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A report by the Center for Health Solutions

The right care in the right way

Global case studies in reducing low-value care

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Executive summary

LOW-VALUE health care—services of low, no, or even negative impact on patients, as well as services delivered in an unsafe or inefficient manner—is pervasive across the globe. Some widely used services are clinically inappropriate for most patients under most circumstances. Examples include doing an EEG for an uncomplicated headache or a CT or MRI for lower back pain in patients without signs of a neurological problem.[1] More examples of low-value care are the misuse of some medications, including opioids and antibiotics, which have led to growing problems in opioid abuse and antibiotic-resistant bacteria.

Reducing low-value care has proved to be a hard and slow task.[2] Nevertheless, doing so is likely essential if we are to lower costs while also pursuing innovation and improving health quality and outcomes. In the United States alone, the financial toll of low-value care is estimated in hundreds of billions of dollars (see sidebar "The high price of low-value care"). In addition, low-value care arising from medical errors and operational inefficiencies in service delivery can result in adverse patient outcomes, excessive costs (including fraud), and poor patient experience. Reducing and ultimately eliminating low-value services are likely essential to achieving value-based care, in which a treatment's effectiveness ultimately helps to determine its value.

The Deloitte Center for Health Solutions conducted extensive research and interviewed experts to see what is working globally to reduce low-value care. The resulting case studies, spanning 10 organizations in five different countries, illuminate four main avenues for reducing low-value care:

- Providing the right care: Curbing services that offer few or no patient benefits
- Delivering care in the right setting: Curtailing unwarranted emergency department utilization
- Delivering care safely: Tackling safety failures
- Providing care in the right way: Rooting out operational inefficiencies

In these 10 case studies, and throughout the paper, we highlight where effective use of technology has made a difference, from seemingly simple fixes such as including patient photographs in electronic health records to improving clinician training with Wi-Fi-enabled robots that simulate patients. We also show where emerging applications could make even more of an impact in the future in terms of improving outcomes or reducing costs. In other cases, we show how seemingly simple ideas or process redesigns, such as regular review of elderly patients'

THE HIGH PRICE OF LOW-VALUE CARE

The full costs of low-value health care services, waste, fraud, and inefficiency across the globe are difficult to gauge, but researchers have estimated those costs for the United States, and they are significant:

- **USD 210 billion**
  Overuse and excessive discretionary use
- **USD 130 billion**
  Mistakes, preventable complications, and care fragmentation
- **USD 190 billion**
  Excess administrative costs, including inefficiencies due to documentation requirements and paperwork costs beyond benchmarks
- **USD 105 billion**
  Unnecessarily expensive care
- **USD 55 billion**
  Missed prevention opportunities
- **USD 75 billion**
  Fraud

Source: Institute of Medicine, ***Best care at lower cost: The path to continuously learning health care in America***, National Academy of the Sciences, 2013.

drug regimens by pharmacists or incorporating lean principles throughout a hospital, can significantly reduce costs or improve outcomes when implemented effectively. Taken together, these examples show how health care organizations can reduce low-value care in favor of the right care, in the right setting, safely, and in the right way.

Introduction

THE high costs of low-value health care—excessive spending, waste of patients' and clinicians' time, and poorer patient outcomes—make a stirring case for change.

Global awareness of the prevalence of low-value care has been increasing. More than 20 countries have initiated "Choosing Wisely" campaigns, in which health care specialty societies identify designated services, tests, or treatments that are inappropriately used in certain circumstances, and work to reduce their use.[3]

In the United States, the cost of services that don't necessarily benefit patients approaches USD 210 billion annually.[4] In addition, safety shortfalls and operational inefficiencies, such as duplicating the delivery of certain services due to inappropriate care coordination, amount to USD 130 billion yearly.[5]

Similarly high costs associated with low-value care service delivery have been documented internationally.[6] For instance, an ongoing review of public health care in Australia has identified potential savings amounting to AUD 409 million from implementing benefit changes to reduce low-value care.[7] In the United Kingdom, eliminating unwarranted variations in care could save up to GBP 5 billion.[8]

