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Evaluation of Accuracy of the 2000 Population Census of Japan

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1 Introduction - Current Status of the Population Census of Japan

The Statistics Bureau of Japan conducts the Population Census every five years enumerating all the people residing in Japan. The Census results are required by law for determination of the Single-Seat Electoral Constituencies of the House of Representatives and the number of seats of local assemblies. They are also required for establishment of cities (as well as Ordinance-Designated Cities, Core Cities, etc.) as well as computation of the Local Allocation Tax. The Census results are also used for policy-making decisions at the national and local government level on such issues as declining birth rate and aging population, employment, disaster prevention, regional development, and environmental preservation. In addition, they are used by academia and research institutes for such studies as demographic analysis and by the private sector for various purposes. The Census results also provide the most complete sampling frame of households for surveys conducted by public and private organizations. All these applications of the Census results demand that they be accurate and timely.

The Statistics Bureau places the highest priority in the census operation on enumerating every person with "neither omissions nor duplications." To achieve this goal, the Statistics Bureau takes such measures as, for example, conducting four pilot surveys before the 2000 Census and defining Enumeration Districts (EDs) one year prior to the Census to assign enumerators to specific EDs.

However, the Census taking has become increasingly difficult in recent years. The reasons include many respondents not being home until very late at night, reflecting diversification of life styles, more people are concerned about privacy, and an increased level of distrust towards the government.

To cope with these phenomena, the Statistics Bureau has implemented various countermeasures in recent Censuses such as extending the enumeration period, intensifying public relations, giving an option for respondents to return questionnaire in an envelope to safeguard privacy, and allowing enumerators to take accompanying person to handle the difficult fieldwork after dark.

To evaluate the accuracy of the Population Census, the Bureau conducts a Post-Enumeration Survey and examines omissions and duplications. It is an attempt to measure indirectly the effectiveness of the various countermeasures adopted for the 2000 Population Census.

(See Appendix for the outline of the Population Census and the Post Enumeration Survey.)

This paper evaluates the accuracy of the Population Census of Japan by three methods : (1) comparison of the Census results with the Basic Resident Registers; (2) age cohort analysis; and (3) analysis of the results of the Post Enumeration Survey. It is hoped that the data users will take these evaluations into consideration when they use the Census data.

2 Comparison with the Basic Resident Registers

The Local Administration Bureau of the Ministry of Public Administration, Home Affairs, Post and Telecommunications compiles and releases population statistics as of the end of March every year based on the Basic Resident Registers. The Basic Resident Registers cover only those people who have Japanese nationality in the entire territory of Japan. Hence, we can compare the Population Census and the Basic Resident Registers with respect to persons of Japanese nationality.

However, it is important to note that the Basic Resident Registers might have a problem of completeness. Some movers do not report their moves to municipal offices even though it is required by law. For the Population Census, enumerators visit the Enumeration Districts on Census Day and check the actual residence of respondents. Moreover, the difference in the two sets of estimates might be partially explained by the way the estimate from the Basic Resident Registers is computed. The Basic Resident Registers estimate for October 1, 2000 is obtained by taking the arithmetic mean of the population estimates from March 31, 2000 and March 31, 2001.

Now, let us compare figures from the Population Census and the Basic Resident Registers. The population of Japanese nationality from the Population Census is 125,615,298 persons, whereas that from the Basic Resident Registers is 126,178,055 persons. The Registers-based figure is larger by 562,757 persons, or 0.45%. This difference could be attributable to omissions in the Census (to be discussed later) and those persons who have been residing abroad for a long time and yet who have not reported their moves to municipal offices.

By age, a difference of about 530 thousand persons is found in the 20-34 year age group. This could mean that those persons described above might have mostly fallen in this age bracket. It should be noted that in the Census, enumerators collected information from proxies such as neighbors about the households whose residents could not be contacted during the survey period. Because only the information on the number of the residents by sex could be obtained, the residents' ages were not known. Hence, persons in such households were not included in the estimates by age but in "age-unknown".

Another difference of about 160 thousand persons is found for the 50-54 year age group. People of this generation were born when the birth rate was quite variable. Hence, it is believed that the time difference between the two sources could have had a considerable effect on this discrepancy (Table 1 and the note below).

