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Supplementary Information for

When peer comparison information harms physician well-being

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SI References

Supplementary Text Table of Contents

1. HM Completion Rate and UCLA Patient Attribution Model Details

<u>HM Completion Rate Details</u>

PCPs' Health Maintenance (HM) completion rate equals the total completed primary care clinical quality measures divided by the total number of open clinical quality measure opportunities within their patient panel. There are a total of 26 clinical quality measures (focus and complementary measures) tracked by the UCLA Department of Medicine's (DOM) Quality Team. The measures are based on the recommendations of the United States Preventive Services Taskforce (1). The HM completion rate is used, in conjunction with other measures (e.g., productivity, patient satisfaction), to determine each PCP's incentive compensation.

Focus measures:
Breast Cancer Screening: Mammogram
Cervical Cancer Screening
Colorectal Cancer Screening
Diabetic Eye Exams
Diabetic Foot Exams
Diabetes HbA1c Testing
Diabetes Nephropathy Testing
Chlamydia Screening (Med-Peds/FM only*)
HPV Immunization (Med-Peds/FM only*)

Complementary measures:
Abdominal Aortic Aneurysm (AAA) Screening
Annual Preventive Wellness Visit
Diabetes: Pneumococcal Vaccine
DTaP/Tdap/Td Vaccine
Complete Hepatitis A Vaccines
Hepatitis B Vaccines
Hepatitis C Screening
HIV Screening
IPV Vaccines
Meningococcal Vaccine (MCV4)
MMR Vaccines
Osteoporosis Early Detection DEXA Scan
Pneumococcal Vaccine
Shingles (Shingrix) Vaccine
Statin prescribed for ASCVD Prevention or Treatment
Tdap During Pregnancy (If > 28 Weeks)
Tdap/Td Vaccine
*Note: Med-Peds refers to Internal Medicine-Pediatrics. FM refers to Family Medicine.

<u>UCLA Health Primary Care Patient Attribution Model Details</u>

The UCLA Health Primary Care Patient Attribution Model is the methodology used to designate patients to each PCP's patient panel. The attribution model is detailed below:

● If a patient has seen the PCP listed in UCLA's electronic health record (Epic Systems ©1979) in the prior 3 years, the patient is attributed to that provider.
● If the patient has not seen the PCP listed in the electronic health record in the prior 3 years or if the electronic health record's PCP field is blank or if the provider listed in the CareConnect PCP field is a UCLA specialist, then the patient's visit history over the prior 3 years is reviewed and the UCLA PCP is attributed as follows:

> 1) The UCLA PCP with a preventive/wellness visit in the prior 1 year is attributed first
> 2) If there is no preventive/wellness visit in the prior 1 year, the UCLA PCP with the highest volume of visits is attributed
> 3) If there is a tie in either the preventive/wellness visit or volume of visit scenario, the UCLA PCP with the most recent visit is attributed.

2. Inclusion Criteria, Randomization Algorithm, and Pre-registration Details

Physician Inclusion Criteria

PCPs were included in the experiment if they satisfied the following criteria at the beginning of the intervention period (i.e., in October 2019):

1) They were part of the UCLA Health DOM primary care network
2) They were a Board-certified Internal Medicine, Geriatrics, Internal Medicine-Pediatrics, and/or Family Medicine physician
3) They had a clinical full-time employment (FTE) level of at least 50% (for reference, 100% FTE is equivalent to 40 hours of clinical work per week)
4) They were eligible for a quarterly primary care quality incentive based on meeting DOM's productivity threshold, and
5) They had a panel size of over 50 patients.

PCPs included in our experiment accounted for 83% of all regularly working PCPs (i.e., with at least 50% FTE) in the UCLA Health DOM network.

Randomization Algorithm

Randomization was performed at the clinic level, using a 1:1:1 allocation ratio. Clinics were stratified by UCLA clinic group (DOM vs. CPN/EIMG). For reference, DOM refers to the Department of Medicine clinic group; and CPN/EIMG stands for Community Physician Network/Entertainment Industry Medical Group, and it is treated as a single clinic group by UCLA Health. A covariate-constrained randomization procedure (2) was used to randomize clinics within UCLA clinic groups. This involved 1) generating 100,000 random allocations, 2) computing a balance score for each allocation, and 3) randomly drawing one from the 1,000 most balanced allocations as our implemented allocation. Factors incorporated into the balance score were 1) total clinical FTE, and 2) clinic-level baseline HM completion rates. Since clinics were being randomized between 3 arms, we used one-way ANOVA F-statistics (evaluating differences in each factor across arms) to measure imbalance, and then computed a balance score by summing the F-statistics for the two factors. Randomization was performed using r.

Pre-Registration Details

The pre-registration document can be found on Clinicaltrials.gov (ClinicalTrials.gov Identifier: NCT04237883).

Our pre-registration was submitted after the experiment started because we had to launch at a specific date based on external deadlines set by UCLA Health before we were able to put together a detailed analysis plan. Importantly, we did not have access to data from the experimental period prior to our pre-registration submission.

3. Sample Characteristics

Table S1. Sample Characteristics

	Condition 1	Condition 2	Condition 3
	Control	Peer Comparison	Peer Comparison and Leadership Training
Clinic Characteristics	(N=14)	(N=14)	(N=14)
Clinical Full Time Employment (FTE)	4.31	4.33	4.43
Baseline HM Completion Rate	0.52	0.52	0.54
CPN/EIMG, n (%)	8 (57%)	7 (50%)	7 (50%)
Physician Characteristics	(N=65)	(N=64)	(N=70)
Gender, n (%)			
Male	27 (42%)	22 (34%)	27 (39%)
Female	33 (51%)	35 (55%)	30 (43%)
Unknown	5 (8%)	7 (11%)	13 (19%)
Race, n (%)			
White	30 (46%)	29 (45%)	33 (47%)
Black	1 (2%)	2 (3%)	0
Asian	20 (31%)	16 (25%)	16 (23%)
Native Hawaiian/Pacific Islander	0	0	2 (3%)
Other	6 (9%)	4 (6%)	3 (4%)
Multiple	1 (2%)	0	2 (3%)
Unknown	7 (11%)	13 (20%)	14 (20%)
Patient Panel Size, Mean (SD)	1507 (808)	1427 (812)	1501 (762)
Years at UCLA, Mean (SD)	7.0 (6.5)	6.2 (6.1)	4.7 (3.6)
Baseline Job Satisfaction* (October 2019), Mean (SD)	5.27 (1.03)	5.40 (1.17)	5.54 (1.26)
Baseline Burnout* (October 2019), Mean (SD)	2.13 (0.72)	2.44 (0.90)	2.37 (1.00)
Patient Characteristics	(N=16,425)	(N=14,781)	(N=15,425)
Age (in years) at Visit, Mean (SD)	53.4 (16.6)	52.5 (17.4)	52.8 (16.8)
Gender, n (%)			
Female	11,938 (72.7%)	10,951 (74.1%)	11,125 (72.1%)
Male	4,487 (27.3%)	3,830 (25.9%)	4,300 (27.9%)
Baseline HM Completion Rate, Mean (SD)	0.28 (0.30)	0.29 (0.30)	0.27 (0.30)

Note: This table displays clinic, physician, and patient-level characteristics across the three study conditions. *An F-test of joint significance confirms that the conditions were balanced during the baseline period in job satisfaction ($p = 0.432$) and burnout ($p = 0.134$).

4. Monthly Performance Feedback Email Details

In all conditions, PCPs received monthly emails from the DOM Quality Team informing them of their HM completion rate over the prior three months, the focus measure on which they had performed the best, and the two focus measures on which they had performed the worst. All emails contained links to: 1) a dashboard showing their performance on all nine focus measures, 2) a document that was updated monthly with tips and guidance for improving performance on focus measures, and 3) a document containing frequently asked questions about the DOM's pay-for-performance program. See below for email examples, images of these resources, and engagement statistics including email open rates. Emails were sent near the beginning of each month. A maximum of two reminder emails, which were identical to the initial email, were sent to those who had not opened the initial email after 7 and 14 days, respectively.

Monthly Performance Feedback Email (Condition 1)

This is an example template of monthly performance feedback emails for physicians in Condition 1 of our field experiment. Text within brackets (<<text>>) was personalized for each physician. The email contained the following hyperlinks (see Section 5 for examples): FAQ sheet regarding the PCCE Program, Tableau Dashboard which provided a detailed breakdown of the physician's quality measure performance, and a PDF of the monthly Best Practices document for both the current month and the previous months.

[Test] Dr. << Test Last Name >>, Your Current Performance (Jan 2020 Quality Update)

UCLA Health

Primary Care Practices | Jan 2020

Beverly Hills	Malibu	Santa Monica
Brentwood	Manhattan Beach	Simi Valley
Burbank	Marina Del Rey	Thousand Oaks
Calabasas	Pacific Palisades	Torrance
Century City	Palos Verdes	Ventura
Culver City	Pasadena	Westlake Village
Downtown LA	Porter Ranch	West Los Angeles
Encino	Redondo Beach	Westwood
Hollywood	Santa Clarita	Woodland Hills

Dear Dr. << Test Last Name >>,

Thank you for your hard work and dedication to high-quality patient care. To support your ongoing efforts, each month, the Department will provide personalized feedback on your Health Maintenance (HM) completion rate and best practice tips.

Dr. << Test Last Name >>, Your Monthly HM Performance
Your health maintenance completion rate for patients seen over the past three months is **<< Test HM Completion >>%**.

You are doing best at addressing <u><< Test Strength >></u>, and you can improve most by addressing <u><< Test Improve1 >></u> and <u><< Test Improve2 >></u>.

We are excited to celebrate everyone's success and grow as a community. Closing health maintenance care gaps is a key part of high-quality primary care and represents the foundation of the *Clinical Quality* domain within the Primary Care Clinical Excellence (PCCE) << Test Incentive/Bonus >> Program (see FAQs).

You can track your progress and that of your colleagues using the **PCCE dashboard**.

Access the PCCE Dashboard

Check out PCCE Best Practices, **Jan 2020 Edition,** from our top-performing physicians and clinics. You can access previous editions here.

Download Best Practices

The Department and Quality team are dedicated to working with you to build the best system of care for our patients, providers, and staff.

Sincerely,

Maria A. Han, MD, MS
Chief Quality Officer, Department of Medicine, UCLA Health

Mark S. Grossman, MD, MBA, FAAP, FACP
Vice Chair, Department of Medicine, UCLA Health Primary Care Networks

<u>Monthly Performance Feedback Email with Peer Comparison Information (Conditions 2 & 3)</u>

This is an example template of monthly performance feedback and peer comparison emails for physicians in Conditions 2 and 3 of our field experiment. All the hyperlinks in Conditions 2 and 3 emails were the same as those in Control 1 emails. Also, the email layout and design (including style, length, and non-experimental content) were crafted to be as similar as possible between these two conditions and Condition 1.
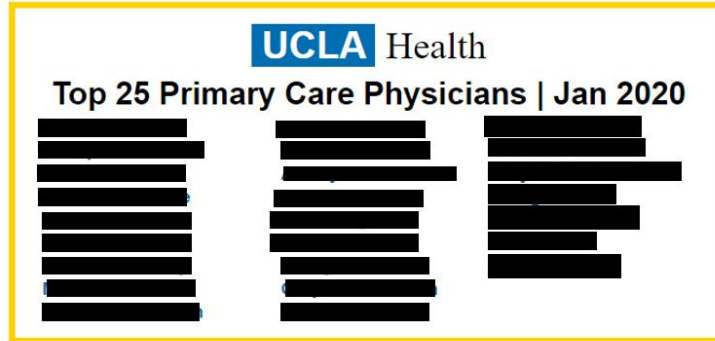
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Top 25 Primary Care Physicians | Jan 2020

Dear Dr. << Test Last Name >>,

Thank you for your hard work and dedication to high-quality patient care. To support your ongoing efforts, each month, the Department will provide personalized feedback on your Health Maintenance (HM) completion rate and best practice tips. We will also congratulate our growing group of **High Performers** who achieve at least **65%** HM completion rates and our monthly **Top 25 Primary Care Physicians.** This month's Top 25 achieved an HM completion rate of over **76%!**

Dr. << Test Last Name >>, Your Monthly HM Performance
Your health maintenance completion rate for patients seen over the past three months is **<< Test HM Completion >>%**. << Test PersonalizedMessage1 >>

You are doing best at addressing << Test Strength >><< Test PersonalizedMessage2 >> << Test Improve1 >> and << Test Improve2 >>.

We are excited to celebrate everyone's success and grow as a community. Closing health maintenance care gaps is a key part of high-quality primary care and represents the foundation of the *Clinical Quality* domain within the Primary Care Clinical Excellence (PCCE) << Test Incentive/Bonus >> Program (see FAQs).

You can track your progress and that of your colleagues using the **PCCE dashboard**.

