Prepare to adapt: blood supply and transfusion support during the first 2 weeks of the 2019 novel coronavirus (COVID-19) pandemic affecting Washington State

Monica B. Pagano[1,2] *John R. Hess*[1,2] *Hamilton C. Tsang*[1] *Elizabeth Staley,*[1] *Terry Gernsheimer,*[1,2] *Nina Sen,*[1] *Christine Clark,*[1] *Theresa Nester,*[3] *Curt Bailey,*[3] *and Kirsten Alcorn*[3]

BACKGROUND: The first coronavirus (COVID-19) case was reported in United States in the state of Washington, approximately 3 months after the outbreak in Wuhan, China. Three weeks later, the US federal government declared the pandemic a national emergency. The number of confirmed COVID-19 positive cases increased rather rapidly and changed routine daily activities of the community.

STUDY DESIGN AND METHODS: This brief report describes the response from the hospital, the regional blood center, and the hospital-based transfusion services to the events that took place in the community during the initial phases of the pandemic.

RESULTS: In Washington State, the first week of March started with four confirmed cases and ended with 150; by the end of the second week of March there were more than 700 cases of confirmed COVID-19. During the first week, blood donations dropped significantly. Blood units provided from blood centers of nonaffected areas of the country helped keep inventory stable and allow for routine hospital operations. The hospital-based transfusion service began prospective triaging of blood orders to monitor and prioritize blood usage. In the second week, blood donations recovered, and the hospital postponed elective procedures to ensure staff and personal protective equipment were appropriate for the care of critical patients.

CONCLUSION: As community activities are disrupted and hospital activities switch from routine operations to pandemic focused and urgent care oriented, the blood supply and usage requires a number of transformations.

Emergency planning scenarios have included planning for health care and community operations in the setting of a pandemic for years. Our plans have not been thoroughly tested until now. When the 2019 novel coronavirus (COVID-19) infection started in a single city in China a mere 3 months ago, there was only mild concern for development into a pandemic. Now the United States is just one of many countries seeing rapidly rising case counts and deaths. Both fear and appropriate public health measures have rapidly disrupted the normal workings of society and the health care system in particular. Adequate blood supply and public messaging, testing capacity, highly skilled laboratory personnel, transportation, and alterations to hospital operations should be considered to adequately support the community during the outbreak.[1]

The first case of COVID-19 in the United States was reported on January 21, 2020, in Washington State.[2] The University of Washington Medical Center was on heightened alert given the number of flights that routinely arrive from Asia to the West Coast, and the Virology Division had started preliminary testing development.

The number of confirmed cases in Washington State escalated very rapidly from four in late February/first week of March, to 150 in the second week, and more than 750 cases as we started the third week of March.[2] Just recently, on March 13, the COVID-19 pandemic was declared a national

ABBREVIATION: BWNW = Bloodworks Northwest.

From the [1]Transfusion Medicine Division, Laboratory Medicine, University of Washington, the [2]Hematology Division, Medicine, University of Washington and [3]Bloodworks Northwest, Seattle, Washington.

Address reprint requests to: Monica B. Pagano, MD, Transfusion Services, University of Washington, 1959 NE Pacific St, Seattle WA 98115; e-mail: monibea@uw.edu

Received for publication March 17, 2020; revision received March 20, 2020, and accepted March 20, 2020.

doi:10.1111/trf.15789

TRANSFUSION 2020;9999;1–4

emergency.[3] As the number of the cases increased, the community, the hospital, and transfusion services responded with measures aimed at preventing further spread of the virus in the community and providing appropriate health care service (Fig. 1).

This report describes the response of the university's hospital, the regional blood center Bloodworks Northwest (BWNW), and the hospital-based transfusion services in the context of the events that took place in the community.

WEEK 1, FEBRUARY 29, 2020: DEALING WITH UNCERTAINTY

Community

As the first patients who tested positive with COVID-19 were identified, members of the community became highly concerned. People rushed to stores to buy and stock essential products. Some products (e.g., hand sanitizer, disinfecting wipes, toilet paper) went out of stock in a matter of hours. By the end of the week, several major organizations asked their employees to work from home; the university's main campus was closed. Routine daily activities of the community were disrupted.[4]

Hospital

The hospital activated the Incident Command Center, and resources were focused on first-line responders. This meant providing health care to patients suspected to be infected with COVID-19 and implementing strategies for patients to be tested without presenting to the hospital. Overall, hospital services including surgeries and procedures were not disrupted. Daily status was discussed at the morning safety huddle, which has representation from all service lines. The virology laboratory went live with clinical testing for COVID-19 and started gathering resources to rapidly increase testing capacity.[5]

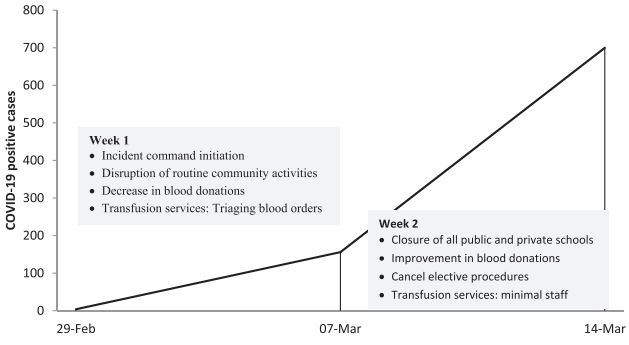

Fig. 1. Number of cases and escalation of measures and response from the community.

