# Mobile Adoption in Clinical Settings:

*Supporting Workflow to Deliver High-Value Patient Care*

calgary scientific

# MOBILE DEVICES AND CLINICAL WORKFLOW: THE CURRENT LANDSCAPE

In a 2016 survey, 83 percent of physicians who own smartphones reported using them at least once in a clinical setting and 97 percent said their smartphone's greatest benefit is fast access to information.[1] These powerful, compact mobile tools bring a multitude of additional benefits to clinical care settings, including simple, mobile access to diagnostic tools and efficient provider-to-provider communications.

Mobile adoption continues to grow because it offers relevant, secure and timely access to clinical content. Mobile devices drive new, more efficient workflows in which content is delivered to tablets and smartphones via data centers and cloud-based web services, providing clinicians with anytime, anywhere access to patient data regardless of their location.

The extent to which caregivers can use their smartphones and tablets in these ways, however, varies broadly between hospitals and healthcare systems, and even among departments at individual hospitals. While many providers have individual pilot programs and projects that use web and mobile devices in place, the majority are still early in the adoption process, developing strategies and policies for smartphone and tablet use in clinical settings. Published research reviews and surveys also point to the need for further study of how mobile devices impact workflow and outcomes. [2 3]

As a developer of mobile health IT for clinical and diagnostic use, Calgary Scientific has a strong interest in health institutions' mobile adoption strategies and policies. To learn more about the current state of mobile adoption for clinical care, Calgary Scientific interviewed the following industry experts and clinical leaders:

- Sajid Ahmed, Chief Information and Innovation Officer, Martin Luther King Junior Community Hospital
- Mario Gutierrez, Executive Director, Center for Connected Health Policy
- Steven Levine, MD, Professor of Neurology and Emergency Medicine, Vice-Chair of Neurology, SUNY Downstate School of Medicine
- Chris Maroules, MD, Radiologist, UT Southwestern Medical Center
- Tomas Nesbitt, MD, Associate Vice Chancellor, Strategic Technologies & Alliances, Director, UC Davis Medical School
- Jeffrey Rideout, MD, CEO, Integrated Healthcare Association
- Ben Wilson, MBA, MPH, Senior Director Healthcare Solutions, Citrix

The broad ranging discussions of this research addressed mobile device adoption and its benefits for patient care delivery. These discussions brought the following points to the forefront:

- While opinions differ on when mobile devices will be widely adopted, these experts agree that the future of patient care delivery will be mobile. The smartphones and tablets already in the hands of patients and providers offers a ready-made platform that meets healthcare reform's need for patient engagement and coordinated care solutions.

- Mobile devices in clinical settings offer a path to rationalizing and synchronizing the integration of health IT with clinical workflow. Physicians are mobile workers and their tools need to be mobile as well.

