

Reducing readmissions to the intensive care unit

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OBJECTIVE: To determine factors that contributed to readmissions to the intensive care unit (ICU) from the general wards.

DESIGN: Prospective, descriptive, qualitative, and quantitative.

SETTING: The Royal Melbourne Hospital, which is a large, metropolitan, university-affiliated tertiary hospital with specialist and general wards. The ICU is a 14-bed medical and surgical adult unit.

PATIENTS: 572 patients admitted to ICU between July 1 and December 31, 1993.

RESULTS: There were 639 admissions, with 67 (10.5%) being readmissions. This study showed that 63% of all readmissions came from the general wards. The study identified three main factors that contributed to readmissions from the ward: progression of the patient's illness, postoperative care requirements, and inadequate follow-up care on the general wards. Identifying inadequate continuity of care on the general wards as a cause of readmissions to the ICU led to the appointment of an ICU follow-up nurse to facilitate the transition from the ICU to the general ward.

CONCLUSION: Preliminary results indicate that the appointment of the follow-up nurse has not only reduced the rate of readmissions to the ICU but also decreased the acuity levels of those readmitted. (Heart Lung® 1999;28:365-72)

The limited number of intensive care unit (ICU) beds and the demand for these beds often forces patients to be discharged earlier than is clinically indicated. Consequently, some patients are discharged from the ICU with significant health care needs requiring skilled management by health care practitioners on the general wards. Without adequate resources on the general wards, in terms of experienced staff, sufficient time, and provision of services, patients are at risk of relapse and readmission to the ICU. Nowadays, ICU nurses are often able to predict which patients will require readmission.

We know which ones will come back. We send them out early because we need the bed. What do you expect? Of course they fall in a hole (Sue, 1997).

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This article questions whether this expectation, and indeed this nurse's understanding of the concept of sending patients out of the ICU early, "early discharges," is related to the quality of care the patients receive on the general wards. Without knowledgeable and experienced staff on the general wards, the "routine" management of a tracheostomy, for example, is often far from routine.

This article highlights the disparities in the provision of health care resources between the ICU and the general wards and discusses the implications these disparities have on patients' care. Instead of the 1:1 nurse-to-patient ratio in the ICU, a nurse on a general ward may be allocated 4 to 8 patients. It will be argued that improved health care in the general wards (eg, improved staffing) could create an environment in which patients with significant health care needs may be managed more safely after their discharge from the ICU.

The findings from this research project led to the employment of a follow-up nurse at the Royal Melbourne Hospital's ICU. The follow-up nurse improved the continuity of patients' care after

their discharge from the ICU. By teaching less experienced nurses to better manage tracheostomies, central venous catheters, and nasogastric tubes, the rate of readmissions from the general wards decreased. It is also likely that this increased knowledge not only improved standards of care for patients transferred to the general wards after the ICU but also contributed to some patients not requiring admission to the ICU at all. Hillman¹ for example, suggested that earlier intervention in the general wards could reduce the admission rate to the ICU.

The recommendation resulting from this research project was to improve the standard of care on the general ward rather than to provide further specialization in high-dependency units. Although Helm and Newman² argue that these high-dependency units "fill the gap" between the ICU and the general ward, and that highly skilled staff and monitoring equipment lead to better care, it is not clear why such high standards of care cannot be achieved on the general wards. Providing high standards of care on the general wards ensures that all patients, not merely the critically ill, benefit.

BACKGROUND

The findings presented in this article are taken from a research project that followed up 639 admissions to the ICU at the Royal Melbourne Hospital between July 1 and December 31, 1993. This ICU is a general medical and surgical unit for adults in a large, metropolitan teaching hospital in Australia. It admits approximately 1300 patients per year. One of the aims of the research was to identify factors that contributed to the readmission rate to the ICU.

Several studies have shown the benefits of follow-up support after discharge from the ICU.^{3,4} In a 5-year follow-up of ICU patients, for example, Frutiger et al⁴ found that many patients "deplored the lack of opportunities for rehabilitation." They questioned the value of performing life-saving interventions when there was no apparent commitment to providing continuing services after discharge to ensure optimal recovery.