Blood center

During this first week, blood donations dropped precipitously. The local blood supplier, BWNW immediately began messaging about the safety and need for blood donation in the community.[6,7] News outlets and public health, community, and business leaders were contacted to help spread accurate information about the need for healthy volunteer blood donors. BWNW provided information to the hospitals it supplies and asked for immediate implementation of shortage protocols, use of stringent transfusion criteria, and review of transfusion orders to help maintain the blood supply for as long as possible. As donations remained low, BWNW reached out to the AABB Task Force, which provided an immediate response to the regional needs. Blood centers around the country shipped products to BWNW, boosting the regional inventory to start the second week of the pandemic.

Transfusion services

The hospital-based transfusion service had adequate blood inventory to support routine operations. Daily communication with the blood center and key clinical teams, including the cancer center and the anesthesia service, helped to predict whether the blood inventory was adequate to cover patient needs. Transfusion services implemented a blood order triage plan to ensure the appropriate clinical use of blood (Table 1). The overall use of products significantly decreased for inpatients this first week and remained stable for the outpatient clinic (Fig. 2). To ensure adequate platelet inventory, the laboratory already had processes in place to split platelets if the shortage became severe and started developing new procedures for bacterial testing to extend platelet expiration from Day 5 to Day 7. None of these measures were needed this first week given the adequate supply.

Despite the disruption of daily activities in the community, laboratory staffing was sufficient in the transfusion services to cover routine and emergency operations. Reagents and other supplies were also adequate.

WEEK 2, MARCH 7, 2020: PRIORITIZING AND ALLOCATING RESOURCES

Community

During the second week, there was a 25-fold increase in the number of positive cases, and there were clear concerns of

TABLE 1. Criteria for prospective order review to conserve inventory

Criteria for blood order review
>1 red blood cell (RBC) unit/24 hours for orders outside of operating room
>4 RBC units/case from surgical cases
>1 platelet unit/24 hours for orders outside the operating room
>2 platelet units/24 hours for orders from the operating room

