 098 100	7 732 500	365 600	66 400	53 400	50 200	63 200
2020	8 163 700	7 787 600	376 100	65 600	53 500	51 100	63 200
2021	8 228 300	7 841 800	386 500	64 600	53 600	52 200	63 200
2022	8 283 700	7 895 000	388 700	55 400	53 800	53 300	54 900
2023	8 337 800	7 947 200	390 600	54 100	53 900	54 400	54 600
2024	8 390 600	7 998 200	392 400	52 800	53 700	55 600	54 600
2025	8 442 100	8 047 800	394 300	51 500	53 600	56 700	54 600
2026	8 492 400	8 096 100	396 300	50 300	53 500	58 000	54 700
2027	8 541 400	8 143 100	398 300	49 000	53 500	59 200	54 700
2028	8 589 000	8 188 800	400 200	47 600	53 500	60 600	54 700
2029	8 634 900	8 232 900	402 000	46 000	53 400	62 000	54 600
2030	8 679 200	8 275 400	403 800	44 200	53 200	63 500	54 500
2031	8 721 500	8 316 100	405 400	42 400	53 100	65 100	54 400

Note: (1) Base year population estimates

**20th Population Census Conference
19–21 June 2002
Ulaanbaatar, Mongolia**

**Application of Census Data:
Updating of Population Estimates
and Population Projections**

**by
Frederick W H HO
Commissioner for Census and Statistics
Hong Kong Special Administrative Region, China**



Introduction

- Population census --- every ten years
- Population by-census --- between two population censuses
- 2001 Population Census was conducted from 15 to 27 March 2001
- Six-sevenths of households provided basic information like age and sex of household members.
- One-seventh of households provided detailed information on a broad range of demographic and socio-economic characteristics of household members.



Population Data System

Population statistical database

- Population censuses/by-censuses --- corner-stone
- Administrative systems (such as births, deaths and passenger movement records)
- Sample surveys (in particular the continuous General Household Survey which is carried out to obtain unemployment situation in Hong Kong)



“Resident population” approach

The Hong Kong Population

- Measured by the “Hong Kong Resident Population”
--- comprised “Usual Residents” and “Mobile Residents”

- At 2001 Population Census moment

Population	6 708 400
<i>Usual Residents</i>	6 523 900
<i>Mobile Residents</i>	184 500



Use of population estimates

- Compilation of various statistical indicators such as fertility rate, mortality rate and per capita Gross Domestic Product.
- Formulating, evaluating and administering of Government policies.
- Forms the foundation on population projections.



