Reducing inappropriate admissions and long hospital stays to improve health management for elderly patients

EXECUTIVE SUMMARY

The aim of the project was to identify the risk of death in elderly patients (>80 yrs old) and to implement an intervention involving discussions about their own goals of care over a six-month period. There was a six-month pre-intervention period which documented normal practice. The study showed no impact on admission/readmission rates, or in hospital length of stay, in-hospital death rates or discharge destination. Nevertheless, there were many lessons learnt from the study. Firstly, and most importantly, conducting these complex and time-consuming discussions in the environment of an Emergency Department (ED) was less than ideal. Patients were ill, relatives anxious and the discussions constantly interrupted by investigations and consultations. The primary goal of the ED is to stabilise the ill and facilitate rapid discharge either to the hospital or the community. Interestingly, patients had little memory of the discussions. We are currently conducting a similar intervention in the setting of GP practices. Furthermore, the outcomes, such as whether their choices were respected and the mortality rates, required a longer term follow-up than our study allowed. One of our other observations reinforced the fact that the medical teams in both the hospital wards and the ED rarely discussed goals of care issues and many thought it was not necessary as the elderly patients were not aware of modern medicine and what it could offer. Another incidental finding was that the goals of care discussions were lengthy and often required follow-up and refining. Future research could explore the need to have this specialised role defined and evaluated compared to the current practice of leaving it to the admitting clinical teams. We are currently exploring this concept in GP settings.

IMPLICATIONS FOR PRACTICE

There is a universal trend to encourage medical research that has a direct bearing on improving patient care. Rather than defining problems in yet more ways, funding is increasingly being tied to addressing the problem. This often involves health services research which is patient-centred. As a result, new services designed to address patient problems are being developed, implemented and evaluated. This project aimed to prevent aggressive treatment in elderly patients who are likely to die. The setting was an Emergency Department (ED). Part of the project's aim was to inform the patient of their clinical condition and encourage them to make decisions about their own health and to incorporate their attitudes and beliefs in helping them to determine their own goals of care and future care choices, including the prevention of inappropriate aggressive treatment.

Conducting implementation research at the clinician/patient point of care raises many challenges which we tried to anticipate before establishing the study. They included:

Pre-implementation

- Getting buy-in from service and health District managers.
- Gaining the trust and hearts of medical and nursing ED staff.
- Ensuring ward specialists were aware of new approaches in the ED that could affect the perceptions of hospitalised patients.
- Needing to brief all hospital staff on several occasions over several months before and during the early stages of implementation (in-service, hubs, grand rounds, annual District conference).
- Production of standardised conversation materials incorporating knowledge, values and preferences sections.
- Clarification on the role of surrogates and presence during end of life discussions.

During implementation

- Embedding brief and simple screening processes in routine duties in the ED was not possible due to its additional workload in winter months.
- Intervention seen as an add-on activity by ED staff, separate from usual duties.
- Managing confusion with existing pathways of care for the imminently dying.
- Exclusion of patients with dementia due to inability to discuss goals of care.
- Inability to invite patients to participate who could not communicate in English unless they had a surrogate to interpret for them.
- Need to employ supernumerary staff to demonstrate feasibility.
- Need to use newly developed conversation materials by nurses used to holding conversations without a script.
- Managing private and sensitive discussions in a chaotic environment.
- Variable duration of conversations depending on patient's age and cognitive level.
- Confusion on the part of ward staff specialists about the use and validity of goals of care forms.

SOLUTIONS IMPLEMENTED

- Five different training and re-training strategies of staff delivering conversations: half-day customised pre-implementation workshop by Clinical Excellence Commission; self-directed learning via online modules from End-of-Life Essentials during early stages of pilot; half-day workshop targeting registrars but attended by nurses; briefing and demonstration on the job during pilot phase by the developer; two-day course interstate during implementation.

