Kasturba Hospital

About

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Industries: Healthcare Location: India

One of India's best-known healthcare brands, Manipal Group prides itself on clinical excellence and a patient-centric approach. From humble beginnings in 1953 as a single teaching hospital—the Kasturba Medical College—in a university town in Karnataka, India, Manipal Group has grown to a presence in seven cities in India and operations in Malaysia and Nigeria. "Our founder, Dr T. M. A. Pai, established Kasturba Medical College just six years after India gained independence," says C. G. Muthana, Chief Operating Officer, Teaching Hospitals, Manipal Health Enterprises Pvt. Ltd, part of Manipal Group.

Manipal Health Enterprises Pvt. Ltd operates 11 corporate, or for-profit, hospitals and five teaching hospitals. "We have about 7,000 beds India-wide, and on that measure, we are the third-largest private-sector healthcare provider in India today," says Muthana. The organization now employs about 6,000 people in its corporate hospitals and 5,000 people in its teaching hospitals.

Manipal Health Enterprises Pvt. Ltd acquires and operates world-class medical technologies in its teaching and corporate hospitals. However, with 75% of corporate hospital wards allocated to fee-paying private patients—compared to just 25% of the wards in teaching hospitals—the differences in information technology budgets are significant. "In the general wards that comprise most of the wards in teaching hospitals, patients are

typically treated for free or at heavily subsidized rates," explains Muthana. "So revenues and costs of delivery vary between hospitals, while employee costs remain similar."

Rostering nurses a critical task

Rostering nurses to work shifts is one of the most important tasks at Manipal Group corporate and teaching hospitals. As at all hospitals, nurses administer medications, monitor patients, maintain records, manage intravenous lines, and work with doctors to heal patients. They can also provide advice and support to patients and loved ones, including teaching them how to administer medication outside a hospital setting. If too few nurses are rostered for a particular shift, the quality of patient care may suffer.

However, rostering at the group's hospitals was a time-consuming exercise. Senior nurses on each ward would have to spend up to 45 minutes per day manually amending paper-based rosters to accommodate requested changes to duty shifts for personal or other circumstances. The organization began receiving complaints from patients, doctors, and other hospital staff that, on occasion, too few nurses were rostered on for certain shifts—particularly at its flagship hospital in Bangalore. "We had based our rostering calculations on the number of beds occupied by patients and, when we investigated, we found at a macro level, we were rostering on the correct number of nurses," says Muthana. "However, on some days, on wards optimally staffed by, say, 10 nurses per shift, we might have 14 nurses rostered on for one shift and seven rostered on for another shift. Those times we had seven, we had a clear shortage."

In 2012, Muthana asked a consultant to develop algorithms to help automate the rostering. "Unfortunately, there were so many variables, the consultant failed to solve the problem," he says. The Chief Operating Officer's next step was to ask the founder and Chief Executive Officer of predictive analytics business Retigence Technologies—already working with the business on a materials management project—to develop an application to manage rostering.

Removing the daily drudgery

“Our plan with the automation project was to relieve our senior nurses of the daily drudgery of amending the rosters and to deliver rosters that were as fair as possible to all our staff,” says Muthana. “We also saw an opportunity to reduce our costs by reducing the overall number of nurses needed to look after our patients.”

Retigence Technologies’ team members then worked with the group’s nurses to capture the variables and requirements for the project. For example, a minimum number of nurses with one year experience or more needs to be rostered on for each shift. Retigence Technologies then started building an application using compute resources available through Compute Engine, a Google Cloud product. “We selected Google primarily because of its pioneering work in artificial intelligence (AI) and machine learning,” says Srinibas Behera, founder and Chief Executive Officer of Retigence Technologies.

With the nurses rostering application developed, Manipal Health Enterprises Pvt. Ltd undertook several pilots to build user acceptance. “Some of our senior nurses took time to accept the fact automation removed their control over rostering assignments, but were finally convinced by the better transparency the product offered,” says Muthana. The organization deployed the application to a smaller hospital and secured user support before rolling out the application to its Bangalore flagship.

Eliminating stress

“Night shifts were more equitably distributed among the nurses, while we have been able to reduce the 45 minutes per day required to amend rosters to just 10 minutes. In Bangalore alone, we have 51 nurses in charge of rostering—so the combined saving there equates to nearly 30 hours per day.”

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Deploying the application has enabled Manipal Health Enterprises Pvt. Ltd to remove a buffer of about 100 nurses retained to accommodate the variations in number of nurses rostered for individual shifts. “The savings on those salaries more than paid for the cost of developing the application,” says Muthana.

The application also enabled the organization to reduce the stress on nurses—both the nurses in charge of the rosters and the nurses subject to the rosters. “Night shifts were more equitably distributed among the nurses, while we have been able to reduce the 45 minutes per day required to amend rosters to just 10 minutes,” says Muthana. “In Bangalore alone, we have 51 nurses in charge of rostering—so the combined saving there equates to nearly 30 hours per day.” This is freeing up these senior nurses to complete more important tasks.

The application was subsequently implemented at Kasturba Hospital, Manipal, again reducing the time needed to generate complete nursing rosters to less than 10 minutes.

Managing leave and training

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The organization now plans to extend the application to manage leave and training for its nurses and other employees. “I would like to see every employee given an annual leave plan that is added to the roster at the start of the year,” says Muthana. “The flexibility and control afforded by the application would enable us to address challenges such as managing leave across a workforce with high attrition rates.” The organization would also be able to create a calendar to ensure nurses receive all their required training.

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“We also plan to keep fine-tuning the application to deploy nurses more efficiently and continue to reduce their stress levels,” adds Muthana. “We also want to create a nursing load indicator tailored to patients’ specific circumstances. For example, a sedated patient may not require much nursing care, whereas a patient who comes in with a broken leg and may be on a ventilator may require assistance from three nurses at once.” The business plans to use Google’s AI and machine learning APIs in the future to improve the value and user experience of the product.