Planting design seeds to fill diagnostic holes

August 31 2017, by Beth Duff-Brown

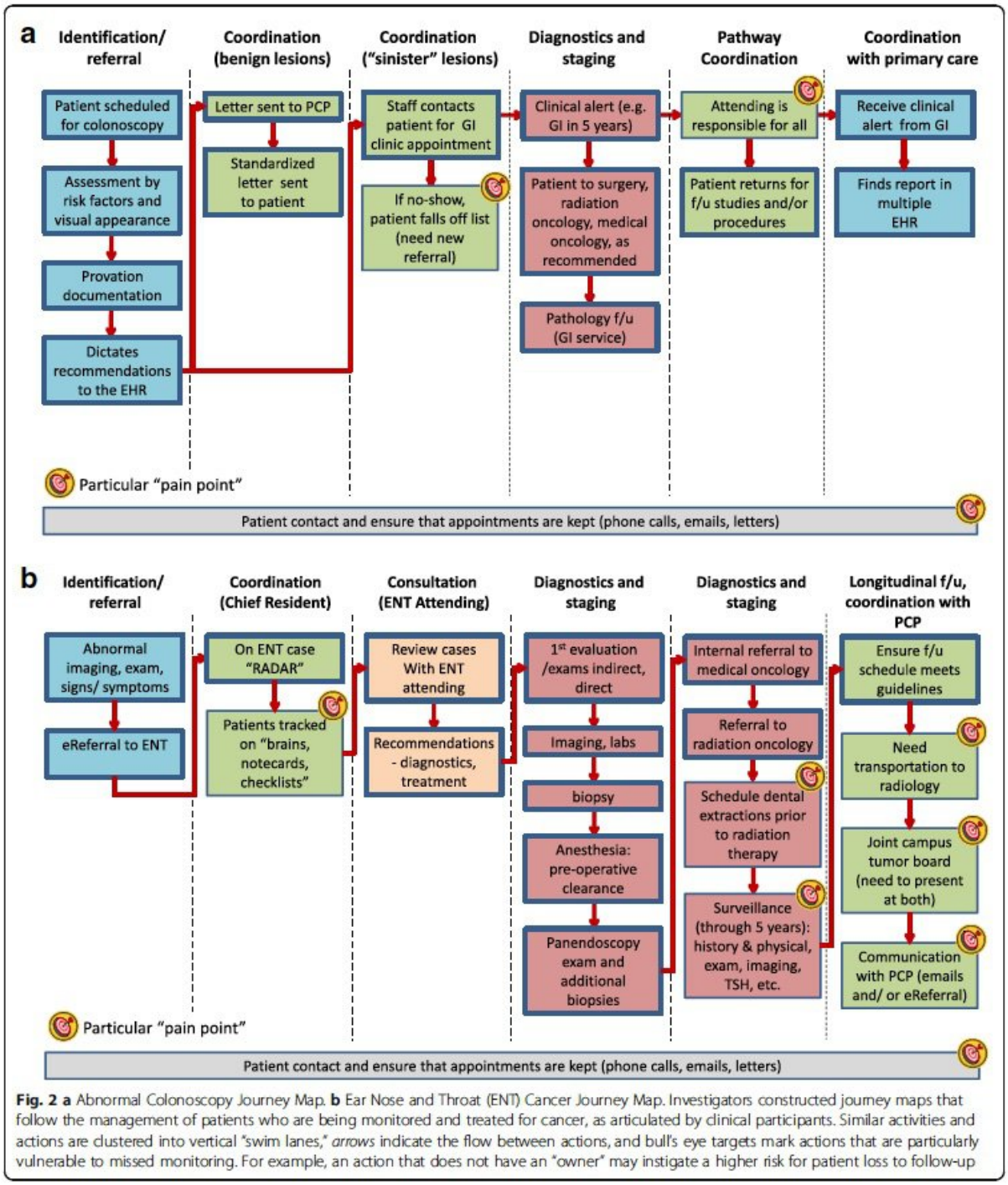

Fig. 2 a Abnormal Colonoscopy Journey Map. **b** Ear Nose and Throat (ENT) Cancer Journey Map. Investigators constructed journey maps that follow the management of patients who are being monitored and treated for cancer, as articulated by clinical participants. Similar activities and actions are clustered into vertical "swim lanes," *arrows* indicate the flow between actions, and bull's eye targets mark actions that are particularly vulnerable to missed monitoring. For example, an action that does not have an "owner" may instigate a higher risk for patient loss to follow-up

Design learning and journey maps are all the rage here at Stanford University and in Silicon Valley. So why not apply it to health systems to reduce diagnostic errors?