- Multiple refinements to interview forms to document values and preferences.
- Multiple staff meetings to raise issues of workload, practicalities, barriers and enablers.
- Decision to hold end of life conversations on the ward after patients' initial complaint addressed.
- Ultimate deviation from intervention materials due to perception that the tick-box approach was inappropriate.
- Notification to managing team on wards about documentation on end of life care preferences being available in the patient's notes for future reference.

While it made intuitive sense, choosing the setting of an ED, it was difficult to not only conduct the interviews but also compromised the patient's ability to make rational choices. The environment of a busy ED is about quickly assessing patients, managing acute symptoms, concentrating on whether they require hospital admission or an alternative such as returning to their existing accommodation. This meant constant interruptions occurring with various staff interviewing the patient at frequent intervals. The patients were also subject to many urgent investigations requiring them to be transported to different imaging sites often when difficult and complex discussions were occurring about patient choices.

In summary, despite our intentions to prevent unnecessary admissions early enough through honest discussions on goals of care, the ED was not the place to conduct complex and delicate discussions about their possible end of life when they were first being admitted for a serious life-threatening problem. Thus, the protocol was changed so that interviews could occur within 48 hrs of admission in the general wards of the hospital. While this was an improvement, the atmosphere and culture of the hospital, together with their degree of illness, made the interview process difficult and perhaps less effective than say, conducting the interview in a community setting such as in general practice. In other words, the failure to demonstrate a difference did not undermine the need to empower patients and their carers to make important decisions about their own choices of future health care, it simply helped us to understand that the environment of an ED was not necessarily the right place to conduct these discussions.

There was little difference between the intervention group and the control. No change in the primary diagnosis; no impact on aggressive interventions; no decrease in hospital admissions; no decrease in the number of repeated hospital emergency presentations; no change in the discharge pattern; and no change in mortality between the two groups.

Does this mean that we should not attempt to engage people and attempt to empower them to make their own decisions about the extent of treatment they would wish as they come nearer to the end of their lives? Should we be satisfied with the status quo where the promise of modern medicine is paramount and which has its own logic?; where continuing to administer treatment that is non-beneficial and is in the face of uncertainty? Almost certainly not to any of these interpretations of the results. We need to conduct more research in an area which is about the effective implementation of systems to improve the care of elderly patients and to empower them to have control over their own future health care.

One of the major conclusions, as explained above, is to conduct these delicate and complex discussions in a more appropriate environment.

Possibly related to the nature of the patient's illness at the time of the interview and the environment of the ED, the patient had little recall of the interview at the time of follow-up. This emphasises the need for discussions to be held in a way to maximise the patient's genuine understanding and their ability to make important decisions about their life. At the same time according to the data, patients believed these discussions were important to have.

Currently the rates of advanced care directives indicating a formal conclusion to such discussions are extremely low in Australia. Perhaps more time is required for the discussions and more research into the most effective way to conduct the discussions; more public promotion of the need for the conversation on preferences; and more effective marketing about the need to discuss your choices and to formalise them.

This overlaps with the need for our Society to understand the prognostic consequences of ageing and frailty. If one has a terminal disease such as cancer, it would be rare not to discuss the implications of the disease and to share that with the patient. Given the same poor prognosis and acknowledging the uncertainty in medicine for non-cancer patients, we currently do not articulate the similarly poor prognosis for the elderly frail near the end of life.

What we would do differently

- Plan for a longer transition to change culture (2 years instead of 6 months).
- Secure funding to pursue interpreters and staff locating surrogates so COPD patients and dementia sufferers can receive the service.
- Involve senior staff specialists in the demonstration of end of life discussions.
- Commence implementation outside the winter season to gradually change the culture.
- Not attempt end of life discussions in the ED.
- Link conversation with co-ordination of out-of-hospital services.
- Champion responder for each ward/department to ensure all 'at risk' elderly have the opportunity to receive the intervention.
- Secure funding to be able to provide patients with a longer follow-up and subsequent conversations as this would help with building rapport and clarifying stability of goals of care.

The need for further research is obvious. For example we need to learn more about prognostic tools and longer-term trajectories including, not only, mortality but also quality of life and the attitudes of patients and their carers. There is also much to learn about the nature of the intervention and how to evaluate it.

