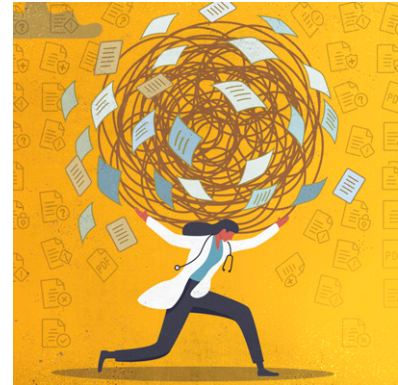


IN DEPTH

In-Basket Reduction: A Multiyear Pragmatic Approach to Lessen the Work Burden of Primary Care Physicians



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The *in-basket* of the primary care physician (PCP) has become unmanageable. A growing volume of messages from system notifications, communications from colleagues, and especially patient medical advice requests has resulted in several hours of such additional indirect care for physicians each day — and is a leading contributor to burnout. Atrius Health embraced this in-basket challenge in 2017, and the authors share their experience here. They determined that they could not effectively create efficiencies in practice for Atrius Health’s PCPs without tackling the in-basket. Atrius had used a team-based model of primary care for decades, but the in-basket processes did not reflect its care model of teamwork; in-basket messages defaulted to the PCP to manage and resolve. Feedback from PCPs, assessments of professional burnout, and measurement of PCP in-basket volume presented a clear need to address this issue. Atrius Health focused on reducing volume but considered performance in quality, safety, and patient experience in all work. The organization launched a multiyear initiative to reduce the burden of what should be a beneficial tool by applying the principles of *eliminate*, *automate*, *delegate*, and *collaborate*. By 2022, Atrius Health had reduced the in-basket volumes by category as follows: media manager (which refers to a folder in which scanned documents are filed), 98% reduction; carbon copy charts (which refers to notes from other physicians and contains a range of critical new diagnoses, prognoses, or treatment plans along with routine follow-up visits),

35% reduction; ED/hospital admissions/discharge/transfer messages, 100% reduction; prescription renewals, 50% reduction; laboratory results, 30% reduction; and patient medical advice requests, 40% reduction. Through a multipronged approach, the total daily in-basket volume for PCPs was reduced by approximately 25% from 100 messages in 2017 to 75 messages in 2022.

Midway through a busy morning of scheduled patients, the primary care doctor feels their heart rate rising. The in-basket in their electronic health record displays the total volume of messages that require resolution. The numbers tick up each time the doctor looks up. Patients are in rooms waiting to be seen, while notes, orders, and care coordination tasks on the patients already seen must be completed. The doctor bounces between taking care of the tasks for today's clinic session and addressing as many in-basket messages as possible. By lunchtime, the doctor feels overwhelmed by the work and tries to prioritize as best they can. They work at their desk over the lunch hour but still have in-basket and chart documentation responsibilities that they will do at home, after dinner. The next patient session starts in an hour, and the cycle goes on.

The Need

The *in-basket* of the primary care physician (PCP) plays a central role in job feasibility: the ability to complete one's work. An ever-increasing amount of clinical and administrative work flows through the PCP's in-basket — the electronic health record (EHR) equivalent of a mailbox filled with all matters related to patient care. This single depository holds a wide range of information, from test results to patient inquiries to reports of care delivered by other physicians and health systems; it includes both clinically critical messages as well as notes on mundane administrative tasks that must be acknowledged and completed. The time necessary to keep pace with the in-basket tasks invades the workdays and personal evening hours and drives many physicians to reduce their work to part-time just to keep up. To address PCP burnout and to improve job feasibility, we must address the work of managing the in-basket.

In this article, we refer to PCPs, the majority of whom are PCPs trained in either internal medicine (IM) or family medicine (FM). Approximately 10% of those we include under the term PCP are advanced practice clinicians (APCs) — nurse practitioners or physician assistants — although their patient panel is capped at about 70% of the physician's panel.

The primary care team (PCT) is the larger group that includes physicians, APCs, nurses (registered nurses and licensed practical nurses), medical assistants, renewal coordinators, patient service representatives (PSRs), and medical secretaries.

“

Our strategy required a multipronged approach. We would work on multiple folders where opportunities were found and look to the sum total of many smaller interventions.”

Table 1. Atrius Health Baseline Volume (2017) and Percentage of Volume Reduction for Each Intervention (2017–2022)

In-Basket Category	Implementation Period Completed, Underway	Baseline In-Basket Volume per Day per Full-Time Primary Care Physician (at Time of Implementation)	In-Basket Message Volume Reduction Achieved, %	Tactic Used
Media manager	2018	5	98	Eliminate
CC charts	2017	13	35	Eliminate
ED/hospital ADT messages	2018	3	100	Eliminate
Prescription renewals	2020*	16	50	Automate
Laboratory test results	2022	19	30	Automate (normal results); delegate (abnormal results)**
Patient medical advice request	2022 [#]	5	40	Collaborate

These six categories represent approximately two thirds of the daily in-basket volume for a primary care physician in 2017 and are the message categories we selected for an intervention. The interventions for each category were begun at different times, and implementation was completed at different times over the 5 years and was measured preintervention and postintervention. Media manager refers to scanned messages or documents. Carbon copy (CC) charts are visit notes from specialty consultations or cross-coverage clinicians (e.g., urgent care). ED/hospital admission, discharge, transfer (ADT) messages are notifications of patients' admission, transfer, or discharge from outside facilities. Prescription renewals are requests to renew a medication from patients or pharmacies. Laboratory test results are finalized imaging and laboratory test results. Patient medical advice requests are patient-generated emails to the primary care team. The information reflects the percent decrease achieved and measured by Atrius Health and uses daily message count measured by Epic (based on the number of days a clinician is logged into Epic). *Prescription renewal was spread over 3 years as follows: 2019, pilot; 2020, implemented at all internal medicine/family medicine sites; and 2021, deployed a centralized team. By 2020, this was implemented at all sites and achieved this 50% reduction. **Abnormal laboratory reductions were not included in the 30% decrease (but are included in an initiative that was being implemented in March 2023). [#]Patient medical advice requests were not yet implemented systemwide as of March 2023. Source: Epic (Wisconsin) Signal Data. In-Basket Volume, Atrius Health Internal Medicine 2017 and 2022

Atrius Health is an ambulatory value-based health system with employed physicians and more than 30 medical practice locations in eastern Massachusetts. As we recognized stressors and burnout among our own, we embraced this challenge in 2017 to create efficiencies in practice for our PCPs. By 2022, this multiyear initiative had enabled substantial improvements, reducing the *total* in-basket volume (Table 1, Table 2).

Why Did We Do It?

Burnout is epidemic in primary care¹ and has been shown to be related to clerical tasks, workload, after-hours work, and inbox volume.^{2–5} Studies continue to validate the unreasonable expectations for PCPs, estimating 26.7 hours per day to complete all the tasks required to care for a panel of 2,500 (which includes 3.2 hours per day for documentation and inbox management). However, this was reduced to only 9.3 hours per day (which includes 2.6 hours per day for documentation and inbox management) if the practice had a strong team-based care model.⁶

Some of the increasing work burden stems from the advancements in prevention and chronic care; there is more to know and more to do to provide evidenced-based preventive and chronic care. In addition, EHRs have introduced and enabled greater complexity in the care environment, whereas at the same time, there has been pressure to move faster, despite this increase in tasks and responsibilities.⁷ The work itself has evolved from largely seeing patients in

Table 2. Atrius Health Same Source Daily Message Volume (Epic [Wisconsin] Generated), 2017 Baseline Versus October 2022 Data Not Adjusted for Atrius Health Clinical Full-Time Equivalent

In-Basket Category	2017 Epic Baseline In-Basket Volume, N as Epic-Reported Average per Day*	Signal Data from the Week of October 1, 2022 (Metric Equals Messages Received/Day with Days Logged into Epic*)	Decrease Using Epic Signal Data 2017–2022, %
Media manager	3.1	0	100
CC charts	8.4	4.7	44
ED/hospital ADT messages	2.1	0	100
Prescription renewals	10.3	5.7	45
Laboratory test results	12.3	9.2	25
Patient medical advice request	3	5.2	–73
Other	22.4	17.2	23
Total	61.6	42	32

These six categories represent more than 60% of the daily in-basket volume for a primary care physician. Definitions are identical to those in Table 1. Regarding patient medical advice requests, we saw an increase rather than a decrease, which is associated with the onset of the Covid-19 pandemic and related growth in the reliance on remote access care and communication. The other category includes message types that were not addressed in the project as of 2022. CC = carbon copy, ADT = admission, discharge, transfer. *Reflects the daily message count measured by Epic (based on the number of days the clinician is logged into Epic) not adjusted for Atrius Health clinical full-time equivalent. Source: Epic (Wisconsin) Signal Data. In-Basket Volume, Atrius Health Internal Medicine 2017 and 2022

the office to spending many hours addressing patient care needs outside of direct care.^{8,9} The nonpatient-facing work stems from increasing information flow in the EHR, consumer expectations, and payment models that value care coordination and quality.

