Objective: \$975, 512, 578, 151; without intervention: \$1,007, 336, 996, 814 (Desired optimality gap: 80%; actual: 77%. Lower Bound: \$222,487,000,000. Time to solve: 50s)  $C' = \$10,000, C^{D} = \$10,000,000$ One Period=7 days (costs scaled by 1,000,000 during optimization) Solved using solve\_and\_process\_vaccination\_T\_vax\_40\_S0\_antivax\_factor\_0.4\_KV\_0.05 Infected - No intervention 300000 -Infected Cumulative Deaths - No intervention **Cumulative Deaths** Recovered - No intervention ---- Recovered Susceptible - No intervention 250000 Susceptible Vaccinated - No intervention \$800,000 Vaccinated Cumulative Cost Total Cumulative Cost Total - No intervention 200000 \$600,000 **≦** 150000 \$400,000 100000 \$200,000 50000 6 7 20 22 24 26 100 Period 19 22 23 24 -21 -22 -23 -25 26 -18 -99 2 2 2. Social Gatherings (in a house) A:  $\$[0, 0, 0, 0] \cdot 10^2$ B:  $\$[0 , 0 , 0 , 0] \cdot 10^2$ C:  $\$[8 , 10 , 12 , 14 ] \cdot 10^2$ 3. Non-Food Service (bank, retail, etc) 3 3 2 2 1 1 1 1

\$3.8e+08 \$0.0 \$3.8e+08 1.000

\$2.2e+10 \$3.2e+09 \$1.9e+10 0.536 \$1.1e+ 0.677 \$2.2e+ \$2.2e+09 \$7.2e+ \$3.2e+08 \$1.1e+ \$8.9e+ 0.856 \$0.856 \$0.925

Movement

A:  $$[5000, 10000] \cdot 10^{2}$ 

**B:** \$[10000,20000]·10<sup>2</sup> C:  $\$[10 , 14 ] \cdot 10^2$ P: [.95 ,.93 ]

A:  $\$[0, 0] \cdot 10^2$ B:  $\$[0 , 0 ] 10^2$ 

C:  $\$[10 , 14 ] \cdot 10^2$ P: [.99 ,.95 ]

1. Education (University level)

P: [.99 ,.99 ,.97 ,.93 ]

A: \$[2500 ,5000 ,10000] 10<sup>2</sup>

B:  $\$[5000, 10000, 20000] \cdot 10^2$ 

C: \$[8 ,10 ,14 ]·10<sup>2</sup> P: [.99 ,.95 ,.93 ]

A:  $\$[0, 0, 0, 0] \cdot 10^2$ B:  $\$[0, 0, 0] \cdot 10^2$ 

C: \$[8 ,10 ,14 ]·10<sup>2</sup> P: [.99 ,.95 ,.93 ]

A: \$[2500 ,5000 ,10000] 10<sup>2</sup>

B: \$[5000 ,10000,20000] 10<sup>2</sup> C: \$[8] , 10 , 14  $]\cdot 10^2$ 

P: [.99 ,.95 ,.93 ]

C: \$[10 ,14 ]·10<sup>2</sup> P: [.95 ,.93 ]

8. Physical Distancing

Cost Per Period: TOTAL
Cost Per Period: POLICY

Cost Per Period: DISEASE

**Probability Factor** 

7. Border Control A:  $[5000, 10000] \cdot 10^2$ **B:** \$[10000,20000] 10<sup>2</sup>

A:  $\$[0] 10^2$ 

**B**: \$[0]  $10^2$ 

C: \$[10 ]·10<sup>2</sup> P: [.93 ]

4. Restaurants

5. Masking

6. Mega Events

A:  $\$[5000, 10000] \cdot 10^2$ **B:** \$[10000,20000] 10<sup>2</sup> C:  $\$[10 , 14 ] 10^2$ P: [.95 ,.93 ]