

White Paper

Evidence Supports the Positive Impact of Automated Staff-Scheduling Technology in Healthcare

Executive Summary

The largest controllable expense in healthcare organizations today is labour. In fact, labour accounts for more than 50 percent of all expenses, making it critical to ensure that labour resources are appropriately allocated.¹ In addition, in the face of current and looming shortages of highly skilled healthcare workers, the ability to recruit and retain the best employees by providing a good work-life balance is critical.

Research conducted by the Workforce Institute at Kronos provides evidence that automated staff-scheduling technology in healthcare has a positive impact on both the employee and the organization. Employees of healthcare organizations using staff-scheduling technology reported increased job satisfaction, decreased work-family conflict, and decreased stress. The organizations themselves experienced improvements in operational efficiency, increased confidence of compliance with regulatory requirements and union contracts, and greater visibility into labour resource allocation in light of variable workloads.

This white paper will outline the current scheduling challenges that exist in healthcare today while also presenting evidence that demonstrates how automated staff-scheduling technology in healthcare not only delivers an effective solution to scheduling challenges but also helps healthcare organizations improve employee recruiting, engagement, and retention.

The Impact of Nonstandard Work Schedules in Healthcare

In Canada, one third of the labour force does not work a regular daytime shift.² These schedules involve early morning, evening, night, and weekend work, as well as extended hours and rotating shifts. Nonstandard schedules are common in healthcare, where the need to provide services exists at all hours of the day, every day of the year.

Though the work itself may require the employee schedule to be nonstandard, often it is the healthcare employee who desires a nonstandard work schedule, and for a number of different reasons. Students often need to schedule work around class schedules and school activities. Parents may work nonstandard schedules that complement their partners' schedules in order to share child care responsibilities. Moonlighters may choose night or weekend schedules that do not conflict with their regular jobs. Additionally, some employees are driven by the incentives often seen in healthcare organizations for nonstandard schedules, such as wage premiums for long work hours, shift and weekend pay differentials, and bonus payments.

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¹ Modern Healthcare, By the Numbers 2010, 22.

² Scientific Symposium, The Health Effects of Shift Work (Toronto, April 12, 2010).

However, despite these benefits, there are some downsides to 24/7 schedules. For example, some employees report that nonstandard schedules interfere with family and social activities.³ When employees cannot meet their nonwork demands, they may be more likely to leave their jobs for one with a schedule that is more compatible with their social and family needs.

However, since nonstandard schedules are not about to go away, it is critical for organizations to develop schedules that meet operational needs and minimize interference with employees' nonwork lives. Employers who can provide positive and flexible schedule opportunities for employees are at a competitive advantage for recruiting and retaining talent. And the ability to recruit and retain talent in healthcare in light of the current and anticipated labour shortages has never been more important.

Schedule Design: Critical to Employee and Organizational Performance

Healthcare organizations challenged with providing around-the-clock coverage face a very complex task. The balance between maintaining adequate coverage and avoiding costly overtime and agency expenses — all while trying to meet employee preferences and needs — can be difficult. Unfortunately, because of the large number of variables that go into designing successful schedules, many organizations struggle with this vital task.

Some of the most frequent complaints that come from employees are related to their schedules. In addition to staff satisfaction, when employees experience fatigue due to poorly designed work schedules, they are less likely to perform at their highest capability and may face increased safety risks. With patient and staff safety of utmost importance in healthcare organizations, well-balanced employee work schedules become critical to ensuring a safe environment.⁴

There are literally hundreds of options for designing work schedules. Important decisions regarding schedule design include:

- **Shift length:** There is great variety in shift length in healthcare organizations today. Shifts may range from a few hours to up to 24 hours for paramedics or medical residents. On average, most shifts range from 8-12 hours in length. Although employees often prefer longer shifts because it means they work fewer days, the consequences of health, fatigue, and related safety are an area of concern.
- **Shift rotations:** Approximately 12% of employed Canadians work rotating shifts, with healthcare having a large proportion (27%).⁵ Though not as prevalent as they once were, schedules with inconsistent workdays and shifts still exist in healthcare organizations. The need to provide adequate coverage in an environment facing labour shortages makes the practice of shift rotation necessary at times.

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³ A. Khaleque, "Sleep Deficiency and Quality of Life on Shift Workers," *Social Indicators Research* 46 (1999): 181-189.

⁴ A. Trinkoff et al. "How Long and How Much Are Nurses Now Working?," *American Journal of Nursing* 106 (2006): 60-71.