“ Our strategy evolved to this: elimination, automation, delegation, and collaboration. ”

To reduce PCP burnout, a multipronged approach that promotes a culture of wellness and efficiency of practice and which provides institutional support for personal resilience is recommended.¹⁰⁻¹² Critically important is changing the workflows and practice environment to ease the burden of work of the PCP.¹³

The Initiative

In 2017, senior leadership approved the first of many initiatives to address physician burnout with EHR optimization strategies. Run by the IM/FM service-line leadership and in partnership with IT leadership, this effort leveraged multiple stakeholders over the ensuing 5 years. Our five-step approach was to:

1. examine the current state,
2. develop a strategic approach,

3. create governance and work groups,
4. establish and execute tactics for each in-basket message type, and
5. measure the impact of each intervention.

1. Examine the Current State

We used Epic (Wisconsin)-generated data (March 2017) and normed the data to our weekly direct patient care hours (32 patient-scheduled hours per week for a full-time PCP from IM and FM). We calculated (converting Epic [Wisconsin] data to our Atrius Health expected daily work hours) that full-time PCPs receive approximately 100 messages per weekday or 500 messages per week in this data set. The breakdown of the top 15 message types is shown in Table 3 for IM and Table 4 for FM. The top five by percentage of total volume were results (19% IM, 24% FM), prescription authorization (16% IM, 18% FM), staff messages (16% IM, 10% FM), carbon copy (CC) charts (13% IM, 9% FM), and patient calls (11% IM, 15% FM).

Given the similarity between the results for the IM and FM physicians, we focused on the larger data pool associated with the IM physicians. As we examined the contents, we found variation

Table 3. Atrius Health Internal Medicine In-Basket Volume According to Message Type

Rank	Message Type	Message Type Volume (March 2017)	Message Type Volume as a Percentage of Total Volume	Number for Every 6 Hours of Patients the Physicians See*
1	Results	44,940	19	18.08
2	Prescription authorization	37,712	16	15.17
3	Staff message	37,292	16	15.00
4	CC charts	30,693	13	12.35
5	Patient calls	25,912	11	10.42
6	Media manager	11,356	5	4.57
7	Patient medical advice request	10,955	5	4.41
8	CE event notification	7,621	3	3.07
9	Covered work	6,161	3	2.48
10	CE outside messages	3,760	2	1.51
11	Medical cosign	3,189	1	1.28
12	Transcription	2,120	1	0.85
13	Open encounters	1,818	1	0.73
14	Referral message	1,156	0	0.47
15	Result notes	1,142	0	0.46

CC = carbon copy, CE = care everywhere. *Data were not adjusted for Atrius Health clinical full-time equivalent. Source: Epic (Wisconsin) Signal Data. In-Basket Volume, Atrius Health Internal Medicine 2017 and 2022

Table 4. Atrius Health Family Medicine In-Basket Volume According to Message Type

Rank	Message Type	Message Type Volume (March 2017)	Message Type Volume as a Percentage of Total Volume	Number for Every 6 Hours of Patients the Physicians See*
1	Results	2,983	24	15.97
2	Prescription authorization	2,213	18	11.84
3	Patient calls	1,920	15	10.28
4	Staff message	1,243	10	6.65
5	CC charts	1,132	9	6.06
6	Media manager	906	7	4.85
7	CE event notification	473	4	2.53
8	Medical cosign	405	3	2.17
9	CE outside messages	335	3	1.79
10	Patient medical advice request	279	2	1.49
11	Result notes	148	1	0.79
12	Covered work	104	1	0.56
13	Significant weight change	88	1	0.47
14	Referral message	45	0	0.24
15	Prescription response	36	0	0.19

The message volume according to type varies somewhat between the internal medicine and family medicine physicians but is generally consistent, with the same message types falling within the top six for each. These tables are derived from Epic (Wisconsin) data for the month of March 2017, and we used this as our baseline data for in-basket reduction. Denominators were based on both days logged into Epic and hours of scheduled patient office visit, which needed to be interpreted with our expected work hours. Key learnings included the type of messages that affected the total volume and potential opportunities. Staff messages are intended for team communication and not clinical tasks, but they often are used for patient-specific clinical care needs. CC = carbon copy, CE = care everywhere. *Data were not adjusted for Atrius Health clinical full-time equivalent. Source: Epic (Wisconsin) Signal Data. In-Basket Volume, Atrius Health Internal Medicine 2017 and 2022

within each folder. The *results* type could have a mix of routine preventive normal laboratory results and critically abnormal diagnostic results. The *CC charts* include notes from other physicians and contained a range of critical new diagnoses, prognoses, or treatment plans along with routine follow-up visits. *Media manager* contained scanned documents of various message types, including those from outside hospital discharge summaries and test results, insurance-related authorizations, and more. There were no simple or singular tactics that could address all message types or folder types. Our strategy required a multipronged approach. We would work on multiple folders where opportunities were found and look to the sum total of many smaller interventions. We were not attempting to address all folders in our early work, and, instead, selected folders in which the investments were technically and operationally feasible and clinically appropriate. The decisions on how to proceed were led by the IM/FM service-line leadership (chair of IM/FM) and IT leadership (chief medical information officer). We considered patient experience, safety, and quality outcomes with each intervention.

“Working together, we learned that the design of information flow was sometimes very intentional and sometimes not. Many dispensations were simply ‘route to primary care physician’ when the intention and purpose of the message were ill defined.”

2. Develop a Strategic Approach

To address the wide range of message types, we asked ourselves the following questions. Could we simply remove some messages entirely as opposed to delegating them to another team member? Could we employ automation for routine tasks, removing all team members from the task? Could we advance delegation with protocols and systems design that routed the message directly to the team member, bypassing the PCP? Our strategy evolved to this: elimination, automation, delegation, and collaboration. *Elimination* meant complete removal of waste and duplication from the in-basket. *Automation* would employ protocols and direct routing to task completion (i.e., routing laboratory results directly to the patient via the portal without also being sent to the physician’s inbox). *Delegation* would route the task to a team member to independently resolve. *Collaboration* involved shared responsibility for message types across team members (i.e., physician and APC colleagues) or coverage departments (Table 5).

3. Create Governance and Work Groups

To design and execute the work, we employed a steering committee to ensure early collaboration with our Epic IT team. As a Lean organization, this project was part of our 2017 annual *hoshin* work, meaning it was an organizational priority and received dedicated IT and

Table 5. 2017 Multiyear Strategy

Approach	Action/Goal	Message Type	Potential Targets
Eliminate	Eliminate low-value clinical information, waste, and duplication	<ul style="list-style-type: none"> Media manager CC charts ED/hospital messages 	<ul style="list-style-type: none"> Low-value media manager scanned documents CC charts with low clinical value Duplicative notifications from ED/hospital
Automate	Embed protocols and automated pathways into the in-basket to resolve routine repetitive tasks	<ul style="list-style-type: none"> Prescription renewals Normal laboratory results 	<ul style="list-style-type: none"> Routine medication renewal requests Normal laboratory and imaging results Routine orders for protocol-based needs
Delegate	Direct tasks to team members who can resolve them within their scope of practice and with clinical protocols	Abnormal laboratory results	<ul style="list-style-type: none"> Patient portal queries to nursing oversight for triage Select abnormal test results to licensed staff for protocol-based actions
Collaborate	Share accountability for tasks between two or more team members	Patient medical advice request	<ul style="list-style-type: none"> Shared in-basket with APC partner for shared panel of patients Cross-coverage in-basket strategies for PCP absences

CC = carbon copy, APC = advanced practice clinician, PCP = primary care physician. Source: The authors

operational support. After 2017, we continued the work when resources were available or organizational priorities overlapped (2019–2021 prescription renewal automation was an access *hoshin* priority). This IM/FM team, led by the chair, included physician and APC leaders, nursing leaders, and operations leaders for primary care. The IT team included Atrius Health leadership and management for all levels of Epic design and resource allocation expertise. We leveraged existing management structures for additional input as needed; IM/FM leadership presented and received feedback from the local medical directors of our 21 IM/FM sites. This was a critical piece of our physician engagement strategy — soliciting input and including local leaders in work groups. Our IT team dedicated key members to ongoing governance and delegated specific initiatives to the technical expert most familiar with the relevant needs.

