

Retail pharmacy's embrace of technology

A brave new world is being sought for pharmacy, based on the accessibility of pharmacists on the front line of health care. To make the most of their unique position, technological advances in a range of areas will be essential, say suppliers and chain drug retailers. Their thoughts on an array of pharmacy technology issues follow.

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Q: What does the future hold for the use of automation/robotics? Haven't most chains already optimized their use?

COYLE: There remains an opportunity to automate routine pharmacy tasks, freeing up time and resources to enable pharmacists to deliver greater care to patients. Specifically, we are leveraging technology to automate many pharmacy tasks. Examples include the use of interactive voice response to address common patient needs via phone, automated pharmacy chat, and enabling data entry with electronic prescribing. These types of solutions have the potential to expand end-to-end pharmacy automation as technology advances.

JENSEN: We foresee a mass adoption of the centralized deployment of automation over the next several years. We estimate that over 80% of U.S. retail chains do not have an automated central fill strategy; thus this is by far the biggest area of impact chains can leverage to address the evolving role of the pharmacy provider. The centralization of prescription fulfillment has numerous benefits for both their business and their patients. From a business standpoint, centralization greatly reduces their pharmacy's in-store dispensing requirements and decreases overall costs, especially labor and medication inventory costs. Most importantly, it frees up their pharmacists to be patient care providers and their techs to focus on patient activities, which enables their patients to have a much better quality experience.

KONRAD: The use of in-store robotics and the capability of these devices has plateaued in the past five years; however, their use continues to rise in central environments, where we see greater efficiency and store-level task relief. The use of central automation has effectively removed work from stores to allow these teams to focus on customer care and de-

liver additional clinical services at the point of service. As the capability of robotics increases, we will see increased efficiencies and an ability to handle a greater percent of a store's daily production workload. We will also see robotics have an increased impact on improving customer adherence by delivering alternate dispensing packaging and other options.

STUTZ: The use of automation and robotics will continue to evolve as equipment becomes smarter and more efficient, resulting in less time spent on dispensing medication. Use of robotic innovation in the areas of compliance packaging and other form factors continues to improve year over year. But the question is, how far can we go before automation and robotics create too much distance between the pharmacist and the patient?

For example, imagine sitting at home and getting a text that your medication has arrived and a drone delivers your prescription to your front door. This automated process removes the face-to-face interaction with the

Neighbor Pharmacy, we strive to continually make investments in innovation and technology that focus on strategy, leadership and governance in health care, helping our customers navigate the ever-changing digital age.

From an automation standpoint, we are seeing continued enhancements in pharmacy technology and dispensing robotics, which increases efficiencies in the pharmacy by boosting prescription volume, minimizing human error and enabling the pharmacist to spend more time one-on-one with patients for medication counseling, discussing any potential side effects and developing personalized relationships. Beyond automation is the consistent implementation we are seeing of medication synchronization programs, which can have a profound impact on medication adherence, Star Ratings and other pharmacy performance measures, along with optimizing a pharmacy's operations. More importantly, med sync programs improve the patient experience and their adherence, impacting outcomes and over-



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the opportunity to maximize the amount of time they currently spend with patients. This opportunity should provide a better pathway to more-effective chronic disease care management as well as better patient outcomes and lower health care costs.

LYONS: While it's true that many chains have effectively put automation and robotics into practice in meaningful ways, developing the solutions can be costly, especially for independent pharmacy practices. In the future, I expect more pharmacies to take advantage of centralized prescription dispensing systems such as McKesson's Central Fill as a Service. Pharmacies that take advantage of the service are able to improve customer service and patient outcomes, increase labor efficiency, and reduce inventory costs without huge initial investment. By choosing the service that allows them to move filling tasks to another location, these pharmacies are able to shift the pharmacy team's focus to additional patient care services, including wellness programs, chronic condition management serv-

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Over 80% of U.S. chains lack automated central prescription fill.

pharmacist. We must consider how to get the biggest benefits from technology without impacting patient care.

Automation and robotics help pharmacists dispense medications quickly, accurately and cost effectively. Plus, there's significant potential for enhancements in the future. However, pharmacists must take advantage of the increase in time to expand their clinical offerings and build relationships with patients, ensuring personal interactions with the patient are still a priority.

NIGHTENGALE: In 2020 and beyond, we predict some significant plays around vastly improving the connectivity of health care providers with pharmacies, opening an opportunity for pharmacists to play a greater role in caring for the patient and going beyond dispensing medication. At AmerisourceBergen and Good

all health and well-being.

