



Patient-Centered Lab Result Communication Through the Clinic Manager Communication Log (CMCL) at MedZou Community Health Clinic

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Abstract

Background: Timely communication of lab results is vital to healthcare delivery. To improve patient care practices, the Clinic Manager Communication Log (CMCL) was implemented at student-run MedZou Community Health Clinic – a free clinic serving uninsured patients in Columbia, Missouri. Without a streamlined system in place, there were delays in reporting lab results and communications to patients. Current literature on this topic is scarce.

Methods: Using an Ishikawa Diagram and mapping workflow, a 2x2 Effort vs. Yield Table was constructed to determine the best lab reporting protocol. As a result, the CMCL was created to track all patient lab communication and follow-up needs. The Clinic Managers (CMs) changed protocol by contacting patients thrice within 1 week, recording all call attempts and information shared between January to August 2022. Retrospective data was collected to calculate turnaround time in reporting lab results prior to CMCL implementation. Feedback was assessed via the Patient Communication Satisfaction Survey.

Results: Before CMCL implementation, 53.30% of patients never received their lab results. CMCL use showed a statistically significant 31.00% relative increase in patients receiving results ($p = 0.002346$) and a 12.60% relative increase in results communicated within one week. Out of the patients who couldn't be reached initially, two-thirds obtained results via a follow-up call. 76.00% of patients rated their communicative experience as "Excellent". Use of the CMCL showed a statistically significant number of additional patients receiving lab results, streamlining the follow-up process regarding their care.

Conclusions: The CMCL demonstrates how tracking communication is effective at improving patient care at student-run clinics. A similar model of centralized data collection can be used to ensure reliable and efficient patient follow-up. CMCL access is currently limited to CMs. In the future, additional leadership teams within MedZou can utilize the CMCL data to practice more effective patient communication.

Introduction

Student-run free clinics (SRFCs) are designed for the local underserved, uninsured population to receive much needed healthcare access. SRFCs can provide services including primary

and specialty care, vaccinations, human immunodeficiency virus (HIV) screenings, medications, and food packages. These clinics give first through fourth-year medical students firsthand experience interacting with patients and managing their care, at times in conjunction

with other allied health professionals, all under the close supervision of clinicians (doctors, physician assistants, nurse practitioners, etc.).

MedZou Clinic

MedZou Community Health Clinic is a SRFC located in Columbia, MO for those without health insurance.¹ MedZou serves many different underserved patient populations, including non-English speakers, ethnic minorities, non-U.S. citizens, gender nonconforming patients, and people experiencing homelessness.

MedZou provides longitudinal primary care at weekly clinics as well as eight specialty clinics on a monthly basis: dermatology, musculoskeletal, neurology, psychiatry, gender affirming care, colposcopy, endocrinology, and ophthalmology. In addition to direct patient care, services that are available to patients include: referrals for external services and imaging studies, creating lab orders to Quest Diagnostics, immunizations, and dispensing as well as writing prescriptions for medications. A comprehensive needs assessment helps identify individuals experiencing food insecurity and provides them with sustainable, nonperishable items in addition to assistance with applying for Medicaid and other resources.

Clinic Managers

Four Clinic Managers (CMs), who are medical students, serve in an assistant medical director role during clinic nights on a rotating monthly schedule. In addition to overseeing clinic operations and aiding in problems that arise throughout the evening, they also create lab orders, input lab results into the electronic medical record system, interpret the labs with the volunteer physicians during the clinic shift, and notify patients of their results and updated care plans. This is similar to other clinics that utilize CMs with an emphasis on scheduling follow-ups and creating patient appointment reminders.²

The CM on duty is responsible for calling the patients whose results have returned that week, after working with the physicians to interpret their labs and identifying follow-up needs. This informs the next steps in management for many patients, who are often awaiting lab results to

monitor their conditions or to aid in diagnosis of ongoing medical problems. When a CM is unable to reach a patient, that CM must continue to reach out in subsequent weeks to ensure the information is relayed.

Significance

The primary purpose of our quality improvement (QI) project was to improve communication of patient lab results at MedZou Community Health Clinic. Initially, there was no streamlined system in place that ensured delivery of patient lab results in a timely manner. Follow-up information was often lost when conveying patient lab results and subsequent care delivery due to the rotating CM schedule. Without a centralized repository of patient lab results, Protected Health Information was ineffectively communicated to patients, leading to delays in dynamic patient care with an unacceptable number of patients never receiving their results.

