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MEDS-D Users' Manual

Frank T. Denton
Christine H. Feaver
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QSEP Research Report No. 400

McMaster University
SOCIAL SCIENCES

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October 2005

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M E D S - D

USERS' MANUAL

by

Frank T. Denton, Christine H. Feaver, and Byron G. Spencer

October 2005

MEDS-D is the demographic component of the MEDS (Models of the Economic-Demographic System) simulation/projection system. It is designed for use in projecting the population and labour force of Canada, the provinces and territories for a period of up to 50 years, starting from 2001. Historical values are included back to 1991.

MEDS is maintained on an on-going basis: see http://socserv2.mcmaster.ca/qsep/ for further information.

The **Social Sciences and Humanities Research Council** supports the MEDS project through its funding of the SEDAP Research Program. Additional support has been made available by **Human Resources and Skills Development Canada.**

MEDS-D Users' Manual

Frank T. Denton, Christine H. Feaver, and Byron G. Spencer

Abstract:

This report is the Users' Manual that accompanies MEDS-D, the demographic component of a new Windows-based version of the MEDS (Models of the Economic-Demographic System) software. MEDS-D is designed for projecting the population, labour force, and number of households for Canada as a whole, for each of the provinces, and for the territories. The projections are made year-by-year, and extend as far as 2051.

The time path of projections is determined by assumptions about fertility, mortality, international and interprovincial migration, household formation, labour force participation and unemployment. "Standard", "high growth", and "slow growth" projections are provided. It is easy to explore the implications of alternative assumptions and to input newly available data.

Keywords: population, labour force, projection

JEL Classification: J11, J21

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Introduction

MEDS is an acronym for “Models of the Economic-Demographic System.” MEDS-D, the demographic component of the projection/simulation system, is designed to project the population and labour force by age and sex, and the number of households, for Canada, the provinces and the territories for up to 50 years starting from July 1, 2001. Historical values are included back to 1991. The time path of the projection is determined by assumptions about fertility, mortality, international and interprovincial migration, household formation, labour force participation and unemployment. Standard assumptions are provided; users can change them.

MEDS-D projection or simulation results at the Canada-level can be fed in MEDS-E, the economy model, to obtain projections of GDP and its components.

The program is designed around a main menu screen which is always displayed. Each option on the main menu has a sub-menu; choosing an option from a sub-menu usually will display another input screen. This manual describes the main menu and sub-menu options, showing sample screens where helpful. Appendix A provides the equations of the model. Appendix B provides some historical Canadian data which can be referred to in making assumptions about rates and other values that are required for making projections. Finally, Appendix C contains a selection of population pyramids and tables available from a MEDS-D projection.

Installation

MEDS is supplied in a zipped file for installation on a machine running Windows 98 or higher. Users should first read the file README.TXT on the Setup Disk. To install, insert the Setup Disk in a drive (e.g. A). Copy the file PMEDSZ.ZIP into a temporary directory (e.g. C:\TEMP) and unzip. Run C:\Temp\setup.exe, and follow the instructions on the screen. After installing, double click on the MEDS-D icon to begin the program. The Main Menu screen appears (see next page).

First-time Users

Click **OK** on the Welcome screen, then **About...** to get a quick overview of the program. Then click **Run**, **View Output**, and **Summary Tables** to view tables that show the population projection for Canada based on standard assumptions.

Main Menu Options

Files is used to save current assumptions and output choices for subsequent re-use, to change file names, and to return to default assumptions.
Select Output is used to view or change output selections; summary tables are always provided.
Assumptions is used to view or change assumptions.
Run is used to make a new projection.
View Output is used to display tables from the most recent projection on the screen.

Print is used to send the table file to the printer or to save it in a format for importing into a spreadsheet.
Graphs is used to display selected information graphically on the screen.
About is used to get a quick summary of instructions for using MEDS-D.
Quit is used to exit the program.
Note: Options may be selected either by clicking the mouse or from the Main Menu by typing Alt + the letter that is underlined or from a drop-down menu by typing only the letter that is underlined.

Files Options

Save current assumptions: You may wish to save changes that you have made to the assumptions or to the output selected for easy recall and reuse.

Suggestion: When prompted to choose a file name, use **.ind** as the file extension to identify it as a MEDS-D input demographic file.

Select Input file: You will be prompted to choose a file name. Three files are provided, one with "standard" assumptions (**pmeddstd.ind**), another with assumptions leading to "high" growth (**pmeddhi.ind**), and a third with assumptions leading to "low" growth (**pmeddlow.ind**). The default case is "standard".

Note: You may use only one of these files or another file previously saved by MEDS-D using the **Save current assumptions** option.

Select Revised Population file: You will be prompted to choose a file name. You may use only the default file (**pmeddstd.rp**) or another file created outside of MEDS-D in the same format. The purpose of this option is to allow use of the latest Statistics Canada post-censal estimates of population by single years of age to replace estimates generated by MEDS-D. The default replacement file contains numbers of persons at July 1, 2001 for Canada, the 10 provinces and 2 territories (Yukon Territory is handled separately; North West Territories and Nunavut are treated as a single area designated by the initials NN), separately for males and females, and by single years of age from 0 to 89, and 90+. To use this file, select **Population Adjustments** in the **Assumptions** menu.

Set file name for Tables: By default, the program stores output tables (and also pyramids, if they were selected) in the file **pmedsd.tab**, over-writing this file for each projection run. To save results from multiple runs for later use, supply a unique file name before each run.

Suggestion: Use **.tab** as the file extension to identify it as a MEDS-D output file.

Set file name for Variables for MEDS-E: By default, the program stores data required by MEDS-E in the file **pmedsd.var**, and over-writes this file for each projection run for Canada. To save results from multiple runs for later use, supply a unique file name before each run.

Suggestion: Use the file extension **.var** to identify it for use in MEDS-E.

Set file name for Spreadsheet Data: By default, the program stores data in a format suitable for importing into a spreadsheet in the file **pmeds.prn** and over-writes this file for each projection run. To save results from multiple runs for later use, supply a unique file name before each run.

Suggestion: Use **.prn** as the file extension to identify it as a MEDS-D spreadsheet file.

There are two options; each produces a "delimited" file. If both are selected, both will be available in the same file.

(1) All output tables selected are available in spreadsheet format; after a projection run, select **Print**, **To Spreadsheet File**.
(2) Population by single years of age from 15 to 25; use **Select Output**, **Population Tables**, second option

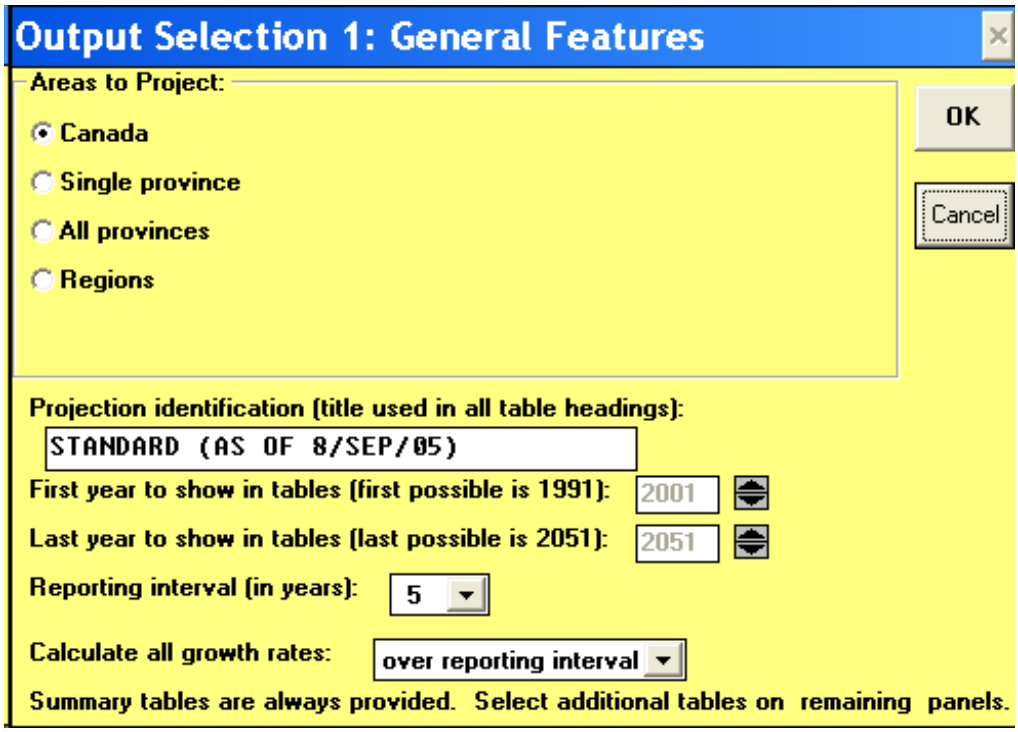
Note: Output option (2) is especially designed for use with the HRDC School Leavers' Model but is of more general interest. It must be selected before a run.

Initialize with Default files: This option will restore all default file names and read in standard assumptions from the default input file, **pmeddstd.ind**. If you have made changes which you wish to save for later use, save them in a file by using the **Save current assumptions** option before using the **Initialize** option.

Select Output Options:

In all cases, when finished with a screen, use the **OK** button to make changes take effect and the **Cancel** button to leave original values unchanged.

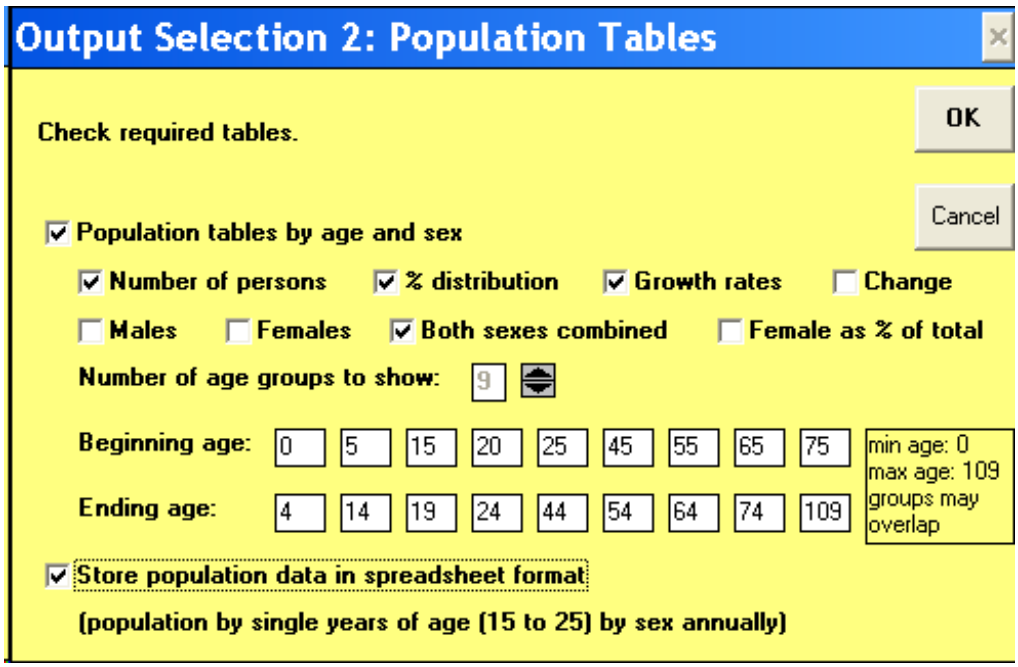
General Features:



- Select area by clicking circles; unselect by clicking again.
- Choose a single area projection (i.e., Canada, a province or a territory), when one area is of interest or when age detail is required. Choose an all provinces or regions projection for area comparisons. Choose a Canada projection to prepare data for use in MEDS-E.

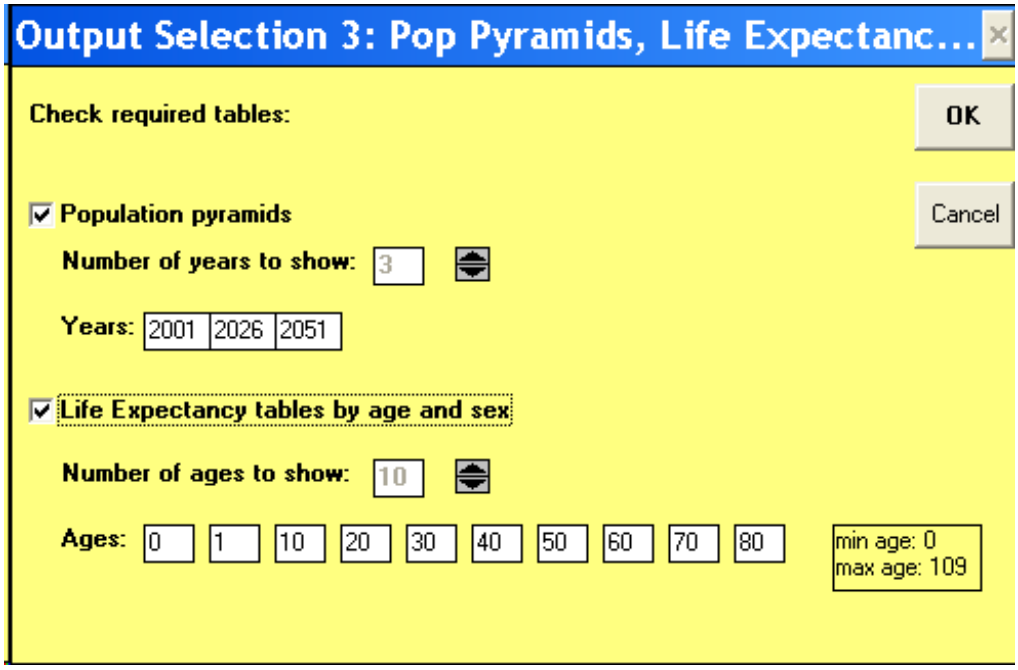
- The population projection from a Canada run differs from that obtained as a sum from an all provinces or regions run, although the results are similar when the default standard assumptions are used.
- The standard six regions are the Atlantic provinces (ATL), Quebec (QUE), Ontario (ONT), the Prairie provinces (PRA), British Columbia (BC), and the territories (NOR). To alter regions, type in new region labels and then drag and drop province labels to match.
- Click on the spin button (the up and down arrowheads) to change the first and last years to be shown in the tables.
- The output can be displayed at 1, 5 or 10 year intervals; reported growth rates may be over the chosen interval or converted to annual averages.

Population Tables:



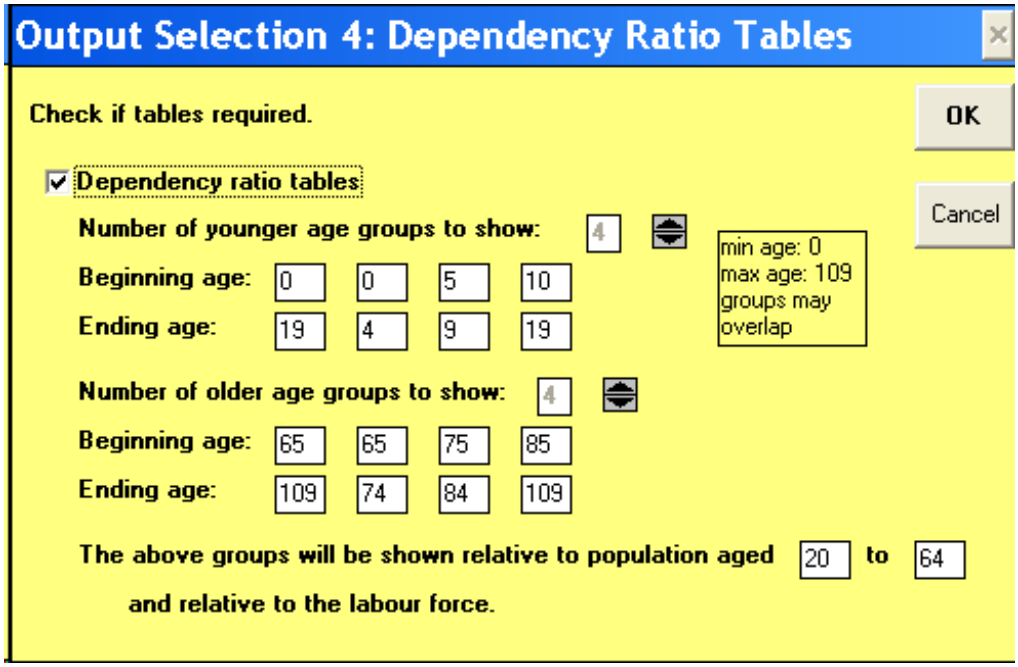
- Select by clicking boxes; unselect by clicking again.
- Click on the spin button to change the number of age groups (max=9).
- Ages may be edited.
- For an all provinces or region run, the population tables are by area rather than age.

