



Effective Vaccine Management for Public Health

Improving immunization efforts with the AccuVax[®] Vaccine Management System

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WHITE PAPER

TABLE OF CONTENTS

EXECUTIVE SUMMARY	3
BACKGROUND	3
CHALLENGES	5
Vaccine Knowledge and Communication	5
Missed Opportunities for Vaccination (MOV)	5
Logistical Barriers	6
SOLUTION	7
Improved Clinical Experience / Care Team Well-Being	9
Better Outcomes / Population Health	9
Improved Patient Experience / Lower Costs	9
CONCLUSION	8
ABOUT THE AUTHOR	9
REFERENCES	10

EXECUTIVE SUMMARY

Vaccines are one of the greatest public health successes. Vaccines have eradicated smallpox and nearly eliminated polio from the world. The number of people who suffer morbidity and mortality from measles, diphtheria, and whooping cough is at an all-time low. This success has been due to broad use and herd immunity conferred from near universal use. Our Public Health institutions play a vital role in ensuring that the uninsured and underinsured are vaccinated and therefore help protect them and the population as a whole.

Vaccines are extremely sensitive to temperature fluctuations. Improper storage and exposing a vaccine to temperature fluctuations can effectively kill live viruses and harm proteins in the vaccines and render them ineffective. Studies have shown that even freezers and refrigerators can with normal use expose vaccines to unapproved temperatures¹. This potential reduction in potency combined with growing vaccine hesitancy can put our herd immunity at risk. Therefore, according to the Centers for Disease Control and Prevention (CDC) and the Advisory Committee on Immunization Practices, it is better to not vaccinate than to vaccinate with an improperly stored vaccine until completing consultation with state or local public health departments or the vaccine manufacturer².

Single cases of these diseases can be costly, and even more so when they progress to an outbreak. The most cost-effective method to deal with these types of diseases is to provide vaccinations on the recommended schedule in order to avoid serious consequences of the disease both to the individual and the population as a whole. Administering the right vaccine at the right time with proper potency requires a number of logistical and administrative challenges to be overcome that can be difficult for healthcare providers to achieve. As a result, state VFC programs, can lose more than 5% of vaccines and recalls due to storage are unfortunately commonplace³.

A possible solution to these challenges is the AccuVax[®] Vaccine Management System which addresses many of the current challenges by protecting the vaccine potency and providing efficiencies and cost savings for immunization efforts for healthcare providers.

BACKGROUND

Vaccines are an important preventive health measure and are the cornerstone to many public health efforts. Without vaccines, diseases such as polio, smallpox and measles could be commonplace, along with lower life expectancy rates and higher childhood morbidity and mortality. With recent outbreaks of vaccine preventable diseases such as measles, a renewed focus on this critical preventive health effort has resurfaced. Healthcare providers in particular are taking note as they are often frontline providers of the vaccines, and the ones identifying and treating those with vaccine-preventable diseases.

For healthcare providers, it is important to understand the benefits of vaccinations and be able to communicate this knowledge adequately to patients and parents of young patients. Studies

have shown that gaps in knowledge and poor communication from healthcare providers can be detrimental to vaccination rates, which in turn deteriorates herd immunity in the population.^{4,5} Herd immunity is important because it is helping to safeguard and protect the most vulnerable within the community, such as those who cannot receive vaccines due to medical reasons, those who are pregnant or those with weakened immune systems (e.g. cancer patients, transplant patients, HIV patients etc.).⁶ Importantly, herd immunity also helps to prevent outbreaks. Unfortunately, the United States (U.S) has seen outbreaks of vaccine-preventable diseases in recent years, to include pertussis (whooping cough), meningococcal disease, influenza (flu), mumps and notably, measles.

The effects of vaccine-preventable diseases can be disastrous to both the individual, and the community in which they reside. Many of these diseases have symptoms that are difficult to treat or can become life threatening.⁷ Measles in particular can be very severe, with many young children dying from pneumonia caused by the disease, having seizures or encephalitis (swelling of the brain).⁸ One of the problems with measles is that it is also highly contagious, infecting 90% of those susceptible to the disease (for example, those too young or unable to be vaccinated and immunocompromised patients) and costing up to \$142,000 for a response to a single case.⁹ The cost can be so high due to contact tracing, prophylactics, quarantine and public outreach to help contain the disease and minimize the effects of an outbreak. Furthermore, the reputational damage to a clinic from being associated with such a severe disease can have dire consequences on their patient base and finances.