METHODS

This project received approval from the Royal Melbourne Hospital's Board of Medical Research and its Ethics Committee. As a result, the researcher was given access to patients' medical files and permission to contact patients 6 months after their discharge from the ICU. The researcher

was also given permission to interview staff and care providers. It was agreed that patients would be identified with a numeric code; care providers would be identified by their relationship to the patients, for example, "patient 20's wife"; and staff members would be identified with pseudonyms.

The decision to make the follow-up contact 6 months after admission to the ICU was based on a study by Le Gall et al⁵ that compared health status at specific times after discharge from the ICU. They found no statistically significant difference of distribution of health status between 6 months and 12 months after discharge and concluded that a 6-month follow-up period seemed a suitable time for an evaluation.

During the study period of 6 months, there were 639 admissions to the ICU: 572 single admissions and 67 readmissions. Data were collected in two stages. Stage 1 involved collecting demographic (age, sex, ethnicity) and medical information (category of illness, severity, length of stay). Stage 2 occurred 6 months after discharge from the ICU, when all of the patients who had survived after hospitalization were telephoned by the researcher. The aim of the follow-up call was to confirm survival and to invite patients and their care providers to participate in the research. From the 343 phone calls, 298 people gave consent.

Given the sample size, a combination of in-depth interviews ($n = 18$), structured interviews ($n = 68$), and self-reported questionnaires ($n = 212$) was used. Although these are all independent methods, the data collected were not analyzed separately. This was a limitation of the research methods.

The sampling for this study was based on the therapeutic scoring system (TISS), which classifies class 4 patients as physiologically unstable, requiring intensive nursing and physician care with the need for frequent reassessment and adjustment of therapy; class 3 patients as physiologically stable patients in need of intensive nursing and monitoring; and class 2 as those requiring either prophylactic postoperative care, cardiac monitoring, or both. The sampling for the in-depth interviews was nonrandom, including only patients who spent longer than 1 week in the ICU and were also classified under TISS as class 4 (most seriously ill). The remainder of the former patients surveyed were given a choice of a structured interview or a self-reported questionnaire. The questionnaire used in this study was designed by the researcher specifically for this study. It included a combination of open-ended questions, yes/no questions, and 5-

Table I
Admissions and readmissions to ICU identified by site of origin

Admission	Site of origin		
	Emergency department	Operating room	General ward
First (n = 572)	268 (47%)	195 (34%)	109 (19%)
Second (n = 55)	10 (18%)	11 (20%)	34 (62%)
Third (n = 9)	1 (11%)	2 (22%)	6 (66%)
Fourth (n = 2)	0	0	2 (100%)
Fifth (n = 1)	1 (100%)	0	0

Values are total number of admissions (not patients) from each site with percentage of total admissions for each level of admission in brackets (eg, 62% of all second admissions came from the general ward). Note that some patients were admitted for a second and third admission. The admission statistic appears in both second and third rows, though they are categorized as "a patient requiring 3 admissions to ICU." The assumption is made that a patient requiring a third admission also required a second admission.

point Likert scale questions. Although the questionnaire was pilot tested, it was not tested for validity or reliability.

The data provided by patients who required multiple admissions to the ICU were analyzed separately by using a combination of qualitative and quantitative methods. The qualitative data were coded with a theoretically informed thematic analysis and comparative descriptive statistical techniques were used to analyze the quantitative data.

RESULTS

In this study, there were 639 admissions. As 67 of these were readmissions, the readmission rate was 67/639 (10.5%); 46 patients were admitted to ICU twice, 7 patients were admitted 3 times, 1 patient was admitted 4 times, and 1 patient was admitted 5 times. This resulted in 55 patients requiring a second admission, with 9 of these patients requiring further admissions. The site of origin and categories of illness of these admissions and readmissions are represented in Tables I and II. The severity of illness is represented in Table III.

In this study, there were no readmissions from a nursing home or convalescent home. All patients transferred to the ICU from the emergency department came either from home or from another hospital. Patients transferred from the operating room were generally elective admissions for postoperative monitoring and treatment, with the ICU bed booked in advance.

Unlike the planned postoperative admissions, the readmissions originating in a general ward were often due to the sudden deterioration of a patient's condition, with 83% of all readmissions caused by either cardiac or respiratory events. As such, readmissions from the general ward tended to occur under emergency conditions, such as cardiac arrhythmia or arrest (24%).