Population Pyramids and Life Expectancy Tables:



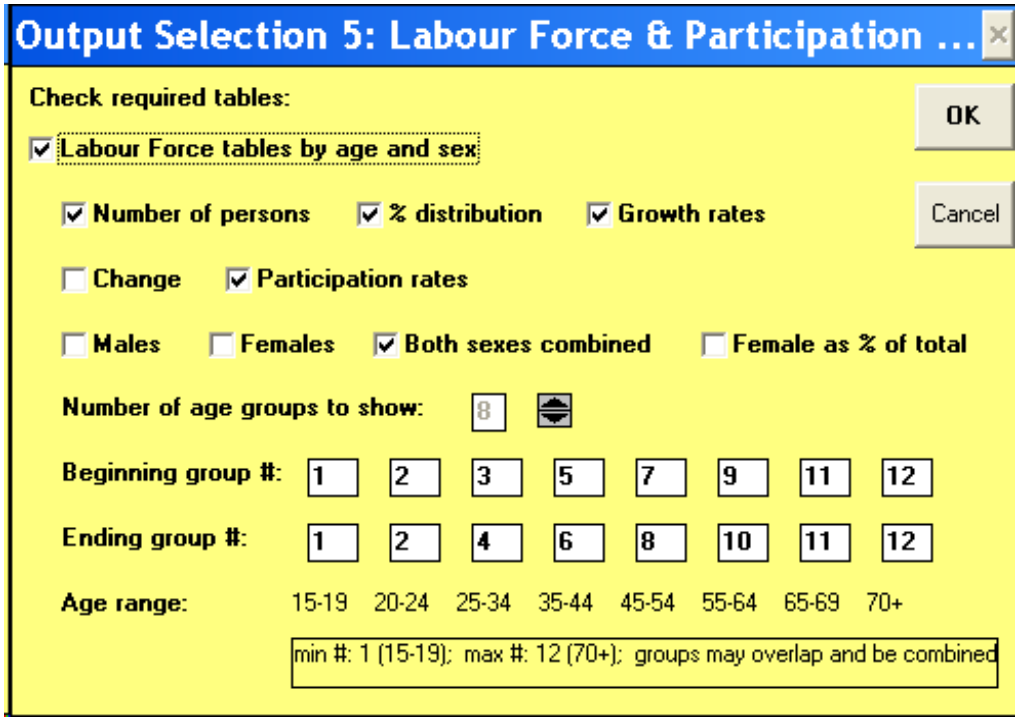
- Select by clicking boxes; unselect by clicking again.
- Click on spin button to change the number of years for population pyramids (max= 11) or ages (max = 10).
- Ages may be edited.
- For an all provinces run, the life expectancy tables are by area at age 0 only.
- Pyramids and life expectancy tables are not available for regions.

Dependency Ratio Tables:



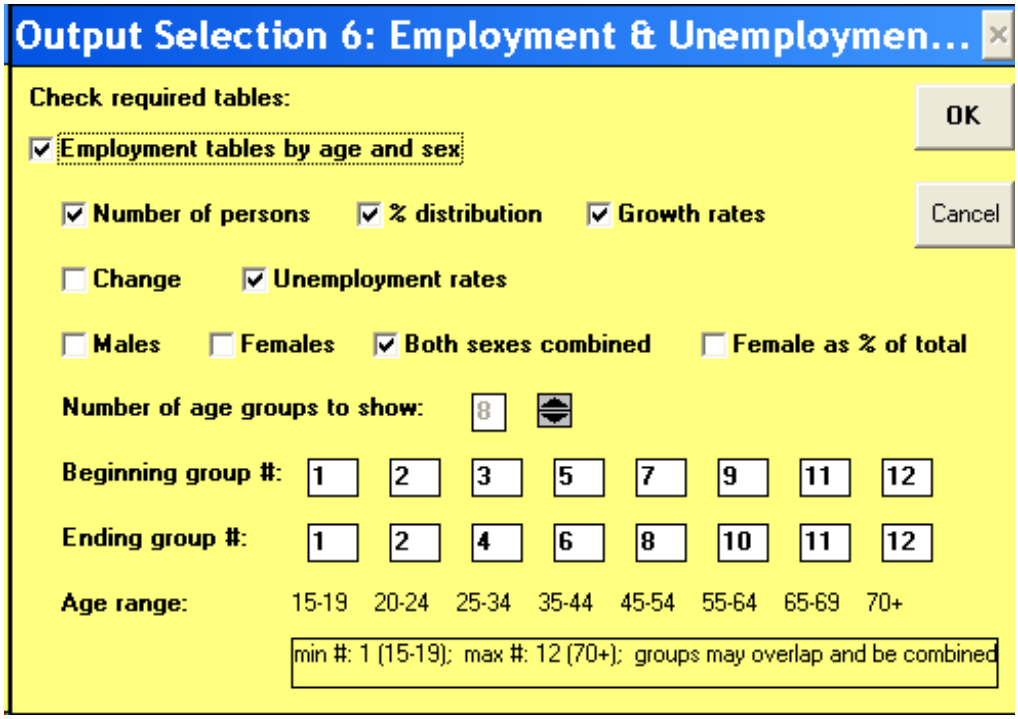
- Select by clicking box; unselect by clicking again.
- Click on spin button to change the number of younger or older age groups (max = 4).
- Ages may be edited.
- For an all provinces or regions run, the dependency ratio tables always show the following population age groups relative to the labour force only: total, <20, 65+, <20 + 65+.

Labour Force and Participation Rate Tables:



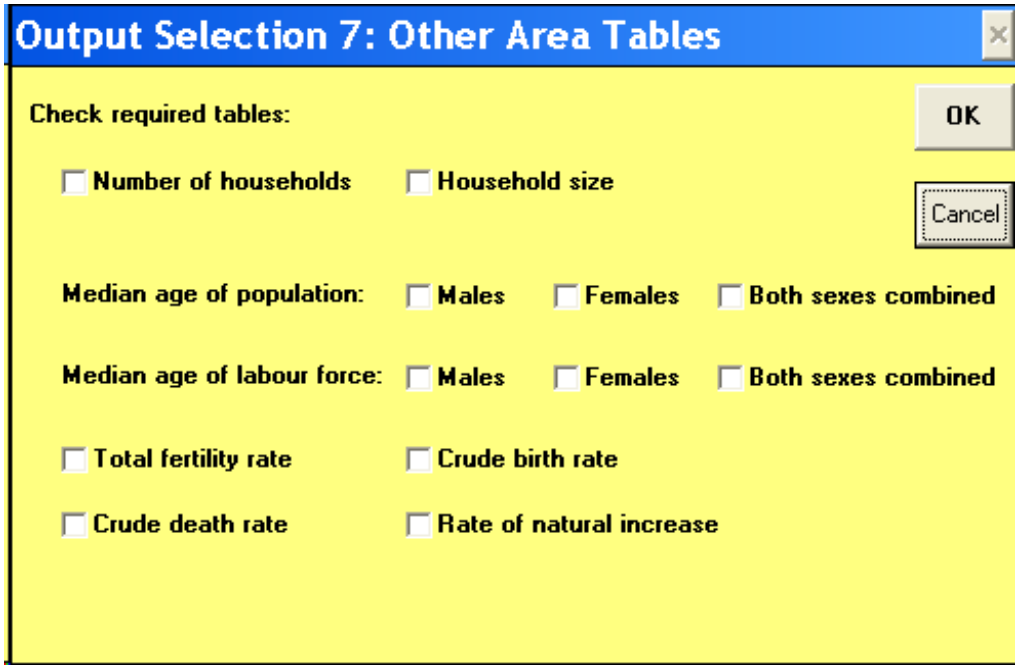
- Select by clicking box; unselect by clicking again.
- Click on spin button to change the number of age groups (max = 8).
- Adjacent age groups may be combined by editing.
- For an all provinces or region run, labour force tables are by area rather than age.

Employment and Unemployment Rate Tables:



- Select by clicking box; unselect by clicking again.
- Click on spin button to change the number of age groups (max = 8).
- Adjacent age groups may be combined by editing.
- For an all provinces or region run, employment tables are by area rather than age.

Other Area Tables:



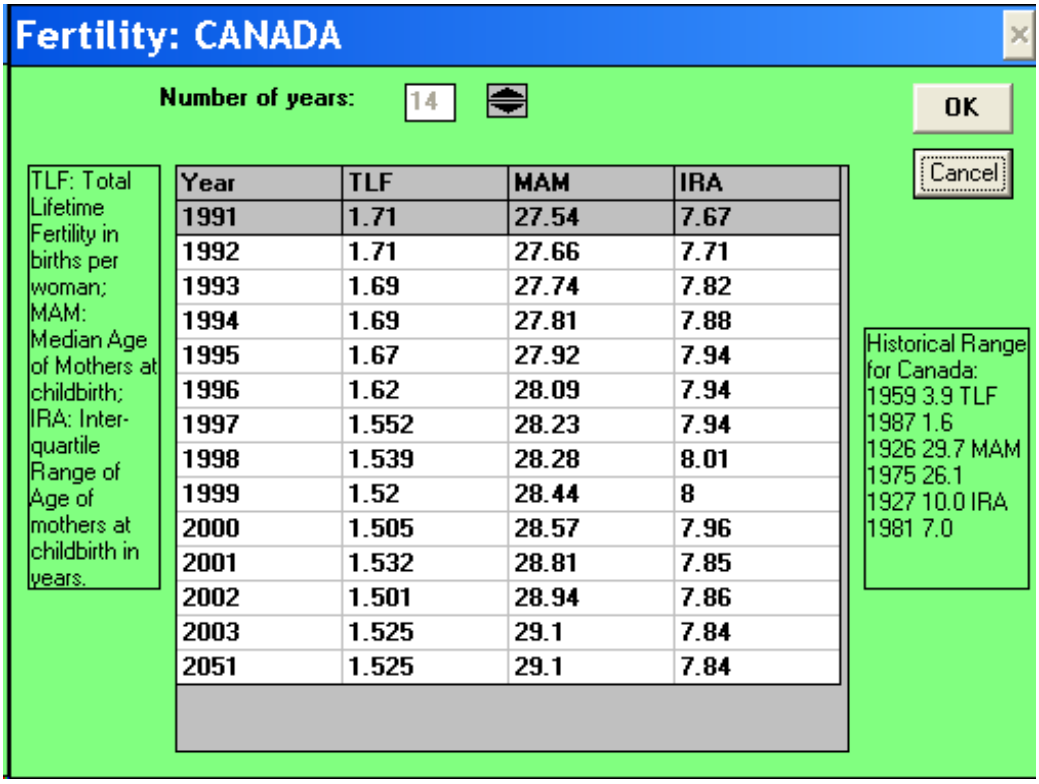
- These tables are available only in a projection for all provinces or regions.
- Select by clicking box; unselect by clicking again.

Assumptions Options

For all screens

- Values on a grey background are fixed; most values on a white background may be changed.
- Click on the spin control (the up and down arrowheads) to increase or decrease the number of years shown on the grid.
- During a projection, MEDS-D generates input values as needed by interpolating linearly between years for which values are specified.
- To change any value in the grid, click on it. Once a box with dotted outline appears, press Enter. Use the delete key to remove unwanted characters before inserting new ones.
- Use the **OK** button to make changes take effect; use **Cancel** to leave original values unchanged.
- For an all provinces or regions projection, use of the **Next Prov** or **Last Prov** button makes changes take effect before changing the display.

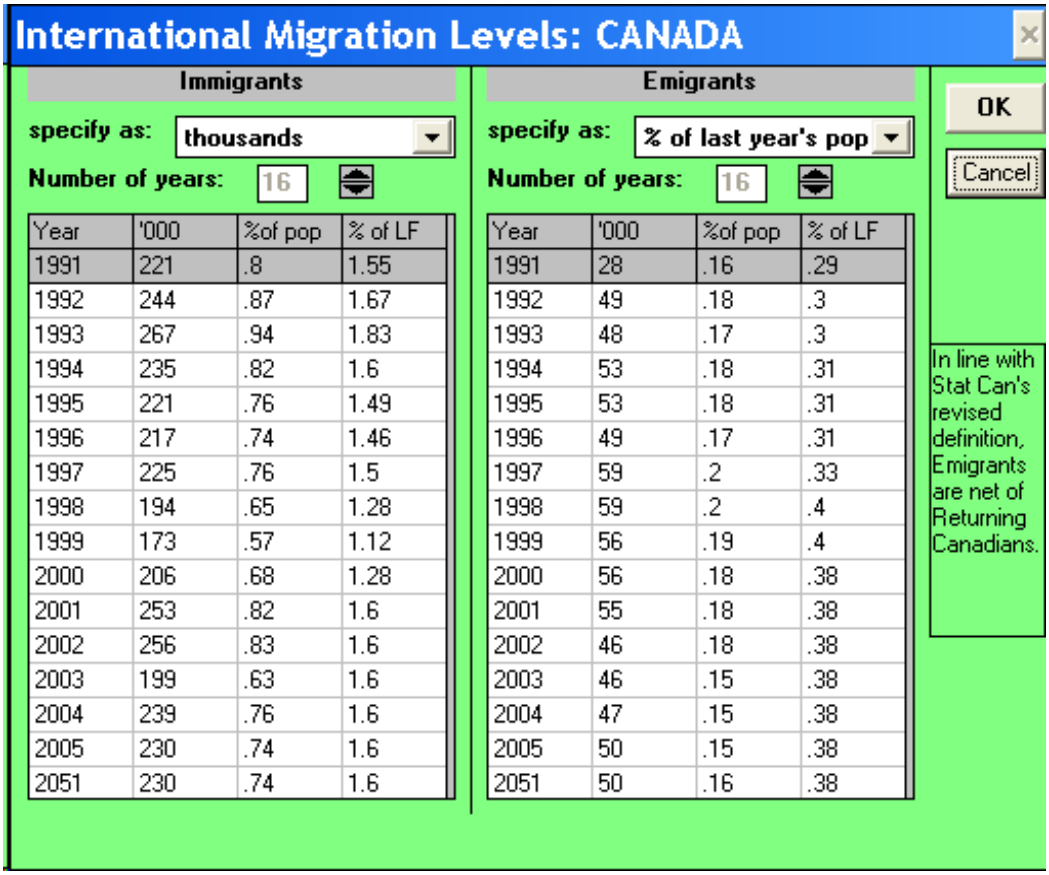
Fertility:



Year	TLF	MAM	IRA
1991	1.71	27.54	7.67
1992	1.71	27.66	7.71
1993	1.69	27.74	7.82
1994	1.69	27.81	7.88
1995	1.67	27.92	7.94
1996	1.62	28.09	7.94
1997	1.552	28.23	7.94
1998	1.539	28.28	8.01
1999	1.52	28.44	8
2000	1.505	28.57	7.96
2001	1.532	28.81	7.85
2002	1.501	28.94	7.86
2003	1.525	29.1	7.84
2051	1.525	29.1	7.84

- Period (as distinct from cohort) fertility schedules are applied; the level of fertility (represented by TLF) has a major influence on the future population.
- The standard assumption maintains the most recent fertility schedule.

International Migration: Levels:



International Migration Levels: CANADA

Immigrants

specify as: thousands

Number of years: 16

Year	'000	%of pop	% of LF
1991	221	.8	1.55
1992	244	.87	1.67
1993	267	.94	1.83
1994	235	.82	1.6
1995	221	.76	1.49
1996	217	.74	1.46
1997	225	.76	1.5
1998	194	.65	1.28
1999	173	.57	1.12
2000	206	.68	1.28
2001	253	.82	1.6
2002	256	.83	1.6
2003	199	.63	1.6
2004	239	.76	1.6
2005	230	.74	1.6
2051	230	.74	1.6

Emigrants

specify as: % of last year's pop

Number of years: 16

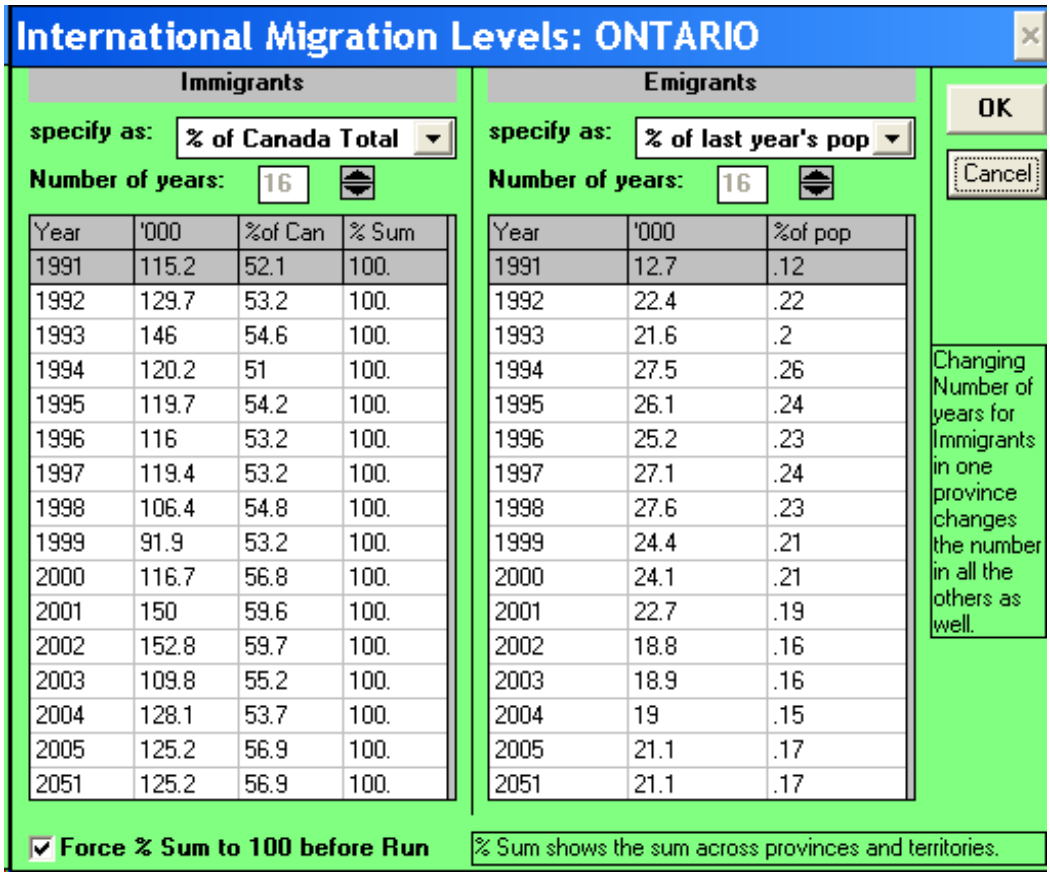
Year	'000	%of pop	% of LF
1991	28	.16	.29
1992	49	.18	.3
1993	48	.17	.3
1994	53	.18	.31
1995	53	.18	.31
1996	49	.17	.31
1997	59	.2	.33
1998	59	.2	.4
1999	56	.19	.4
2000	56	.18	.38
2001	55	.18	.38
2002	46	.18	.38
2003	46	.15	.38
2004	47	.15	.38
2005	50	.15	.38
2051	50	.16	.38