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Download Best Practices

The Department and Quality team are dedicated to working with you to build the best system of care for our patients, providers, and staff.

Sincerely,

Maria A. Han, MD, MS
Chief Quality Officer, Department of Medicine, UCLA Health

Mark S. Grossman, MD, MBA, FAAP, FACP
Vice Chair, Department of Medicine, UCLA Health Primary Care Networks

The following information was displayed in the emails in Conditions 2 and 3.

- At the top of the email, the names of the Top 25 PCPs were listed in a banner. This list was updated each month.
- The first paragraph included a high performer benchmark (65% completion rate). This benchmark was held constant during the study period.
- A personalized message notified PCPs about how they compared to other physicians. Physicians were classified into one of four performance tiers, and the personalized message varied depending on their classification. The subject line also varied depending on their classification. Below we provide more information on the four performance tiers:

  - **Top 25 Performer:** Participants were labelled a "Top 25 Primary Care Physician" in a given month if their 90-day HM completion rates were among the top 25 scores across all three study conditions. The email subject line and the email body congratulated them on being a Top 25 PCP.

  - **High Performer:** Participants who achieved a 90-day HM completion rate of 65% or higher, but were not among the Top 25, were labelled as a "High Performer". A 65% threshold was chosen for the High Performer threshold to be above the median HM completion rate. At baseline, the 65% threshold corresponded with the 59th percentile across all PCPs in our study. The email subject line and the email body congratulated them on being a High Performer and encouraged them to become a Top 25 performer.

  - **Almost High Performer:** Participants with a 90-day HM completion rate between 55% and 65% were labelled "Almost a High Performer". At baseline, 55% and 65% HM completion rates corresponded with the 29th percentile and the 59th percentile, respectively. The email subject line and the email body both acknowledged their status as almost being a High Performer and encouraged them to become a High Performer.

  - **Low Performer:** Participants with a 90-day HM completion rate lower than 55% were internally classified as "Low Performers". However, to avoid offending these physicians, this negative label was not mentioned in the emails. Their email subject line was instead worded, "Your Current Performance" and the personalized message in the email body noted that, "The majority of physicians have an HM completion rate of 55% or greater".

Email Distribution Schedule

The emails were distributed monthly, with two reminder emails per month for those who had not yet opened that month's email. Email operations were conducted using Mailchimp©. The date each email was sent out is listed below:

Table S2. Email Distribution Dates

Monthly Email	1st Follow Up Email	2nd Follow Up Email
November 5th, 2019	November 12th, 2019	November 18th, 2019
December 4th, 2019	December 11th, 2019	December 18th, 2019
January 16th, 2020	January 23rd, 2020	January 30th, 2020
February 11th, 2020	February 18th, 2020	February 25th, 2020
March 4th, 2020	March 10th, 2020	March 17th, 2020

5. Monthly Email Materials and Engagement Statistics

<u>FAQ Document</u>

This FAQ document was provided as a reference in each of the monthly emails.

UCLA Health

Primary Care Clinical Excellence

Frequently Asked Questions

1. **What is the UCLA Health Primary Care Clinical Excellence (PCCE) incentive program?**

As part of UCLA Health's commitment to developing a premier, integrated health system built on a foundation of physician-led, team-based primary care, the Department of Medicine (DOM) supports a quality based Primary Care Clinical Excellence (PCCE) incentive program.

The incentive program was developed to highlight the hard work and excellence of UCLA Health primary care physicians. The goals of the program are to improve clinical outcomes for primary care patients, align provider/clinic incentives to deliver high quality care in a team-based model, and recognize primary care physicians for the time spent engaging in health system activities and quality improvement interventions.

2. **How is my PCCE incentive program payment determined?**

Your PCCE incentive payment is determined based on performance in 5 domains: Clinical Quality, Patient Satisfaction, Professional Participation, Office Function, and Risk Coding. Within the domain of Clinical Quality, performance on the following health quality measures will be assessed:

- Breast Cancer Screening
- Cervical Cancer Screening
- Colorectal Cancer Screening
- Diabetes – Eye Exam
- Diabetes – HbA1c Screening
- Diabetes – Foot Exam
- Diabetes – Nephropathy Screening
- Chlamydia Screening (Peds, Med/Peds, and Family Medicine Only)
- HPV Vaccination (Peds, Med/Peds, and Family Medicine Only)

Please note, we recognize that the PCCE incentive program may not address important subtleties to medical management including engaging patients in shared decision making and risk-benefit discussions.

3. **How do I track my overall performance?**

To support your ongoing efforts, the Department will send you an email each month, giving you your health maintenance completion rate and providing best practice tips. This monthly update will also highlight the quality measure you are performing best on (relative to the median benchmark for that particular measure) as well as the two quality measures on which you could improve the most (relative to the median benchmark for these measures). These data are based on patients seen in the past three months.

Image of Dashboard

Below is an example image of the PCCE Dashboard (©Tableau) that physicians saw when they clicked on the dashboard link from their monthly email. The Dashboard breaks down how a physician is performing in each respective quality measure. Table S3 below shows the number of emails and dashboard clicks on a month-to-month basis.
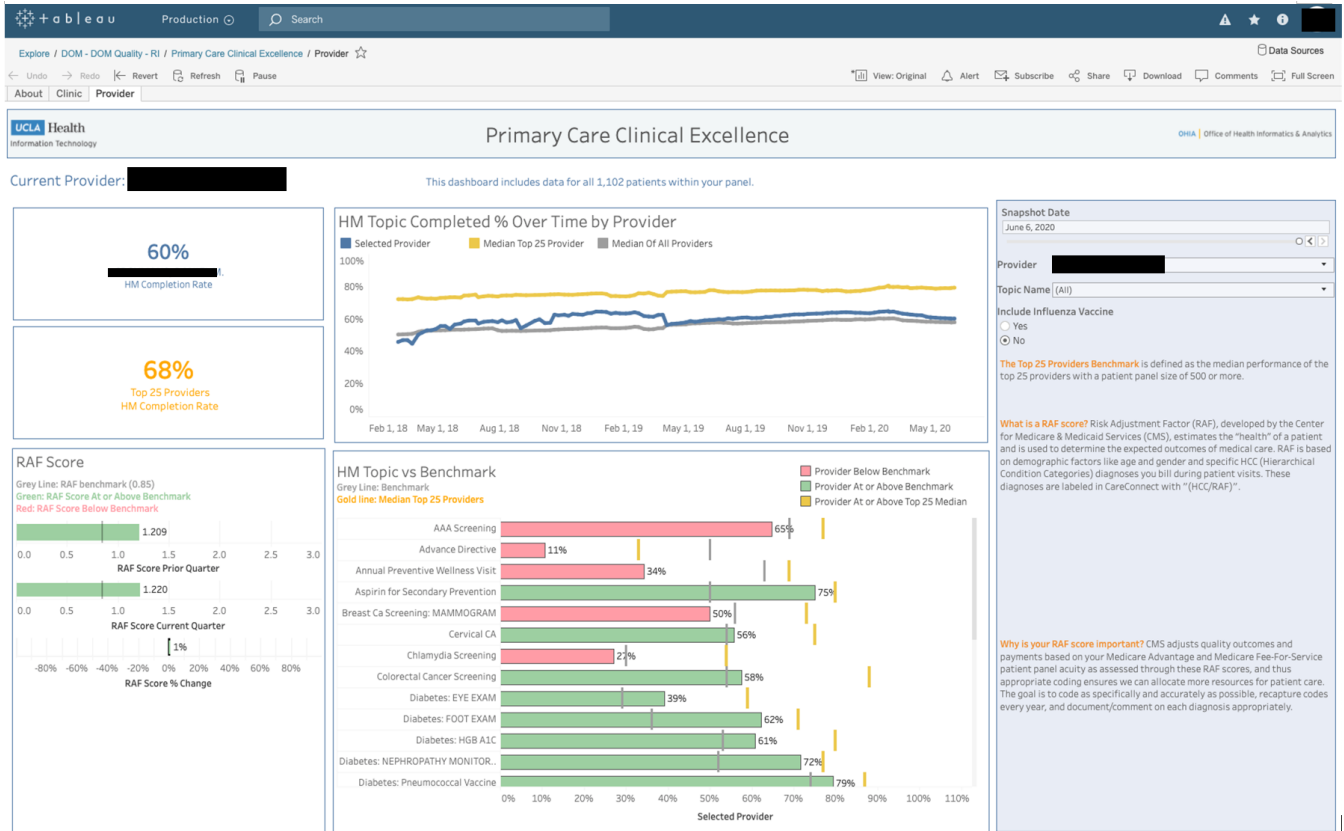

Table S3. Engagement with Intervention Emails

Month	Percentage of Opened Emails Across all Participants	Percentage of Dashboard Links Clicked Across all Participants
November 2019	73.4%	13.6%
December 2019	79.4%	14.1%
January 2020	71.4%	16.1%
February 2020	69.8%	15.1%
March 2020	68.8%	6.5%

Example of Monthly Best Practices Document

The monthly best practices documents were disseminated through the monthly performance emails as a link. These best practices included tips from UCLA physician champions on how to streamline certain orders and improve team-based primary care to ultimately improve HM completion rates. Displayed below is a page taken from the January 2020 Best Practices document.

1 Use the Annual Wellness Visit (AWV) to identify and close care gaps!

- Huddle with the MA or RN before each clinic session and identify patients coming in for the AWV, then review what care gaps need to be closed and divide and conquer!

- Use the Care Gaps SmartSet to quickly close care gaps.

Click for Care Gaps SmartSet

- For a step-by-step guide, please see the Dec. 2019 Best Practices, Tip #2.

Click for Dec. 2019 Best Practices

- Encourage your patients to sign up for MyChart and empower them to ask questions about their health. Ask the MA to help sign them up before they finish the visit!

- Use the dot-phrase [.HMLISTPT] in your note and After Visit Summary for a personalized patient-friendly list of health maintenance items and preventive care gaps.

Health Maintenance Topic	Date Due
Shingles Vaccine (1 of 2)	10/30/2003
Pneumonia (PCV13 and/or PPSV23) Vaccine (2 of 2 - PPSV23)	02/08/2020
Annual Preventive Wellness Visit	02/08/2020
Colon Cancer Screening: Colonoscopy	03/08/2024
Tdap/Td Vaccine (2 - Td)	09/10/2024
Flu Vaccine	Completed
Routine Hepatitis C Screening	Completed
Abdominal Aortic Aneurysm Screening	Completed
Statin prescribed for ASCVD Prevention or Treatment	Completed

Best Practice Tip

Ask patients to sign up for MyChart...[as it] is a good double check because it means a patient will bring up something on their record if it's incorrect. It empowers them to take ownership of their health.

6. Leadership Support Training Intervention Details

<u>Overview</u>

In addition to the standard communication and peer comparison interventions, the physician leads and non-clinical managers in Condition 3 also received leadership training. Note that there were only 11 clinic leads in Condition 3 (and 33 clinic leads in the experiment) because non-clinical managers covered for physician leads in some clinics and some physician leads did not meet the experiment's inclusion criteria (e.g., due to FTE < 50%).

The aim of the leadership training intervention was to provide physician leads and non-clinical managers with the skills needed to foster a collaborative environment at their workplace, improve team-based primary care at their clinic, support their fellow PCPs, and engage their colleagues in a continuous cycle of quality improvement. The workshop curriculum guided them to formulate quality improvement goals for their clinic, design strategies to reach these goals, and disseminate best practices and key takeaways to the other PCPs at their clinic (e.g., core principles of team-based primary care, meaningful use of data to drive quality improvement).

As part of the leadership training intervention, physician leads and non-clinical managers within clinics randomized into Condition 3 attended two workshops on leadership and quality improvement. The two seminars occurred on December 3rd, 2019, and March 10th, 2020, respectively. Following the first workshop, physician leads and non-clinical managers also received additional one-on-one advice (via telephone calls, emails, and in-person meetings) from the DOM Quality Team. These meetings were intended to allow the clinic leadership team to revisit the takeaways from the workshop so they could formulate quality improvement goals and implementation plans to further improve team-based primary care at their clinics. All dyads were encouraged to schedule monthly all-clinic staff meetings to foster a communicative, positive team environment, discuss care gaps, and find strategies to enhance primary care quality.

<u>December 2019 Workshop</u>

The first primary care leadership workshop was designed to help clinic physician leads and non-clinical managers recognize the importance of team-based primary care and encourage them to subsequently collaborate with clinical staff (e.g., front desk staff, nursing staff, other physicians) to more effectively foster team-based primary care within their own clinic. A copy of the workshop agenda can be found below.

