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COBALT: Supporting the mental well-being of the health care workforce with technology-facilitated care during Covid-19 and beyond

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A B S T R A C T
Two-thirds of health professionals facing the clinical demands of responding to the Covid-19 pandemic experience psychiatric symptoms, including post-traumatic stress, anxiety, substance use, depression, insomnia, and suicide. Compounding matters, access to mental health services is poor, quality is variable, and stigma is prevalent. COBALT, a digital mental health and wellness platform developed at Penn Medicine, was designed to support health care workers, offering a combination of self-directed resources, virtual group sessions, and individual appointments with a stepped care model of providers, including peers, resilience coaches, psychotherapists, and psychiatrists. In COBALT’s first 11 months, the platform saw approximately 10,000 users, 200,000 page views, 1,400 one-on-one appointment bookings, over 1,000 group appointment reservations, and 158 interceptions of employees contemplating self-harm. COBALT reveals the unmet demand for mental health support among health professionals and provides a model for both expanding the supply of and streamlining access to services.

1. Introduction
When the Covid-19 pandemic is memorialized in historic images, we believe these images will fall into three main categories: [1] patients on ventilators or in graveyards; [2] the political divide of public health measures designed to reduce the pandemic burden; and [3] haggard health care workers supporting the spectrum of illness that COVID-19 has presented. While the mental health and well-being of the world’s population has been affected, health care workers have been especially susceptible, with increased patient volume, longer work hours, and concerns of exposing themselves or their families to the disease. Studies have shown that up to two-thirds of HCWs caring for Covid-19 patients report psychological distress or depression. In early March 2020, the likely emotional burdens of the pandemic became obvious, and we sought to support our workforce as they stood on the front lines for our community.

Our goal was to deliver accessible, high-quality mental health services to the health care workforce at a large academic medical center during the initial days of Covid-19. Over time, the workforce has faced additional challenges – economic threats, racial injustice, election anxiety, and continued hazards from the pandemic. We aimed to create a virtual platform that could support HCW’s mental health needs and be flexible enough to adapt to the uncertain future of a new disease in a turbulent social context.

2. The approach

2.1. Design & development
COBALT’s name was inspired by the adaptable transition metal and the bold color. The team designed the platform as a centralized, comprehensive service for HCWs to access timely mental health resources. The initial phase of the platform’s conceptual design was followed quickly by the hiring of a software development firm tasked with an accelerated timeline. Initial funding came from Optum Labs, which had an existing research relationship with Penn Medicine. Given early success, supplemental funding was provided by Optum Labs.

2.2. Initial launch
The minimum viable product for COBALT was released on April 13, 2020, two weeks after it was resourced. This version offered...
functionality in three core areas: self-directed asynchronous content (e.g. videos about how to practice mindfulness), virtual group sessions, and one-to-one support. Health system leadership promoted specific COBALT resources in daily Covid-19 emails to all health system employees. COBALT was also featured on departmental websites, new content and group sessions were sent to managers through regular newsletters, and updates were shared in town hall presentations and circulated across desktop and unit based monitors in clinical settings.

2.3. Functionality & experience

COBALT is accessible to the entire health system community via single sign-on or anonymous entry (Fig. 1). Upon accessing the platform, employees may select their role, who they are concerned about and what concerns them most from a prepopulated list. For example, users could be frontline HCWs, researchers, or students; concerned about themselves, their children, or their community; focused on anxiety, physical safety, or social isolation. Based on these answers, the platform curates articles, videos, tip sheets, and podcasts that employees can browse at their own pace. Employees may also sign up for synchronous skill and support groups. These groups are created by members of the health system community and span topics such as meditation, sleep, resilience, substance use, and timely issues such as election stress.

