ANNEX B: ESTIMATING HEALTH IMPACTS

In an influenza pandemic, the BCCDC estimates that between 20% and 50% of the population may become infected, and that 15% to 35% of the population would become clinically ill such that they would be unable to attend work or other activities for at least one and a half a days. The rate of outpatient visits is estimated at 40 to 400 per 1,000 people, the rate of hospitalizations is estimated at 0.2 to 13 per 1,000 people, and the rate of death is estimated at 0.014 to 7.65 per 1,000 people (www.cdc.gov/ncidod/eid/vol5no5/meltzer.htm). This means that in BC during the next pandemic:

- More than three million people will be infected with the virus.
- As many as 1.8 million people will become clinically ill.
- Up to 610,000 people will visit a health care provider.
- Approximately 18,500 people will need hospital care.
- As many as 6,800 people will die from influenza and related complications.

These estimates are based not on a worst-case scenario, but on the impact of the 1957 and 1968 influenza pandemics, which were relatively mild compared with the 1918 pandemic. There is no way to predict the severity of the next pandemic.

To calculate the regional pandemic impact, use the tables below (Table B-1 and Table B-2) and follow these steps:

1. Table B-1, Column 1: Enter your region's age-stratified population into column 1 of Table B-1. Express the numbers in 1,000s (e.g. 100,000 expressed in 1,000s is 100).

2. Table B-1, Columns 2 & 3: Calculate low and high estimates of the numbers of high-risk person in each age group using the following percentages:
   - 0-19 years: 6% to 11% of the total population in this age group.
   - 20-64 years: 14% to 25% of the total population in this age group.
   - 65+ years: 40% to 55% of the total population in this age group.

3. Table B-1, Columns 4 & 5: Calculate low and high estimates of the numbers of other persons (e.g. non-high-risk) in each age group by subtracting the low and high estimates of high-risk individuals from the total population in each age group. For example, for the low estimate for 0-19 year olds (column 4), subtract column 3 from column 1.

4. Table B-2, Column 3 & 4: Use the rates per 1,000 population (columns 1 & 2) and multiply these by the low and high population estimates from Table B-1 to estimate regional impact.

Note that these are population-based estimates and do not take into account individuals who live in one area but travel to another to visit a family physician or to receive hospital or other care. For example, many people who live outside of Vancouver work in Vancouver and therefore have Vancouver-based physicians. Likewise, Vancouver has a greater number of tertiary care hospitals (including BC Children's Hospital) and so the burden borne by Vancouver may be disproportionate to their population. This should be considered in regional plans as possible and as appropriate.

Table B-1: Template for Calculating Population Estimates, High-Risk and Other (Non-High-Risk), by Age

	Column 1	Column 2	Column 3	Column 4	Column 5
Population by age group	Total (in 1,000s)	Number of High-Risk (in 1,000s)		Number of Other Persons (in 1,000s)	
		Low estimate	High estimate	Low estimate	High estimate
0-19 years		(total x 0.06)	(total x 0.11)	(column 1 – 3)	(column 1 – 2)
20-64 years		(total x 0.14)	(total x 0.25)	(column 1 – 3)	(column 1 – 2)
65+ years		(total x 0.40)	(total x 0.55)	(column 1 – 3)	(column 1 – 2)

Source: US CDC. Draft Influenza Planning Guide for State and Local Officials. Version 2.1, Jan 99, table 2.

Table B-2: Template for Calculating Health Care Impact Estimates, High-Risk and Other (Non-High-Risk), by Age

		Column 1	Column 2	Column 3	Column 4
	Age group (yrs)	Rates per 1,000 pop.*		Health Authority cases	
		Lower limit	Upper limit	Lower limit (pop x rate)	Upper limit (pop x rate)
OUTPATIENT VISITS: HIGH-RISK	**0-19**	289	403		
	20-64	70	149		
	65+	79	130		
OUTPATIENT VISIT: OTHER	**0-19**	165	230		
	20-64	40	85		
	65+	45	74		
Total outpatient visits					
HOSPITALIZATIONS: HIGH-RISK	**0-19**	2.1	9.0		
	20-64	0.9	5.1		
	65+	4	13.0		
HOSPITALIZATIONS: OTHER	**0-19**	0.2	2.9		
	20-64	0.18	2.8		
	65+	1.5	3.0		
Total Hospitalizations					
DEATHS: HIGH-RISK	**0-19**	0.13	7.65		
	20-64	0.1	5.7		
	65+	2.8	5.6		
DEATHS: OTHER	**0-19**	0.014	0.13		
	20-64	0.025	0.09		
	65+	0.28	0.54		
Total deaths					

