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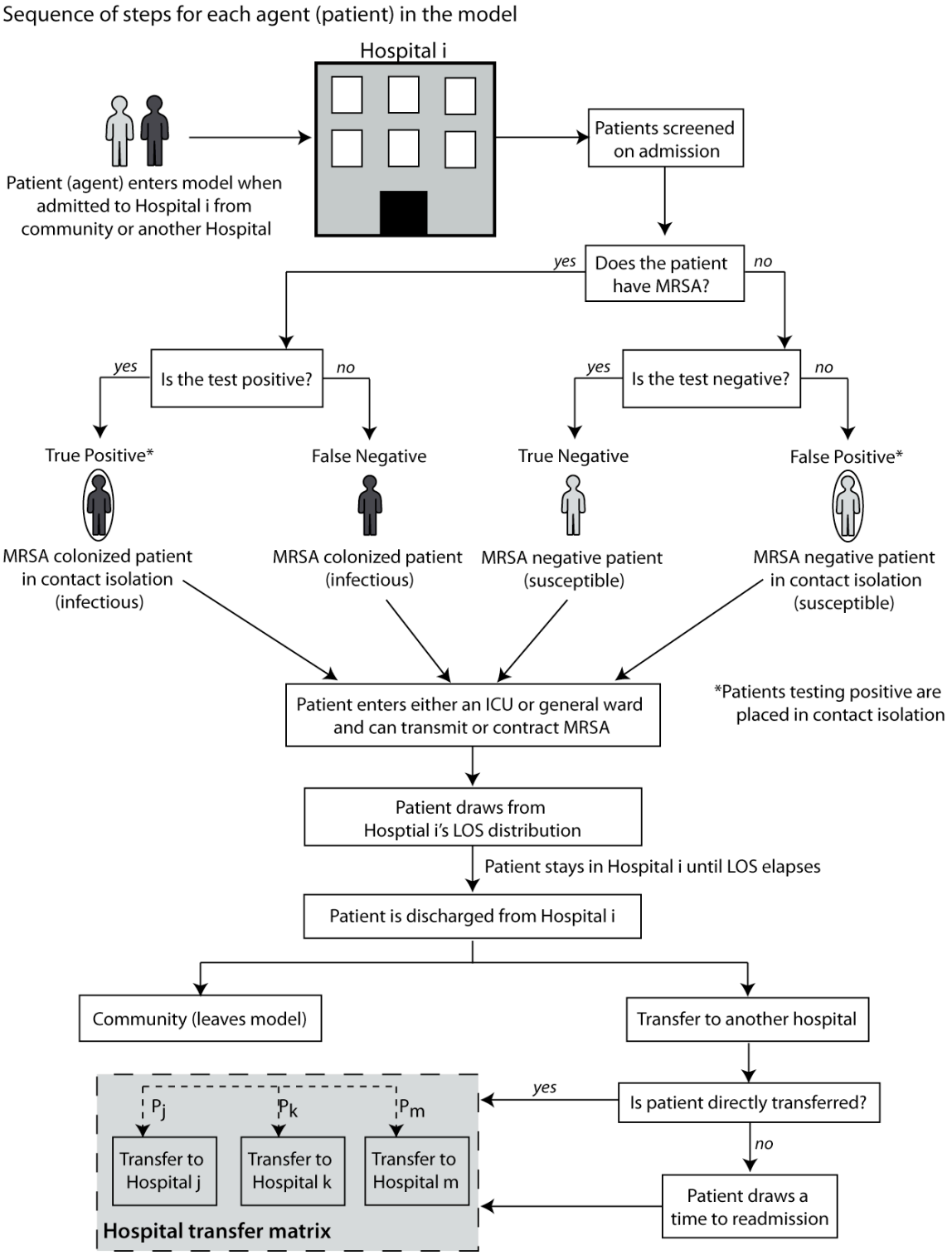
Appendix

Exhibit 1: Key hospital parameters (for 2006-2007 Orange County, California hospitalizations).