OK

Cancel

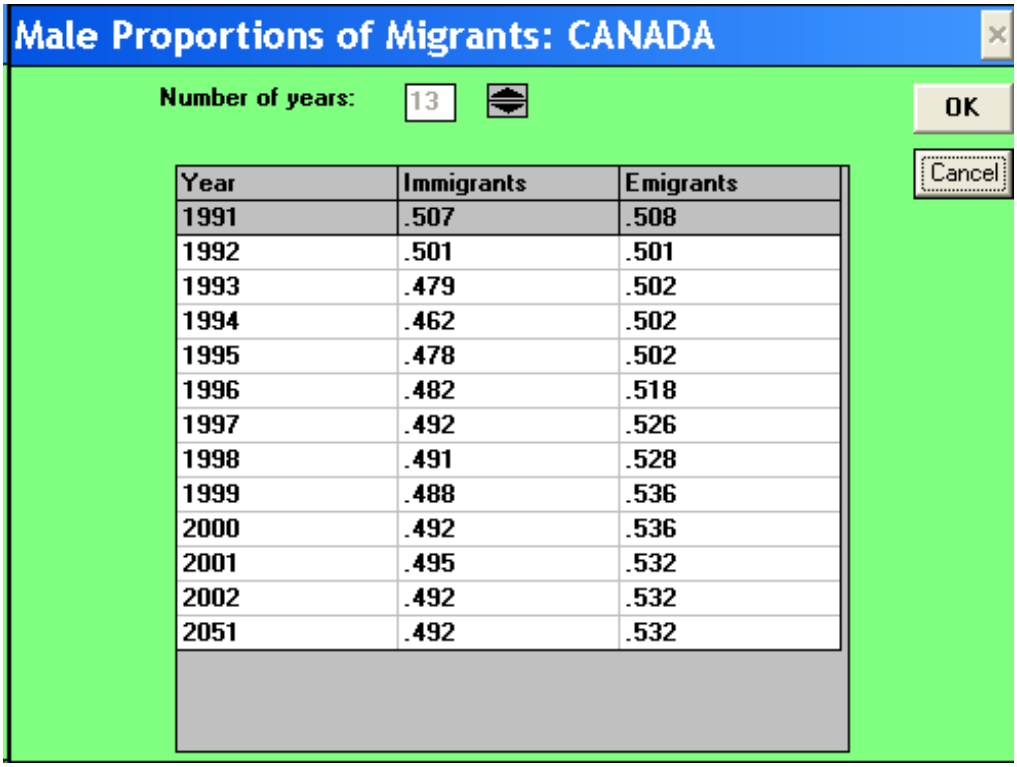
In line with Stat Can's revised definition, Emigrants are net of Returning Canadians.

- Immigration to and emigration from Canada may be specified in thousands or as a percentage of the previous year's population or labour force.
- The standard assumption holds immigration to Canada at 230 thousand per year, in the mid-range of recent policy target levels, and emigration from Canada at its most recent percent of the population of the previous year.



- Ontario is shown for illustration.
- Immigration to a province may be specified in thousands or as a percentage of total immigration to Canada; emigrants from a province may be specified in thousands or as a percentage of the previous year's population.
- The standard assumption holds constant the most recent allocation of new immigrants across provinces.
- Changing the percent going to any one province without offsetting changes elsewhere will result in a total allocation differing from 100 percent; the allocation is forced to 100 percent through a pro-rata adjustment if the box is checked.

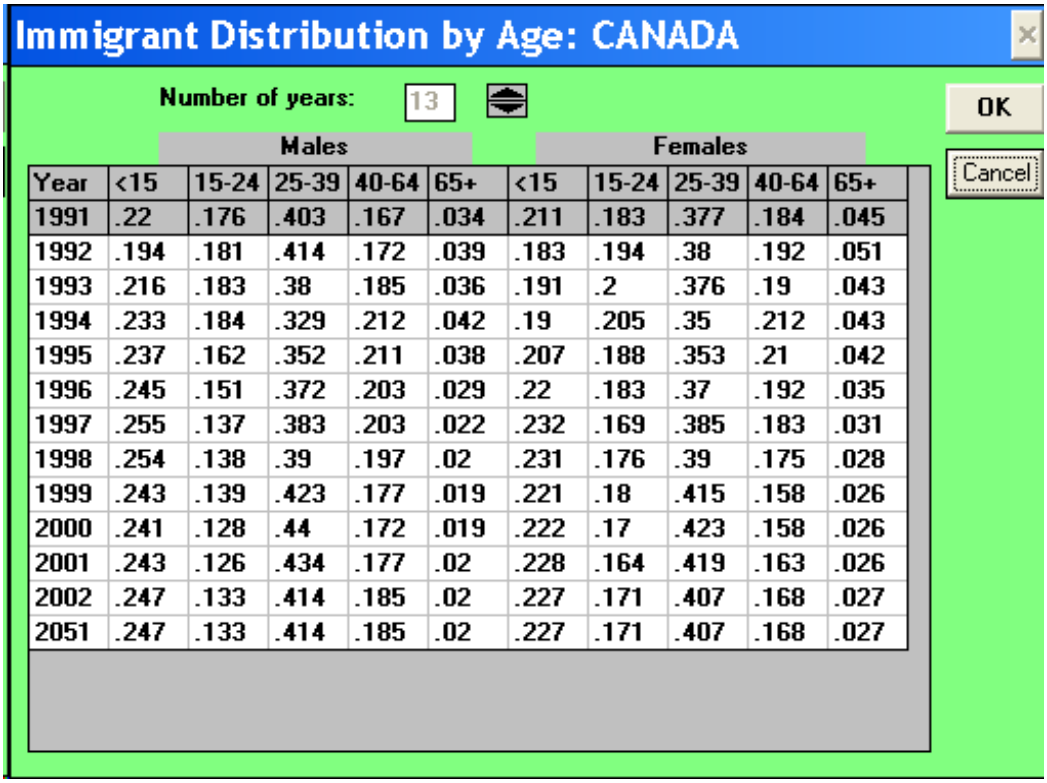
International Migration: Distribution by Sex:



Year	Immigrants	Emigrants
1991	.507	.508
1992	.501	.501
1993	.479	.502
1994	.462	.502
1995	.478	.502
1996	.482	.518
1997	.492	.526
1998	.491	.528
1999	.488	.536
2000	.492	.536
2001	.495	.532
2002	.492	.532
2051	.492	.532

- The standard assumption holds the male (and hence female) proportions of both immigrants and emigrants at their average values calculated over the previous 5 years.

International Migration: Immigrant Distribution by Age:



Immigrant Distribution by Age: CANADA

Number of years: 13

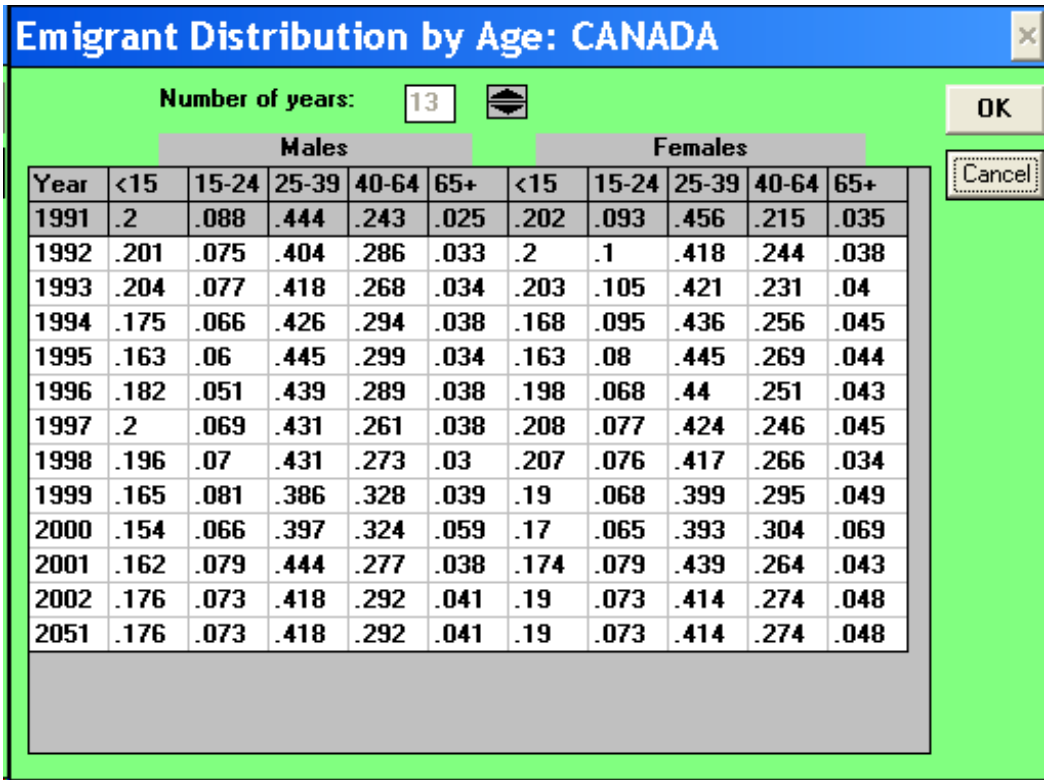
OK

Cancel

	Males					Females				
Year	<15	15-24	25-39	40-64	65+	<15	15-24	25-39	40-64	65+
1991	.22	.176	.403	.167	.034	.211	.183	.377	.184	.045
1992	.194	.181	.414	.172	.039	.183	.194	.38	.192	.051
1993	.216	.183	.38	.185	.036	.191	.2	.376	.19	.043
1994	.233	.184	.329	.212	.042	.19	.205	.35	.212	.043
1995	.237	.162	.352	.211	.038	.207	.188	.353	.21	.042
1996	.245	.151	.372	.203	.029	.22	.183	.37	.192	.035
1997	.255	.137	.383	.203	.022	.232	.169	.385	.183	.031
1998	.254	.138	.39	.197	.02	.231	.176	.39	.175	.028
1999	.243	.139	.423	.177	.019	.221	.18	.415	.158	.026
2000	.241	.128	.44	.172	.019	.222	.17	.423	.158	.026
2001	.243	.126	.434	.177	.02	.228	.164	.419	.163	.026
2002	.247	.133	.414	.185	.02	.227	.171	.407	.168	.027
2051	.247	.133	.414	.185	.02	.227	.171	.407	.168	.027

- The proportion 65+ is calculated residually and so cannot be changed directly.
- The standard assumption holds the age distributions of male and female immigrants at their average values calculated over the previous 5 years.

International Migration: Emigrant Distribution by Age:



Emigrant Distribution by Age: CANADA

Number of years: 13

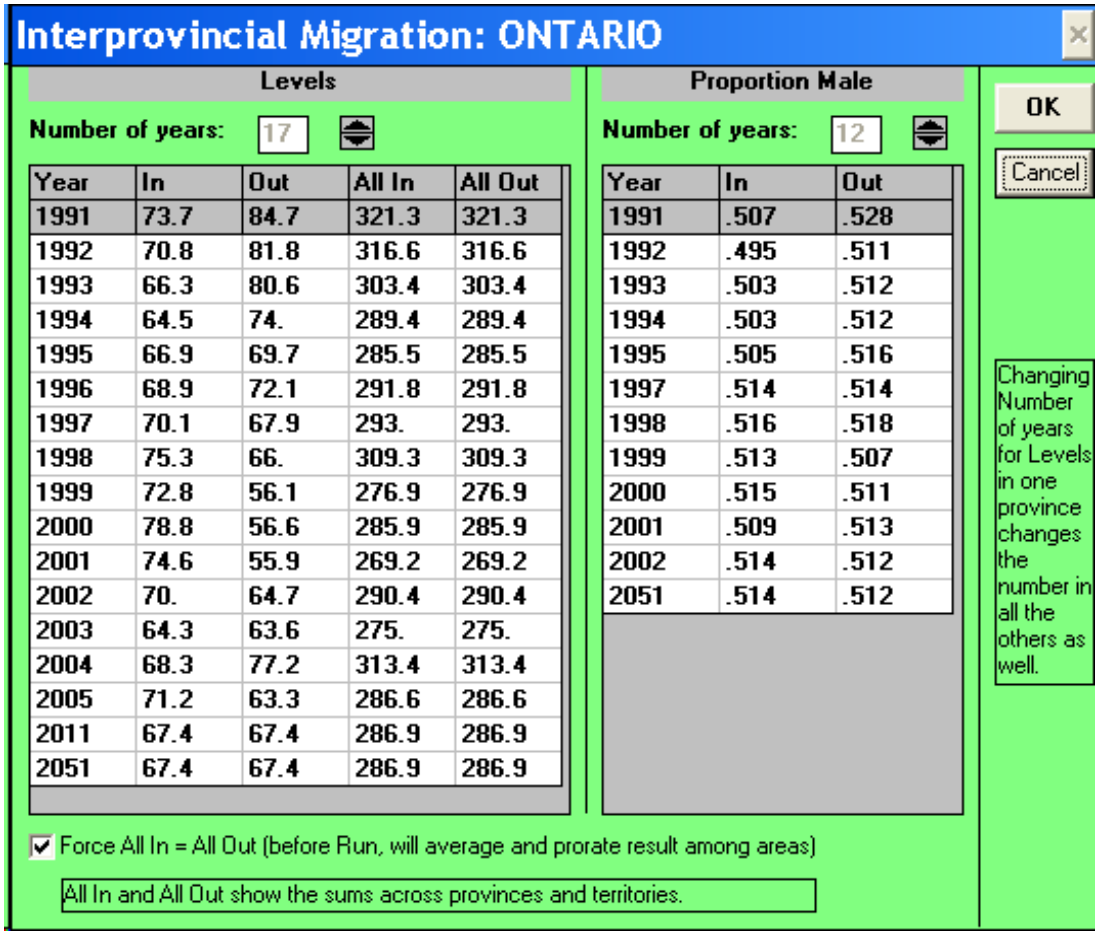
OK

Cancel

	Males					Females				
Year	<15	15-24	25-39	40-64	65+	<15	15-24	25-39	40-64	65+
1991	.2	.088	.444	.243	.025	.202	.093	.456	.215	.035
1992	.201	.075	.404	.286	.033	.2	.1	.418	.244	.038
1993	.204	.077	.418	.268	.034	.203	.105	.421	.231	.04
1994	.175	.066	.426	.294	.038	.168	.095	.436	.256	.045
1995	.163	.06	.445	.299	.034	.163	.08	.445	.269	.044
1996	.182	.051	.439	.289	.038	.198	.068	.44	.251	.043
1997	.2	.069	.431	.261	.038	.208	.077	.424	.246	.045
1998	.196	.07	.431	.273	.03	.207	.076	.417	.266	.034
1999	.165	.081	.386	.328	.039	.19	.068	.399	.295	.049
2000	.154	.066	.397	.324	.059	.17	.065	.393	.304	.069
2001	.162	.079	.444	.277	.038	.174	.079	.439	.264	.043
2002	.176	.073	.418	.292	.041	.19	.073	.414	.274	.048
2051	.176	.073	.418	.292	.041	.19	.073	.414	.274	.048

- The proportion 65+ is calculated residually and so cannot be changed directly.
- The standard assumption holds the age distributions of male and female emigrants at their average values calculated over the previous 5 years.