We think there is still a lot of opportunity for innovation and technology to support pharmacists and allow them to focus on care. In the future, AmerisourceBergen and Good Neighbor Pharmacy hope to bring more emergent technologies to market to create even more efficiencies for pharmacists, patients and prescribers. Together, we will continue to remove roadblocks to care, support connectivity and advance the practice of pharmacy.

WYSONG: Providers will continue to rely on automation and emerging technologies as an effective way to address the short-term challenges of the business, with a renewed focus on finding new areas of profitability. Automation and robotics not only afford providers an opportunity for better asset management, but also

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and more. This lets them better engage with their patients and dedicate time to developing new revenue streams.

RINKER: We are in the early innings of a paradigm shift in how medication is being dispensed in America, so by extension we are very early in a new wave of pharmacy automation.

According to a recent paper in the *Annals of Pharmacotherapy*, the estimated annual cost of prescription drug-related morbidity and mortality resulting from nonoptimized medication therapy was \$528.4 billion in 2016. That is considerably higher than the \$300 billion annual cost of medication nonadherence that is widely published.

To put that in another perspective, there were approximately 4 billion prescriptions dispensed in the U.S. in 2019. That means every prescription dispensed generated \$131 in additional spending to account for nonoptimized medication therapy. Despite massive efforts, the cost of medication nonadherence appears to be increasing, and this is clearly not sustainable.

How does this compare to other country markets? In Canada, in 2019 there were 500 million prescriptions dispensed, and the cost of nonadherence was \$4 billion, or \$8

per prescription dispensed. In the U.K., in 2019 there were 1 billion prescriptions dispensed and the cost of nonadherence was £500 million, according to the National Health Service. Or in other words, less than \$1 per prescription dispensed.

Pharmacists play a significant role in helping patients remain adherent.

How can that be, why are nonadherence costs dramatically lower in these countries? There are a number of contributing factors, but the major one that stands out is the vast majority of patients with complicated medication regimens (five-plus medications) have their medication organized at the pharmacy in a multidose blister pack that is checked for accuracy by their pharmacist.

Today, more and more pharmacists and pharmacy executives are concluding the predominant dispensing method today (90-day fill in a vial) falls short of supporting their patients to properly self-medicate at home.

The blister pack offers the best chance the patient will take their medication as pre-

scribed and address the massive cost of nonadherence. It's simple, it's logical and it's proven. The shift to blister packs is a win for the patient, a win for the pharmacy, and a win for the payer.

SULLIVAN: Actually, the opposite is true. Automation and robotic applications continue to evolve and provide additional value at both centralized pharmacies and retail. For example, consider the following use cases:

- The latest KNAPP high-speed automated pill counting technology provides greater accuracy and security systems that allow pharmacies to do remote replenishment as well as canister verification. Because of this, they are able to reduce requirements for pharmacists and techs within the pharmacy. With the current challenges to comply with the latest USP <800> regulations, centralized vacuum systems are being integrated into automated systems to minimize dust and particles and allow the pharmacies to keep more of their fastest-moving meds in labor-saving automation.

- Robotics are also continuing to deliver game-changing results, whether they are used like our KMed robots for pill counting of mid- and slow-moving medications or combined with artificial intelligence (AI) technology to drive

improved results in packaging and/or pharmacy distribution.

- Automated storage and retrieval systems like the KNAPP-Store have now replaced the manual put-away of medications from wholesaler delivered totes and use dynamic storage and automated dispensing. Because the medications are always dispensed first to expire, first out (FEFO), the pharmacy is able to better control its inventories, and reduce losses while lowering both its staffing requirements and footprint.

- At retail, this same robotic technology can now be married with 24-7 automated dispensing system terminals, reducing the floor space required by up to 60% and extending hours of operation at no additional cost. This also allows pharmacies to add value-added functions and products like medication therapy management consulting, clinical functions or even additional health and beauty products to increase their margins.

FITZMAURICE: Optimization is an ongoing process. That refinement requires the leveraging of system integration and attention to the shifting demand for new medications moving off the shelves. As medication regimens become more complex, a multifaceted system of software and hardware integration is required to keep pharmacies at maximum efficiency. Automation companies that understand the need for this approach can continue to help pharmacies improve their workflow operations.

Q: What's next for consumer-facing pharmacy technology — e.g., apps with refill reminders? Can apps be used for MTM and boosting prescription adherence?