- The workshop began by providing attendees a history and background on UCLA DOM's primary care network along with a discussion of the increasingly complex nature of primary care in recent years.
- Participants were then asked to participate in a Plan-Do-Study-Act (PDSA) team-building exercise with those at their table. This exercise (Constructing a Mr. Potato Head) is a quality improvement exercise for team building designed by the Institute for Healthcare Improvement (3).
  - Mr. Potato Head activity (see photo further below): Each team was tasked to try and construct the Mr. Potato Head as quickly as possible. After each timed attempt at constructing Mr. Potato Head, teams were encouraged to debrief with one another to identify what went right and what could be improved before beginning another attempt. Once all teams had made three attempts, the workshop attendees reconvened to debrief each other about the exercise. This was done to highlight the importance of communication and teamwork in complex tasks such as primary care.
- Next, the DOM Quality Team discussed the fundamental tenets of effective team-based primary care. These core tenets include:
  - Defined Purpose
  - Shared Goals
  - Clear Roles
  - Mutual Trust
  - Effective Communication
  - Measurable Processes and Outcomes
- Attendees were then split into groups for a breakout session where they brainstormed how to improve team-based primary care at UCLA Health using these core tenets. Following the brainstorming period, attendees were asked to report their suggestions to the larger group.
- To conclude the session, attendees were told to anticipate in one-on-one Quality Improvement (QI) meetings with the DOM Quality Team in the upcoming months. Additionally, attendees were asked to take 10-15 minutes out of their monthly clinic meetings to have data-driven conversations with their clinic staff. Whether or not these conversations occurred was not formally tracked.

Displayed below is the agenda from the first Primary Care Leadership Workshop which took place in December 2019. Attendees (Condition 3 clinic physician leads and non-clinical managers) learned about UCLA's vision for primary care excellence, participated in team-building exercises, and brainstormed how to utilize best practices from the workshop in order to improve primary care practices at their respective clinics.

UCLA Health

Primary Care Leadership Workshop

Tuesday, December 3, 2019, 7:00 - 9:30 am
Luskin Conference Center, Illumination Room (Level 2)
425 Westwood Plaza, Los Angeles, CA 90095

7:00 am   **Breakfast and Networking**

7:30 am   **Welcome Remarks** by Dr. Alan Fogelman & Dr. Mark Grossman

7:50 am   **Attendee Introductions**

8:00 am   **Leadership Team Exercise with Mr. Potato Head** by Anna Dermenchyan

8:20 am   **Leading Transformation in Primary Care** by Dr. Maria Han

8:30 am   **Innovations in Team-based Primary Care** by Dr. Daniel Croymans

9:20 am   **Summary & Closing Remarks**

Our Goals:

1. Unite local leadership and discuss our shared vision for UCLA Health Primary Care.

2. Identify quality and operational improvements to our model of team-based primary care.

3. Introduce new resources and encourage ongoing feedback to further support primary care leadership efforts.

Mr. Potato Head Teamwork Exercise

As part of the Primary Care Leadership Workshop, attendees participated in a Mr. Potato head exercise in order to learn about Plan-Do-Study-Act cycles while emphasizing the importance of communication. Participants were informed that these skills could be used to experiment with solutions to clinic workflow challenges.

Slide 1: Leading Transformation in Primary Care

Slide 2: Opportunity to Lead Change — Why primary care / Why now / Why you are key

Slide 3: UCLA Health is building an integrated delivery system centered around primary care
Community Hospital / Specialty Care / Primary Care / Virtual Care / Home / Urgent Care/Retail Clinic
Delivering comprehensive, coordinated care where patients work and live
UCLA Health
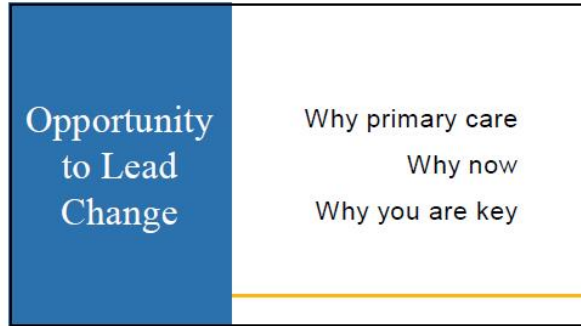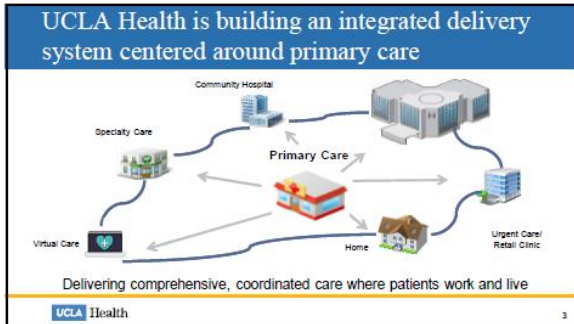
Slide 4: This is a golden moment for primary care…
Patient Demand / Payer Demand / Academic Mission
Our leadership recognizes that primary care is critical to the success of the health system
UCLA Health

Slide 5: What does primary care look like in an integrated delivery system?
1,000,000
UCLA Health

Slide 6: Having strong local leaders in our communities is paramount to our success
UCLA Health Expansion, 2015 to 2018
Central leaders can't begin to have the impact in your clinics that you can
UCLA Health

19
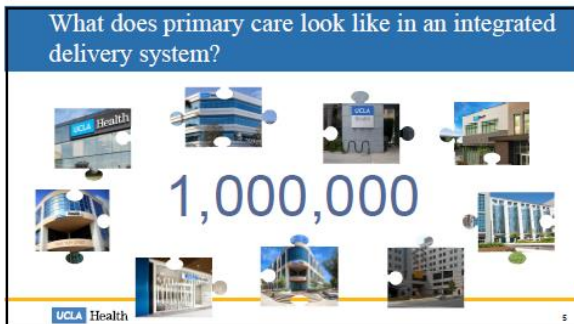
Local leaders act as a conduit between DOM senior leadership and care teams

- You know your patients, teams, and communities
- You have trusted relationships with your colleagues and staff
- You are the critical link between DOM leadership and care teams
- Uniquely positioned to provide insight, share information, and convey messages in both directions

DOM Senior Leadership

Clinic Manager — Physician Lead — Clinic Manager — Physician Lead

Clinical Team   Clinical Team

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7

Local clinical-operational leadership dyads support integrated care delivery

- Equal partnership between a clinical leader and an operational leader
- Complementary skills and strengths
- A highly functioning dyad makes decisions, sets priorities, and holds the team accountable together

"Leadership Dyad"

Clinic Manager — Physician Lead

Clinical Team

- **Ideally brings together the best in clinical thinking with the best in operational thinking for the best in patient care**

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8

The leadership dyad works together to optimize care team functioning

Physician Lead   **Clinic Manager**

Clinical Expertise

Care Team Optimization

Operational Expertise

Delivering high quality care ultimately comes down to how the care team works together

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9

Optimizing care teams to deliver primary care

We've made great strides in developing care teams, but still room to learn from one another and fine tune how we're delivering care.

- How do we best deliver team based primary care?
- What do *you* need to lead team based primary care?

Invite you to take advantage of this golden moment...

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10

Slide 1

Innovations in Team-based Primary Care
Breakout Session

Daniel Croymans, MD MBA MS

UCLA Health

1

Slide 2

Primary Care Feedback calls for team-based care

- Thank you for participating in improving quality across primary care settings!
- Feedback received from in-person visits and surveys have the following key themes:
  - **Advancing team-based primary care is the most consistent recommendation for improving quality**
  - Joint staff and faculty meetings allow for information sharing and stronger team work and collaboration
  - Strong clinic leaders who communicate regularly to staff/faculty are key to disseminating information and getting team members engaged
  - Many clinics are interested in piloting improvement efforts in their clinical workflow. This clinic level engagement is critical to becoming a high performing integrated health system
  - CareConnect and Health Maintenance enhancements help improve care

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2

Slide 3

Our Top Performers emphasize importance of effective teamwork in clinic

Primary Care Clinical Excellence **Recognition Program**
- To support a positive and collaborative culture of clinical excellence
- To recognize high performing PCPs and clinics
- To share best practices across our primary care network

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3

Slide 4

Why Team-based Primary Care?

- Provides more effective and efficient care
- Enhances care coordination and population health efforts
- Shares work across the expertise of a variety of team members.
- Increases job satisfaction

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4

Slide 5

How do we practice effective team-based primary care?

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5

Slide 6

Principles of Effective Teamwork
Adapted from NAM and Google

1. Defined Purpose
2. Shared Goals
3. Clear Roles
4. Mutual Trust
5. Effective Communication
6. Measurable Processes and Outcomes

"The whole is greater than the sum of its parts"
- Aristotle

Google

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Aristotle Project, Google: https://rework.withgoogle.com/guides/understanding-team-effectiveness/steps/Introduction/
National Academy of Medicine (NAM), Core Principles & Values of Effective Team-Based Health Care, Oct 2012

6

You are the Experts

- These are just guiding principles.
- You know the work. You know your patients, your team, and your community. You are the experts.

- **Session Goal:** to brainstorm concrete, effective strategies on how we can further enhance teamwork at your clinic and across our primary care network.

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Breakout Session

- Spend 20 min with your table group brainstorming strategies to foster team work at your clinic site
  - Start with assigned principle. Generate as many ideas as possible on post-it notes.
  - Present ideas to group and decide where to place on team's impact vs feasibility matrix.
  - Once principle is examined collectively decide group's 3-5 specific and actionable takeaways.
  - Designate 1 person to report findings back to the larger group.

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8

8

Begin!

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9

9

7 Minutes Left

You should begin synthesizing your 3-5 specific, actionable, takeaways

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Time!

Let's discuss our key takeaways.

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Next Steps : towards leading world class primary care teams

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Slide 13

Our Dyad Leadership is the foundation to effective teamwork

Physician Lead   Clinic Manager

"Bringing together the best in clinical thinking with the best in operational thinking for the best in patient care."

Clinical Expertise — Care Team Optimization — Operational Expertise

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Slide 14

How We Can Help

- Review and implement strategies from today's discussion.
- Provide monthly Quality/Operational updates via email
- Recognize top performers and share best practice tips
- Schedule 1-on-1 clinic meetings w/ DOM Quality Team
- Develop additional primary care leadership workshops

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Slide 15

What You Can Do

- Share regular quality/operational updates during your monthly clinic meetings.
  - Use 10-15 min of monthly meetings to review updates, collect feedback, & identify barriers and facilitators to high quality care.
- Continue to provide your feedback
  - How was the workshop? Let us know how we can help moving forward. What's working and what's not.
- Help us pilot, refine, and share strategies for improvement.

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Slide 16

Stay Tuned – Next Workshop Feb 2020

- Data Driven Primary Care Improvement

- Guest speaker
  - ███████████ M.D., FACP, FAACH
    - Nationally-recognized physician in value based care and data driven improvement.

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Slide 17

Thank you for your time and leadership!

We are dedicated to working with you to build the best system of care for our patients, providers, and staff.

DOMQuality@mednet.ucla.edu

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Slide 18

Please take a moment to complete the evaluation form

Primary Care Leadership Workshop Evaluation Form

We appreciate your help in evaluating this workshop. Please take a few minutes to complete this evaluation. Your comments and suggestion will help us to plan future events.

Please rate:

	Excellent	Good	Fair	Poor
Practical Value of the Workshop				
Topics Discussed				
Workshop Location				
Overall Impression				

1. What did you like most about the workshop?

2. How could the workshop have been improved?

3. What other topics would you like to see in the future?

4. Other thoughts or comments?

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*Note the "Feb 2020" date listed on Slide 16 was tentative. Following the first workshop in December 2019, DOM leadership decided to have the second workshop take place in March 2020.

<u>March 2020 Leadership Training Workshop</u>

The second primary care leadership workshop aimed to continue the conversation about fostering team-based primary care and translating these efforts into practice so as to improve clinical quality measures at a clinic level. Attendees were encouraged to take initiative to improve clinic performance in ways they saw fit for their clinic.

- This second primary care leadership workshop included a guest speaker who is a widely recognized expert in designing and implementing pay-for-performance models in primary care. The central message of this part of the workshop was that successful primary care networks would foster the following:
    - Core values
    - Team-based care
    - Senior management and board buy-in
    - A non-judgmental workspace
- Next, a UCLA DOM member shared an experience about how they track up-to-date information on their patients' health statuses.
- Attendees were then split up for a breakout session. Each table was assigned a clinical quality measure (HbA1c screening, BP control, etc.) and asked to identify current primary care gaps and craft solutions to address them. After brainstorming ideas, each group then reported their findings to the larger group.
- Finally, attendees were reminded to utilize available data and their own clinical experience to identify best practices for their own clinics in order to deliver high quality primary care to their patients.

Attendees were trained on how to guide conversations with their co-workers whereby they could formulate performance/quality improvement goals, design effective strategies to reach these goals, and track their clinic's progress.