Interprovincial Migration: Levels and Distribution by Sex:



Interprovincial Migration: ONTARIO

Levels

Number of years: 17

Year	In	Out	All In	All Out
1991	73.7	84.7	321.3	321.3
1992	70.8	81.8	316.6	316.6
1993	66.3	80.6	303.4	303.4
1994	64.5	74.	289.4	289.4
1995	66.9	69.7	285.5	285.5
1996	68.9	72.1	291.8	291.8
1997	70.1	67.9	293.	293.
1998	75.3	66.	309.3	309.3
1999	72.8	56.1	276.9	276.9
2000	78.8	56.6	285.9	285.9
2001	74.6	55.9	269.2	269.2
2002	70.	64.7	290.4	290.4
2003	64.3	63.6	275.	275.
2004	68.3	77.2	313.4	313.4
2005	71.2	63.3	286.6	286.6
2011	67.4	67.4	286.9	286.9
2051	67.4	67.4	286.9	286.9

Proportion Male

Number of years: 12

Year	In	Out
1991	.507	.528
1992	.495	.511
1993	.503	.512
1994	.503	.512
1995	.505	.516
1997	.514	.514
1998	.516	.518
1999	.513	.507
2000	.515	.511
2001	.509	.513
2002	.514	.512
2051	.514	.512

OK

Cancel

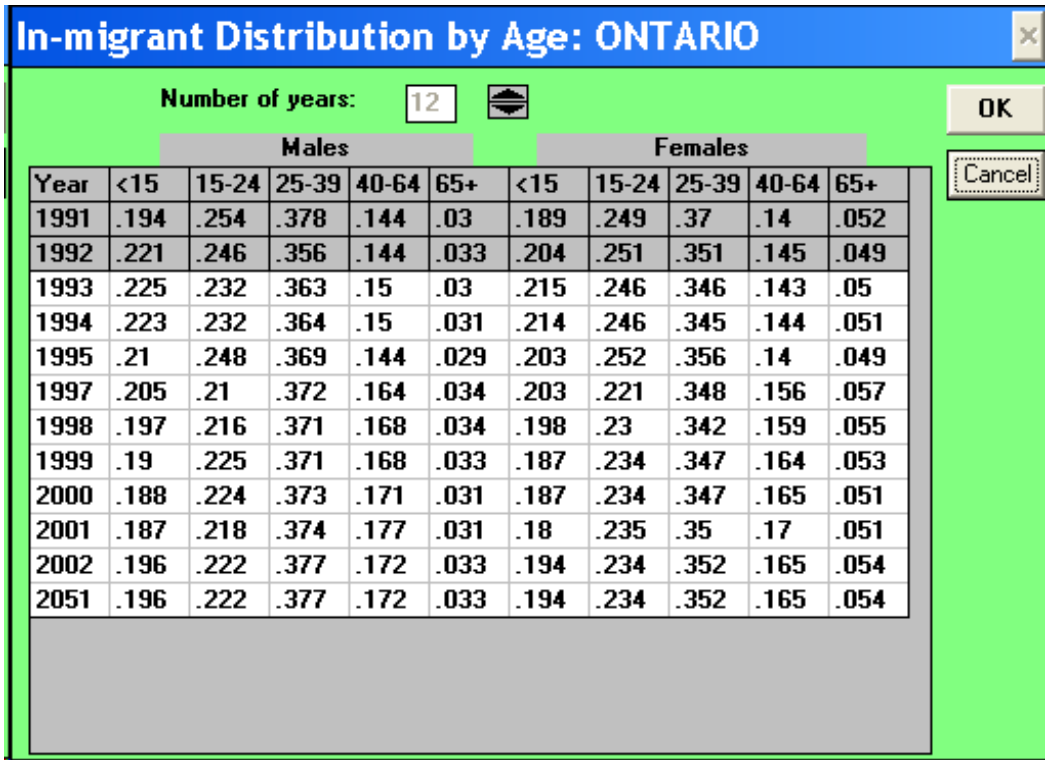
Changing Number of years for Levels in one province changes the number in all the others as well.

Force All In = All Out (before Run, will average and prorate result among areas)

All In and All Out show the sums across provinces and territories.

- The latest actual numbers moving into and out of each province relate to the year ending June 30, 2004; the 2005 figures are averages of the previous five-year period; flows in and out are assumed to reach equality by 2011 and to remain at that level for the remainder of the projection.
- Changing the number flowing into/out of one province or territory without offsetting changes elsewhere will result in a difference between the total “ins” and “outs”; these two flows are forced to be equal if the box is checked.

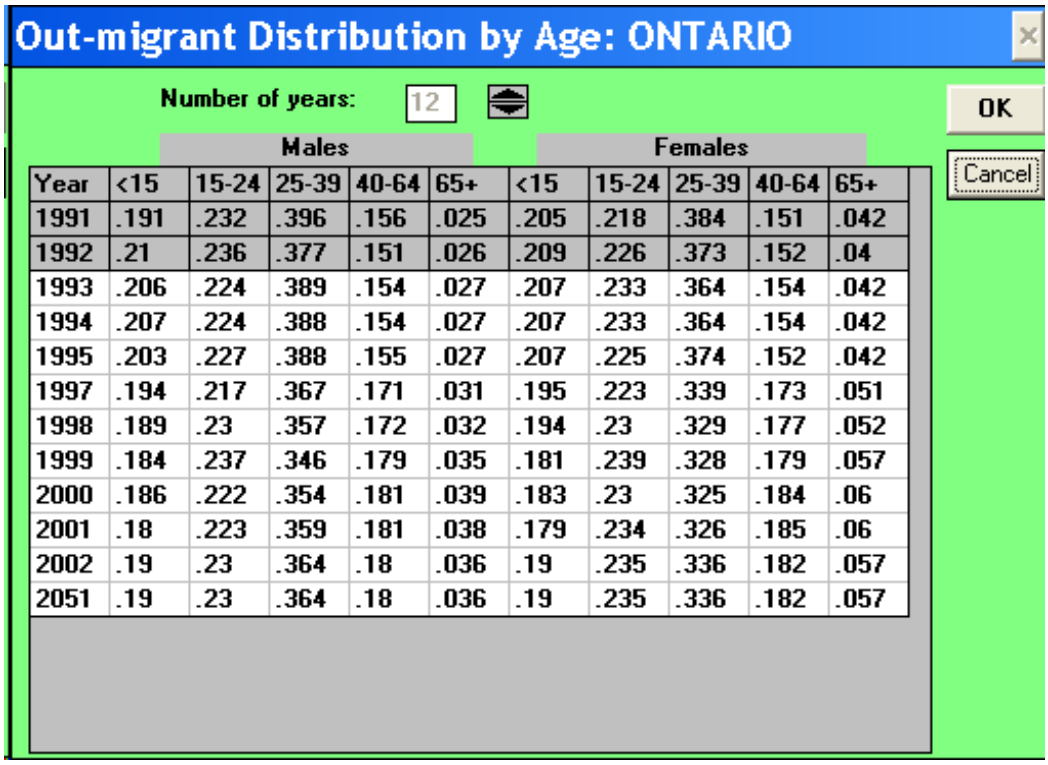
Interprovincial Migration: In Distribution by Age:



Year	<15	15-24	25-39	40-64	65+	<15	15-24	25-39	40-64	65+
1991	.194	.254	.378	.144	.03	.189	.249	.37	.14	.052
1992	.221	.246	.356	.144	.033	.204	.251	.351	.145	.049
1993	.225	.232	.363	.15	.03	.215	.246	.346	.143	.05
1994	.223	.232	.364	.15	.031	.214	.246	.345	.144	.051
1995	.21	.248	.369	.144	.029	.203	.252	.356	.14	.049
1997	.205	.21	.372	.164	.034	.203	.221	.348	.156	.057
1998	.197	.216	.371	.168	.034	.198	.23	.342	.159	.055
1999	.19	.225	.371	.168	.033	.187	.234	.347	.164	.053
2000	.188	.224	.373	.171	.031	.187	.234	.347	.165	.051
2001	.187	.218	.374	.177	.031	.18	.235	.35	.17	.051
2002	.196	.222	.377	.172	.033	.194	.234	.352	.165	.054
2051	.196	.222	.377	.172	.033	.194	.234	.352	.165	.054

- The proportion 65+ is calculated residually and so cannot be changed directly.
- The standard assumption holds the distributions of male and female in-migrants for each province and territory at their average values calculated over the previous 5 years.

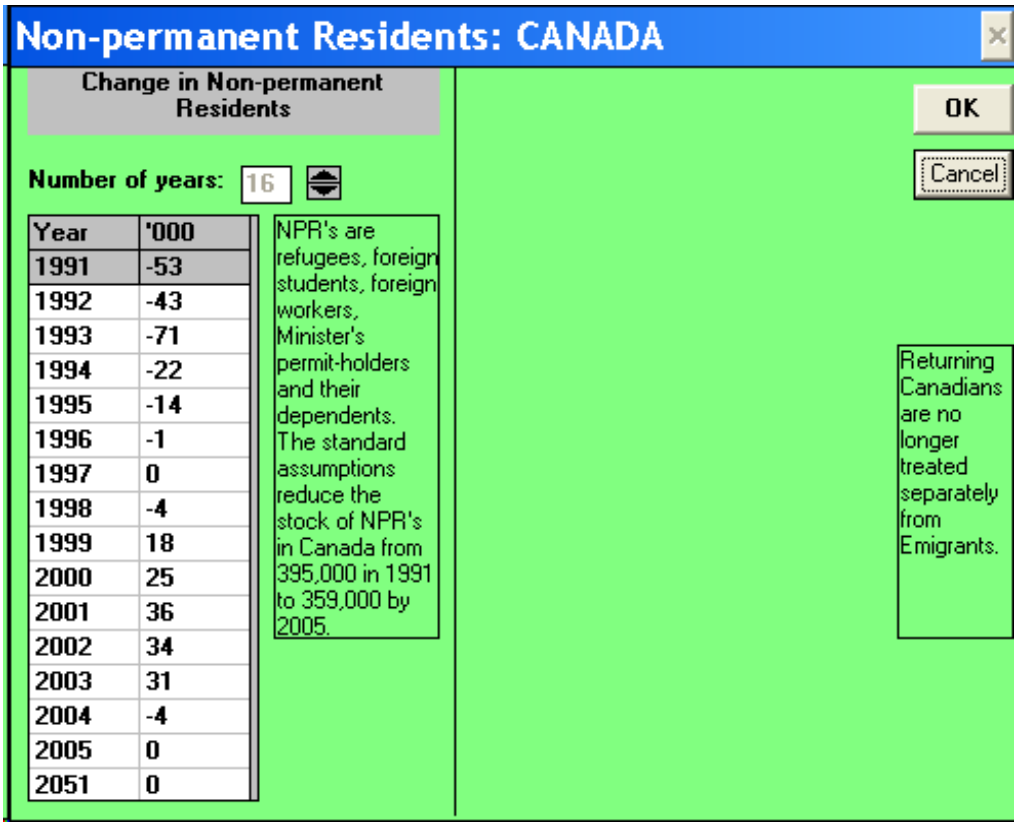
Interprovincial Migration: Out Distribution by Age:



	Males					Females				
Year	<15	15-24	25-39	40-64	65+	<15	15-24	25-39	40-64	65+
1991	.191	.232	.396	.156	.025	.205	.218	.384	.151	.042
1992	.21	.236	.377	.151	.026	.209	.226	.373	.152	.04
1993	.206	.224	.389	.154	.027	.207	.233	.364	.154	.042
1994	.207	.224	.388	.154	.027	.207	.233	.364	.154	.042
1995	.203	.227	.388	.155	.027	.207	.225	.374	.152	.042
1997	.194	.217	.367	.171	.031	.195	.223	.339	.173	.051
1998	.189	.23	.357	.172	.032	.194	.23	.329	.177	.052
1999	.184	.237	.346	.179	.035	.181	.239	.328	.179	.057
2000	.186	.222	.354	.181	.039	.183	.23	.325	.184	.06
2001	.18	.223	.359	.181	.038	.179	.234	.326	.185	.06
2002	.19	.23	.364	.18	.036	.19	.235	.336	.182	.057
2051	.19	.23	.364	.18	.036	.19	.235	.336	.182	.057

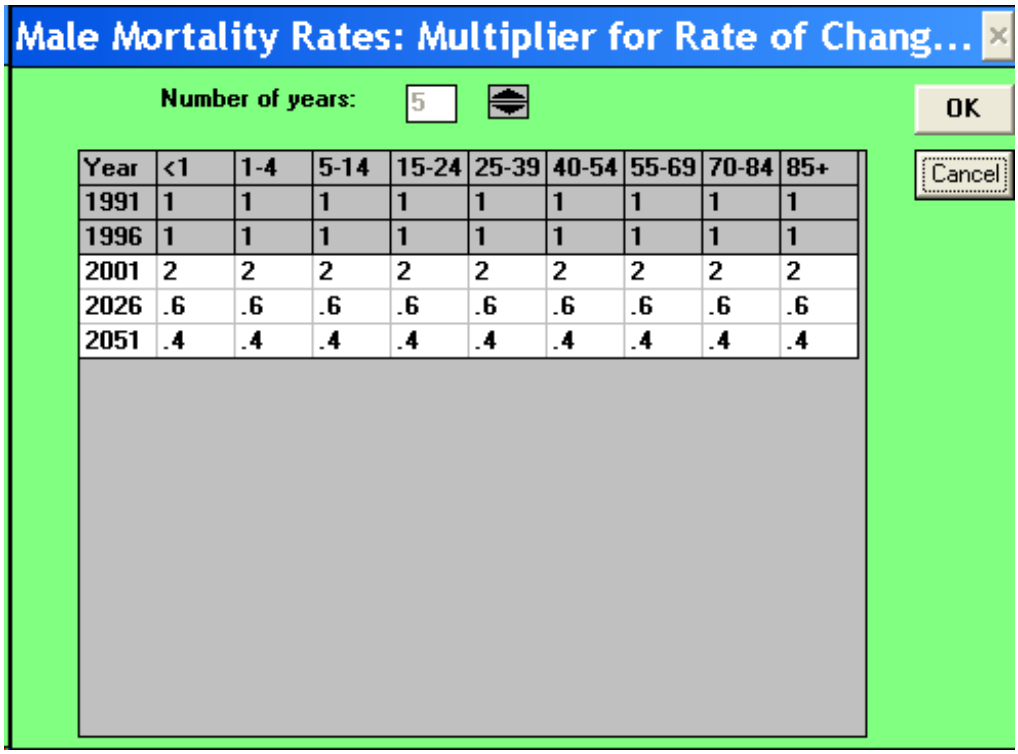
- The proportion 65+ is calculated residually and so cannot be changed directly.
- The standard assumption holds the distribution of male and female out-migrants for each province and territory at their average values calculated over the previous 5 years.

Non-permanent Residents:



- The standard assumption for non-permanent residents assumes no change in the stock after 2005.

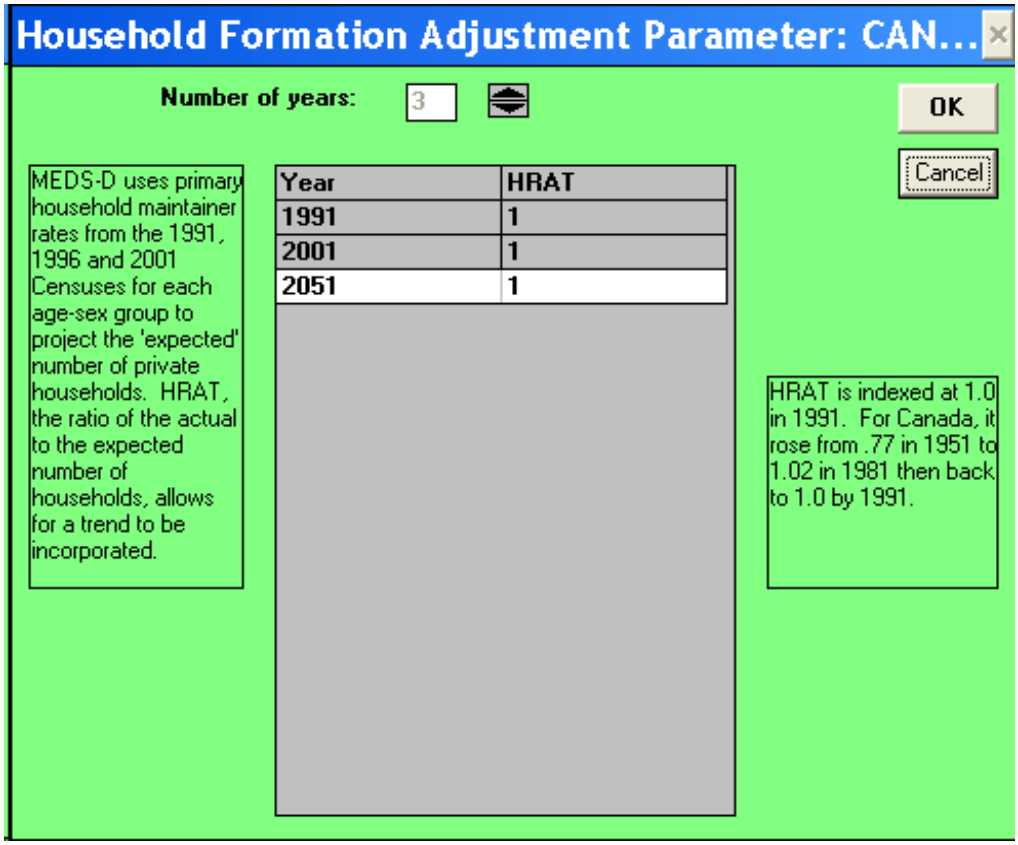
Mortality: Males, Females:



Year	<1	1-4	5-14	15-24	25-39	40-54	55-69	70-84	85+
1991	1	1	1	1	1	1	1	1	1
1996	1	1	1	1	1	1	1	1	1
2001	2	2	2	2	2	2	2	2	2
2026	.6	.6	.6	.6	.6	.6	.6	.6	.6
2051	.4	.4	.4	.4	.4	.4	.4	.4	.4