During the in-depth interviews, patients and their care providers spoke about the care received on the general wards. Two main themes developed from these interviews: first, decreased resources on the general wards, and, second, lack of communication between ICU and ward staff. Many patients described the lack of preparation for their transfer to the general wards. Patient 578, for example, was one of many who remembers feeling "thrown" into the ward without the general ward having adequate resources to care for him.

It was all done very quickly. I had my tubes taken out, then I was gone. I felt very anxious. Not prepared for this transfer. Having had a person with you all the time in ICU, then having so little attention on the ward (patient 578).

After close surveillance in the ICU, patient 378's mother was distressed by the lack of attention on the wards.

We found it quite distressing when she was moved to the ward. Having had such specialized one-to-one care in ICU, it came as a bit of a shock to be just one patient in a whole ward (patient 378's mother).

According to patient 136's mother, the general wards lacked a sufficient number of qualified staff

Table II

Admissions and readmissions to ICU identified by category of illness

Admission	Postoperative	Trauma	Attempted suicide	Respiratory	Cardiac	Other
First	201 (35%)	32(6%)	41(7%)	78 (14%)	154 (27%)	66 (12%)
Second	12 (22%)	1(2%)	1(2%)	21 (38%)	14 (25%)	6 (11%)
Third	3 (33%)			5 (56%)	1 (11%)	
Fourth				1	1	
Fifth					1	

Values are number of patients, with percentage in brackets.

Table III

Acuity of patients during their admission and readmission to ICU

Admission	Class of patients		
	2	3	4
First (n = 572)	194 (34%)	211 (37%)	167 (29%)
Second (n = 55)	8 (15%)	20 (36%)	27 (49%)
Third (n = 9)	1 (11%)	5 (56%)	3 (33%)
Fourth (n = 2)		1 (50%)	1 (50%)
Fifth (n = 1)			1 (100%)

Values are number of patients admitted in each class with percentage of total admissions for each level of admission in brackets (eg, 49% of all second admissions were class 4).

members to provide adequate care. She also believed that the lack of resources led to inadequate communication between herself and the health care practitioners.

We had some bad experiences on the wards. She was on the patient-controlled analgesia (PCA) when she went up there but was taken off.... We found out much later that it was because they didn't have the accredited staff. I didn't expect her to be given the same level of care that she had been given in ICU.... But we needed to be told some basic things, and the ward could never get us any answers. The doctors never had the time to tell us what was going on. Everyone just seemed too busy (patient 136's mother).

Busy ward staff and lack of communication from the staff were also problems for patient 484's family.

But then he got to the ward. Now the ward people are flat out. We understand that. They ran from the moment they started duty.... They tried their hardest under terrible circumstances. So I don't blame them. But there was no communication. We never saw the registrar. He [sic] never contacted us.... It had been 10 days and no one had spoken with me (patient 484's daughter).

According to patient 484's medical notes, he required readmission for aspiration pneumonia, allegedly because the nurses on the general ward failed to aspirate the nasogastric tube.

In patient 378's case, lack of resources and communication had tragic outcomes. Although she had already spent 38 days in the ICU, she was readmitted with a chest infection and it was necessary to reinsert an endotracheal tube and reattach a venti-

Table IV
Comparing time spent in ICU

Admission	No. of patients	Hours in ICU		
		Mean	Median	Range
First	572	78	34	1-1191
Second	55	112	59	1-505
Third	9	91	73	16-264
Fourth	2	360	N/A	61-660
Fifth	1	151	N/A	N/A

N/A, Not applicable.

lator. She was one of the 49% of patients readmitted to ICU as a class 4 patient (Table III). According to her parents, the readmission to ICU set patient 378 back both physically and mentally. Not only did it take all her strength to fight the life-threatening infection, but her optimism for recovery faded.

The lack of communication between the ICU and the ward nearly killed her.... It is unbelievable. She was only in the ward for a week and she's back in ICU.... There was just no communication. They forgot to order all her antibiotics on the ward and she got pneumonia. Good health care, huh? After all the effort—not to mention all the time and money that was spent to keep her alive. And then to send her into the ward where, because of some poor communication system...I mean, she could well have died and wasted all that time and effort (patient 378's father).

