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Change Management and an Innovative Approach to Heart Bypass Surgery

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In this article…

Take a look at the milestones and potential pitfalls one group faced when attempting to introduce innovation to cardiac surgery.

Over the past several decades, cardiac surgery has provided a level of reliability that is highly valued by referring doctors, and a profitability that hospitals depend on. Recently this field has faced the challenge of percutaneous coronary interventions (PCI). This innovation has proven that it can provide similar results to invasive surgery with dramatically less procedural morbidity.[1]

Reducing invasiveness has been a natural step in the evolution of virtually all mature surgical procedures (e.g., laparoscopic, arthroscopic, and robotic approaches). The ability of cardiac surgery to adapt to the challenges of less invasive approaches seems likely to determine its future.

As one of the most common surgical procedures performed in the U.S., with expenditures that exceed $5 billion per year, coronary artery bypass grafting (CABG) is the bellwether procedure for the viability of cardiac surgery as a field. Multiple studies have established that the longevity of the left internal mammary artery (IMA) grafted onto the left anterior descending artery is superior to PCI.[2]

Our group has used robotics to facilitate surgical grafting of one or both IMA via small incisions[3] providing the long-term advantages of traditional CABG without the morbidity of the sternal incision. Although it is not currently offered at most cardiac surgical programs, a sizable subset of patients continues to actively seek out robotic CABG (R-CABG) and other less-invasive surgical procedures.

Replacing a highly successful status quo (CABG via sternotomy) with the unfamiliar procedure (R-CABG) can be associated with a lengthy “learning curve”[4] (Figure 1) and poses a number of underappreciated organizational challenges.

Let’s look at the change management process and describe the pitfalls to be anticipated and specific milestones to be reached in order to maximize the chances for a successful implementation of R-CABG or any other innovative program in cardiac surgery.

Setting sights on success

Cardiac surgery is not a platform easily conducive to change. The first stage of change involves carefully preparing all stakeholders in the cardiac surgery program (cardiology, anesthesiology, nursing, CT surgeons, perfusionists, PA's, administrators) to accept that change is necessary and what it is likely to entail (Milestone 1).

The well-established fact that patients prefer having less invasive options available to them is a fundamental argument in support of R-CABG. Patients' enthusiastic endorsement of PCI technology over traditional CABG for the last two decades speaks to their views of less invasive approaches as "patient centered" care.[5]

These discussions should address the consequences of inaction, and opportunities other than R-CABG that could be exploited. The debate is likely to intensify and support for the status quo emboldened after the first cases reveal evidence of the lengthy learning curve for R-CABG. Naysayers to R-CABG should be challenged about alternative plans they suggest for addressing the shift toward providing more patient-centered care.

Convincing the cardiac surgical team to overcome the learning curve requires reliable and credible tools to monitor progress as the program is implemented. It is important to appraise baseline performance according to the wide array of clinical, financial, and human factors that are influenced by high impact change (Milestone 2).

Group presentations from prior or potential R-CABG patients (e.g., consumer groups), dissatisfied customers, competitors and industry representatives (e.g., robot manufacturer) can help provide a comprehensive view of the good, bad and ugly aspects of the program prior to change.

Clearly articulating the goals and action plan for implementing R-CABG a priori enables the metrics of success to be established (Milestone 3). These metrics should be negotiated among all stakeholders[6] so that they are realistic and include prolonged OR times and a higher risk of complications during the learning curve.

For every one story of sustainable success with R-CABG, there are multiple anecdotes of failure. Factors unique to a high-impact project like R-CABG make this project a high risk for failure.

First is the long duration of the project. It takes 100 cases or one to two years to complete the learning curve for R-CABG. This can strain support of the program among the hospital administration. Adverse outcomes during this period can have a lasting influence on team morale, hindering commitment from the front lines.

Surgeon champions of R-CABG, the leaders of this project, usually have no formal training in change management. An extraordinary level of effort is requested from program participants including extra training (often off-site), participating in multidisciplinary meetings, and enduring prolonged operative times. Each of these issues contributes to a project that is high risk for failing during or after implementation.[7]

Hospital administration can compensate for many of these deficiencies prior to initiating the project. The deliberate selection of team members who are most likely to improve and speed up team training have been shown to reduce the duration of the learning curve for R-CABG.[8] This allows simulation and other forms of training to be focused on a smaller, selected group, making these investments more effective.