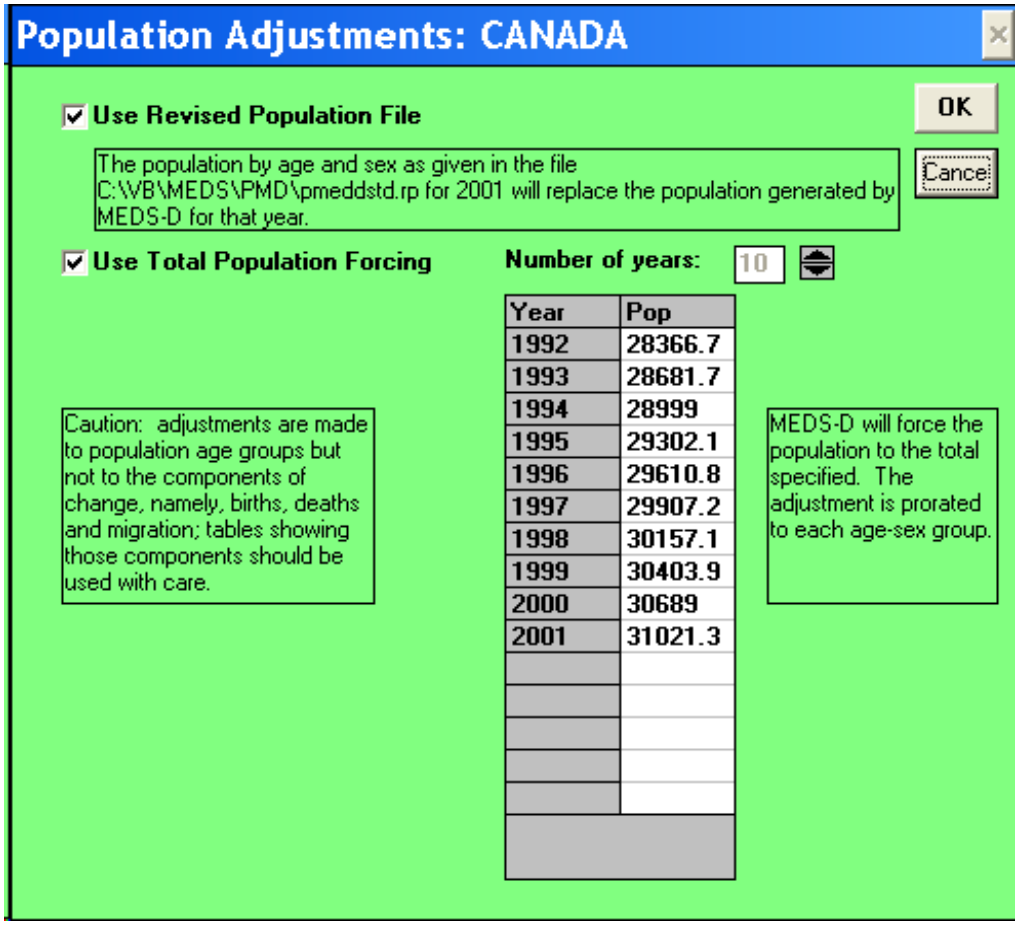
- MEDS-D starts with single year age-sex-specific mortality rates derived from Statistics Canada 1991 and 1996 life tables.
- These mortality rates are projected to change annually at the average rates of change calculated over the period 1971-96 adjusted by a multiplier (k) as given in the above table. The value of k in 1996 is fixed at 1.
- Setting k=1 in the next selected year of the projection would result in a continuation of recent rates of change until that year for each age in the indicated range; setting k=0.25 in the next selected year would result in reducing the rates of change to one quarter of their initial values by that year; setting k=0 in 2002 and in the end year would mean that 2001 mortality rates would apply throughout the projection period.
- For Canada, the standard assumptions for k imply an increase in life expectancy for males from 74.6 years in 1991 to 82.8 by 2051 and for females from 80.9 years in 1991 to 86.1 by 2051.

Household Formation:



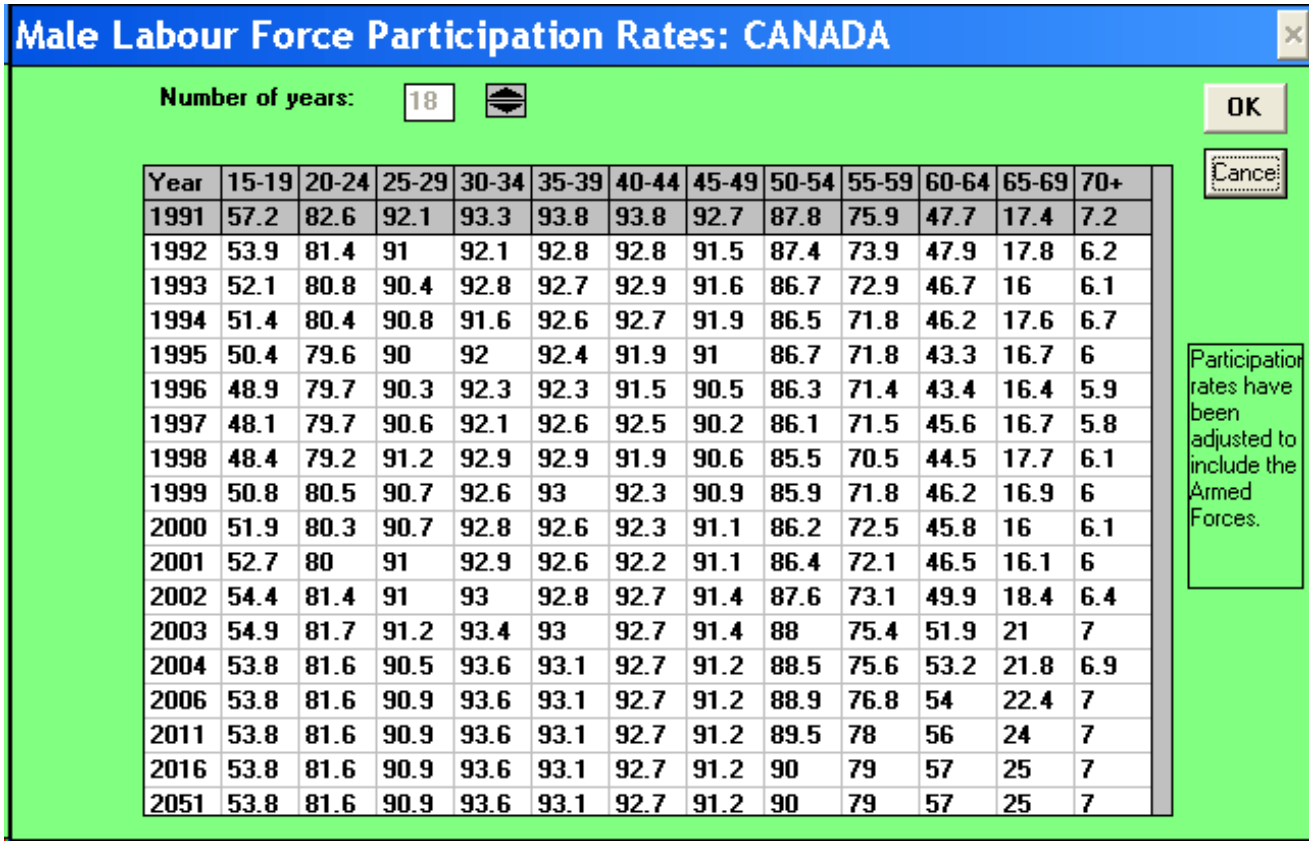
- By holding HRAT at 1 the standard assumption assumes no changes in age-sex group primary household maintainer rates after 2001.

Population Adjustments:



- As described above, a revised population file can be used to impose on the projection the latest Statistics Canada post-censal estimates of population by single years of age (see **Select Revised Population file**, above, for details).
- Also, MEDS-D can force population totals to specified values for a maximum of fifteen years (1992 to 2006), in order to reflect the latest available estimates. The estimates included with the program reflect the 2001 Census.
- If both Population Adjustment options are chosen MEDS-D will, for the year specified, combine the age distribution implicit in the Revised Population File with the population total as indicated. This is the standard assumption.

Labour Force Participation Rates: Males, Females:



Male Labour Force Participation Rates: CANADA

Number of years: 18

OK

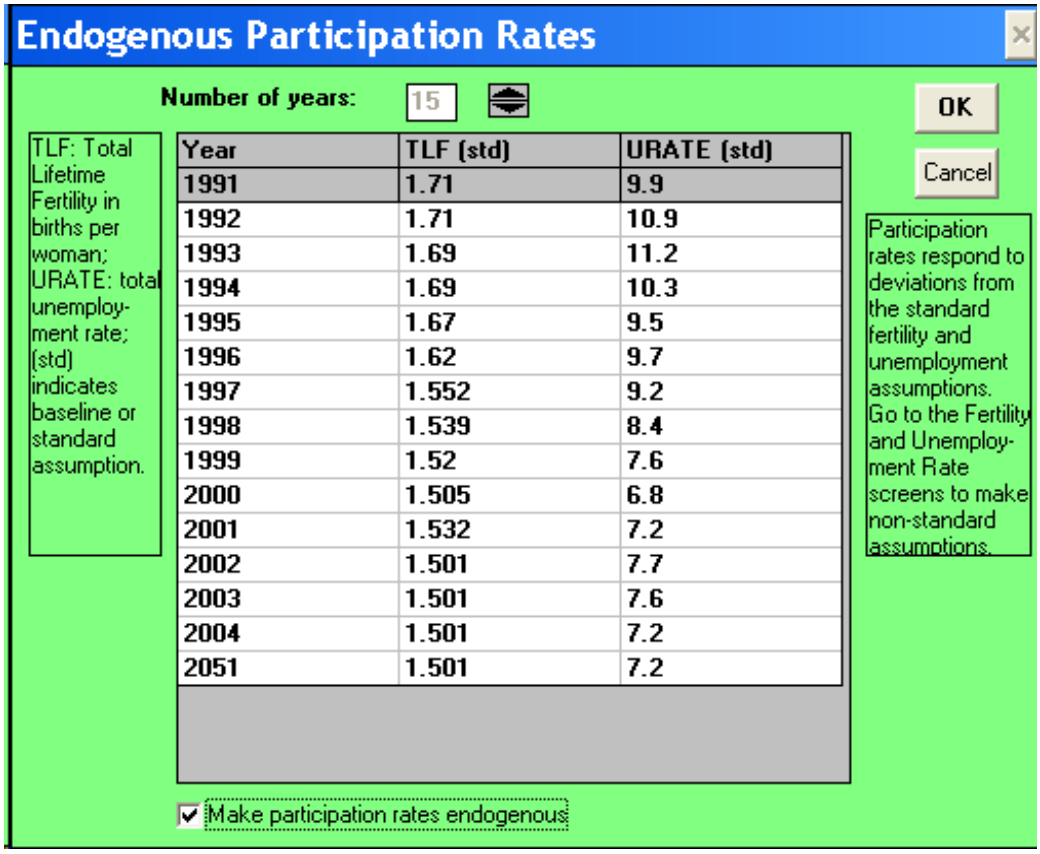
Cancel

Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+
1991	57.2	82.6	92.1	93.3	93.8	93.8	92.7	87.8	75.9	47.7	17.4	7.2
1992	53.9	81.4	91	92.1	92.8	92.8	91.5	87.4	73.9	47.9	17.8	6.2
1993	52.1	80.8	90.4	92.8	92.7	92.9	91.6	86.7	72.9	46.7	16	6.1
1994	51.4	80.4	90.8	91.6	92.6	92.7	91.9	86.5	71.8	46.2	17.6	6.7
1995	50.4	79.6	90	92	92.4	91.9	91	86.7	71.8	43.3	16.7	6
1996	48.9	79.7	90.3	92.3	92.3	91.5	90.5	86.3	71.4	43.4	16.4	5.9
1997	48.1	79.7	90.6	92.1	92.6	92.5	90.2	86.1	71.5	45.6	16.7	5.8
1998	48.4	79.2	91.2	92.9	92.9	91.9	90.6	85.5	70.5	44.5	17.7	6.1
1999	50.8	80.5	90.7	92.6	93	92.3	90.9	85.9	71.8	46.2	16.9	6
2000	51.9	80.3	90.7	92.8	92.6	92.3	91.1	86.2	72.5	45.8	16	6.1
2001	52.7	80	91	92.9	92.6	92.2	91.1	86.4	72.1	46.5	16.1	6
2002	54.4	81.4	91	93	92.8	92.7	91.4	87.6	73.1	49.9	18.4	6.4
2003	54.9	81.7	91.2	93.4	93	92.7	91.4	88	75.4	51.9	21	7
2004	53.8	81.6	90.5	93.6	93.1	92.7	91.2	88.5	75.6	53.2	21.8	6.9
2006	53.8	81.6	90.9	93.6	93.1	92.7	91.2	88.9	76.8	54	22.4	7
2011	53.8	81.6	90.9	93.6	93.1	92.7	91.2	89.5	78	56	24	7
2016	53.8	81.6	90.9	93.6	93.1	92.7	91.2	90	79	57	25	7
2051	53.8	81.6	90.9	93.6	93.1	92.7	91.2	90	79	57	25	7

Participation rates have been adjusted to include the Armed Forces.

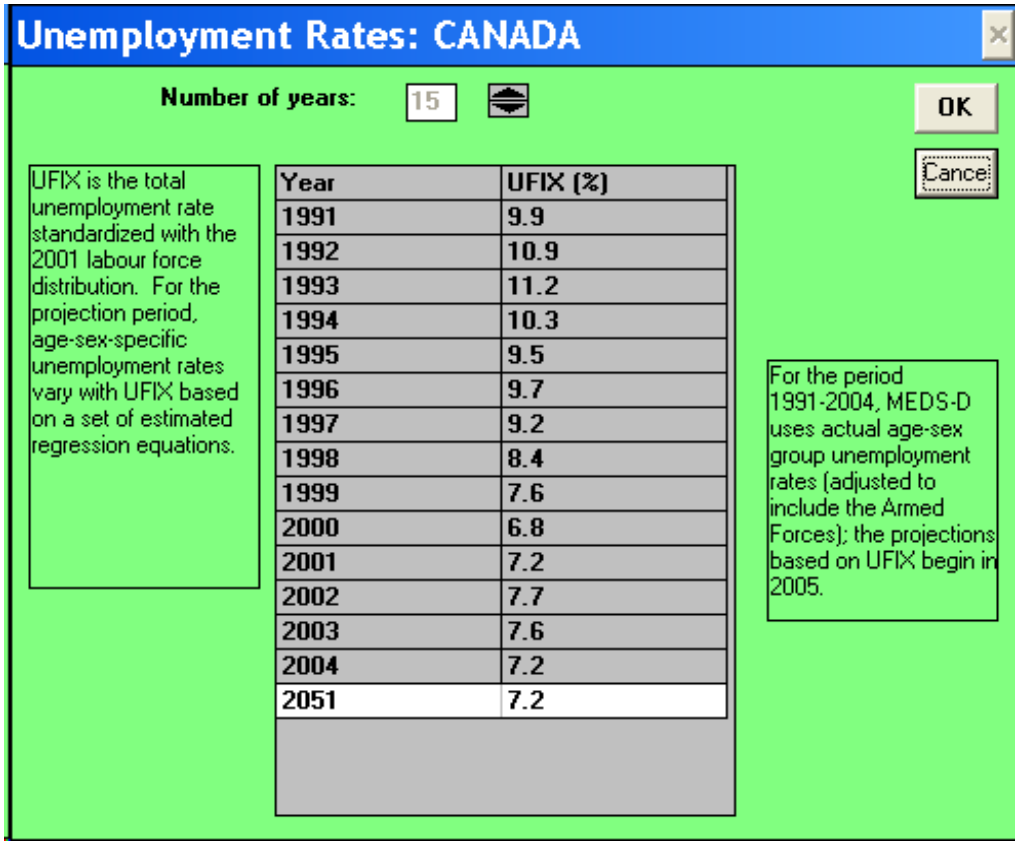
- The standard assumption has participation rates for each age-sex group change until 2016, continuing recent trends; rates are held constant after 2016.
- Note that the rates have been adjusted to include members of the Armed Forces.

Labour Force Participation Rates: Endogeneity



- This option is available at the Canada level only. The standard assumption is that participation rates are not endogenous.