Previous studies conducted by SRFCs that address issues regarding successful patient lab communication are scarce. Many studies regarding routine lab testing processes are specific to non-student run clinic settings, such as post-surgical pediatric intensive care units (PICUs).³ The current literature for SRFCs discusses broader topics such as patient wait times, operating process improvement for clinic flow, and monitoring patient medication use.⁴ Quality improvement studies that were found focused more on discussing the procedure of involving medical students into such projects in non-SRFCs.⁵

An assessment of patient follow-up from Indiana University School of Medicine's student-run eye clinic found a higher probability of follow-up in patients with insurance coverage.⁶ Since MedZou's patient population is uninsured, it is highly essential for our volunteers to facilitate proper patient follow-up.

Several SRFCs found that labs are key for patient care delivery. Lab result communication was the third most common chief concern reported by patients in 2551 patient encounters documented by Clinica Esperanza, a SRFC in Memphis, Tennessee⁷.

A Rowan Cooper Clinic study found that

implementation of a post-encounter phone call increased overall completion rates for laboratory studies,⁸ however they did not address the communication of completed results back to patients. Similarly, a multi-site study in the San Francisco Bay Area explored benefits of lab result follow-up conducted in-person or via phone, citing nuances of healthcare needs affecting patient preferences but did not provide practical solutions for reporting results.⁹

A study at the Indiana University Student Outreach Clinic recognized the need for prompt review of lab results in order to form appropriate treatment plans for patients. The data collected included attempted and completed phone calls and categorized types of conversations with patients.¹⁰ Although the duties of the CMs at this clinic are like those at MedZou, the data did not include success measures like patient satisfaction or an improvement analysis from previous operations.

When deciding how to improve the lab result communication process, we wanted to have as much patient input as possible: verifying patients' phone numbers, best times to call, explaining what to expect post-lab visit, etc. Thus, our QI project addresses a niche requirement by

connecting both lab work results, patient input, and SRFCs in improving care delivery.

Intervention

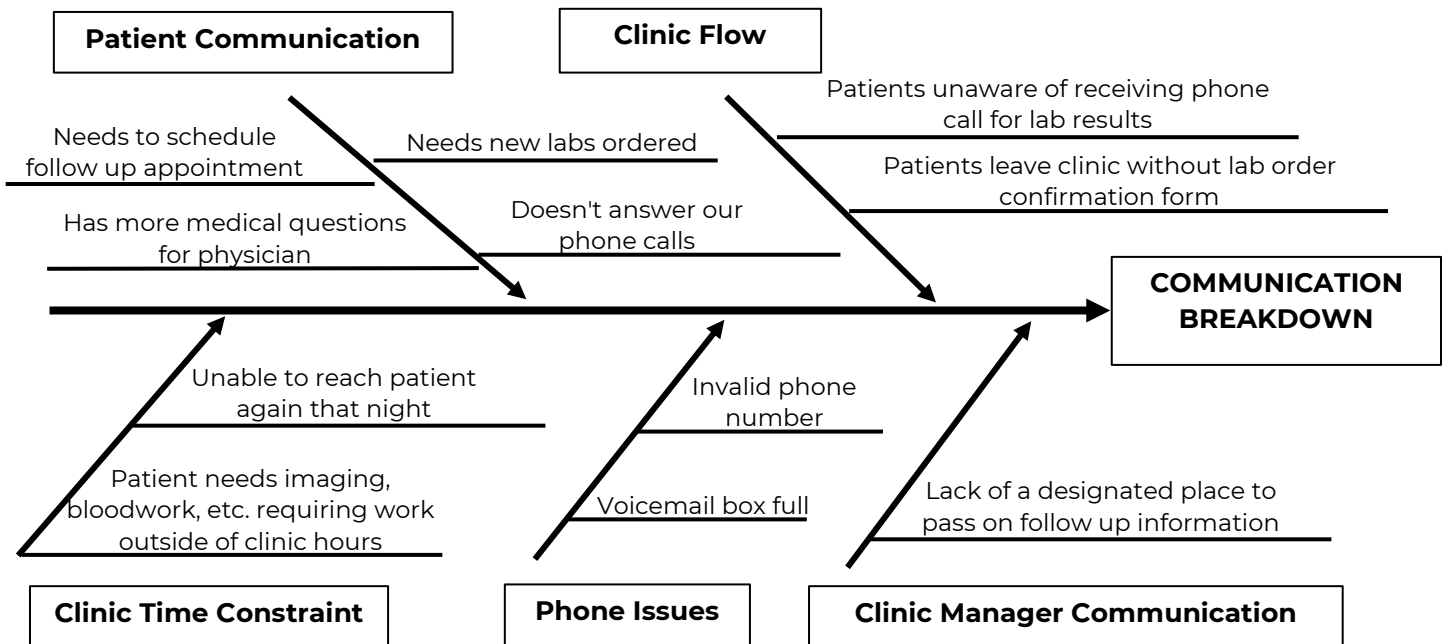
The CMs created the Clinic Manager Communication Log (CMCL) which serves as a centralized database to track all MedZou patient lab communications and follow-up needs. The CMs changed protocol within clinic to meet the goal of delivering results to patients within 1 week of receiving them from Quest Diagnostics. The project aimed to reduce the percentage of patients not directly communicated with during a MedZou shift by a CM by August 2022 through implementation of the CMCL.