That's what Stanford Health Policy's Kathryn M. McDonald is trying to do: Map the journey of worrisome scenarios that keep clinicians up at night, and then plant design seeds that might just help those clinicians get back to sleep.

One of those real-world scenarios involves a preventable diagnostic error made as a high-risk condition unfolds across multiple visits to the doctor. Missed cancer diagnoses, for example, are the leading cause for paid medical malpractice claims in the ambulatory setting, with one in 20 patients experiencing potentially preventable diagnostic errors each year.

"For example, a patient who has a positive fecal blood test, but no follow-up colonoscopy within a reasonable period may experience a missed opportunity to detect and successfully treat colon cancer," McDonald said.

McDonald and her team worked with San Francisco public health clinics that cater to low-income patients to investigate this key problem—missed diagnosis and prevention activities during outpatient care—then came up with design seeds to plant possible solutions.

She and her co-authors published their research in the journal *Implementation Science*. The project was conducted at the Ambulatory Safety Center for Innovation (ASCENT), a patient safety learning laboratory led by Dr. Urmimala Sarkar at University of California San Francisco, and funded by the federal Agency for Healthcare Research and Quality.

The team used a research design approach called "journey mapping," a

tool that tells the story of a customer's experience through his own viewpoint. They constructed maps for each pathway used by doctors to monitor patients with sinister findings, starting with the initial diagnostic assessment during an initial clinic visit and continuing through ongoing follow-up visits.

"Whenever participants in the study verbalized elements of the pathway that were particularly vulnerable to error or poor monitoring, we marked the activity with a bullseye target, also referred to by clinicians as a 'pain point,'" the authors wrote. "To our knowledge, this technique has seldom been applied to the ambulatory setting, and has not been targeted to clinic workflow efficiency or patient safety intervention development."

"A design seed gives the specs for what a solution needs to do," said McDonald, who is the executive director of Stanford Health Policy's Center for Health Policy and Center for Primary Care and Outcomes Research. "Once you know the vulnerabilities through journey mapping, you create all the design seeds that are tied to the problem, then the implementation stage becomes much more straightforward and more likely to assure that all the key goals are met."

To test out this theory, McDonald's team spent the last two years working with doctors, residents, nurse practitioners and registered nurses with the San Francisco Health Network. The publicly funded integrated health network operates under the auspices of the San Francisco Department of Public Health and includes 14 primary care clinics, as well as urgent and specialty care at Zuckerberg San Francisco General hospital.

"The health system serves many of the most medically and socially vulnerable patients in San Francisco," the authors wrote in their research paper. "Like many safety-net systems and ambulatory practices, the health system does not have a comprehensive electronic health record

system and struggles with information transfer as well as fragmentation of health information across over 50 electronic platforms."

The health system had more than half a million outpatient visits last year by people who could not afford care. Patients at the network's main clinics and hospital are diverse: 35 percent are Latino, 21 percent are white, another 21 percent are Asians, and 17 percent are African-American.

Only 1 percent of the network population has commercial insurance; 10 percent were uninsured; 57 percent were on Medi-Cal—California's Medicaid program—21 percent were on Medicare and the remaining 11 percent were covered by other, mostly public sources.

This type of ambulatory health care is complex, requiring constant tracking and reconciliation of individual patient activities, patient data, and the unique evolution of each clinical case.

"Human factors and industrial design methodologies have tremendous potential to help unravel these complexities and provide fundamental insights that can drive the development of novel solutions," said co-author George Su of the University of California San Francisco School of Medicine.