Source: Meltzer, M., Cox, N., and Fukuda, K. 1999. The Economic Impact of Pandemic Influenza in the United States: Priorities for Intervention. Emerging Infectious Diseases vol. 5:5.

Table B-3: BC Provincial Population Estimates, High-Risk and Other (Non-High-Risk), by Age

	Column 1	Column 2	Column 3	Column 4	Column 5
Population by age group	Total (in 1,000s)	Number of High-Risk (in 1,000s)		Number of Other Persons (in 1,000s)	
		Low estimate	High estimate	Low estimate	High estimate
0-19 years	974	58	107	867	916
20-64 years	2637	369	659	1978	2268
65+ years	572	229	315	257	343

Table B-4: BC Provincial Health Care Impact Estimates, High-Risk and Other (Non-High-Risk), by Age

		Column 1	Column 2	Column 3	Column 4
	Age group (yrs)	Rates per 1,000 pop.*		British Columbia cases	
		Lower limit	Upper limit	Lower limit (pop x rate)	Upper limit (pop x rate)
OUTPATIENT VISITS: HIGH-RISK	**0-19**	289	403	16,762	43,121
	20-64	70	149	25,830	98,191
	65+	79	130	18,091	40,950
OUTPATIENT VISIT: OTHER	**0-19**	165	230	143,055	210,680
	20-64	40	85	79,120	192,780
	65+	45	74	11,565	25,382
Total outpatient visits				**294,423**	**611,104**
HOSPITALIZATIONS: HIGH-RISK	**0-19**	2.1	9.0	121	963
	20-64	0.9	5.1	332	3,361
	65+	4.0	13.0	916	4,095
HOSPITALIZATIONS: OTHER	**0-19**	0.2	2.9	173	2,656
	20-64	0.18	2.8	356	6,350
	65+	1.5	3.0	386	1,029
Total Hospitalizations				**2,284**	**18,454**
DEATHS: HIGH-RISK	**0-19**	0.13	7.65	8	819
	20-64	0.1	5.7	37	3,756
	65+	2.8	5.6	641	1,764
DEATHS: OTHER	**0-19**	0.014	0.13	12	119
	20-64	0.025	0.09	49	204
	65+	0.28	0.54	72	185
Total deaths				**819**	**6,852**

Source: Meltzer, M., Cox, N., and Fukuda, K. 1999. The Economic Impact of Pandemic Influenza in the United States: Priorities for Intervention. See http://www.cdc.gov/ncidod/eid/vol5no5/meltzer.htm#Table%202

APPENDIX B-1: FLUSURGE

Centers for Disease Control and Prevention, www.cdc.gov/flu/flusurge.htm

FluSurge is a spreadsheet-based model which provides hospital administrators and public health officials with estimates of the surge in demand for hospital-based services during the next influenza pandemic. FluSurge estimates the number of hospitalizations and deaths during an influenza pandemic (pandemic length and virulence are determined by the user) and compares the number of persons hospitalized, the number of persons requiring ICU care, and the number of persons requiring ventilator support during a pandemic with existing hospital capacity.

System Requirements:

- Windows* operating system (MS Windows 2000 or higher)
- Microsoft Excel (MS Office 2000 or higher)
- 486 Pentium processor and at least 128 MB RAM
- 2 MB of hard drive storage space

*MS Windows and Office are copyrighted products produced by Microsoft Corporation, WA. Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services, by the BCCDC or by any other provincial agency.

Instructions for Downloading:

Before loading and starting FluSurge, you must change Excel's security level:

- Open a blank Excel spreadsheet.
- Click Tools and the click Macro, choose Security.
- Set Security Level to Medium.
- Click OK.

Then download and start FluSurge:

- Double click and open FluSurge file.
- When asked to Disable Macros or Enable Macros, click Enable Macros.