Appointment adherence with smart messaging

Designed to predict lost slots and intervene to prevent them

No-shows and late cancellations create scheduling inefficiencies that can lead to lost revenue and worse patient outcomes. The effect is significant, costing the U.S. healthcare system $150 billion per year and contributing to an increase in all-cause mortality[1,2]. Patient Engagement Manager's machine learning predictive model integrates demographic, historical scheduling, and engagement data to identify patients at high-risk for missing their appointments. PEM's predictive model is built atop its automated and multi-modal patient communications — together, these technologies dynamically interact to better tailor communications designed to empower patients. With a bidirectional integration into the EMR, high-risk patients are flagged in real-time, allowing administrative staff to perform targeted interventions.

An example of a patient timeline

Mammograms often have the highest rate of no-shows within radiology practices. Patient anxiety and a lack of appreciation for the importance of health maintenance screenings play a role[3].

Saturday: Stephanie is scheduled for a screening mammogram next Friday.

Monday: Patient Engagement Manager's predictive model algorithm identifies Stephanie as a patient with a high risk for no-show based on her demographics and past appointment history — she lives farther from the facility than most patients, and she didn't show up to several appointments this year.

Tuesday: In addition to her pre-visit navigational program, Patient Engagement Manager delivers an *additional* automated time-released message to Stephanie on Tuesday, three days before her appointment. The motivational message includes a link to a site with education on the importance of the exam and helpful suggestions provided by other women we interviewed who have also gone in for the same scan. It's a reminder to Stephanie that she is not alone in her experience.

Thursday: The predictive model automatically updates Stephanie's chart in the EHR with an indication that Stephanie is at high-risk and alerts staff of the need for additional outreach. One day before her appointment, staff reach out to Stephanie to answer any remaining questions and to ensure that she can make it to her appointment.

Friday: As a result of the additional motivational messaging, Stephanie feels less anxious, more prepared, and ready to go now that she knows what to expect and how to get there. She arrives to her appointment on time and prepared. She even brought detailed family health history information. The additional education and support from her care team made all the difference!

We received an order to schedule you for a mammogram. Would you like to schedule an appointment? (Reply Yes or No)

Yes

Great. You'll receive a call from one of our scheduling staff shortly. Thanks!

A mammogram takes less than 30 mins, is low-risk, and is the best way for your doctor to see early signs of cancer. Learn more: info.clinic/3v9lna

Click the **video** to learn more about your upcoming imaging experience.

OK ✓

11 Women Share What Getting A Mammogram Really Feels Like

"It was quick and easy"

"I have had to have 3 mammograms — 2 regular and 1 diagnostic — and it's been...

It's normal to be anxious about your scan. Several women we spoke with suggested to bring a friend and wear a sports bra. Listen to their experience and tips, here: info.clinic/1v8lkb

Your appointment is tomorrow. Directions to the imaging center are available here: info.clinic/1k9lna

Directions to
1 Canal Park, Boston, MA 02141

4. Take the exit.

5. At the traffic circle, take the 1st exit onto MA-2 E/Boston University Bridge.

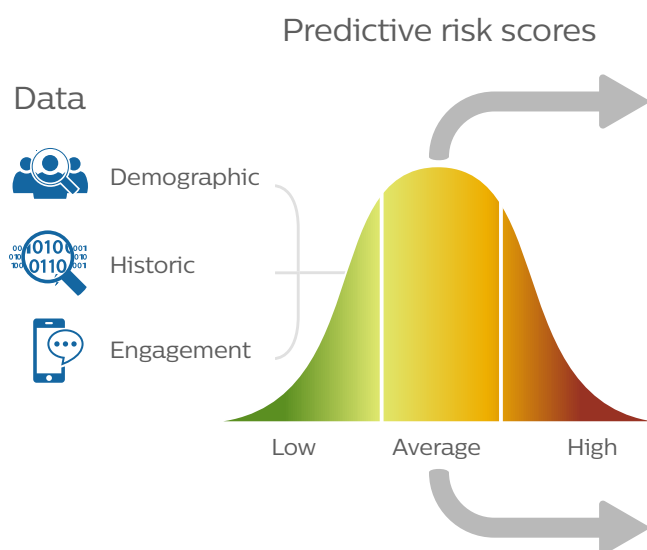6. Exit the traffic circle onto MA-2 E/Boston University Bridge.