Avoidable injury from adverse events related to medical procedures, stress associated with false positives from unnecessary screening tests and invasive follow-up procedures, and time and productivity costs can greatly add to the toll taken by inappropriate or inefficiently delivered services. Misuse of antibiotics, for instance, is a contributing factor to the rise of antibiotic-resistant bacteria, associated with over 20,000 deaths annually in the United States alone.[9]

Awareness of the issue is important but likely not enough to effect change. Reducing low-value care has often proved hard and slow. There is no single, simple solution to reducing low-value care that organizations can put into motion by pulling a lever. But some health organizations around the world have been successful in finding solutions to reduce the prevalence of low-value care. Our case studies from the United States, Brazil, Israel, Singapore, and the United Kingdom demonstrate that technology has often made a difference. From seemingly simple fixes such as including patient photographs in electronic health records to improving clinician training with Wi-Fi-enabled robots that simulate patients, technology can serve a crucial role in enabling solutions to reducing low-value care around the globe, and promises to help even more in the future.

The right care

Curbing the provision of services that offer few or no patient benefits

ALTHOUGH progress on changes at the broad system level has been slow, our case studies—from the United States, the United Kingdom, and Brazil—highlight successful initiatives to reduce the delivery of services that provide few or no patient benefits. In the United States, process change, education, and physician training have reduced unnecessary preoperative testing in California; in the United Kingdom, process change, education, and training to cut down potentially unnecessary diagnostic procedures reduced their use; and in Brazil, training clinicians prevented excessive use of C-sections.

Case study 1

Eliminating unnecessary preoperative testing

Los Angeles County-University of Southern California Medical Center[10] *saw a* ***six-month reduction in patient wait time for surgery*** *and* ***USD 1,200 in savings per patient.***

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The Los Angeles County-University of Southern California Medical Center (LAC+USC), a public teaching hospital, made changes in 2015 to eliminate routine preoperative testing that not all patients need before routine cataract surgery. The changes were based on Choosing Wisely guidelines.[11] With just three additional keystrokes in the ordering system, doctors could identify patients who did not need the expensive, time-consuming testing because they did not meet specific clinical criteria. The three additional keystrokes circumvented an unnecessary radiology consult, leading to fewer potential delays to scheduling the procedure.

As a result, LAC+USC saw an 80 percent drop in unnecessary preoperative work for cataract surgery over a six-month trial period as compared to another large public teaching hospital that did not implement the same change. Without additional testing, average waiting time for surgery declined by six months.

Detailed results of an evaluation of this initiative showed that:

- Unnecessary preoperative medical visits fell from 76 percent to 12 percent of patients after the program was implemented.
- Ninety percent of pre-intervention patients had unnecessary preoperative laboratory testing compared to 31 percent following implementation.
- Patients waited a median of 245 days until surgery pre-intervention, compared to a median of 64 days following implementation.
- Given that preoperative testing is estimated at USD 1,200 per case, LAC+USC Medical Center anticipates significant cost savings with no adverse impact on patient care.

Case study 2

Involving patients in decision-making

The UK Health Foundation's MAGIC program involved patients in treatment decisions, which led to ***more streamlined services*** *and* ***positive satisfaction scores*** *for both patients and health care professionals.*[12]

In 2010, the UK Health Foundation commissioned the MAGIC (Making Good Decisions in Collaboration) program to identify, design, and test the best ways to embed shared decision-making (involving both patients and doctors) in health care. The program worked with frontline health professionals and their priority projects across the United Kingdom.

Treatment options covered included:

- Primary care: Prescribing antibiotics and using generic decision support tools for other key primary care decisions
- Breast cancer: Helping women choose between mastectomy and breast-conserving surgery
- Kidney disease: Providing multiple options for treating chronic kidney disease
- Head and neck cancer: Helping patients choose the type and aggressiveness of treatment appropriate for them, balancing the risks and side effects with the possible benefits
- Pediatric care: Options for treating pediatric ear, nose, and throat patients
- Maternity care: Helping patients choose whether to repeat C-section and using generic decision support tools for other key obstetric decisions
- Urology: Helping men with enlarged prostrate choose between taking drugs, surgery, and lifestyle changes