We found that working together in 2017, when we were exploring our strategy, defining the problem we were trying to solve had great value. We discovered more possibilities combining IT and clinical operations design and uniting clinical needs with EHR design feasibility. For example, our clinical leaders did not know how our in-basket systems were designed, such as why a document was routed to them. Our IT leaders did not know what the PCP needed to manage patient care needs, such as which team member could best address that document. Working together, we learned that the design of information flow was sometimes very intentional and sometimes not. Many dispensations were simply “route to PCP” when the intention and purpose of the message were ill defined. We discovered system design flaws stemming from our history of siloed leadership; the design of some routing protocols was individualized to each department and site, creating a complex web of routing protocols.

“

We paced ourselves, understanding that the work would extend over multiple years and the desired impact of a 30% reduction in in-basket volume would come from the sum of many different interventions implemented over time.”

A degree of standardization across the organization was needed to implement systems’ approaches to in-basket reduction — specifically, standardization of common clinical workflows, such as renewing medications, telephone triage, or physician-to-physician communication. Standardization of clinical practice has merits and challenges; although there is opportunity to create greater reliability of outcomes, practicing medicine also relies on clinical judgment, clinician experience, and strong patient–doctor relationships.¹⁴ Our collaboration between clinical and IT leadership helped us understand the necessity of *targeted standardization*. For example, we needed to standardize definitions and the design of the in-basket to implement reduction tactics, such as identifying message types in the media manager folder. We needed unified policies and procedures on communication, such as criteria for a consultant to send a notification to a PCP. In targeted areas, we needed clinical agreement on workflows supporting medication renewals, care gap closure, and results automation. We employed broader multidisciplinary governance committees composed of physicians, nurses, and pharmacists to provide guidance on important clinical decisions.

As a Lean organization, we used pilots, data, iteration, and input to ensure we were spreading the right changes. Iteration sometimes occurred well downstream when we thought we had completed implementation; we believe that physician engagement requires their trust that we will take action to resolve clinical concerns. As an example, our prescription renewal automation was designed to close care gaps (disease management screenings to ensure safe prescribing). We generated a significant increase in laboratory testing, and, with clinician feedback, we later reduced the menu of laboratory tests to maintain safety while reducing the volume of testing. We communicated robustly and welcomed positive and negative feedback from our site teams. We invested in training and leveraged our management structure to ensure success.

We paced ourselves, understanding that the work would extend over multiple years and the desired impact of a 30% reduction in in-basket volume would come from the sum of many different interventions implemented over time. We started with eliminating waste.

4. Establish and Execute Tactics for Each In-Basket Message Type

Media Manager (Tactic: Eliminate Waste)

Media manager is a folder for scanned documents, comprising 5% of the total in-basket volume in 2017. It included any information that was received as a fax or paper and not available electronically. We scrutinized the contents of the media manager messages to look for waste, duplication, and the opportunity to eliminate or reclassify. PCPs told us that they were struggling to find relevant clinical information among a large volume of extraneous information. In addition, some media manager items were mislabeled, allowing PCPs to miss important information.

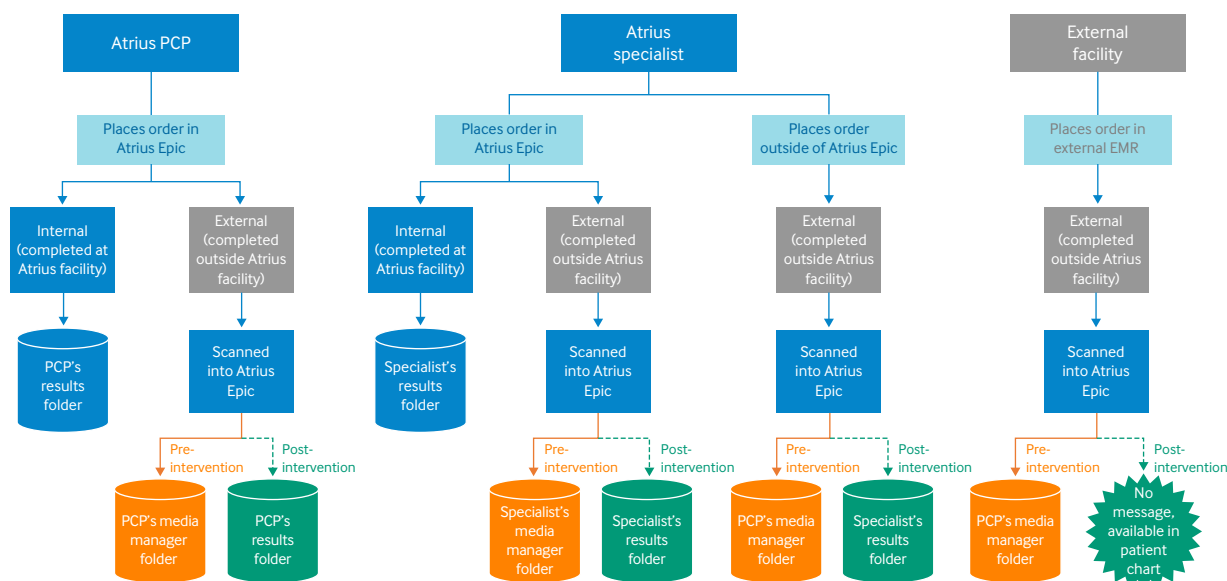
We employed a governance committee of practicing PCPs to review the contents of media manager with our Director of Health Information Management. Items were categorized and assessed for clinical value. To ensure safety, nothing was eliminated that required PCP action or contributed to clinical care or decision-making. We worked with our specialty colleagues and health information management team and redirected the messages to an appropriate folder. Some were reassigned to folders that emphasized their content (e.g., a hospital discharge summary that belonged in the CC chart folder). We discovered that laboratory test results ordered by our Atrius Health specialists at outside hospitals were directed to media manager; not only did this clutter the in-basket, but it failed to deliver the test results to the ordering, responsible physician. Some items were eliminated from this basket by *not* routing them to the PCP in-basket but, instead, filing them in the patient's chart without notification; examples include continuity of care documents, patient-entered attachments, and screening documents already addressed at the visit.

“*Primary care physicians told us that they were struggling to find relevant clinical information among a large volume of extraneous information. In addition, some media manager items were mislabeled, allowing primary care physicians to miss important information.*”

FIGURE 1

Routing of Results to the In-Basket by Source

This schematic describes the results-routing process for Atrius Health primary care physicians (PCPs), Atrius Health specialists, and external facilities. The design was last revised January 25, 2018, and it indicates *preintervention* and *postintervention* folder destinations. The goal was to ensure that results are routed to the relevant folder, that the ordering PCPs receive their results, and that nonessential external results are removed from non-Atrius Health sites from the Atrius Health PCPs' in-baskets. We continue this routing logic as of March 2023.



EMR = electronic medical record.

Source: The authors

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The *key learning* from this tactic was that we can find waste if we take the time to examine the contents of an in-basket folder, understand the routing protocols, and use a clinical governance committee to determine the appropriate changes (Figure 1).

Our initial changes led to a 98% reduction in volume, which we have sustained through February 2023.

CC Chart (Tactic: Eliminate Waste)

In 2017, 13 of 100 daily PCP in-basket messages were related to the CC charts folder, which consisted of consult notes from specialists, urgent care notes, and cross-coverage notes from colleagues. With this volume of daily messages, it is difficult to identify those of clinical importance that require follow-up, such as a care plan change or outreach. We approached the work with several tactics. We looked at the logic embedded in Epic that determined if a CC chart

message was automatically sent to a PCP and discovered wide variation by department and site. We then turned off the automatic routing, forcing all CC chart messages to be pushed rather than automated. We engaged all stakeholders — including PCPs, specialists, and urgent care physicians — to understand the intention of sending their notes and the clinical value to the PCP.

We created a practice agreement with our same-system specialists on what and what not to send. Notes that should be sent included new consults; significant changes in treatment, prognosis, or condition; or those in which there was an expected action that the PCP must take. We asked that all sent notes have an attached comment to indicate why it was sent and highlight an expected action. Our goal was to improve the visibility of the purpose of the communication. Finally, we purged all CC chart messages older than 60 days from the PCP in-basket (the CC chart note remains in the patient chart) after discovering a large volume that remained in active in-baskets. The early results showed a 40% drop in monthly CC chart messages in PCP in-baskets to about 7.8 per day (2017 quarter 2 to quarter 4) and a sustained reduction of 35% to about 8.5 per day (2016–2022) (Figure 2).

