Open Forum Infectious Diseases

BRIEF REPORT

Establishing a Distribution Network for COVID-19 Monoclonal Antibody Therapy Across a Large Health System During a Global Pandemic

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Emergency authorized coronavirus disease 2019 (COVID-19)–neutralizing monoclonal antibodies can aid outpatients with mild to moderate COVID-19 infection. Many report barriers to adequate distribution and uptake. We present our model for distribution in a large health system as well as early lessons learned.

Keywords. COVID-19; COVID-19 therapies; monoclonal antibodies.

Two neutralizing monoclonal antibody (mAb) treatments for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) received Emergency Use Authorization (EUA) in late 2020 from the Food and Drug Administration for treatment of outpatients with mild to moderate coronavirus disease 2019 (COVID-19) infection [1, 2]. Available limited evidence suggests that these treatments lead to decreased health care visits including hospitalizations [3, 4]. Currently mAbs are taxpayer purchased and supplied without charge to institutions. Aside from evidence limits, early use limits often come from logistics around providing outpatient infusions within a short eligibility window [5, 6].

At the University of Pittsburgh Medical Center (UPMC), we chose to proceed with wide use given the public interest and early evidence of benefit. We describe our process for allocating and administering these agents across our health system's Pennsylvania locations including 35 hospitals, several senior community facilities and skilled nursing facilities (SNFs), and numerous outpatient providers.

The Pennsylvania Department of Health supplied mAbs to UPMC sites within the state weekly and as a single entity. Our central pharmacy supply shipped mAbs regularly to each hospital pharmacy associated with one of these infusion centers where the mAb was compounded for use when a patient arrived. We specifically chose outpatient infusion centers (Figure 1) for this process and avoided administration in emergency departments. We created a process seeking fair and equitable access to mAb infusion across all our sites in Pennsylvania. We modeled an mAb-weighted lottery process based on our previous similar tool used for fair allocation of remdesivir [7]; the lottery would occur during any periods where demand exceeded supply or infusion chair availability. In this lottery, specific patient characteristics receive weighted odds for individual patients. We initially limited eligibility to patients 65 or older or with a body mass index of at least 35 as the available literature at the time indicated benefit in these groups specifically [3]. Patients with mild to moderate COVID-19 symptoms for ≤9 days were eligible for referral. We utilized a 9-day referral limit to allow for any review or scheduling delays yet still ensure that patients could be infused within 10 days of symptom onset.

Figure 2 describes our mAb referral, review, allocation, and administration processes. We accepted referrals from outpatient offices, urgent care centers, emergency departments, and our senior community facilities or SNFs. For providers not affiliated with UPMC, we developed a paper-based referral form to accept referrals from non-UPMC-affiliated providers. Potential SNF candidate identification utilized a collaborative approach involving SNF medical directors, the attending physician or nurse practitioner, and the SNF nursing and infection preventionist staff.

We reviewed referrals every morning using either a physician or pharmacist to verify eligibility. After allocation, nurse coordinators communicated results with referring providers and facilitated scheduling with 12 infusion centers providing up to 295 mAb infusion appointments per week throughout Western and Central Pennsylvania. Each patient was scheduled for 3 hours to allow for patient arrival, a 60-minute infusion and 60-minute observation, and chair cleaning. We expanded availability at preexisting outpatient infusion centers and identified new sites as well. For those patients in a senior community facility or SNF, our trained nurses administer mAbs. Our system's medical, nursing, and patient safety leadership allocated 5.5 FTE for administration of this process, for daily clinician referral review (15–30 minutes per day), and to be available for questions.