Results of the program included a reduction in urology patients' requests for appointments with physicians after obtaining information on clinical pathways for enlarged prostate. Clinicians reported that the additional time spent in involving the patient reduced the potential number of repeat conversations with the patient, ultimately leading to better outcomes.[13] Encouraging deeper conversations with patients also contributed to clinicians embracing a more patient-centric approach. As a physician reported: "You realize each patient is different . . . we need some time talking and communicating in the patients' language."[14]

Case study 3

A collaborative approach to reduce C-section rates

Projeto Parto Adequado in Brazil ***reduced C-section rates in the country by 12 percent in 18 months*** *by leveraging technology to train clinical teams and educating patients.*

In 2015, a coalition of 26 private and public hospitals across Brazil began a pilot project—Projeto Parto Adequado (PPA)—to lower the rate of medically unnecessary C-section births. In 2017, more than half of all births in Brazil were by C-section.[15] Compared to vaginal births, C-sections have been associated with maternal pelvic floor dysfunction, increased risk of childhood asthma and childhood obesity, and increased risk of complications in pregnancies after C-section.[16]

PPA included short-term (six- to fifteen-month) learning collaboratives that brought together several teams from participating hospitals to achieve improvement in focused areas—a learning system developed under the Institute for Healthcare Improvement's Breakthrough Series. Key PPA changes included reorganization of care delivery toward multidisciplinary teams rather than an overreliance on obstetricians, as well as the use of non-pharmacological methods to manage pain. Women were given appropriate evidence-based information about their options.

Physicians and teams were trained in vaginal delivery using Wi-Fi-enabled, interactive robot patient simulators. They also received information on how their delivery practice statistics compared with those of their colleagues, drawing upon professionalism (and good-natured competitiveness) as an incentive for change.

In phase 1 of the project, partner organizations increased the rate of vaginal birth from 21.6 percent to 38 percent over 18 months in 26 public and private hospitals. Phase 2 (expansion to 137 hospitals)

was launched in August 2017, and in 2019 this program is expected to roll out to other sites. PPA leaders are also working with health insurance companies in Brazil to reduce the disparity in payment between C-sections and vaginal births to incentivize clinicians to avoid unnecessary C-sections.[17]

Lessons learned

- Successful implementation relies on a combination of interventions supporting many stakeholders—administrators, clinical staff, and patients.
- Culture change is critical, and organizational support and ownership are vital for engagement.
- For clinicians, the right incentives matter, and "giving something to get something"—such as feedback on performance relative to peers when seeking to engage physicians—can be a valuable inducement to change.
- Education, information, and training for patients and physicians alike can be important in curbing overuse; technologies such as virtual reality or robots can help support such clinical training endeavors.

Although the health care settings are different, the key lessons from these case studies can readily be applied elsewhere, as evidenced by the World Health Organization's expressed interest in using Brazil's Projeto Parto Adequado as a model to inspire health care leaders in other countries where C-section is overused.[18]

The right setting

Curtailing unwarranted use of emergency department care

RESEARCH shows that not all visits to the emergency department (ED) involve a medical emergency. The convenience of the ED, lack of access to a primary care physician and alternative care settings, socioeconomic deprivation and lack of social support systems, lack of information about more appropriate sites of care—all these factors and more play a role in driving inappropriate ED utilization.[19] Inappropriate ED visits account for between 12 and 32 percent of all ED visits in countries such as the United States, Canada, England, Italy, Portugal, and Australia. In Belgium, inappropriate ED utilization is as high as 56 percent.[20]

Inappropriate ED use is very costly for health care systems around the world. In England, the cost of inappropriate ED visits was estimated at nearly GBP 100 million between 2011 and 2012.[21] A 2010 US study projected that a potential USD 4.4 billion in annual savings could be achieved by diverting non-urgent ED use to alternative health care settings.[22]

How can inappropriate ED utilization be reduced while still ensuring that patients receive the emergency care they need? Below, we compare telehealth-based initiatives in two very different settings—the metropolis of Houston, Texas, and the small town of Millom, England.

