

## **The Single-Patient Room Is Not the Only Option**

*Lessons from Rapid Prototyping in Christchurch, New Zealand*

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For many healthcare providers, single-patient bedrooms are the way of the future—in the United States, at least, they have already become the norm for new construction. The benefits of single-bed rooms are many: they reduce medication errors and hospital-acquired infections, and they increase overall bed utilisation;<sup>i</sup> they reduce patient falls and help people sleep more soundly at night.<sup>ii</sup>

But what if the single-patient room isn't the panacea we've thought? A recent article by a practicing physician in *The Atlantic* points out the loss of companionship that results from exclusively single-bed wards, as well as the potential for social stratification of patients by race or socioeconomic status.<sup>iii</sup> Closer to home, Scottish patients have been quoted as viewing their time in single rooms as 'solitary confinement'.<sup>iv</sup>

While single-bed patient rooms might be optimal for some aspects of physical health (by optimising infection control) and mental health (by ensuring patient privacy), true wellbeing is much larger than mere lack of disease. In reality, wellbeing is a complex interaction amongst multiple factors: physical, mental, social, economic, environmental and spiritual. When any one of these factors are lacking, overall wellbeing suffers; conversely, improving one factor often improves the others. For instance, multi-bed patient rooms might better promote the social aspect of healing, which can be essential in stimulating physical movement and mental and emotional wellbeing.

So what's the answer? Do we build all single-patient rooms or are there some contexts in which the single-patient room could actually be detrimental to patient care? Our recent experience in Christchurch, New Zealand, suggested instances in which a multi-bed patient room might be not only practical, but preferable. And we developed some strategies for their implementation.

### CHRISTCHURCH: RAPID PROTOTYPING

On 22 February 2011, a magnitude 6.3 earthquake struck Christchurch, killing 185 and resulting in billions of dollars of damage. Even before the quake, the Canterbury District Health Board (CDHB) had planned to rebuild their existing hospital, but the disaster gave them an opportunity to create a completely new vision of their future. And while other providers around the world move toward single-patient rooms, CDHB wanted to reimagine the multi-bed arrangement, not only for reasons of cost and efficiency, but also for benefits to patient care that specifically derive from prevailing social norms in New Zealand.

So CDHB engaged NBBJ for our expertise in Lean design and rapid prototyping. They wanted disruptive thinking that would challenge the dominance of the single-patient room, a mission that resonated with us because we were also beginning to consider the limits of this approach. By applying our intelligence to the multi-bed model, we hoped to test something that could potentially be revolutionary in the UK and elsewhere to challenge the supremacy of the single-patient room.

A multidisciplinary team assembled in Christchurch: from NBBJ, a healthcare futurist and a facilitator from Seattle, a designer from Columbus and a Lean project manager from London; from CDHB, representatives of the medical-surgical, intensive care, allied health, physician, nursing and Maori staff. Together, we met within a 10,000-square-metre warehouse that CDHB had rented expressly as a design lab. The design of a new hospital was already underway, so the rapid prototyping effort was limited in scope, to generate ideas that could be directly applied to the medical planning of the new facility.

For this effort we first identified key flows and processes—both for the current state and in the future—for a variety of procedures, considering all the necessary steps through the perspectives of the patient, family members, caregivers and staff. Then we isolated the variables we planned to prototype. We've learned it's crucial to disassemble the design problem for the sake of user engagement, because solving for multiple variables simultaneously can be overwhelming, but studying one variable at a time makes it easier for everyone to wrap their heads around the problem. We decided to test four variables: caregiver line-of-sight to the patient, patient views to the outdoors, sociality and family integration, and patient safety (specifically, minimising patient falls).

Then we built mockups of potential room arrangements. We used cardboard for walls and arranged different configurations of beds to optimise each variable. For instance, to evaluate patient views to the outdoors, we arranged the beds in a variety of configurations: a circle, a line and a sawtooth. We ran simulations of essential processes and flows, playing the roles of patients, family members, caregivers and people delivering supplies, and tweaked the mockup based on users' feedback. We did this for four days, one day for each variable.

## LESSON 1: EFFICIENCY

From this exercise, we learned several things, beginning with efficiency. When every patient has his or her own room, some waste is inevitable: single-patient rooms lead to increased area requirements, and resources that could be shared, such as ensembles and hand-washing stations, are utilised less frequently. When resources are reduced in volume and dispersed less widely, smaller facilities become possible.