Note: Persons in the 50-54 year age group in the Census were born between October 1945 and September 1950. On the other hand, the Registers-based population is computed as an average of the two estimates. This implies that half of those who were born in the period from April through September 1945 and from October 1950 through March 1951 are included when they should have been excluded while, half of those who were born in the period from October 1945 through March 1946 and from April through September 1950 are excluded when they should really have been included. The net effect of this calculation is estimated to be an overestimation of the Registers-based population by about 60 thousand persons, because the overestimate from the former group is larger than the underestimate from the latter by about 120 thousand persons judging from the data tabulated for each year and month of birth from the Census.

Table 1 Difference between Census Population and Register Population

Sex and Age	Census Population 1/ (a)	Register Population 2/ (b)	Difference (b)-(a) (c)	%Difference (c)/(a)
Total	125,615,298	126,178,055	562,757	0.45
0 ~ 4	5,849,380	5,900,725	51,345	0.87
5 ~ 9	5,974,192	6,012,617	38,425	0.64
10 ~ 14	6,495,736	6,521,275	25,539	0.39
15 ~ 19	7,419,590	7,383,909	-35,681	-0.48
20 ~ 24	8,283,983	8,393,045	109,062	1.30
25 ~ 29	9,607,641	9,825,768	218,127	2.22
30 ~ 34	8,592,300	8,799,072	206,772	2.35
35 ~ 39	7,963,085	7,970,076	6,991	0.09
40 ~ 44	7,692,306	7,723,194	30,888	0.40
45 ~ 49	8,829,742	8,872,324	42,582	0.48
50 ~ 54	10,372,267	10,534,938	162,671	1.54
55 ~ 59	8,682,659	8,618,571	-64,089	-0.74
60 ~ 64	7,697,802	7,689,633	-8,170	-0.11
65 ~ 69	7,079,386	7,102,593	23,207	0.33
70 ~ 74	5,880,374	5,880,199	-176	0.00
75 ~ 79	4,133,156	4,144,702	11,546	0.28
80 ~	4,833,138	4,805,402	-27,736	-0.58
Age-Unknown 3/	228,561	-	-228,561	-
Male	61,489,718	61,864,416	374,698	0.61
0 ~ 4	2,994,566	3,023,110	28,544	0.94
5 ~ 9	3,059,217	3,079,911	20,694	0.67
10 ~ 14	3,327,370	3,340,768	13,398	0.40
15 ~ 19	3,799,600	3,771,627	-27,974	-0.74
20 ~ 24	4,243,859	4,288,775	44,916	1.05
25 ~ 29	4,882,084	5,025,335	143,251	2.85
30 ~ 34	4,354,603	4,495,381	140,778	3.13
35 ~ 39	4,025,226	4,054,056	28,830	0.71
40 ~ 44	3,873,623	3,907,957	34,334	0.88
45 ~ 49	4,425,700	4,469,498	43,798	0.98
50 ~ 54	5,174,238	5,279,443	105,205	1.99
55 ~ 59	4,264,397	4,245,100	-19,297	-0.45
60 ~ 64	3,731,102	3,731,945	843	0.02
65 ~ 69	3,344,958	3,347,811	2,853	0.09
70 ~ 74	2,660,796	2,647,289	-13,507	-0.51
75 ~ 79	1,617,570	1,615,805	-1,765	-0.11
80 ~	1,562,618	1,540,601	-22,018	-1.43
Age-Unknown 3/	148,191	-	-148,191	-
Female	64,125,580	64,313,639	188,059	0.29
0 ~ 4	2,854,814	2,877,615	22,801	0.79
5 ~ 9	2,914,975	2,932,707	17,732	0.60
10 ~ 14	3,168,366	3,180,507	12,141	0.38
15 ~ 19	3,619,990	3,612,283	-7,708	-0.21
20 ~ 24	4,040,124	4,104,270	64,146	1.56
25 ~ 29	4,725,557	4,800,433	74,876	1.56
30 ~ 34	4,237,697	4,303,691	65,994	1.53
35 ~ 39	3,937,859	3,916,020	-21,840	-0.56
40 ~ 44	3,818,683	3,815,237	-3,447	-0.09
45 ~ 49	4,404,042	4,402,826	-1,216	-0.03
50 ~ 54	5,198,029	5,255,495	57,466	1.09
55 ~ 59	4,418,262	4,373,471	-44,792	-1.02
60 ~ 64	3,966,700	3,957,688	-9,012	-0.23
65 ~ 69	3,734,428	3,754,782	20,354	0.54
70 ~ 74	3,219,578	3,232,910	13,332	0.41
75 ~ 79	2,515,586	2,528,897	13,311	0.53
80 ~	3,270,520	3,264,802	-5,719	-0.18
Age-Unknown 3/	80,370	-	-80,370	-

1/ Population of Japanese nationality as of 1 October 2000.