Case study 4

Video chat evaluates ED-bound patients

*Integration of tablet-enabled telehealth into ambulance calls results in **fewer unnecessary ED visits** in Houston, Texas, saving **approximately USD 2,500 with each avoided unnecessary ED visit**.*

The Emergency Telehealth and Navigation (ETHAN) program was launched in Houston, Texas, in 2014. ETHAN established a system of ambulance-based teleconsultations that reduced ED use and freed emergency medical services (EMS) teams to respond to other calls.[23]

Under the program, patients requesting ambulance services receive on-the-spot referrals to the most appropriate site of care—ED, hospital, home, or urgent-care clinic. When EMS teams aren't sure whether a patient needs emergency transport to the hospital, ETHAN uses tablet-based video chat and other technology to enable emergency physicians to conduct real-time patient assessment. For patients deemed in need of ED care (or refusing proposed alternatives), EMS provides transportation to the ED by ambulance or taxi. For patients not requiring ED care, EMS teams use an app to schedule appointments at partner clinics, refer patients to their primary care providers, or facilitate self-care at home. Local partner organizations help with follow-up monitoring and connecting patients to community-based resources that address social health-related needs. Follow-up monitoring played a key role in reducing ED utilization: "After an ETHAN encounter, patients are less likely to call 911 again," said one of the program's leaders we interviewed.[24]

Achieving institutional acceptance of ETHAN was one of the biggest challenges to the program's success. Helping EMS staff become comfortable with the system was the key. ETHAN's organizers worked for over a year to help ensure that each EMS team member received in-person training. After this education outreach, even many of those who had resisted the system in the beginning had become fans.[25]

An evaluation of the program found that ETHAN reduced unnecessary visits to the ED in Houston by 6.7 percent.[26] As each avoidable inappropriate ED visit saves about USD 2,500, the program cost savings are estimated to amount to almost USD 1 million annually for private and public health insurers. The program also reduced back-in-service times for ambulances by 44 minutes.

The ETHAN program has received inquiries from across the country from interested parties seeking to replicate its success: One leader of the ETHAN program estimates that they have received over 700 requests for interviews from across the country and around the world.[27]

Case study 5

Telehealth brings health care to remote areas

Using telehealth to bring urgent care to patients in remote Millom, England, as part of a program that led to ***1,500 fewer unnecessary hospital visits per year*** *throughout the region.*

In 2016, Millom, England, (population 8,500) launched a telehealth pilot designed to make hospital consultations available in a geographically remote area, and potentially reduce unnecessary ED use.[28] A triage room located in the small town's patient-care clinic and the nearest ED located nearly an hour's drive away are both equipped with a high-definition camera and monitor. A team of general and nurse practitioners consult remotely with ED experts to triage patients, with the high-definition camera allowing remotely located doctors to see the wounds or injuries. If ED travel is still required after triage, it is arranged at the clinic.

Millom's initiative is part of Better Care Together, a five-year plan for determining how health services across the Furness and Cumbria region are to be delivered. The scheme, regarded as a "vanguard model" by the Department of Health, has been awarded nearly GBP 13 million in government funding since its 2015 launch.

The teleheath system followed on the initial success of a program to connect general physicians in the area to specialists. An email link used by general practitioners across the area allowing them to seek direct advice from hospital specialists on questions about referral of specific patients reduced outpatient appointments across south Cumbria by 1,500 (close to 10 percent) in its first year.[29]

While results from Millom's telehealth program have yet to be reported publicly, a three-year randomized controlled trial in England found that telehealth could reduce hospital admissions by 20 percent and ED use by 15 percent for patients with chronic conditions, including diabetes, chronic obstructive pulmonary disease, and heart failure.[30] Though adoption of telehealth throughout the United Kingdom has been slow,[31] when properly implemented, the potential benefits of improved availability of care remain considerable.

Lessons learned

- It's important to anticipate some initial resistance to change due to inertia and obtain buy-in from those likely to be affected by change (ideally in advance).
- Physicians and staff need to be trained in new tools and approaches.
- Since misaligned financial incentives can be an important barrier to the widespread adoption of programs to reduce inappropriate ED use, finding ways to ensure shared savings may also be key.
- Effective use of technology—in this case, telehealth—can make a difference when redesigning care delivery.