With consequences of these vaccine-preventable diseases being so high, public health officials and the healthcare system are working to develop strategies to improve vaccination rates, mitigate potential outbreaks and reduce preventable infectious diseases. A key driver of this effort are specific vaccine focused goals in the Healthy People 2020 objectives. These goals focus on reducing, eliminating or maintaining progress on 17 vaccine-preventable diseases across the full age spectrum.¹⁰ The National Committee for Quality Assurance (NCQA) is another organization also focused on improving vaccination rates by using the Healthcare Effectiveness Data and Information Set (HEDIS) to share information across plans on vaccination rates.¹¹ And from an incentive perspective, the Promoting Interoperability program (a part of the Merit-based Incentive Payment Systems (MIPS)—formerly Meaningful Use), promotes clinicians working with public health agencies to transmit information on immunization rates to improve disease surveillance efforts collectively.¹²

As clinicians work to meet these quality goals and improve vaccination rates, it is important to fully understand which vaccines should be offered, and when. The primary resource for this information can be found in the Advisory Committee on Immunization Practices (ACIP) Immunization Schedules.¹³ These schedules are determined by a committee of subject matter experts and professional organizations, and then approved and published as the official Centers for Disease Control and Prevention (CDC) recommendation for immunizations in the U.S. These recommendations are based on evidenced-based practice, routinely reviewed and updated accordingly. Schedules vary based on age-ranges, as well as shared clinical decision-making, catch-up and risk-based immunization strategies. With so many professional organizations and

the CDC endorsing these vaccination guidelines, it is really the norm or standard practice for clinicians to rely on and recommend vaccinations based on the ACIP schedule within the U.S.

CHALLENGES

While many healthcare providers support vaccination efforts, it can often still be a challenge to implement vaccination programs and achieve the desired immunization rates in patient populations. Outlined below are a few key challenges that many healthcare providers may face while attempting to deliver vaccine programs to their patient population.

VACCINE KNOWLEDGE AND COMMUNICATION

It has repeatedly been established that healthcare provider knowledge, attitudes and beliefs about vaccines are often determinants of their intention to recommend vaccines to their patients, as well as uptake of vaccines in their patient base.^{14,15} Knowledge of the recommended immunization scheduled, contraindications and recent research can be challenging for healthcare providers to stay fully abreast on. Often it is cited that healthcare providers can be anxious about discussing vaccines with vaccine hesitant patients (or parents of patients) and may not feel equipped to answer the in-depth questions that may arise. While about 84% of providers feel comfortable discussing concerns and addressing questions regarding vaccines, they will still see on a monthly basis an average of 79-89% of patients either refusing a vaccine or altering the immunization schedule.¹⁶

Healthcare providers are routinely listed as the most trusted source of information on vaccines, and when they can successfully convey this information, they are also one of the most likely sources to influence patients to change their mind on vaccination practices.¹⁷ Part of the challenge to this though is often the balancing of other urgent concerns in the healthcare setting and having adequate time to spend with the patient to answer all of their questions.¹⁸ Physicians reported that they were more likely to discuss vaccinations during an annual or well-care visit, as opposed to sick or acute care visits.¹⁹

MISSED OPPORTUNITIES FOR VACCINATION (MOV)

Staying on schedule and not missing any recommended vaccines is another challenge healthcare providers face.²⁰ As of 2014, only about 63% of children met the recommended schedule from ACIP, and about 23% were adhering to an alternate schedule which meant that they either delayed or skipped recommended vaccinations.²¹ While vaccine hesitancy can be a huge driver of missed immunizations in children, other factors include issues with access and vaccine availability, use of all opportunities to vaccinate (i.e. all healthcare visits), cost and service quality, and a lack of healthcare provider knowledge on vaccine schedules.²²

Missed opportunities for vaccinations (MOV), are instances where vaccine eligible patients (no contraindications for the vaccine) visit a healthcare provider and don't receive a vaccine. Missing immunizations are often cited by the provider to be a result of patients' fear or dislike of needles, lack of education or understanding of vaccine benefits and disease prevention, as well as a fear for adverse events.²³ A number of strategies to mitigate MOVs have been

identified, to include communicating with patients about vaccines, patient tracking, standard operating protocols (SOPs), provider prompts and messaging systems.²⁴ These strategies though can be difficult to implement comprehensively across a clinical care setting, and at times can have associated costs, or staff resistance that may limit their effectiveness.