In summary, this study actually attempted to put the theory of frailty and the implication of the chronic health status into clinical practice. Many practical lessons were learned. It is anticipated that further similar research in other settings will also inform us and eventually assist in creating an intervention that could be used on a large scale.

Outcome Data for GOC participants only (as opposed to all-of-hospital)

All 421 participants in this analysis were assigned to either the control group (n=221), or the Intervention group (n=200). Some participants appear in the 'During intervention' data and in the 'Post intervention' data and some did not appear in the post-intervention data if they did not return to ED or hospital admission databases.

Base hospital data

After removing all same day admission and treatments, and ensuring admissions were only for the nominated 6-month period, there were 858 admissions, for 402 Goals of Care patients in the hospital admission data.

Hospital admission summary data

Participant Group	Patients admitted	Total admissions	First admission	Last admission
b_During Control	207	324	2017-11-02	2018-04-29
b_During Intervention	190	300	2017-11-01	2018-04-29
c_Post Control	77	132	2018-05-01	2018-10-31
c_Post Intervention	63	102	2018-05-02	2018-10-30

Primary diagnoses

Top 20 primary diagnoses for index admission

	B_During			C_Post		
Diagnosis description	Control	Intervtn	% different	Control	Intervtn	% difference
Chronic obstructive pulmonary disease with acute lower respiratory infection	3.86	4.74	0.88	2.60	7.94	5.34
Pneumonia, unspecified	3.38	1.58	-1.80	7.79	3.17	-4.62
Pneumonitis due to food and vomit	3.38	1.58	-1.80	1.30	1.59	0.29
Delirium not superimposed on dementia, so described	2.90	1.58	-1.32	NA	4.76	NA
Congestive heart failure	2.42	6.32	3.90	7.79	4.76	-3.03
Urinary tract infection, site not specified	2.42	3.16	0.74	5.19	3.17	-2.02
Unspecified injury of hip and thigh	1.93	0.53	-1.40	2.60	NA	NA
Syncope and collapse	1.93	3.16	1.23	NA	NA	NA
Fracture of pubis	1.45	0.53	-0.92	1.30	NA	NA
Atrial fibrillation and atrial flutter, unspecified	1.45	0.53	-0.92	1.30	1.59	0.29
Delirium superimposed on dementia	1.45	3.16	1.71	NA	NA	NA
Atrioventricular block, complete	0.97	0.53	-0.44	NA	NA	NA
Fever, unspecified	0.97	0.53	-0.44	NA	NA	NA
Fracture of subcapital section of femur	0.97	0.53	-0.44	NA	NA	NA
Gastroenteritis and colitis of unspecified origin	0.48	1.58	1.10	NA	1.59	NA
Orthostatic hypotension, unspecified	0.97	0.53	-0.44	NA	NA	NA
Volume depletion	0.48	1.58	1.10	NA	1.59	NA
Cerebral infarction, unspecified	0.48	1.05	0.57	NA	NA	NA
Fracture of thoracic vertebra, T11 and T12 level	0.48	1.05	0.57	NA	1.59	NA
Other delirium	0.48	1.05	0.57	NA	3.17	NA

NA=Not available data

Top 20 primary diagnosis for second admission (ordered by largest change during Intervtn)
Note: Due the small sample for the second admission of post intervention group (n= 25), 4% equates to 1 diagnosis.

