

# PandORA: Worst Case Scenario Summary

## Cases and Capacities

Based on information provided by Oregon State public health officials, local hospitals, and seasonal flu considerations (in addition to pandemic H2N2 flu) a worst case scenario for an un-vaccinated or low-vaccination-rate population was developed. This scenario includes the assumption of a seasonal flu season peaking in late-November/early-December (not outside the realm of reason given past flu seasons) and unusually low vaccination rates. The latter assumption is based on the potential confusion in the population about the two circulating types of flu (seasonal and pandemic) and their respective vaccines.

## Hospitalizations and Deaths

<u>Time Frame</u>	<u>New Admissions</u>			<u>Deaths</u>			<u>Comment</u>
	<u>Pandemic*</u>	<u>Seasonal*</u>	<u>Total*</u>	<u>Pandemic</u>	<u>Seasonal</u>	<u>Total</u>	
<i>Weeks 3-8 tot.</i>	4280	800	5030	492	215	752	
Week 3	760	75	810	29	3	33	
Week 4	965	100	1065	49	24	73	Begin peak admissions
Week 5	965	125	1065	73	33	106	
Week 6	765	150	915	93	41	134	Begin peak mortality
Week 7	505	200	705	93	49	142	Seasonal flu peak
Week 8	320	150	470	73	65	138	

\* rounded to 5; weeks may not add to total because of rounding

## Hospital bed use excluding ED beds. Estimated daily use during weeks 3 and 4.\*

<u>Week</u>	<u>Day</u>	<u>Need</u>		<u>Available</u>				<u>Shortage (# beds needed)</u>			
		<u>ICU</u>	<u>Other</u>	60%**		30%**		60%**		30%**	
				<u>ICU</u>	<u>Other</u>	<u>ICU</u>	<u>Other</u>	<u>ICU</u> ***	<u>Oth</u>	<u>ICU</u> ***	<u>Oth</u>
3	1	261	290	275	1174	137	587	-	-	124	-
	2	304	290	275	1174	137	587	29	-	167	-
	3	347	290	275	1174	137	587	72	-	210	-
	4	347	333	275	1174	137	587	72	-	210	-
	5	347	376	275	1174	137	587	72	-	210	-
	6	347	420	275	1174	137	587	72	-	210	-
	7	347	463	275	1174	137	587	72	-	210	-
4	8	384	463	275	1174	137	587	109	-	247	-
	9	420	463	275	1174	137	587	145	-	283	-
	10	456	463	275	1174	137	587	181	-	319	-
	11	456	499	275	1174	137	587	181	-	319	-
	12	456	536	275	1174	137	587	181	-	319	-
	13	456	572	275	1174	137	587	181	-	319	-
	14	456	609	275	1174	137	587	181	-	319	22

\* Assumptions: Evenly distributed admissions each day of the week; 7 days hospitalized for all flu cases (regardless of outcome, death or discharge); 3 days ICU for all admissions

\*\* For 60%: Assumes 60% Multnomah County Hospital beds & 30% Providence St. Vincent (Washington Co.) beds. For 30%: Assumes 30% Multnomah County Hospital beds & 15% Providence St. Vincent beds.

\*\*\* ED beds available on any one day to help meet shortage ~165 (80% Mult Co; 40% Prov St.V)

For each hospitalized case we can estimate approximately 2-3 additional cases in the community that are either relatively severe cases (e.g., longer than usual course of disease, etc. but not requiring hospitalization) or in persons with multiple barriers to hospitalization (8,560-12,840 cases total).

The remaining ~150,000 cases will appear more like typical seasonal influenza cases. However, absenteeism related to these cases will appear high given the time compression in which they will occur.

The information presented here is based on occurrence in Asia, where health care delivery models and capacities vary greatly from our own. Quality hospital-based and mortality surveillance should be pursued to assure timely acquisition of real-time information that will help in adjusting these projections as the local epidemic continues.

## Related issues

### *Strengths of current strategy (IAP)*

- If the current vaccine can perform in a manner consistent with existing influenza vaccines...
  - Even in settings where vaccine efficacy of complete protection is low (see limitations below) protection against severe disease is still found among vaccines (e.g., 30%--70% effective in preventing hospitalization for pneumonia and influenza among persons over 64 years old in long term care type settings).
  - Vaccine-related seroconversion is not immediate, but is generally significant within one week of vaccination. (NOTE: Seroconversion is not fully predictive of effectiveness)
- Community control measures beyond vaccination key during vaccination roll out. They should also help with seasonal influenza, in the event that persons end up insufficiently vaccinated for those strains.