Presentation Slides from March 2020 Leadership Training Workshop

Slide 1: UCLA Health — Primary Care Leadership Workshop — Data Driven Primary Care Improvement — Tuesday, March 10, 2020, 7:00 - 10:00 am — Luskin Conference Center, Exploration Room (Level 2), 425 Westwood Plaza, Los Angeles, CA 90095

Slide 2: Building an Integrated Delivery System centered on Primary Care — Delivering comprehensive, coordinated care where patients work and live

Slide 3: Delivery of High Quality Primary Care is Complex — 49 clinics, 300 PCPs, >1500 staff — 380,000 patients — 32 HM topics (once, q6m, q1y, q10y) — 2.3 Million active HM topics

Slide 4: Our Model, Primary Care Clinical Excellence — Multi-pronged approach to quality improvement in primary care delivery — Data & Technology Optimization, Team-Based Care, Shared Leadership, Aligned Incentives — Connecting Quality, Operations, and Finance

Slide 5: Primary Care Clinical Excellence Timeline

Slide 6: Our Health Maintenance Rates Improving! — Your efforts have resulted in: 6,900 more topics closed per month; 10 more patients lives saved from CRC per month; 10 fewer heart attacks and 8 fewer strokes per month*; 4 more diabetics saved from blindness — Combined DOM PCP groups. *After taking statin for 5 years.

Slide 7
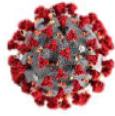
Today's Agenda

7:00 am	Breakfast and Networking
7:30 am	Welcome Remarks by Drs. Daniel Croymans and Mark Grossman
7:40 am	Attendee Introductions
7:50 am	Data-Driven Primary Care Improvement by Dr. Howard Beckman
8:30 am	Break
8:45 am	Innovations in Diabetes Care Management by Dr. Ben Waterman
9:00 am	Breakout Session by Jeff Butler, Anna Dermenchyan, & Drs. Howard Beckman, Daniel Croymans, Maria Han, and Ben Waterman
9:30 am	Report Out by Individual Groups
9:50 am	Summary & Closing Remarks by Dr. Maria Han

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Slide 8

Introduction

Overseeing our COVID-19 testing center go-live

Vi

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Slide 9

Data Driven Primary Care Improvement: A National Perspective

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Slide 10

The Current State of Affairs

10

Slide 11

Objectives
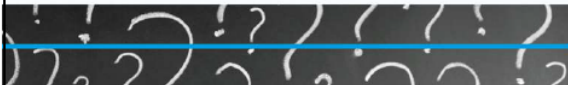
- Explain the components and importance of value based care

- Emphasize the importance of clinic based leadership

- Encourage the use of data to create a meaningful improvement program

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Slide 12

Why a New Approach to Addressing Quality Improvement in Primary Care?

- Emphasis switching to value, effectiveness and efficiency from simply addressing underuse
- Quality is increasingly being defined in terms of reducing overuse, misuse and underuse (IOM)
- Physicians respond to conversations around appropriateness
- One important marker of appropriateness is explaining variation in care: increasingly outcomes rather than process
- **Peer comparison data about measures anchored in evidence of benefit is the most powerful motivator of behavior change**

Beckman H. Ann Intern Med. 2011;154:430

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Slide 13

HBP Episode Cost/BP Control Relationship

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Slide 14
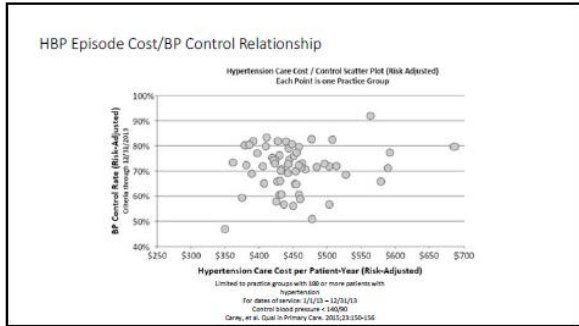
Clinical Learning Communities are Forming

- 1000+ practice sites, nearly 7,000 clinicians, serving all 5 Virginia health planning regions.
- The systems/CINs have been randomized into 3 cohorts.
  - Cohort 1 (Inova/SP and Sentara) begins this month.
  - Cohort 2 (Ballad and Carilion) launches in November.
  - Cohort 3 (VCU and HCA/VCP) launches in March 2020.
- Each health system is establishing a clinical leadership team (CLT).
- Active intervention period for each cohort is 18 months.

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Slide 15

Clinical Learning Community

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Slide 16

What Practitioners Will Want From A Learning Community

| Explicit project goals And core values | Focus on appropriateness and actionability | Major influence in the selection and design of programs, measures and data analyses |

- Accurate Peer Comparison Data about measures anchored in evidence of benefit is the most powerful motivator of behavior change*
- A single network wide report
- Acceptable available attribution model
- Simplicity

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Slide 17

Getting Started: Leadership's Role

17

Slide 18

Getting Started: Senior Leadership's Role

- Publicize the project **and its value** through organizational outlets (avoid surprises and **normalize** the process):
  - Board meetings
  - Committee or Specialty meetings
  - Newsletter
  - Identify Project Champions
  - Praise successes

18
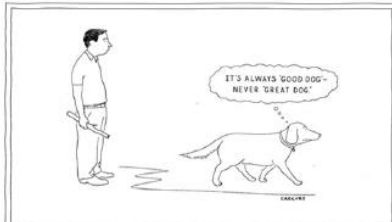
Getting Started:
Leadership's Role (cont'd)

- Clarifying core values
- Providing needed resources
- Announcing the Project Leadership Team
- Avoiding triangulation
- Celebrating success

19

Encouragement, Praise, and Support

20

Does It Work?:
Examples of
Success

21

PRACTICE A
June 2019 High Blood Pressure Registry Report

22

% of HBP Patients with BP Controlled
Ten Practices with Highest % of Low SES Patients

23

Hypertension control has improved across all socioeconomic groups
Finger Lakes nine county region

24

25

26
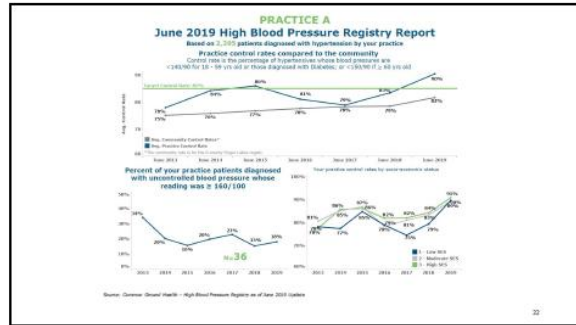
Creating a Successful Program
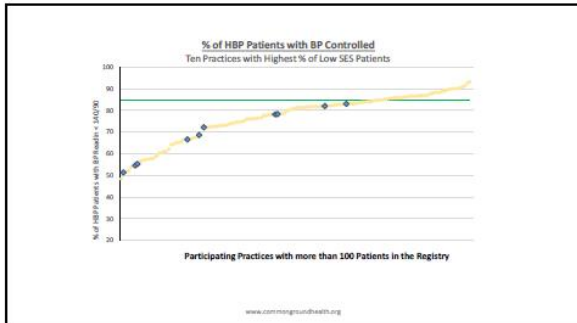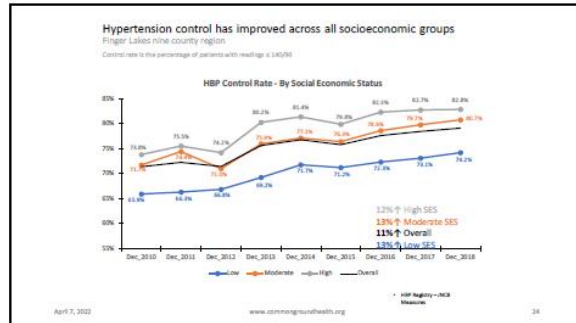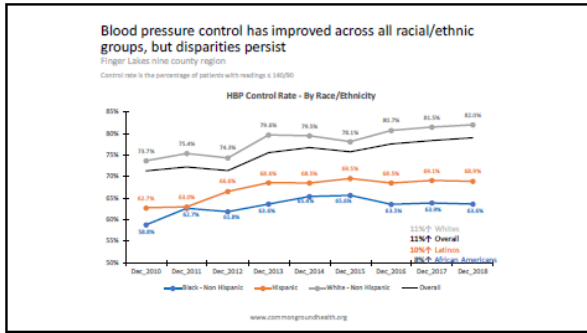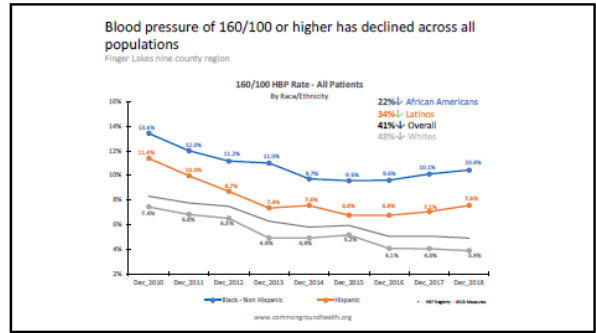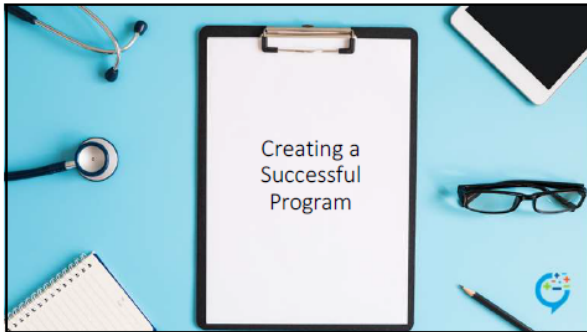
27

Components of a Successful Program: Engaging Physicians in Meaningful Change

1. Secure senior management and board buy-in and resources. Ensure organizational reasons to commit
2. Form an interdisciplinary **team** anchored in the project's **core values** – respect, nonjudgmental and transparency – focus on appropriateness
3. Recruit clinical champions for each project
4. Create accurate, dramatic reports that deliver a clear respectful message (pointing out unnecessary variation)
5. Conduct a non-judgmental conversation that identifies the sources of unnecessary variation

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Components of a Successful Program: Engaging Physicians in Meaningful Change

Cont'd

6. Collaboratively construct a way to address and reduce that unnecessary variation (a quality improvement plan)
7. Offer physicians on-going feedback through a respectful process of sharing data and facilitating improvement
8. Communicate regularly with project team, physicians and key sponsors on program progress and outcomes
9. Use tracking tools to monitor and report interim measures of success, (reaching targets, % improvement, $ savings and ROI)
10. Praise success (ex. Newsletters, bonuses, plaques)!

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Engaging Physicians in Change: All Are Required

Core Values

Interpersonal Process

Leadership

Accurate, meaningful data

Clear, accessible Reporting Tools
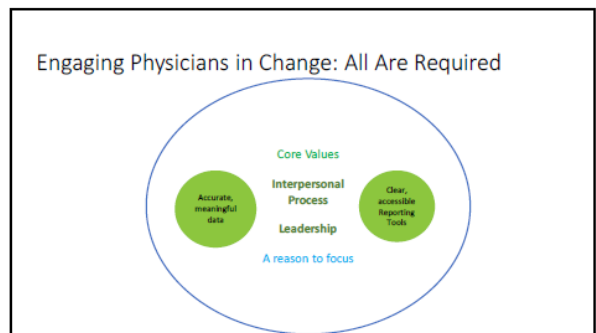
A reason to focus

30

A Reason to Focus

- Reducing overuse and underuse of services?
- Self satisfaction in delivering appropriate care?
- Public/Professional recognition for delivering appropriate care?
- Patient Safety?
- Financial incentives?
- Peer Recognition?
- Reducing the cost of care?
- **What will you promote in your practice?**

Beckman H. Lost in Translation, Ann Intern Med. 2011;154:430

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What Does Clinical Variation Look Like: At What Level to Report?

32

Using Variation Wisely

33

Why So Much Variation?

