How to improve patient outcomes with machine learning

CCD HEALTH
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Leveraging Machine Learning to minimize the impact of patient no-shows on Business outcomes and Patient Care

As of 2021, there are close to 11,000 outpatient medical centers in the United States. Whether large multi-state systems or individual, independent clinics all face the same two challenges: decreasing overhead costs and improving Patient Care.

How imaging centers handle patient interactions can affect both goals. And in 2021, Patient Care means more than just being polite to your patients or providing service with a (virtual) smile.

Patient care is about delivering the utmost Patient Experience, from the first interaction through their treatment to post-visit follow-ups. Still, as an outpatient imaging center, you must protect your revenue generation engine -- your Patient Care.

Medical companies lose billions of dollars each year due to missed appointments. In fact, one 2017 study found that **no-shows cost the U.S. healthcare system more than $150 billion a year, and individual physicians an average of $200 for every 60-minute appointment.** Year after year, that stacks up to an unimaginable amount of lost revenue.

Throughout our research, the CCD Business Intelligence Department was concerned with three aspects of patient no-shows in medical centers: identifying the leading causes of patient no-shows, pinpointing the most at-risk patients and time slots for missed appointments, and developing an action plan that can diminish no-show rates among patients.

In this report, you'll learn about:

- COVID-19's impact on imaging center scheduling
- The cost of patient no-shows across medical centers
- Leading indicators of missed appointments
- Best practices to lower no-show rates at imaging centers
- Next steps for your patient care

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Modern-day outpatient imaging operations

Your scheduling process can significantly impact if, when, and how patients show up to your facilities. And in the age of COVID-19, every interaction's impact is amplified. Medical centers saw a significant drop in scheduling throughout 2020, uniquely impacting each imaging modality service .

Some imaging modalities, such as chest X-rays and CT scans, are commonly used for diagnosing and managing COVID-19 patients. Still, modalities like mammography have seen significant drops in scheduling and patient volumes since the beginning of COVID-19.

Now more than ever, business efficiency and patient satisfaction are crucial elements of your operations and long-term continuity.

Even when 100% of your patients attend their scheduled appointments, your outpatient imaging organization must ensure that you're fully utilizing your equipment and employees.

Inefficient use of healthcare facilities and resources can severely impact your profitability and business outcomes due to improper scheduling, especially given the high patient no-show rates pervasive in the radiology industry.

At CCD, our patient scheduling expertise within outpatient imaging has allowed us to explore and identify solutions to optimize the patient scheduling process and minimize patient no-shows. To do this, the Business Intelligence department leveraged machine learning techniques to ensure that you can maximize revenue without sacrificing your Patient Experience.

The impact of patient no-shows

There's no doubt that our lives grow more hectic and busy with each passing week. While managing personal and professional responsibilities, meetings, reservations, and appointments are often missed or forgotten. Your patient's lives are complex and unique, yet this impact is costly and wasteful for outpatient imaging centers across the healthcare industry.

In healthcare, patient no-shows and missed medical appointments without prior notice are prevalent. As Patient Care and medical centers' efficiency increases, it's essential to understand the explicit and implicit impact of missed patient appointments.

When a patient misses a medical appointment, three core elements of a medical center are impacted:
- revenue is left uncaptured
- resources and staff are left underutilized and idle
- patients receive delayed care

Yet as machine learning, analytics and technology continues to develop, it's hard to believe that such an expensive problem persists. Because of this, the team at CCD developed and deployed a three-stage research plan to identify and prevent patient no-shows for healthcare providers and outpatient imaging centers.

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How to improve business outcomes for outpatient care providers

The advanced analytics division at CCD set out to improve business outcomes for outpatient imaging centers experiencing medium to high patient no-show rates -- usually above 5% of total appointments.

These findings were implemented to reduce patient no-show rates with an easy-to-implement solution that uses existing resources without impacting the delivery of service to patients.

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The impact of missed patient appointments

Before minimizing the impact of patient no-shows on business outcomes, our analytics department set out to identify the underlying causes of imaging center missed appointments.

Some participants involved in imaging centers' daily operations saw that the portion of no-show appointments was disrupting their workflow and impacting Patient Care. However, other outpatient imaging centers believed their no-show appointment rates were under control.

Radiology information systems (RIS) played an integral role in this research by providing transparency into daily appointment information. Through different RIS, we analyzed patient no-show rates by:

- Radiology Modality
- Weekday
- Time of day
- Location

Early research across radiology practices and their RIS displayed a clear differentiation in rates by modality and weekday. The outpatient facility location significantly impacted patient no-show rates, even after controlling for modality and weekday of appointment.

What does this mean? The difference between patient no-show rates by geography amidst modality and weekday could be related to the patient's demographics at each outpatient care center.