“ *Some items were eliminated from this basket by not routing them to the primary care physician in-basket but, instead, filing them in the patient’s chart without notification.* ”

Admission, Discharge, and Transfer (Tactic: Eliminate Waste)

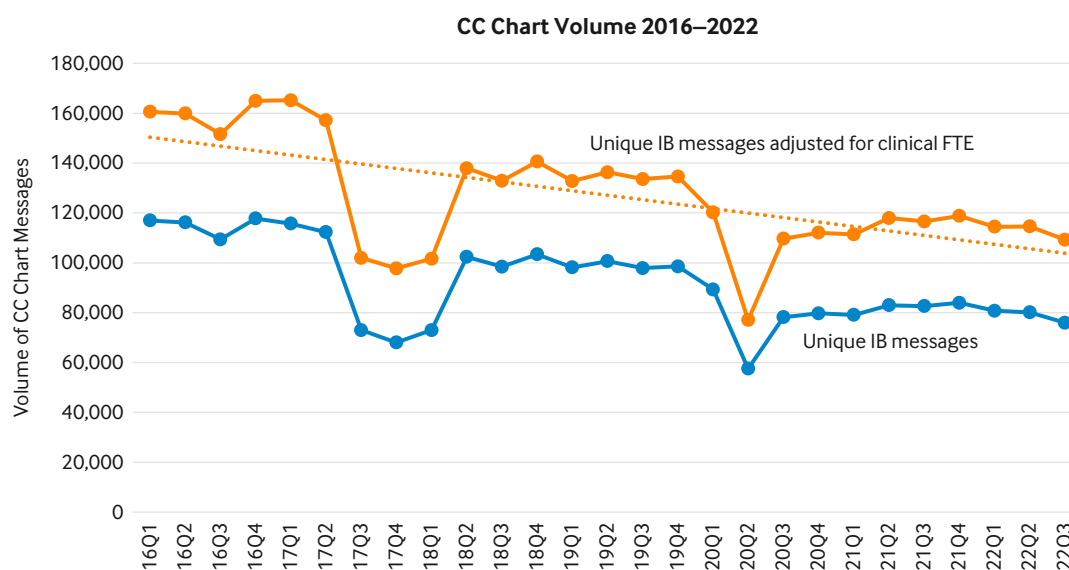
PCPs receive automated care everywhere (CE) alerts, notifications, and discharge summaries in their in-basket through admission, discharge, transfer (ADT) feeds from an ever-increasing array of local and national health systems (referred to as CE events in the in-basket). In 2017, we found duplication of documentation and incomplete information in many of these messages. One hospital admission could generate six or more unique in-basket messages. The timing of notification was not synchronous with clinical care, and drilling down on pertinent information was onerous. We removed the ADT automatic routing to in-baskets and pooled the notifications into a dashboard. The dashboard organized ED and hospital discharges according to patient and provided the relevant information. When discharge summaries were available, they could be accessed via a link. Postdischarge calls and appointments are visible to the PCP as well. The PCPs “pull” their dashboard on the main page of Epic at their discretion. Critical to the decision to remove these notifications from the in-basket was our long-standing system of nurse oversight for postdischarge outreach. Nurses and case managers review daily lists of patient discharges, prioritize, and outreach to ensure a safe transition to home and a PCP follow-up appointment. We turned on the dashboard in March 2018 and had a dramatic drop in these notification as in-basket messages to single and double digits per quarter from more than 32,000 in 2017 quarter 4 (Figure 3).

The success with elimination tactics furthered our resolve to embed automation into our clinical workflows. With the elimination of waste in media manager, CC chart, and CE chart notifications, the most we could achieve is a reduction of just 15 messages or half of our

FIGURE 2

Trends in Volume of CC Chart Messages and CC Chart Volume 2016–2022

In 2016, unique in-basket (IB) messages for the first quarter had exceeded 160,000 adjusted for Atrius Health clinical full-time equivalent (FTE), which was 157 primary care physician FTE at that time. We saw rapid improvement upon implementation of the intervention in 2017 quarter 3 (Q3) to less than 98,000 by 2017 Q4. On July 1, 2017, automatic routing was turned off, and on September 1, 2017, an ongoing purge of carbon copy (CC) charts older than 60 days started. We saw a rise to sustained levels of 135,000–140,000 for several quarters in 2018 and 2019, which we hypothesize is the accumulation of messages after our first purge. The first purge eliminated 37,289 messages extending back as far as 13 years. A >60-day purge was continued to prevent a similar accumulation. After the precipitous drop related to Covid-19 (reduced consultation notes), levels rose but did not exceed 120,000, as the trend line continued its downward slope. The blue line shows unique IB messages, and the orange line shows unique IB messages adjusted for Atrius Health clinical FTE.



Notable dates: 2017 Q1 = intervention begins; 2017 Q3 = automatic routing turned off; 2017 Q3 = begin continuing purge of CC charts older than 60 days; 2020 Q2 = Covid-19 impact begins.

Source: The authors. Orange and blue lines represent Atrius-generated data. The data in orange is adjusted by current clinical FTE.

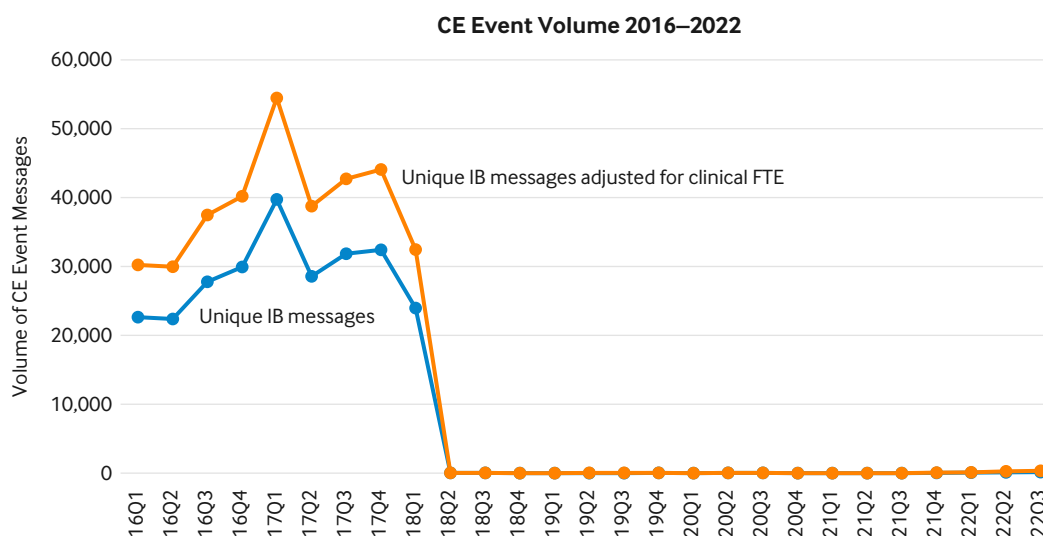
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30% goal; another 85 daily in-basket messages remained untouched. As we explored automation, we went deeper into clinical decisions, scope of practice, and operational standardization. We pushed our professional norm from the expectation that PCPs touch everything as a form of quality control to the norm of building systems that can be trusted to deliver reliable, high-quality outcomes. Before these interventions, our PCPs expressed mounting angst that they would “miss something” as the flow of information had become unmanageable. The literature supported our PCPs’ experience; when sorting through high volumes of results, physicians report missing critical results.¹⁵

FIGURE 3

Trends in Volume of Care Everywhere Chart Messages (i.e., Admission, Discharge, Transfer Notifications), 2016–2022

This volume trend shows the enduring effect of a systems change, eliminating in-basket (IB) messages from admission, discharge, transfer feeds and consolidating them in a dashboard outside of the IB. Unlike carbon copy charts, this does not rely on primary care team workflows or purging of old messages. The small rise in 2022 represents a pilot of two primary care physicians who are testing the value of receiving admission, discharge, transfer feeds as they relate to readmission prevention.



CE = care everywhere, FTE = full-time equivalent, Q = quarter.

Source: The authors

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Prescription Renewals (Tactic: Automation)

We adopted a three-part process to address message volume related to prescription renewals: defining the problem, choosing a vendor and piloting in the initial stages, and bringing the platform in-house and centralizing the workforce in the later maturing stages.