Visible involvement of administrators (particularly those who allocate resources) in team development helps members realize that participating departments will be equipped to meet the challenges that change poses.[9] The productivity of the project should be measured not just on results and volume, but also on how well organizational challenges are identified and addressed by the team.

Senior leaders also impact change through the managers they hire and promote. The manager relationship represents a critical pressure point for front-line staff participating in the innovative process. The quality of this relationship affects the trust, participation and enthusiasm for adopting change, which ultimately influences the risks of job dissatisfaction and poor morale.

Staff initially passionate about the need for change in the organization will quickly decipher ambiguities in their managers, dampening their enthusiasm. Taken together, these interventions emphasize that it is optimal for innovation to set up a project that is at high risk for success rather than failure. These expectations of hospital leadership should be made clear at the outset of the program (Milestone 4).

Build a coalition for change

With help from the administration, the project leader should pull together those leaders in the hospital who would be willing to commit to the success of this high-impact change.[12] This “change coalition” should be interdisciplinary and involve different levels within the hospital ranging from front-line staff to senior administration (Milestone 5).

Active participation of the R-CABG surgeon in the hospital wide robotics committee will help establish credibility and trust among peers and gain reciprocal interest in the R-CABG program (Milestone 6). Regularly measuring and presenting outcomes for the program against the publicly agreed upon metrics for success will allow the team to hold members accountable.

The result for these ongoing reviews will be to either reaffirm that R-CABG is feasible and safe or allow interested stakeholders to help troubleshoot problems that arise. A consensus of the interdisciplinary team should have the gravitas necessary to reassure the administration that the new program is truly in the best interests of the patients and hospital.

It takes 100 cases or one to two years to complete the learning curve for R-CABG.

The hospital administration, in turn, reinforces the efforts of the coalition by confirming its own realistic expectations about the program.

Establish the business plan

Because the financial performance of R-CABG is inconsistent during the learning curve (Figure 2), a thorough business plan is a critical component of the vision for a successful adoption of R-CABG (Figure 3).

In prior analyses, we found that the costs of R-CABG cases performed during the learning curve were approximately $5,000 greater than cases done by R-CABG in the second year or compared to the typical sternotomy CABG case.[13]

In light of fixed reimbursement, this cost difference meant that $500,000 was required to complete the 100 cases needed to learn R-CABG. In addition, a marketing campaign initiated at the start up of the program has costs ranging from $75 to 300K. Gaining commitment to these substantial investments requires a business plan that articulates the following anticipated advantages of R-CABG (estimates based on a CABG program of 200 cases with 50 percent done with a less invasive approach):

- **Reduction in mediastinitis compared to sternotomy CABG**—The recent designation of sternal infections as a “never event” by Medicare creates an important financial risk to CABG programs. Patients with obesity, active smoking, and diabetes are commonly referred for CABG and are at substantial risk of sternal infection. By avoiding a sternal incision, R-CABG completely mitigates exposure to the unreimbursed costs of mediastinitis that are conservatively estimated at $50K/case.[14] If avoiding the sternotomy for half of the CABG procedures prevents two annual cases of mediastinitis per year, this advantage would provide a benefit to the hospital of $100,000 per yr.
- **Improved quality rating**—Stroke and mediastinitis are the two most costly complications after CABG. By avoiding aortic manipulation and the sternotomy, the robotic approach is well-suited to reduce the risks of these events. This not only improves the profit margins for CAB, but will also improve an outcome metric called the “STS composite quality rating,” a publicly reported score used by Medicare to derive its pay-for-performance incentive payments. Current plans provide 2 percent bonus payment for those centers that are rated at “three stars” (Given that we received three stars at our institution and our Medicare reimbursement was $5 million in FY09, this score yielded an additional bonus of around $100,000).
- **More efficient bed utilization**—Most programs routinely discharge R-CABG patients two or three days sooner than the length of stay allotted by insurance, an advantage that helps offset higher intraoperative costs. There is an opportunity for additional financial gain when an earlier than expected discharge occurs concurrently with full occupancy of all ICU and/or telemetry beds. For a hospital that runs near full capacity, this overlap is expected for at least 15 to 25 percent of the early discharge dates and allows a new patient to be admitted into that open bed who would have otherwise been turned away. A conservative estimate of $10,000

per day of additional reimbursement for each of these episodes would be expected to create $150,000–$200,000 additional revenue to the hospital per year.

