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## Major Article

## Strategies utilized to prevent and control SARS-CoV-2 transmission in two congregate, psychiatric healthcare settings during the pandemic



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## A B S T R A C T

**Background:** The COVID-19 pandemic has had a substantial effect on the delivery of psychiatric health care. Inpatient psychiatric health care facilities have experienced outbreaks of COVID-19, making these areas particularly vulnerable.

**Methods:** Our facility used a multidisciplinary approach to implement enhanced infection prevention and control (IPC) interventions in our psychiatric health care areas.

**Results:** In a 16-month period during the COVID-19 pandemic, our 2 facilities provided >29,000 patient days of care to 1,807 patients and identified only 47 COVID-19 positive psychiatric health inpatients (47/1,807, or 2.6%). We identified the majority of these cases by testing all patients at admission, preventing subsequent outbreaks. Twenty-one psychiatric health care personnel were identified as COVID+ during the same period, with 90% linked to an exposure other than a known positive case at work.

**Discussion:** The IPC interventions we implemented provided multiple layers of safety for our patients and our staff. Ultimately, this resulted in low SARS-CoV-2 infection rates within our facilities.

**Conclusions:** Psychiatric health care facilities are uniquely vulnerable to COVID-19 outbreaks because they are congregate units that promote therapeutic interactions in shared spaces. IPC interventions used in acute medical care settings can also work effectively in psychiatric health care, but often require modifications to ensure staff and patient safety.

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COVID-19 was declared a global pandemic on March 11, 2020.<sup>1</sup> The pandemic has substantially affected both the mental health of people around the world, as well as the delivery of psychiatric health care. Patients with psychiatric conditions experience higher incidences of chronic medical conditions that may put them at risk for

increased morbidity and mortality from COVID-19.<sup>2–5</sup> Patients with psychiatric conditions may also experience a decreased ability to follow infection prevention and control (IPC) guidelines due to their underlying illness.<sup>6,7</sup>

Psychiatric health care facilities around the world have experienced significant outbreaks of COVID-19.<sup>8,9</sup> However, published guidelines for preventing the spread of SARS-CoV-2 within health care facilities do not necessarily translate to inpatient or residential psychiatric health care facilities, due to the aforementioned risks to the patient population and other determinants.<sup>10</sup> Therapy at inpatient or residential psychiatric health care facilities often involve

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group meals and group activities. The physical surroundings of such facilities present additional challenges, as patients may share rooms, bathrooms, and other communal spaces. The use of hand sanitizer dispensers is very limited due to the risk of intentional ingestion.<sup>11</sup> There is also a concern for violence or self-harm, including ligature risks,<sup>12</sup> that may limit the use of personal protective equipment (PPE) for patients.<sup>13</sup>

Our psychiatric health care facilities serve a diverse patient population and present unique challenges for infection prevention. These facilities consist of 3 inpatient psychiatric health care units with 76 total beds within an academic medical center, a freestanding psychiatric health facility with a 28 bed inpatient unit, and a residential building that supports a 16 bay crisis and assessment center, 16 beds for residential psychiatric health and 16 beds for substance abuse disorders. At the main hospital, there are separate units for patients with psychotic disorders, patients in crisis, geriatric populations, eating disorders, child, adolescent, and one of the only inpatient perinatal psychiatric disorders unit in the United States. Of the 104 beds available for inpatient psychiatric health care, 38% are shared rooms. The 32 residential beds are all in private rooms but have shared common bathrooms.

When the first reports of COVID-19 outbreaks began in early 2020, a multidisciplinary group began planning interventions to protect the inpatient and residential psychiatric health units. Limited published data on interventions specific to psychiatric health care facilities underscored the need for practical interventions to protect our patients and staff.<sup>14,15</sup> Our manuscript builds on those efforts by describing interventions implemented with a variety of psychiatric health patient populations, while health care personnel (HCP) continued to provide much-needed mental health care during the pandemic. The planning and implementation of interventions were an iterative process that took place over an entire year, from March 2020 to March 2021.

Here we describe the methodology for implementing these interventions, which were designed to integrate published guidance on COVID-19 infection prevention practices in acute and long-term care facilities to inpatient and residential psychiatric health care facilities. We also describe the incidences of transmission of COVID-19 within the facilities to demonstrate the effect of these interventions.