And smaller facilities are not only cheaper to build, they are significantly cheaper to operate as well. Fewer supplies and utilities are necessary. Staff can work more efficiently and see more than one patient at a time, instead of duplicating their work and repeating the same instructions in room after room. And with less overall floor area, staff spend less time walking between rooms and more time at the bedside. Increasing the amount of time in the patient room can also lead to increased safety, as caregivers have eyes on their patients—even if only peripherally, while they tend to others in the room—for longer durations.

While some of these efficiency gains may be difficult to quantify, our experience from prototyping with users in Christchurch suggests that they are real and apparent to staff. As conversations about waste and inefficiency intensify in healthcare in the UK, these gains are worth considering.

## LESSON 2: CULTURE

Our second, and perhaps more unexpected, lesson relates to cultural appropriateness. While the team was solving for the variables and reconfiguring the cardboard walls, Rich Dallam, a partner and leader of NBBJ's healthcare practice, was also considering how different arrangements resonated with the larger culture. The inpatient wing, he said, could be thought of as a river that runs between and supports the Whānau—a Maori concept with a deep, longstanding tradition of family or tightly-knit group togetherness.

While these things are specific to Maori culture—and to a lesser extent, to New Zealand more generally—the lesson for us was the importance of tailoring medical planning to the specific population. By deeply understanding patients, patients' families and staff, we were able to create prototypes that resonated at multiple levels: clinical, operational and spiritual. This would not have been possible without a design team and healthcare provider that were aware of all the populations that will make use of a facility.

But this led us to a crucial insight: while there are clear socialisation benefits to multi-patient rooms, as the interactions with other people can lead to faster discharge times and a decreased likelihood of mental-health issues, those benefits must be weighed against the cultural context of the patients. So while communal arrangements are appropriate to a culture, like New Zealand's, with a long tradition of extended family, they may be less appropriate elsewhere.

In many parts of the UK, for instance, the 'healthcare hospitality' trend of recent years has given patients a different expectation for the healthcare experience. Increasingly we hear user groups—both patients and staff—ask, 'When I go to a hotel, do I want to share my room and toilet, or do I want my own? So what makes a hospital different?'

Even something as simple as a television makes a difference—while television is a huge part of the patient experience in the UK and United States, in New Zealand, there is no expectation of a screen in every room, so there are no issues over who controls the programming and the volume. Perhaps multi-patient rooms will be more readily accepted in more tightly-knit communities, in countries with a socialised provision of medicine or in cultures that are more accepting of multiple families sharing the same space.

### LESSON 3: FURTHER INVESTIGATION

We are not advocating for a wholesale return to multi-bed patient rooms. And our prototyping effort in Christchurch has taught us that, before we can create multi-bed patient rooms that rectify the shortcomings of those in the past, more research is necessary. For instance, we would still need to address variables of acoustics, air movement, infection control, smell, privacy and a patient's own control over his or her immediate environment. However, some possibilities are already apparent—we spoke with the designer of British Airlines' first-class sleeping pod about the uses of 'white noise' and 'pink noise'; about how air curtains could be used for infection control; about deploying panels for increased privacy; and about storage.

Furthermore, while our prototyping effort primarily took a cellular approach, looking at the scale of the individual room, the next step would be to investigate how multi-bed patient-room planning informs the massing of a building. We performed a preliminary study of how to build a multi-patient bed tower on

top of a procedural podium, but more work needs to be done on adjacencies, the location of cores, facility-wide operational flows and so on.

In the end, the biggest lessons might not even apply to the deployment of single-bed versus multi-bed rooms. The United Kingdom is long overdue for a conversation about waste in healthcare, and the arrangement of patient rooms will be an important part of the debate. Regardless, the radical thinking and challenged preconceptions that we saw in Christchurch will be essential to fighting waste in healthcare and creating patient experiences that heal and uplift the spirit.

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<sup>i</sup> "Hospital of the Future: Lessons for Inpatient Facility Planning and Strategy," The Advisory Board Company, 2007.

<sup>ii</sup> Laura Landro, "New Standards for Hospitals Call For Patients to Get Private Rooms," The Wall Street Journal, 22 March 2006. Accessed 24 August 2014 <http://online.wsj.com/news/articles/SB114298897540904723>

<sup>iii</sup> Richard Gunderman, "Human Connection and the Downside to Private Hospital Rooms," The Atlantic, 12 March 2013. Accessed 24 August 2014 <http://www.theatlantic.com/health/archive/2013/03/human-connection-and-the-downside-to-private-hospital-rooms/273901/>

<sup>iv</sup> "Single-bed hospital rooms are "solitary confinement" for patients, medics warn," Deadline, 3 February 2014. Accessed 24 August 2014 <http://www.deadlinenews.co.uk/2013/02/03/single-bed-hospital-rooms-are-solitary-confinement-for-patients-medics-warn/>