Unemployment Rates:

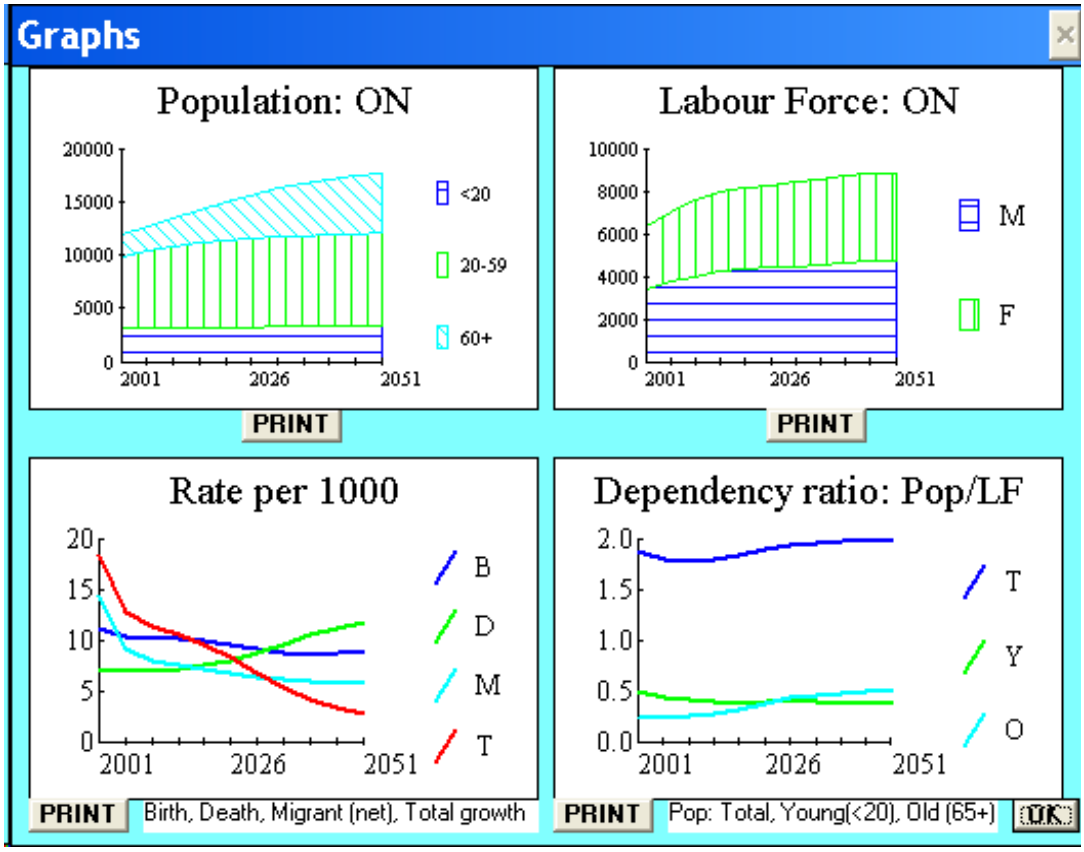


- The standard assumption involves little change in UFIX, the overall standardized unemployment rate.

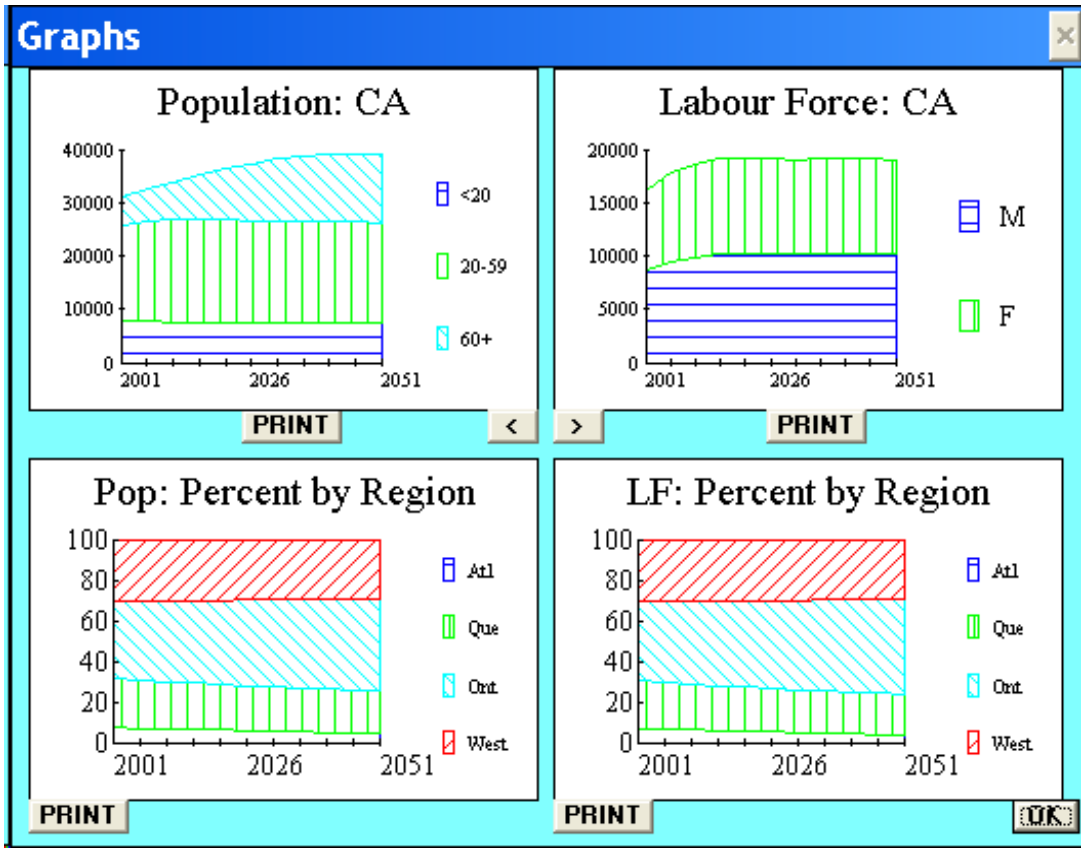
View Output Options**:**

- Four **Summary Tables** are provided with a single area projection and two with an all province or region projection. Other tables that were selected before running the projection are also available for viewing on screen.
- If the set of tables selected for viewing is sufficiently large, a **More** button will appear on the screen. Click this button to view the remaining tables.

Graphs Options:



- With a single area projection, graphs similar to the above are available on screen and may be printed one graph at a time. The first graph shows the total population by age group (<20, 20-59, and 60+). The second graph shows the total labour force by sex. The third graph shows the Birth rate, the Death rate, the net Migration rate, and the Total growth rate (i.e., the sum of the first three rates). The fourth graph shows dependency ratios for three population groups relative to the total labour force. The population groups are Total, Young (<20), and Old (65+).



- For an “all areas” projection, the bottom two graphs show the percentage distribution of the total Canadian population and labour force in the following four regions: Atlantic (NF, PE, NS, NB), Quebec, Ontario, and West (MA, SA, AL, BC, YU, NW).
- Use the > or < button to display graphs for the next or previous area. For the provinces, the display on the bottom two graphs will be the rate graphs as shown in the previous screen.

Alternative Input Files:

To provide for a range of projections with MEDS-D, two alternative input files are supplied in addition to the standard one.

In the first file, **pmeddhi.ind**, assumptions of higher fertility and immigration are combined with assumptions of lower mortality to yield “high” growth. Separate assumptions are provided for Canada and each of the provinces and territories. For Canada as a whole the high growth assumptions result in a population of about 50 million in 2051, or about 27% higher than with the standard assumptions. Underlying the high growth projections: (1) The total fertility rate for Canada is assumed to increase linearly over 10 years to 2.1 by 2013 and the final level for the provinces/territories increases by the same percentage (approximately 38%); (2) Annual immigration into Canada is assumed to be 280 thousand, or 50 thousand higher than in the standard case; assumptions relating to interprovincial migration remain “standard”; (3) Regarding mortality, the multipliers for the rates of change of mortality rates are increased by 40 percentage points from standard values; these

changes result in increases in both male and female life expectancies of about a year and a half by 2051.

In the second file, **pmeddlow.ind**, assumptions of lower fertility and immigration are combined with assumptions of higher mortality to yield “low” growth. Again, separate assumptions are provided for Canada and each of the provinces and territories. For Canada as a whole the low growth assumptions result in a population of about 33 million in 2051, or about 17% lower than with the standard assumptions. Underlying the low growth projections: (1) The total fertility rate for Canada is assumed to decrease linearly over 10 years to attain a level of 1.2 by 2013 while the rates for the provinces/territories decrease by the same percentage (about 21%); (2) Annual immigration into Canada is assumed to be 180 thousand, or 50 thousand lower than in the standard case; assumptions relating to interprovincial migration remain “standard”; (3) Regarding mortality, the multipliers for the rates of change of mortality rates are decreased by 40 percentage points from standard values; these changes result in decreases in both male and female life expectancies of about a year and a half by 2051.

APPENDIX A:

THE POPULATION PROJECTION MODEL

THE POPULATION PROJECTION MODEL

We describe in this section the demographic model incorporated into the MEDS-D program. For the most part, the model is the standard demographic projection model. Let N_{sxt} be the cohort of people of sex s, age x, at the middle of year t. The cohort will be of age $x+1$ one year later, in year $t+1$. During the interval, the cohort will have been augmented by inflows of immigrants, and nonpermanent residents, and it will have been diminished by deaths, emigration of Canadians (and permanent residents), and the exit of nonpermanent residents. A few of the migrants in and the migrants out will have died after entering or leaving the country but the numbers will be so small that they can be ignored. (Migrants will have moved about half-way through the year, and thus will have been exposed to only half a year of mortality risk after arriving or departing, on average. Also, the fact of their migration indicates that they are likely to be in good health.) For all but the very youngest age group, the population of sex s, age $x+1$ at time $t+1$ is thus given by

$$(1) \qquad N_{s,x+1,t+1} = N_{sxt}\left(1 - d_{s,x+1,t+1}\right) + IM_{s,x+1,t+1}$$

$$+ NPR_{s,x+1,t+1} - EM_{s,x+1,t+1} \qquad (s = 1,2;\ x = 0,1,\ldots,xmax)$$

$d_{s,x+1,t+1}$ is the rate of mortality for the cohort over the preceding one-year interval and $IM_{s,x+1,t+1}$ is the number of immigrants (over the same interval) who are of age $x+1$ at time $t+1$. EM refers to emigrants from Canada to other countries, and NPR to the net inflow of nonpermanent residents. (The availability of data does not support separate treatment of inflows and outflows of nonpermanent residents.) We set $s=1$ for males, $s=2$ for females. $xmax$ is the highest age to which anyone lives.

The calculation is somewhat different for infants -- children born during the interval t to $t+1$.

The number of persons of age 0 at $t+1$ (children who have not reached their first birthday) is given by

(2) $$N_{s,0,t+1} = B_{s,t+1}(1-d_{s,0,t+1}) + IM_{s,0,t+1} + NPR_{s,0,t+1} - EM_{s,0,t+1} \qquad (s=1,2)$$

$B_{s,t+1}$ is the number of live births of sex s over the t to $t+1$ interval and $d_{s,0,t+1}$ is the proportion of the newborn children who die before the end of the interval. The IM, NPR, and EM flows, which have the same definitions as before, are likely to be very small, but are included for completeness.

The rates of mortality for males and females are allowed to vary over a projection period, in accordance with user-specified assumptions. To recognize that formally we express the rates as functions of time and write

(3) $$d_{sxt} = d_{sx}(t) \qquad (s=1,2; x=0,1,\ldots,xmax+1)$$

The overall totals of the migration flows (symbolized, with no sex or age subscript, by IM_t, NPR_t, EM_t) are also permitted to vary, again in accordance with user-specified assumptions:

(4) $$IM_t = IM(t)$$

(5) $$NPR_t = NPR(t)$$

(6) $$EM_t = EM(t)$$

The proportionate age and sex distributions of the migrant flows are assumed constant over a projection period, and we therefore allocate the flow totals on the basis of the following relations:

(7) $$IM_{sxt} = m_{sx} IM_t \qquad (s=1,2; x=0,1,\ldots,xmax+1)$$

(8) $$NPR_{sxt} = n_{sx} NPR_t \qquad (s=1,2; x=0,1,\ldots,xmax+1)$$

(9) $$EM_{sxt} = e_{sx} EM_t \qquad (s=1,2; x=0,1,\ldots,xmax+1)$$

m_{sx}, n_{sx}, and e_s are the proportions of IM_t, NPR_t, and EM_t, respectively, allocated to sex s, age x, in any year t.

The number of live births is determined by applying age-specific fertility rates to the female population in the childbearing age range. The total is then allocated to males and females on the basis of a fixed sex ratio at birth. Letting ϕ denote the ratio of male to female births, and letting B_{1t} and B_{2t} denote the numbers of male and female births, the total number of births is then allocated as follows:

(10) $$B_{1t} = (\phi/(1+\phi))B_t$$

(11) $$B_{2t} = (1/(1+\phi))B_t$$

In practice, ϕ is set equal to about 1.05, the mean ratio over the period 1995-2004. (The ratio is quite stable over time.)

The childbearing age range is usually defined, for statistical purposes, as 15 to 49, inclusive, and we adopt that definition. The total number of live births is then calculated as

(12) $$B_t = \sum_{x=15}^{50} \left((f_{x-1,t-1}+f_{xt})/2\right) \left((N_{2,x-1,t-1}+N_{2xt})/2\right)$$

where f_{xt} is the fertility rate for women of age x at time t. (The fertility rate is the number of live births to women of a given age, divided by the number of women of that age.) B_t stands for the number of live births during the 12 months preceding the middle of year t. A cohort of women who were of age x at the end of the 12-month period, and subject to fertility rate f_{xt} at that time, would have been of age $x-1$ at the start of the period, and subject then to fertility rate $f_{x-1,t-1}$. The averaging of the fertility rates and cohort sizes in equation (12) is intended to take account of that. (Note that the fertility rates for $x=14$ and $x=50$ are set to 0 in the equation.)

There are 35 age-specific fertility rates over the childbearing range. Rather than deal with them individually for population projection purposes it is convenient to parameterize the fertility schedule so that the entire schedule can be generated from a small set of parameters. The Gompertz function fits the cumulative fertility schedule quite closely and we use it for that purpose. Letting F_{xt} denote the sum of the fertility rates up to exact age x at time t, we then have

$$\ln F_{xt} = \ln \alpha_t + (\ln \beta_t)\gamma_t^{x-x_0} \qquad (x = 16,17,\ldots,50) \tag{13}$$

where x_0 is a reference age chosen for convenience. (We set x_0 equal to 28 but the choice is arbitrary; it does not affect the final calculation of fertility rates when the function is applied.) The function has three parameters, α, β, γ, and each carries a t subscript, indicating that it can vary over time. The Gompertz function is continuous on the interval $(-\infty, \infty)$. However, for our purposes it is interpretable only over the childbearing range, and we set F_{xt} to 0 for integer values of x less than 16 and greater than 50. The age-specific fertility rates are calculated by differencing the cumulative function:

$$f_{xt} = F_{x+1,t} - F_{xt} \qquad (x = 15,16,\ldots,50) \tag{14}$$

One could project the Gompertz function, and hence the fertility rate schedule, by projecting the $\alpha, \beta,$ and γ parameters. That would be more convenient than projecting the 35 age-specific fertility rates directly. However, the parameters are not readily interpretable and we have found it preferable to project them indirectly. To do that we establish a one-to-one correspondence with three characteristics of the fertility rate distribution that are easier to understand, and hence easier to frame assumptions about, namely the total lifetime fertility rate (TLF), the median age of mothers at childbirth (MAM), and the interquartile range of age of mothers at childbirth (IRA). TLF represents the mean number of children that would be born alive to a cohort of women over the whole of its childbearing period, assuming that no members of the cohort die over that period.

MAM is a locational measure and **IRA** is a measure of dispersion. The three measures, taken together, provide a convenient representation of the age distribution of fertility rates in any given year. There is also a correction factor for each age to force the fertility rates generated by the Gompertz function to sum to the actual TLF in 2001. The factors are applied every year in the projection. There is a further overall adjustment to ensure the rates sum to the user-requested TLF in each year of the projection period.

We have constructed historical series for **TLF**, **MAM**, and **IRA**, going back to 1921. The information provided by those series establishes a basis for framing assumptions about future values. Given the future values for each year of a projection period, the corresponding values of $\alpha, \beta,$ and γ can then be found by solving the following three equations:

(15) $$\ln TLF_t = \ln \alpha_t + (\ln \beta_t)\gamma_t^{50-x_0}$$

(16) $$\exp\{MAM_t \ln \gamma_t\} = \ln(TLF_t / 2\alpha_t) / \ln \beta_t$$

(17) $$\exp\{IRA_t \ln \gamma_t\} = \ln(3TLF_t / 4\alpha_t) / \ln(TLF_t / 4\alpha_t)$$

The equations can be solved by straightforward application of standard iterative methods.

Projections of the labour force are required for the calculation of some of the "dependency ratios" that are available in MEDS-E. Projections are made of labour force participation rates and "excluded" populations in 24 age-sex groups (males and females 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, and 70 and over). The "excluded" population represents inmates of institutions (jails, nursing homes, etc.) and Indians living on reserves, both of which groups are excluded from the Statistics Canada Labour Force Survey. The Survey also excludes members of the armed forces and the populations of the Yukon and Northwest Territories but we have made special adjustments (based on census and other data) in order to include those in our historical and projection tables. The participation rates are projected on the basis of historical trends

and likely long-run future patterns of change (declining rates among the older population, convergence of male and female rates, and so on). The exclusion rates are assumed constant within age-sex groups. Formally, then, the labour force of sex s, age group x, in year t, is given by

(18) $$L_{sxt} = p_{sxt}(1-k_{sx})N_{sxt} \qquad (s=1,2; x=1,2,\ldots,12)$$

where p is the participation rate, k the exclusion rate, and N the population generated by the population projection model. (The subscript x is used here to denote one of the 12 age groups, rather than a single year of age. The single-age population projections are aggregated up to the age-group level for purposes of the labour force calculations.)