## METHODS

Beginning in March 2020, a multidisciplinary group developed interventions to prevent and mitigate the spread of SARS-CoV-2 within the psychiatric health care units. This group included nursing and physician leadership, infection prevention, therapy services, environmental services, quality improvement, educational specialists, and hospital leadership. These interventions were developed using CDC guidance for COVID-19 infection control in both acute care and long-term care facilities,<sup>15</sup> scientific evidence as it emerged in the literature, and expert opinion. Our infection prevention and control interventions and strategies adapted for safe implementation in the psychiatric health setting are described in [Table 1](#): Infection Prevention Interventions and Psychiatric Health-Specific Strategies.

## RESULTS

We identified 57 COVID-19 positive psychiatric health patients at the main campus and freestanding center from March 2020 through March 2021. Of these patients, 39 (68%) were identified through asymptomatic admission or discharge testing, 13 (23%) were identified through symptomatic testing, and 5 (9%) was identified with an unknown reason for testing. During this time frame, the psychiatric health areas provided inpatient care to 1,807 unique patients, or a 2.6% positive COVID-19 incidence rate among our patients. Of the 47

positive patients, 4 experienced a possible exposure in the milieu and later tested positive, indicating possible SARS-CoV-2 transmission. Thus, our hospital-associated incidence rate would be 4 of 1,807 patients, or 0.2%. In both facilities, we used admission testing and symptom screening to identify the majority of positive patients as soon as possible during their inpatient admission. We were then able to care for them in a designated COVID containment area using the appropriate PPE.

Twenty-one HCP within our psychiatric health units were identified as being positive for COVID-19. Nineteen cases (90%) were linked to community, household, or unknown transmission source. Two cases (10%) were linked to a positive patient case within one of the units. Of those 2 cases, one was linked to an incident involving workplace violence from a positive patient against a staff member, who later tested positive.

As one of the state's main providers of psychiatric health care, our team's goal was to continue to provide high quality care during the pandemic. From March 2019 through March 2020, our units provided 38,442 patient days of care. From April 2020 through April 2021, the units provided 29,417 patient days of care.

## DISCUSSION

Psychiatric health units have inherent challenges for infection prevention that are different from acute care medical units. Therefore, we implemented the interventions outlined in the methods section with the following adjustments for psychiatric health units/areas. While some of these interventions may be specific to our facility, ideally other inpatient and residential psychiatric health facilities could use the majority of the interventions.

### *Patient-focused interventions for psychiatric health*

#### *Symptom screening*

Daily symptom screening of all patients and approved visitors upon entry to any of our facilities, in accordance with CDC guidance, began in April 2020. To improve screening compliance, implementation of electronic medical record documentation began in the summer of 2020. While objective symptoms like fever were easier to screen for, more subjective symptoms like sore throat and shortness of breath were more difficult to assess in patients with underlying psychiatric conditions. Similarly, it was difficult to discern the cause of gastrointestinal symptoms and shaking chills that are common clinical manifestations of both COVID-19 and patients experiencing acute detoxification. Nevertheless, this was an important intervention to ensure HCP were accurately assessing, isolating, and testing symptomatic patients as soon as symptoms began.

#### *Universal masking*

Hospital-wide, all inpatients were required to don a procedure mask upon leaving their room, or when a HCP enters their room. The facility supplies clean masks for patients as well as a clean paper bag for storage. Unit leadership performed a risk assessment for patient masking at the beginning of the pandemic due to concern for potential self-harm and ligature risk. Ultimately, we decided that the infection prevention benefits outweighed potential self-harm risks and there were no reported instances of serious injury or self-harm related to the mask. Certain populations (eg, those with psychosis or dementia) proved challenging to mask at all. Psychiatric health leadership and frontline staff reported significant fatigue in policing the masking policy among patients. In these cases, HCP would often resort instead to increasing the physical distance between unmasked patients.