KONRAD: App-driven technology to improve the customer's pharmacy experience will be a focus at Rite Aid in the coming years. We have seen the positive effect of apps in other business sectors, and the time has come to disrupt (and improve) the current paradigm by making it easier for customers to order, pay and receive their prescriptions and services. Not only will apps allow customers to manage their prescriptions, but they will also enable them to chat with a health professional (pharmacist, health coach, etc.) to ask questions about their medications, receive advice about proper medication use, and gain deeper insight into making healthier living decisions. We see these pharmacy apps as an extension of our pharmacy teams and other resources (Health Dialog, RediClinic, etc.) providing customer care and friendly advice in addition to simplifying the actual process of receiving medication.

LYONS: There is an abundance of consumer-facing technology available to offer solutions for health and wellness needs. Patients can already set reminders to fill medications at the pharmacy and alarms to remember to take doses at the appropriate times of day, as well as track activity and behavior to encourage improved health. The next opportunity for these technology adopters is to include their local pharmacist in the digital conversation from an omnichannel approach. Allowing the pharmacist to

positively support health behaviors is one way to stay engaged. For example, when an app shows that a patient is not taking a medication as prescribed, their local pharmacist can receive an alert and be available for a conversation about the reasons for the missed doses. By digging into the challenges directly with the patient, the pharmacist can help with specific solutions to address adherence with a clear plan. The pharmacist can also engage the prescriber to make needed changes in therapy between office visits.

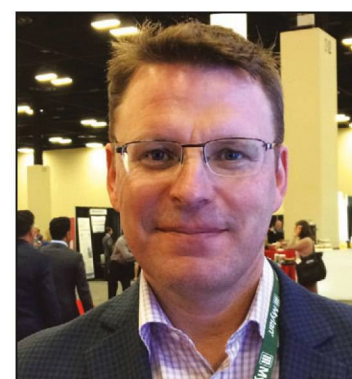
WYSONG: There is no question that consumer-facing technologies will continue to evolve and reshape how we interact with our customers and patients. The technology not only offers a patient the ability to order prescriptions online, but instantly opens a line of communication and messaging around better product selection and better comprehensive care management. The unmatched convenience and accessibility to providers and patients put these platforms at the center of many of the new MTM and outcome and adherence improvement initiatives. These technologies will ultimately give providers greater insight into how our patients manage their own health, their activities, and a more tailored solution to improving their overall health. It also means that we will have more educated and compliant patients.

SULLIVAN: Retail pharmacy automation is also undergoing an exciting transformation; much like the grocery or retail industry the latest robotic technologies are more space efficient and can allow the pharmacy to provide differentiated and value-added services. Responding to consumer demand for a more compelling shopping experience, the latest point-of-sale technologies are now emerging. For example, KNAPP's Aposcreen technology allows the consumer to research products and explore consumer product information — providing a seamless and omnichannel experience — where they can order from a wider variety of product in-store. When the product selection is virtual, stores are able to reduce inventory on hand and minimize shrinkage of high-valued product.

NIGHTENGALE: When prescriptions are not taken as prescribed, or potentially not filled at all, patients are unable to receive the benefit of the therapy, which can criti-



Mike Wysong



Mark Rinker

cally impact outcomes. Fortunately, pharmacists can play a significant role in helping patients remain adherent to their medications and potentially improve their health. In fact, the 2019 NCPA Digest found that 91% of independent pharmacies are working to offer an array of services, including medication adherence programs.

Mobile applications, including the MyGNP Good Neighbor Pharmacy app, make it easier for patients to refill prescriptions, receive refill reminders, review custom medication information and schedule medication reminders by enhancing timely, relevant communications between patient and pharmacist, which is key for maintaining adherence. Creating mobile connectivity to the pharmacy puts power in the hands of the patient and helps foster a strong relationship between that patient and the pharmacy — all while being accessible and convenient, no matter where the patient is located. By fostering communication and creating a seamless user experience, pharmacists can extend their reach and impact, building trust with the patient in order to help enhance patient care and potentially increase adherence.

Beyond our consumer-facing mobile app, Good Neighbor Pharmacy has implemented a "safety net" program, which combines proactive and reactive calls and text messages to patients who are nonadherent or at risk of nonadherence. Designed to help catch

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patients who are not refilling their prescriptions on time, this is a program that we run in partnership with our partner, Prescribe Wellness, and is part of our adherence offerings, which includes EQuIPP, a patient engagement center, analytics, business coaching and more. We have developed these solutions with a goal to help pharmacists pick the right solutions that work for them, help protect their independence and strengthen the connections that matter most — those with their patients.

