Cost-effectiveness of Pharmaceutical-based Pandemic Influenza Mitigation Strategies

Technical Appendix 2

Parameters: base-case and sensitivity range

Parameter	Base-case	Distribution	Distribution parameters	Source
Population:				
General population (age in years)		–	–	*(1)*
0–19	5,513,878			
20–64	12,744,215			
≥65	2,759,129			
Total	21,017,222			
Average life-expectancy (years)		–	–	*(2)*
0–19	72.1			
20–64	41.9			
≥65	13.0			
Percentage of population employed		–	–	*(3)*
15–19	47.3%			
20–64	74.8%			
≥65	9.7%			
Disease:				
R_0	1.7	Triangular	Min: 1.1, Max: 2.3, Mean: 1.7	*(4–6)*
Percentage of those infected who are symptomatic	50%	Beta	α=11, β=11	*(7)*
Latent period	1 day	Gamma	Shape: 25, Scale: 0.04	*(8)*
Infectious period	2 days	Gamma	Shape: 40, Scale: 0.05	*(8)*
Relative infectiousness of asymptomatic individuals	66.7%	Beta	α=6, β=3	*(9, 10)*
Percentage of individuals clinically infected who seek primary care		Beta		*(11)*
Strategy 1/3	50%		α=20, β=20	
Strategy 2/4	80%		α=24, β=6	
Percentage of primary care general practitioner (vs emergency department)	80%	–	–	
Case-hospitalization rate		Beta	α=3, β=117	
0–19	1.875%			

20–64	2.5%			
≥65	5%			
Case-fatality rate		Beta	α=5, β=495	
0–19	0.75%			
20–64	1%			
≥65	2%			
Time to pandemic	5 years	Exponential		
Number of days absent from work for individuals clinically infected	2.6	Gamma	Shape: 8, Scale: 0.325	*(12)*
Vaccine and antiviral drugs				
Efficacy against infection				
Pre-pandemic vaccine				
1 dose	5%	(in proportion to 2nd dose efficacy)		
2 dose	40%	1-Efficacy ~ Lognormal	exp(μ)=0.6, σ=0.1	
Matched vaccine				*(13)*
1 dose	40%	(in proportion to 2nd dose efficacy)		
2 dose	80%	1-Efficacy~ Lognormal	exp(μ)=0.2, σ=0.1	
Booster to prepandemic	80%	1-Efficacy~ Lognormal	exp(μ)=0.2, σ=0.1	
Vaccine efficacy in ≥65 age group	50% of other age-groups	–	–	*See main text*
Antiviral Prophylaxis	-	-	-	*(14)*
Efficacy against infection	70%	1-Efficacy ~Lognormal	exp(μ)=0.3, σ=0.1	
Efficacy against transmission	60%	1-Efficacy ~Lognormal	exp(μ)=0.4, σ=0.1	
Antiviral Treatment				*(15)*
Reduction in hospitalization	59%	1-Efficacy~ Lognormal	exp(μ)=0.41, σ=0.2	
Reduction in mortality	59%	1-Efficacy~ Lognormal	exp(μ)=0.41, σ=0.2	
Percentage receiving antiviral treatment within 48 hours	80%	Beta	α=8, β=2	
Percentage of contacts of clinical cases receiving effective post-exposure antiviral prophylaxis	30%	Beta	α=6, β=14	
Percentage of infections resistant to antiviral drugs	10%	Beta	α=9, β=1	
Shelf life of vaccine	3 years	Gamma	Shape: 3, Scale: 1	
Shelf life of antiviral	5 years	Gamma	Shape: 20, Scale: 0.25	
Size of antiviral stockpile:		–	–	
Strategies 2/4	41% of population			
Strategies 1/3	1% of population			
Vaccine coverage	80%	Beta	α=8, β=2	*(16)*
Matched vaccine 1st dose timing- Days given post pandemic infection in Australia	180 days	Normal	μ=180, σ=30	
Pre-pandemic vaccine 1st dose timing- Days after pandemic infection in Australia	0 days	Normal	μ=0, σ=30	
Costs:				

Vaccine pre-pandemic and matched (per dose)	$12.00	Lognormal	exp(μ)=12, σ=0.08	
Administration (per dose)	$11.60	Lognormal	exp(μ)=11.60, σ=0.3	*(17)*
Antiviral treatment (per course)	$32	Lognormal	exp(μ)=32, σ=0.03	
Administration prophylaxis (per course)	$11.60	Lognormal	exp(μ)=11.60, σ=0.3	
Storage cost (per year)				
Antiviral per course	$0.5	Gamma	Shape: 1.5, Scale: 1/3	
Vaccine per dose	$1	Gamma	Shape: 1.5, Scale: 2/3	
General practitioner visit	$33.32	Lognormal	exp(μ)=33.32, σ=0.09	*(18)*
Emergency department visit	$72.35*	Lognormal	exp(μ)=72.35, σ=0.09	*(19)*
Hospitalization (per day)	$860.85	Lognormal	exp(μ)= 860.85, σ=0.09	*See main text*
Average hospitalization length of stay in days				*(20)*
0–19	3.0	Gamma	Shape: 4, Scale: 0.75	
20–64	5.1	Gamma	Shape: 6.8, Scale: 0.75	
≥65	8.0	Gamma	Shape: 10.67, Scale: 0.75	
Lost work day	$161	Lognormal	exp(μ)=161, σ=0.05	*(21)*
Discounting rate		–	–	*(22)*
Costs	5%			
Effects	5%			

*Standardized to 2005 Australian $ using consumer price indices

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