For Canada, there is also provision for making particiption rates endogenous by having them respond to deviations from the standard values of two variables, u_t, the national unemployment rate and c_t, a measure of child care calculated as an exponentially weighted average of current and past fertility levels, which can be expressed as

(19) $$c_t = q\, c_{t-1} + (1-q)\, TLF_t$$

After experimentation with alternative values, q has been set to 0.85. The equation for p^e_{sxt}, the endogenous participation rate is

(20) $$p^e_{sxt} = p_{sxt} + a_0(u_t - u^*_t) + a_1(c_t - c^*_t)$$

where the superscript $*$ denotes standard values. The values for a_0 and a_1 are taken from regression equation estimates of participation rates by age and sex as a function of time, time squared, u_t and c_t.

The number of households, H, is calculated by applying household maintainer rates, h, to the population in seven age groups (<25, 25-34, 35-44, 45-54, 55-64, 65-74, 75+), separately by sex, with an adjustment factor, HRAT, to allow for an overall time trend:

(21) $$H_{sxt} = h_{sx}\, HRAT_t\, N_{sxt} \qquad (s=1,2; x=1,2,\ldots,7)$$

HRAT values for earlier census years were calculated as the ratios of actual numbers of houeholds to the numbers as they would have been if the 1991 maintainer rates for the seven male and female groups had applied. The HRAT series is projected on the basis of its observed historical trend.

APPENDIX B:

SELECTED CANADIAN HISTORICAL SERIES

1976-2004

This appendix contains historical data starting in 1976 for some selected Canadian series; the series shown here are of particular importance in framing assumptions for projections. The CANSIM identifier numbers are shown, where applicable.

Symbols are defined as follows:

TLF -- Total lifetime fertility (number of births per woman)
MAM -- Median age of mothers at childbirth
IRA -- Interquartile range of age of mothers at childbirth
IM -- Total Immigration
EM -- Total Emigration
NPR -- Non-permanent residents
POP -- Population
LF -- Labour force
URATE -- Unemployment rate (percent)

CANSIM #				v391099	v391114	v494880	
	TLF	MAM	IRA	IM	EM	NPR	Change in NPR
1976	1.765	26.27	7.31	170,028	30,315	98,936	
1977	1.746	26.33	7.26	130,931	25,057	96,934	-2,002
1978	1.698	26.41	7.19	100,967	31,437	93,937	-2,997
1979	1.700	26.52	7.10	84,518	30,857	101,927	7,990
1980	1.676	26.55	7.10	143,825	20,521	116,913	14,986
1981	1.648	26.66	7.09	127,238	17,819	130,206	13,293
1982	1.637	26.69	7.20	135,339	29,110	142,503	12,297
1983	1.625	26.82	7.18	101,404	31,121	146,273	3,770
1984	1.630	26.98	7.18	88,592	31,750	151,338	5,065
1985	1.613	27.09	7.18	83,925	28,134	155,049	3,711
1986	1.600	27.18	7.23	88,657	24,794	177,485	22,436
1987	1.578	27.29	7.32	130,880	31,006	236,176	58,691
1988	1.607	27.37	7.39	152,211	26,685	278,353	42,177
1989	1.670	27.41	7.52	177,632	26,308	419,101	140,748
1990	1.720	27.49	7.57	203,357	25,834	447,930	28,829
1991	1.710	27.54	7.67	221,382	28,484	395,077	-52,853
1992	1.710	27.66	7.71	244,281	49,475	352,158	-42,919
1993	1.690	27.74	7.82	266,890	48,458	280,973	-71,185
1994	1.690	27.81	7.88	235,360	52,844	258,777	-22,196
1995	1.670	27.92	7.94	220,738	53,426	244,625	-14,152
1996	1.620	28.09	7.94	217,478	49,106	243,799	-826
1997	1.552	28.23	7.94	224,857	59,423	243,981	182
1998	1.539	28.28	8.01	194,459	58,708	239,998	-3,983
1999	1.523	28.44	8.00	173,194	56,084	258,315	18,317
2000	1.505	28.57	7.96	205,710	55,973	283,347	25,032
2001	1.532	28.81	7.85	252,533	55,419	318,974	35,627
2002	1.501	28.94	7.86	256,334	46,409	352,724	33,750
2003	1.525	29.10	7.84	199,212	46,500	383,286	30,562
2004				239,116	46,708	379,012	-4,274

Note: Before 1991, TLF, MAM, and IRA do not include Newfoundland.

CANSIM #	v1					
	POP	LF	IM/POP-1	IM/LF-1	EM/POP-1	EM/LF-1
				– percent –		
1976	23,449,791	10,561,869				
1977	23,725,921	10,857,746	0.56	1.24	0.11	0.24
1978	23,963,370	11,229,630	0.43	0.93	0.13	0.29
1979	24,201,801	11,614,300	0.35	0.75	0.13	0.27
1980	24,516,071	11,959,306	0.59	1.24	0.08	0.18
1981	24,820,393	12,318,103	0.52	1.06	0.07	0.15
1982	25,117,442	12,384,547	0.55	1.10	0.12	0.24
1983	25,366,969	12,611,866	0.40	0.82	0.12	0.25
1984	25,607,651	12,833,647	0.35	0.70	0.13	0.25
1985	25,842,736	13,099,927	0.33	0.65	0.11	0.22
1986	26,101,155	13,361,373	0.34	0.68	0.10	0.19
1987	26,448,855	13,617,485	0.50	0.98	0.12	0.23
1988	26,795,383	13,871,784	0.58	1.12	0.10	0.20
1989	27,281,795	14,145,009	0.66	1.28	0.10	0.19
1990	27,697,530	14,336,086	0.75	1.44	0.09	0.18
1991	28,031,394	14,428,000	0.80	1.54	0.10	0.20
1992	28,366,737	14,413,000	0.87	1.69	0.18	0.34
1993	28,681,676	14,509,000	0.94	1.85	0.17	0.34
1994	28,999,006	14,636,000	0.82	1.62	0.18	0.36
1995	29,302,091	14,736,000	0.76	1.51	0.18	0.37
1996	29,610,757	14,885,000	0.74	1.48	0.17	0.33
1997	29,907,172	15,115,000	0.76	1.51	0.20	0.40
1998	30,157,082	15,351,000	0.65	1.29	0.20	0.39
1999	30,403,878	15,636,000	0.57	1.13	0.19	0.37
2000	30,689,035	15,912,000	0.68	1.32	0.18	0.36
2001	31,021,251	16,168,000	0.82	1.59	0.18	0.35
2002	31,372,587	16,649,000	0.83	1.59	0.15	0.29
2003	31,660,466	17,042,000	0.63	1.20	0.15	0.28
2004	31,946,316	17,273,000	0.76	1.40	0.15	0.27

Note: LF has been adjusted to include Armed Forces, Yukon, NWT and Nunavut.

Labour Force Participation Rates by Age Group

CANSIM #						Males							Both
v2461…	463	464	465	466	467	468	469	470	471	472	474	475	245
Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+	15+
1976	53.2	85.8	94.4	96.2	96.2	95.3	93.8	90.7	84.2	66.5	24.5	9.2	61.5
1977	54.8	85.9	94.0	96.0	95.9	95.1	93.3	90.4	83.5	64.7	23.2	8.1	61.9
1978	55.6	86.7	94.4	96.3	96.2	95.0	93.8	90.8	83.0	65.1	21.5	8.5	62.7
1979	58.1	87.2	94.6	96.2	96.5	95.4	93.8	90.4	82.4	65.3	22.5	7.9	63.7
1980	59.0	87.4	94.2	96.0	95.8	95.5	93.6	90.3	82.9	63.9	21.4	7.6	64.3
1981	59.2	87.5	94.2	96.1	96.1	95.5	94.0	90.8	82.1	63.7	19.9	7.9	65.0
1982	54.9	85.5	92.9	95.0	95.4	94.4	92.7	90.1	80.9	62.0	20.9	7.3	64.4
1983	54.1	85.3	92.5	94.5	95.0	94.5	93.0	90.5	81.1	59.9	19.8	7.2	64.7
1984	54.6	84.5	92.3	94.8	95.2	94.2	92.9	88.6	80.1	59.2	19.0	7.4	65.0
1985	54.5	84.7	92.9	94.4	95.4	94.6	92.7	88.5	80.4	55.7	18.5	7.6	65.6
1986	56.6	85.2	93.2	95.1	94.8	94.5	93.1	89.2	78.2	55.2	17.5	7.1	66.1
1987	58.4	85.2	93.0	94.7	94.8	94.9	93.2	90.7	78.1	51.4	18.1	7.0	66.5
1988	59.0	85.4	93.1	94.8	94.2	95.0	93.2	88.9	77.8	51.5	17.2	6.6	66.8
1989	61.0	85.3	93.3	94.7	94.3	94.7	93.3	89.1	77.6	51.3	16.3	6.7	67.2
1990	60.1	83.9	92.8	94.3	94.3	94.1	92.5	88.5	76.1	50.9	17.1	6.8	67.1
1991	57.0	82.4	91.9	93.2	93.7	93.7	92.7	87.8	75.9	47.7	17.4	7.2	66.6
1992	53.7	81.2	90.8	92.0	92.7	92.7	91.5	87.4	73.9	47.9	17.8	6.2	65.7
1993	51.9	80.6	90.2	92.7	92.6	92.8	91.6	86.7	72.9	46.7	16.0	6.1	65.3
1994	51.3	80.3	90.6	91.5	92.5	92.6	91.9	86.5	71.8	46.2	17.6	6.7	65.1
1995	50.3	79.5	89.8	91.9	92.3	91.8	91.0	86.7	71.8	43.3	16.7	6.0	64.8
1996	48.8	79.6	90.1	92.2	92.2	91.4	90.5	86.3	71.4	43.4	16.4	5.9	64.6
1997	48.0	79.6	90.4	92.0	92.5	92.4	90.2	86.1	71.5	45.6	16.7	5.8	64.8
1998	48.3	79.1	91.0	92.8	92.8	91.8	90.6	85.5	70.5	44.5	17.7	6.1	65.0
1999	50.7	80.4	90.6	92.5	92.9	92.2	90.9	85.9	71.8	46.2	16.9	6.0	65.5
2000	51.8	80.2	90.6	92.7	92.5	92.2	91.1	86.2	72.5	45.8	16.0	6.1	65.8
2001	52.6	79.9	90.9	92.8	92.5	92.1	91.1	86.4	72.1	46.5	16.1	6.0	65.9
2002	54.3	81.3	90.9	92.9	92.7	92.6	91.4	87.6	73.1	49.9	18.4	6.4	66.9
2003	54.8	81.6	91.1	93.3	92.9	92.6	91.4	88.0	75.4	51.9	21.0	7.0	67.5
2004	53.7	81.5	90.4	93.5	93.0	92.6	91.2	88.5	75.6	53.2	21.8	6.9	67.6

	Labour Force Participation Rates by Age Group												URATE
CANSIM #	Females												Both
v2461…	673	674	675	676	677	678	679	680	681	682	684	685	224
Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+	15+
1976	47.7	69.1	57.3	50.8	53.2	53.5	50.7	45.5	38.2	24.4	7.8	2.2	7.1
1977	47.7	71.1	58.3	53.0	55.4	55.9	52.3	44.6	37.5	24.2	7.8	1.8	8.0
1978	48.9	72.2	61.8	56.3	58.1	57.6	53.4	46.1	37.4	23.6	7.1	2.3	8.4
1979	51.7	73.1	63.7	58.2	60.0	58.5	54.9	47.7	38.7	25.9	7.7	1.8	7.5
1980	52.9	74.6	65.5	60.5	61.5	61.1	56.9	49.2	38.8	25.0	7.5	1.8	7.5
1981	54.1	74.9	67.9	63.7	64.4	64.0	58.7	51.1	38.9	25.0	7.1	2.3	7.6
1982	51.6	74.8	68.3	64.1	66.0	65.6	60.1	51.0	40.3	24.5	7.7	1.9	11.0
1983	51.2	75.9	70.1	65.9	67.1	66.7	61.8	53.2	39.5	25.3	6.4	2.3	12.0
1984	51.2	76.4	71.4	67.8	69.0	69.0	62.8	53.7	39.5	25.0	7.0	2.3	11.3
1985	52.6	75.9	72.9	70.0	70.4	70.0	66.0	56.0	42.3	24.1	7.8	2.1	10.6
1986	53.5	77.8	75.0	72.5	71.7	73.0	65.7	55.0	41.7	23.5	6.7	1.6	9.7
1987	55.0	77.8	75.6	72.7	74.0	73.3	68.4	57.5	43.4	24.6	6.6	1.6	8.8
1988	56.8	77.8	76.3	73.3	76.3	75.3	71.7	59.4	44.2	24.3	6.7	1.9	7.8
1989	57.3	78.3	77.3	74.9	77.2	76.7	71.6	62.1	44.8	22.4	7.2	2.1	7.6
1990	56.4	77.2	78.5	75.7	77.4	79.1	73.2	62.1	45.3	24.1	6.9	1.9	8.2
1991	54.7	76.5	78.0	76.3	77.6	79.1	74.3	64.2	46.1	24.0	6.8	1.7	10.3
1992	52.1	75.7	76.7	75.5	76.8	78.1	75.3	65.0	47.6	23.2	7.5	1.5	11.2
1993	50.0	73.7	76.5	75.0	77.9	78.9	75.3	66.7	47.0	24.3	7.5	1.7	11.4
1994	49.4	73.7	76.4	74.9	77.5	78.8	75.9	64.8	48.4	24.9	7.3	1.6	10.4
1995	49.2	73.1	76.2	76.0	77.3	78.9	76.2	65.9	48.1	23.4	7.4	1.6	9.6
1996	47.4	73.0	76.9	77.2	77.2	79.5	75.8	65.6	48.2	23.2	7.1	1.7	9.7
1997	46.2	72.2	78.0	77.5	77.8	80.1	77.0	67.3	47.8	24.0	7.8	1.8	9.2
1998	47.8	72.7	79.4	77.8	78.6	79.6	78.4	68.6	49.9	25.1	7.4	1.9	8.4
1999	49.7	73.5	80.0	78.3	79.1	80.6	78.5	70.4	50.3	25.7	7.2	1.8	7.6
2000	51.8	74.0	79.9	79.3	79.4	80.8	79.3	70.9	53.0	27.0	7.2	1.7	6.8
2001	52.0	74.4	80.6	79.3	79.8	81.6	79.8	72.6	53.3	27.4	7.8	1.7	7.2
2002	55.2	75.2	80.8	80.1	81.5	82.6	81.6	74.9	54.5	30.3	8.8	1.8	7.7
2003	55.2	77.2	81.3	80.9	82.1	82.4	82.3	76.9	60.0	32.2	10.3	1.9	7.6
2004	55.4	76.4	81.8	81.9	82.3	83.0	82.5	77.4	60.1	34.5	11.0	1.9	7.2

APPENDIX C:

SELECTED OUTPUT OF MEDS-D SYSTEM

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MEDS-D CHART  1:  POPULATION AGE PYRAMID:  2001  CANADA
                  ID:  STANDARD (AS OF 14/SEP/05)           DATE: 19SEP2005
--------------------------------------------------------------------------
 BIRTH YEARS          MALES           AGE          FEMALES
 PRE 1911                             90+  *
 1911-1916                       *  85-89  **
 1916-1921                     ***  80-84  ****
 1921-1926                    ****  75-79  ******
 1926-1931                  ******  70-74  *******
 1931-1936                 *******  65-69  ********
 1936-1941                ********  60-64  ********
 1941-1946             **********  55-59  ***********
 1946-1951            ************ 50-54  **********
 1951-1956           ***********  45-49  ***********
 1956-1961         **************  40-44  **************
 1961-1966         **************  35-39  **************
 1966-1971           ***********  30-34  **********
 1971-1976            **********  25-29  **********
 1976-1981            **********  20-24  **********
 1981-1986            **********  15-19  **********
 1986-1991            **********  10-14  **********
 1991-1996             *********   5- 9  **********
 1996-2001              ********   0- 4  **********
    %      6   5   4   3   2   1            1   2   3   4   5   6
                       PERCENT OF TOTAL POPULATION
```

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MEDS-D CHART  2:  POPULATION AGE PYRAMID:  2051  CANADA
                  ID:  STANDARD (AS OF 14/SEP/05)           DATE: 19SEP2005
--------------------------------------------------------------------------
 BIRTH YEARS          MALES           AGE          FEMALES
 PRE 1961                        ***  90+  ******
 1961-1966                     *****  85-89  *******
 1966-1971                   *******  80-84  *********
 1971-1976                 **********  75-79  **********
 1976-1981              ***********  70-74  ***********
 1981-1986             ************  65-69  ************
 1986-1991             ************  60-64  ************
 1991-1996             ************  55-59  ************
 1996-2001             ************  50-54  ***********
 2001-2006              ***********  45-49  ***********
 2006-2011              ***********  40-44  ***********
 2011-2016              ***********  35-39  ***********
 2016-2021              ***********  30-34  ***********
 2021-2026               **********  25-29  **********
 2026-2031                *********  20-24  *********
 2031-2036                *********  15-19  *********
 2036-2041                *********  10-14  *********
 2041-2046                 ********   5- 9  *********
 2046-2051                 ********   0- 4  *********
    %      6   5   4   3   2   1            1   2   3   4   5   6
                       PERCENT OF TOTAL POPULATION
```

MEDS-D TABLE 1: PROJECTION SUMMARY PART 1 CANADA
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	POPULATION			LABOUR FORCE			TOTAL HOUSE-HOLDS	HOUSE-HOLD SIZE	% OF TPOP	
	TOTAL ('000)	CHANGE ('000)	GROWTH (%)	TOTAL ('000)	CHANGE ('000)	GROWTH (%)	('000)		<15	65+
2001	31021.	1411.	4.76	16168.	1283.	8.62	12216.	2.54	18.9	12.6
2006	32508.	1487.	4.79	17755.	1587.	9.81	13177.	2.47	17.3	13.2
2011	33899.	1391.	4.28	18635.	880.	4.96	14114.	2.40	16.1	14.4
2016	35237.	1338.	3.95	19123.	488.	2.62	15029.	2.34	15.6	16.5
2021	36472.	1235.	3.50	19161.	38.	.20	15909.	2.29	15.4	18.9
2026	37531.	1059.	2.90	19095.	-66.	-.35	16658.	2.25	15.1	21.6
2031	38342.	810.	2.16	19073.	-22.	-.11	17264.	2.22	14.6	23.9
2036	38888.	546.	1.42	19129.	56.	.29	17712.	2.20	14.1	24.9
2041	39208.	320.	.82	19160.	31.	.16	18009.	2.18	13.8	25.5
2046	39359.	151.	.39	19090.	-69.	-.36	18162.	2.17	13.7	26.1
2051	39400.	41.	.10	18935.	-155.	-.81	18227.	2.16	13.8	26.7

Note: TPOP is total population.
Note: The growth rates show total growth over the preceding 5 years.