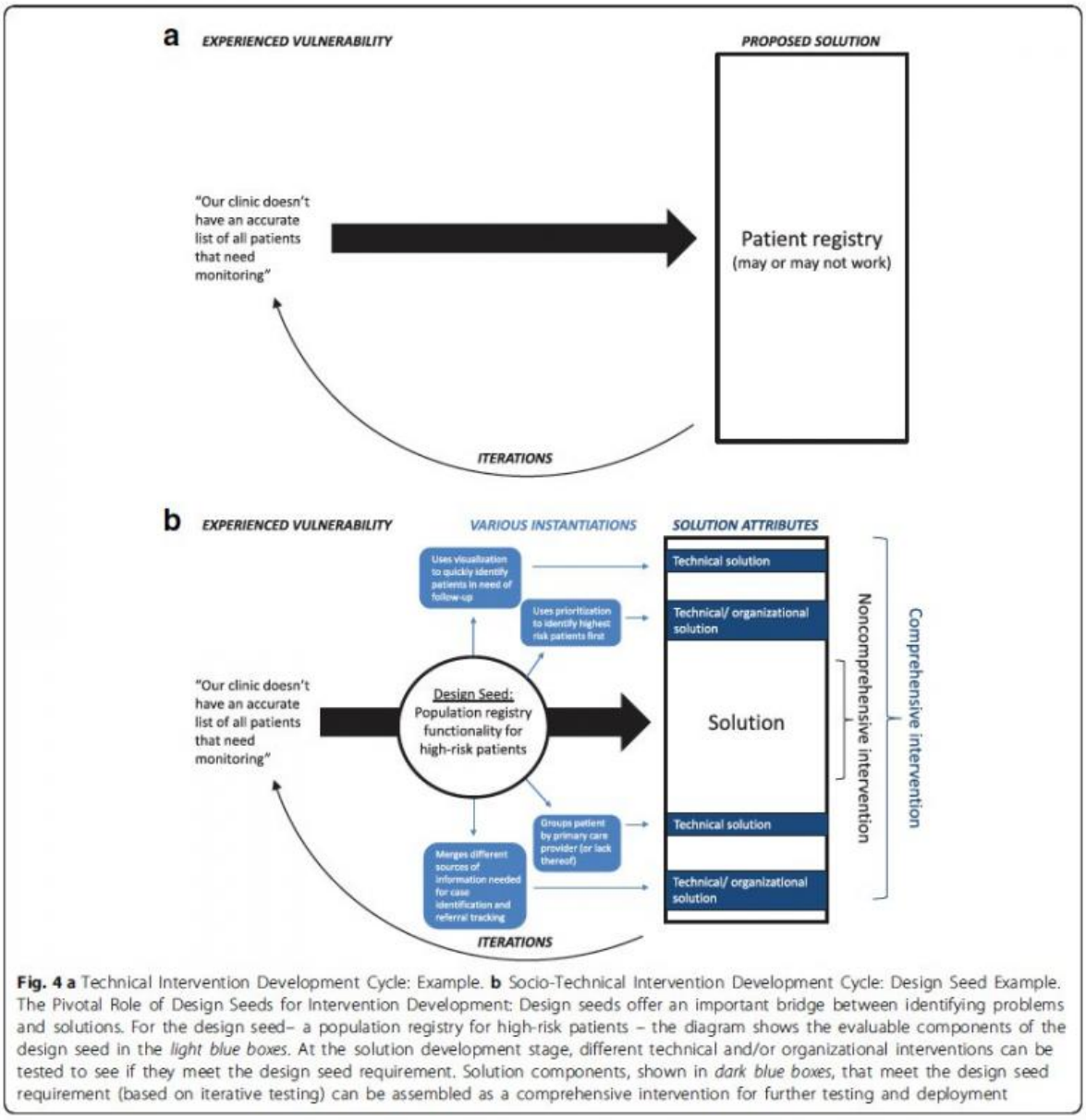

Fig. 4 a Technical Intervention Development Cycle: Example. **b** Socio-Technical Intervention Development Cycle: Design Seed Example. The Pivotal Role of Design Seeds for Intervention Development: Design seeds offer an important bridge between identifying problems and solutions. For the design seed– a population registry for high-risk patients – the diagram shows the evaluable components of the design seed in the *light blue boxes*. At the solution development stage, different technical and/or organizational interventions can be tested to see if they meet the design seed requirement. Solution components, shown in *dark blue boxes*, that meet the design seed requirement (based on iterative testing) can be assembled as a comprehensive intervention for further testing and deployment