Basis of Decisions	Number of Decisions*	% of Total
Experience/Anecdote	441	37.1
Arbitrary/Instinct	175	14.7
Trained to do it	173	14.6
General Study	146	12.3
First Principles	146	12.3
Limited Study	61	5.1
Specific Study	34	2.9
Parental Preference	6	0.5
For Research	4	0.3
Avoid a Lawsuit	2	0.2
* Rounded to the nearest integer	1188	100.0

Darst JR, et al. Deciding without Data. Congenital Heart disease. 2010;5:339

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% of HBP Patients with BP Controlled
Dec_2010, Dec_2015 and Dec_2018 Registries
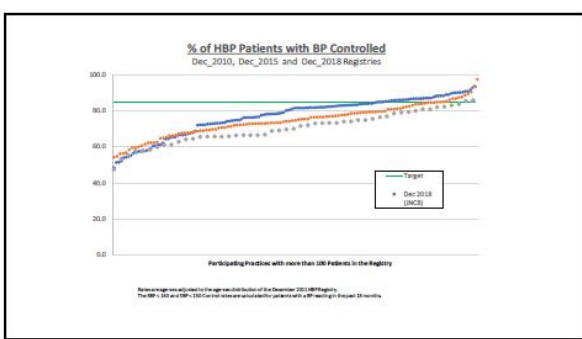
35

The Role of Motivation in Changing Physician Behavior

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Self Determination Theory

- Developed by Ed Deci, Ph.D. and Richard Ryan, Ph.D.
- Proposes that internal motivation trumps external motivation
- Central for working with team members and practitioners
- Defines three areas responsible for internal motivation
  - Competence
  - Autonomy
  - Relatedness
  - In the context of synchronous core values

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Competence

- Asking someone to accomplish something they believe is possible
- The need to feel that one can reliably produce desired outcomes and/or avoid negative outcomes

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Autonomy

- Being given the chance to discover how to solve a problem; encouraged to own the solution
- Autonomy relates to the feeling that one is acting in accord with one's sense of self
- A sense of choosing rather than feeling compelled or controlled

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Relatedness

- Believing one is being asked to be part of a larger task, goal, community (Doing meaningful work)
- Context values – Believing in the team asking for the effort. Feeling that the community involved in the project shares reasons for participating and conducts its work responsibly

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Self-Determination and Motivation

- https://www.youtube.com/watch?v=u6XAPnuFjJc

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Comments? Concerns? Relevance to UCLA Operation?

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Summary

- Meaningful use of data requires clinical leadership, the articulation of core values, an organizational commitment to a culture of improvement and respectful involvement of the practitioner community
- Data is now available to promote improved clinical outcomes and the elimination of low value services
- Higher cost does not correlate with higher quality
- Clinical measurement should focus on appropriateness of care

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References

- Camissa C, Partridge G, Buehrer T, Ardans C, Chapman B, Beckman H. Engaging physicians in change: Results of a safety net quality improvement program to reduce overuse in managing back pain. Am J Med Qual. 2011;26:26-33
- Greene RA, Beckman HB, Mahoney T. Beyond the Efficiency Index: Finding a better way to reduce overuse and increase efficiency in physician care. Health Affairs. 2008;27:w250-w259
- Beckman HB, Mahoney T, Greene RA. Current approaches to improving the value of care: A critical appraisal. December, 2007.
  http://commonwealthfund.org/publications/publications_show.htm?doc_id=607846
- Francis D, Beckman H, Chamberlain J, Partridge G, Kerr J, Greene R. Primary Care Specialty Responses to a Multifaceted Guideline Adherence Program: Do Pediatricians, Internists and Family Physicians Respond Differently. American J Med Qual. 2006;21:134-143.
- Beckman H. Lost in Translation: Physician's struggle with cost-reduction programs. Ann Intern Med. 2011;154:430-433
- Beckman H, Suchman AL, Curtin K, Greene RA. Physician reactions to quantitative individual Performance reports. Am J Med Qual. 21:192-199, 2006.

44

References

- Deci EL, Flaste R. Why we do what we do: Understanding self-motivation. Penguin Books. 1995. New York, NY.
- Pink DH. Drive: The Surprising truth about what motivates us. Riverhead Books. 2009. New York, NY
  http://www.youtube.com/watch?v=u6XAPnuFjJc
- Williams, G. C., Niemiec, C. P., Patrick, H., Ryan, R. M., Deci, E. L. (2009). The importance of supporting autonomy and perceived competence in facilitating long-term tobacco abstinence. Ann Behavioral Med, 37, 315-324.
- Williams, G. C., McGregor, H. A., Sharp, D., Kouides, R. W., Levesque, C. S., Ryan, R. M., Deci, E. L. (2006). A self-determination multiple risk intervention trial to improve smokers' health. Journal of General Internal Medicine, 21, 1288-1294.
- Williams, G. C., & Deci, E. L. (2001). Activating patients for smoking cessation through physician autonomy support. Medical Care, 39, 813-823.
- Williams, G. C., Wiener, M. W., Markakis, K. M., Reeve, J., Deci, E. L. (1994). Medical student motivation for internal medicine. Journal of General Internal Medicine, 9, 327-333.

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References

- Carey VA, Casey MR, Partridge GH, Beckman HB, Mahoney T. Cost and quality in hypertension care: Observations from a quality improvement primary care initiative. Qual in Primary Care. 2015;23:150-156
- Beckman H, Healey P, Safran D. Improving Partnerships between Health Plans and Medical Groups. Am J Manag Care. 2015;11:294-297
- Castano C, Love M, van Duren M, Shapiro L, Clarke R, Beckman H. Working in Concert: A How-to-Guide to Reducing Unwarranted Variations in Care. California Healthcare Foundation. http://www.chcf.org/publications/2014/09/working-in-concert-reducing-variations. September, 2014
- Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. Journal of Organizational Behavior, 26, 331-362.
- DeVoe, S. E., & Pfeffer, J. (2010). The stingy hour: How accounting for time affects volunteering. Personality and Social Psychology Bulletin, 36, 470-483.
- Meyer, J. P., & Gagné, M. (2008). Employee engagement from a self-determination theory perspective. Industrial and Organizational Psychology, 1, 60-62.

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7. Quarterly Survey Materials, Schedule, and Completion Rates

Quarterly Survey Questions

The questions from the quarterly survey are displayed below (excluding the questions that measured physicians' self-reported attendance at professional activities and committees). See questions 8, 15, and 16 for our measures of perceived leadership support, job satisfaction, and burnout, respectively. Note that CareConnect is the name of UCLA Health's Electronic Health Record system (Epic Systems, ©1979).

1. The degree to which my care team works efficiently together is: (4)
   ● Poor
   ● Marginal
   ● Satisfactory
   ● Good
   ● Optimal

2. My proficiency with using CareConnect is: (4)
   ● Poor
   ● Marginal
   ● Satisfactory
   ● Good
   ● Optimal

3. I have frequent opportunities to make improvements at my clinic. (5)
   ● Strongly Disagree
   ● Disagree
   ● Neither Agree Nor Disagree
   ● Agree
   ● Strongly Agree

4. I am involved in deciding on changes that affect my work and care team. (5)
   ● Strongly Disagree
   ● Disagree
   ● Neither Agree Nor Disagree
   ● Agree
   ● Strongly Agree

5. I have adequate performance feedback and best practice guidelines to help me provide high quality care.
   ● Strongly Disagree
   ● Disagree
   ● Neither Agree Nor Disagree
   ● Agree
   ● Strongly Agree

6. I am confident in my ability to use performance feedback and best practice guidelines to help me provide high quality care.
   ● Strongly Disagree
   ● Disagree
   ● Neither Agree Nor Disagree
   ● Agree
   ● Strongly Agree

7. I feel supported, understood, and valued by my *work colleagues*. (6)
   ● Strongly Disagree

- Disagree
- Neither Agree Nor Disagree
- Agree
- Strongly Agree

8. I feel supported, understood, and valued by my *department leaders*. (6)
- Strongly Disagree
- Disagree
- Neither Agree Nor Disagree
- Agree
- Strongly Agree

Most people compare themselves from time to time with others. For example, they may compare the way they feel, their opinions, their abilities, and/or their situation with those of other people. There is nothing particularly 'good' or 'bad' about this type of comparison, and some people do it more than others.

We would like to find out how often you compare yourself with other people. To do that we would like to ask you to indicate how much you agree with each statement below.

9. If I want to find out how well I have done something, I compare what I have done with how others have done. (7)
- Strongly Disagree
- Disagree
- Neither Agree Nor Disagree
- Agree
- Strongly Agree

10. If I want to learn more about something, I try to find out what others think about it. (7)
- Strongly Disagree
- Disagree
- Neither Agree Nor Disagree
- Agree
- Strongly Agree

Please rate the extent to which each reason below describes why you are currently engaged in your profession:

11. Because I enjoy this work very much. (8)
- Not at all
- Very Little
- A Little
- Moderately
- Strongly
- Very Strongly
- Exactly

12. Because this job fits my personal values. (8)
- Not at all
- Very Little
- A Little
- Moderately
- Strongly
- Very Strongly
- Exactly

13. Because this job affords me a desirable standard of living. (8)
    - Not at all
    - Very Little
    - A Little
    - Moderately
    - Strongly
    - Very Strongly
    - Exactly

14. Because my reputation depends on it. (8)
    - Not at all
    - Very Little
    - A Little
    - Moderately
    - Strongly
    - Very Strongly
    - Exactly

15. Taking everything into consideration, how do you feel about your job as a whole? (9)
    - Extremely Dissatisfied
    - Dissatisfied
    - Somewhat Dissatisfied
    - Neutral
    - Somewhat Satisfied
    - Satisfied
    - Extremely Satisfied

16. Overall, based on your definition of burnout, how would you rate your level of burnout? (10)
    - I enjoy my work. I have no symptoms of burnout.
    - Occasionally I am under stress, and I don't always have as much energy as I once did, but I don't feel burned out.
    - I am definitely burning out and have one or more symptoms of burnout, such as physical and emotional exhaustion.
    - The symptoms of burnout that I am experiencing will not go away. I think about frustration at work a lot.
    - I feel completely burned out and often wonder if I can go on. I am at the point where I may need some changes or may need to seek some sort of help.

17. In the past three months, what were the two most significant barriers that hindered your delivery of excellent patient care?

    _____
    _____
    _____
    _____

Demographic Information

Please answer the following confidential demographic questions. You will only need to complete this section once. This section will help us identify how population characteristics might relate to physician experiences.

1. What is your age?

    _____

2. What year did you graduate from medical school?

    _____

3. When did you start practicing medicine at your current clinic?
   - Year _____
   - Month _____

4. Are you of Hispanic or Latino origin or descent?
   - Yes, Hispanic or Latino
   - No, not Hispanic or Latino

5. What is your race? (Mark one or more)
   - White
   - Black or African American
   - Asian
   - Native Hawaiian or other Pacific Islander
   - American Indian or Alaska Native
   - Some other race, ethnicity, or origin
   - I would rather not answer

6. Do you currently describe yourself as male, female or transgender?
   - Male
   - Female
   - Transgender
   - None of these
   - I would rather not answer

7. Please describe your relationship status.
   - Single
   - Married
   - In a relationship
   - Living as married
   - Widowed/Widower
   - Divorced or Separated

8. Do you have any children or dependents that you look after?
   - Yes
   - No

   (If yes to above question, then ask)

9. If yes, how many?
   _____

Quarterly Survey Schedule and Completion Rates

Table S4. Quarterly Survey Launch Dates

Quarterly Survey	Launch Date
1	October 3rd, 2019
2	January 8th, 2020
3	April 7th, 2020
4	July 13th, 2020

Table S5. Survey Completion Rates

Quarterly Survey	Overall	Condition 1	Condition 2	Condition 3	p
1. October, 2019	98.0% (195/199)	98.4% (64/65)	98.4% (63/64)	97.1% (68/70)	1.00
2. January, 2020	91.5% (182/199)	93.8% (61/65)	93.8% (60/64)	87.1% (61/70)	0.32
3. April, 2020	93.0% (185/199)	92.3% (60/65)	90.6% (58/64)	94.3% (66/70)	0.84
4. July, 2020	88.4% (176/199)	90.8% (59/65)	82.8% (53/64)	91.4% (64/70)	0.26

Note: The p-value in the right column is from a Fisher's exact test, which evaluates whether the completion rates in each of the three conditions are statistically different from one another.

8. Primary Analysis of HM Order Rates

Table S6 includes our primary regressions reported in the manuscript using mixed effects binomial logistic regressions. As explained in the statistical analysis section of the manuscript, the model assumes that each patient's number of orders placed follows a binomial distribution, where the number of trials is the patient's number of open topics, and a logit-linear function is used to estimate the probability that a patient has an order placed for any given open topic.