Hospital	Patient Admissions in 2006	Mean Patient Length-of-Stay (LOS) in Days	Median LOS (days)	General Ward Initial MRSA Prevalence	General Ward MRSA Transmission Coefficient (β)	ICU Initial MRSA Prevalence	ICU β
Acute Care							
A	7,111	6.57	4	0.028	0.00046	0.054	0.0109
B	15,058	6.20	4	0.031	0.00065	0.064	0.0053
C	4,540	5.70	4	0.044	0.00065	0.044	0.0067
D	21,488	5.05	4	0.029	0.00083	0.057	0.0069
E	9,202	4.06	3	0.032	0.0011	0.064	0.011
F	2,481	4.55	4	0.033	0.0012	0.064	-
G	6,932	4.41	3	0.032	0.00070	0.064	0.0120
H	2,366	6.59	4	0.012	0.00063	0.084	0.0107
I	14,347	6.59	4	0.088	0.00053	0.090	0.0060
J	13,755	5.45	4	0.026	0.00075	0.043	0.0064
K	14,281	4.96	4	0.032	0.00084	0.064	0.0085
L	16,095	5.17	4	0.014	0.00078	0.039	0.0076
M	4,028	4.30	4	0.021	0.0013	0.045	0.024
N	6,535	5.72	4	0.033	0.00062	0.290	0.0077
O	11,375	5.41	4	0.032	0.00061	0.064	0.0048
P	4,399	6.32	4	0.053	0.00047	0.080	0.0117
Q	12,020	4.50	3	0.056	0.00096	0.069	0.0058
R	8,951	5.67	4	0.043	0.00069	0.064	0.0088
S	11,505	4.54	4	0.032	0.00093	0.064	0.0059
T	2,773	6.94	5	0.031	0.00057	0.064	0.0105
U	15,967	4.67	4	0.124	0.00090	0.064	0.0091
V	26,292	5.06	4	0.032	0.00082	0.096	0.0072
W	4,810	5.39	4	0.010	0.00093	0.029	0.0219
X	4,881	5.38	4	0.015	0.00081	0.115	0.040
Long-term Acute Care (LTAC)							
AA	388	33.97	28.5	0.085	0.00033	-	-
BB	947	37.15	25	0.085	0.00028	-	-
CC	3,082	9.38	5	0.085	0.0016	-	-
DD	966	12.47	11	0.085	0.0011	-	-
EE	1,819	3.32	3	0.165	0.0056	-	-

Source: California Health and Human Services Agency. Office of Statewide Health Planning and Development,. Sacramento, CA [updated October 4, 2010; cited 2010]; Available from: http://www.oshpd.ca.gov/. And, Initial MRSA prevalence for each hospital's wards came from Project MAPP Infection Control Survey.

Exhibit 2. Sequence of steps for each agent (patient) in the model.



Source: author generated depiction.

Methodology

The following formula determined the new cases of MRSA (colonization or carriage) in a hospital ward or intensive care unit each day:

$$\text{New MRSA Cases (colonization)} = \beta SI + \beta(1-\theta)SI_{CI} + \beta(1-\theta)S_{CI}I + \beta(1-\theta)^2 S_{CI}I_{CI}$$

where β (beta) is the ward's transmission coefficient, S the number of susceptible patients, I the number of infectious patients (i.e., MRSA positive), and θ the staff compliance with contact isolation procedures. CI denotes those patients who are under contact isolation; I_{CI} are the true positives and S_{CI} are false positives placed under contact isolation. Contact isolation for other organisms or syndromes was not modeled.

Exhibit 3. Percent Relative reduction in MRSA prevalence (Number of Cases Averted*) at each healthcare facility when implementing various active surveillance and contact isolation campaigns.