	b_During			c_Post		
diagnosis_code des	Control	Intervtn	% different	Control	Intervtn	% different
Cellulitis of lower limb	2.60	6.25	3.65	6.25	4.0	-2.25
Pneumonitis due to food and vomit	5.19	1.56	-3.63	0	4.0	4.00
Chronic obstructive pulmonary disease with acute exacerbation, unspecified	1.30	4.69	3.39	6.25	0.0	-6.25
Pneumonia, unspecified	1.30	4.69	3.39	NA	4.0	NA
Chronic obstructive pulmonary disease with acute lower respiratory infection	7.79	4.69	-3.10	3.12	0	NA
Congestive heart failure	5.19	7.81	2.62	3.12	12.0	8.88
Anaemia, unspecified	1.30	3.12	1.82	NA	NA	NA
Transient cerebral ischaemic attack, unspecified	1.30	3.12	1.82	3.12	NA	NA
Acute subendocardial myocardial infarction	1.30	1.56	0.26	NA	NA	NA
Other and unspecified convulsions	1.30	1.56	0.26	NA	NA	NA
Sepsis due to Escherichia coli [E. Coli]	1.30	1.56	0.26	6.25	0.0	NA
Syncope and collapse	1.30	1.56	0.26	0.0	4.0	NA
Abnormal coagulation profile	1.30	NA	NA	NA	NA	NA
Acute gastroenteropathy due to Norwalk agent	1.30	NA	NA	NA	NA	NA
Acute kidney failure, unspecified	2.60	NA	NA	3.12	0	NA
Acute myeloblastic leukaemia [AML], without mention of remission	NA	1.56	NA	NA	NA	NA
Angina pectoris, unspecified	NA	1.56	NA	NA	NA	NA
Anorexia	NA	1.56	NA	NA	NA	NA
Asthma, unspecified	NA	NA	NA	3.12	NA	NA
Atherosclerosis of arteries of extremities with ulceration	NA	NA	NA	NA	4.0	NA

NA=Not available data

Length of stay differentials between intervention and control post-intervention

Is there a difference in Length of Stay between Intervention and Control groups during the intervention?

- Overall: No, F = 1.07, p = 0.301
- For first admission: No, F = 0.32, p = 0.573
- For second admission: No, F = 1.94, p = 0.166 – but this might be clinically relevant
- For third admission: No, F = 0.29, p = 0.598

Is there a difference in Length of Stay between Intervention and Control groups post intervention?

- Overall: No, F = 0.69, p = 0.409
- For first admission: No, F = 0.16, p = 0.689
- For second admission: No, F = 0.97, p = 0.325

Length of stay by Admission number and Participant group

Admission number	Participant group	n	mean	st.dev.	min	median	max	se	lowCI	upperCI
1	b_During Control	207	7.96	8.468	1	6.0	50	0.589	6.80	9.12
1	b_During Intervtn	190	7.48	8.370	1	5.0	64	0.607	6.28	8.68
1	c_Post Control	77	8.71	10.316	1	5.0	51	1.176	6.37	11.05
1	c_Post Intervtn	63	7.19	7.313	1	4.0	39	0.921	5.35	9.03
2	b_During Control	77	10.23	11.883	1	7.0	56	1.354	7.53	12.93
2	b_During Intervtn	64	7.66	9.706	1	5.0	51	1.213	5.24	10.08
2	c_Post Control	32	8.41	8.167	1	6.0	37	1.444	5.46	11.36
2	c_Post Intervtn	25	8.48	7.462	1	6.0	28	1.492	5.40	11.56

Primary procedures

Top 20 main procedures for INDEX admission: There were baseline between-groups differentials in the rate of procedures at baseline. In the post-intervention period some differences remained and others changed direction but it is not possible to determine if this was random variation due to the small sample.