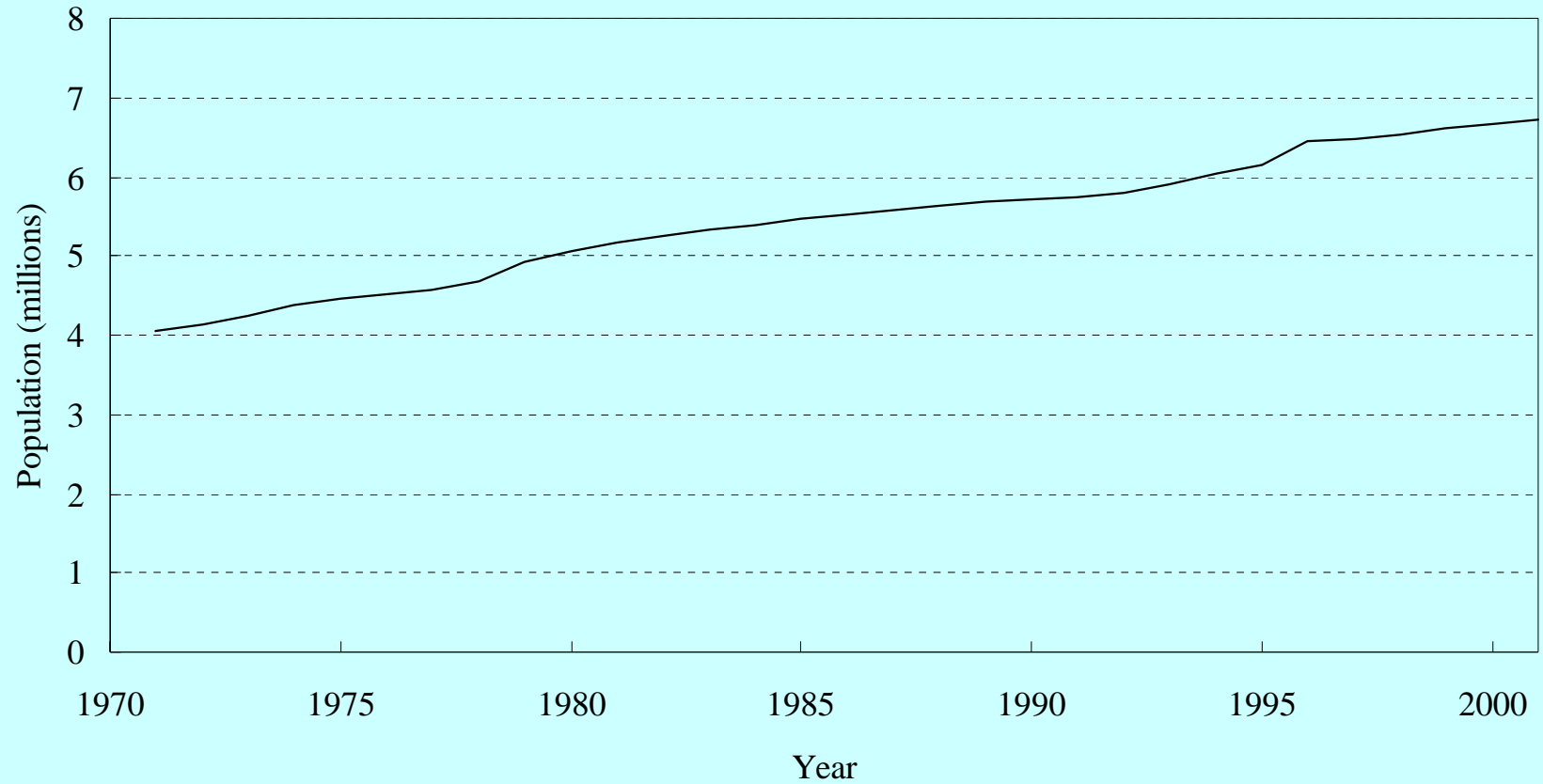
Updating of population estimates

$$\begin{aligned} &\text{Population (at reference time-point } t) \\ &= \text{Population (at census moment } c) \\ &\quad + \text{births (from } c \text{ to } t) \\ &\quad - \text{deaths (from } c \text{ to } t) \\ &\quad + \text{inflows (from } c \text{ to } t) \\ &\quad - \text{outflows (from } c \text{ to } t). \end{aligned}$$

Population estimates are updated at half-yearly intervals, corresponding to the mid-year and end-year reference time-points.



Population trend



Population projections

- Updated at intervals of two to three years
- The latest set of population projections, covering the period from 2002 to 2031, was released in May 2002.
- Form a common basis for Government planning in the various programme areas
- Widely used by the private sector.



Projection methodology

“Component method”

- The population of a base year is brought forward by age and sex under separate projections of fertility, mortality and migration, year after year until the end of the projection period.
- The starting point for the projections is the population situation in 2001.

