by Wayne Caverly

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Simulation models aid decision-making

Pharmacies are complex places serving multiple needs for a wide range of people. Some of the people who come through your door are shopping for household items or beauty products, or looking for an over-the-counter remedy to help them get through a spell of pain or the sniffles. But the heart of the drugstore is the dispensary, which is no less complex. Pharmacy staff serve a multitude of patients in a wide range of ages with varying needs—from infants to teenagers, from businesspeople (often in a hurry) to the elderly (who often want to chat). Some have only one prescription, while others have many to fill. Pharmacies have little control over prescription volumes, and although some medications are routine, others can be quite complex, taking hours to complete.

It's no surprise then, that the business of pharmacy is equally complex, as are the staffing decisions, task allocation, pharmacy layouts and use of technology that go along with it.

Although prescription volumes continue to grow, there has been little or no increase in the number of available pharmacists, leading many to look to automation technologies for assistance— robots, tablet counters, interactive voice response units and automated water dispensers. These technologies are expected to improve a pharmacy's efficiency, but given the complicated environment of today's dispensary, it's not easy to determine which technologies provide the best results.

Installing a robot is an expensive and invasive procedure that often requires changes to workflow patterns and the physical layout of the pharmacy. Although robotic dispensing will clearly reduce prescription filling times, it's difficult to relate this reduction to overall savings in the daily prescription process.

When considering technology, most pharmacies rely on automation vendors to provide time savings projections and the resulting return on investment models—many of which are fairly basic analyses (with predictable outcomes) relying heavily on the "time is money" assumption. Time definitely has value, but will one 'saved' minute in the prescription-fill process save money? Unless payroll is reduced, or the time saved is used to pursue other revenue-generating activities, the answer is "no." It can be hard to determine whether a few seconds will impact the overall pharmacy process.

Fortunately, there is a way to "test drive" the impact before making expensive decisions and changes in the real world.

The world's leading companies use a technique called simulation modelling to ensure that the changes they are contemplating, which often cost millions of dollars, will provide the desired results. Simulation is often used to model changes in plant design, modifications to airport staffing and, in health care, to evaluate changes to facility design, personnel scheduling and the impact of new technologies (as well as combinations of all three). In a pharmacy setting, we would use powerful computer programs, pharmacy data gathered using time studies and other tools, as well as information about the potential changes to create a model. The result is a "virtual pharmacy" that can run for days, weeks or months to see exactly how the pharmacy will be affected.