The health care system continues to look for ways to create connectivity and create efficiencies by adopting new technologies to meet the unique needs and challenges patients — and pharmacies — face when it comes to impacting outcomes and improving patient care. At Amerisource-Bergen, we have begun to develop digital solutions for those with chronic illnesses to help with tracking appointments, medical records, prescriptions and more, along with the ability to integrate a patient's pharmacy record within their medical record through the pharmacist e-care system. While a work in progress, these are tangible steps that are advancing our ability to serve patients in a more personal way, improving outcomes and ultimately decreasing the overall cost of health care.

STUTZ: There's a variety of opportunities for patient-facing apps to play a critical role throughout the patient journey. In the near future, our OutcomesMTM Connect platform will allow pharmacists to identify MTM opportunities and then use our digital platform, mscripsts, to send refill reminders, schedule comprehensive medication reviews (CMRs) and offer additional clinical services. Pharmacists can use patient-facing apps, alongside face-to-face MTM services, to help patients overcome barriers to adherence and identify new business opportunities for pharmacies.

As technology enables pharmacists to have a larger impact on medication adherence, it also increases their access to patient information across the entire health care continuum. Previously, there have been breakdowns along the chain of communication, resulting in a lack of coordination of care. Stakeholders recognize that meaningful dialogue with patients and collaboration between manufacturers, payers, prescribers and pharmacists is key to reducing the costs of care while improving health outcomes. Last year, our net-

work facilitated 1.9 million adherence interventions and addressed 420,000 medication therapy problems that resulted in \$436 million in health care savings.

COYLE: Providing access to care when and how patients need it will continue to play an important role in improving health outcomes. Consumers have come to expect the delivery of services and products at the click of their fingertips, and it's no different with their health care. There are a number of opportunities for pharmacies to leverage consumer-facing technology, like apps, to help connect patients to care, drive pharmacist engagement and increase adherence.

Today, mobile apps for pharmacies are evolving to meet the needs of patients throughout their health experience. Our digital tools support patients throughout their entire journey — from making appointments or speaking to an online health care provider for services they need, to opting for express or delivery options for their prescriptions, to accessing a pharmacist 24/7 if they have questions. All of this allows patients to more effectively manage the multiple aspects of their health care.

Digital pharmacy solutions also help address and eliminate medication adherence barriers and improve patient outcomes. Our research shows that our pill reminder feature on the Walgreens mobile app increased adherence in diabetic patients as much as 22%. When pharmacists work with patients to synchronize medications with Save a Trip Refill, we've seen improved adherence in patients with diabetes, hypertension and high cholesterol by nearly 10%.

While the age of digitization is upon us, it still remains critical to ensure we have the services and expertise that our patients count on from their local pharmacy. The balance is delivering convenience and coupling that with the personal touch that Walgreens has always been known for — whenever, wherever and however they want it.

JENSEN: With the majority of patients now smartphone users, we've certainly seen the rise of mobile apps for patient adherence, MTM and so on. Consumers can now use apps that do everything from serving as a "virtual pillbox," showing the color and shape of a patient's medications along with their dosages and schedules, to having patients selecting a character and then making choices that affect their character's health. It seems the more engaging the

app, the more promise it has for having widespread use.

Q: What's the potential for greater use of telepharmacy/telehealth, and how can technology enhance its prospects?

WYSONG: Telepharmacy has experienced a precipitous amount of growth over the last couple of years, given its promise of better accessibility and care management in predominantly rural areas where such current care options and logistics have traditionally been unfavorable. The ability to counsel patients at these locations using a tablet or telephone opens a wide range of enhanced clinical services for the most vulnerable of populations aimed at reducing overall health care costs and improving outcomes. Telepharmacy also holds the promise of being the facilitator of add-on technologies including digital gathered information from wearables, meters and pharmacy compliance apps. All of this should result in mitigating the barriers to better care providers and a marked reduction in hospital readmissions.

More patients are starting to accept and trust remote care technology.

COYLE: Telepharmacy has been successfully meeting the needs of patients in remote or underserved areas, as well as expanding the footprint of outpatient pharmacy services across health system campuses for years.