Defining the Problem. In 2017, prescription renewal requests were 16% of the total in-basket message volume, which averaged to 16 or more requests of 100 messages per day per PCP. Renewals were requested by patients and pharmacies, often creating duplication and waste. Requests came from telephone calls and faxes, requiring significant staff hours to process before the PCP review. Examining the volume at one of our smaller sites in 2016, we required 7.65 hours per day of secretarial work to complete fax review and chart review and to enter the refill encounters into the in-basket for a site with 5.2 full-time equivalents of PCPs (eight individual PCPs) serving a combined patient panel of approximately 13,000. We also reviewed safety events related to renewals from pharmacy faxes at that site, which totaled 36 in 1 year. The renewal demands and processes added burden to the PCP and the entire practice team. We had

used tactics to reduce volume, such as refilling medication at visits and extending refills to 1 year, but the volume remained high regardless.

Renewal requests are also an opportunity to review the patient's chart and to engage in outreach for any outstanding care needs. We had Epic SmartTools (charting tools to guide the user) to facilitate this review process, but they were awkward and not universally used. As we looked to automation for renewal processes, improving reliability and outcomes in care gap closure at the renewal encounter was essential.

“*The early results showed a 40% drop in monthly carbon copy chart messages in primary care physician in-baskets to about 7.8 per day (2017 quarter 2 to quarter 4) and a sustained reduction of 35% to about 8.5 per day (2016–2022).”*

Initial Stages: Choosing a Vendor and Piloting. To implement and scale rapidly, we chose to work with a vendor that had a mature renewal automation platform that we could embed in our EHR. The automation platform had protocols that we could customize to suit our clinical needs. We created a clinical governance team that could vet the vendor's protocols and determine what medication categories would be in scope. Medications that are in scope for automation were called *delegable* and out of scope for automation were called *nondelegable*. Nondelegable medications include antibiotics, scheduled medications, and medications requiring closer clinician oversight. The governance team was multidisciplinary and leveraged our group's primary care and specialty care physicians, pharmacists, and nurses. Adjustments were made, and care gaps were selected. We then piloted the approach at two of our primary care sites to test the application of the complete prescription renewal automation to our practice. The pilots lasted from January to September 2018 at each location. The share of delegable refills not requiring PCP sign off was approximately 40% at site 1 and 50% at site 2.

Our pilots taught us key lessons and helped customize and mature the renewal automation for our practice. Before the complete prescription renewal automation pilots, we conducted a smaller pilot to determine whether a refill protocol could improve quality and safety metrics; in September 2017, we tested one nondelegable category of medication, opioids, with a home-grown protocol to see if the workflows identified care gaps that staff could resolve, such as narcotic contracts, medication monitoring tests, and appropriate visit cadence. The percentage of patients with a completed opioid bundle (group of metrics for safe prescribing) doubled from 33% to 68% according to a 2018 internal Atrius Health study. This outcome showed that protocols improved quality performance over individual physician management, and we saw similar improvements in this same quality metric with our complete prescription renewal automation pilots (site 1, 60% increased 6 points to 66%; site 2, 70% increased 13 points to 83%). The 2018 site pilots for full protocols taught us operational lessons as well; training for our nonlicensed renewal staff was essential as the work of care gap closure was new. To understand how to optimize patient experience, we focused on *responsiveness* to their request. We tested staffing levels, turnaround time (TAT), and level loading needs. TAT from prescription request

to completion is tracked today to assess patient experience with our automation; 95% of requests are completed in less than 48 hours (2021–2022 data). Before the automation, our ability to track TAT was hampered by site variation and use of fax machines (no time stamp), but time studies suggested a TAT of 3–4 days.

We gathered physician and APC input and identified further adjustments to improve workflows and ensure that care gaps identified were clinically appropriate. We measured our performance and worked with our legal, nursing, and senior leadership team to align our policy on delegation. Our renewal automation workflow did not require a PCP to sign each approved medication. Our renewal teams were able to facilitate a medication renewal request through a protocol and were not exercising clinical judgment; this allowed us to automate the response without sending an approved medication to the PCP in-basket. We invested in broad and robust communication within the participating service line (IM/FM) and, for awareness, across our organization. The combination of ongoing clinical governance, sharing results, gathering physician input, and thorough piloting supported broad adoption of the renewal automation. By investing in our pilot learnings, we spread it rapidly across the remaining 19 sites in 6 months (June 2019 to January 2020).

“*We pushed our professional norm from the expectation that primary care physicians touch everything as a form of quality control to the norm of building systems that can be trusted to deliver reliable high-quality outcomes.*”

Maturing Stages: Bringing the Platform In-House, Centralizing the Workforce. Our early results were impressive. Between July 2019 and January 2020, we removed 50% of the prescription renewals from the PCP in-basket across our service line, from approximately 16 per day to 8 per day. We had a reliable system to check care gaps, automate orders for blood tests, and schedule patients to come in when needed. As we gained experience with renewal automation, we decided to develop our own platform and protocols and ended our vendor relationship. We desired control to iterate this automation, so we can match our clinical and operational needs quickly. Later, in October 2020, we centralized our renewal team to create greater efficiencies and performance. With a centralized team, we could level load and cross-cover with greater ease. The skills for the renewal team could be better monitored and supported for maximal service and effectiveness. There was a loss of local control and team relationships at the sites; renewal coordinators are part of the PCT. We received feedback from PCPs and service-line leadership engaged in conversations about the balance of benefit and loss in any centralized system. The overwhelming challenge for all was maintaining adequate and consistent renewal staffing at the site; with centralization, all sites could enjoy appropriate staffing levels to offer consistent service to their patients. Centering on the patient, centralization was the most efficient way, all things considered, to reliably support renewal workflows and patient experience.

We also adjusted the scope of our care gap closure with input from our PCP leaders. We had cast a broad net to find care gaps related to any medication or prevention need and experienced

an increase in the laboratory results coming to our PCPs. To reduce the burden of this additional in-basket volume and with greater experience in automated care gap closure, we chose to narrow the focus on the laboratory care gaps to those that support safe prescribing (and not broader prevention). An example was hepatitis C screening; initially, we included it as a care gap but later eliminated it from renewal workflows when volume of results and patient feedback indicated it was disruptive. (We do include it in preventive care previsit laboratory workflows.) We continue to examine areas for workflow improvement, such as adhering to standard medication documentation guidelines to reduce messaging between renewal staff and PCPs when documentation was unclear. For example, standardizing how we document medications that are prescribed by outside sources reduces downstream questions from the renewal team to the PCP.

Automation of prescription renewals remains a highly successful initiative that supports reliable care gap closure and reduces the in-basket volume of renewals by 50% for our PCPs.

We had excellent results from our elimination and automation tactics. Between 2017 and 2019, we estimated a 25% reduction of the total in-basket from the elimination tactics (CC chart, media manager, ED/hospital event notification) and prescription renewal automation efforts alone. As all experienced, the Covid-19 pandemic drove new volume into the in-basket as patients became more proficient with portal use and more inclined to seek care outside of office visits. We continued our journey and initiated more of our tactics with delegation and collaboration.

Normal Laboratory Results (Tactic: Automation)

The test results folder in the PCP in-basket held 19% of the total volume in 2017 (19 of 100) and was the largest bucket of work in the in-basket for PCPs. The results folder included laboratory and imaging tests. Our PCPs felt overwhelmed both by the volume of results to manage and by the angst that they would miss significant findings that were buried in the volume. Studies supported this concern. One large primary care study found that 1 of 14 clinically significant abnormal results was not communicated to the patient.¹⁶ Other researchers found a direct correlation between information overload and missed test results.¹⁷ A Veterans Affairs survey of physicians cited almost 30% of physicians self-reporting having personally missed a test result that led to care delays.¹⁸ With the success of our prescription renewal automation, we looked again to automation to reduce the burden of the results folder while also helping clinicians to avoid missing a critical result.

In 2019, we gathered a multidisciplinary team of physicians, APCs, nurses, IT, data scientists, and practice operations staff. They analyzed the contents of all IM/FM laboratory results over 3 months and found that 69% (63%–76% across 21 sites) were normal by laboratory criteria and inclusive of the entire laboratory panel (e.g., all values in a basic metabolic profile). This translated to 20 normal laboratory results per PCP per workday in 2019. The work group defined *normal* to mean that the results fell in the normal range in our EHR and must be clinically normal in all scenarios. The scope also included patients who had access to their results in our EHR via the patient portal.