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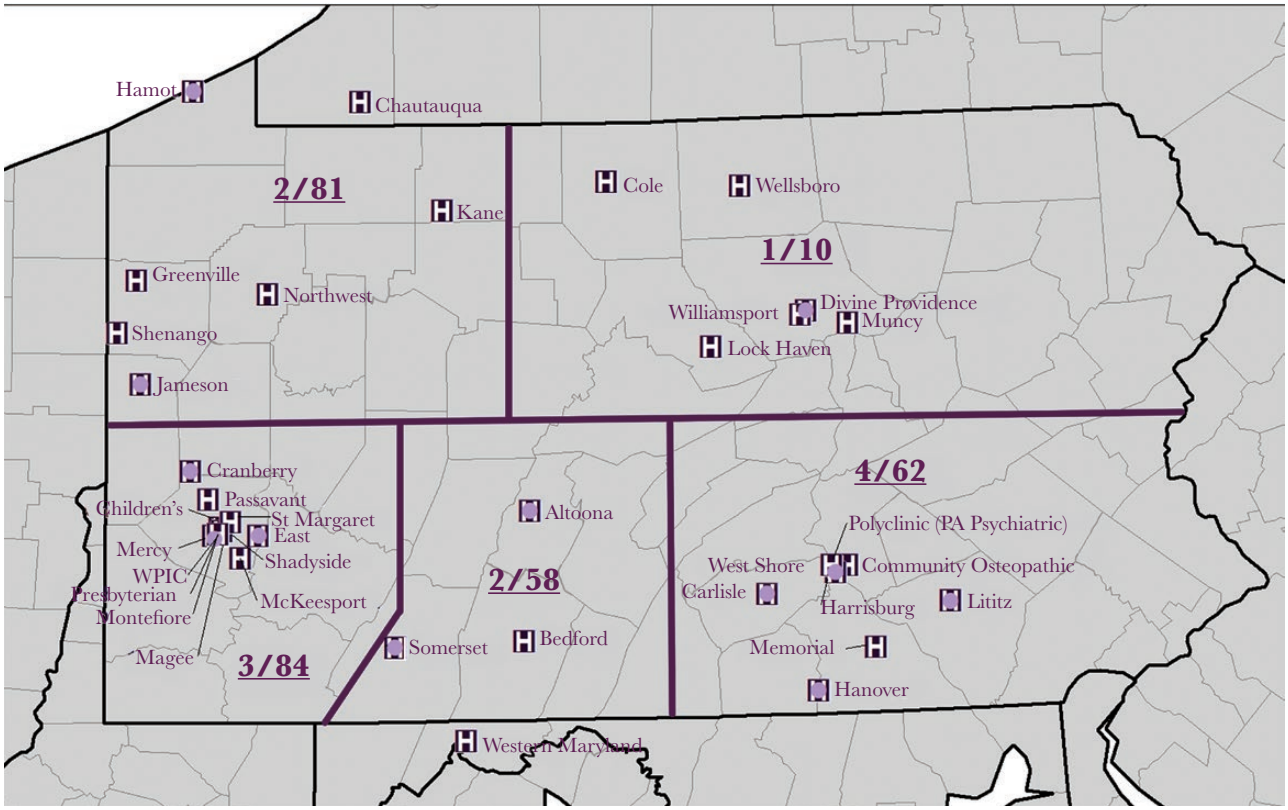

Figure 1. Map of UPMC hospitals. Initial COVID-19 monoclonal antibody infusion centers indicated by light purple dots. Per region, weekly COVID-19 monoclonal antibody infusion center capacity, reported as number of sites/weekly infusion chair appointments available. Abbreviations: COVID-19, coronavirus disease 2019; UPMC, University of Pittsburgh Medical Center.

We began our planning process after the initial EUA in November 2020, and we infused our first patient on December 8, 2020. In our initial 2 weeks, 187 patient referrals resulted in 167 (89%) eligible patients. Seventeen of the 20 ineligible patients (85%) had symptoms for >9 days before referral. Of the 167 who were eligible for infusion, 116 (69%) received mAb. The remainder declined infusion when contacted for scheduling (n = 14), clinically worsened before infusion (n = 8), improved before infusion (n = 5), were unreachable for scheduling (n = 4), or had other reasons for not receiving infusion (n = 20).

We learned several lessons. Distributing medication for outpatient infusions within a limited eligibility window is logistically demanding. UPMC leadership committed resources to fairly allocate this and to ensure access across our entire region. We opened and expanded infusion sites to address inequalities exposed during the COVID-19 pandemic [8]. We worked to ensure that infusion centers were uniformly distributed across our catchment areas and were often located in locations with high area-of-deprivation indices [9]. We utilized preexisting infusion centers where available and created stand-up infusion centers in areas where we had inadequate coverage. Information Technology also committed significant resources, as a referral process was needed in each of 3 different electronic medical record systems utilized across our system. To address infection prevention issues in our preexisting infusion centers, we utilized physically separated corridors or other isolated areas with dedicated entrances for COVID-19 patients where possible. Where this was not physically possible, we expanded hours to allow for times when only COVID-19 patients were present. At sites providing care for both COVID-19 and other patients at the same time, infusion center nurses provided care to both patient groups if needed, observing proper PPE practices for COVID-19 patients.

Due to adequate drug supply and infusion chair capacity, there has been no need for our weighted lottery. As drug supply, patient demand, and chair and staff availability allowed, we expanded eligibility after 1 month to immunocompromised patients, patients in our behavioral health units, eligible adolescents and pregnant patients, and homebound patients via home health services. We now offer treatment to all patients who meet any of the eligibility criteria under the EUAs. Most recently we have also increased our infusion center capacity to 16 sites.