In addition, COBALT offers employees the opportunity to connect with one-to-one support. When users select this option, the platform prompts them to complete a brief mental health assessment. This includes the Patient Health Questionnaire-4 (PHQ-4) for depression and anxiety which, if positive, reflexes to the Patient Health Questionnaire-9 (PHQ-9), the Generalized Anxiety Disorder-7 scale (GAD-7), and the Primary Care PTSD Screen for DSM-5 (PC-PTSD). A positive response to the PHQ-9 question assessing self-harm sends an immediate alert to a Licensed Clinical Social Worker on our Employee Assistance (EAP) team. The alert includes a summary of scores from the mental health assessments and contact information for the patient. The EAP provider contacts the patient within 24 hours and conducts a telephonic risk assessment, creates a safety plan, and connects to the patient to the appropriate mental health provider. The patient will also receive information about suicide prevention resources including the national suicide prevention hotline number.

Based on the results of the self-assessment, COBALT triages employees to a specific level of mental health care. There are 2 levels of care in COBALT: subclinical and clinical. The subclinical level includes peers (fellow community members with shared experiences) and resilience coaches (volunteers trained in psychological first aid). The clinical level includes EAP program providers, psychotherapists, and psychiatrists. Employees can view available appointment slots and directly book a time to virtually meet with their provider. If the provider is a clinician, the employee registers through a patient look-up connected to the electronic medical record (EMR). COBALT then emails confirmations to both the employee and provider with a unique URL for a HIPAA-compliant telehealth session. This appointment populates the employee’s calendar on COBALT and, via an Application Programming Interface (API), the provider’s calendar in the EMR. Over 90% of these clinical sessions continue to be delivered by telehealth supporting the notion that such visits are efficient and cost effective.

Through these processes, COBALT addresses several pain points of conventional care. First, the assessment triages users with mild symptoms to the subclinical level of support (peers and resilience coaches), preserving access to psychotherapists and psychiatrists for those with more severe symptoms. Second, direct booking of appointments

![Fig. 1. The COBALT user journey.](image-url)
bypasses a traditionally fraught intake process for patients, and the automatic creation of telehealth sessions streamlines provider workflows. Finally, the platform decreases wait times and increases transparency, as employees can view appointments by “first-available” and choose their preferred provider.

Of course, this engineered process is more nuanced when seen through the context of one’s mental health journey. For example, incoming medical residents were introduced to COBALT via email and encouraged to book an appointment with a resilience coach given the demands of entering a new clinical setting during a pandemic. Some residents chose to do so and engaged with ongoing one-to-one support at various levels. Others explored this option but rurouted themselves to group support and self-directed resources. While the entry point was the same, the platform’s flexibility gave residents autonomy and control over their care experience.

2.4. Continuing improvement

As demand for the platform increased over the first few months, the COBALT team recruited more providers to join, onboarding professionals from the academic medical center’s mental health practices and volunteers from the community. Volunteer applicants detailed their experience and interests and were grouped into teams for upfront skill evaluation and weekly supervision. Sources across the health system and university contributed articles, videos, and more to the content library. The rapid onboarding of volunteer mental health providers including psychologists and psychiatrists enabled us to meet the early demand typically within a week of an appointment request.

The COBALT platform also evolved. As the nation faced a reckoning with racial injustice, the COBALT team organized resources and groups for processing and addressing racism in the workplace, community, and society at large. The team developed the option for departments to request a group discussion specifically for their employees. During the 2020 election, COBALT also featured group sessions and asynchronous content related to political unrest. While COBALT was originally designed to support the mental health needs of HCWs during Covid-19, this evolution showed the platform’s ability to serve the community in settings far beyond the pandemic.

2.5. Hurdles

COBALT had to overcome several hurdles. First, mental health professionals and volunteers faced a technical learning curve delivering care virtually. In response, the team developed standardized communication and onboarding procedures to increase provider comfort with the platform. The team also designated a leader within each provider group to serve as the initial contact for any issues.