Our uptake of patient portal activation is high (91% portal activation measured by Epic 2022) and increased in recent years in the Covid-19 pandemic. Atrius Health was an early user of Epic (1986 to present), and we have prioritized user uptake of the portal with our *hoshin* initiatives over many years; the pandemic increased use, but we started with a high baseline usage. In addition to the 91% of patients who have activated their portal account, our own month-long study in January 2020 involving about 104,000 messages found that 90.5% of patients who receive a message via the portal are reading the messages. We leveraged the EHR capability to share results with patients automatically via the portal. The team analyzed the most frequently ordered laboratory tests at the four pilot sites to understand the potential impact of automated select laboratory results. Some laboratory tests were added later when we adjusted our EHR normal range to ensure accuracy; examples include reducing the range of normal for hemoglobin A1c and adding a less than 20% rate of change requirement for creatinine.

“*The combination of ongoing clinical governance, sharing results, gathering physician input, and thorough piloting supported broad adoption of the renewal automation.*”

Some laboratory tests were not amenable to the automation as the clinical context, such as pregnancy (thyroid-stimulating hormone) or cardiovascular risk scores (lipids), was not routinely available in the chart. We added an option to CC a copy of the laboratory test to the patient if they wanted to see the results regardless; if a test was ordered as part of a diagnostic evaluation and a normal result would prompt subsequent testing, this CC feature enabled that. This option supported critical customization of a standard workflow and promoted physician engagement in laboratory automation.

Once implemented, the effects were immediate; the initial pilot of four clinical sites reported a 25% reduction in volume of laboratory results. Of note, the total laboratory volume increased over the duration of our work, with a temporary drop during the Covid-19 pandemic; the trend upward was driven by our care gap closure systems (prescription refill care gaps and previsit laboratory testing protocols) and, in 2021, because of patients returning to care postpandemic peak. This created an overall increase in laboratory results. Our 25% reduction mitigated this increase, neutralizing it. We rolled out the program to the remaining sites in 2021 and added more laboratory results to the menu in 2022. We have reached a sustained average of 30% result notification reduction across our PCP service line — to about 10 per day per clinician in 2022 from 15 per day in 2019.

Engagement of our physician leaders was critical to this project as this was on the leading edge of automation in clinical practice. Metrics, workflows, and pilot design were regularly brought to the larger group of site-based IM/FM medical leadership for discussion and feedback. Inclusion of this service-line physician leadership group was critical to early engagement, anticipating the sensitivity of this initiative. All individual PCP feedback was addressed by the physician leader of the normal result automation initiative. We also leveraged our formal clinical governance, the Clinical Standards Committee, to ensure broader vetting than the results automation work

group and our adult primary care chiefs. In addition, the initiative leader reviewed our patient experience through Press Ganey metrics and comments prepilot and postpilot, finding no complaints or concerns. Press Ganey scores for “extent to which your provider or others in the office connect with you between visits” and “likelihood of recommending care provider” trended upward from before to after the intervention (January 1, 2019, to December 31, 2022: 75.64–76.82 top box and 86.91–88.33 top box, respectively; Press Ganey IM/FM).

We encountered some professional reluctance through feedback and conversations with our primary care clinicians. The initiative was not optional, and thus all participated; however, we worked to gain trust and endorsement. The idea of ordering a test and having the results go directly and only to the patient was indeed new. We engaged in open discussions about the role of a PCP in managed lower-acuity care needs and the expectations of our patients. With more transparency and access to information, we felt that the norm for our patients was to have rapid access to their test results. We also wanted to reduce the volume overload in results messaging that can lead to errors. Overall, we enjoyed widespread support, with a small minority of PCPs sharing concerns. Through our usual service-line safety governance and auditing, we have not seen any adverse effect on patient care.

Abnormal Laboratory Results (Tactic: Delegation)

Encouraged by the success of results automation, we looked to further the management of results with our IM/FM nursing teams. Delegation has always been part of our team care but only at the instigation of the PCP who received the result. In September 2022, we began piloting abnormal test result routing and delegation to nurses. Abnormal vitamin D levels with protocolized management are sent directly to nursing. Nurses contact the patient, review the care plan, and resolve the result.

The volume of abnormal vitamin D laboratory results is low — about 1.5% of all laboratory results, well below even one per clinician per day — but the work needed to manage each result can take time. This relieves the PCP of a more time-intensive result management and enables nurses to work at the top of license. We plan to expand to other laboratory results after pilot completion and when staffing resources allow.

Patient Medical Advice Request (Tactic: Collaboration)

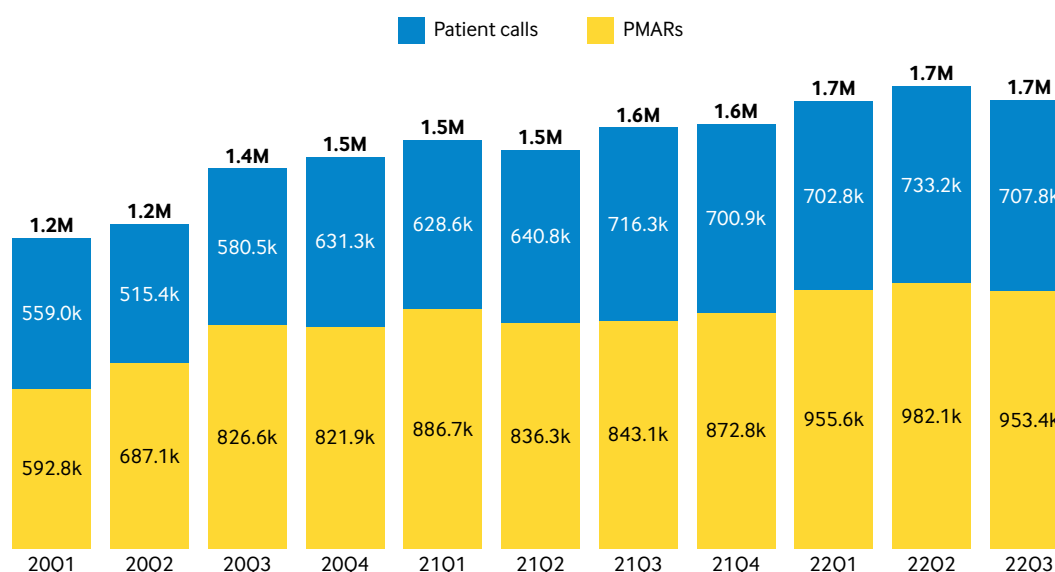
In 2020, we saw a sharp rise in both nurse triage telephone calls and patient medical advice requests (PMARs) via the portal. We have had a long-standing system to triage our portal messages, routing prescription renewals, clerical questions, and other items to the right team member. We triaged messages about Covid-19 to central nursing teams (2020–2022) as well. Despite our system to direct messages to staff members to manage (appointments, referrals, and prescriptions), the questions directed at our PCPs rose by about 100%, from approximately 6 per day in quarter 1 of 2020 to about 12 per day in 2022 (Figure 4).

Our goal was to delegate the PMARs to a different team member who could then *delegate up* to the physician as needed. Our current state analysis revealed wide variation in workflow and

FIGURE 4

Trends in Patient Calls and Patient Medical Advice Requests

This chart shows the unique in-basket (IB) messages received by primary care physicians adjusted by clinical full-time equivalent (FTE) by message type and quarter. The data are associated with 21 locations and approximately 160 FTE primary care physicians. Of note, patient medical advice request and patient telephone calls both increased starting in July 2020 (quarter 3 [Q3]) and plateaued over 2022. The rise represents both patient utilization of the portal and an increase in patient queries (call or email) for medical advice and triage. In correspondence with ambulatory primary care groups, we have learned of similar trends.



Blue = patient calls (in thousands), gold = patient medical advice requests (in thousands), total, in millions.