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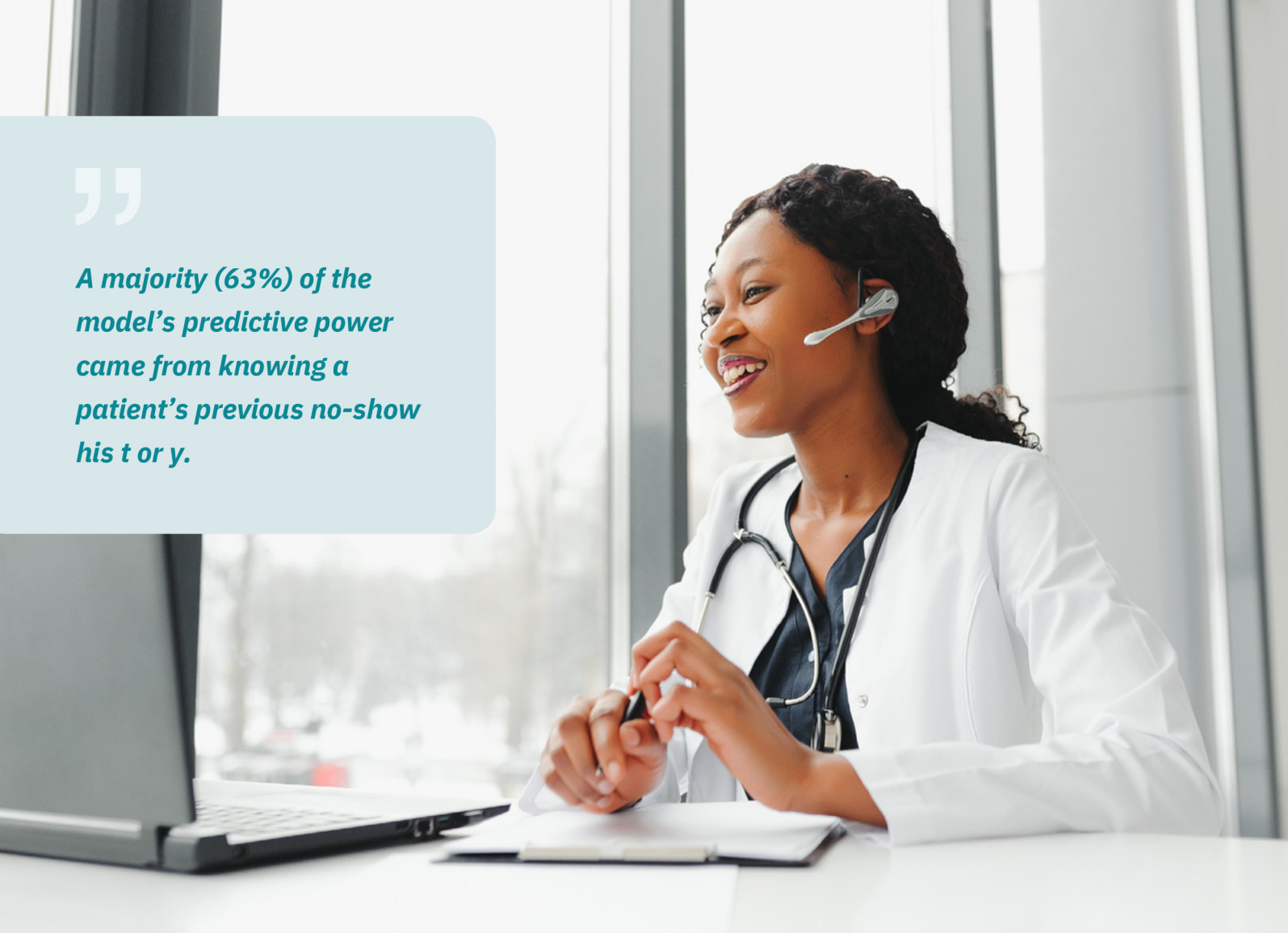
The leading indicator of patient no-shows: previous no-show history

CCD's advanced analytics department found that a patient with at least one no-show in the 12 months leading to the appointment was **15 times** more likely to miss appointments than patients with no previous no-show.

Aside from prior history of no-shows, predictive factors that indicate a potential patient no- show include: 1. Appointment lead time 2. Imaging modality 3. Type of insurance

Still, a majority (63%) of the model's predictive power came from knowing a patient's previous no-show history.

By understanding this, we developed an analytical model with variables related to appointment scheduling that are readily available at every outpatient imaging provider.

Armed with these insights, we built a predictive algorithm that was 90% accurate with a sensitivity of 75% for predicting appointment no-shows. With this, your radiology center and CCD can mitigate the risk of patient no-shows and increase your productivity and profits with intelligent, optimized scheduling operations— all to drive an improved Patient Experience, lower asset downtime, and the most productive schedules possible.