Methods

Prior to the creation of the CMCL, the CMs recognized a bottleneck with reporting lab results to patients. Not only was it difficult to reach patients who may have changed their phone numbers or had limited access to phones, but there was no easy way to communicate amongst the CMs themselves.

Due to delayed notification, patients were unable to schedule follow-up appointments as

Figure 1. Ishikawa diagram



Used to identify issues seen with communication breakdown.

Table 1. 2x2 Effort vs. yield table

Effort required	Low yield	High yield
Low effort	<ul style="list-style-type: none"> Call patient via the Director phone and have the patient call the Director phone back if they don't answer Wait for patients to return to clinic for results 	<ul style="list-style-type: none"> Shared communication log with all information in one place*
High effort	<ul style="list-style-type: none"> Call patients daily until able to get ahold of them 	<ul style="list-style-type: none"> Create new workflow with Clinic Directors for patient follow-up Create new role for patient lab communications

Used to create potential solutions to the issues found.
*selected solution

Table 2. CMCL example*

Example patient information	Patient A	Patient B	Patient C
Patient's name	John Doe	Kelly Smith	Mario Lopez
Patient's date of birth	1/1/1960	7/10/1982	8/25/1990
Patient's phone #	(xxx) xxx-xxxx	(xxx) xxx-xxxx	(xxx) xxx-xxxx
Preferred call back day/time	Anytime	Anytime	Anytime
Clinic Manager	Shreya Dash	Wendy Zhang	Karolina Pogorzelski
Charted in Powerchart?	Yes	Yes	Yes
Marked as reviewed in Quest?	Yes	Yes	Yes
Date labs ordered	5/5/2022	5/12/2022	5/19/2022
Date labs resulted	5/10/2022	5/16/2022	5/25/2022
Date of lab interpretation	5/12/2022	5/19/2022	5/26/2022
Date patient was notified of labs	5/12/2022	5/19/2022	-
Attempted phone call?	Yes	Yes	Yes
Did patient answer?	Yes	Yes	No
Left voicemail?	N/A	N/A	No—voicemail box full
Info to provide to patient	Lab Results: CBC: all within normal limits; CMP: Triglycerides = 265 (high) and glucose = 176 (high)	Lab Results: A1c = 5.9% (high); TSH = normal	TSH = 0.48 (normal); He is to be told that his Levothyroxine dose is appropriate and that we will recheck his TSH level at his next MedZou appointment (6/23/22)
Patient concerns/extra notes	Labs discussed. He should have labs redrawn in 6 weeks	She will be following up during Diabetes Clinic night in 2 weeks	-
Callback follow-up (if needed)	N/A	N/A	Called patient for the first time on 5/26/2022

Example CMCL with sample patient information to demonstrate the information obtained.

*This information is for example purposes only and is not representative of real patients

CMCL: Clinic Manager Communication Log; CBC: complete blood count; CMP: comprehensive metabolic panel; TSH: thyroid stimulating hormone

necessary, get new labs drawn, adjust medication regimens, and receive updated treatment plans. These potential delays were inconsistent with MedZou's mission and potentiated new problems arising if appropriate recommendations were not able to be transmitted to patients in a timely manner.