Table S6. Estimated Treatment Effects on HM Order Rates (Mixed Effects Binomial Logistic Regressions)

A.   Conditions 2 and 3 Combined (vs. Condition 1) Contrast

	Dependent variable:		
	HM Order Rate		
	(1)	(2)	(3)
Condition 2+3 (vs. Condition 1)	0.078	0.078	0.120
	(0.100)	(0.096)	(0.082)
Controlling for Patient Baseline HM Completion Rate	No	Yes	Yes
Controlling for Patient and Provider Characteristics	No	No	Yes
Observations	46,631	44,282	44,166

Note: Mixed effects binomial logistic regressions with physician and clinic random effects were used to estimate the treatment effect of Conditions 2 and 3 combined (vs. 1) on HM order rates. Patient characteristics include patients' age, gender, and ZIP code. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B.   Condition 2 (vs. Condition 1) and Condition 3 (vs. Condition 1) Contrasts

	Dependent variable:		
	HM Order Rate		
	(1)	(2)	(3)
Condition 2 (vs. Condition 1)	0.078	0.075	0.092
	(0.114)	(0.110)	(0.093)
Condition 3 (vs. Condition 1)	0.078	0.081	0.145
	(0.116)	(0.112)	(0.096)
Controlling for Patient Baseline HM Completion Rate	No	Yes	Yes
Controlling for Patient and Provider Characteristics	No	No	Yes
Observations	46,631	44,282	44,166

Note: Mixed effects binomial logistic regressions with physician and clinic random effects were used to estimate differences between conditions in HM order rates. Patient characteristics include patients' age, gender, and ZIP code. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

C. Condition 3 (vs. 2) Contrast

	Dependent variable:		
	HM Order Rate		
	(1)	(2)	(3)
Condition 3 (vs. Condition 2)	0.000	0.006	0.054
	(0.116)	(0.112)	(0.095)

Note: The coefficients reflect linear contrasts using the coefficients from the corresponding models in Panel B above. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

9. Robustness Checks and Secondary Analyses for HM Order Rates

Robustness Check: Pre-registered Alternative Models Estimating Treatment Effects on Order Rates

Table S7 shows results from binomial logistic regressions with standard errors clustered by clinic. Again, the model assumes that each patient's number of orders placed follows a binomial distribution, where the number of trials is the patient's number of open topics, and a logit-linear function is used to estimate the probability that a patient has an order placed for any given open topic. Table S8 shows linear mixed effects regressions with physician and clinic random effects, and Table S9 shows Ordinary Least Squares (OLS) regressions with standard errors clustered by clinic.

Table S7. Estimated Treatment Effects on HM Order Rates (Binomial Logistic Regressions with Clustered Standard Errors)

A. Conditions 2 and 3 Combined (vs. Condition 1) Contrast

	Dependent variable:		
	HM Order Rate		
	(1)	(2)	(3)
Condition 2+3 (vs. Condition 1)	0.073	0.069	0.106
	(0.087)	(0.082)	(0.074)
Controlling for Patient Baseline HM Completion Rate	No	Yes	Yes
Controlling for Patient and Provider Characteristics	No	No	Yes
Observations	46,631	44,282	44,166

Note: Binomial logistic regressions with standard errors clustered by clinic were used to estimate the treatment effect of Conditions 2 and 3 combined (vs. 1) on HM order rates. Patient characteristics include patients' age and gender. Zip codes could not be included as a control because the regression did not converge. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B. Condition 2 (vs. Condition 1) and Condition 3 (vs. Condition 1) Contrasts

	Dependent variable:		
	HM Order Rate		
	(1)	(2)	(3)
Condition 2 (vs. Condition 1)	0.102	0.097	0.106
	(0.101)	(0.100)	(0.089)
Condition 3 (vs. Condition 1)	0.043	0.041	0.106
	(0.109)	(0.102)	(0.094)
Controlling for Patient Baseline HM Completion Rate	No	Yes	Yes
Controlling for Patient and Provider Characteristics	No	No	Yes
Observations	46,631	44,282	44,166

Note: Binomial logistic regressions with standard errors clustered by clinic were used to estimate differences between conditions in HM order rates. Patient characteristics include patients' age and gender. Zip code could not be included as a control because the regression did not converge. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

C. Condition 3 (vs. 2) Contrast

	Dependent variable:		
	HM Order Rate		
	(1)	(2)	(3)
Condition 3 (vs. Condition 2)	-0.059	-0.056	0.000
	(0.122)	(0.122)	(0.109)

Note: The coefficients reflect linear contrasts using the coefficients from the corresponding models in Panel B above. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Table S8. Estimated Treatment Effects on HM Order Rates (Linear Mixed Effects Regressions)

A. Conditions 2 and 3 Combined (vs. Condition 1) Contrast

| | Dependent variable: | | |
| | HM Order Rate | | |
	(1)	(2)	(3)
Condition 2+3 (vs. Condition 1)	0.008	0.008	0.013*
	(0.009)	(0.009)	(0.007)
Controlling for Patient Baseline HM Completion Rate	No	Yes	Yes
Controlling for Patient and Provider Characteristics	No	No	Yes
Observations	46,631	44,282	44,166

Note: Linear mixed effects regressions with physician and clinic random effects were used to estimate the treatment effect of Conditions 2 and 3 combined (vs. 1) on HM order rates. Patient characteristics include patients' age, gender, and ZIP code. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B. Condition 2 (vs. Condition 1) and Condition 3 (vs. Condition 1) Contrasts

| | Dependent variable: | | |
| | HM Order Rate | | |
	(1)	(2)	(3)
Condition 2 (vs. Condition 1)	0.008	0.008	0.011
	(0.011)	(0.010)	(0.009)
Condition 3 (vs. Condition 1)	0.008	0.009	0.015*
	(0.011)	(0.011)	(0.009)
Controlling for Patient Baseline HM Completion Rate	No	Yes	Yes
Controlling for Patient and Provider Characteristics	No	No	Yes
Observations	46,631	44,282	44,166

Note: Linear mixed effects regressions with physician and clinic random effects were used to estimate differences between conditions in HM order rates. Patient characteristics include patients' age, gender, and ZIP code. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

C. Condition 3 (vs. Condition 2) Contrast

	Dependent variable:		
	HM Order Rate		
	(1)	(2)	(3)
Condition 3 (vs. Condition 2)	0.0002	0.001	0.004
	(0.011)	(0.011)	(0.009)

Note: The coefficients reflect linear contrasts using the coefficients from the corresponding models in Panel B above. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

The marginally significant coefficients in Model (3) of Panels A and B are not stable across specifications so we do not interpret them as revealing true treatment effects.

Table S9. Estimated Treatment Effects on HM Order Rates (OLS Regressions with Clustered Standard Errors)

A. Conditions 2 and 3 Combined (vs. Condition 1) Contrast

	Dependent variable:		
	HM Order Rate		
	(1)	(2)	(3)
Condition 2+3 (vs. Condition 1)	0.008	0.008	0.014**
	(0.009)	(0.008)	(0.007)
Controlling for Patient Baseline HM Completion Rate	No	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes
Observations	46,631	44,282	44,166
R^2	0.0002	0.004	0.018

Note: OLS regressions with standard errors clustered by clinic were used to estimate the treatment effect of Conditions 2 and 3 combined (vs. 1) on HM order rates. Patient characteristics include patients' age, gender, and ZIP code. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B. Condition 2 (vs. Condition 1) and Condition 3 (vs. Condition 1) Contrasts

	Dependent variable:		
	HM Order Rate		
	(1)	(2)	(3)
Condition 2 (vs. Condition 1)	0.011	0.011	0.015*
	(0.011)	(0.010)	(0.008)
Condition 3 (vs. Condition 1)	0.005	0.005	0.013
	(0.011)	(0.010)	(0.009)
Controlling for Patient Baseline HM Completion Rate	No	Yes	Yes
Controlling for Patient and Provider Characteristics	No	No	Yes
Observations	46,631	44,282	44,166
R^2	0.0003	0.004	0.018

Note: OLS regressions with standard errors clustered by clinic were used to estimate differences between conditions in HM order rates. Patient characteristics include patients' age, gender, and ZIP code. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

C. Condition 3 (vs. Condition 2) Contrast

	Dependent variable:		
	HM Order Rate		
	(1)	(2)	(3)
Condition 3 (vs. Condition 2)	-0.006	-0.006	-0.002
	(0.012)	(0.012)	(0.008)

Note: The coefficients reflect linear contrasts using the coefficients from the corresponding models in Panel B above. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

The significant and marginally significant coefficients in Model (3) of Panels A and B are not stable across specifications so we do not interpret them as revealing true treatment effects.

Secondary Analysis: Order Rates Moderated by Physician Baseline Performance

We examined whether the effects of peer comparison on order rates were moderated by baseline performance (physicians' HM completion rates at baseline; from July-October 2019) using both a continuous and categorical version of the moderator (Tables S10 and S11). We were specifically interested in the Condition 2 (vs. Condition 1) contrast and its interaction with baseline performance because they allow us to isolate the heterogeneous treatment effects of peer comparison information (without conflation with the potential heterogeneous effects of leadership support training).

Table S10. Order Rates Moderated by Physicians' Baseline Performance (Continuous)

	Dependent variable:	
	HM Order Rate	
	(1)	(2)
Condition 2 (vs. Condition 1)	0.097	0.083
	(0.100)	(0.092)
Condition 3 (vs. Condition 1)	0.058	0.091
	(0.102)	(0.095)
Baseline HM Completion Rate	0.022***	0.013**
	(0.006)	(0.005)
Condition 2 (vs. Condition 1) * Baseline HM Completion Rate	-0.005	-0.002
	(0.007)	(0.006)
Condition 3 (vs. Condition 1) * Baseline HM Completion Rate	0.000	0.004
	(0.007)	(0.006)
Controlling for Patient and Provider Characteristics	No	Yes
Observations	46,336	46,218

Note: Mixed effects binomial logistic regressions with physician and clinic random effects were used to estimate the coefficients. Baseline HM Completion Rate is mean-centered. Patient characteristics include patients' age, gender, and ZIP code. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Table S11. Order Rates Moderated by Baseline Performance (Categorical)

A. Regressions with Interactions

	Dependent variable:	
	HM Order Rate	
	(1)	(2)
Condition 2 (vs. Condition 1)	0.133	0.004
	(0.167)	(0.151)
Condition 3 (vs. Condition 1)	0.068	-0.020
	(0.169)	(0.151)
Baseline "Almost High Performer"	0.209	-0.001
	(0.144)	(0.126)
Baseline "High Performer"	0.356**	0.167
	(0.149)	(0.133)
Baseline "Top Performer"	0.625***	0.311*
	(0.196)	(0.178)
Condition 2 (vs. Condition 1) * Baseline "Almost High Performer"	-0.036	0.144
	(0.194)	(0.173)
Condition 2 (vs. Condition 1) * Baseline "High Performer"	-0.064	0.045
	(0.198)	(0.174)
Condition 2 (vs. Condition 1) * Baseline "Top Performer"	-0.066	0.043
	(0.260)	(0.227)
Condition 3 (vs. Condition 1) * Baseline "Almost High Performer"	-0.109	0.112
	(0.190)	(0.167)
Condition 3 (vs. Condition 1) * Baseline "High Performer"	0.028	0.158
	(0.202)	(0.175)
Condition 3 (vs. Condition 1) * Baseline "Top Performer"	0.107	0.220
	(0.252)	(0.222)
Controlling for Patient and Provider Characteristics	No	Yes
Observations	46,336	46,218

Note: Mixed effects binomial logistic regressions with physician and clinic random effects were used to estimate the coefficients. The baseline performance tiers include: "Almost High Performer" = 55-65% completion rate; "High Performer" = >65% completion rate, but not top 25 ranked score; "Top Performer" = top 25 ranked score; with "Low Performer = <55% completion rate as the reference group. Patient characteristics include patients' age, gender, and ZIP code. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: $*** p < 0.01$; $** p < 0.05$; $* p < 0.10$.