**Table 1**  
Infection prevention and control interventions during the COVID-19 pandemic and associated challenges within a psychiatric health care setting

| Process  | Intervention   | Psychiatric health-specific challenges   |
|--|--|--|
| <b>Patients</b>                                    |  |  |
| <i>Identification at admission</i>                 | Admission algorithm created to identify patients with symptoms and assist with bed placement   | Difficult to assess for symptoms present on admission  |
| <i>Symptom screening</i>                           | Daily (at least every shift) screening for known COVID-19 symptoms with documentation in electronic medical record (isolation and testing for patients with positive screen)   | Accurately assessing changes in patient condition  |
| <i>Universal masking</i>                           | All patients instructed to mask when HCP enter room/area, and when in milieu setting   | Risk assessment performed to ensure patient safety with all components of mask<br>Patient compliance with masking  |
| <i>Physical distancing</i>                         | Strict guidelines on use of shared suites<br>Patients spaced out at meals<br>Therapy performed in smaller groups or one-on-one   | Determining patients appropriate for shared suites<br>Compliance with distancing   |
| <i>Enhanced precautions for psychiatric milieu</i> | Standardized hand hygiene, physical distancing, masking, visual cues to provide therapeutic activities safely  | Increased workload for staff   |
| <i>Surface disinfection</i>                        | Environmental surfaces disinfected at regular intervals; HCP wiped down shared bathrooms after use, and surfaces after therapy, meals  | Increased workload for staff   |
| <i>Hand hygiene</i>                                | HCP assisted patients with hand hygiene prior to therapy and meals   | Inability to allow alcohol-based hand rub on unit without supervision.   |
| <i>Cohorting COVID-19 patients</i>                 | Secured, separate units created for medically stable COVID-19 psychiatric health patients after mild and asymptomatic cases were increasingly admitted   | Staffing, physical space, patient compliance in remaining in room  |
| <i>PCR Testing</i>                                 | In-house test with quick turnaround time   | Patient resistance<br>Delay in turn-around time at freestanding facility due to need for courier transport of specimens<br>Increased workload for microbiology lab   |
| <i>Outbreak management</i>                         | Standardized measures implemented rapidly  | Patient compliance with masking, quarantine, additional testing  |
| <i>Vaccination</i>                                 | Vaccination provided to inpatients   | Vaccine misinformation and resulting hesitancy   |
| <b>Health care Personnel</b>                       |  |  |
| <i>Daily wellness screening</i>                    | Online symptom screening completed before each shift   | Lack of standardized oversight to ensure screening completed accurately  |
| <i>Physical distancing at work</i>                 | Increased distancing during breaks when masks were off during eating and drinking  | Lack of dedicated space for distanced breaks in built environment  |
| <i>PPE supplies</i>                                | Special Airborne/Contact Precautions for COVID-19 patients; Universal Pandemic Precautions (UPP) for all patients  | Shifting availability of N-95 respirators<br>Lack of trained staff to fit-test   |
| <i>Contact tracing</i>                             | Occupational Health traced exposures between HCP   | Time-intensive process   |
| <i>Routine communication to HCP</i>                | Regular check-ins provided at town halls   | Time-intensive process   |
| <i>Vaccination</i>                                 | Free vaccination available to all staff  | Vaccine misinformation and resulting hesitancy   |
| <b>Physical Environment</b>                        |  |  |
| <i>Airborne Infection Isolation Rooms (AIIR)</i>   | Symptomatic patients under investigation and/or known COVID patients isolated in private room using SAC; AIIR or HEPA filter if aerosol-generating procedure<br>Symptomatic patients under investigation and/or known COVID patients isolated in private room using SAC; AIIR or HEPA filter if aerosol-generating procedure | No AIIR in free-standing center<br>HEPA filter presents safety risk<br>Shared suites and shared bathrooms<br>No AIIR in free-standing center; HEPA filter presents safety risk; shared suites and shared bathrooms |

### *Milieu therapy and physical distancing*

Group therapy, an important modality utilized in psychiatric health, sustained frequent adjustments throughout the pandemic. Following generalized CDC guidance, group leaders ensured that all patients completed hand hygiene before and after group and physically separated individuals at least 6 feet apart. During seasonal pandemic peaks, we implemented more protective measures. These measures included cancelling group therapy, using telemedicine options, providing meals in patient rooms, and reducing outside contractors visiting for therapy. After seasonal peaks subsided, group therapy was again approved with physical distancing, hand hygiene, and masking.

