Supplemental Digital Appendix 1

Examples of Opportunities for Experiential Learning Within the Three Suggested Models for Trainee Engagement in Quality and Safety Work at the Point of Care[a]

Team-Based Model (Short-Term Time Horizon)

A care team huddles at the beginning of their two weeks together and decides to improve a proximal problem of limited scope, which was reported to them from the previous team on the unit: documentation of VTE prophylaxis for their patients. They know that documentation is happening on a sufficiently frequent basis for them to track improvement. Their specific aim is to increase the proportion of eligible hospitalized patients *(for whom)* receiving VTE prophylaxis *(what)* from 75% to 100% *(by how much*) by the end of their two-week rotation together *(by when).*

They seek input from the interprofessional leaders in that particular unit, who can provide important context and continuity that permits the short-term initiatives to build on each other over time. They quickly design a family of metrics to measure their aim. Their outcome measure is the proportion of patients receiving VTE prophylaxis. A process measure could be number of patients eligible for VTE prophylaxis but not ordered for it, and balancing measures could be rounding time, which might increase as there is more discussion on each patient about the status of their VTE prophylaxis, or complications related to anticoagulation during hospitalization. The baseline data collection could happen within the first 48 hours of the clinical team's two weeks together on service.

The rapid tests of change (Plan-Do-Study-Act, or PDSA, cycles) occur on a near-daily basis during the two weeks. As part of the daily routine before, during, or after bedside rounds or during an afternoon huddle, the team could pause to discuss progress since the prior checkpoint on their improvement initiative. Tracking tools such as run charts should be portable and able to be quickly shared (ideally on a web-based platform) to give real-time feedback to the team members.

Other inpatient examples: Improving medication reconciliation upon transfer out of the intensive care unit (stopping gastritis prophylaxis and restarting home medications that have been held); removing urinary catheters as soon as clinically indicated; decreasing time to discharge after rounds for patients who are clinically ready for discharge; and improving verbal communication of STAT orders to nurses once ordered in the electronic medical record.

An example from the outpatient setting: A resident and preceptor pair decide to develop a system for improving their documentation and discussion of vital signs, particularly blood pressures, over the next month after nearly missing an elevated blood pressure measurement in a patient.

Unit-Based Model (Medium-Term Time Horizon)

A General Pediatrics unit is interested in improving its inconsistent provision of Asthma Home Management Care Plans (AHMCP) to patients upon discharge. The unit's aim is initially to increase the proportion of patients under 18 discharged with a primary or secondary diagnosis of asthma *(for whom)* who are given an updated AHMCP on day of discharge *(what)* from a current baseline of 70% to 100% *(by how much*) by the end of the quarter *(by when),* and then maintain this level.

To encourage buy-in, team huddles at the beginning of the time period should ideally include nursing leadership or other interprofessional leaders as appropriate. In this case, metrics are fairly straightforward: the proportion is calculated using the denominator of all patients with a primary or secondary diagnosis of asthma, and baseline data have already been collected and are ready to use on day one. At the beginning of the rotation, and every couple of days thereafter, the team brainstorms and implements small tests of changes (PDSA cycles) such as having the unit coordinator send a page at the end of rounds with a list of the patients with asthma being discharged that day and a friendly reminder to create or update the AHMCP, or having the team incorporate this item into the presentation of the patient's plan for the day on rounds. The unit coordinator, or discharge coordinator, can track the proportion of completed AHCMPs on a weekly basis and create a run chart that can be

displayed in the resident workroom for real-time feedback.

Other inpatient examples: Improving communication around direct admissions from outside the hospital; reducing wait times to be seen with a new diagnosis of breast cancer; and reducing the number of patients who have undergone a procedure and are transferred to a unit without verbal pass-off from the physician who performed the procedure.

Examples from the outpatient setting and emergency department: Improving empanelment of patients with a primary care provider; developing a workflow in the emergency department to decrease the time to first dose of pain medication for patients with sickle cell presenting with vaso-occlusive pain

Systems-Based Model (Long-Term Time Horizon)

To meet its patient-centeredness goals, a safety net hospital that serves a resource-limited population decides it wants to collaborate with patients with three common conditions to improve medication adherence upon discharge. The hospital leadership makes an institution-wide commitment to increase the proportion of patients with asthma, chronic obstructive pulmonary disease, and/or congestive heart failure *(for whom)* with their prescription medications in hand *(what)* from 0% to 100% *(by how much)*, by the end of 12 months *(by when)*.

The hospital quality leadership establishes buy-in from clinical leaders on all affected units and also collaborates with the hospital-affiliated outpatient pharmacy to develop a workflow of faxing flagged prescriptions to the pharmacy the day prior to discharge. The pharmacy hires extra staff so that a pharmacist delivers the medications in person to the patient room and, together with the nurse, provides tailored instructions about the prescription. Patients leave the hospital with their important medications instead of needing to fill them after discharge. The housestaff and nurses in the affected clinical units, as well as pharmacy staff, receive training on the process and rationale. A continuously-updated run chart records the hospital's progress on a monthly basis and the results are shared with all hospital staff.

Other inpatient examples: implementation of the surgical safety checklist; and implementation of the central venous catheter insertion bundles in the ICU.

An example from the outpatient setting: An entire ambulatory clinic decides to improve its provision of interpreter services to its patients who do not speak or understand English.

[a]The three models have been published on the Institute for Healthcare Improvement's website as a course on its Open School learning platform.[17]