Source: The authors from the Atrius Health dashboard

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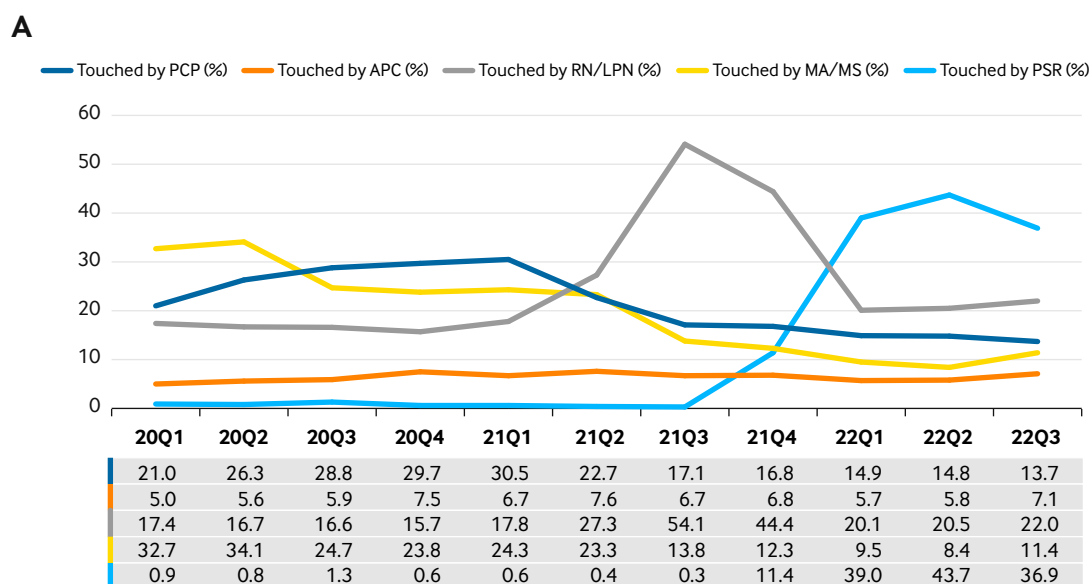
team responsibility across our adult primary care practice; to determine the optimal team member to be the first recipient, we compared nurses (registered nurses) and PSRs. We found that PSR workflows were equal to or superior in sustaining a reduction of about 40% of PMAR messages going to the physicians. Beyond volume reduction for PCP in-baskets, we chose metrics including TAT, percentage of messages converted to appointments, patient experience, and physician experience. We have been spreading this model across our adult primary care sites since late 2022 (Figure 5), with a goal to complete by the end of 2023.

“This requires teamwork and trust, with the primary care physician and the advanced practice clinician determining the optimal way to share an in-basket. We are purposeful in transitioning from ‘cover my in-basket’ to ‘share our in-basket.’”

FIGURE 5

Percentage of In-Basket Messages Touched by and Resolved by Care Team Members by Quarter in 2020–2022

(A) Percentage of in-basket messages touched by a care team member. We see the frequency of team members touching — but not resolving — a message. This illustrates how patient medical advice request (PMAR) messages are often handled by multiple team members, sometimes two or three team members working on one message. Our intervention in quarter 3 (Q3) 2021 shows the change in frequency by staff, initially relying heavily on nurses (registered nurse [RN]/licensed practical nurse [LPN]) to assume the first touch. When we shifted from nurses to patient service representatives (PSRs) for the first touch, we continued our reduced primary care physician (PCP) percentage of touch (from 30.5% in 2021 Q1 down to 13.7% in 2022 Q3). This shows that secretarial-level staff can effectively reduce PCP work in PMAR messages. (B) Percentage of in-basket messages resolved by a care team member. We see the changing frequency of who completed or resolved the message (locally referred to as *donned*). With our intervention, PSRs went from resolving 0.2% of PMAR messages to 24.7%. When we changed our approach from RN/LPN being the first touch to the PSR in 2022 Q1, the crossing lines (gray and light blue, respectively) show the shifting responsibility. Importantly, the shift did not disrupt the trend line for the reduction of PCP-resolved messages, from a high of 26.1% in 2021 Q1 to 11.7% in 2022 Q3. Dark blue indicates touched/resolved by a PCP, orange indicates touched/resolved by an advanced practice clinician (APC), gray indicates touched/resolved by an RN/LPN, yellow indicates touched/resolved by a medical assistant/medical secretary (MA/MS), and light blue indicates touched/resolved by a PSR.



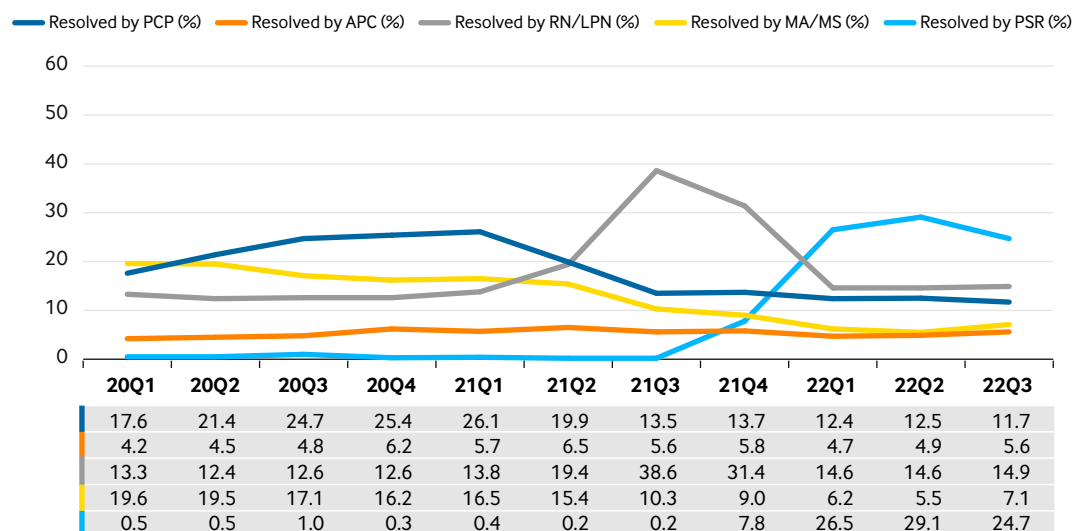
5. Measure Impact of Each Intervention

We measured the volume of in-basket reduction within each message type (Table 1) and tracked our ability to sustain these improvements over time (Figure 2, Figure 3, Figure 4, Figure 5,

FIGURE 5

Percentage of In-Basket Messages Touched by and Resolved by Care Team Members by Quarter in 2020–2022: Continued

B



Source: The authors

NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

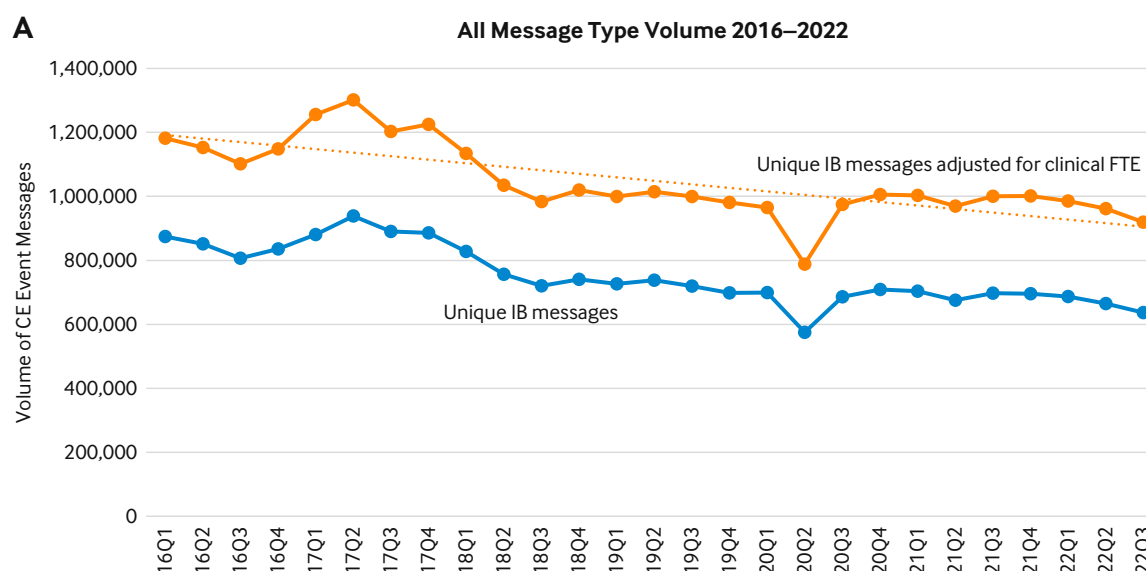
and Figure 6). We have learned that measurement of in-basket work is not simple. A variety of methods can measure message volume, but not all messages carry equal weight in work burden. Some messages touch multiple team members; defining who completes the task or how much work each member contributes is murky. One needs to identify what is sent to the PCP but diverted to a staff member in-basket versus PCP in-basket. In addition, some measurement systems within our EHR changed over time, breaking continuity of our metrics. Epic-generated measurements changed the denominator after 2017, for example, affecting our ability to translate their data to PCP work hours.