- **Increased case volume**—The explosive growth of health information has created a consumer base as well-informed as it has ever been. This provides a unique opportunity to market distinctive programs such as R-CABG directly to sophisticated consumers. The inherent advantages for robotics to achieve high marks on existing online report cards (e.g., consumerreportshealth.org, hospitalcompare.hhs.gov) become increasingly relevant as the demand for online information about cardiac surgery grows in the elderly market segment. If this new procedure improves case volumes and market share, it will improve hospital revenue regardless of its profit margin compared to standard CABG. At Boston Medical Center, our marketing efforts yielded 50 additional cases per year while world class competitors in the Boston area all had volume declines. Assuming profit margins of $5,000 per case, these additional cases yielded $250,000 for our center.

- **Improved "payer mix"**—The margins for CABG depend on the insurance payer, and R-CABG recruits patients into the hospital with a more favorable payer mix. After the introduction of R-CABG at our hospital, the ratio of "government" (Medicare/Medicaid) to private payers changed from 2:1 to 1:2. As a result, R-CABG cases were reimbursed $2,000 more than sternotomy CABG and demonstrated higher margins despite higher costs. During the two years of the program, this yielded a net benefit of $200,000 per year.

- **The effect on patient satisfaction**—Less invasive surgery has an established track record at improving patient satisfaction ratings in a variety of surgical fields, including cardiac surgery.[3,15] Because these scores are now publicly reported and available online[16] it is imperative for hospitals to have an effective plan for maximizing these scores. The cost effectiveness of R-CABG at improving satisfaction is similar to other commonly proposed methods designed to improve satisfaction (e.g., reducing the patient-to-nurse ratios or redesigning hospital beds from semiprivate to private).[3] Therefore, initiating an R-CABG program avoided the need to invest $400–500K into these other strategies.

- **Renegotiating managed care contracts**—R-CABG programs create a unique market position for the hospital by providing a patient outcome that is highly valued by employers (i.e., quicker return to work). This provides the hospital with leverage for renegotiating contracts with managed care organizations and increasing CABG reimbursement. There has been anecdotal evidence of $2,000 more reimbursement per robotic case compared to sternotomy CABG using this strategy. For a program that performs 100 R-CABG cases per year, this provides $200,000 additional revenue to the hospital (Milestone 7).

Thoughtful cost-benefit analyses are likely to be instrumental if this or any other surgical innovation is able to mature into a safe and effective standard of care approach. When assessing new devices or techniques associated with controversy, it is critical to rigorously evaluate the actual costs and benefits free of unexamined biases.

The hospital will play an important role in the objectivity of this process by closely monitoring expenses during and after the implementation of R-CABG (Milestone 8). This will help validate whether the financial advantages outlined above are able to justify the costs of the program.[3]

Expectations and reality

Perceptions of reality can be distorted during the adoption of any high-impact change. This is particularly true for change that involves CABG, where tolerance for error is low and adverse events are intensely scrutinized.

A team well experienced at the status quo can become demoralized by change, leading to a tendency to misinterpret reality and exaggerate the number and severity of poor outcomes.[11] Stakeholders who participated in the selection of metrics that define success of the program should hold their own judgments about the program accountable to the actual results demonstrated for these metrics.

The collection and reporting of data requires sufficient support from the administration. Most cardiac surgical programs already collect outcome data as part of continuous quality improvement efforts and participation in publicly reported databases of CABG outcomes.[18]

As described in Milestone 2, monitoring a wider range of factors is indicated when initiating R-CABG. During regular reviews, the team should evaluate the data in the context of the originally agreed upon set of goals. It is helpful to think of the evaluations in terms of two discrete phases for the program (Milestone 9).

During the early phase, only low-risk cases will be selected with emphasis on excellent clinical outcomes as well as maintaining high patient satisfaction and staff morale. The initiation of the late phase will begin with a thorough review of early phase results among all interested stakeholders. During this review, the team will engage in troubleshooting for any problems that have been identified, with an emphasis on shortening OR times, controlling costs (e.g., fast track protocols, OR extubations, restrictive transfusions), and how to translate early successes into a high-volume program. This will also provide a forum to advise those staff members that are struggling on how to adjust their tasks to the new program or to be reassigned when it is clear that their goals are misaligned.