Initial limitations included addressing infection prevention concerns in infusion centers that treat other patients, identifying adequate chair availability uniformly across our service regions, maintaining compliance with EUA and

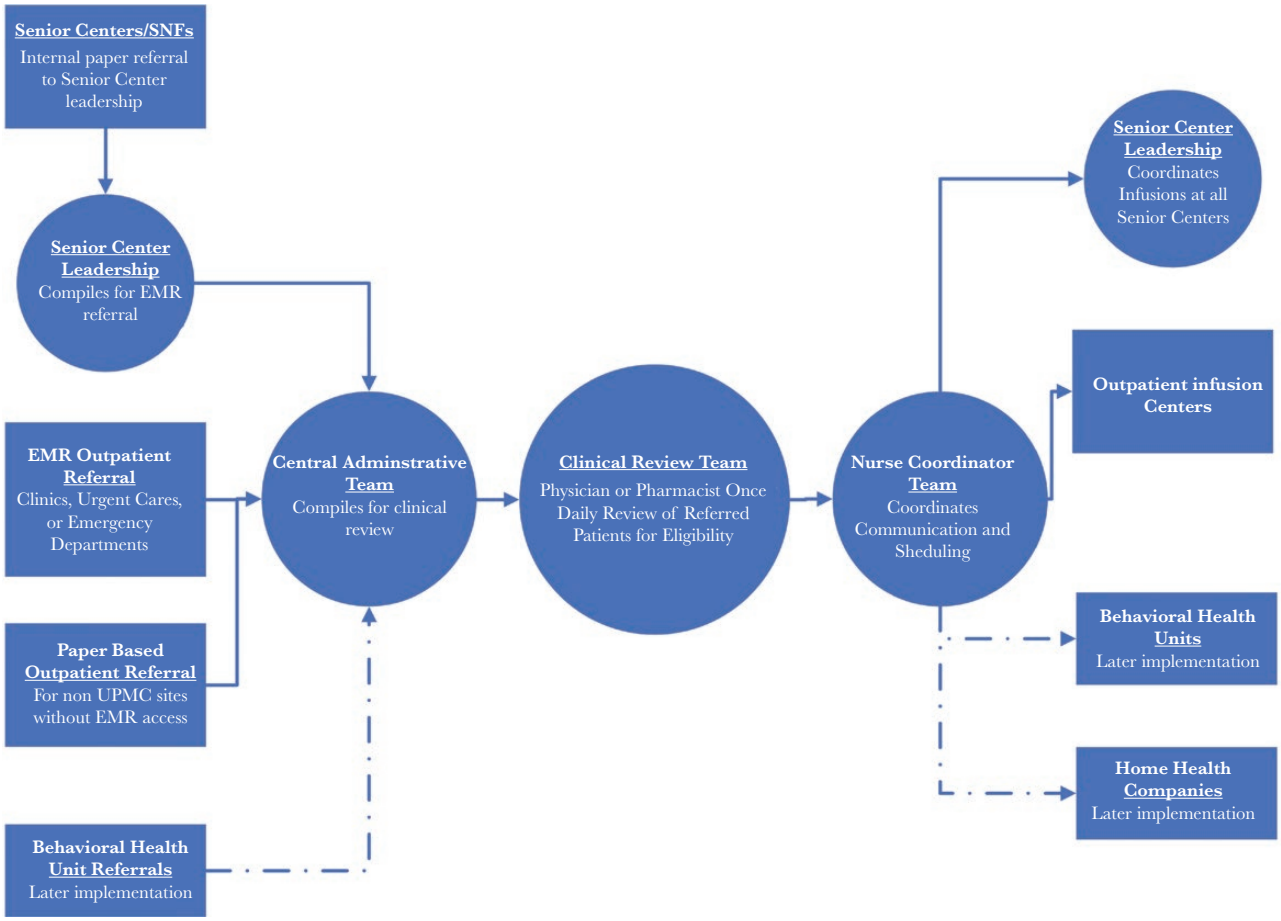

Figure 2. Referral and review process.

UPMC eligibility criteria, coordinating referrals and medication ordering across multiple electronic health records (EHRs) and sites without EHRs, and maintaining the FTE support required for this process. Also, not all infusion centers are equipped and certified to provide infusions to adolescent patients.

The need to educate providers about the availability and effectiveness of these agents persists. Some providers continue to harbor hesitation about these agents due to the limited clinical evidence to date, especially regarding benefit in certain authorized patient groups such as adolescents. Many outpatient providers also have a general lack of familiarity around utilizing outpatient infusion centers. Adequate reimbursement for home infusion services remains an issue we are working to address. Finally, the largest barrier is nurse availability for staffing extended infusion centers hours. Due to inpatient staffing needs, many available nurses were needed in the inpatient settings. We utilized financial bonuses for this additional infusion center work when needed.

Along with preventative measures such as masks, social distancing, and vaccination, as well as the various therapies for inpatient management of COVID-19 patients [10, 11], passive antibody therapy with mAbs provides an option for the treatment of mild to moderately ill outpatients that can prevent progression to hospitalization. We await further clinical evidence regarding the benefit of these agents for patients. In the meantime, we share our efforts and learning to aid all in delivering this in a fair, effective manner, and realize it may be a model for other care distribution.

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Patient consent. No patient consent was required for this manuscript, which is a description of processes developed for mAb distribution. No patient medical records were accessed for preparation of this manuscript. Review and ongoing evaluation of our process are conducted under the auspices of a quality improvement protocol and initiative.

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