The technique is not restricted to new technologies. Anything that might improve the pharmacy's productivity can be modelled, including: changes to opening hours, staffing levels, staffing schedules, roles and responsibilities, physical
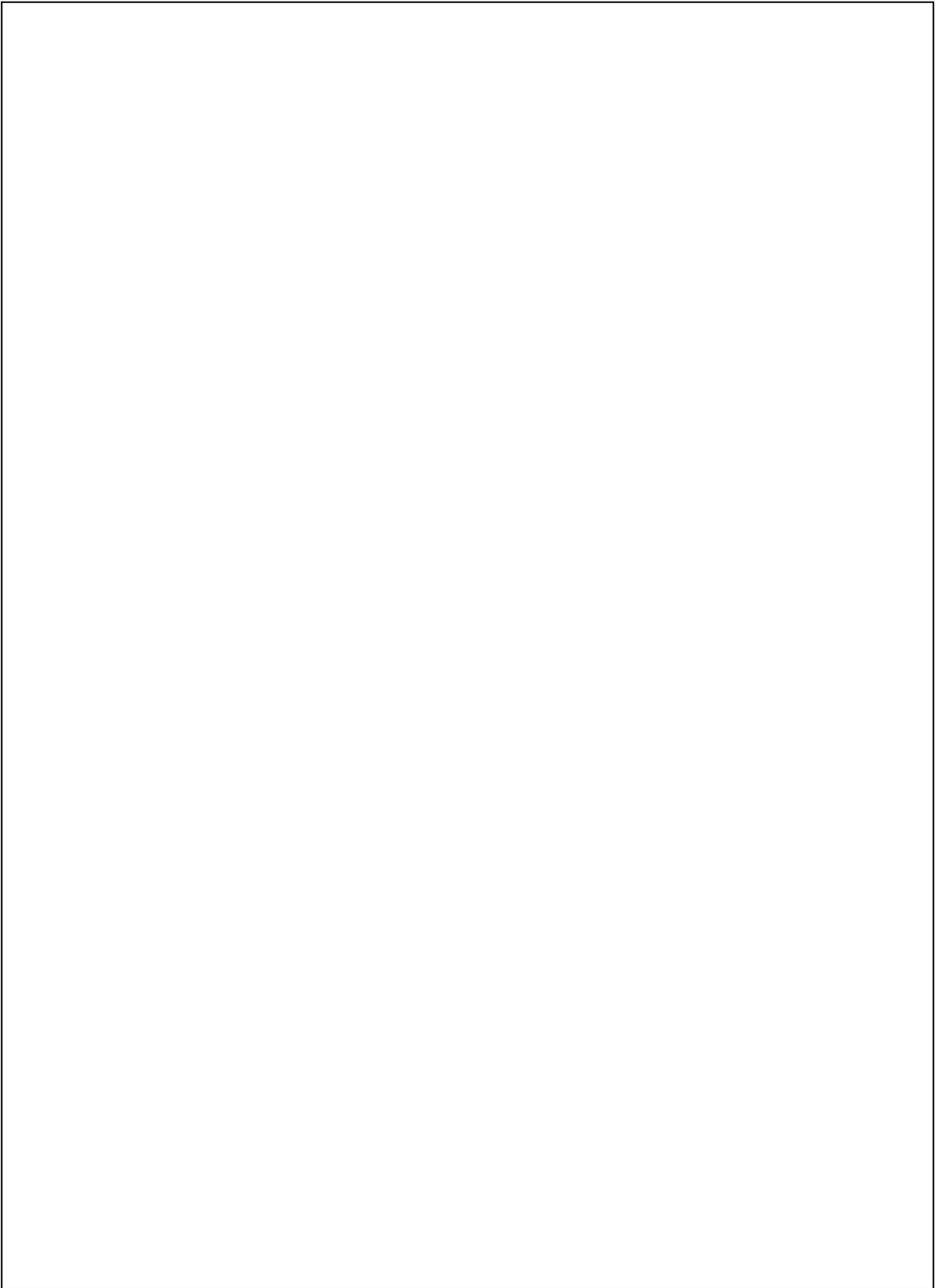
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layout changes, workflow adjustments, technologies, and any combination of two or more changes occurring at once or in stages.

Simulation can also be used in conjunction with optimization tools—comparing multiple scenarios against desired outcomes, budgets, etc. This takes a lot of the guesswork out of choosing optimal resource levels and identifying the investment(s) that will minimize costs while maintaining customer service objectives. The result is a balanced investment plan that matches the business plan.

These tools can be used throughout many stages in a project's lifecycle and for multiple purposes. The initial purpose is to test concepts in a simulated environment before making expensive and potentially irreversible investment decisions. Once the simulations are complete and the results are tabulated, a clear return on investment and a rationale behind decisions can be presented to management and staff.

The software can provide on-screen simulations (see figure 1) where patients and staff members (and scripts if desired) are seen moving through the pharmacy in real time (or fast-forwarded). Key metrics, such as the number of patients in the pharmacy, the number waiting to hand-in or pick-up scripts and average wait times are displayed on the screen. At the end of the simulation, overall statistics are provided for analysis. This virtual pharmacy 'movie' is an invaluable tool in selling the potential changes to others.

Simulation and optimization are well worth the investment, especially when the cost associated with making investment decisions could run in the tens or hundreds

of thousands of dollars per site. A small investment in time and money before making these major decisions will ensure better outcomes for the pharmacy, its staff and its patients. ∎

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For references, product websites, or additional information about these products, please contact Wayne Caverly: wayne@ efficientpharmacy.com.

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Fig. 1 A simulation modelling program can be used to answer "what if?" questions about implementing new dispensary technology.