The public and the medical profession are generally unaware that R-CABG is an option. Therefore, a comprehensive marketing plan is essential for the success of this program (Milestone 10). Advertisements that emphasize the superior clinical outcomes of R-CABG resonate with patients but come at the expense of some controversy.

Local surgeons and health care institutions who view this message can become alienated if they infer that standard CABG does not demonstrate as much concern about patient outcomes. An alternative message that may be less likely to be derailed by anecdotes of poor outcomes is the intrinsic value of a second opinion, a concept that R-CABG inherently promotes.

Growing evidence suggests patient satisfaction and outcomes are improved by merely participating in shared decision making, particularly for important choices that heavily depend on the context of the patient's social circumstances and willingness to accept risks (e.g., R-CABG).

This message is more conducive to an integrated marketing communications plan that creates consistency among the planned and inferred messages of the program (e.g., customer service, staff morale).

Remove obstacles

Traditional CABG has been practiced the same way with minor alterations for 30 years, with virtually all cardiac surgical teams highly proficient at this procedure. Paradoxically, this expertise becomes a roadblock for R-CABG because the well-honed rituals and tacit knowledge of surgical and ICU teams experienced at traditional CABG are not easily tailored to R-CABG.

Moreover, the limited anatomical access reduces the efficiency of response to emergency situations and can distort anatomical and geometrical information. These factors inevitably lead many teams toward unfavorable preconceptions about the inherent safety and reproducibility of R-CABG. Well-publicized anecdotes of adverse events after R-CABG[19] combined with complications or other problems during the learning curve reinforce these views and can create a major obstacle to success.

The best way to address adverse preconceptions about R-CABG is to articulate a concrete strategy for enhancing the safety and reproducibility of this procedure. The principles of this strategy are:

1. Choosing candidates wisely (particularly during the learning curve).
2. Regularly rehearsing the bail-out options (e.g., peripheral access cardiopulmonary bypass support, full thoracotomy/sternotomy, etc.) through group discussion or simulation exercises
3. Providing the team with frequent feedback about early outcomes. When the team understands that such a strategy is in place it will accelerate learning and acceptance of this procedure.[20]

The allocation of appropriate resources heavily influences the obstacles to optimal team learning and patient safety during R-CABG adoption. The administration must be ready and willing to support a dedicated OR team because it dramatically influences the reproducibility of early cases and the ability to achieve an "early win" for the program. This includes adjustments to call schedules or the need for overtime pay for both anesthesia and nursing support staff.

In addition, it has been well described that the "heat of the moment" is not an ideal situation to foster learning of how to deal with emergency scenarios. Access to simulation facilities is an innovative way to help teams practice for both routine cases and emergencies that require use of bail out options. Providing funding for these and other training activities has been

shown to pay for itself by reducing the operative times of early cases and reduce costs in the long run.[21]

Finally, the hospital must commit to the reality that not all staff will be willing to embrace and advance an innovative program regardless of how well its strengths are identified and communicated.[22] Under these circumstances, the chances for success will be improved by reassigning these staff.

R-CABG and other surgical innovations have been a “patient-driven” phenomenon as physicians have not been a reliable source of information. As a result, many patients referred for traditional CABG remain unaware of the robotic option even though they might be appropriate candidates.

Mass media and other sophisticated marketing techniques have been used to alter the speed with which R-CABG is recognized, popularized, and demanded by patients. Despite a market segment indicated for CABG that is as well informed about health care as it has ever been, there is a significant concern that advertising too easily persuades patients to pursue less invasive therapies.

Using mass media to sway a therapeutic decision as complex as R-CABG can have political and ethical implications. It’s important to establish an interdisciplinary team that can review the content of the ads as well as clear lines of communication with patients, referring doctors and other stakeholders to provide reassurance about the value of the program. Most of these potential problems are also aided by establishing clear lines of communication among patients, referring doctors and others (Milestone 11).

Conclusion

Implementing R-CABG has the potential to increase case volume for the hospital as well as improve patient recovery times and publicly reported metrics such as the scores for satisfaction and STS composite quality index.