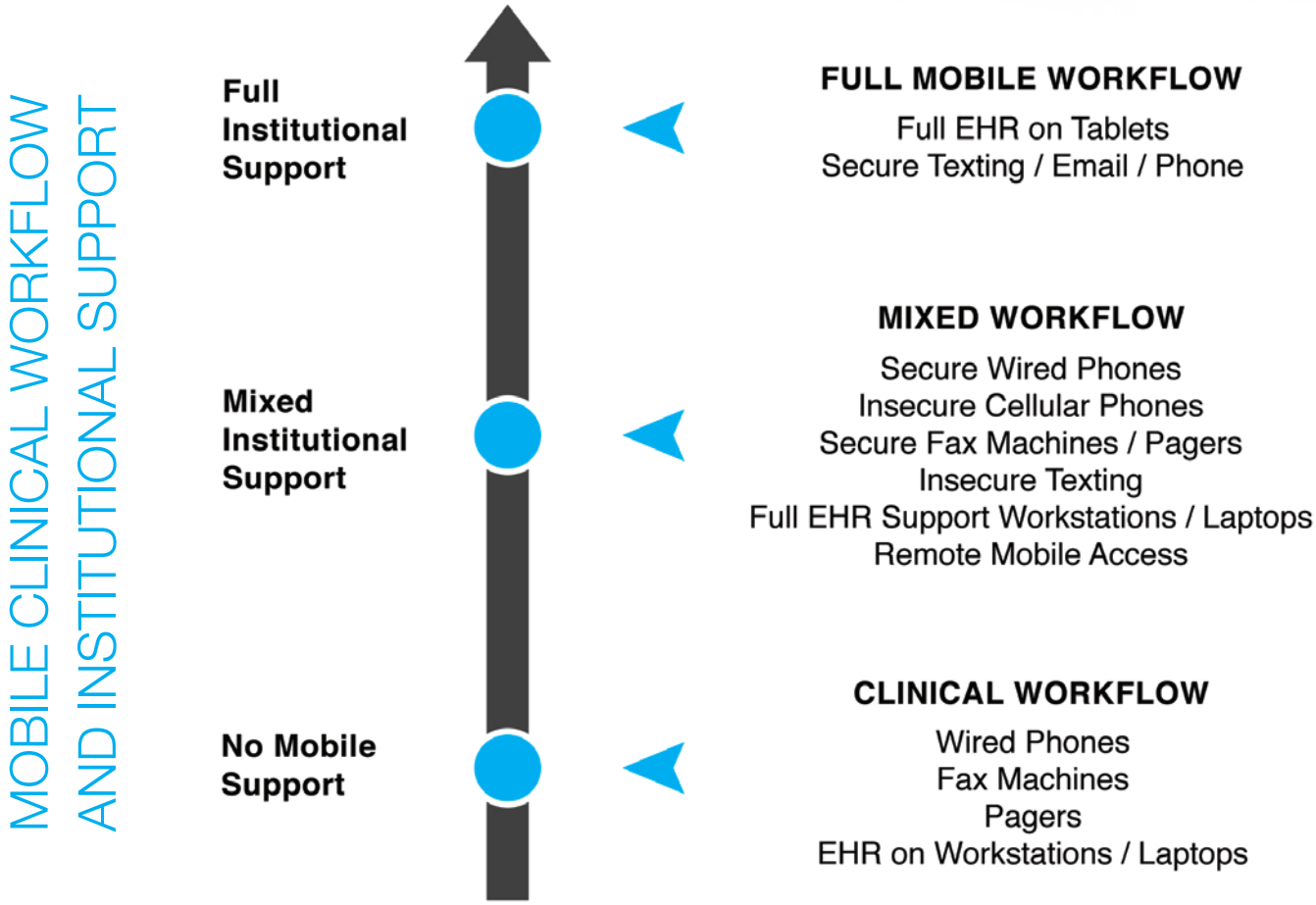
- Institutional support for the use of mobile devices to deliver clinical care is necessary to ease the integration of health IT with physician workflow. Ad hoc support for such uses as remote access to patient data or after hours support for doctors on call is not enough to realize the broad benefits that mobile devices make possible.

This paper summarizes this expert commentary on the current state of mobile use in clinical settings, including specific hospital and health system examples. While in some cases mobile workflow has been implemented enterprise wide, few providers have the opportunity to eliminate current health IT systems and implement entirely new systems.

Healthcare institutions have spent millions on electronic health records (EHR) and now require new clinical tools that seamlessly integrate into their EHR investment. The paper's conclusion offers an approach and framework for integrating mobile devices with existing health IT infrastructures.

## MOBILE DEVICES AND CURRENT CLINICAL ADOPTION

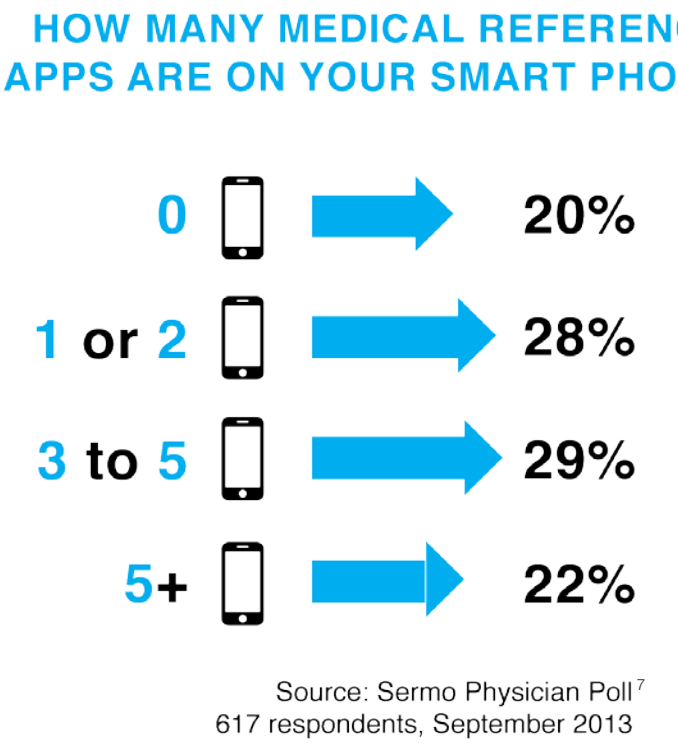
Mobile devices are perfectly suited to the pervasive mobile workflow of clinical care.[4] Smartphones and tablets provide untethered instant access to medical information and research, patient data and caregiver communications. Any access to or communication of patient data requires high-level security. In today's clinical environment, institutional levels of security and support for mobile devices impact how providers use their smartphones and tablets.