### *Surface disinfection*

Surface disinfection, particularly of shared, communal areas, was of a concern to our units. The hospital-wide standard practice for surface disinfection prior to the pandemic was a routine daily cleaning of all touchable surfaces below shoulder level in communal, patient care related areas (for example, countertops, furniture, workstations, etc.). Environmental service technicians wiped all surfaces with an approved EPA-registered disinfectant. Inpatient and residential psychiatric health care unit rooms and bathrooms were also cleaned on a daily basis using the same method.

As concern grew about the potential spread of COVID within our hospital, environmental service technicians and the nursing staff

increased the cleaning frequency of all touchable surfaces in communal patient care-related areas every shift. In addition, we created a standard checklist for cleaning the milieu prior to patients engaging in an activity there. The freestanding facility also instituted a more frequent cleaning schedule for their shared bathrooms. The increased frequency of surface disinfection produced additional workload for staff.

#### *Hand hygiene*

Hand hygiene is a key measure to prevent the spread of any communicable disease, including COVID-19. We have a hospital-wide program to measure hand hygiene compliance.<sup>16</sup> These audits focus on the hand hygiene of HCP, rather than patient hand hygiene. While we had no way to specifically measure patient hand hygiene in psychiatric health patients, HCP provided opportunities for patient hand hygiene prior to meals, therapies, and any other pertinent times (eg, after toileting). Patients were encouraged to use soap and water rather than alcohol-based hand rub (ABHR), due to the number of patients with a history of substance abuse and the inability to have unattended alcohol-based hand rub in the milieu.

#### *Co-horting COVID-19 patients*

In April 2020, our facility created COVID-19 containment areas in the emergency department, one intensive care unit, and one acute care unit to facilitate patient care and infection prevention. While these areas could and did care for psychiatric health patients who were COVID-19 positive, it was not ideal for the patients' mental health treatment. Individual psychiatric health COVID-19 containment areas for mildly symptomatic and asymptomatic case patients were created in the psychiatric health emergency department, one inpatient psychiatric health unit at the medical center, and one inpatient wing at the freestanding facility. New signage and videos were created to remind HCP of PPE requirements and workflow for the COVID-19 areas.

Each containment area was made physically separate from non-COVID-19 areas through physical barriers. In one instance, we installed pre-fabricated doors and walls to enclose one wing of 6 patient rooms as a COVID-19 containment area. Creating this physical separation was challenging on several levels. We needed to obtain prior approval from the state department of health and human services. The pre-fabricated barrier walls posed ligature risks necessitating additional staffing to mitigate the potential for patient harm. Fluctuating numbers of COVID-19 positive patients needing psychiatric health care admissions posed a challenge in deciding where to place patients and how to staff each area. At times, the additional staffing and beds needed for the designated COVID-19 units diverted resources from other psychiatric health care areas. Float staff, with no prior experience in a psychiatric health setting, were used to fill critical roles such as PPE station monitors, nurses, nursing/medical assistants, and meal service delivery.

#### *PCR testing*

Our microbiology laboratory developed an FDA-approved in-house SARS-CoV-2 PCR test in April 2020. This allowed us to quickly diagnose and isolate symptomatic individuals. As cases increased, our testing strategy pivoted from testing only symptomatic individuals to testing all hospital admissions. We then further refined this strategy to testing all psychiatric health patients at admission, and at 7 days postadmission to account for patients who may have been incubating on admission. This strategy led to the identification of several inpatients who were asymptotically infected at 7 days and prevented further disease transmission on the units. The additional testing required expanded lab capacity and supplies. Many patients were hesitant or refused testing at first, but as the pandemic

progressed and staff better verbalized the importance of testing as a requirement, almost all patients became amenable to routine testing.

#### *Outbreak management*

When units identified a patient who tested positive for SARS-CoV-2, HCP and infection prevention worked quickly to contain further spread. Mitigation steps included immediate isolation of case patient, baseline testing and repeat testing of other patients on the unit, careful symptom screening of both patients and staff, continued masking of patients and staff, with the addition of eye protection for staff. Additional measures such as cessation of group activities or unit closure to admissions were made based on discussions with unit leadership.

#### *Vaccination*

COVID-19 vaccinations for inpatients became available in the spring of 2021. An initial challenge was actually obtaining doses, as they were only available on certain days of the week. Subsequent challenges for psychiatric health patient populations included vaccine hesitancy due to misinformation and scheduling second dose of the 2-shot series.