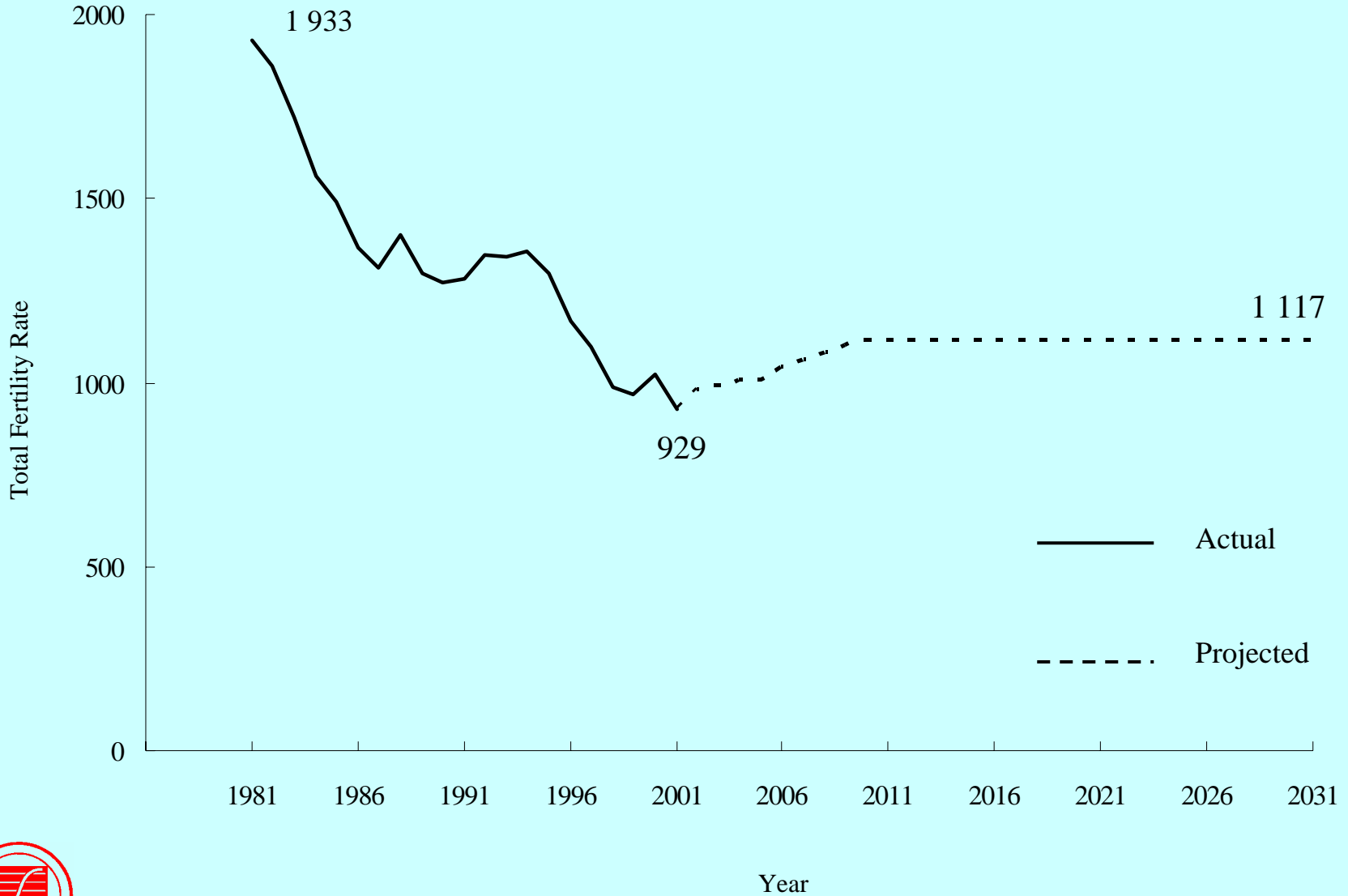


Projection assumptions

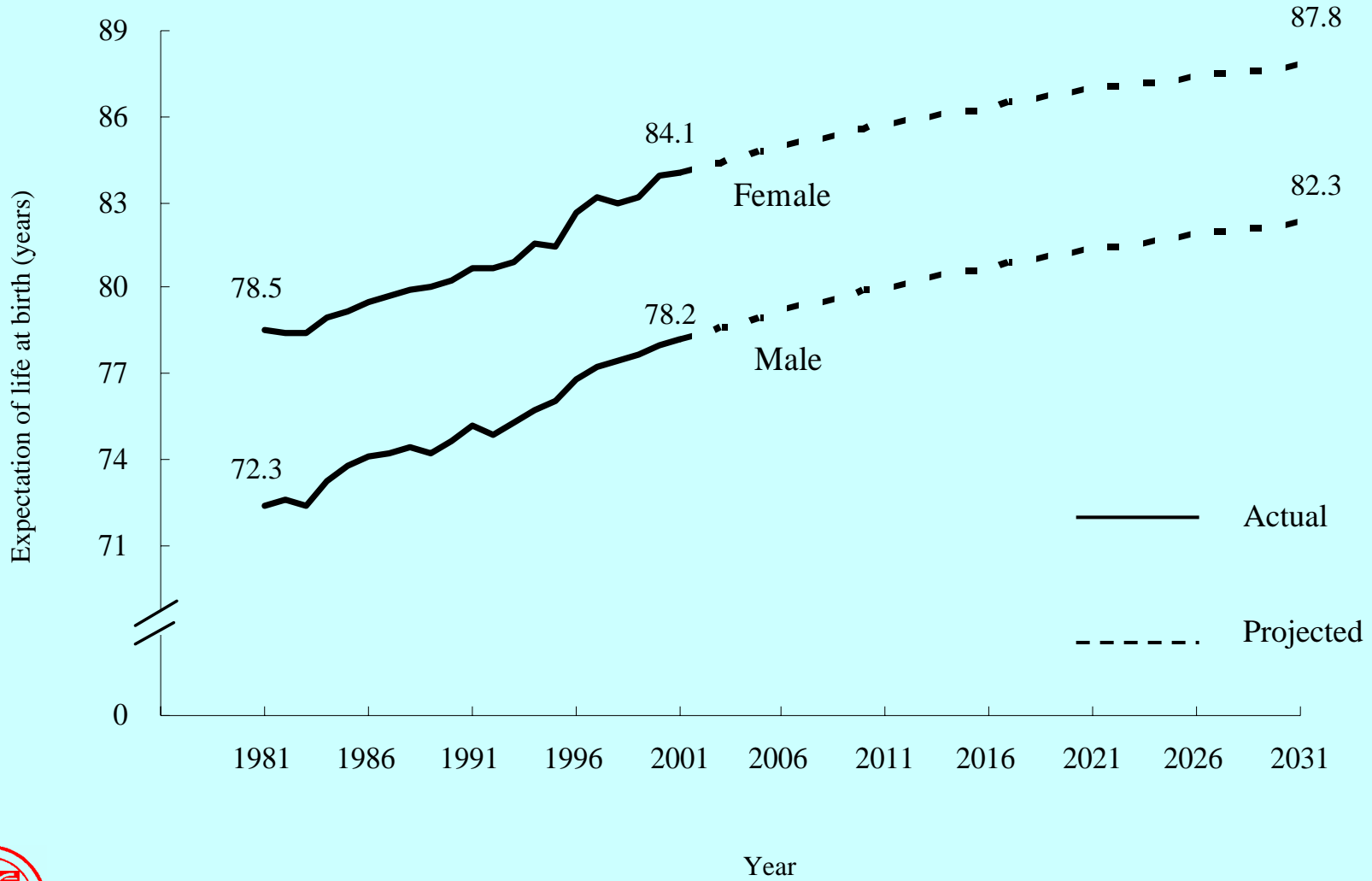
- Statistical studies using modelling methods as far as possible are made on the past trends and recent developments pertaining to the socio-economic conditions in Hong Kong to generate the fertility, mortality and migration assumptions.
- Where government policies are involved, it is taken that existing policies will continue to apply.