# FAST INFORMATION ACCESS AT THE POINT OF CARE

Searching for and finding data to support diagnosis is a caregiver's most frequent use of mobile devices. This information is not protected health information (PHI), so accessing it requires no institutional security or technical support.

Physicians spend 64 percent of their time looking up information and some have come to prefer to use smartphones or tablets for this purpose.[5] One study shows that hospital-based physicians access electronic resources on a mobile device more often than paper because "a hand-held device offers greater portability and provides a greater scope of up-to-date information that may be more rapidly accessed from any location."[6]




Source: Sermo Physician Poll[7]
617 respondents, September 2013

With the abundance of online medical informational resources, junior doctors often turn to their mobile devices for efficient fact checking and information searches. "Younger physicians are very tech savvy and are constantly looking for ways to use technology to improve the efficiency of our lives and our practices," explains Chris Maroules, a senior resident in radiology at the University of Texas Southwestern School of Medicine.

"Every day on rounds, you've got students giving you the answers before you finish the question," comments Steven Levine, MD and Professor of Neurology and Emergency Medicine at SUNY Downstate University Hospital of Brooklyn, NY.

# MULTI-DEVICE ENVIRONMENTS: BYOD AND HOSPITAL-ISSUED MOBILE DEVICES

As mobile strategies mature at different rates throughout the health system landscape, providers who bring their mobile devices to work have very different experiences.[8] Pagers, for example, are still part of the device mix because of their reliability as a dedicated messaging device and their integration into healthcare workflows. So providers frequently juggle multiple devices for both local and remote uses.

## TYPES OF DEVICES SUPPORTED BY HOSPITALS

**75%** SMARTPHONES
**67%** PAGERS
**65%** TABLETS
**57%** WIDE-AREA PAGERS

Source: BYOD Trends in Healthcare: An Industry Snapshot, 2015.[9]

Supporting caregivers with secure access to patient information from their personal mobile devices is an increasingly complex challenge for hospitals and health systems due to costs, security and interoperability. At the same time, patients are demanding access to their own information which adds a layer of complexity. Healthcare organizations must ensure that any access given via mobile devices is accredited and secure.

With the increase in security breaches at healthcare facilities, support for BYOD shows signs of decreasing. In 2014, 88 percent of hospitals surveyed said they allow some form of BYOD. In 2015, that percentage had dropped to 73 percent. For those hospitals that do support BYOD, their support for physicians, at 91 percent, is highest. In contrast, support for nurses is 51 percent, in part because many hospitals provide devices for nursing staff. [10]

When hospitals and health systems provide devices to staff, they come preloaded with a set of secured applications that provide access to enterprise health information systems.

*"The preferred institutional practice is to provide clinicians with secure devices for the purposes of clinical work, diagnostic services and communication and coordination, so that if that device gets lost or misplaced, there is a fail-safe to be able to destroy all the data on the device," comments Mario Gutierrez, executive director of the Center for Connected Health Policy.*

Regardless of where the device comes from, whether BYOD or hospital issued, it's clear that having mobile access to clinical information is a great support to workflow and timely decision making.

# REMOTE AND LOCAL ACCESS TO PROTECTED PATIENT INFORMATION

Hospitals and health systems that currently provide institutional support for mobile devices do so to meet both clinician demand and organizational needs for remote and after-hours access to protected health information (PHI).