### *Limitations of current strategy (IAP)*

- The current vaccine is untested. While efficacy is likely to be as good as similarly produced vaccines, its immunogenicity is un-evaluated; and possible side effects, uncharacterized.
- If the current vaccine can perform in a manner consistent with existing influenza vaccines, vaccine efficacy will not be 100%. Vaccine efficacy of existing influenza vaccines in immune-competent persons is usually 70-90%. It is generally considerably lower among the elderly (20-60%).
- The singular focus on the vaccine for the pandemic H2N2 strain leaves the population at serious risk of being under-vaccinated for the circulating seasonal flu strains. While generally less lethal overall, the mortality rates from seasonal influenza are not trivial, especially for the traditional high risk groups.
- The majority of influenza-related deaths are likely to be caused by secondary bacterial pneumonias. The most common causes of these secondary infections are *Haemophilus influenzae*, *Streptococcus pneumoniae*, and *Staphylococcus aureus*. The effect of broadly vaccinating the general population for *S. pneumoniae* and *H. influenzae B* as a means of lowering mortality in a pandemic flu setting has not been assessed. However, a hypothetical benefit and limited influenza vaccine supply indicate such a policy would be worth considering. As a minimum, those persons currently recommended for vaccination with one or both of these vaccines should be vaccinated accordingly.

### *Recommendations*

- Prepare for shortages in ICU beds (within days; likely to occur even with prompt vaccination)
- Prepare for shortages in other non-ED beds (within 2 weeks; this shortage may be averted with vaccination)
- Prioritize vaccination of persons at highest risk for complications of influenza and health care (including public health) providers
- Pursue vaccination other sub-populations as vaccine supply allows
- Immediately implement community control measures regardless of vaccine availability/distribution
- Vaccination strategies should include both pandemic and seasonal types of influenza.
- Supplement the existing state/federal influenza surveillance network with quality surveillance data collection from death certificates of Multnomah County residents; all out-patient clients of Multnomah County Health Department ICS; and all hospitals located in the county (ED and in-patient). Regional surveillance may be preferable if it can be coordinated. See Tab A for hospital-based surveillance details.
- Continue to follow epidemiologic and clinical situations elsewhere in U.S. to inform current environment.
- Assure vaccine supply of vaccines for *S. pneumoniae* and *H. influenzae B*, and promote vaccination for persons included under current ACIP recommendation. Consider expanding the vaccine-eligible population as a means to limit secondary bacterial infections in the wider population.

## **Miscellaneous Additional Information**

## PanFlu Vaccination Tiers: Numbers for Multnomah County

<u>Tier</u>	<u>SubTier</u>	<u>Population</u>	<u>Mult. Co. Est N</u>	<u>Comments</u>
<b>1</b>	<b>A</b>	Vaccine & antiviral manufacturers & others essential to manufacturing & critical support	0	No vaccine/antivirals manufactured in county
		Medical workers and public health workers who are involved in direct patient contact, other support services essential for direct patient care and vaccinators	31,705	Based on BRFS. HCP with direct patient contact.
	<b>B</b>	Persons >= 65 years with 1 or more influenza high-risk conditions, not including essential hypertension	21,000	Based on BRFS
		Persons 6 months to 64 years with 2 or more influenza high-risk conditions, not including essential hypertension	95,659	Used est for any chronic illness in 2-64 year old
	<b>C</b>	Persons 6 months or older hospitalized w/ pneumonia, influenza, or other influenza high-risk condition in past year	300	e-Sentinal reports est.65-100 influenza hospitalizations per year, but incomplete reporting; based on literature, est mobility in avg yr ~350
		Pregnant women	8,800	Based on "Flu season" ~ Nov-Mar; Becoming preg in Oct/Nov unlikely vacc'd:(# pregnancies- est # abortions)*0.83; est abortions low (planned v. unplanned)
		Household contacts of severely immune-compromised persons who would not be vaccinated due to likely poor response to vaccine	12,412	Est. based on 2036 PLW AIDS (6/30/2005 Portland MSA); 2003 Oregon incident cancer rate (455.8/100,000, age adj.) applied to county pop; and avg HH size=2.32 (Census-AmCommSurv)
		Household contacts of children < 6 months old	8,000	Based on 0.5*under 1 y.o. pop. adjusted for 67.5% of families lead by married couple (2000 census; assume 2 care-givers)
	<b>D</b>	Public health emergency response workers critical to pandemic response	Requested	
		Key government leaders	Requested	
<b>2</b>	<b>A</b>	Healthy 65 years and older	53,900	Total population >64 less the 21,000 estimated to have additional risk
		6 months to 64 years with 1 high-risk condition	See above	
	<b>B</b>	6-23 months old, healthy	~14,000	Includes healthy and at risk
		Other public emergency responders	3,000	For 9 PODs for 12 hour shifts 2000 (many not from public health) and 6 RSPs 1,000
		Public safety workers, including police, fire, 911 dispatchers, and correctional facility staff	70,000	guesstimate 70,000 total ranging from schools to postal and local to Federal ---,
		Utility workers essential for maintenance of power, water, and sewage system functioning	5000	
		Transportation workers transporting fuel, water, food, and medical supplies as well as public ground transportation	10000	Managers and High level Experts 7000, supervisors 15000, and the rest actually deliver the service.
Telecommunications/IT for essential network ops/maintenance	5000			
<b>3</b>	Other key government health decision-makers	30000	Executives might be2000	
	Funeral directors/embalmers	2000	estimate	
<b>4</b>		Healthy person 2-64 years not included in above categories	Requested	