To remedy this inconsistency, the CMs brainstormed numerous solutions. Using an Ishikawa Diagram (Figure 1) and mapping workflow to analyze the source of the communication problems, a 2x2 Effort vs. Yield Table (Table 1) was created to identify the most optimal way to improve the reporting process. We decided on the shared communication log based on our desire to preserve current clinic protocol while also enhancing workflow. Our high yield, high effort solution required extensive changes to the existing workflow or adding additional roles, which was less feasible to implement mid-year. Ultimately, the CMCL was chosen as the best balance of effort and yield of results.

After selecting our solution, we submitted it for Institutional Review Board (IRB) approval. The University of Missouri-Columbia IRB determined that our QI project was Exempt and did not constitute human subjects research.

Using the CMCL, all pertinent information is recorded in an organized document accessible to the CMs. Designated columns include: Date Labs Ordered, Patient Contact Information, Communication Status with Patients, etc. (Table 2). This information is updated as new lab results are posted in Quest Diagnostics, the physician interprets the labs during clinic, and as the results are ultimately communicated with patients by the CMs. There are also built-in columns to indicate if there are any additional issues or concerns the patient needs assistance with so all the CMs can quickly connect patients with the necessary teams. Moreover, this was created in an accessible, secure folder on Microsoft Teams that is only shared between the CMs, allowing for protection of sensitive patient health information.

The CMs began reaching out to patients on 3 separate dates within 1 week, while recording all call attempts and information shared (including appointment scheduling, follow-up questions,

referral requests, and connecting with specialty clinics). Now when a patient requires a lab order, the CM enters the patient room to confirm their identity, phone number, preferred method and time of contact, and explains the process of obtaining labs. The CM then offers the patients a printed list of lab locations nearby and delineates the next steps moving forward.

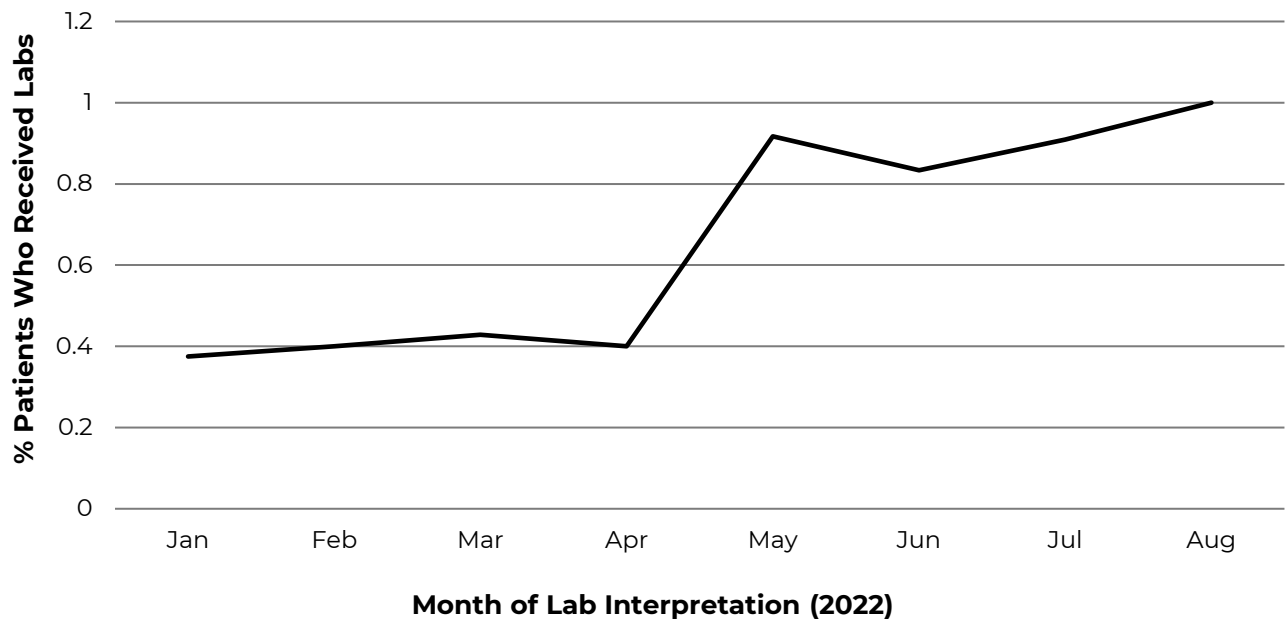
Using the data collected in the CMCL, the following percentages of MedZou patients were calculated: patients spoken to within 1 week of labs resulting, patients left with voicemails, and patients contacted past the 1-week deadline.