Besides the obvious lack of protection from Missed Opportunities for Vaccinations, they can have greater public health impact, but importantly may also lower reimbursement for Public Health Centers from missed vaccine HEDIS Scores. Solutions to avoid MOVs must be an important part of any Public Health Vaccination program.

LOGISTICAL BARRIERS

For healthcare providers, it is often the logistical challenges that are the hardest to overcome. These types of challenges are often systemic, involve a wide variety of personnel with varying levels of interaction with the patient, and can be slow to change or costly in some instances. Specific challenges include vaccine storage requirements, the cost of the vaccines themselves, a lack of accurate and consolidated vaccination records, supply and distribution challenges, as well as practices associated with the safety of the vaccines, and safe administration of the vaccines themselves.^{25,26} To overcome these many challenges the CDC has issued a storage and handling toolkit, which lays out detailed guidance to improve compliance and protect vaccine integrity. Because it in combination with state VFC guides are so detailed, most institutions have dedicated staff to manage this process as non-compliance can cause significant reputational harm, jeopardize VFC status, and devastate a Public Health center.

Good vaccine management requires centers to manage, monitor, and report on temperatures constantly, and have staff available at all hours to respond to power outages, which can jeopardize the entire inventory and process.

Further, vaccine shortages are a common challenge due to manufacturing capacity, but clinic management of stock is also a component to this problem. In cases of critical vaccines, such shortages can be worsened due to losses at the administration sites. In some instances of vaccine shortages, vaccines can be delayed but, it is imperative to have good record keeping and reminder systems in place to ensure the dose is not ultimately missed.²⁷

Accurate and consolidated record keeping is critical for understanding which patients are on schedule, what vaccines they have received, the brand, dosage (particularly when combination vaccines are used) and lot numbers (for safety purposes and follow-up). Current practices for vaccine record keeping are often disjointed and rely heavily on the patient to maintain their record and share it with their doctor. Many states have an immunization information system (IIS) or immunization registry where vaccine information can be shared to consolidate records. Challenges exist with data quality, timeliness and shared access to this information which make it challenging for healthcare providers to rely on these systems alone.

Safety is another key concern and realized in vaccines when examining storage and handling procedures, particularly centered around temperature control. Cold-chain practices are imperative for vaccine integrity and safety and can become problematic in rural areas or where there are not always reliable power sources. Introducing temperature monitoring control (TMC) devices presents a way to mitigate this, in addition to updating equipment, having spare parts and backup power. These solutions can be costly, but without systems to alert providers that the cold chain has been properly maintained, it is possible to inadvertently deliver a vaccine that was not properly maintained which could result in reduced potency and significant costs.²⁸

Ultimately, Public Health centers that fail to protect vaccines from causes of waste and loss (poor storage) are increasingly being required to purchase vaccines on the private marketplace to replace lost vaccines in order to maintain VFC provider status.

SOLUTION

Single healthcare providers or clinics alone cannot be held responsible for the health of the entire population, but healthcare providers can influence the communities and patient bases that they serve. Building a comprehensive solution to assist healthcare providers in living up to all the requirements can be challenging. However, the AccuVax Vaccine Management System from TruMed® Systems offers a single integrated solution that will help every center meet or exceed VFC standards. AccuVax point-of-care supply management system addresses many of the aforementioned concerns involving vaccine supply, safety, adherence to ACIP schedules, and streamlined record keeping processes. AccuVax integrates a refrigerator, a freezer, digital data loggers, an alerting suite, and maintenance into a regulatory compliant vaccine management system.

AccuVax system eliminates 91% of all common vaccination errors. The Institute for Safe Medication Practices (ISMP) National Vaccine Errors Reporting Program (ISMP VERP) documents the most common vaccination errors as: wrong vaccine (23% of all reported errors), wrong dose (19%), expired vaccine (19%), wrong age (17%), wrong time or interval (8%), and vaccine component omission (4%)²⁹. AccuVax with EHR integration and the integrated Patient Safety Checks eliminates 91% of reported common vaccination errors. All of these vaccine and patient safety efforts help contribute towards meeting quality metrics and improving reimbursement rates for healthcare providers.

