Presentation Type:
Poster Presentation - Poster Presentation
Subject Category: Emerging Pathogens
Understanding Nosocomial Amplification by Identifying Important Parameters in a Community-Hospital Model
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Background: The phenomena of emerging infectious diseases accelerating once they reach healthcare facilities have been well documented. Outbreaks of MERS-CoV, SARS-CoV, and COVID-19 have led to in-hospital transmission where the initial patient infects healthcare workers, patients, visitors, etc., with infection control policies unable to curtail the spread early on. We refer to this phenomenon as nosocomial amplification. Nosocomial amplification causes an undue burden on a hospital that's already strained from the pandemic. We aimed to understand which hospital-level parameters impact the community most and vice versa. **Methods:** We adapted an SEIR compartmental model to have two interconnected units, a community unit and a hospital special care unit, to determine the number of COVID-19 acquisitions in each of them over a hypothetical year. The model was stochastically simulated using Gillespie's Direct Method for 1000 iterations. A parameter sensitivity analysis assessed the effects each parameter had on the model. The original values of all parameters were allowed to vary +/- 50%. The number of simulation acquisitions was normalized as a percent change from the original model's mean acquisition. **Results:** Our analysis found that parameters impacting the community had a disproportionate impact on COVID-19 acquisitions in the hospital as compared to the special care unit, as did the parameters governing the level of asymptomatic transmission. Transmission between healthcare workers facilitated within-hospital transmission even when strict patient-based cohorting and testing were in place. Extensive community-level transmission was also found to readily overwhelm hospital-level infection control at realistic levels of effectiveness and compliance. **Conclusion:** These findings illustrate that hospitals and the community are tightly linked systems. Hospitals may reintroduce infection into the community that might have contained or mitigated ongoing outbreaks or introduce the disease into a disease-free population; community transmission puts tremendous pressure on infection control. In the future, we can model policies to curb an existing COVID-19 outbreak or subsequent outbreaks to avoid or minimize nosocomial amplification, thus improving the disproportionate burdens on the healthcare system.

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Understanding the impact of mpox-related hospitalizations for medical versus infection control indications in New York City
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Understanding the impact of mpox-related hospitalizations for medical versus infection control indications in New York City **Background:** New York City (NYC) accounted for 15-20% of new mpox infections at the peak of the 2022-2023 United States outbreak. Globally, 8% of mpox patients required hospitalization. We investigated the proportion of mpox hospitalizations for medical versus infection control indications at two large healthcare systems in the New York metropolitan area. **Methods:** We included all patients admitted to NYU Langone Health or NYC Health + Hospitals for laboratory-confirmed mpox between May 1, 2022, and April 28, 2023. We analyzed demographic information, reasons for hospitalization, length of stay, number and type of co-infections, healthcare encounters, complications, and treatments received. **Results:**

Table 1. Demographic characteristics, sexual behavior, and housing status of patients hospitalized with mpox

	Overall cohort N=65	Admitted for mpox medical indication N=57	Admitted for mpox isolation N=8	p-value[a]
Age, years (median, IQR[b])	35 (31-40)	35 (30-39)	38 (34-44)	0.27[c]
Gender identity				
Cis male	45 (69%)	38 (66%)	7 (88%)	0.76
Cis female	5 (8%)	5 (9%)	0 (0%)	
Trans male	0 (0%)	0 (0%)	0 (0%)	
Trans female	4 (6%)	4 (7%)	0 (0%)	
Non-binary	1 (2%)	1 (2%)	0 (0%)	
Unknown	10 (15%)	9 (16%)	1 (12%)	
Race[d]				
White	10 (15%)	6 (11%)	4 (50%)	0.06
Black	25 (38%)	24 (42%)	1 (13%)	
Asian	3 (5%)	3 (5%)	0 (0%)	
Native American or Pacific Islander	2 (3%)	2 (4%)	0 (0%)	
Unknown	28 (43%)	24 (42%)	4 (50%)	
Ethnicity				
Hispanic	30 (46%)	26 (45%)	4 (50%)	0.23
Non-Hispanic	33 (51%)	30 (53%)	3 (38%)	
Unknown	2 (3%)	1 (2%)	1 (12%)	
Sexual behaviour				
MSM	49 (75%)	42 (74%)	7 (88%)	0.72
Housing status				
Private residence	48 (74%)	46 (81%)	2 (25%)	**<.01**
Homeless shelter or unsheltered[e]	9 (14%)	5 (9%)	4 (50%)	**<.01**
Other[f]	8 (12%)	6 (10%)	2 (25%)	0.24

[a]Pearson's chi-squared test, unless otherwise specified.
[b]IQR: Interquartile Range.
[c]Wilcoxon ranked sum test.
[d]Two patients in the mpox medical indication group and one patient in the mpox isolation group identified as belonging to two racial categories.
[e]On street, in a vehicle, or other place not meant for habitation.
[f]Private residence of friend/family member, permanent supportive housing or other housing arrangement.