Trip time: **15 minutes**
Distance: **3.5 miles**

Your mammogram is today at 10AM. Please arrive 30 mins early, park in the west lot, and check-in at the radiology front desk. We will validate parking. Parking and building map here: info.clinic/p1rk3a

Main St.
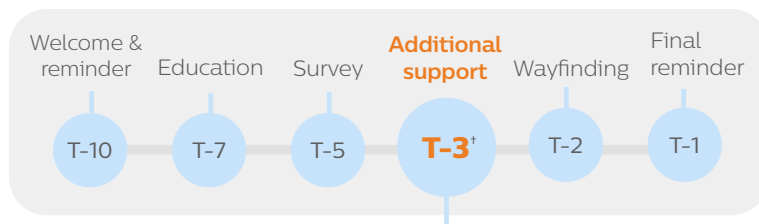
B

Parking

E

C

A

Clinic entrance
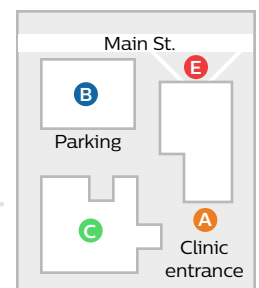
The predictive model

The predictive model combines demographic, historic, and engagement data to pinpoint patients at highest risk of no-showing or cancelling their appointments. PEM can populate risk scores back into the EHR for staff to leverage as part of their care navigation workflows. Health systems can direct frontline staff resources toward high-risk patients with targeted manual phone calls, while sparing resources and time by reaching low-risk patients with PEM's automated navigation programs.

Data

Demographic

Historic

Engagement

Predictive risk scores

Low · Average · High

PEM-enhanced workflows

Welcome & reminder	Education	Survey	Additional support	Wayfinding	Final reminder
T-10	T-7	T-5	T-3[†]	T-2	T-1

High-risk patients receive targeted messaging and support

Risk score delivered into the EHR to enable staff intervention

Patient demographics	Reason for exam	Appointment	No-show likelihood	Automated PEM engagement
Female, 45yrs	Mammo screening	Tue, 2020/12/01, 08:00-08:30AM	90%	SMS sent
Female, 53yrs	Mammo screening	Tue, 2020/12/01, 09:00-09:30AM	85%	SMS sent
Female, 39 yrs	Mammo screening	Tue, 2020/12/01, 09:30-10:00AM	50%	SMS sent
Male, 43yrs	Lung cancer screening	Tue, 2020/12/01, 10:00-10:30AM	20%	Email sent

Visit us at **philips.com/pem** to learn more.

[1] Gier, J. (2017). Missed appointments cost the U.S. healthcare system $150B each year. Retrieved from https://www.hcinnovationgroup.com/clinicalit/article/13008175/missed-appointments-cost-the-us-healthcare-system-150beach-year

[2] McQueenie, R., Ellis, D.A., McConnachie, A. et al. Morbidity, mortality and missed appointments in healthcare: a national retrospective data linkage study. BMC Med 17, 2 (2019). https://doi.org/10.1186/s12916-018-1234-0

[3] Rosenbaum JI, Mieloszyk RJ, Hall CS, Hippe DS, Gunn ML, Bhargava P. Understanding Why Patients No-Show: Observations of 2.9 Million Outpatient Imaging Visits Over 16 Years. J Am Coll Radiol. 2018 Jul;15(7):944-950. doi: 10.1016/j.jacr.2018.03.053. Epub 2018 May 10. PMID: 29755001.

[†] "T-3" represents three days before the procedure date. All other time points represent the specified number of days before the procedure date (T-0).

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