“Physicians want to be mobile and still have access to their clinical information. Allowing providers real-time access to data from a device, such as a smartphone or tablet that is always with them, gives them the mobile access they want,” says Kyle Hall, telehealth coordinator, Nebraska Medicine.

The security and technical needs of mobile remote access to PHI are complex and require the support of health IT departments. Before the explosive adoption of mobile devices, physicians would access EHRs from their home computers using a virtual private network (VPN). Today, providers want to access EHRs from their mobile devices rather than a tethered desktop system.

“It’s our clinical staff who are pushing us to provide mobile access. At first, they requested hospital access via their home computer, so we provided a secure VPN,” explains Thomas Nesbitt, MD, Associate Vice Chancellor of Strategic Technologies and Alliances at UC Davis Medical Center (UCDMC). “Now we hear, I’m not always at my home. I want to look at a result for a patient that I’m going to call on my phone. How can I do that?”

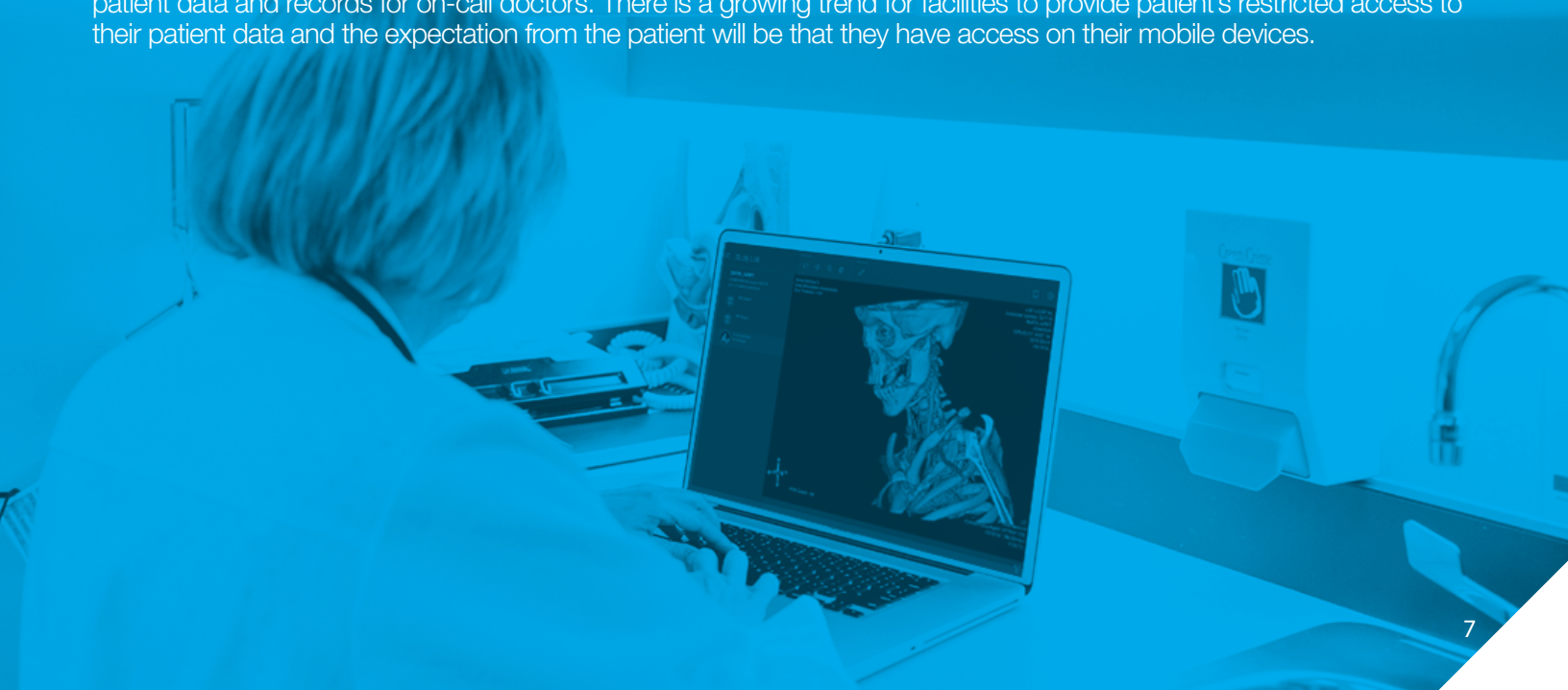
To support this demand, UCDMC has implemented a range of technologies that make it possible for providers to view a patient’s EHR from any device. When working remotely, providers can receive messages from patients and message them back from smartphones or tablets.