According to patient 378's medical notes, antibiotics were prescribed for the patient during both admission and readmission to ICU, but not during her admission to the general wards. Whether "they forgot" or this medication was not indicated was not, however, ascertained.

In interviews with hospital staff about the care on the ward of patients in unstable condition, staff members believed it was preferable to manage such patients in the ICU. A physician from the emergency room described his reluctance to send patients to the general ward.

It is a feature of the inadequacy of the ward nursing staff to cope with patients who are sick...the need to put patients in a defined area where you know that the nurses are safe because in the wards it is a bit of an unknown (David).

Table II highlights the disproportionate number of readmissions from the general wards under the "respiratory" category. Respiratory infections, respiratory failure, sputum retention, and airway management were the most common indications for readmission to the ICU, with 52% of all ward readmissions being caused by respiratory complications.

In general, patients admitted to the ICU a second time were more critically ill than first admissions, with 49% of all second admissions in the class 4 category (Table III). This is a significant increase compared with first admissions, when only 29% were class 4 admissions. It was not surprising, therefore, that both the median and mean length of stay in the ICU for second time readmissions was longer than for the first admissions. Also, given the number of readmissions for respiratory complications, it was not surprising that 64% of patients in a second admission required treatment with a ventilator.

In this study, 75% of patients admitted to the ICU survived 6 months. The group of patients who required readmissions to the ICU had a much higher mortality, with only 60% surviving 6 months.

DISCUSSION

This research identified three main factors that contributed to readmissions from the ward: progression of the patient's illness, postoperative care requirements, and inadequate follow-up care on the general wards. The inadequate follow-up care was evident in the narratives describing the transition to the general ward. Unlike the ICU, where the staff-to-patient ratio was greater than 1:1 and the

Table V
Comparing readmission rates between 1993 and 1995

Year	Readmissions			Severity of illness: class 4	Respiratory readmission from general ward
	Emergency department	Operating Room	Ward		
1993 (n = 67)	12 (18%)	13 (19%)	42 (63%)	32 (48%)	22 (52% of total ward readmissions)
1995-1996 (n = 108)	21 (19%)	29 (27%)	58 (54%)	37 (34%)	19 (32% of total ward readmissions)

Although there is the possibility of seasonal variability in readmissions, especially respiratory readmissions, the assumption was made that this variability would be statistically insignificant.

access to life-saving treatments was often instantaneous, the nurses on general wards often cared for 4 to 8 patients each shift. Narratives in this study highlighted the difficulties caused by the lack of resources in the general wards. Time constraints, lack of knowledge, poor communication, and busy staff were some of the factors that led to inadequate care on the general wards. In some cases, failure to adequately manage patients with nasogastric tubes, central venous lines, and tracheostomies resulted in readmissions to the ICU.

Patient 378's father's observation that his daughter was owed "good health care [on the general ward]...especially after all the effort—not to mention all the time and money that was spent to keep her alive" could imply that patient 378's right to a high standard of health care was greater than the rights of others because she had spent several weeks in the ICU. Yet, all patients, not only the critically ill, require high standards of health care on the general wards. To achieve this, the general wards need to be adequately equipped with adequate resources, including an experienced and knowledgeable staff.

In 1981, Knaus et al⁶ recommended increasing the number of nursing staff members in the general wards to care for noncritically ill patients. They believed this would prevent admissions to the ICU, allow earlier discharges to the general wards, and prevent readmissions. Another strategy designed to decrease readmissions to the ICU has been to provide further specialization in high-dependency units. Studies show that the additional expense of

establishing and running a high-dependency unit is offset by the cost savings gained by avoiding the use of ICU beds.² It is not made clear, however, which services in the health care system were forced to close so that high-dependency units could open. Yet, resources allocated to high-dependency units are resources not allocated elsewhere in the hospital.

Although high-dependency units may prevent readmissions to the ICU, they increase the existing inequalities that favor "high-tech" areas. They also further deplete the general wards of experienced and suitably qualified health care practitioners. Rather than follow the trend to provide high-dependency units as "halfway stages," the employment of an experienced follow-up nurse to monitor patients after their discharge from ICU has been investigated on a trial basis at the Royal Melbourne Hospital. Because of the disproportionate number of readmissions that came from the general wards, it was argued that the provision of specific follow-up services to patients after their discharge from the ICU could prevent some costly readmissions.