2/ Average population on 3/31/2000 and 3/31/2001.

3/ Includes all persons whose age is unknown as their nationality is also unknown.

By prefecture, the Census-based population exceeds the Registers-based population in six prefectures: Tokyo, Kyoto, Aichi, Fukuoka, Miyagi, and Osaka. The difference is 36 thousand persons (1.4 %) in Kyoto, and 70 thousand persons (0.6 %) in Tokyo. On the other hand, the Registers-based population is larger in the remaining 41 prefectures. The difference is especially large in Wakayama (2.3 %) and in Aomori (1.7 %). (See Table 2.)

An analysis of the difference by age in prefectures shows that the difference is especially large for the 15-24 year age group. In prefectures where the Census-base population is larger, the difference is 9.9 % for 20-24 year olds and 8.2 % for 15-19 year olds in Kyoto, and 7.6 % for 15-19 year olds and 7.2 % for 20-24 year olds in Tokyo. On the other hand, in prefectures where the Register-base population is larger, the difference is 13.9 % for 20-24 year olds in Wakayama, and 11.4 % for 20-24 year olds in Kagawa.

Such differences could be attributable to youths from local areas who entered colleges or universities in large cities and failed to report their moves to municipal offices (Table 3).

3 Age Cohort Analysis

As stated above, persons in those households which could not be contacted in the Population Census and to which questionnaires could not be delivered are counted as "age-unknown". Due attention should be paid to this point when we look at the results, since those persons are included in the total population, but excluded from all tables broken down by age and other characteristics.

To investigate to which age groups such age-unknown people often belong, we have made a cohort analysis comparing the results of the 2000 Census and the previous 1995 Census.] The cohort analysis was restricted to population below 50 years of age because the number of deaths in the 5-year interval was believed non-negligible in age groups beyond 50. The 24-year population in 2000 was 66 thousand persons (3.6%) less than the 19-year population in 1995, showing the largest decrease of all age groups. Centering on this age group, there was decrease of 370 thousand persons among persons in their 20's (15-24 year olds in 1995), exceeding the expected reduction due to deaths and moves abroad.(Table 4).

This analysis shows that age-unknown persons are likely to be concentrated around this age group of 20-29 year olds in 2000. However, we know from the 2000 Population Census that the age-unknown population is 228,561 persons in total (Table 1), and thus, they alone could not explain the gap of 370 thousand persons between the census and the age cohort from the 1995 Census. It is likely that this age group also included those people who were omitted in the Census .

It should also be mentioned that the 5-year population (0 year old 5 years earlier) increased greatly in Table 4. This could be attributable to omissions of newborn babies, which is a common phenomenon in every Census. In the Census, babies should be counted if they were born before the Census date. However, they are often not named or are still in hospital, making it highly likely to be forgotten and omitted when questionnaires are filled in.