As innovation in telehealth capabilities continues around the world, telehealth might be poised to play an even greater role in reducing inappropriate ED use. For instance, in 2016, Israel became the first country to offer its citizens the opportunity to engage in video calls and chats with ED responders, increasing the potential for screening and direction.[32]

Providing care safely

Reducing failures in safety

ADVERSE events in health care due to safety failures are estimated to be the 14th leading source of the global disease burden—comparable in impact to diseases such as tuberculosis and malaria.[33] In higher-income countries, the burden of patient harm due to safety failures is similar to that of chronic diseases such as multiple sclerosis and some types of cancer.[34] Most of the burden of patient harm is associated with a small number of common adverse events, including health care-associated infections, venous thromboembolism, pressure ulcers, medication errors, and wrong or delayed diagnosis.[35] The cost of treating safety failures is high, accounting for more than 15 percent of hospital expenditures in developed countries.[36]

Despite widespread recognition of safety problems in health care delivery, progress in reducing clinical errors and improving safety has been slow, in part because relatively few effective interventions have been identified.

Nevertheless, case studies from Colorado, Scotland, and Israel illustrate some effective interventions. In these examples, adding patient photographs to electronic medical records (EMRs), deploying apps to support patient care protocols, and establishing polypharmacy review processes have made a marked difference in reducing low-value care.

Case study 6

Patient photos in EMRs reduce medical errors

In 2010, Children's Hospital in Colorado added patient photographs to the electronic medical records and changed order entry protocols to reinforce the link between patients and their orders, thus ***reducing errors and near-misses****.*

The system requires clinicians to confirm any order entered into its computerized order entry system through a pop-up verification screen that includes a prominent photograph of the patient, along with demographic information such as age and gender, and verify that the order has been entered into the right patient's chart.

This system has reduced cases in which patients receive (or nearly receive) care intended for someone else.[37] In 2011, three patients received care intended for someone else because of orders being placed in the wrong chart, compared to 12 patients in 2010. A similar decline occurred in near-misses, which fell from 33 in 2010 to 12 in 2011.

Case study 7

An early warning scoring system to improve safety

The Scottish Patient Safety Programme's Early Warning Scoring System contributed to a ***5 percent overall decline in mortality*** *and* ***faster identification and treatment of key conditions****.*

The Scottish Patient Safety Programme (SPSP), a keystone of quality improvement in Scotland, introduced a "National Early Warning Score (NEWS) calculator" to alert clinicians to deteriorating patients in 2014. It also launched a screening tool for the prompt recognition and timely initiation of treatment of patients with sepsis, a life-threatening complication from infection. An algorithm helped identify organ dysfunction, severe sepsis, and septic shock and determine when to escalate care for these patients.

The program has seen remarkable results, with inpatient hospital mortality declining by 5 percent overall and the share of sepsis patients receiving

antibiotics within an hour of diagnosis improving to 70 percent from 20 percent.[38] The NEWS system has since been adopted by National Health Service (NHS) England and is in wide use.[39]

Case study 8

Medication review improves safety and patient independence

Simplifying prescription regimens leads to a ***reduction in unnecessary medications*** *and* ***increased patient independence and safety*** *in Tel Aviv, Israel.*

In 2012, the Givat Hashlosha geriatric center in Tel Aviv, Israel, implemented an intervention targeted at reducing potentially inappropriate medication use among elderly, chronically ill patients. Residents aged 65 and older taking at least one medication were randomized to either receive usual pharmaceutical care or to be enrolled in a special program. In the program, a pharmacist reviewed the patient's medication regimen every six months, and using established criteria, recommended to the patient's physician any changes to reduce inappropriate or unnecessary medication.[40]

The program helped reduce the number of medications per patient, saving each patient, on average, the equivalent of about USD 30 a month. Program patients enjoyed the same quality of life and level of functional independence as their peers, and their rate of hospitalization was no higher. Even two years after the initial study, the patients who had enrolled in this program experienced falls less frequently than those who had not.[41]

Lessons learned

- Focused initiatives, such as training clinicians and implementing review-and-advise protocols for patients taking multiple medications can have a significant payoff in terms of improved health outcomes and cost savings.
- Technology can be an effective tool to support the implementation, functioning, and monitoring of strategies to address safety failures.