## Seasonal Influenza Impact Estimates

Group <sup>1 2</sup>	Vaccination			Estimated Morbidity*				Estimated Mortality			CFR, Avg
	Est.Pop, '03-'05 data	Vacc'd in 2002 <sup>3</sup>	Est. Doses Needed	Hosp. per 100,000 Average	Cases (Avg)	Hosp. per 100,000 Low Vacc	Cases (Low Vacc)	Rate per 100,000**	Cases w/ vaccine***	Cases w/ low vaccine****	
All children 6-23 months	14,160	30.0%	4,248	200	28	800	113	5	1	3	0.03
All adults over 64 years	74,910	68.0%	50,939	225	169	460	345	162	121	248	0.72
<i>Residents of nursing home &amp; LTC, over 64</i>	4,000	NA		NA		NA		NA			
Persons 2-64 with chronic medical conditions	130,098	28.1%	36,558	--	56	--	157	--	4	10	0.07
<i>2-17 years, chronically ill</i>	20,348	NA		40	8	90	18	1.4	0	1	0.04
<i>18-49 years, chronically ill</i>	54,351	NA		40	22	100	54	1.5	1	2	0.04
<i>50-64 years, chronically ill</i>	20,960	NA		40	8	400	84	12.5	3	26	0.31
<i>Residents of nursing home &amp; LTC, thru 64 yrs</i>	75	NA		40	0	40	0	12.5	0	0	0.31
All women pregnant during flu season	8,810	12.4%	1,092	25	2	50	4	1.5	0	0	0.06
Healthcare workers with direct patient contact OOH caregivers & HH contacts of children <6 mos	31,705	38.4%	12,175	NA		NA		NA			
	9,720	18.0%	1,750	1000	97	1900	185	6	1	1	0.01
<b>Total</b>	<b>269,478</b>		<b>106,761</b>		<b>352</b>		<b>803</b>		<b>127</b>	<b>263</b>	

<sup>1</sup> Main groups are considered mutually exclusive; indented group in italics a subset of the main group.

<sup>2</sup> Children 6 mos to 18 years old on chronic aspirin therapy are not included separately (assume covered by 6-23 mos & 2-64 with chronic illness);

<sup>3</sup> Based on 2002 national CDC NHIS vaccine coverage estimates except for adults >64 yrs from Oregon state BRFSS, 2002 (NOTE: BRFSS 2005, 68.9%)

\* Estimated from ACIP Report Recommendations (CDC. MMWR-RR. 4/25/03)

Blue indicates calculations for at-risk, 0-5 m.o. population, not pop shown

\*\* Estimated based on VISTA P&I mortality, average of 1992-2003 and on Thompson (below)

\*\*\* Estimated based on Thompson, et al. JAMA. 2003;289(2):179-86

\*\*\*\* Apply CFR from average year to that of Low vaccination year