Prefectures	Census Population (a)	Register Population 1/ (b)	Difference (b)-(a) (c)	%Difference (c)/(a)	Male		Female	
					Difference	%Diff.	Difference	%Diff.
Japan	125,615,298	126,178,055	562,757	0.45	374,698	0.61	188,059	0.29
Hokkaido	5,670,616	5,679,068	8,452	0.15	10,095	0.37	-1,643	-0.06
Aomori	1,472,692	1,498,381	25,689	1.74	17,344	2.47	8,345	1.08
Iwate	1,412,340	1,423,466	11,126	0.79	8,908	1.31	2,218	0.30
Miyagi	2,354,919	2,345,509	-9,410	-0.40	-4,270	-0.37	-5,140	-0.43
Akita	1,186,209	1,200,519	14,310	1.21	9,119	1.62	5,191	0.83
Yamagata	1,239,133	1,243,160	4,027	0.32	1,738	0.29	2,289	0.36
Fukushima	2,118,102	2,134,870	16,768	0.79	8,356	0.81	8,412	0.78
Ibaraki	2,954,828	2,994,728	39,900	1.35	24,905	1.69	14,995	1.01
Tochigi	1,983,735	2,001,890	18,155	0.92	9,812	1.00	8,344	0.84
Gunma	1,996,313	2,018,747	22,434	1.12	13,529	1.37	8,906	0.88
Saitama	6,875,595	6,884,111	8,516	0.12	8,856	0.26	-340	-0.01
Chiba	5,868,700	5,906,782	38,082	0.65	24,323	0.82	13,759	0.47
Tokyo	11,851,126	11,781,017	-70,109	-0.59	-56,822	-0.96	-13,288	-0.22
Kanagawa	8,390,723	8,398,038	7,315	0.09	6,563	0.15	752	0.02
Niigata	2,466,384	2,479,643	13,259	0.54	7,791	0.65	5,468	0.43
Toyama	1,113,790	1,125,217	11,427	1.03	6,189	1.15	5,238	0.91
Ishikawa	1,174,656	1,176,131	1,475	0.13	15	0.00	1,461	0.24
Fukui	819,083	828,114	9,031	1.10	3,975	1.00	5,057	1.20
Yamanashi	877,171	885,750	8,579	0.98	4,452	1.03	4,127	0.93
Nagano	2,181,890	2,203,408	21,518	0.99	12,146	1.14	9,372	0.84
Gifu	2,081,101	2,109,476	28,375	1.36	17,858	1.77	10,517	0.98
Shizuoka	3,715,000	3,761,772	46,772	1.26	25,419	1.39	21,353	1.13
Aichi	6,933,002	6,921,005	-11,997	-0.17	-7,580	-0.22	-4,417	-0.13
Mie	1,833,417	1,858,133	24,716	1.35	14,844	1.67	9,873	1.05
Shiga	1,324,048	1,330,120	6,072	0.46	2,125	0.32	3,947	0.59
Kyoto	2,599,297	2,563,280	-36,017	-1.39	-15,441	-1.23	-20,576	-1.53
Oosaka	8,634,204	8,627,684	-6,521	-0.08	12,468	0.30	-18,989	-0.43
Hyogo	5,467,713	5,529,396	61,683	1.13	45,819	1.74	15,864	0.56
Nara	1,434,352	1,448,840	14,488	1.01	11,363	1.65	3,125	0.42
Wakayama	1,065,105	1,089,437	24,332	2.28	14,679	2.91	9,653	1.72
Tottori	610,228	617,452	7,224	1.18	3,540	1.21	3,684	1.16
Shimane	757,074	762,922	5,848	0.77	2,626	0.72	3,222	0.82
Okayama	1,938,273	1,957,597	19,324	1.00	13,824	1.49	5,500	0.55
Hiroshima	2,855,802	2,873,256	17,454	0.61	10,492	0.76	6,962	0.47
Yamaguchi	1,515,294	1,531,690	16,396	1.08	8,865	1.24	7,531	0.94
Tokushima	821,371	832,325	10,954	1.33	7,470	1.91	3,484	0.81
Kagawa	1,017,976	1,033,901	15,925	1.56	8,596	1.76	7,330	1.39
Ehime	1,488,552	1,510,349	21,797	1.46	13,966	1.99	7,831	1.00
Kochi	811,520	818,561	7,041	0.87	3,897	1.02	3,144	0.73
Fukuoka	4,984,997	4,973,457	-11,541	-0.23	-2,344	-0.10	-9,197	-0.35
Saga	874,068	883,075	9,007	1.03	6,352	1.54	2,656	0.58
Nagasaki	1,511,867	1,529,817	17,950	1.19	11,528	1.62	6,422	0.80
Kumamoto	1,854,935	1,870,118	15,183	0.82	9,504	1.08	5,679	0.58
Ooita	1,216,441	1,235,419	18,978	1.56	10,986	1.91	7,992	1.24
Miyazaki	1,167,556	1,185,783	18,227	1.56	11,145	2.02	7,082	1.15
Kagoshima	1,782,569	1,785,176	2,607	0.15	3,066	0.37	-459	-0.05
Okinawa	1,311,531	1,329,478	17,947	1.37	12,617	1.96	5,330	0.80

1/ Average population on 3/31/2000 and 3/31/2001.