Some of the most promising, technology-driven safety interventions—including cloud-enabled artificial intelligence and advanced clinical decision support systems to predict which patients are at the greatest risk for adverse events—signal safer health care in tomorrow's hospitals, clinics, and physician offices.[42] To cite just one example, the Antimicrobial Companion, a mobile app launched in Scotland in 2016, aims to achieve safer and more effective prescribing with its dosage calculators, clinical guidelines, and data collection features.[43]

Providing care in the right way

Rooting out operational inefficiencies

HEALTH care delivery is often riddled with operational inefficiencies such as complex administrative procedures, lack of proper patient care coordination between different departments, slow turnaround times for diagnostic tests, information silos, and outdated record systems.

Operational inefficiencies can increase the cost of delivering services, as well as lost productivity and time due to unnecessary patient waits. In the United Kingdom, the 2016 Carter Review estimated that unwarranted variation in hospital resource use due to operational inefficiencies represented GBP 5 billion in excess costs, or 9 percent of the GBP 55.6 billion spent on acute care hospitals in England.[44]

Below, we examine two very different approaches to successfully rooting out operational inefficiencies in health care.

Case study 9

Near real-time lab results bring down reoperation rates

Integrating fast lab results to ***avoid repeat lumpectomies*** *at the Mayo Clinic in Rochester, Minnesota.*

In 2006, the Mayo Clinic launched an initiative to reduce its lumpectomy reoperation rate. By leveraging a novel lab technique that delivers pathology results from frozen tissue in under 20 minutes—rather than 24 hours or later after surgery—surgeons are informed in near real time whether the cancer operated on has been removed.

The approach eliminates the need for repeat lumpectomy in about 96 percent of patients. In one study that analyzed five years of data, the 30-day reoperation rate was 3.6 percent at Mayo, compared with 13.2 percent nationally.[45] Mayo's costs for lumpectomy surgery are higher in the short term, due to the additional 20 minutes of wait time for pathology results, and Mayo Clinic earns less revenue from follow-up operations. But leveraging this technology reduces overall medical costs, as well as patients' psychological stress and inconvenience, and improves the patient's experience of care.

Case study 10

Designing health care around lean processes

In 2006, Singapore's Tan Tock Seng Hospital (TTSH) adopted a "lean health care" model of facility design and operations ***that increased the efficiency of its services delivery and improved patients' experience*** *of care.*

Lean and user-centered design principles drive TTSH processes, including building or updating infrastructure and training staff. All new employees are inducted into the lean health care-centered principles on which TTSH operates, and are empowered to carry out improvement initiatives in their work units. Some employees are further equipped with capabilities and platforms to lead process improvement projects.

The hospital leverages technology to eliminate non-value-adding tasks. With data from pedometers that track the number of steps a nurse takes, TTSH improved processes and redesigned wards so that nurses spend less time needlessly walking and more time by the patient's bedside. TTSH embraced the "go-and-see" principle of lean management, in which process redesign happens in close collaboration with ground-level staff. Data analytics, combined with "go-and-see," has informed this and other changes.

TTSH processes incorporate both "lean" (efficient) and "design-thinking" (centered on users'

needs). To this end, the layout and setup of each clinic was reorganized for clear, seamless, and safe flow of people, information, and supplies. Cutting needless movement and delays helped to reduce waiting times and patient turnaround times. By understanding the workloads for each clinic and clinical support services required by each discipline, the clinical services could be relocated to where the volume is justified. In the pharmacy, for example, repetitive tasks have been automated to reduce wait times. Robots now read electronic prescriptions, pack medicines, and label them with a barcode linked to the correct patient.