MEDS-D TABLE 2: PROJECTION SUMMARY PART 2 CANADA
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	IMMI-GRA-TION	EMI-GRA-TION	CHANGE IN NPR	NET IN-FLOW	BIRTHS	DEATHS	NAT-URAL INC-REASE	RATIO OF TPOP TO--	
								P20-64	LF
2001	253.0	55.2	36.0	233.8	333.1	225.2	108.0	1.62	1.92
2006	230.0	48.4	.0	181.6	335.9	234.6	101.4	1.59	1.83
2011	230.0	50.9	.0	179.1	347.3	251.3	96.0	1.58	1.82
2016	230.0	53.3	.0	176.7	355.9	271.3	84.6	1.61	1.84
2021	230.0	55.6	.0	174.4	356.6	295.3	61.3	1.65	1.90
2026	230.0	57.7	.0	172.3	348.5	326.9	21.6	1.72	1.97
2031	230.0	59.5	.0	170.5	337.4	367.4	-30.1	1.78	2.01
2036	230.0	60.8	.0	169.2	333.3	412.9	-79.6	1.80	2.03
2041	230.0	61.8	.0	168.2	336.3	455.8	-119.5	1.80	2.05
2046	230.0	62.5	.0	167.5	339.9	487.8	-147.9	1.81	2.06
2051	230.0	63.0	.0	167.0	339.8	504.6	-164.9	1.83	2.08

Note: NPR is non-permanent residents; TPOP is total population;
P20-64 is population aged 20 to 64; LF is total labour force.
All numbers of persons are in thousands.

MEDS-D TABLE 3: PROJECTION SUMMARY PART 3 CANADA
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	TOTAL FERT-ILITY RATE	CRUDE BIRTH RATE	CRUDE DEATH RATE	NAT-URAL INC-REASE	LIFE EXPECTANCY AT -- AGE 0 M	AGE 0 F	AGE 65 M	AGE 65 F	LF PART RATE	LF % FEMALE
2001	1.53	10.8	7.3	3.5	76.9	81.9	16.7	20.4	66.0	46.0
2006	1.52	10.4	7.2	3.1	78.4	82.6	17.5	20.8	67.8	46.7
2011	1.52	10.3	7.4	2.8	79.5	83.2	18.1	21.2	67.3	46.9
2016	1.52	10.1	7.7	2.4	80.4	83.8	18.5	21.5	66.1	46.9
2021	1.52	9.8	8.1	1.7	81.0	84.2	18.9	21.8	63.9	46.7
2026	1.52	9.3	8.7	.6	81.5	84.6	19.1	22.1	61.8	46.7
2031	1.52	8.8	9.6	-.8	81.8	85.0	19.4	22.4	60.2	46.7
2036	1.52	8.6	10.6	-2.0	82.1	85.3	19.5	22.6	59.3	46.7
2041	1.52	8.6	11.6	-3.0	82.4	85.6	19.7	22.8	58.7	46.7
2046	1.52	8.6	12.4	-3.8	82.6	85.9	19.9	23.0	58.2	46.6
2051	1.52	8.6	12.8	-4.2	82.8	86.1	20.0	23.2	57.7	46.6

Note: LF is total labour force.

MEDS-D TABLE 4: PROJECTION SUMMARY PART 4 CANADA
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	MEDIAN AGE OF POPULATION TOTAL	MALE	FEMALE	AGE 20-64	AGE 65+	MEDIAN AGE OF LF TOTAL	MALE	FEMALE	U RATE (%)
2001	37.2	36.3	38.0	40.9	73.9	39.1	39.3	38.8	7.2
2006	38.9	37.9	39.8	42.3	74.4	40.5	40.7	40.2	7.2
2011	40.2	39.3	41.1	43.0	73.9	41.0	41.3	40.7	7.2
2016	41.3	40.5	42.2	43.1	73.2	41.2	41.5	40.9	7.2
2021	42.5	41.7	43.2	43.1	73.3	41.4	41.8	40.9	7.2
2026	43.7	43.0	44.4	43.3	73.6	41.6	42.1	41.2	7.2
2031	44.8	44.0	45.6	43.3	74.3	41.8	42.3	41.4	7.2
2036	45.7	45.0	46.5	43.7	75.4	42.2	42.6	41.7	7.2
2041	46.5	45.7	47.4	44.0	76.3	42.4	42.8	41.8	7.2
2046	46.9	45.9	47.9	43.8	76.4	42.2	42.6	41.6	7.2
2051	46.9	45.8	47.9	43.6	76.1	42.0	42.5	41.5	7.2

Note: LF is total labour force; U RATE is total unemployment rate.

MEDS-D TABLE 5: PROJECTED POPULATION ONTARIO BOTH SEXES
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	TOTAL	AGE GROUP								
		0- 4	5-14	15-19	20-24	25-44	45-54	55-64	65-74	75+
		- THOUSANDS -								
2001	11898.	708.2	1600.8	805.1	784.8	3751.4	1671.7	1086.3	827.7	661.6
2006	12717.	676.5	1602.1	846.2	851.0	3820.8	1905.6	1376.6	868.3	770.0
2011	13491.	700.0	1526.4	886.4	887.8	3854.3	2127.3	1649.4	1004.5	854.9
2016	14242.	734.4	1514.9	842.4	926.4	3996.3	2126.8	1880.5	1279.6	940.5
2021	14971.	762.8	1570.7	808.3	882.4	4176.3	2045.3	2099.5	1536.9	1088.5
2026	15651.	775.5	1632.3	829.7	848.3	4258.1	2094.6	2102.1	1760.5	1350.4

MEDS-D TABLE 6: PROJECTED POPULATION ONTARIO BOTH SEXES
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	TOTAL	AGE GROUP								
		0- 4	5-14	15-19	20-24	25-44	45-54	55-64	65-74	75+
		- PERCENTAGE DISTRIBUTION -								
2001	100.0	6.0	13.5	6.8	6.6	31.5	14.1	9.1	7.0	5.6
2006	100.0	5.3	12.6	6.7	6.7	30.0	15.0	10.8	6.8	6.1
2011	100.0	5.2	11.3	6.6	6.6	28.6	15.8	12.2	7.4	6.3
2016	100.0	5.2	10.6	5.9	6.5	28.1	14.9	13.2	9.0	6.6
2021	100.0	5.1	10.5	5.4	5.9	27.9	13.7	14.0	10.3	7.3
2026	100.0	5.0	10.4	5.3	5.4	27.2	13.4	13.4	11.2	8.6

MEDS-D TABLE 7: PROJECTED POPULATION ONTARIO BOTH SEXES
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	TOTAL	AGE GROUP								
		0- 4	5-14	15-19	20-24	25-44	45-54	55-64	65-74	75+
		- PERCENTAGE GROWTH RATE -								
2006	6.9	-4.5	.1	5.1	8.4	1.8	14.0	26.7	4.9	16.4
2011	6.1	3.5	-4.7	4.7	4.3	.9	11.6	19.8	15.7	11.0
2016	5.6	4.9	-.8	-5.0	4.4	3.7	.0	14.0	27.4	10.0
2021	5.1	3.9	3.7	-4.0	-4.8	4.5	-3.8	11.7	20.1	15.7
2026	4.5	1.7	3.9	2.6	-3.9	2.0	2.4	.1	14.5	24.1

Note: The growth rates show total growth over the preceding 5 years.

MEDS-D TABLE 1: PROJECTION SUMMARY PART 1 CANADA (SUM)
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	POPULATION			LABOUR FORCE			TOTAL HOUSE-HOLDS	HOUSE-HOLD SIZE	% OF TPOP	
	TOTAL ('000)	CHANGE ('000)	GROWTH (%)	TOTAL ('000)	CHANGE ('000)	GROWTH (%)	('000)		<15	65+
2001	31021.	2990.	1.02	16180.	1749.	1.15	12214.	2.54	18.9	12.6
2011	33885.	2864.	.89	18656.	2475.	1.43	14092.	2.40	16.1	14.4
2021	36420.	2535.	.72	19186.	530.	.28	15854.	2.30	15.4	18.9
2031	38264.	1844.	.50	19104.	-82.	-.04	17180.	2.23	14.6	23.9
2041	39127.	863.	.22	19200.	96.	.05	17906.	2.19	13.8	25.6
2051	39324.	198.	.05	19000.	-201.	-.11	18115.	2.17	13.8	26.7

Note: TPOP is total population.
Note: The growth rates show annual average growth over the preceding 10 years.

MEDS-D TABLE 2: PROJECTION SUMMARY PART 2 CANADA (SUM)
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	IMMI-GRA-TION	EMI-GRA-TION	CHANGE IN NPR	IN-MIGRA-TION	OUT-MIGRA-TION	NET IN-FLOW	BIRTHS	DEATHS	NAT-URAL INC-REASE
2001	253.0	54.9	35.6	269.2	269.2	233.7	333.4	225.1	108.3
2011	230.0	54.6	.0	286.9	286.9	175.4	347.2	251.1	96.1
2021	230.0	59.1	.0	286.9	286.9	170.9	356.2	295.0	61.2
2031	230.0	62.6	.0	286.9	286.9	167.4	337.9	366.4	-28.5
2041	230.0	64.4	.0	286.9	286.9	165.6	336.9	453.6	-116.7
2051	230.0	65.0	.0	286.9	286.9	165.0	340.4	502.4	-162.0

Note: NPR is non-permanent residents. All numbers of persons are in thousands.

MEDS-D TABLE 5: PROJECTED POPULATION CANADA (SUM) BOTH SEXES
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	AREA												
	CA	NF	PE	NS	NB	QU	ON	MA	SA	AL	BC	YU	NN
	- THOUSANDS -												
2001	31021	522	137	932	750	7397	11898	1151	1000	3057	4078	30	69
2011	33885	507	142	941	753	7823	13491	1220	1002	3484	4411	31	80
2021	36420	496	145	938	748	8180	14971	1309	1044	3763	4699	32	94
2031	38264	465	143	908	720	8358	16246	1383	1071	3950	4879	32	108
2041	39127	417	137	847	671	8319	17122	1431	1080	4034	4915	30	122
2051	39324	362	128	771	609	8162	17690	1466	1077	4037	4857	29	136

MEDS-D TABLE 6: PROJECTED POPULATION CANADA (SUM) BOTH SEXES
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	AREA												
	CA	NF	PE	NS	NB	QU	ON	MA	SA	AL	BC	YU	NN
	- PERCENTAGE DISTRIBUTION -												
2001	100.0	1.7	.4	3.0	2.4	23.8	38.4	3.7	3.2	9.9	13.1	.1	.2
2011	100.0	1.5	.4	2.8	2.2	23.1	39.8	3.6	3.0	10.3	13.0	.1	.2
2021	100.0	1.4	.4	2.6	2.1	22.5	41.1	3.6	2.9	10.3	12.9	.1	.3
2031	100.0	1.2	.4	2.4	1.9	21.8	42.5	3.6	2.8	10.3	12.8	.1	.3
2041	100.0	1.1	.4	2.2	1.7	21.3	43.8	3.7	2.8	10.3	12.6	.1	.3
2051	100.0	.9	.3	2.0	1.5	20.8	45.0	3.7	2.7	10.3	12.4	.1	.3

MEDS-D TABLE 7: PROJECTED POPULATION CANADA (SUM) BOTH SEXES
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	AREA												
	CA	NF	PE	NS	NB	QU	ON	MA	SA	AL	BC	YU	NN
	- PERCENTAGE GROWTH RATE -												
2011	.9	-.3	.4	.1	.0	.6	1.3	.6	.0	1.3	.8	.3	1.6
2021	.7	-.2	.2	.0	-.1	.4	1.0	.7	.4	.8	.6	.3	1.6
2031	.5	-.7	-.1	-.3	-.4	.2	.8	.6	.2	.5	.4	-.1	1.4
2041	.2	-1.1	-.4	-.7	-.7	.0	.5	.3	.1	.2	.1	-.4	1.2
2051	.1	-1.4	-.7	-.9	-1.0	-.2	.3	.2	.0	.0	-.1	-.6	1.1

Note: The growth rates show annual average growth over the preceding 10 years.

MEDS-D TABLE 26: PROJECTED MEDIAN AGE OF POPULATION BOTH SEXES
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	PROVINCE											
	NF	PE	NS	NB	QU	ON	MA	SA	AL	BC	YU	NN
2001	38.1	37.6	38.5	38.2	38.5	36.7	36.4	36.4	34.7	37.9	35.8	26.8
2011	44.2	42.1	43.1	43.1	41.9	39.5	38.1	38.1	37.0	41.8	39.5	27.9
2021	48.6	45.7	46.6	47.0	44.0	41.6	39.4	39.4	39.9	44.7	40.9	29.5
2031	52.1	48.9	49.7	50.3	46.3	43.7	41.1	41.6	42.7	47.3	43.9	30.6
2041	55.4	51.8	52.2	52.8	47.8	45.5	42.3	42.6	44.1	49.4	46.0	30.7
2051	57.3	53.7	53.9	54.2	47.9	46.1	42.2	42.3	44.1	50.1	45.0	31.1

MEDS-D TABLE 9: PROJECTED LABOUR FORCE CANADA (SUM) BOTH SEXES
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	AREA						
	CAN	ATL	QUE	ONT	PRA	BC	NOR
	- THOUSANDS -						
2001	16180.	1157.	3772.	6329.	2788.	2084.	52.
2011	18656.	1213.	4186.	7580.	3244.	2372.	61.
2021	19186.	1114.	4109.	8173.	3339.	2385.	65.
2031	19104.	986.	3972.	8415.	3349.	2314.	69.
2041	19200.	878.	3898.	8696.	3385.	2269.	75.
2051	19000.	762.	3765.	8857.	3343.	2192.	81.

MEDS-D TABLE 10: PROJECTED LABOUR FORCE CANADA (SUM) BOTH SEXES
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	AREA						
	CAN	ATL	QUE	ONT	PRA	BC	NOR
	- PERCENTAGE DISTRIBUTION -						
2001	100.0	7.1	23.3	39.1	17.2	12.9	.3
2011	100.0	6.5	22.4	40.6	17.4	12.7	.3
2021	100.0	5.8	21.4	42.6	17.4	12.4	.3
2031	100.0	5.2	20.8	44.0	17.5	12.1	.4
2041	100.0	4.6	20.3	45.3	17.6	11.8	.4
2051	100.0	4.0	19.8	46.6	17.6	11.5	.4

MEDS-D TABLE 11: PROJECTED LABOUR FORCE CANADA (SUM) BOTH SEXES
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	AREA						
	CAN	ATL	QUE	ONT	PRA	BC	NOR
	- PERCENTAGE GROWTH RATE -						
2011	1.4	.5	1.0	1.8	1.5	1.3	1.6
2021	.3	-.8	-.2	.8	.3	.1	.7
2031	.0	-1.2	-.3	.3	.0	-.3	.6
2041	.1	-1.2	-.2	.3	.1	-.2	.9
2051	-.1	-1.4	-.3	.2	-.1	-.3	.7

Note: The growth rates show annual average growth over the preceding 10 years.

MEDS-D TABLE 13: PROJECTED LABOUR FORCE CANADA (SUM) BOTH SEXES
ID: STANDARD (AS OF 14/SEP/05) DATE: 19SEP2005

YEAR	AREA						
	CAN	ATL	QUE	ONT	PRA	BC	NOR
	- PARTICIPATION RATES (%) -						
2001	66.0	61.4	63.5	67.3	70.1	64.0	73.8
2011	67.3	61.9	64.6	68.6	72.2	65.0	73.3
2021	64.1	56.8	60.6	66.0	69.1	61.0	69.5
2031	60.4	51.8	57.2	62.4	65.6	56.6	66.3
2041	58.9	49.3	56.0	60.7	64.4	54.7	66.2
2051	58.0	47.5	55.3	59.7	63.4	53.5	65.8

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