One way we're complementing the work of in-store pharmacy teams to help patients is through a new team of dedicated pharmacists called Health Outcomes Pharmacists. Using analytics from our clinical engagement platform, these specialized pharmacists provide telepharmacy support and work closely with patients most at risk of nonadherence. They address barriers that could prevent patients from taking their medications as prescribed and can provide personalized interventions. Preliminary results show significant improvement among patients who receive high-touch clinical interventions.

To holistically address the needs of our patients, we launched the Walgreens Find Care digital platform online and through our mobile app.

Walgreens Find Care has a number of services like urgent care, telehealth, lab testing, physician second opinions, physician house calls, and even optical and hearing services. Patients can connect via phone or video chat — or schedule an in-person appointment in their local community. Patients can also use MDLive, which provides 24/7 online doctor visits from the comfort of their home.

LYONS: Telehealth and telepharmacy are powerful tools that can link and expand critical services to more patients, particularly in rural or underserved communities. It is important to keep in mind that like any health care service, it must be used effectively to get the needed value. Local Health Mart pharmacies are already a trusted, convenient and valuable provider in communities across the country. By pairing the right telehealth solution, the pharmacy can bridge care gaps and offer patients quicker, more effective care options.

JENSEN: Due to the decline of pharmacist availability in some geographic areas, we see an increased use of telepharmacy to oversee various aspects of pharmacy operations or to provide patient care services for groups of pharmacies. One of the more common



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experience for the customer, technology can reduce clerical work by automatically generating clinical notes and simplifying workflows. Additionally, push notifications and an asynchronous model can allow providers to deliver care from potentially anywhere.

FITZMAURICE: Telepharmacy and other, similar models (central fill, kiosk pickup, etc.) have huge potential. As market disrupters continue to enter the industry, pharmacies should look for ways to assist the continually underserved rural areas, which necessitates a look at these models. Advanced technologies (5G, enhanced secured robotics, etc.) will continue to make telepharmacies a viable option, and could also give them some distinct advantages.

STUTZ: We're heading toward the future of telehealth as staffing challenges and value-based care become more apparent. In addition, more and more patients are starting to accept and trust remote care technology as they search for convenient, affordable access to health care.

TelePharm, our video conferencing platform, allows pharmacists to expand pharmacy services to patients in rural, isolated areas. Through this service, patients have immediate access to care anytime they have a medical question, empowering the patient/pharmacist relationship and reducing the cost of care.

It's important to note payment reimbursements and pol-

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icy regulations must improve support for telehealth's integration and interoperability with health care services. As technology enhances and legislation continues to evolve, telehealth will enable health systems to efficiently reach more patients than ever before, presenting opportunities to reach more patients. Considering medication adherence remains a major barrier in patient outcomes and chronic diseases affect approximately 133 million Americans, according to the National Health Council, this ability to reach more people more efficiently is key to improving patient outcomes.

NIGHTENGALE: Patient care is continually evolving and improving through technological developments such as digital apps and telehealth. These technologies increase access to care by creating more lines of communication between patient and provider. As a result, dialogue between the patient and pharmacist is bolstered, patient outcomes improve, readmission rates are reduced and expenses decrease.

Beyond mobile applications, pharmacists are also innovating patient care through telemedicine. For example, there is a Good Neighbor Pharmacy in Michigan — Hemmingsen Drug Store — that is operating a program with a local hospital and social work agency to support patients who have been recently discharged from the hospital. Through a telemedicine program, the pharmacist communicates remotely with patients and helps them navigate the often-confusing new medication regimen they are on. Through these programs, pharmacists can work directly with a patient's social worker to review care instructions digitally and save the patient a trip to the pharmacy. This is one example we are seeing of how an independent community pharmacy can create connections across the care team with the goal of impacting patient outcomes.

Q: How can technology help fight the opioid epidemic — e.g., detecting patterns of misuse?

LYONS: I believe that technology can play a major role in improving patient safety in the opioid epidemic. McKesson is dedicated to the development of a national prescription safety alert system that will focus on the key goals of

identifying patients at risk for opioid overuse, abuse, addiction or misuse. The system would provide proactive, real-time clinical alerts, integrated into pharmacist workflow, and would address shortcomings of existing state and federal clinical decision support systems, while saving time for pharmacists and prescribers.