Fertility



Mortality

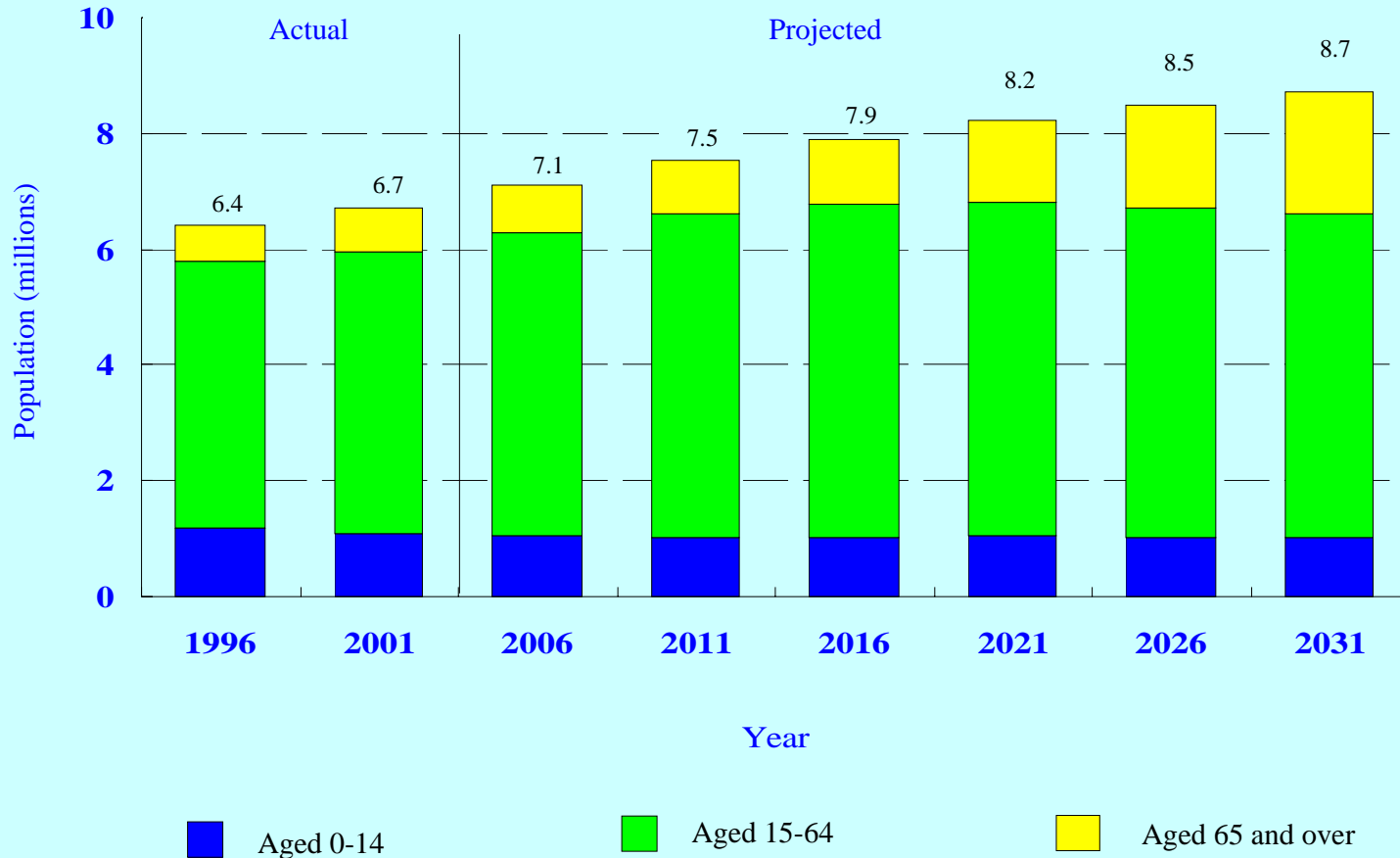


Population Size

	Mid-2001	Mid-2031	Average annual growth rate
Population	6 724 900	8 721 500	0.9%
<i>Usual Residents</i>	<i>6 542 300</i>	<i>8 316 100</i>	<i>0.8%</i>
<i>Mobile Residents</i>	<i>182 600</i>	<i>405 400</i>	<i>2.7%</i>