Table 3 Difference between Census Population and Register Population by Age (Selected Prefectures)

Age	Prefectures where Census Population exceeds Register Population					
	Miyagi	Tokyo	Aichi	Kyoto	Oosaka	Fukuoka
Total 1/	%Difference 2/					
	-0.40	-0.59	-0.17	-1.39	-0.08	-0.23
0 ~ 4	0.68	2.36	0.42	0.90	1.15	1.04
5 ~ 9	0.16	1.89	0.46	0.59	1.09	0.27
10 ~ 14	0.20	1.54	0.26	0.10	0.52	0.43
15 ~ 19	-5.10	-7.55	-2.09	-8.19	-4.34	-4.19
20 ~ 24	-2.17	-7.24	-0.04	-9.91	-3.21	-2.16
25 ~ 29	1.28	2.61	1.32	1.96	1.93	2.34
30 ~ 34	1.44	3.58	1.97	2.36	2.62	2.04
35 ~ 39	-0.44	1.05	-0.40	0.24	0.08	0.04
40 ~ 44	-0.34	0.53	0.21	0.29	0.38	0.54
45 ~ 49	-0.26	0.33	0.08	0.20	0.16	0.38
50 ~ 54	0.98	1.22	0.89	1.80	1.93	1.78
55 ~ 59	-0.77	-1.35	-0.72	-1.12	-1.57	-1.44
60 ~ 64	-1.07	-0.60	-0.11	0.29	0.21	-0.22
65 ~ 69	-0.01	-0.10	0.64	0.31	0.28	-0.31
70 ~ 74	-0.08	-0.80	0.28	-0.17	0.03	-0.34
75 ~ 79	0.48	-0.76	0.26	-0.13	-0.01	0.03
80 ~	-0.02	0.07	-1.00	-1.32	-0.82	-1.69
	Prefectures where Register Population fairly exceeds Census Population					
	Aomori	Ibaraki	Gifu	Wakayama	Kagawa	Miyazaki
Total 1/	%Difference 2/					
	1.74	1.35	1.36	2.28	1.56	1.56
0 ~ 4	1.72	1.14	0.54	1.19	1.29	0.70
5 ~ 9	0.28	0.92	0.54	0.97	0.55	-0.06
10 ~ 14	0.82	0.41	0.55	0.75	0.21	0.25
15 ~ 19	1.75	3.08	3.06	6.54	4.49	4.19
20 ~ 24	4.29	6.60	7.89	13.93	11.41	9.76
25 ~ 29	2.61	2.31	2.73	4.57	3.06	2.81
30 ~ 34	2.65	2.62	2.67	3.86	2.93	1.73
35 ~ 39	1.13	0.33	-0.18	0.68	0.02	-0.33
40 ~ 44	1.96	0.96	0.62	1.11	0.36	0.75
45 ~ 49	2.16	0.96	0.75	1.50	0.45	1.10
50 ~ 54	3.21	1.73	1.54	2.68	1.62	2.51
55 ~ 59	3.36	-0.25	-0.10	-0.91	-1.19	-0.39
60 ~ 64	1.22	0.28	0.07	0.96	0.33	0.61
65 ~ 69	1.63	0.52	0.77	1.27	0.50	0.50
70 ~ 74	0.01	0.09	0.39	0.15	0.72	0.60
75 ~ 79	0.44	0.42	0.79	0.79	1.03	1.97
80 ~	-1.23	-0.86	-0.17	0.08	-0.14	0.90

1/ Includes persons whose age is unknown.

2/ (Register Population 3/ - Census Population) / (Census Population)

3/ Average population on 3/31/2000 and 3/31/2001.

Table 4 Change Rate by Cohort (1995-2000)