#### *HCP-focused interventions*

##### *Wellness screening*

Wellness screening of all employees began March 2020. The first iteration involved individual screening of each HCP for COVID-19 symptoms. Badge stickers were used each day to signify asymptomatic HCP. All HCPs answering yes to new or worsening symptoms were immediately sent home and referred for testing. In summer 2020, the employee wellness screening transitioned to a written attestation on a web-based platform.

##### *Physical distancing at work*

Physical distancing when HCP were unmasked (eg, during meal breaks) was a challenge, and caused several high-risk exposures among HCP. Many of the areas used for HCP breaks were physically small, with inadequate ventilation. To reduce HCP exposures, we limited the capacity of common areas to 50% of their typical seating, we converted larger, better ventilated areas into break spaces for HCP, and signage, wipes, and hand sanitizer were provided at break areas.

##### *PPE and supplies*

To protect HCP from possible exposures in all settings, we utilized what we referred to as "Universal Pandemic Precautions (UPP)" which included wearing eye protection with a procedural mask. Wearing UPP offers the wearer some level of protection from SARS-CoV-2 exposure, regardless of the symptoms or the masking compliance of people around the wearer. For any known or suspected COVID-19 positive patients and during aerosol-generating procedures (eg, non-invasive ventilation, cardiopulmonary resuscitation), HCP were required to wear a respirator, eye protection, gown and gloves, regardless of patient symptoms. Suspected or known COVID-19 patients required the same PPE. Also, HCP who worked in close, direct contact with unmasked patients were later provided the option to wear an N-95 for additional source control.

Our psychiatric health units were at a disadvantage compared to our acute care medical units even before the pandemic hit our hospital. Our freestanding facility had no airborne infection isolation rooms (AIIR). HCP there were not fit-tested using N-95 respirators due to their TB program risk assessment and plan to send suspect or confirmed TB patients to the medical center. The HCP did not have access to any other NIOSH-approved respirator, such as powered air purifiers (PAPRs). While our 3 medical center inpatient units did



have AIIR, HCP were also not widely fit-tested with N-95 respirators or trained on PAPRs due to the TB program risk assessment.

Our facilities worked with environmental health and safety and used train-the-trainer sessions to increase the number of fit-tested HCP. The freestanding psychiatric hospital designated several PPE champions to complete train-the-trainer sessions and subsequently fit tested all HCP. The supply of respirators was tenuous throughout our health system for months in the beginning of the pandemic. Differing fit-testing and PPE resources shed light on inherent vulnerabilities within the psychiatric health care areas.

Ensuring PPE and other needed supplies were available at the point of care for HCP caring for known or suspected COVID-19 patients was challenging due to the safety risks. Psychiatric health leadership collaborated with Infection Prevention to devise safe solutions and provide appropriate PPE to frontline staff. To stop patients from accumulating masks and avoid potential safety risks, patients were required to exchange their old mask for a new mask replacement. Due to ligature and self-harm risks, PPE for the designated psychiatric COVID-19 units were maintained in secured nursing stations or in small carts monitored by HCP assigned as PPE monitors. These PPE monitors were HCP assigned to ensure correct donning and doffing of PPE. The monitors were a “just-in-time” resource need identified early in the pandemic, and eventually led to a PPE monitor “train-the-trainer” program.<sup>17</sup>

Additionally, infection prevention created training posters and videos to demonstrate donning and doffing of PPE required for suspected or known COVID-19 patients. The videos were mandatory for all HCP, and the posters were displayed at the entrance to all rooms and/or areas with known or suspected COVID-19 patients. Infection preventionists and unit leadership enforced the importance of following this guidance.

#### Contact tracing

The Occupational Health Service performed contact tracing for all positive employees. This helped identify opportunities for improvement in infection prevention (eg, staying home when ill and physical distancing during unmasked breaks).

#### Routine communication to HCP

From the start of the pandemic, there was a great deal of uncertainty and concern from hospital staff. These feelings were magnified within psychiatric units, as HCP felt especially vulnerable to the spread of COVID-19 due to the nature of the units and the patients. Psychiatric health leadership provided regular check-ins during “town halls” with frontline staff.