⁵ Scientific Symposium, *The Health Effects of Shift Work* (Toronto, April 12, 2010).

- **Night work:** Not all areas of a healthcare organization need to operate 24 hours a day, but critical areas of operation do (e.g., nursing and security). Special attention to the health, safety, and sleep consequences of these shifts is important.
- **Changeover times:** Changeover times, or the start and stop times of shifts, can influence sleep-related problems of employees. Flexibility over changeover times can help accommodate individual preferences and reduce sleep-related problems.

Effective Schedule Management Can Be a Competitive Advantage

In addition to schedule-design issues, the way work schedules are managed can have a significant impact on both employees and organizations. For example, poorly managed schedules can result in negative outcomes for employees' sleep and health⁶ as well as their emotional well-being.⁷

Additionally, schedule management has been related to employee job attitudes and retention. For example, employees who are able to design their own work schedules are more satisfied in their jobs; are less likely to swap shifts with their co-workers, and have higher work-life balance, job satisfaction, social support, and community spirit.⁸ Furthermore, the way managers interact with employees regarding their schedules is an important determinant of attitudes about schedules. For example, when employees believe the procedures used to determine their schedules are fair — that they are treated well by schedule-makers and supervisors — they are more satisfied at work and less likely to quit.⁹

Some of the most common complaints employees have about schedules are:

- Unpredictable schedules that change from week to week
- Lack of control over schedules and the ability to make changes (e.g., shift swapping)
- Schedules that change frequently with little to no notice
- Perceived inequities or unfairness related to distribution of overtime, extra shifts, or time off
- Inconsistency in awarding schedule-change requests
- Difficulty balancing work and nonwork responsibilities due to schedule constraints

Organizations that can find ways to minimize these complaints while maintaining operational schedule efficiency can have great advantages over their competition in a healthcare labour market challenged with current and soon-to-be-realized shortages of highly skilled labour.

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⁶ C. S. Smith, S. Folkard, and J. A. Fuller, "Shift Work and Working Hours," in *Handbook of Occupational Health Psychology*, ed. J. C. Quick and L. E. Tetrick (2003).

⁷ M. Shields, "Shift Work and Health," *Health Reports* 13 (2002): 11-33.

⁸ J. Pryce, K. Albertsen, and K. Nielsen, "Evaluation of an Open-Rota System in a Danish Psychiatric Hospital: A Mechanism for Improving Job Satisfaction and Work-Life Balance," *Journal of Nursing Management* 14 (2006): 282-288.

⁹ K. E. Charles and R. R. Sinclair, "Examining Work-Schedule Management for Direct-Care Workers in the Long-term Care Industry" (paper presented at the 22nd Annual Society for Industrial and Organizational Psychology Conference, New York, NY, April 2007).

The Role of Technology in Healthcare Staff Scheduling

One way to more effectively manage work schedules is to use automated scheduling programs. This type of technology can help organizations ensure adequate and efficient coverage while working to meet employee requests for certain schedules. Organizations are increasingly automating their scheduling processes and taking advantage of these tools. With this increased use, there has been some criticism of “optimized scheduling” that is perceived to maximize efficiency at the expense of employee schedule preferences and standard hours. However, many organizations are using this software not only to increase operational efficiency, but to engage employees in the process and provide employees more control and flexibility in determining their schedules.

For example, many programs allow employees to take some control of their schedules by requesting shift changes or time off and even selecting their own schedules. These changes are often difficult to manage when schedules are done manually, because managers and schedulers don’t have immediate insight into things like shift coverage and overtime. However, automated scheduling tools allow managers to assess the impact of a proposed schedule change and quickly make an informed decision.

In addition, if a request is denied, the specific reason for the denial can be communicated to the employee, thereby reinforcing the fair application of scheduling practices. When scheduling becomes more automated, employees may become less concerned that schedules are based on favoritism or other unfair practices by managers or schedulers. In the Kronos Workforce Institute study, 83 percent of participants agreed that the scheduling technology provides equitable staffing, and participants noted that the use of the technology removed some of the subjectivity inherent in a manual scheduling process.

Getting the Most out of Technology

Although research has found that electronic scheduling programs can provide optimal schedules and decrease the amount of time spent on scheduling, most organizations are not using these programs to their full potential.¹⁰ Additionally, the technology works only as well as the processes and policies in place to support it. Research conducted by the Kronos Workforce Institute uncovered several best practices for managing employee work schedules:

- Provide employees with the ability to use the automated shift-swapping features of the technology
- Communicate clearly with employees about scheduling practices and policies
- Provide as much advance notice as possible to employees when schedules change
- Ensure scheduling best practices are a routine part of manager training

Automated scheduling tools allow managers to assess the impact of a proposed schedule change and quickly make an informed decision.