“Our clinicians now have the capability of securely looking at the electronic health record from any device,” comments Dr. Nesbitt.

In addition to supporting remote access from clinicians’ own mobile devices, UCDMC also issues tablets to on-call physicians who will be providing telehealth consults to other hospitals. The device is set up to log all aspects of the on-call physician’s interactions with UCDMC’s EHR system both for patient care records as well as reimbursement purposes. UCDMC has a team of trainers that reach out to on-call physicians to ensure proper training for hospital-issued tablets for video consultations and other patient interactions.

“For example, when a neurologist is on call at night for other hospitals and he or she is doing video-based consultations, we have our technical team call in the afternoon and say, I notice you’re on call tonight. Do you have your tablet? Do you have any questions about using it? Can I come by and help you?” explains Dr. Nesbitt.

The net impact of UCDMC’s mobile access to PHI is better care for patients through direct communication between providers and patients, anytime anywhere access to patient information and fast and efficient after-hours access to patient data and records for on-call doctors. There is a growing trend for facilities to provide patient’s restricted access to their patient data and the expectation from the patient will be that they have access on their mobile devices.



# MOBILE-FIRST FROM THE START: MARTIN LUTHER KING JR. COMMUNITY HOSPITAL

As evidenced from the current use of mobile devices, layering smartphones and tablets on top of existing hospital information systems has proven to be a complex endeavor that adds to technology fragmentation. As hospitals and health systems grapple with how to securely and effectively access the benefits of mobile devices, Martin Luther King, Jr. Community Hospital (MLKCH) in Los Angeles has had a unique opportunity to design and implement a fully mobile health IT infrastructure and clinical workflow.

MLKCH is a safety net hospital that was shut down in 2007 due to serious patient safety issues. A project to rebuild the entire hospital system from the ground up was started in 2010 and completed in August of 2015. From the beginning, the hospital was dedicated to taking the greatest advantage of technology and today MLKCH is a fully wireless, 131-bed hospital that serves more than 1.3 million people in South Los Angeles.

“We had an incredibly unique opportunity to implement mobile from the start,” says Chief Information and Innovation Officer Sajid Ahmed. Ahmed and his health IT colleagues worked with vendors to create a sophisticated set of iOS applications that support secure access to patient data, patient alerts, texting, emailing and voice communication over the hospital’s secure IP network.

Every day, staff members take one of the **380** hospital-issued iPhones, log in and get access to a set of applications and patient data customized for their individual role.


## FULLY FUNCTIONAL, SECURE iPhones INTERGRATING INTO CLINICAL WORKFLOW

One of the first lessons of securing mobile devices for health IT environment is that simple features are very complex. “The first thing we had to do was make sure that the iPhones could make a voice call,” Ahmed explains. “That’s the one feature users would assume was available and would look for first and foremost.”

To support voice calls, Ahmed worked with Cisco to translate Cisco’s secure IP phone hardware into an iOS application. In addition to voice calling, the health IT team added paging that works in the hospital over IP and outside of the hospital over cellular networks. Added to that were texting, emailing and access to the Cerner EHR.

The hospital-issued iPhones are used mostly by nurses and support for BYOD is provided to physicians. Like nurses and other staff, physicians log in when they get to the hospital for access all iOS clinical applications. They even use the secure voice over IP calling, versus their cellular connections, from their iPhones while in the hospital.

# INTEGRATING MOBILE DEVICES INTO CURRENT CLINICAL HEALTH IT ENVIRONMENTS

The widespread integration of mobile technology into clinical care is considered inevitable in large part because this transition is critical to achieving the Triple Aim's health reform goals of better care, healthier populations and lower costs. To meet these goals, providers need efficient, anywhere, anytime access to PHI to support collaboration and care coordination.

"We all see the direction health IT is heading. It's not a question of if, because the answer is definitely yes. How it will happen is the more important question. Can it get there as a whole series of fragmented organic efforts?" comments Jeff Rideout, MD and CEO of the Integrated Healthcare Association.