Age	Population		Change by Cohort	Change Rate by Cohort (%)	Population		Change Rate by Cohort (%)	Population		Change Rate by Cohort (%)
	1995	2000			1995	2000		1995	2000	
	(Total)				(Male)			(Female)		
0	1,182,029	1,160,750	-	-	604,314	594,995	-	577,715	565,755	-
1	1,191,561	1,155,107	-	-	610,178	591,236	-	581,383	563,871	-
2	1,176,303	1,180,836	-	-	602,272	604,562	-	574,031	576,274	-
3	1,199,265	1,178,398	-	-	614,948	602,338	-	584,317	576,060	-
4	1,200,465	1,174,289	-	-	614,947	601,435	-	585,518	572,854	-
5	1,221,825	1,193,690	11,661	0.99	625,104	610,395	1.01	596,721	583,295	0.97
6	1,259,920	1,198,107	6,546	0.55	644,833	613,368	0.52	615,087	584,739	0.58
7	1,301,714	1,179,758	3,455	0.29	667,518	604,179	0.32	634,196	575,579	0.27
8	1,340,447	1,201,297	2,032	0.17	686,099	615,909	0.16	654,348	585,388	0.18
9	1,369,204	1,201,340	875	0.07	701,994	615,366	0.07	667,210	585,974	0.08
10	1,429,151	1,229,381	7,556	0.62	731,035	629,032	0.63	698,116	600,349	0.61
11	1,479,546	1,252,229	-7,691	-0.61	757,001	641,247	-0.56	722,545	610,982	-0.67
12	1,496,040	1,304,101	2,387	0.18	765,207	668,413	0.13	730,833	635,688	0.24
13	1,500,889	1,342,376	1,929	0.14	768,240	687,133	0.15	732,649	655,243	0.14
14	1,519,077	1,367,649	-1,555	-0.11	778,509	701,545	-0.06	740,568	666,104	-0.17
15	1,589,238	1,432,055	2,904	0.20	815,178	733,084	0.28	774,060	698,971	0.12
16	1,630,652	1,481,874	2,328	0.16	837,574	759,363	0.31	793,078	722,511	0.00
17	1,695,912	1,497,017	977	0.07	869,002	766,390	0.15	826,910	730,627	-0.03
18	1,742,191	1,495,589	-5,300	-0.35	891,694	765,241	-0.39	850,497	730,348	-0.31
19	1,833,936	1,513,055	-6,022	-0.40	938,610	775,522	-0.38	895,326	737,533	-0.41
20	1,899,137	1,578,561	-10,677	-0.67	971,374	813,067	-0.26	927,763	765,494	-1.11
21	1,987,701	1,600,058	-30,594	-1.88	1,017,208	823,058	-1.73	970,493	777,000	-2.03
22	2,009,731	1,652,249	-43,663	-2.57	1,023,926	846,087	-2.64	985,805	806,162	-2.51
23	1,960,472	1,685,077	-57,114	-3.28	998,443	860,381	-3.51	962,029	824,696	-3.03
24	1,908,254	1,768,038	-65,898	-3.59	968,947	901,266	-3.98	939,307	866,772	-3.19
25	1,847,915	1,847,233	-51,904	-2.73	939,203	940,058	-3.22	908,712	907,175	-2.22
26	1,816,197	1,944,714	-42,987	-2.16	920,884	989,528	-2.72	895,313	955,186	-1.58
27	1,778,877	1,979,791	-29,940	-1.49	902,521	1,004,162	-1.93	876,356	975,629	-1.03
28	1,782,557	1,942,128	-18,344	-0.94	904,002	987,204	-1.13	878,555	954,924	-0.74
29	1,388,857	1,893,775	-14,479	-0.76	703,116	961,132	-0.81	685,741	932,643	-0.71
30	1,724,800	1,843,990	-3,925	-0.21	873,839	937,319	-0.20	850,961	906,671	-0.22
31	1,614,594	1,810,662	-5,535	-0.30	817,818	917,218	-0.40	796,776	893,444	-0.21
32	1,578,827	1,774,490	-4,387	-0.25	799,404	899,257	-0.36	779,423	875,233	-0.13
33	1,533,994	1,777,909	-4,648	-0.26	776,148	900,671	-0.37	757,846	877,238	-0.15
34	1,516,471	1,385,249	-3,608	-0.26	767,443	700,138	-0.42	749,028	685,111	-0.09
35	1,534,153	1,723,749	-1,051	-0.06	775,349	872,086	-0.20	758,804	851,663	0.08
36	1,568,758	1,613,166	-1,428	-0.09	792,033	815,862	-0.24	776,725	797,304	0.07
37	1,530,529	1,578,984	157	0.01	771,514	798,340	-0.13	759,015	780,644	0.16
38	1,495,223	1,532,175	-1,819	-0.12	753,864	773,740	-0.31	741,359	758,435	0.08
39	1,580,365	1,515,011	-1,460	-0.10	796,323	765,198	-0.29	784,042	749,813	0.10
40	1,641,633	1,531,934	-2,219	-0.14	827,879	772,678	-0.34	813,754	759,256	0.06
41	1,648,558	1,566,996	-1,762	-0.11	829,965	789,513	-0.32	818,593	777,483	0.10
42	1,763,850	1,528,421	-2,108	-0.14	885,815	769,056	-0.32	878,035	759,365	0.05
43	1,869,958	1,492,041	-3,182	-0.21	938,218	751,147	-0.36	931,740	740,894	-0.06
44	1,992,938	1,572,914	-7,451	-0.47	1,000,195	791,229	-0.64	992,743	781,685	-0.30
45	2,152,520	1,631,368	-10,265	-0.63	1,079,866	820,782	-0.86	1,072,654	810,586	-0.39
46	2,375,410	1,636,126	-12,432	-0.75	1,192,467	821,925	-0.97	1,182,943	814,201	-0.54
47	2,356,356	1,747,076	-16,774	-0.95	1,181,678	874,602	-1.27	1,174,678	872,474	-0.63
48	2,250,486	1,848,381	-21,577	-1.15	1,130,244	924,234	-1.49	1,120,242	924,147	-0.81
49	1,410,172	1,966,791	-26,147	-1.31	705,335	984,157	-1.60	704,837	982,634	-1.02

