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.