The reality is that hospitals and health systems need clinical mobile tools that can be deployed within the context of current health IT infrastructures. Clinical tools for mobile devices for these environment's must have the following attributes:

**Clinical Relevancy:** Mobile clinical applications must be able to provide dedicated functionality within the mobile application that matches what the clinicians can do on the desktop interface while still interoperating with the existing health IT systems.This level of interoperability enables a streamlined clinical experience that is fast and simple.

**Patient data protection:** Patient data protection is critical in the face of increasing security breaches among hospitals and health systems. Any mobile clinical tool must provide both HIPAA compliance and integrated security for Protected Health Information (PHI).

**Integration with existing security:** Mobile tools must support integration into existing security and network access systems to provide single sign-on for users and avoid added IT complexity. Support for single sign-on enables providers to log in once and access multiple tools with a high level of security, a key feature for usability.

**Low IT footprint:** Mobile clinical tools should support the usability of smartphones and tablets apps, minimizing their IT footprint. This enables easy adoption with a simple path to future upgrades.

# THE PROMISE OF MOBILE: RATIONALIZING CLINICAL WORKFLOW AND SUPPORTING COLLABORATION

With the integration of mobile devices, clinical workflows that are currently defined by EHRs can be improved by allowing doctors to both use their EHR and provide patient care simultaneously. “The benefit of having the patient information at the point of care and taking your device with you from room to room is a significant improvement in workflow,” notes Ben Wilson, Senior Director of Healthcare Solutions at Citrix.

In comparison, in a non-mobile workflow, a physician may talk to two or three patients or do rounds at a hospital and write up notes from these encounters on paper. To get those notes into an EHR, the physician would then head to a desktop workstation and type them in. When that same physician can access an EHR on a mobile device, the process of talking to a patient and entering notes could happen simultaneously while also providing access to information searches, decision support access and ordering lab tests.

Mobile devices can reduce the inefficiencies created when EHRs replace paper charts. They can also improve upon the old paper system by mitigating potential medical errors. “If you’re prescribing a drug at the point of care, you will know if the patient has an allergy or is on another drug that might cause a drug to drug interaction, which reduces medical errors and adverse drug events,” adds Wilson.

Caregiver collaboration is also more effective and efficient with the support of mobile devices. Patient teams can share images quickly and easily and set up simultaneous communications even when team members are remotely located. The immediacy of mobile communications has the potential to significantly improve patient care.

“Mobile devices and technology software apps are the future,” says SUNY Downstate’s Dr. Levine. “They have a 100 percent ability to improve results. I was in Israel two years ago and was sent a CT on my smartphone so that I could review it for a clinical trial. My results had to be reported in 24 hours and using mobile technology allowed me to provide what was needed from 6000 miles away. This capability is going to become a bigger and bigger piece of medicine.”

## ABOUT CALGARY SCIENTIFIC INC. AND RESOLUTIONMD®

Calgary Scientific's enterprise image-viewer, ResolutionMD®, supports the promise that mobile technology brings to healthcare. By integrating on the back end to any vendor's archive (PACS, VNA), and on the front end to any EHR, PACS or other workflow engine, ResolutionMD provides flexible access to any images or reports inside the hospital or out, to address a host of clinical needs: facilitating rounds, meetings with patients, second opinions, expert consultations, and more.

Whether you are a single facility or a large healthcare system, ResolutionMD is the best choice for seamless image access across multiple departments throughout the enterprise. The solution is globally accredited by the FDA, CFDA, TGA, PMDA, MDCO, MFDS, HSA, CE, ANVISA, Turkish MoH and Health Canada for web and mobile medical diagnosis. Our federated approach is an important differentiator from other solutions as highly sensitive data is never moved to any device and no additional data storage locations are created. ResolutionMD is fully scalable and is currently installed in leading healthcare institutions around the world via a network of more than forty-five world class healthcare partners.

For more information on Calgary Scientific or ResolutionMD, please contact us or access our self-serve demo.

## ABOUT BLUEPATH HEALTH

BluePath Health is a California-based consulting firm that partners with government agencies, public health organizations, health IT companies, providers and payers to develop policies and strategies that improve the delivery of patient care and build community health. For more information visit bluepathhealth.com.

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### END NOTES


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