However, poor team morale and the dangers of the learning curve are important risks of change. Management decisions prior to and after implementation of R-CABG can either prolong or accelerate team learning. Harnessing the advantages of this new procedure requires a hospital leadership with a strategic vision for innovation.

R-CABG is a procedure fundamental to the success of cardiac surgery. Successful implementation will help create an infrastructure in which the elements necessary for future innovations will become fully integrated.

Biographies

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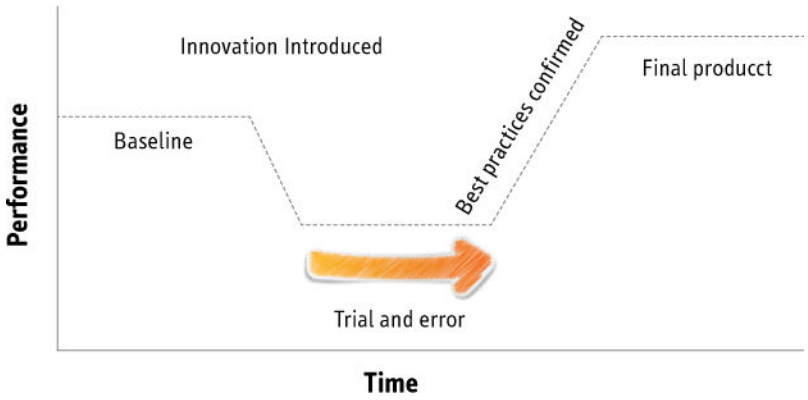

Figure 1.

Innovation initially reduces performance in a process called the “learning curve.” Through trial and error, the team adapts to the challenges of the new program, allowing the advantages of the less invasive approach to be harnessed at a higher level of performance.

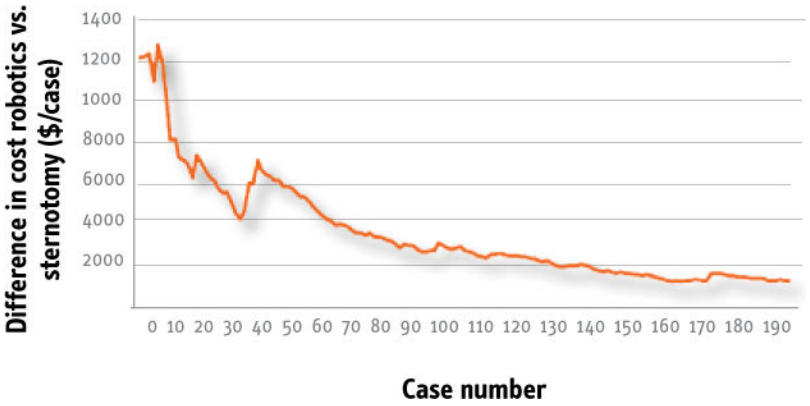

Figure 2.

Use of the cumulative sum technique[17] to illustrate the declining cost differential between R-CABG and sterntomy CABG at Boston Medical Center in FY09.

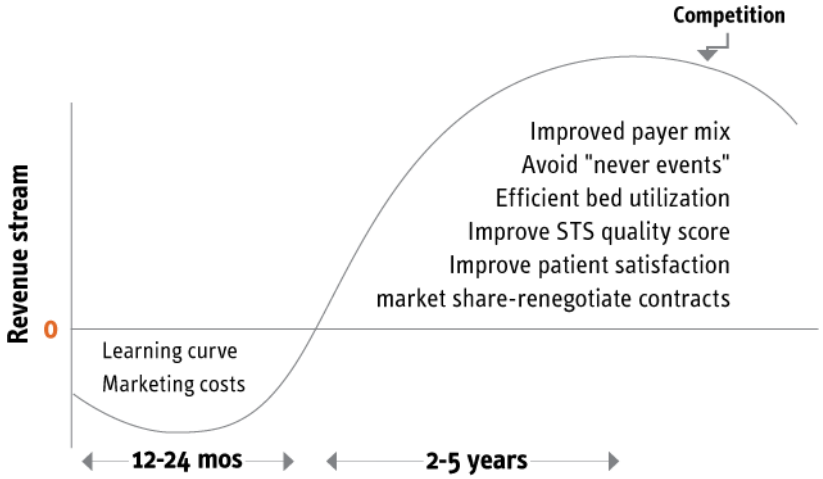

Figure 3.