McDonald said that journey mapping helped frontline clinic members see their workflow for a specific task, which in this case was monitoring this diverse population for follow-up visits after a potentially sinister

finding. The system challenge is population management of an ill-defined problem.

"Lots of ambulatory care work is done one patient interaction at a time, but robust monitoring requires a view from a higher plane," she said in an interview. "Journey mapping makes the aerial view more tangible and realistic for clinic team input."

McDonald's team selected high-risk cancer situations: incidentally discovered pulmonary nodules; monitoring for breast, colorectal and prostate cancers; and ear, nose and throat cancers. These high-risk cancers require recurring and timely follow-up care to assure intervention whenever the disease takes hold.

The team interviewed clinicians from each of five specialty clinics responsible for these high-risk patients in pulmonary medicine, breast cancer, gastroenterology, urology, and otolaryngology. They asked the frontline clinicians: "What keeps you up and night? And what are your clinical hunches about who might fall through the cracks?"

While the providers talked about the types of patients who become lost to follow-up visits, the researchers found, none of the clinics had a standardized and efficient method of quantifying how many patients were lost to follow-up care and, perhaps more importantly, why.

"Many other health networks share similar struggles with incomplete documentation and measuring the real-time scope of patient safety problems," wrote McDonald and co-authors Sarkar, Su and Sarah Lisker of the University of California San Francisco School of Medicine; and Emily S. Patterson of Ohio State University College of Medicine.

"When a patient has a warning signal for a serious condition that has yet to materialize but may in the future, the ability of a clinical team to

watch the patient closely over time hinges on incredible vigilance on the part of individual clinicians—hardly an ideal solution," McDonald said.

This is the crux of the problem, she said, and where so-called "design seeds" are planted.

"The design seeds lay the groundwork in a very specific fashion. Journey mapping and process tracing figure out the problem, in our case, vulnerabilities, and then the design seeds are the first-stage of the solution," McDonald said. "It's very user-focused, learning directly from those who are on the frontlines of the work, and making sure that the problem is specified in a way that allows for the developments of solutions that can scale more flexibly during implementation."

The team identified 45 vulnerabilities within San Francisco's publicly funded health clinics.

"Repeatedly, we heard that clinicians worry about properly tracking these patients, and are troubled by the significant personnel time required in carrying out patient-level monitoring activities without tools and organization approaches for population-level monitoring," they wrote.

But even then, the team did not jump straight to solutions. That's the next step.

The team will launch a pilot project to test possible solutions that will grow from the design seeds, such as whether new digital technology, workflow arrangements, and structured data collection could help find those patients lost in the cracks of an overloaded system.

"Such focused and potentially scalable work is particularly needed for patients who may be lost to follow-up in systems that are stretched for

dollars and time," the authors concluded. "Providers will often create informal workarounds in response to the lack of comprehensive and coordinated record-keeping systems, which can result in errors as well as redundant efforts."

The ASCENT team is already implementing a monitoring solution informed by the journey mapping activities, in subspecialty care clinics at Zuckerberg San Francisco General, by testing technical and workflow models.

"We determined the need for a registry for high-risk patients in the otolaryngology clinic to help us monitor the entire process," said Sarkar, a primary care physician and head of the ASCENT lab at UCSF. "This means the final diagnosis, workup and treatment planning, the actual treatment itself and then surveillance and follow-up."

More information: Kathryn M. McDonald et al. Implementation science for ambulatory care safety: a novel method to develop context-sensitive interventions to reduce quality gaps in monitoring high-risk patients, *Implementation Science* (2017). DOI: 10.1186/s13012-017-0609-5

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