Table 2. Co-morbidities and vaccination status of patients hospitalized with mpox

	Overall cohort N=65	Admitted for mpox medical indication N=57	Admitted for mpox isolation N=8	p-value[a]
Mpox vaccination status[b]				
Unvaccinated	57 (88%)	50 (88%)	7 (88%)	0.62
Partially vaccinated	5 (8%)	4 (7%)	1 (12%)	
Vaccination received after exposure/infection	3 (4%)	3 (5%)	0 (0%)	
HIV status				
HIV-positive	38 (58%)	36 (63%)	2 (25%)	**0.04**
Absolute CD4, cells/mm^3 (median, IQR) N=36[c]	307 (147-573)	338 (155-574)	174 (157-191)	0.32[d]
CD4 % (median, IQR) N=34[c]	19 (9-29)	19 (9-29)	20 (16-23)	1.00[d]
Undetectable HIV RNA (≤50 copies/mL) N=36[e]	13 (36%)	12 (35%)	1 (50%)	0.70
Presence of opportunistic infection (OI) at admission	7 (18%)	7 (19%)	0 (0%)	0.29
Presence of any immunocompromising condition	2 (3%)	2 (4%)	0 (0%)	0.59
Presence of any dermatologic condition	9 (14%)	8 (14%)	1 (12%)	0.91
Presence of any psychiatric diagnosis	17 (26%)	12 (21%)	5 (63%)	-[f]

[a]Pearson's chi-squared test, unless otherwise specified.
[b]Partial vaccination was receipt of one vaccine dose ≥14 days prior to mpox infection. No patients were fully vaccinated.
[c]Two patients did not have data on absolute CD4 count; four did not have data on CD4 %.
[d]Wilcoxon ranked sum test.
[e]Two patients in the mpox medical indication group did not have data on HIV RNA level.
[f]A statistical analysis was not performed due to concern of potential inconsistencies in psychiatric screening. Thus, the values presented may be an underestimate.

Table 3. Outcomes among patients hospitalized with mpox

	Overall cohort N=65	Admitted for mpox medical indication N=57	Admitted for mpox isolation N=8	p-value[a]
Total number of hospital admissions	80	72	8	-
Number of hospital admissions per patient, median (IQR)	1 (1-1)	1 (1-1)	1 (1-1)	0.18[b]
Cumulative length of stay per patient in days, median (IQR)	4 (2-10)	4 (2-10)	6 (3-9)	0.69[b]
Significant complications				
Secondary bacterial infections	40 (62%)	38 (67%)	2 (25%)	**0.02**
All-cause ICU admissions[c]	8 (12%)	8 (14%)	0 (0%)	0.26
Cumulative length of stay for patients in ICU (N=8)	4 (2-41)	4 (2-41)	0	N/A[d]
In-hospital death	3 (5%)	3 (5%)	0 (0%)	N/A[d]
Treatments received				
Tecovirimat	40 (62%)	37 (65%)	3 (38%)	0.14
Antibiotics	49 (75%)	47 (82%)	2 (25%)	**<.01**

[a]Pearson's chi-squared test, unless otherwise specified.

[b]Wilcoxon ranked sum test.

[c]Of the eight patients admitted to the ICU, five (63%) had an ICU indication (mechanical ventilation, need for pressor support, or need for renal replacement therapy).

[d]P-value is N/A due to insufficient number of patients for analysis.