#### Vaccination

Vaccination against SARS-CoV-2 became available to frontline HCP at our hospital in late 2020. By mid-June 2021, 61% of our psychiatric HCP were fully vaccinated. In July 2021, hospital leadership made the decision to require vaccination as a condition of employment.

#### Physical environment

Our freestanding inpatient and residential facility had no airborne infection isolation rooms (AIIR). The main campus facility did have AIIR, but also had a lack of private rooms. This made it difficult to reliably isolate symptomatic patients under investigation for COVID and patients quarantined for a possible exposure. Overall, the milieu environment, coupled with patients’ underlying psychiatric conditions, made enforcing any sort of isolation difficult. Creating designated units/areas for COVID+ psychiatric patients reduced the concern about patients wandering into the milieu and exposing others.

In acute medical units, we used HEPA filters in rooms during aerosol generating procedures (eg, non-invasive ventilation, intubation) to reduce the risk of disease transmission. HEPA filters would have presented a safety risk to our psychiatric health patients, so we avoided their use, although filters were kept in secured areas of the main hospital for emergencies.

All of the above interventions led to very low rates of patient to patient, patient to employee, and employee to employee exposures. We built in layers of safety with a multi-faceted IPC approach to prevent and reduce patient harm from COVID transmission.

In both facilities, our testing strategy identified the majority of COVID-19 positive patients prior to inpatient admission and we were then able to isolate them in a COVID containment area. Our daily symptom screens and 7 day postadmission testing identified other COVID-19 cases before extensive exposures occurred. We mitigated risk even further with the use of PPE (including UPP), careful donning and doffing, physical distancing, hand hygiene, frequent surface disinfection, and vaccination. There were 4 patients who were found to be positive for SARS-CoV-2 after an exposure in the milieu. This represents only 7% of our total positive patients over a 16-month time period.

The majority (90%) of COVID-19 positive HCP were acquired either via a community exposure or an unknown exposure (ie, not linked to a known positive case at work). This low rate of in-work employee exposure illustrates the effectiveness of the PPE used in our facilities, staff adherence to other interventions such as physical distancing, and the importance of vaccination.

Adjustments to the delivery of therapy allowed us to continue to provide high quality psychiatric health care to a large number of psychiatric patients. Although the number of days of patient care provided decreased during the pandemic, when compared to the previous 12 months, we still provided a high number of patient care days, and even continued to provide psychiatric care to patients with mild or asymptomatic COVID-19 infections. A major concern of our psychiatric HCP was potentially having to close our units to admissions due to large scale exposures and outbreaks. Fortunately, we never experienced a large outbreak in any of our facilities, and our known patient to patient transmission rate was limited to 7% over thirteen months.

#### LIMITATIONS

This is a retrospective, descriptive study. We tracked each positive patient and employee found in our electronic medical record reporting, but we may have inadvertently not counted patients who were discharged prior to testing positive or developing symptoms after an exposure in the milieu. Our interventions were implemented throughout the pandemic, and were refined based on feedback and observations gleaned from infection preventionists, leadership, and frontline staff. This made it easier to adjust to changes that occurred during the pandemic, but it is therefore not possible to attribute our low transmission rates to any one intervention.

#### CONCLUSIONS

Inpatient and residential psychiatric health care facilities pose unique infection prevention and control challenges. The COVID-19 pandemic magnified these challenges. In order to continue to provide safe psychiatric health care, and ensure the safety of our HCP, we needed to use a multi-pronged approach to reduce the risk of SARS-CoV-2 transmission within our facilities. An engaged leadership and multidisciplinary team helped implement these interventions.

The interventions we describe have demonstrated effectiveness in a variety of patient populations within a psychiatric health care setting. While no 2 psychiatric facilities will face the same challenges

from COVID-19, we aim to provide actionable solutions to some of the most common problems.

We identified several areas for future research. This includes increasing the uptake of IPC interventions in vulnerable psychiatric health patient populations, particularly masking and vaccinations. Many communities, including health care personnel, have experienced an increased need for psychiatric health care directly related to experiences from the pandemic. Health care facilities must build resiliency and ensure their psychiatric health areas have the necessary tools, support and safeguards to continue to provide high quality care during a global pandemic.

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