AccuVax provides both convenience and enhanced patient safety through Electronic Medical Records (EMRs) integration. When enabled, the EMR system automatically transmitting the provider's immunization order to the AccuVax system, ensuring the prescribed dose is selected and dispensed at the touch of a button, eliminating incorrect selection as common source of vaccine errors. In addition, AccuVax transmits the administered vaccine lot and expiration date back to the EMR, allowing for accurate and timely billing along with time saved from documentation requirements.

AccuVax has a user friendly portal that provides complete real time inventory transparency and makes re-ordering simple so that out of stock vaccines can become a thing of the past, while maintaining the cold-chain process ensuring vaccine inventory is protected and maintains integrity.

Patients increasingly want to be more involved in decisions surrounding their care, and vaccinations afford them a unique opportunity to do so. In order for patients to make the best decision on vaccinations, they need time with the clinical provider to ask questions and for the provider to fully assess their unique situation. With the increasing demand on providers, it is also increasingly hard to devote time to having these important discussions. The AccuVax system helps as it saves time on non-clinical tasks such as counting, rotating, vaccine selection, record keeping, and frees up staff time for top of license care. Further, because of the integrated record keeping, for the quarter of patients altering their vaccine schedule, capturing both the administered and non-administered vaccines in their records can help minimize MOVs in the future and ensure that doses are not missed.

Minimizing MOVs and keeping patients in adherence with the ACIP schedule are critical efforts towards improving overall immunization rates and contributing to public health efforts. Despite their importance, execution can be challenging with the different vaccination schedules and individual deviations. The AccuVax system has a tool called Patient Safety Checks, which automatically checks to see whether a patient has all the ACIP recommended vaccines for their age group. It will then suggest dispensing the missing vaccines at the next visit in order to ensure that the patient receives all of their recommended dosages thus helping increase HEDIS scores for vaccination visits.

CONCLUSION

Implementing a comprehensive vaccine delivery program that is effective, adheres to CDC, VFC, and ACIP recommendations and high levels of safety and quality is no easy task for healthcare providers. With recommendations frequently changing, vaccine hesitancy rates rising and vaccine availability fluctuating, it can be challenging and costly to try and meet or exceed immunization goals in patient populations. With many funding mechanisms also tied to vaccine success rates, along with overall quality measures and population health measures, it is important that solutions to these problems are identified soon.

One such solution is the AccuVax Vaccine Management System which is designed to improve vaccine operations, efficiency and safety while reducing costs. With these issues addressed, healthcare providers can return their focus to patient care and focus less so on the logistical and administrative challenges to successful vaccine delivery.

The solutions provided by the AccuVax system align well with the triple-aim in healthcare which focuses on quality care through the improvement of the patient experience, improvement of population health and the lowering of costs.³⁰ Another important aspect that is recognized from the challenges above is that the clinical experience of the providers can be equally

important, which can be captured through the quadruple-aim. The quadruple-aim incorporates the experience of the provider and the clinic as the fourth aim, with the understanding that all four parts of the quadruple-aim need to improve in order to see meaningful results.³¹

The quadruple aim is outlined below, with a brief review of how the AccuVax system can address each of these priorities in healthcare.

IMPROVED CLINICAL EXPERIENCE / CARE TEAM WELL-BEING

- AccuVax automates non-clinical vaccine management tasks, including compliance requirements
- Tracks vaccine inventory down to the dosage, and provides real-time on hand and usage information
- Integrates with EMRs to help streamline record keeping and ensures accuracy in billing and documentation requirements

BETTER OUTCOMES / POPULATION HEALTH

- Cold-chain concerns are minimized because AccuVax safeguards vaccines with ideal temperature control.
- Personalized ACIP schedules are recommended for each patient based on their age-range, and providers can further customize this schedule in the clinical setting to meet their specific vaccine strategies
- Institute for Safe Medication Practices (ISMP) errors can be avoided because AccuVax checks vaccines to always dispenses the correct dose

IMPROVED PATIENT EXPERIENCE / LOWER COSTS

- The recommended ACIP (or personalized) vaccine schedule is available at every visit
- Brand consistency is maintained across dosages as AccuVax references the National Drug Codes (NDC) before each administration
- Provides expiring and low inventory alerts, minimizing costs associated with waste and loss

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