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Three tactics to minimize patient no-shows and equipment downtime

Contact centers and outpatient medical centers can utilize the model scores from the analytics model in three different ways to minimize patient no-shows and resource downtime: confirmation campaigns and strategic scheduling.

Identify target appointments with confirmation campaigns

Patients identified as 'highly likely to miss their appointments' should receive a confirmation call from your contact representatives three days before their scheduled appointment. This gives the medical center 72 hours to fill the available spot and increase equipment utilization rates if the patient cancels or re-schedules the appointment.

To take this a step further, patients should receive additional reminders before their appointments across automated:
- Text messages
- Emails
- Phone calls

Establishing a multi-channel communication system is essential to provide a fast, streamlined experience for patients to book and keep appointments.

Eliminate difficulty and delays in Patient Care

Many healthcare centers struggle to deliver a satisfactory level of Patient Care, struggling with:
- Dropped, declined, or missed calls
- Struggle to resolve issues within one call
- Long waiting time in call queues

These problems can impact a patient's ability to schedule, reschedule or cancel appointments with enough time to optimize schedules.

Additional friction along the patient scheduling or cancellation process will discourage patients from reaching out to reschedule or cancel appointments. Because of this, having a well-trained and professional point of contact at your healthcare facility is essential to providing a positive Patient Experience.

To eliminate delays and challenges in your Patient Care, your outpatient medical center should give your contact team the right resources and bandwidth to appropriately address each caller's needs. Still, many imaging centers only allocate one or two staff members for patient communications and struggle to find imaging contact representatives that deliver exceptional levels of Patient Care.

Instead of leaving your patient communications short-staffed and spread thin, your imaging center can leverage imaging support professionals backed by intelligent insights to:
- Ensure that 100% of your inbound patient calls are addressed to balance appointment location, procedure and available slots
- Conduct all patient follow-ups and outbound calls to confirm and educate patients
- Provide your patients with any relevant instructions and information prior to their appointments
- Update attending physician statements (APS) to alleviate your employee workloads and give your staff time back
- Manage patient record data entry, such as order intake and referring physician information
- Transcribe physician medical audio files in compliance with formatting and turnaround times
- Retrieve medical records and verify insurance for patients surrounding medical appointments

Your outpatient imaging center should address the needs of your patients before they even step foot in your imaging center. Whether your contact agents are in-house or outsourced, ensure that you're delivering the best possible care to deliver the utmost Patient Experience, reduce your appointment cancellations and patient complaints, increase your level of efficiency.

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Implement a strategic scheduling procedure

By identifying the appointment time slots with a high probability of patient no-shows, you can schedule additional patients during those appointment times to maximize your resource utilization and minimize patient waits.

However, note that this scheduling strategy should only target timeslots with a 90% probability (or higher) of patient no-shows. This will minimize potential discomfort for your other patients, and ensure that you're not overbooking for your resources.

To take this one step further, your imaging center should develop and execute on a scheduling system that assigns high-risk patients to appointments later in the business day. This makes the potential impact of a patient no-show less impactful to your staff efficiency levels, asset utilization, patient wait times, and operational workflow.

Utilizing these processes at your outpatient imaging medical center won't resolve 100% of your missed appointments. Still, it's a critical step toward improvement that will lead to long-term revenue and resource optimization.

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Implement preventative measures to lower missed appointments

With these three approaches in place, outpatient medical centers can work towards enacting the proper safeguards to minimize patient no-shows, inefficient scheduling and idle equipment.

Based on the assumption that outpatient medical centers with an average no-show rate of **10% lose $200 for every missed 60-minute appointment, a 50% lower no-show rate will lead to savings of $2,200/ month/doctor, or $26,400/year/doctor.**

In the big picture of your outpatient imaging center's business operations, an outpatient center that employs 30 physicians could help save up to $792,000 every single year.

Traditional methods medical centers used to resolve patient no-shows involve a significant tradeoff between delivering satisfactory levels of Patient Care and maximizing business revenue. This leaves your assets underutilized, your staff idle, patient appointments delayed, and revenue left uncaptured.

Now, there's a better way to reduce missed appointments and still deliver exceptional Patient Care:

1. Execute appointment confirmation campaigns for high-risk appointments and patients
2. Eliminate delays in Patient Care with responsive, experienced contact representatives
3. Develop and implement strategic scheduling to reduce patient wait times and increase staff efficiency

Outpatient medical centers no longer need to make the trade-off between supporting patients and driving operational efficiency.

By looking at prior no-show history across patients, your outpatient medical center can effectively target and enact preventative strategies that lower your no-show rate, significantly reducing the guesswork and optimizing the continuous use of medical equipment.

To find out how you can implement a seamless Patient Care experience, visit **www.ccdcare. com**