The data calculations were performed in Microsoft Excel (Excel, Microsoft 365, Microsoft Corporation, Redmond, WA) followed by direct visual adaptations into Figures 2 and 3. A chi-square test (degrees of freedom = 1, $p < 0.05$) was performed using SPSS Statistics (IBM SPSS Statistics for Windows, Version 29.0, 2022, Armonk, NY) comparing the proportion of patients who received their lab results pre-CMCL (N = 30) and post-CMCL (N = 27) implementation.

Post-CMCL implementation data was collected from May 2022 to August 2022. This prospective data was collected weekly by the CMs using the CMCL, updating the information as necessary. Retrospective data was collected from January 2022 to April 2022 regarding the turnaround time reporting lab results to patients prior to the implementation of the CMCL, using similar data metrics. This retrospective dataset was collected by documenting previous patient encounters from clinic visits and lab interpretation through the Quest Diagnostics website. Patients' charts noted the date and communication of this information on the patient EMR system, PowerChart.

In addition, the Patient Communication Satisfaction Survey was completed at the end of all clinic visits to assess overall feedback rated as either "Excellent", "Good", "Fair", or "Poor" for the following categories: quality of a patient's communicative experience, how patients had previously been contacted about lab results and additional information, and patient confidence in understanding their lab results.

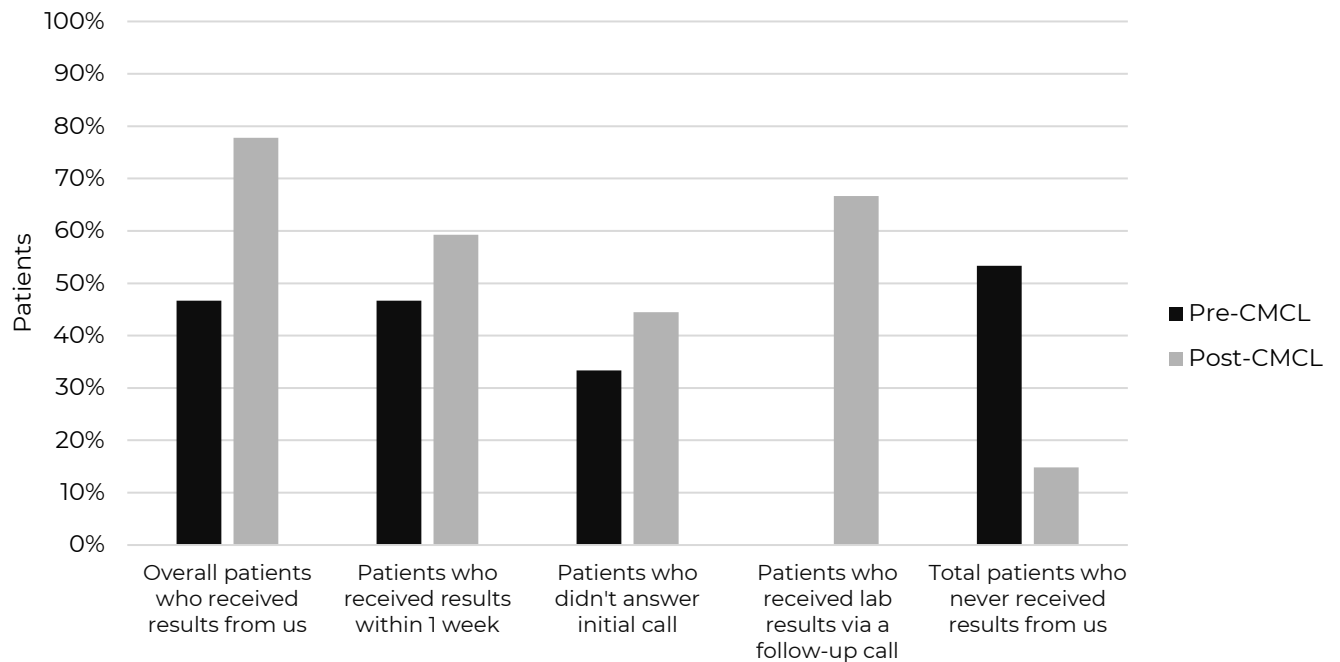
Figure 2. Percent of patients who received labs by month



This image shows the tracking of patients receiving lab results pre- and post-CMCL implementation, which was implemented in May 2022

CMCL: Clinic Manager Communication Log.