	Hospitals Implementing Active Surveillance and Contact Isolation (75% Compliance)					
	Only This Hospital	1 Highest Capacity	5 Highest Capacity	10 Highest Capacity	11 Highest Volume[†]	All Hospitals
Acute Care Hospital Impacted:						
A	14.9 (59.1)	0.3 (1.0)	2.2 (8.7)	2.8 (11.1)	3.1 (12.4)	20.2 (80.4)
B	13.6 (100.2)	0.2 (1.5)	14.4 (106.3)	14.8 (109.0)	14.8 (108.9)	15.6 (115.0)
C	13.5 (36.1)	0.7 (1.9)	2.3 (6.2)	3.5 (9.4)	3.8 (10.2)	19.6(52.6)
D	10.3 (87.4)	0.3 (2.6)	11.4 (96.7)	12.0 (102.6)	12.1 (103.4)	13.6 (115.4)
E	8.3 (33.6)	0.4 (1.6)	1.0 (4.1)	2.7 (10.7)	2.8 (11.1)	11.9 (48.1)
F	6.7 (7.4)	0.1 (0.1)	2.3 (2.6)	4.7 (5.2)	4.8 (4.9)	12.2 (13.4)
G	9.9 (31.9)	0.3 (0.8)	1.6 (5.2)	2.9 (9.4)	3.1 (9.8)	14.9 (47.8)
H	19.1 (34.1)	0.7 (1.3)	1.9 (3.5)	2.6 (4.6)	2.7 (4.8)	22.8 (40.7)
I	17.0(260.9)	0.4 (6.1)	17.2 (265.4)	17.7 (272.7)	17.8 (273.1)	18.5 (284.3)
J	12.5 (72.0)	0.4 (2.3)	1.2 (7.0)	14.2 (81.7)	14.5 (83.5)	16.8 (96.7)
K	10.6 (69.2)	0.1 (0.8)	1.2 (7.8)	12.6 (82.3)	12.8 (83.1)	14.6 (95.1)
L	16.9 (115.5)	None	17.6 (120.4)	19.3 (132.1)	19.2 (131.5)	20.2 (138.1)
M	12.5 (18.5)	0.1 (0.2)	2.3 (3.4)	3.6 (5.4)	3.6 (5.4)	17.2 (25.4)
N	9.4 (33.5)	0.4 (1.3)	1.7 (6.1)	3.1 (11.0)	3.4 (12.2)	15.5 (55.5)
O	11.2 (60.6)	0.3 (1.7)	1.6 (8.9)	13.2 (71.5)	13.2 (71.7)	15.6 (84.8)
P	13.1 (40.8)	0.6 (1.9)	1.3 (4.1)	2.1 (6.6)	2.3 (7.1)	15.9 (49.3)
Q	8.7 (67.8)	0.2 (1.7)	0.7 (5.7)	9.7 (75.6)	10.0 (77.5)	10.6 (82.6)
R	15.6 (89.9)	0.2 (1.4)	0.36 (2.1)	0.7 (2.6)	0.5 (2.8)	16.4 (95.3)
S	9.8 (50.3)	0.5 (2.3)	1.2 (6.1)	2.4 (12.1)	12.1 (61.8)	13.5 (68.9)
T	11.3 (18.6)	0.0 (0.1)	1.7 (2.8)	2.8 (4.6)	3.1 (5.1)	20.2 (33.3)
U	8.6 (163.9)	0.5 (8.9)	0.9 (17.8)	9.2 (174.9)	9.2 (174.9)	9.4 (179.3)
V	12.2 (162.0)	12.2 (162.0)	12.7 (169.4)	13.1 (173.8)	13.3 (176.5)	13.9 (184.8)
W	10.5 (12.0)	0.6 (0.7)	2.9 (3.2)	4.7 (5.3)	4.8 (5.4)	17.8 (20.2)
X	9.3 (14.5)	none	1.5 (2.3)	3.0 (4.7)	3.3 (5.1)	16.5 (25.7)
Countywide Acute Care Reduction						
Mean	-	0.8 (8.4)	4.3 (36.1)	7.4 (57.5)	7.9 (60.1)	16.0 (84.7)
Median	-	0.3 (1.4)	1.7 (6.1)	4.2 (11.0)	4.6 (12.3)	15.7 (74.7)
Long-term Acute Care Facility Impacted:						
AA	9.9 (2.0)	4.5 (0.9)	10.9 (2.2)	12.9 (2.6)	13.2 (2.7)	25.3 (5.1)
BB	7.4 (4.8)	2.1 (1.3)	3.8 (2.5)	7.2 (4.7)	7.4 (4.8)	19.5 (12.8)
CC	12.7 (36.6)	0.8 (2.2)	1.26 (3.6)	1.5 (4.4)	1.6 (4.6)	15.8 (45.3)
DD	15.4 (8.5)	10.9 (6.0)	15.1 (8.4)	18.2 (10.1)	18.4 (10.2)	28.0 (15.5)
EE	11.3 (37.5)	0.4 (1.3)	0.6 (2.0)	0.7 (2.5)	0.8 (2.5)	12.6 (41.7)
Countywide Long-term Acute Care Reduction						
Mean	-	3.7 (2.3)	6.3 (3.7)	8.1 (4.8)	8.3 (5.0)	20.2 (24.1)
Median	-	2.1 (1.3)	3.8 (2.5)	7.2 (4.4)	7.4 (4.6)	19.5 (15.5)

*Per year, after the implementation of surveillance and isolation has taken full effect (approximately 6 months)

[†] Those with ≥10,000 Admissions (11 in OC)

Source: author generated data.

Exhibit 4. Benefits [Median (Range)] to each hospital when implementing active surveillance and contact isolation campaigns in select subsets of hospitals

Contact Isolation Compliance	Hospitals Implementing the Intervention					
	1 Highest Capacity	3 Highest Capacity	5 Highest Capacity	10 Highest Capacity	11 Highest Volume†	All Hospitals
	Reduction in Each Hospital's MRSA Prevalence (%)					
25%	0.2 (NE to 9.7)	0.5 (NE to 11.5)	0.7 (0.2 to 11.3)	1.5 (0.2 to 12.6)	1.6 (0.2 to 12.6)	5.7 (3.5 to 15.9)
50%	0.3 (NE to 10.4)	0.9 (0.2 to 13.0)	1.9 (0.4 to 13.5)	3.1 (0.2 to 13.5)	3.1 (0.4 to 15.6)	10.9 (0.2 to 13.8)
75%	0.4 (NE to 12.2)	1.3 (0.3 to 17.1)	1.7 (0.4 to 17.6)	4.7 (0.5 to - 19.3)	4.8 (0.4 to 17.6)	15.9 (9.4 to 28.0)
	Number of MRSA Cases Averted in Each Hospital*					
25%	1.0 (None to 55.0)	2.1 (None to 92.5)	2.2 (0.6 to 93.8)	4.1 (1.2 to 95.8)	4.2 (1.4 to 95.0)	18.8 (2.4 to 99.0)
50%	1.1 (None to 109.2)	2.9 (0.8 to 177.9)	4.1 (1.3 to 180.2)	7.3 (2.0 to 184.8)	7.8 (2.1 to 185.3)	36.2 (3.8 to 193.9)
75%	1.4 (None to 162.0)	4.0 (1.0 to 262.7)	5.7 (2.0 to 265.4)	10.1 (2.5 to 272.7)	10.2 (2.5 to 273.1)	52.6 (5.1 to 284.3)

*Per year, after the implementation of surveillance and isolation has taken full effect (approximately 6 months)

† Those with ≥10,000 Admissions (11 in OC)

NE = no effect

Source: author generated data.