¹⁰ M. L. Grano, D. J. Medeiros, and D. Eitel, “Accommodating Individual Preferences in Nurse Scheduling via Auctions and Optimization,” *Health Care Management Science* 12 (2009): 228-242.

- Adopt consistent scheduling practices and policies across the organization
- Apply the scheduling technology consistently throughout the organization
- Conduct education for all employees, highlighting the benefits of the technology
- Identify the limitations of the technology and need for human intervention

Research Study: Impact of Scheduling Technology on Healthcare Workers and Organizations

A 2010 research piece sponsored by the Workforce Institute at Kronos, “The Impact of Scheduling Technology on Healthcare Workers and Organizations,” examined the role of scheduling technology in several large U.S.-based multi-facility acute care hospital organizations. The data was collected via one-on-one interviews and an online survey completed by approximately 800 healthcare workers, supervisors, and managers.

Research Study Results

Technology use

Participants were asked to indicate how their departments utilize the scheduling technology to provide employees flexibility with their schedules.

- More than 50 percent reported using the technology to request time off, swap shifts with co-workers, and fill open shifts, which resulted in more flexible work schedules
- 69 percent reported being satisfied with the schedule produced by the technology

Employee impact

Employee satisfaction was evaluated in the study. Because many employees included in the study worked in departments not utilizing all the employee self-service scheduling features, the researchers were able to compare groups that used the features with those that did not.

- Higher levels of job satisfaction were reported by employees who worked in departments that utilize the technology to request time off, swap shifts, and fill open shifts (see Figure 1, Relationship Between Job Satisfaction and Technology Feature Utilization)
- Employees working in departments that used the technology were approximately 23 percent more likely to be satisfied than employees working in departments that did not

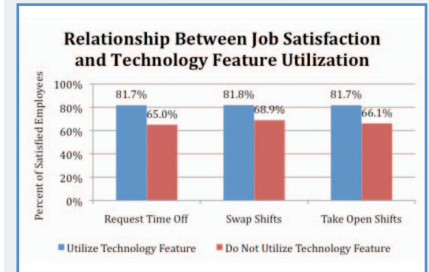


FIGURE 1 Relationship Between Job Satisfaction and Technology Feature Utilization

In addition to job satisfaction, this study also looked at work-family conflict and employee stress. As depicted in Figures 2 and 3, departments that provided schedule flexibility through employee self-serve functionality in the scheduling technology had employees with lower levels of these negative indicators.

For example, 30 percent of people working in departments that did not use technology for time-off requests experienced work-family conflict, while only 11 percent of people in departments that use the technology experienced the same issues. While it is unclear whether these findings are attributable to the policies themselves or the role of the scheduling technology, the results clearly state that utilizing technology to manage good schedule policies has a positive impact on employee satisfaction.

Organizational impact

The impact of the use of scheduling technology on the organization was evidenced in increased operational efficiency. Participants in the Workforce Institute study were asked to indicate whether they thought the use of technology was related to several organizational outcomes. A large proportion of respondents thought that the scheduling technology made it easier to fill open shifts, follow scheduling policies, comply with union and regulatory requirements, and provide visibility into workload data. Additionally, in one-on-one interviews with scheduling managers:

- 84% reported the technology increased employee effectiveness
- 97% believed it contributed positively to quality patient care
- 84% tied it positively to impacting safety

Finally, the positive impact of the scheduling technology and associated practices and policies was also related to employees' reported intentions to leave the organization, which has been shown to predict actual turnover behavior. Figure 4, Relationship Between Turnover Intentions and Schedule Technology Utilization, shows that in departments that provided schedule flexibility through technology, fewer employees reported intentions to leave.