Population Size and Age Structure



Natural Increase of the Population

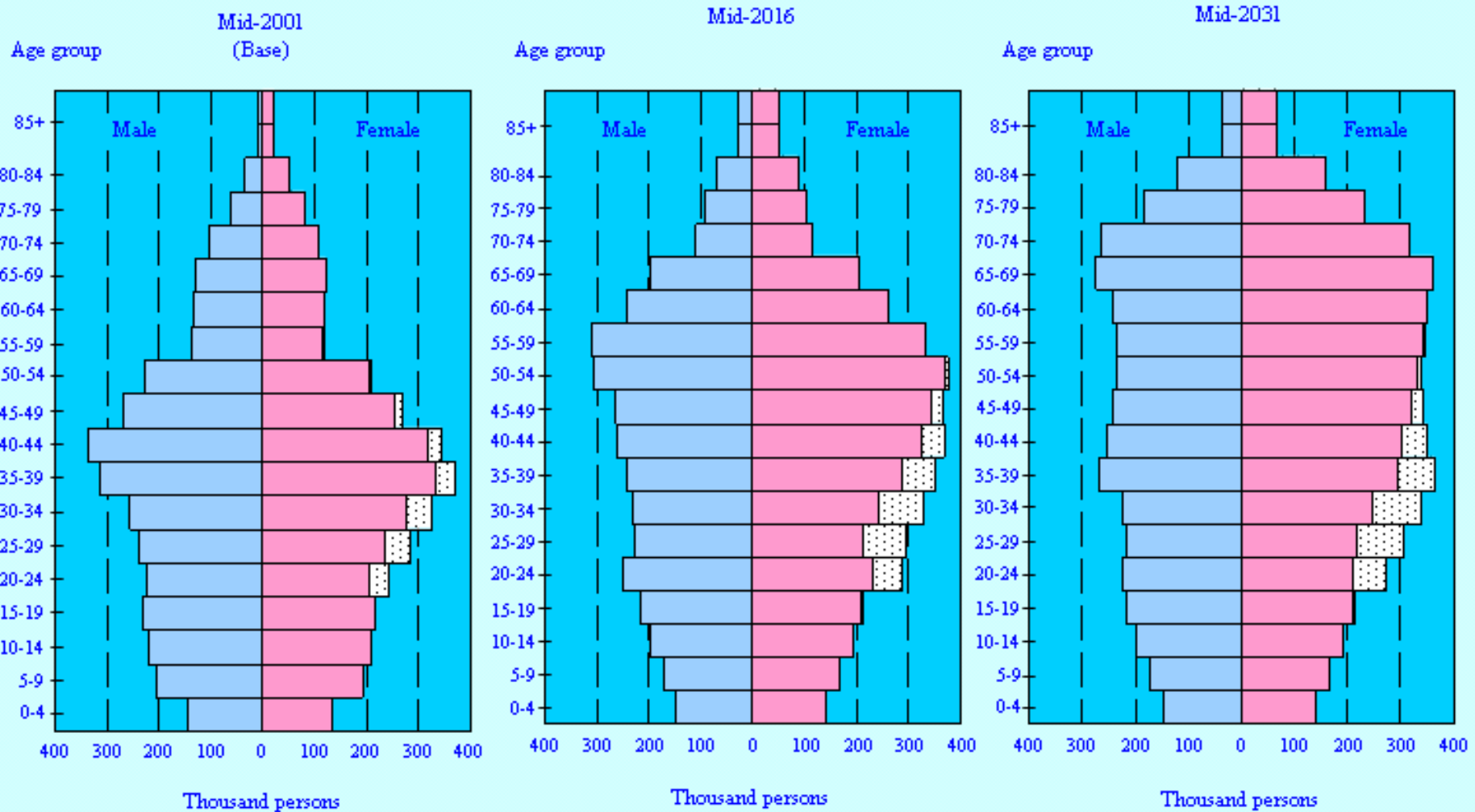
	<u>Currently</u>	<u>End of Projection Period (2031)</u>
Births	50 000 (per year)	53 000 (per year)
Deaths	33 000 (per year)	65 000 (per year)


2002-2031

Total natural increase would account for 7% of the population growth.



Population Pyramid



 Foreign domestic helpers