KONRAD: Technology can and does play a large part in fighting the opioid epidemic, starting with the growing adoption and utilization of electronic prescriptions (ERxs). ERxs eliminate the risk of fraudulent prescriptions being created and submitted by unlawful customers that can be a gateway to misuse and/or illegal sale of prescription drugs. Additionally, online edits have been created to assist our pharmacy teams (in a standardized manner) in the vetting process whenever they fill opioid prescriptions. Lastly, nationwide databases are now being utilized to provide additional data to physicians and pharmacists to assist their decision making to prescribe and/or dispense the medications to customers.

WYSONG: The opioid crisis is certainly one of the most difficult and dynamic problems our industry has had to face to date. Technology isn't the only answer to appropriately addressing the issue of misuse, but it does play a central and supporting role in providing caregivers and patients a platform to drive forward better and more meaningful solutions. The current PDMP in tandem with EHRs enable providers to access data on specific patients in real time so they can make more informed prescribing decisions. Expansion of these services with the continued promotion of CSOS (Controlled Substances Ordering System) enhances a pharmacy's ability to determine if it is appropriate to dispense an opioid; furthermore, technology also has a prominent place in the promotion of healthier alternatives to opioid treatment. Such advancements include wearable devices measuring physical activity, advancements in virtual reality and other non-pharmaceutical therapies like audiology.

NIGHTENGALE: According to the Healthcare Distributors Alliance, approximately 60% of opioid patients had never had a conversation with their pharmacist or other health care professionals about safe use, storage or disposal of prescription opioids. Nearly 70% had never had a conversation with a health care provider about alternatives to opioids, and 90% kept unused

opioids for future use.

As stakeholders in health and wellness, pharmacists play a critical role in helping to combat the opioid epidemic. Although they are not the prescriber, they can be a powerful influence in discouraging opioid misuse. Through the AmerisourceBergen Foundation we've seen technology play a supportive role in educating communities around prescription drug safety. We have supported prevention programming, fueled through technology, that is implemented in schools to equip students with the skills to make safe and healthy decisions about prescription medications.

In addition to our foundation work, we partner with Allied Against Opioid Abuse (AAOA), which helps pharmacists engage in conversations with their patients and health care provider colleagues through tool kits and other mediums about the rights, risks and responsibilities associated with prescription opioids. AAOA navigates difficult but important conversations to help prevent opioid abuse and misuse, and many of its resources can be found online or shared among pharmacists digitally.

ERx eliminates the risk of fraudulent scripts being created and submitted.

JENSEN: Having access to data is one of the biggest potential points of impact. A centralized clearing house that electronically monitors in real time opioid prescriptions written and filled would have the greatest impact. This information is generally available today when prescriptions are filled through a pharmacy benefits manager, but much greater visibility is needed.

COYLE: Technology does and will continue to play an important role in addressing the opioid epidemic. Technology helps at the point of prescribing by identifying other opioids that a patient may be taking. This helps reduce overuse and is a patient safety benefit. Technology provides the ability for prescribers to send controlled substance prescriptions, including opioids to pharmacies via e-prescription. The expansion and adoption of e-prescriptions improves transparency and quality and reduces diversion by directly linking the prescriber and pharmacy through standardized communication.

Technology also supports the pharmacist by providing drug utilization review tools that

may assist patient counseling. It can make identifying opportunities for offering naloxone even easier.

If patients have unwanted medications, they can safely discard them at one of our 1,500 safe medication disposal kiosks across the country.

Q: To what extent can technology foster the increasing use of home diagnostics, and how can the results be tied to pharmacy needs?

STUTZ: Consumers want quick, convenient interactions with treatment options tailored to make their lives easier. That, combined with the trend of an aging population, means greater demand for at-home care and deliveries. Home diagnostics offer patients the convenience they crave by allowing them to independently gather medical information and quickly report it to their provider for proper treatment. When treating chronic conditions like diabetes or hypertension, having

more frequent data points allows providers and pharmacists to make changes to medication, resulting in a healthier patient.

And as technology improves, home diagnostics can be used in parallel with telehealth and telepharmacy. When a pharmacist consults with a patient remotely, they can rely on results from home diagnostics tests to prescribe and deliver medications. Home diagnostics and telehealth may save the patient money and time, but pharmacists must not rely solely on diagnostic information or telepharmacy. Maintaining a relationship with the patient remains an important factor in medication adherence.

JENSEN: I believe the key to taking home diagnostic use to the next level is a centralized, standardized repository of patient health records. The repository must be accessible to all members of a patient's health care team, and also be able to generate "push" notifications when a level or condition is above the normal threshold. This would enable teams to review pertinent real-time patient data, make informed assess-



Brian Sullivan



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ments, and take appropriate actions for the patient.