Figure 3. Pre- and post-CMCL implementation data comparison



This image shows the data comparison showing the impact of the CMCL before and after implementation on patient lab result communication

CMCL: Clinic Manager Communication Log.

Results

CMCL implementation increased the number of patients who received lab results (Figure 2) and reduced time taken for patients to receive their lab results overall. Previously, only 46.67% of MedZou patients were notified of their lab results. Since labs were only reported via calling during clinic hours, patients unavailable then would not receive labs at all unless they contacted the clinic independently or had follow-up visits.

The CMCL changed this pattern – logging patients not answering the phone guided CMs to make additional follow-up calls outside of clinic hours (Table 2). This made a significant difference in the number of patients who received their lab results, reaching 66.67% of the patients not initially answering their phone during clinic. With the CMCL in use, 77.78% of MedZou patients overall were notified of their lab results, with 59.26% of patients receiving them within 1 week following the report from Quest Diagnostics (Figure 3). The chi-square statistic was 9.2569, which was significant (p -value = 0.002346).

The percentage of MedZou patients not reached with an initial phone call remained consistent throughout the study at 26.67% pre-CMCL and 29.63% post-CMCL implementation, indicating that two subsequent follow-up calls directly improved result notification, rather than other confounding variables. A secondary intervention included communicating directly with patients about preferred callback days/times at the time of the current clinic visit. After implementing the CMCL, a patient satisfaction survey found that 76.00% of patients rated their communicative experience as “Excellent”.

Many qualitative improvements to clinic flow and patient communication are worth noting. The lack of any follow-up in calling patients prior to the CMCL meant patients were not receiving their lab interpretations, were unable to ask questions, and were not scheduled for follow-ups as needed. This required the patient to reach out to the clinic for updates, which is undesirable since MedZou patients are uninsured and may have socioeconomic and/or language barriers to navigating an already confusing healthcare system.

Conclusion

The CMCL demonstrates how consolidating communication records into a shared, protected file can be effective in improving communication between patients and clinic volunteers. Despite multiple efforts to contact every patient via the CMCL, several patients remained unreachable. However, the communication breakdown rate significantly reduced with CMCL usage. CMCL implementation also enhanced patients' experience with MedZou care delivery, as shown by the Patient Communication Satisfaction Survey results. In addition to reforming healthcare delivery, patients are better informed about where and when to get labs drawn, and how results will be communicated to them in the future. Now, the CMs directly speak to patients needing labs drawn to ensure understanding of the next steps in the protocol and follow-up. With CMCL-use, the data shows an enhancement of lab reporting turnaround times.

Limitations

The limitations of this intervention are that the CMCL is restricted to only CM use. Also, given the additional steps in the protocol, CM compliance issues may arise with ensuring accurate data input or clinic workflow changes, if patients are mistakenly sent home without speaking with the CM. Additionally, there is room for further collaboration with specialty clinics who communicate lab results without CMs' involvement.

A potential limitation for other SRFCs to implement a system like the CMCL is the amount of initial time and effort that it would take on behalf of the CMs. This intervention does require considerable effort to adjust to with a new interface. The CMCL requires the CMs to have an additional program open on computers to input and organize data. CMs must remain aware of which patients will need labs and be ready to speak to them prior to appointment completion.

Future Application

In the future, the CMCL data can be used internally with the MedZou leadership team (i.e., Directors, Patient Liaisons, Specialty Clinic Chairs) to quickly reference when contacting patients

regarding next steps and to be updated on previous communications. With annual leadership transitions, we plan to expand CMCL access.

Other SRFCs can implement similar models of centralized data collection for labs and other patient follow-up needs. SRFCs often have many moving parts with busy volunteers, so ensuring we do our due diligence to meet patients' needs is critical. A streamlined system like the CMCL would be especially useful for internal communication at larger free clinics operating with larger patient and lab volumes coming in weekly. Alternatively, having a designated "Lab Coordinator" might be beneficial when CMs may have too many responsibilities to balance. A separate role handling all lab-related inquiries, results, and communication of results to patients would ensure quality and accuracy for the clinic's lab process.

The CMCL framework can also be altered and applied to specific needs of SRFCs. Rather than functioning with the primary purpose of delivering lab results to patients, using a centralized, shareable log of pertinent patient information can serve to track patient needs as they come up during clinic visits. This would ensure that various aspects of patient care do not get missed as information passes through multiple clinic volunteers.

Disclosures

The authors have no conflicts of interest to disclose.

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