4 Analysis of the Results of the Post Enumeration Survey

The Post-Enumeration Survey (PES) was conducted in December 2000 to evaluate the accuracy of the 2000 Population Census. (See the attachment for detail.) The goal of the PES was to investigate whether and where people had been enumerated in Enumeration Districts, which were selected with a sampling rate of 1 out of 800. The returns were compared with the Census questionnaires to examine how accurately households and people had been enumerated. The sample size was about 60 thousand households (or about 150 thousand persons).

In the PES, the following three questions were asked, in addition to key items (name, sex, year and month of birth, etc.) that are necessary for the comparison with the Census questionnaires: (1) residence on the Census Day, (2) other place of stay on the Census Day, and (3) place of enumeration in the Census (if enumerated in the Census). Using these three items and "Place of enumeration in the PES," the Census and the PES records were compared, and every person surveyed in the PES was classified into one of the following four groups:

- A: Verified in one place (likely to have been correctly enumerated in the Census)
- B: Not verified (likely to have been omitted in the Census. See the note.)
- C: Verified in two or more places (likely to have been doubly enumerated in the Census) :
- D: Impossible to verify due to incomplete entries, etc.

Note: Not all of them in this category were necessarily omitted in the Census. They included, for example, persons whose "place of enumeration in the Census" was incorrectly recorded, and persons with unknown age.

The result shows that 98.9% of persons were "verified in one place," 0.8% were "not verified," and 0.2% were "verified in two or more places."

The PES included not only general Enumeration Districts (EDs) but also "EDs which had social institutions and hospitals having a capacity of about 200 persons or more" (hereafter referred to as "Social Institution /Hospital EDs") and "EDs which had dormitories or boardinghouses where about 50 or more single persons lived" (hereafter referred to as "Dormitory/Boardinghouse EDs"). In Social Institution /Hospital EDs, the proportion of the "not verified" was very high at 3.8%. One of the reasons was because there was respondents' lack of understanding on how they should record the long-term inpatients on the census form. The proportion of the "not verified" was also higher at 1.3% in Dormitory/Boardinghouse EDs than in general EDs. Here, the proportion of the "verified in two or more places" was also high at 0.8% as they were likely to have been enumerated at their parents' home as well.

Note: There are other Census EDs including "Mountains, Forests and Wastes Districts", "Factory/School Districts", "Reformatory Institution Districts", "Self-Defense Forces Districts", "US Forces Districts", and "Water Surface EDs" but they were defined as out of scope in the PES.

Moreover, among those who answered that they had not been enumerated, the "not verified" proportion is as high as 25.4 %, but even among those who answered that they had been enumerated, the "not verified" proportion is 0.3 % (Table 5).