COYLE: There is a natural synergy between home diagnostics and pharmacy. The more information available to pharmacists, the better they can support patients by learning more about their daily routines. This translates into more impactful patient support from their pharmacist. It also unlocks more collaboration opportunities with providers to implement changes in their care plan. As technology makes it easier for patients to connect and share data with their providers they will likely need some instruction along this journey. Online resources are fantastic, but having expert pharmacists in the community will help accelerate adoption.

KONRAD: As health care shifts towards personalization and digitization, diagnostics allow individuals to receive vital information with increased accuracy, specificity and speed. These products lower cost and time commitments necessary to generate medical opinions, while increasing accessibility of care, often allowing customers to undergo diagnostic testing in their own homes. Pharmacists, being one of the most trusted and accessible health care professionals, are able to have multiple touchpoints with customers along this journey, starting with the type of diagnostic to purchase, utilization of the device and ultimately helping the customer understand results and next steps.

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WYSONG: The role that pharmacy plays in the continuum of health care today is clearly expanding. Pharmacies tend to be more accessible than public health facilities and are more trusted and closer to the people in the communities that they serve. Those variables tend to promote an expansion of services ushered in by consumers looking to have a greater number of the health care needs met by a locally trusted and accessible partner. The natural expansion of these services beyond medication dispensing now includes flu shots, vaccines, diabetes care, blood pressure monitoring and several self-administered diagnostic tests. We expect this expansion to continue, and the prospect that these services can be performed on-site is a sizable opportunity for pharmacy. The role technology would play here would certainly be significant in the integration of data, training and regulatory oversight of these additional services.

FITZMAURICE: As new models of pharmacy emerge, the continuum of care is going to become more focused. Whereas previously a patient had to go to three or more locations to move from diagnosis to treatment, home diagnostics and additional technologies will cut this down significantly. If a patient can do more than half the work from the comfort of their own home, it greatly reduces the potential for them falling into the cracks inherent in transitions of care. And because pharmacies will have access to that same data, they'll be able to make more sound clinical decisions, thus filling in some of those cracks. This is a powerful change for patients and pharmacists alike.

LYONS: This is an area where I believe pharmacists can take a much greater role in optimizing therapy and helping patients achieve better clinical outcomes. In managing chronic conditions, prescribers often need to make medication adjustments to optimize therapy. Traditionally, these adjustments are made during scheduled office visits that may be weeks or months apart, causing delays in the patient reaching clinical goals. Many home diagnostic devices have connectivity abilities, allowing the user to share results with family members, caregivers and providers. When the pharmacist can review the home diagnostic results between office visits, they can use the data to evaluate progress to clinical goals and work with the prescriber to adjust therapy between visits.

Home diagnostics help in the team approach to patient care and ultimately result in better clinical outcomes for patients.

Q: What ideas are in the works for bringing artificial intelligence to the technology used in community pharmacies?

LYONS: There are multiple ways that AI can impact health care and pharmacy technology as we find better ways to use data and predictive analytics to identify risks, make decisions and create action plans. AI is already being used to analyze data and predict risks around hospital readmissions, medication adherence challenges, opioid misuse and other costly challenges facing the health care system. AI has the potential to help create pathways for pharmacists to take more effective action in patient engagement, prevention and management of chronic conditions.

WYSONG: AI and some of the new advanced technology solutions like block-chain will undoubtedly find a meaningful place within the pharmacy sector. As progressive as some of the new drugs and therapies have been, our vertical

complex tasks like managing a loved one's medication regimen or even their required health services (immunizations, disease state testing, etc.) At the pharmacy, AI can and will be leveraged in even a greater capacity to automate activities that today require human intervention. Tasks like entering prescription orders, offering services and even cashiering transactions, will eventually be assisted and/or automated via AI technology and/or machine learning.

SULLIVAN: AI-enabled technologies are certainly now entering the pharmacy technology space. Systems like KNAPP's RedPILOT control tower software are innovative platforms that allow pharmacy operators to leapfrog legacy order management and scheduling technology. These technologies can quickly convert data to insights, and insights to increased performance. While early on in its development within pharmacy, we expect similar bottom-line results to those we have seen in the warehouse space.