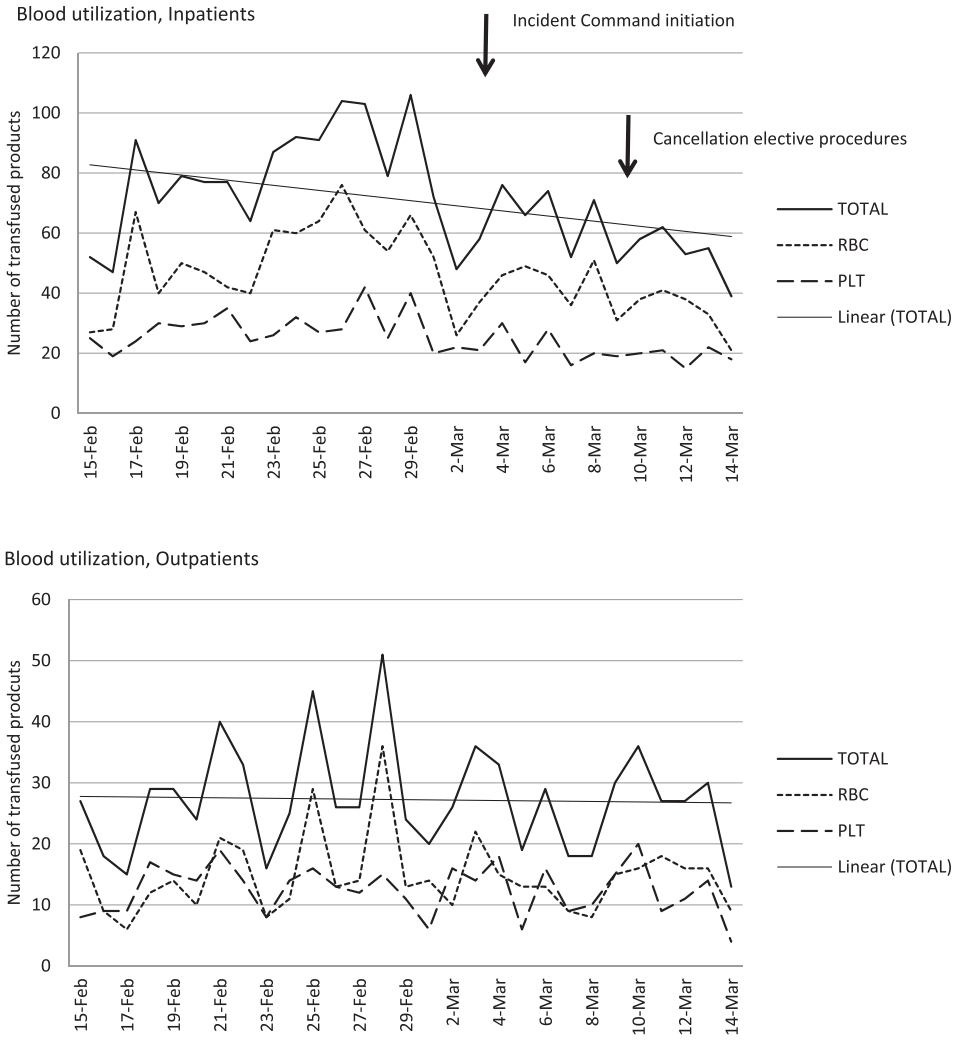

Fig. 2. Blood use for inpatients and outpatients in relation with hospital operations.

cryptic spread of the virus across the state. Washington State governor Jay Inslee announced measures to close all public and private schools and to discontinue in-person instruction for all higher education institutions in the state through April 24.[8] This measure, intended to slow the spread of the virus throughout the community, resulted in more challenges to hospital and laboratory staff availability, for example, meeting household needs, including child care support. The community was very responsive to public health guidelines, with a notable decrease in traffic and population in any public space.

Hospital

The hospital committed resources to continue supporting COVID-19 testing and clinical care of confirmed cases. Protecting the well-being of the workforce was also prioritized. With the goal of ensuring adequate personnel and personal protective equipment availability, hospital leadership decided to postpone all elective surgeries and procedures for the following 2 weeks. The hospital also organized resources to provide child care to ensure that health care professionals could come to work.

Blood center

Blood donations started to improve. Combined with the blood that had come from around the country and all local hospitals' careful blood supply management and suspension of elective surgical cases, the local blood supply began to recover toward baseline. BWNW strengthened its own recommendations for staff in higher-risk groups to work from home and began its own contingency planning for potential impact to critical staff. This included discussion with the university's transfusion services medical staff to share service and on-call responsibilities if needed.

It warrants mention that the improvement of blood donations has been previously described during a Japanese influenza epidemic.[9]

Transfusion services

As the number of routine surgeries decreased, blood use for inpatients continued to have a slow downtrend (Fig. 2). Because staffing was appropriate and operations were decreasing, transfusion services was asked to provide medical laboratory scientists to support the virology laboratory, which had a high volume of testing. Transfusion services were operating appropriately with minimal staff and had a contingency plan in case of critical shortage of personnel to triage the need for secondary processing (i.e., volume reduction and washing) and testing (e.g., extended antibody screen, reference laboratory testing). To date, implementation of contingency plans has not been required.

MARCH 14 AND MOVING FORWARD: CONTINUE TO ADAPT AND PROJECT

The number of COVID-19 cases is expected to follow an upward trend for the next several weeks. As we start the third week of this unprecedented situation, we continue evaluating operations and resources on a daily basis to maintain a balance between blood demand and blood availability. As hospital activities switch from routine operations to pandemic focused and urgent care oriented, the transfusion services will adapt accordingly.

RESOURCES

AABB has posted several resources for donor centers and transfusion services on their Web site that we follow closely.[10] Local public health authorities and social media are resources to reach out widely to the community and make them aware of the implications related to blood shortages and the need for daily, routine blood donations.

CONFLICT OF INTEREST

The authors have disclosed no conflicts of interest.

REFERENCES

1. Zimrin AB, Hess JR. Planning for pandemic influenza: effect of a pandemic on the supply and demand for blood products in the United States. Transfusion 2007;47:1071-9.
2. Washington State Department of health. Available from: https://www.doh.wa.gov/Emergencies/Coronavirus.
3. Trump DJ. Proclamation on declaring a national emergency concerning the novel coronavirus disease (COVID-19) outbreak. White House Proclamations; 2020.
4. University of Washington. Press conference: University of Washington's response to COVID-19. UW News staff; 2020.
5. Green SJ. UW medicine gets green light to test for coronavirus. The Seattle Times 2020.
6. Bloodworks Northwest. Bloodworks Northwest reassures community it's safe to donate blood: donors reminded to visit neighborhood donor centers and blood drives. Bloodworks Northwest Press Release; 2020.
7. Bloodworks Northwest. Blood supply hits emergency level due to coronavirus concerns: community action needed to prevent blood supply collapse. Bloodworks Northwest Press Release; 2020.
8. Furfaro H, O'Sullivan J, Morton N, Bazzaz D. Inslee expands coronavirus K-12 school closure, 250-person gathering ban, across Washington. The Seattle Times 2020.
9. Tsubokura M, Nakada H, Matsumura T, et al. The impact of H1N1 influenza A virus pandemic on the blood donations in Hyogo Prefecture, Japan. Transfusion 2010;50:1803-5.
10. AABB Coronavirus resources. Available from: http://www.aabb.org/advocacy/regulatorygovernment/Pages/AABB-Coronavirus-Resources.aspx.