The success of this approach has been remarkable. The hospital cut waiting time by 40 percent in its outpatient pharmacy and doctor waiting time by 7 percent over five years.[46] By standardizing processes involved with straightforward cases of cataract surgery, productivity increased from 2 to 3.5 procedures per hour between 2009 and mid-2012, a 75 percent improvement over baseline.[47]

TTSH redirects the savings and resources to uses that increase value to patients, physicians, and TTSH. For instance, patient service associates are trained to perform venipuncture, freeing nurses' time to preform higher-value activities.

Patient and staff satisfaction has continuously improved over time.

Lessons learned

- Fewer unnecessary procedures and workflow redesign can increase productivity.
- Leveraging clinical advances to require fewer repeat procedures means less impact on patients, freeing resources to treat more patients, conduct research, or focus on innovation.
- Improved organizational processes can have immediate and direct positive impact for the patient, achieving much-needed early buy-in, which is essential to fundamental redesign.

The frontier for harvesting efficiency gains is expansive, offering many opportunities for experimentation and innovation. Emerging technologies, particularly artificial intelligence (AI), data analytics, cloud, the Internet of Things, and robotics, have tremendous potential to assist such endeavors, from clinical applications, such as robot-assisted procedures and pharmacy to robotic automation of repetitive administrative processes. AI shows promise as a tool to reduce length of stay in hospitals by identifying bottlenecks that prevent prompt discharge.[48]

Conclusions and overview of lessons for adoption and innovation

LOW-VALUE care is pervasive and costly, but our case study examples from around the world show that some organizations have embraced successful solutions to help ensure that more patients get the right care, in the right setting, and delivered in the right way.

We have distilled a number of broad lessons from the successful programs and initiatives highlighted in this research report:

- No magic bullet/one-size-fits-all solution has been identified to reduce low-value care. In all the examples we have featured, and in conversations with experts and stakeholders, multicomponent and tailored solutions have given the best results. For instance, implementing lean health care at Tan Tock Seng Hospital in Singapore spanned the whole organization, from space design to clinical workflows, and Projeto Parto Adequado involved multidisciplinary clinical teams as well as community education.
- Although technology isn't a solution in and of itself, our case studies illustrate that it can enable the implementation, functioning, and monitoring of successful strategies to reduce low-value care in diverse settings (see table 1).
- It can be critical to help ensure that cultural changes accompany technological changes, as demonstrated by the many months of in-person trainings and demonstrations that the ETHAN team had to undertake to help ensure adoption

Table 1. Successful applications of emergent technologies to reduce low-value health care across the globe

Emergent technology	Applications
Robotics	• Facilitating realistic clinical training through simulation of vaginal and C-section delivery on virtual robotic patients at hospitals in Brazil • Assisting in pharmacy dispensing at Tan Tock Seng Hospital in Singapore
Tablets and other computer-aided audio-visual equipment	• In-ambulance teleconsultation with emergency physicians in Houston, Texas, to determine whether an ED visit was necessary • Local teleconsultation with remote hospital physicians in Millom, England
Mobile apps	• Improving recognition of patients at risk for sepsis in Scotland • Scheduling appointments for patients needing a medical home in Houston, Texas • Safer and more effective antibiotic prescribing in Scotland
Innovations in electronic health records	• Pop-up screen with patient photographs being used to increase safety • Three-stroke modification to hospital order-entry system facilitated changes allowing patients to obtain more timely eye surgery

Source: Deloitte analysis.

of the tablet-based technology. Cultural changes for physicians and other health care providers represent a shift from a culture of thoroughness to a culture of appropriateness. Building on physicians' professionalism and innate competitiveness (through education, monitoring, and feedback, for example) has often proven its value. Developing replicable models of physician training, as with the robotics experience of Projeto Parto Adequado, may prove to be an important path forward in bringing innovative solutions to scale.

- Effective progress can include looking for ways to substitute high-value care for low. For example, improving the precision of diagnostic tests can result in fewer false positives, which in turn results in higher-value service.
- Patients need to be front and center in initiatives. For patients, the shift from a more-is-better mind-set to an understanding that too much can be not only costly, but even harmful can be accomplished through education, as MAGIC did in the United Kingdom. Informed and engaged patients are often more satisfied and have better care outcomes. Physicians should understand that patient questions about services don't normally constitute demands or expectations.

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