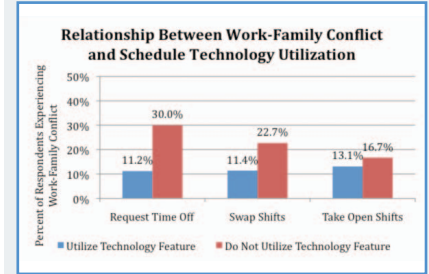


FIGURE 2 Relationship Between Work-Family Conflict and Schedule Technology Utilization

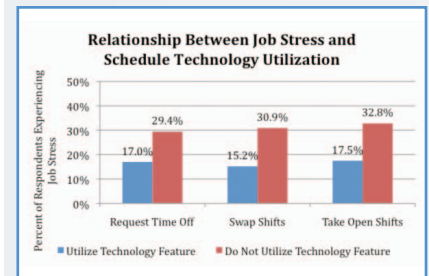


FIGURE 3 Relationship Between Job Stress and Schedule Technology Utilization

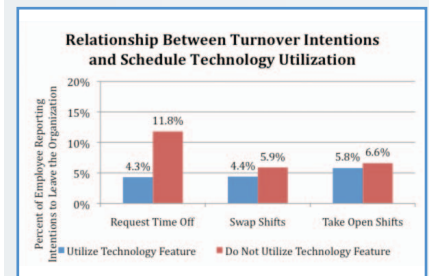


FIGURE 4 Relationship Between Turnover Intentions and Schedule Technology Utilization

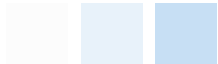
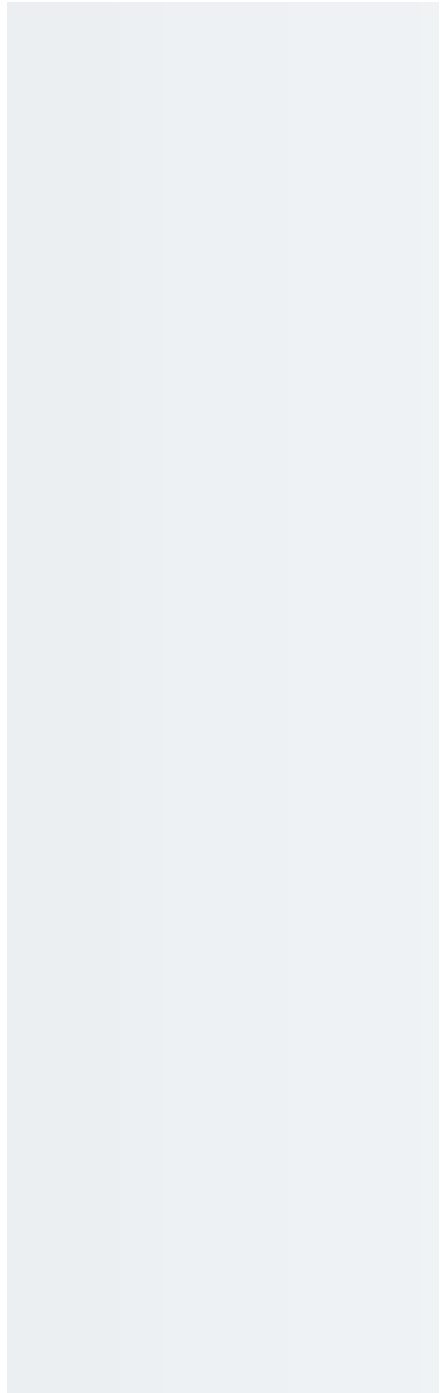
Conclusions

Staff scheduling in the acute care hospital setting operating 24 hours a day is challenging. With innumerable conditions related to schedule design and management and the impact on both the individual employees and the organization as a whole, the role technology may play in scheduling was investigated in this research study. The study provides evidence that leveraging technology in staff-scheduling in the acute care hospital setting has a positive impact on both the employee and the organization.

Since not all employee participants in the study were using staff-scheduling technology, the opportunity to compare and contrast experiences was afforded the research team. When comparing the reported employee experience with and without the employee self-service features of the technology — time-off requests, shift swapping, and filling open shifts — higher levels of job satisfaction were associated with those using the technology. In addition, reductions in work-family conflict and job stress were also identified in employee groups using the scheduling technology.

The evidence also suggests that the overall organization benefits from the use of staff-scheduling technology through increased operational efficiencies, support of regulatory compliance and contractual commitments, and an enhanced ability to respond to fluctuating workload volumes. In addition, when scheduling technology was in use, the reported employee intention to leave the organization was reduced. This measure has been shown to be predictive and therefore indicates that using the scheduling technology may reduce staff turnover. This would be desirable in today's and tomorrow's healthcare environments, where competition for highly skilled labour is anticipated to increase.

In general, the study provides evidence that the use of staff-scheduling technology has a positive impact on both the healthcare employee and the organization. Use of the technology may enhance an acute care hospital's ability to recruit and retain a highly skilled workforce while simultaneously improving operational efficiency and more rigorously managing its greatest asset and expense — labour.



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