Sixty-five patients were hospitalized for mpox, with 8 (12%) admitted primarily for infection control isolation (Table 1). Median age was 35 years (IQR=31-40), 69% were cisgender men, and 38% were Black. Those hospitalized primarily for isolation were more likely to reside in a homeless shelter (50% vs. 9%, p < 0 .01) and less likely to have a private residence (25% vs. 81%, p < 0 .01) than those hospitalized for medical indications. Those hospitalized for medical indications were more likely to have HIV (63% vs. 25%, p=0.04), secondary bacterial infections (67% vs. 25%, p=0.02), and to receive antibiotics (82% vs. 25%, p < 0 .01) (Tables 2 and 3). There was no significant difference in median cumulative length of stay per patient (p=0.69) between those hospitalized for medical versus isolation purposes. Most admissions for medical indications were for soft tissue superinfection (40%), severe pharyngitis and/or proctitis (28%) and pain management (20%). There was no significant difference in the proportion of tecovirimat receipt (65% vs. 38%, p=0.14) between those hospitalized for medical versus isolation purposes. **Conclusion:** Infection control isolation accounted for a significant proportion (12%) of mpox hospitalizations and was associated with a similar median length of stay per patient as hospitalization for medical indications. Our small cohort limits statistical power for comparison between groups. However, our findings argue for increased community-based isolation capacity. This may reduce unnecessary hospitalizations during future outbreaks, particularly amongst unsheltered individuals or those living in congregate settings.

Disclosure: Madeline DiLorenzo: Stocks - Abbvie, Amgen Inc., Becton Dickinson, Biogen Inc., Bristol Myers and Squibb, CVS Health, Davita Inc., Elevance Health, Gilead, Henry Schein, Hologic Inc., Humana Inc., Jazz Pharmaceuticals, Laboratory Corp, Merck and Co., Quest Diagnostics, ResMed Inc., Teladoc Health, Vertex Pharmaceuticals, West Pharmaceuticals

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Building a Special Pathogen Response Center from the Ground Up

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Background: In September 2022, UNC Hospitals was awarded a Regional Emerging Special Pathogens Treatment Center (RESPTC) grant by the U.S. Department of Health and Human Services Administration for Strategic Preparedness and Response (ASPR) to care for up to two patients with viral hemorrhagic fever, or similar pathogen, and up to ten patients with novel respiratory pathogens. Intensive infection prevention efforts and timely multidisciplinary commitment was required to develop the Space, Strategy, Staff, and Stuff needed to care for patients with a special pathogen. **Methods:** Multiple space needs assessments were undertaken to acquire spaces for the care of patients, simulation training, and a dedicated laboratory. Strategies for developing the response plan required collaboration with hospital executives, nursing leadership, public health leaders, and regional partners. Staff were recruited across various disciplines to join the response team and were provided hands-on skills training which was assessed by post-training surveys. Specialized 'stuff' (i.e., PPE, training equipment, and waste management devices) were researched and procured for use by the team. **Results:** Patient care and dedicated laboratory space was identified within existing infrastructure, and renovation plans were developed to adapt the space for these specialized activities. A waste management plan that benefits the hospital for routine waste and allows for Category A waste management was approved. Fifty-three staff members were recruited from 3 main disciplines (RNs, MDs, Paramedics), and across numerous settings (Medicine Acute Care & ICU, Pediatric ICU & Stepdown, Air Care/Transport, Burn ICU, Surgery Stepdown, Emergency Medicine, Infection Prevention, Infectious Disease) were trained during five 4-hour training sessions, culminating in an exercise involving transporting a rule–out Ebola patient to the hospital's special pathogens unit. Post-training evaluations demonstrated a very high level of confidence ('strongly agree') in staffs' knowledge about the RESPTC site (92.3%), special pathogens (80.8%), collaboration needed for managing patient care (80.8%), and in their comfort with special PPE donning and doffing (73.1%). **Conclusions:** Using a systematic approach to develop Space, Strategy, Staff, and Stuff, a large academic hospital readied itself to become a new RESPTC site. Key lessons learned include the importance of a multidisciplinary response team; local, state, and regional coordination for care planning and delivery; and early community partnership development. Logistical infrastructure and waste management challenges continue to require partnership with hospital leadership to optimize workflows and patient care. Holistic decision-making around infrastructure has led to changes that benefit all hospital patients and offer efficiencies to

Disclosure: William Fischer: Consultant - Roche, Merck, Inhalon Biopharma; Speaker for ACGME - IMG. David J Weber: Consultant on vaccines: Pfizer; DSMB chair: GSK; Consultant on disinfection: BD, GAMA, PDI, Germitec

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Improving Cleaning Validation Utilizing Adenosine Triphosphate Technology

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Background: Thorough cleaning and disinfection of high-touch surface areas in hospital inpatient rooms remain vital parts of effective strategies in reducing hospital-acquired infections (HAIs). Currently, Methodist Specialty & Transplant Hospital (MHST) inconsistently utilizes fluorescent marking for terminal cleaning validation. Without quantitative results, it's difficult to measure the effectiveness of cleaning. To ensure