The follow-up nurse ensured that the general wards were better equipped to care for those patients who continued to require skilled management after their discharge from ICU. She not only improved the communication between the general wards and ICU but also conducted ongoing education for ward staff. As a result, improvements in patient management on the wards were made. These improvements were reflected in the read-

mission statistics recorded between June 1, 1995, and June 30, 1996 (Table V). These figures indicate that the appointment of the follow-up nurse has been successful in the following ways:

- The readmission rate decreased from 10.5% (1993) to 8.5% (1995-1996), though this decrease was not statistically significant ($P = .45$).
- The severity of illness of patients being readmitted from the general ward decreased. Although the decrease in number of class 4 admissions is clinically interesting, it does not satisfy conventional levels of statistical significance ($P = .076$).
- The number of readmissions from the general wards with respiratory complications decreased from 52% to 32%. This decrease is not only clinically important, it is statistically significant ($P < .001$).

The data indicate that the follow-up nurse improved the readmission rates. She also ensured that patients were readmitted before they "crashed." In 1995-1996, only 34% of readmissions were class 4, giving ICU patients better chances to recover. The most remarkable achievement of the follow-up nurse has been the statistically significant reduction in readmissions from the general wards because of respiratory complications. Reducing respiratory readmissions from the general ward from 52% to 32% required continuing education of ward staff about respiratory management. Teaching junior nurses about tracheostomy management, for example, ensured continuity of care on the wards. Continuity of care provides patients with the optimal conditions for recovery.

Although these statistics are encouraging, many less encouraging stories are hidden beneath the surface. One of these stories concerns a patient who had been discharged from ICU only hours earlier. The follow-up nurse found this patient lying flat on his back with the oxygen mask on his forehead. The follow-up nurse promptly placed the mask over his mouth and sat the patient upright. This action assisted his breathing, and his color improved. It is quite possible that the follow-up nurse prevented an acute readmission to ICU, or perhaps even a death. Yet, when it was discovered that a newly graduated nurse had been allocated to care for this and 5 other patients, serious questions were expressed about assignments.

RECOMMENDATIONS

The main recommendation stemming from this research is to develop strategies to improve continuity of care for patients after their discharge from

the ICU. One strategy tried at the Royal Melbourne Hospital is to employ a follow-up nurse. The role of the follow-up nurse is to strengthen the link between the specialized care patients receive in the ICU and their ongoing care. Although the role is to provide support and education to nurses on the wards, a follow-up nurse does not replace clinical educators on the ward. Similarly, the follow-up nurse does not take over the care of patients on the ward. The role is to facilitate patients' care by removing the communication barriers between nursing staff in the specialized and general areas.

In recommending the employment of a follow-up nurse to improve continuity of care for patients after their discharge from ICU, it must be stressed that the role of the ICU follow-up nurse is to facilitate the transition between patients' care in ICU and general wards. To determine whether this follow-up nurse has made the transition from ICU to ward less stressful for patients and families requires further research.

CONCLUSION

When patients are critically ill, they require access to sophisticated technology and skilled health care practitioners in the ICU. Most critically ill patients would die without such life-saving interventions. After close surveillance in the ICU with monitors and specialized medical and nursing care, patients in this study were then discharged to a general ward where there is a significant reduction in the provision of health care services. Unlike the ICU, the general wards were predominantly staffed by inexperienced health care practitioners. The effect of this lack of professional experience is nowadays exacerbated by heavy workloads.

The ability of the general wards to manage patients with significant health care needs, such as tracheostomies, total parenteral nutrition and central venous lines, was a factor that influenced the rate of readmissions to ICU. The data indicate that a number of these readmissions to ICU were preventable.

When a patient is wheeled down the corridor of an ICU for the second, third, fourth and sometimes fifth time, ICU nurses often say: "If only..." If only the nurses on the wards had been taught to aspirate nasogastric tubes; if only "not for resuscitation" had been documented; if only the registrar on the general ward had known about the antibiotics. In short, "if only" there had been both better communication between the different sites of health care

and sufficient resources on the general wards. By working with staff on the general wards, the follow-up nurse has become an important link between the ICU and the general wards. As a result, the words "if only" are being heard less often.

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