Another challenge was interfacing with the health system’s EMR. Most appointments with community volunteers—peers, coaches, and some psychotherapists—took place outside of the EMR ecosystem. However, encounters with Department of Psychiatry psychotherapists and psychiatrists were treated as virtual office visits, necessitating EMR communication for scheduling, documentation, and billing. Initially, an office staff member manually transferred information from COBALT to the EMR, but the team later built an interface to automate this process.

As the pandemic progressed, ensuring access to providers became more challenging. With the resumption of regular work hours, volunteer therapists and community members had limited availability. Psychiatry clinics also returned to their pre-pandemic capacity. Despite the decline in providers, we were able to maintain our service levels given that 60% of the users trying to connect with care were triaged to subclinical care taking significant pressure off the clinical level of support, reinforcing the need for providers to practice at the top of their license. COBALT’s flexible scheduling and automation introduced the ability to leverage cancelations as last-minute availability, stretching clinical capacity. Additionally, 90% of our clinical care support visits remain delivered by telemedicine, removing many of the previous barriers to healthcare workers seeking mental health support.

3. Outcomes

In COBALT’s first 2 years, approximately 33,000 employees engaged with the platform, with 75% entering anonymously. Employees have self-scheduled over 3,000 appointments for one-on-one support and there have been over 18,900 unique connections to support resources and over 280,000 unique page views. About 12.5% of individual support appointments were booked with psychiatrists; 29% with EAP providers (licensed clinical social workers); 36% with psychologists; 21.2% with trained resilience coaches; and the small remainder to peers, chaplains, or others. Three hundred and twenty individuals screened positive for self-harm risk and were rapidly connected to care.

3.1. Lessons for the field

We needed five things to launch COBALT. First, we needed leadership to recognize the need to provide better mental health services. All large employers provide some sort of mental health support, often in the form of outsourced employee assistance programs. Leaders often speak eloquently about mental health issues, but it is challenging for enterprises to put the right resources in place to make a difference. We had leadership commitment and tangible action from team managers to C-suite executives.

Second, we needed a smooth and responsive technology interface. We chose to outsource the efforts to a local development firm because our internal resources were stretched to accommodate other Covid-19 response efforts. We had the advantage of external grant support we could allocate to this purpose.

Third, we needed passionate staff who were committed to seeing this program through. We identified champions for specific programs within the platform and ensured that community remained a central tenet of its development.

Fourth, while many apps and websites point to mental health resources, we wanted COBALT to enable full clinical support for a wide spectrum of employee needs, up to and including direct warm handoffs to psychiatry services. This required the build of clinical protocols to wrap around the digital solution.

Fifth, to add meaningful self-directed content, respond to national events with timely group offerings, and provide resilience coach appointments to all incoming trainees, we relied on innovative ideas and rapid implementation from experts and engaged contributors throughout the health system. It is this creative use of simple features that has enabled COBALT to grow over time.

4. Conclusions

The Covid-19 pandemic accelerated demand for mental health care, particularly among health care workers (HCWs), while challenging the health care system to re-imagine technology’s role in care delivery. COBALT was stood up within 2 weeks on the pandemic onset in response to the tsunami of healthcare worker mental health needs. It increased access to mental health support by empowering peers and community members as volunteer providers, leveraging technology to match HCWs to an appropriate level of care, and creating one front door to the full spectrum of services. Over time, COBALT adapted to confront new challenges such as economic threats, racial injustice, election-related stress, pandemic surges and the war in Ukraine. Our aim is to use COBALT’s digital platform and its community of experts and resources to deliver wellness resources and mental health care more efficiently, effectively, and conveniently, on their own terms. This evolution highlights the opportunity for COBALT’s dynamic platform to serve the community far beyond the pandemic.
Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Cecilia Livesey reports financial support was provided by Optum Labs. David A Asch reports financial support was provided by Optum Labs. Cecilia Livesey reports a relationship with UnitedHealth Group that includes: employment and equity or stocks.

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