Expected timetable for the investments required to initiate the R-CABG program and the expected return on those investments.

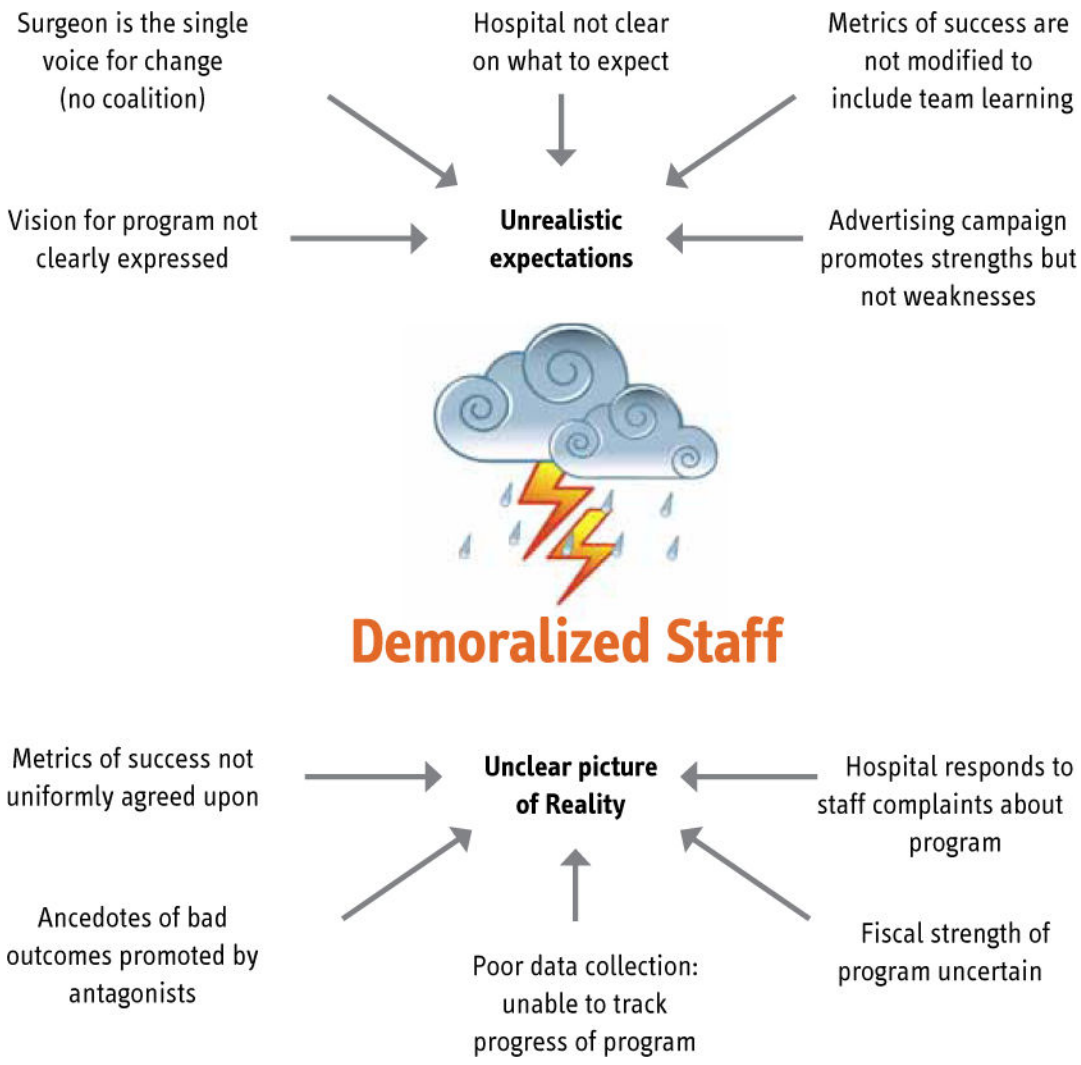

Figure 4.

A variety of management missteps during the early adoption of R-CABG can contribute to a growing gap between expectations and reality, and may lead to problems with staff morale.