COYLE: AI has an immense opportunity to advance innovations and address complexities in the current health care ecosystem by delivering data-driven insights that make health care more personalized and integrated. Partnerships that leverage the patient care expertise and retail footprint of pharmacies with the AI ca-

plementing Theatro's voice-powered AI solution in all of our locations to allow our store teams to obtain information needed to deliver differentiated customer experiences. As we transform our stores into neighborhood health care destinations and the pace of change continues to accelerate, this technology helps us communicate the changes we're making directly and regularly with team members.

Through powerful combinations like these, AI technology can help create a more connected and consumer-centric health care delivery and management platform; offer personalized health care services; and collaborate with payers, providers and manufacturers to create solutions to improve health outcomes.

STUTZ: In the future, pharmacists will leverage technology to make an even greater shift from dispensing medications to providing a broader range of patient care services. AI is a broad set of capabilities and includes computer vision and natural language processes (NLP). If you think about computers verifying pill counts or patients talking to a virtual assistant about their refill, AI is already here. While many believe AI will dehumanize health care, the technology has been proven to create workflow efficiencies, increase accuracy and improve patient outcomes.

Pharmacists will start to rely on AI to make informed decisions about their patients, based on patient data captured from pharmacy and external data systems, and identify medication-related risk due to changes in their diagnoses. The more AI advances, the less time pharmacists will spend on filling prescriptions and, instead, focus on patient engagement and clinical services.

Although, pharmacy systems must evolve to successfully deploy AI that integrates data from different sources. If the right technology is in place, AI also provides pharmacists the opportunity to facilitate better collaboration with health care stakeholders working on behalf of the patient to provide a better continuum of care. With the right data, pharmacists will be able to predict which patients will remain adherent to their medication, which patients will impact DIR fees and ultimately which patients will stay out of the acute setting.

NIGHTENGALE: Across the entire health care system, providers need access to multiple data sets for knowledge sharing and open communication. A significant pain point for providers is insufficient and ineffective data within a pa-



Justin Coyle



Brent Stutz

tient's medical record, limiting visibility to prescriptions, treatment protocols and diagnoses. From the pharmacy's standpoint, when a patient is admitted to a hospital or treated by a specialist, it is his or her responsibility to report current and past medications, which may lead to inaccuracy in reporting.

Pharmacists play an important role in not only providing care but also fostering communication. Soon, I believe we will see significant movement around supporting data connectivity between providers and the pharmacy, such as the use of pharmacist e-care plans within care teams. Ultimately, that connectivity will enable pharmacists to play a larger role in supporting patients holistically and as an essential part of the care team overall.

JENSEN: As with centralization, we believe AI will continue to have a huge impact in pharmacy automation and pharmacy-related applications. At Innovation, we've incorporated AI and continue to assess how to use it at various key junctures in our customer's central fill/mail order pharmacies. These points of impact enable us to better optimize the technologies to help increase throughput, meet request time lines, and continue to drive down the cost to fill prescriptions. This use of AI drives our systems to dynamically prioritize prescription orders and balance the workload of each process instead of relying on user interpretation and underlying system settings, thus providing a huge "hands off" impact.

AI can and will be leveraged in even a greater capacity to automate activities.

is still hyper-fragmented, and the current IT infrastructure supporting it is oddly antiquated. This systemic issue presents a unique opportunity for these solutions to have a major impact on the way we deliver care today. Many organizations cannot access or act on the data that is critical to providing a tailored approach to meet the needs of the customers that they serve today. AI could aid in the collection and coordination of key data, built around a highly accurate and predictable outcomes model to help identify the highest risk patients for costly events and/or lengthy hospital stays. This would give providers more time to deliver quality care at a lower cost.

KONRAD: There are many ways that AI can assist the pharmacy business. On the consumer level, AI can be leveraged as a Personal Assistant to perform simple tasks like medication reminders all the way to more

pabilities of technology companies show the greatest potential to help accelerate and transform retail health care and the role of pharmacy in patients' lives. By harnessing advanced digital technology and retail solutions, pharmacies have the potential to develop new, game-changing health care delivery models.

Walgreens' partnership with Microsoft is key in our strategy to transform care for patients through our pharmacies. The partnership combines the customer reach, convenience and personal care of Walgreens locations, health services, pharmacists and health care providers with Microsoft's cloud and AI technologies, health care investments and innovative retail solutions. Our aim together is to make health care delivery more personal, affordable and accessible for people around the world.

We're also leveraging voice-based AI to improve customer experience in stores. We are im-