B. Treatment Effects within Each Performance Tier

	Dependent variable:			
	HM Order Rates			
	(1)	(2)	(3)	(4)
Condition 2 (vs. Condition 1)	0.004	0.149	0.050	0.047
	(0.151)	(0.125)	(0.132)	(0.196)
Condition 3 (vs. Condition 1)	-0.020	0.092	0.138	0.200
	(0.151)	(0.129)	(0.136)	(0.187)
Baseline Performance Tier	Low Performer	Almost High Performer	High Performer	Top Performer

Note: The coefficients reflect the estimated treatment effects among PCPs within each performance tier (indicated in the last row of the table) and come from Model (2) in Panel A. For instance, the treatment effect of Condition 2 (vs. 1) within the "Top Performer" tier (0.022) is estimated using the following linear contrast with the coefficients from Model (2) in Panel A: Condition 2 (vs. Condition 1) * Baseline "Top Performer" + Condition 2 (vs. Condition 1) = (0.029 - 0.007). The baseline performance tiers include: "Low Performer" = <55% completion rate; "Almost High Performer" = 55-65% completion rate; "High Performer" = >65% completion rate, but not top 25 ranked score; "Top Performer" = top 25 ranked score. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

10. Primary Analysis of Job Satisfaction and Burnout in April 2020

Table S12. Estimated Treatment Effects on Job Satisfaction (April 2020)

A. Condition 2 (vs. Condition 1) and Condition 3 (vs. Condition 1) Contrasts

	Dependent variable:			
	Job Satisfaction			
	(1)	(2)	(3)	(4)
Condition 2 (vs. Condition 1)	-0.519**	-0.631***	-0.549**	-0.564**
	(0.250)	(0.217)	(0.235)	(0.240)
Condition 3 (vs. Condition 1)	-0.179	-0.237	-0.103	-0.120
	(0.207)	(0.148)	(0.155)	(0.150)
Controlling for Baseline Job Satisfaction	No	Yes	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes	Yes
Controlling for COVID Case Load	No	No	No	Yes
Observations	183	177	177	177
R^2	0.028	0.361	0.398	0.415

Note: OLS regressions with standard errors clustered by clinic were used to estimate differences between conditions in job satisfaction. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B. Condition 3 (vs. Condition 2) Contrast

	Dependent variable:			
	Job Satisfaction			
	(1)	(2)	(3)	(4)
Condition 3 (vs. Condition 2)	0.341	0.395**	0.447**	0.444*
	(0.249)	(0.197)	(0.219)	(0.230)

Note: The coefficients reflect linear contrasts using the coefficients from the corresponding models in Panel A above. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Table S13. Estimated Treatment Effects on Burnout (April 2020)

A. Condition 2 (vs. Condition 1) and Condition 3 (vs. Condition 1) Contrasts

	Dependent variable:			
	Burnout			
	(1)	(2)	(3)	(4)
Condition 2 (vs. Condition 1)	0.539**	0.360**	0.329**	0.330**
	(0.217)	(0.152)	(0.151)	(0.152)
Condition 3 (vs. Condition 1)	0.159	-0.070	-0.112	-0.111
	(0.141)	(0.112)	(0.123)	(0.121)
Controlling for Baseline Burnout	No	Yes	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes	Yes
Controlling for COVID Case Load	No	No	No	Yes
Observations	180	174	174	174
R^2	0.065	0.471	0.486	0.488

Note: OLS regressions with standard errors clustered by clinic were used to estimate differences between conditions in burnout. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B. Condition 3 (vs. Condition 2) Contrast

	Dependent variable:			
	Burnout			
	(1)	(2)	(3)	(4)
Condition 3 (vs. Condition 2)	-0.380*	-0.430**	-0.441**	-0.441**
	(0.211)	(0.172)	(0.181)	(0.183)

Note: The coefficients reflect linear contrasts using the coefficients from the corresponding models in Panel A above. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

11. Robustness Checks and Secondary Analyses for Job Satisfaction and Burnout

Placebo Test: Regression Analysis of Proficiency with CareConnect

We estimated our primary specification with an outcome that we would not expect to be impacted by the interventions. We specifically used physicians' responses to the following item in the April 2020 quarterly survey as the outcome: "My proficiency with using CareConnect is: (1) Poor, (2) Marginal, (3) Satisfactory, (4) Good, (5) Optimal."

Table S14. Estimated Treatment Effects on Proficiency with CareConnect (April 2020)

A. Condition 2 (vs. Condition 1) and Condition 3 (vs. Condition 1) Contrasts

	Dependent variable:
	CareConnect Proficiency
	(1)
Condition 2 (vs. Condition 1)	-0.139
	(0.087)
Condition 3 (vs. Condition 1)	-0.168[**]
	(0.082)
Controlling for Baseline CareConnect Proficiency	Yes
Controlling for Provider Characteristics	Yes
Observations	179
R^2	0.320

Note: OLS regression with standard errors clustered by clinic was used to estimate differences between conditions in CareConnect proficiency. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B. Condition 3 (vs. Condition 2) Contrast

	Dependent variable:
	CareConnect Proficiency
	(3)
Condition 3 (vs. Condition 2)	-0.029
	(0.093)

Note: The coefficient reflects a linear contrast using the coefficients from Panel A above. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

The placebo item was not impacted by either intervention: the effect of the peer comparison intervention alone (Condition 2 (vs. 1)) was null, and the effect of leadership training was null (Condition 3 (vs. 2)). We do not know why the two interventions combined (Condition 3 (vs. 1)) had a negative effect on the placebo item, and we suspect this is spurious. Importantly, this effect could not explain our findings about job satisfaction and burnout.

Secondary Analysis: Effects on Physician Leads and Non-Leads

To better understand the effects of leadership support training, we also examined whether the benefits trickled down to fellow PCPs who were not physician leads and thus did not receive training personally. Specifically, we analyzed the effects of our interventions on PCPs who were not leaders ["non-leads"; columns (1)-(3)] and PCPs who were leaders ["leads"; columns (4)-(6)]. Note that we use Condition 2 as the reference group in these regressions because the main contrast of interest is Condition 3 (vs. Condition 2), which reflects the impact of leadership training.

Table S15. Estimated Treatment Effects on Job Satisfaction for Physician Leads and Non-Leads (April 2020)

	Dependent variable:					
	Job Satisfaction					
	(1)	(2)	(3)	(4)	(5)	(6)
Condition 1 (vs. Condition 2)	0.542*	0.536*	0.524	0.505	0.745	0.463
	(0.299)	(0.296)	(0.330)	(0.569)	(0.569)	(0.614)
Condition 3 (vs. Condition 2)	0.294	0.356	0.435	0.636	0.636	0.946*
	(0.329)	(0.348)	(0.362)	(0.498)	(0.437)	(0.543)
Subsample	Only Non-Leads	Only Non-Leads	Only Non-Leads	Only Leads	Only Leads	Only Leads
Controlling for Baseline Job Satisfaction	No	Yes	Yes	No	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes	No	No	Yes
Observations	152	147	147	31	31	31
R^2	0.030	0.056	0.135	0.060	0.161	0.488

Note: OLS regressions with standard errors clustered by clinic were used to estimate the differences between conditions in job satisfaction. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Table S16. Estimated Treatment Effects on Burnout for Physician Leads and Non-Leads (April 2020)

	Dependent variable:					
	Burnout					
	(1)	(2)	(3)	(4)	(5)	(6)
Condition 1 (vs. Condition 2)	-0.511**	-0.520**	-0.518**	-0.744**	-0.775**	-0.852**
	(0.249)	(0.233)	(0.254)	(0.322)	(0.302)	(0.363)
Condition 3 (vs. Condition 2)	-0.419	-0.476*	-0.469*	-0.209	-0.210	-0.453
	(0.256)	(0.264)	(0.282)	(0.301)	(0.305)	(0.446)
Subsample	Only Non-Leads	Only Non-Leads	Only Non-Leads	Only Leads	Only Leads	Only Leads
Controlling for Baseline Burnout	No	Yes	Yes	No	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes	No	No	Yes
Observations	150	145	145	30	30	30
R^2	0.059	0.082	0.102	0.173	0.177	0.360

Note: OLS regressions with standard errors clustered by clinic were used to estimate the differences between conditions in burnout. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Secondary Analysis: Job Satisfaction and Burnout Moderated by Baseline Performance

We examined whether the effects of peer comparison on job satisfaction and burnout were moderated by baseline performance (physicians' HM completion rates at baseline; from July-October 2019) using both a continuous and categorical version of the moderator (Tables S17 and S18). We were specifically interested in the Condition 2 (vs. Condition 1) contrast and its interaction with baseline performance because they allow us to isolate the heterogeneous treatment effects of peer comparison information (without conflation with the potential heterogeneous effects of leadership support training).

Table S17. Job Satisfaction Moderated by Baseline Performance (Continuous)

	Dependent variable:		
	Job Satisfaction		
	(1)	(2)	(3)
Condition 2 (vs. Condition 1)	-0.507**	-0.605***	-0.524**
	(0.243)	(0.218)	(0.230)
Condition 3 (vs. Condition 1)	-0.170	-0.215	-0.090
	(0.196)	(0.143)	(0.153)
Baseline HM Completion Rate	-0.020**	-0.005	-0.006
	(0.010)	(0.008)	(0.007)
Condition 2 (vs. Condition 1) * Baseline HM Completion Rate	0.031*	0.019	0.017
	(0.016)	(0.015)	(0.013)
Condition 3 (vs. Condition 1) * Baseline HM Completion Rate	0.034***	0.012	0.014
	(0.013)	(0.011)	(0.010)
Controlling for Baseline Job Satisfaction	No	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes
Observations	182	176	176
R^2	0.044	0.371	0.409

Note: OLS regressions with standard errors clustered by clinic were used to estimate the coefficients. Baseline HM Completion Rate is mean-centered. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Table S18. Burnout Moderated by Baseline Performance (Continuous)

	Dependent variable:		
	Burnout		
	(1)	(2)	(3)
Condition 2 (vs. Condition 1)	0.533**	0.349**	0.315**
	(0.213)	(0.152)	(0.150)
Condition 3 (vs. Condition 1)	0.153	-0.083	-0.135
	(0.131)	(0.110)	(0.128)
Baseline HM Completion Rate	0.014	0.005	0.009
	(0.011)	(0.006)	(0.007)
Condition 2 (vs. Condition 1) * Baseline HM Completion Rate	-0.007	-0.007	-0.008
	(0.016)	(0.009)	(0.010)
Condition 3 (vs. Condition 1) * Baseline HM Completion Rate	-0.006	-0.003	-0.005
	(0.012)	(0.008)	(0.008)
Controlling for Baseline Burnout	No	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes
Observations	179	173	173
R^2	0.078	0.473	0.492

Note: OLS regressions with standard errors clustered by clinic were used to estimate the coefficients. Baseline HM Completion Rate is mean-centered. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Table S19. Job Satisfaction Moderated by Baseline Performance Tier (Categorical)

A. Regressions with Interactions

	Dependent variable:		
	Job Satisfaction		
	(1)	(2)	(3)
Condition 2 (vs. Condition 1)	-1.250***	-1.020***	-0.886***
	(0.247)	(0.193)	(0.198)
Condition 3 (vs. Condition 1)	-0.900***	-0.440**	-0.352*
	(0.252)	(0.188)	(0.208)
Baseline "Almost High Performer"	-0.700**	-0.336	-0.333
	(0.269)	(0.217)	(0.204)
Baseline "High Performer"	-0.762***	-0.274	-0.313
	(0.277)	(0.236)	(0.293)
Baseline "Top Performer"	-0.600***	-0.080	-0.227
	(0.229)	(0.735)	(0.584)
Condition 2 (vs. Condition 1) * Baseline "Almost High Performer"	0.950	0.585	0.448
	(0.613)	(0.440)	(0.479)
Condition 2 (vs. Condition 1) * Baseline "High Performer"	1.130**	0.569	0.551
	(0.523)	(0.461)	(0.499)
Condition 2 (vs. Condition 1) * Baseline "Top Performer"	0.707*	0.376	0.371
	(0.403)	(0.799)	(0.696)
Condition 3 (vs. Condition 1) * Baseline "Almost High Performer"	0.700*	0.240	0.272
	(0.366)	(0.265)	(0.278)
Condition 3 (vs. Condition 1) * Baseline "High Performer"	1.329***	0.450	0.446
	(0.505)	(0.355)	(0.388)
Condition 3 (vs. Condition 1) * Baseline "Top Performer"	0.955**	0.103	0.345
	(0.428)	(0.792)	(0.643)
Controlling for Baseline Job Satisfaction	No	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes
Observations	182	176	176
R^2	0.063	0.374	0.411

Note: OLS regressions with standard errors clustered by clinic were used to estimate the coefficients. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B. Treatment Effects within Each Performance Tier

	Dependent variable:			
	Job Satisfaction			
	(1)	(2)	(3)	(4)
Condition 2 (vs. Condition 1)	-0.886***	-0.438	-0.335	-0.515
	(0.198)	(0.414)	(0.459)	(0.719)
Condition 3 (vs. Condition 1)	-0.352*	-0.081	0.093	-0.008
	(0.208)	(0.222)	(0.343)	(0.678)
Baseline Performance Tier	Low Performer	Almost High Performer	High Performer	Top Performer

Note: The coefficients reflect the estimated treatment effects among PCPs within each performance tier (indicated in the last row of the table) and come from Model (3) in Panel A. For instance, the treatment effect of Condition 2 (vs. 1) within the "Top Performer" tier (-0.509) is estimated using the following linear contrast with the coefficients from Model (3) in Panel A: Condition 2 (vs. Condition 1) * Baseline "Top Performer" + Condition 2 (vs. Condition 1) = (0.374 – 0.883). The baseline performance tiers include: "Low Performer" = <55% completion rate; "Almost High Performer" = 55-65% completion rate; "High Performer" = >65% completion rate, but not top 25 ranked score; "Top Performer" = top 25 ranked score. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Table S20. Burnout Moderated by Baseline Performance (Categorical)