We have created homegrown tools more recently to assess volume changes, but these measurements are affected by a variety of factors. For example, we changed the message type for prescription refills to standardize all requests to one message type. Before this, requests might fall into a *staff message* request (general message type meant for issues not related to specific patients) rather than *refill request*. The change in organizational use of a message type affected our measurements over time. We know that physicians possess varied skills in managing a large queue of work, and comparing work effort requires more nuance than volume or Epic-generated clinical time metrics can provide. Time per message is difficult to measure but is critical to understanding the work demands of PCPs. Importantly, EHR measurements of *time in in-basket* only include the in-basket activity; they exclude chart review, telephone call, staff-to-staff coordination, documentation, and other activities necessary to complete the

FIGURE 6

Trends in Message Volume

(A) Trends in total message volume (all types) from 2016 to 2022. We see the total volume of in-basket (IB) messages for primary care physicians (PCPs) in internal medicine/family medicine from 2016 to 2022 quarter 3 (Q3). The interventions in 2017–2019 (elimination and automation) showed a reduction of total volume and volume normed to clinical full-time equivalent (FTE). The Covid-19 pandemic caused a sharp and temporary drop in total message volume in 2020 Q2. By 2022, the resumption of the trend downward reflects laboratory automation and patient medical advice request (PMAR) interventions. (B) Trends in total message volume (all types excluding PMARs) from 2016 to 2022. We see a downward trend as in panel A, but with a steeper slope of declining total message volume. The PMAR volume increased over this time period mitigated our total message volume reduction. The adjustment for clinical FTE is calculated based on the FTE of the PCP at the time of data collection (in aggregate, the average Atrius Health PCP FTE is approximately 0.7). We often normalize our data to 1.0 FTE to see if a trend in volume is true if all PCPs are the same FTE (1.0) as FTE is not a precise correlation to workload (panel size, patient acuity, and productivity rate impact workload).



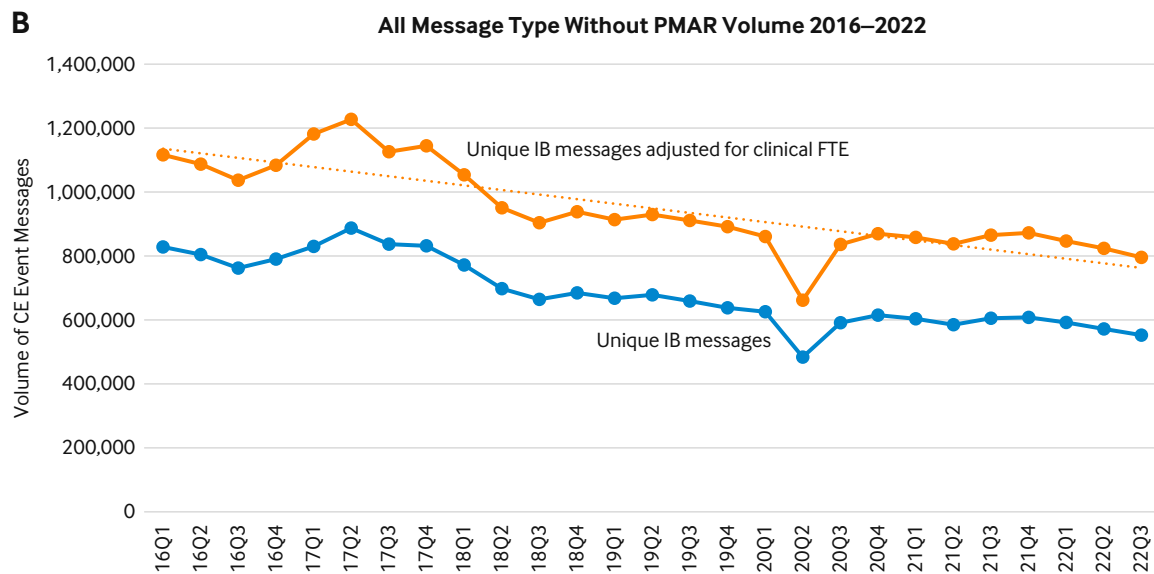
in-basket task. Advancing shared tools of in-basket measurement will benefit all organizations undertaking this work as message volume trends evolve (Figure 6).

Collaboration and Accountability

Collaboration is a key strategy necessary to achieve our goals. Even with robust programing to reduce in-basket volume, the health care environment continues to generate more information flow and traffic. Collaboration is sharing accountability for tasks between two or more team members, and we have implemented this in two ways: one directly at the clinician level and one at the departmental level.

FIGURE 6

Trends in Message Volume: Continued



CE = care everywhere.

Source: The authors

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APC Teaming Model

To provide great access to the team and manage the total needs of the primary care panel, we are implementing a teaming model of matching each PCP to an APC. Together, they care for our panels of 2,500 patients as a dedicated team. In this new model, the expectations are of shared accountability for managing the panel and the in-basket. This requires teamwork and trust, with the PCP and the APC determining the optimal way to share an in-basket. We are purposeful in transitioning from “cover my in-basket” to “share our in-basket.” We believe this will provide greater continuity of care for the APC, who historically managed overflow needs — acute and chronic patient care needs from a myriad of PCPs in their practice. With continuity comes greater joy and ease of patient care. Until there are technical solutions to create a singular in-basket, meaning a single in-basket for the PCP and APC to receive and manage their shared patient panel clinical information, we depend on our local teams to endorse PCP and APC “covering” each other’s in-baskets.

“

We have reached a sustained average of 30% result notification reduction across our primary care physician service line — about 10 per day per clinician in 2022 from 15 per day in 2019.”

In 2021, we created a new Clinical Coverage Department to provide flexible support to the IM/FM primary care practices that are experiencing physician shortages because of departures, leaves of absence, and overpaneled practices. The department covers both visit access gaps and in-basket coverage. For the in-basket, the Clinical Coverage Department team can cover for extended absences to reduce the cross-coverage burden on the practice. They also give episodic help to struggling physicians who are falling behind and need relief to catch up, improve their efficiency skills, and employ systems to reduce the strain. This department is led by its own medical director and staffed by experienced retired PCPs and APCs who work solely in the department and have the clinical and technical skills to assist with an in-basket and provide meaningful help. Several struggling PCPs successfully emerged from in-basket coverage with additional skills and support. Our sites have reduced strain from extended physician leaves that affect the entire team.

Limitations and Reflections

An important consideration in this work has been the impact on our ultimate goal — improving PCP burnout through the reduction of in-basket work burden. We monitor clinician burnout through annual clinician wellness surveys run through our Professional Affairs Department. IM/FM clinician burnout has been reduced from 50% in 2018 to 45% in 2022. Although temporally associated, we cannot claim causation as many other factors have been used to improve burnout across the organization and within adult primary care (leadership training, resiliency retreats, augmented teaming, and access to scribes, among other initiatives). Safety, patient experience, and patient outcomes are routinely monitored throughout the organization, and we leverage those systems, as noted above, to ensure that our initiatives are not causing adverse outcomes.

Limitations are important to consider as well. The changes in data sources over time are reflective of a multiyear project that has spanned almost 6 years. Correlation of volume change to time in the in-basket cannot be made with current tools as we do not have an accurate accounting of the actual time to manage all in-basket messages. We recognize that we took away the low-impact messages (e.g., normal laboratory results, media manager) in our initial work, leaving PCPs with the experience of an in-basket that now has a greater proportion of high-impact messages (e.g., nondelegable medications or PMAR). Organizational resources affected the cadence of our multiyear initiative, with necessary pauses when IT, operations, and clinician leadership needed to focus on other priorities. Finally, there were external forces affecting the volume of messages flowing to primary care, most importantly the Covid-19 pandemic. We experienced a significant increase in patients seeking medical advice via the portal. Across the United States, patients have become more comfortable using portals to interact with their PCTs. We also worked to address preventive care needs that had lapsed during the pandemic, thus increasing clinical activity and information.

Looking Ahead

Our work shows that in-basket message volume reduction can be achieved. By performing a detailed analysis of each category of in-basket message and employing a multistakeholder approach to eliminating, delegating, automating, and collaborating around in-basket work, we

were able to reduce the total volume of in-basket messages for our PCPs by 25%. The national trend of increasing patient portal queries affected our outcomes; if we exclude PMARs, we would have decreased the in-basket volume by 29%. Continued investment in reducing in-basket volume and work burden is critical for primary care.

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