Table 5 Verification of the Post Enumeration Survey and the Population Census by Type of ED and by Whether Enumerated in the Census or Not

	No. of persons in comparison	Verified in one place	Not verified	Verified in two or more places	Impossible to verify
		%	%	%	%
Total	152,367	98.89	0.80	0.17	0.14
Ordinary EDs	148,865	98.93	0.77	0.17	0.13
Social Institution /Hospital EDs	1,850	95.78	3.78	0.32	0.11
Dormitory/ Boardinghouse EDs	1,652	96.07	1.33	0.79	1.82
Enumerated	147,575	99.45	0.34	0.17	0.04
Don't know whether enumerate or not	728	83.06	14.29	1.07	1.58
Not enumerated	2,266	72.64	25.36	0.27	1.73

By age, the proportion of the "not verified" is as high as 1.6 % in the 20-29 age group, which signifies the degree of difficulty in census enumeration of this age group. (In this age group, the proportion of the "verified in two or more places" is also high.) Furthermore, the "85 and over" age group also has high proportions of "not verified" and "verified in two or more places." This group is likely to include many long-term inpatients in hospitals or residents of social institutions (Table 6).

Table 6 Verification of the Post Enumeration Survey and the Population Census by Age Group

	No. of persons	Verified in one place	Not verified	Verified in two or more places	Impossible to verify
Total	152,367	% 98.89	% 0.80	% 0.17	% 0.14
0-4 years old	7,020	98.80	1.03	0.09	0.09
0-year	1,387	98.20	1.51	0.22	0.07
5-9	7,082	99.52	0.38	0.11	0.00
10-14	7,785	99.69	0.24	0.00	0.06
15-19	8,683	98.91	0.89	0.15	0.05
20-24	9,371	97.80	1.64	0.33	0.22
25-29	11,016	97.97	1.60	0.23	0.20
30-34	10,340	98.77	0.94	0.15	0.14
35-44	18,484	99.02	0.71	0.17	0.10
45-54	22,519	99.18	0.65	0.14	0.03
55-64	19,447	99.35	0.45	0.16	0.04
65-74	15,316	99.52	0.37	0.09	0.02
75-84	8,116	98.85	0.80	0.32	0.04
85 years old and over	2,743	97.35	1.83	0.82	0.00

Note: Age denotes the one on the Census Day based on the entry of the year and month of birth in the PES.

5 Conclusion

As shown above, the Population Census, which aims to enumerate all the people, is not 100 % accurate: People around the 20-29 age group included "age-unknown population" and omissions ; Some of newborn babies were omitted; There were people doubly enumerated. The Statistics Bureau of Japan is now in a process of designing the 2005 Population Census, and in doing so, it will take necessary measures to improve the accuracy of the Census based on the findings of causes of errors shown in this paper.

Appendix

Outline of the 2000 Population Census

1. Date and Coverage of the Census

The 2000 Population Census was taken as of 0:00 a.m., 1 October 2000, covering the whole territory of Japan.

2. Investigated Topics

For household members: (1) Name, (2) Sex, (3) Year and month of birth, (4) Relationship to the household head, (5) Marital status, (6) Nationality, (7) Duration of residence at the current residence, (8) Place of residence 5 years ago, (9) Education, (10) Type of activity, (11) Hours of work during the previous week, (12) Name of establishment and kind of business (Industry), (13) Type of work (Occupation), (14) Status in employment, (15) Place of work or location of school, (16) Transportation to the place of work or the location of school.

For households: (1) Type of household, (2) Number of household members, (3) Sources of household income, (4) Type and tenure of dwelling, (5) Floor area of dwelling, (6) Type of building and number of stories.

3. Organization of the Census

The 2000 Population Census was conducted through the following channels:

Statistics Bureau – Prefectures – Municipalities – Supervisors (About 60 thousand)–
–Enumerators(About 830 thousand) – Households.

The enumerators delivered questionnaires to all households in the enumeration district that had been assigned to him/her in advance, and visited the households again to collect the questionnaires on and after the census date.

Outline of the Post Enumeration Survey of the 2000 Population Census

1. Date and Coverage of the Survey

The survey was taken as of 0:00 a.m., 12 December 2000, in the Enumeration Districts sampled at 1/800 from all the Enumeration Districts.

2. Main Topics Investigated

Name, Sex, Year and month of birth, Relationship to the household head, Marital status, Nationality, Residence as of the Census date, Place of stay on the Census date, Whether enumerated in the Census or not, Place of enumeration in the Census, etc.