A. Regressions with Interactions

	Dependent variable:		
	Burnout		
	(1)	(2)	(3)
Condition 2 (vs. Condition 1)	0.731**	0.533***	0.485***
	(0.309)	(0.164)	(0.168)
Condition 3 (vs. Condition 1)	0.231	-0.125	-0.164
	(0.206)	(0.177)	(0.189)
Baseline "Almost High Performer"	0.181	0.026	0.112
	(0.202)	(0.108)	(0.116)
Baseline "High Performer"	0.183	0.002	0.085
	(0.261)	(0.125)	(0.129)
Baseline "Top Performer"	0.631	0.428**	0.669**
	(0.538)	(0.203)	(0.283)
Condition 2 (vs. Condition 1) * Baseline "Almost High Performer"	-0.347	-0.333	-0.289
	(0.426)	(0.249)	(0.265)
Condition 2 (vs. Condition 1) * Baseline "High Performer"	-0.271	-0.274	-0.248
	(0.420)	(0.238)	(0.235)
Condition 2 (vs. Condition 1) * Baseline "Top Performer"	-0.274	-0.195	-0.294
	(0.597)	(0.312)	(0.389)
Condition 3 (vs. Condition 1) * Baseline "Almost High Performer"	-0.231	-0.059	-0.090
	(0.244)	(0.163)	(0.160)
Condition 3 (vs. Condition 1) * Baseline "High Performer"	0.217	0.415**	0.431**
	(0.331)	(0.178)	(0.174)
Condition 3 (vs. Condition 1) * Baseline "Top Performer"	-0.531	-0.495*	-0.640**
	(0.578)	(0.261)	(0.282)
Controlling for Baseline Burnout	No	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes
Observations	179	173	173
R^2	0.098	0.511	0.532

Note: OLS regressions with standard errors clustered by clinic were used to estimate the coefficients. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B. Treatment Effects within Each Performance Tier

	Dependent variable:			
	Burnout			
	(1)	(2)	(3)	(4)
Condition 2 (vs. Condition 1)	0.485***	0.196	0.237	0.191
	(0.168)	(0.254)	(0.226)	(0.387)
Condition 3 (vs. Condition 1)	-0.164	-0.254	0.267*	-0.805***
	(0.189)	(0.156)	(0.157)	(0.285)
Baseline Performance Tier	Low Performer	Almost High Performer	High Performer	Top Performer

Note: The coefficients reflect the estimated treatment effects among PCPs within each performance tier (indicated in the last row of the table) and come from Model (3) in Panel A. For instance, the treatment effect of Condition 2 (vs. 1) within the "Top Performer" tier (0.189) is estimated using the following linear contrast with the coefficients from Model (3) in Panel A: Condition 2 (vs. Condition 1) * Baseline "Top Performer" + Condition 2 (vs. Condition 1) = (0.483 - 0.294). The baseline performance tiers include: "Low Performer" = <55% completion rate; "Almost High Performer" = 55-65% completion rate; "High Performer" = >65% completion rate, but not top 25 ranked score; "Top Performer" = top 25 ranked score. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

12. Treatment Effect Persistence

Table S21. Estimated Long-term Treatment Effects on Job Satisfaction (July 2020)

A. Condition 2 (vs. Condition 1) and Condition 3 (vs. Condition 1) Contrasts

	Dependent variable:		
	Job Satisfaction		
	(1)	(2)	(3)
Condition 2 (vs. Condition 1)	-0.579**	-0.748***	-0.601**
	(0.286)	(0.242)	(0.247)
Condition 3 (vs. Condition 1)	-0.014	-0.169	0.014
	(0.251)	(0.209)	(0.223)
Controlling for Baseline Job Satisfaction	No	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes
Observations	175	170	170
R^2	0.038	0.358	0.412

Note: OLS regressions with standard errors clustered by clinic were used to estimate differences between conditions in job satisfaction. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B. Condition 3 (vs. Condition 2) Contrast

	Dependent variable:		
	Job Satisfaction		
	(1)	(2)	(3)
Condition 3 (vs. Condition 2)	0.565*	0.579**	0.615**
	(0.327)	(0.247)	(0.245)

Note: The coefficients reflect linear contrasts using the coefficients from the corresponding models in Panel A above. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Table S22. Estimated Long-term Treatment Effects on Burnout (July 2020)

A. Condition 2 (vs. Condition 1) and Condition 3 (vs. Condition 1) Contrasts

	Dependent variable:		
	Burnout		
	(1)	(2)	(3)
Condition 2 (vs. Condition 1)	0.380[*]	0.212[*]	0.088
	(0.207)	(0.124)	(0.148)
Condition 3 (vs. Condition 1)	0.176	-0.041	-0.123
	(0.193)	(0.167)	(0.192)
Controlling for Baseline Burnout	No	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes
Observations	172	168	168
R^2	0.027	0.418	0.492

Note: OLS regressions with standard errors clustered by clinic were used to estimate differences between conditions in burnout. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B. Condition 3 (vs. Condition 2) Contrast

	Dependent variable:		
	Burnout		
	(1)	(2)	(3)
Condition 3 (vs. Condition 2)	-0.203	-0.252	-0.211
	(0.239)	(0.188)	(0.215)

Note: The coefficients reflect linear contrasts using the coefficients from the corresponding models in Panel A above. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

13. Regression Analysis of Perceived Leadership Support

Table S23. Estimated Treatment Effects on Perceived Leadership Support (April 2020)

A. Condition 2 (vs. Condition 1) and Condition 3 (vs. Condition 1) Contrasts

	Dependent variable:			
	Perceived Leadership Support			
	(1)	(2)	(3)	(4)
Condition 2 (vs. Condition 1)	-0.499*	-0.635***	-0.599**	-0.599**
	(0.275)	(0.222)	(0.237)	(0.240)
Condition 3 (vs. Condition 1)	0.029	-0.099	-0.040	-0.039
	(0.251)	(0.156)	(0.162)	(0.164)
Controlling for Baseline Perceived Leadership Support	No	Yes	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes	Yes
Controlling for COVID Case Load	No	No	No	Yes
Observations	184	179	179	179
R^2	0.049	0.398	0.434	0.434

Note: OLS regressions with standard errors clustered by clinic were used to estimate differences between conditions in perceived leadership support. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B. Condition 3 (vs. Condition 2) Contrast

	Dependent variable:			
	Perceived Leadership Support			
	(1)	(2)	(3)	(4)
Condition 3 (vs. Condition 2)	0.528*	0.536**	0.560**	0.560**
	(0.282)	(0.233)	(0.238)	(0.242)

Note: The coefficients reflect linear contrasts using the coefficients from the corresponding models in Panel A above. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Table S24. Estimated Long-term Treatment Effects on Perceived Leadership Support (July 2020)

A. Condition 2 (vs. Condition 1) and Condition 3 (vs. Condition 1) Contrasts

	Dependent variable:		
	Perceived Leadership Support		
	(1)	(2)	(3)
Condition 2 (vs. Condition 1)	-0.590**	-0.740***	-0.689***
	(0.276)	(0.222)	(0.219)
Condition 3 (vs. Condition 1)	-0.077	-0.275*	-0.199
	(0.246)	(0.166)	(0.174)
Controlling for Baseline Perceived Leadership Support	No	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes
Observations	175	171	171
R^2	0.055	0.437	0.451

Note: OLS regressions with standard errors clustered by clinic were used to estimate differences between conditions in perceived leadership support. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Observations differ between models because of variables with missing values. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

B. Condition 3 (vs. Condition 2) Contrast

	Dependent variable:		
	Perceived Leadership Support		
	(1)	(2)	(3)
Condition 3 (vs. Condition 2)	0.513	0.465*	0.489*
	(0.316)	(0.251)	(0.251)

Note: The coefficients reflect linear contrasts using the coefficients from the corresponding models in Panel A above. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

We also examined whether the effects of leadership training on perceived leadership support trickled down to fellow PCPs who were not physician leads and thus did not receive training personally. Specifically, we analyzed the effects of our interventions on PCPs who were not leaders ["non-leads"; columns (1)-(3)] and PCPs who were leaders ["leads"; columns (4)-(6)]. Again, we use Condition 2 as the reference group in these regressions because the main contrast of interest is Condition 3 (vs. Condition 2), which reflects the impact of leadership training.

Table S25. Estimated Treatment Effects on Perceived Leadership Support for Physician Leads and Non-Leads (April 2020)

	Dependent variable:					
	Perceived Leadership Support					
	(1)	(2)	(3)	(4)	(5)	(6)
Condition 1 (vs. Condition 2)	0.431	0.430	0.491	0.909*	0.967*	0.565
	(0.279)	(0.285)	(0.323)	(0.477)	(0.503)	(0.547)
Condition 3 (vs. Condition 2)	0.491*	0.541*	0.607*	0.727	0.727	0.990
	(0.279)	(0.296)	(0.315)	(0.529)	(0.533)	(0.586)
Subsample	Only Non-Leads	Only Non-Leads	Only Non-Leads	Only Leads	Only Leads	Only Leads
Controlling for Baseline Perceived Leadership Support	No	Yes	Yes	No	Yes	Yes
Controlling for Provider Characteristics	No	No	Yes	No	No	Yes
Observations	153	148	148	31	31	31
R^2	0.041	0.062	0.163	0.122	0.128	0.418

Note: OLS regressions with standard errors clustered by clinic were used to estimate differences between conditions in perceived leadership support. Provider characteristics include providers' gender, race, years since graduating medical school, and years of working at UCLA Health. Statistical significance is indicated by: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

14. Coding of Open-Ended Responses

The follow-up survey (conducted in April 2021) showed all the PCPs, regardless of their original experimental condition, an example of the peer comparison email. Then PCPs were asked, "Would you prefer that the Department resumes sending these types of emails to physicians?" The responses were qualitatively coded by two PCPs, who had the necessary contextual knowledge on how clinical care is practiced at the DOM primary care network. They were blind to the hypotheses, design of the experiment, and survey respondents' study conditions. The coders categorized the responses based on whether the PCPs expressed any negative reaction and, more specifically, whether they indicated that the peer comparison information would be harmful (e.g., offensive, stress-inducing). After confirming that the responses had high interrater reliability (negative reaction, Cohen's Kappa = 0.83; harm, Cohen's Kappa = 0.77), the coders reconciled the remaining differences in their categorizations through discussion. According to their final ratings, 35.3% of PCPs reacted negatively to the peer comparison information, and 14.1% of PCPs went as far as to indicate that it would be harmful.

15. Perceived Control over HM Completion Rates

The follow-up survey (conducted in April 2021), asked for agreement (1- Strongly Disagree; 5- Strongly Agree) with the following item:

Physicians can improve their Health Maintenance completion rate with enough effort.

Table S26. Distribution and Summary Statistics of Perceived Control Item

A. Distribution

Response	Count (Frequency)
Strongly disagree (1)	7 (4.6%)
Disagree	27 (17.8%)
Neither agree nor disagree	44 (29.0%)
Agree	64 (42.1%)
Strongly agree (5)	10 (6.6%)

B. Summary Statistics by Baseline Performance Tier

Statistic	All Respondents	Low Performers	Almost High Performers	High Performers	Top Performers
Mean (SD)	3.3 (1.0)	3.1 (1.1)	3.3 (1.0)	3.3 (1.0)	3.7 (0.7)
Median (Q1, Q3)	3 (3, 4)	3 (2, 4)	3 (2, 4)	4 (3, 4)	4 (3, 4)

Note that responses to the perceived control item were predicted by PCPs' baseline performance tier ($p = 0.010$; estimated from a linear regression with tier treated as a continuous variable, with values ranging from 1 = Low Performers to 4 = Top Performers, and with clustered SEs at the clinic level).

SI References

1. A and B Recommendations | United States Preventive Services Taskforce (February 26, 2022).
2. L. H. Moulton, Covariate-based constrained randomization of group-randomized trials. *Clin. Trials* **1**, 297–305 (2004).
3. L. Dumenco, *et al.*, An interactive quality improvement and patient safety workshop for first-year medical students. *MedEdPORTAL* **14**, 10734 (2018).
4. M. Linzer, *et al.*, Evaluation of work satisfaction, stress, and burnout among US internal medicine physicians and trainees. *JAMA Netw. Open* **3** (2020).
5. Survey documents related to conducting the survey | NHS Staff Survey (March 2, 2022).
6. S. F. Richer, R. J. Vallerand, Construction and validation of the ESAS (The relatedness feelings scale). *Eur. Rev. Appl. Psychol.* **48**, 129–138 (1998).
7. F. X. Gibbons, B. P. Buunk, Individual differences in social comparison: Development of a scale of social comparison orientation. *J. Pers. Soc. Psychol.* **76**, 129–142 (1999).
8. M. Gagné, J. Forest, M. Gilbert, The motivation at work scale: Validation evidence in two languages. *Educational and Psychological Measurement* **70**, 628-646 (2010).
9. C. L. Dolbier, J. A. Webster, K. T. McCalister, M. W. Mallon, M. A. Steinhardt, Reliability and validity of a single-item measure of job satisfaction. *Am. J. Health Promot.* **19**, 194–198 (2005).
10. E. D. Dolan, *et al.*, Using a single item to measure burnout in primary care staff: a psychometric evaluation. *J. Gen. Intern. Med.* **30**, 582–587 (2015).