	b_During			c_Post		
procedure_code des	Control	Intervtn	% different	Control	Intervtn	% different
Allied health Intervtn, physiotherapy	26.57	28.42	1.85	27.27	26.98	-0.29
NOT AVAILABLE CODE	12.56	18.42	5.86	15.58	11.11	-4.47
Allied health Intervtn, social work	3.86	9.47	5.61	1.30	9.52	8.22
Allied health Intervtn, occupational therapy	8.21	6.32	-1.89	3.90	6.35	2.45
Allied health Intervtn, speech pathology	8.21	6.32	-1.89	5.19	6.35	1.16
Administration of packed cells	6.76	3.16	-3.60	9.09	3.17	-5.92
Management of noninvasive ventilatory support, <= 24 hours	3.38	1.58	-1.80	NA	1.59	NA
Management of noninvasive ventilatory support, > 24 and < 96 hours	2.42	1.05	-1.37	2.60	1.59	-1.01
Allied health Intervtn, dietetics	2.42	1.05	-1.37	5.19	7.94	2.75
Allied health Intervtn, pharmacy	2.42	2.11	-0.31	5.19	3.17	-2.02
Continuous peritoneal dialysis, long term	0.97	0.53	-0.44	1.30	NA	NA
Coronary angiography with left heart catheterisation	0.97	0.53	-0.44	NA	NA	NA
Hemiarthroplasty of femur	0.97	0.53	-0.44	1.30	NA	NA
Percutaneous insertion of 1 transluminal stent into single coronary artery	0.97	0.53	-0.44	NA	NA	NA
Allied health Intervtn, other	1.45	1.05	-0.40	NA	1.59	NA
Internal fixation of fracture of trochanteric or subcapital femur	0.97	1.05	0.08	NA	NA	NA
Panendoscopy to duodenum	0.97	1.05	0.08	NA	NA	NA
Carotid endarterectomy	0.48	1.05	0.57	NA	NA	NA

Insertion of intercostal catheter for drainage	0.48	2.11	1.63	1.30	1.59	0.29
Administration of other serum	0.48	0.53	0.05	NA	NA	NA

Top 20 main procedures for second admission

Note: Due the small sample for the second admission of post intervention group (n= 25), 4% equates to 1 diagnosis.

	b_During			c_Post		
procedure_code des	Control	Intervtn	% different	Control	Intervtn	% different
Allied health Intervtn, physiotherapy	27.27	18.75	-8.52	12.50	20.0	7.50
Allied health Intervtn, speech pathology	12.99	3.12	-9.87	18.75	4.0	-14.75
CODES NOT AVAILABLE	10.39	10.94	0.55	12.50	16.0	3.50
Allied health Intervtn, social work	9.09	12.50	3.41	12.50	24.0	11.50
Allied health Intervtn, occupational therapy	5.19	12.50	7.31	3.12	4.0	0.88
Allied health Intervtn, pharmacy	5.19	3.12	-2.07	3.12	8.0	4.88
Allied health Intervtn, other	5.19	4.69	-0.50	NA	NA	NA
Administration of packed cells	2.60	7.81	5.21	6.25	0.0	NA
Percutaneous insertion of 1 transluminal stent into single coronary artery	2.60	1.56	-1.04	NA	NA	NA
Management of noninvasive ventilatory support, <= 24 hours	2.60	3.12	0.52	3.12	4.0	0.88
Administration of platelets	1.30	NA	NA	NA	4.0	NA
Allied health Intervtn, diabetes education	1.30	NA	NA	NA	NA	NA
Abdominal paracentesis	1.30	NA	NA	NA	NA	NA
Continuous peritoneal dialysis, long term	1.30	NA	NA	3.12	NA	NA
2 dimensional real time transoesophageal ultrasound of heart	NA	1.56	NA	NA	NA	NA
Administration of coagulation factors	NA	3.12	NA	NA	NA	NA
Amputation of toe	NA	NA	NA	NA	4.0	NA
Amputation of toe including metatarsal bone	NA	1.56	NA	3.12	NA	NA

Biopsy of skin and subcutaneous tissue	NA	1.56	NA	NA	NA	NA
Continuous haemodiafiltration	NA	NA	NA	3.12	NA	NA

Rate of in-hospital death

The number of deaths was not significantly different between the case and control groups during (Chi Sq. = 0.01, p = 0.927) or after (Chi Sq. 0.00, p = 0.980) the intervention.

Number of deaths

Participant group		No death	Died
During	Control	187	19
	Intervtn	171	19
Post	Control	66	11
	Intervtn	55	8

The number of deaths in 24 hours was not significantly different between the case and control groups during (Chi Sq. = 0.00, p = 1.0) or after (Chi Sq. 0.00, p = 1.0) the intervention.

Number of deaths within 24 hrs

Participant group		Died after 24 hrs	Died within 24 hrs
During	Control	16	3
	Intervention	16	3
Post	Control	8	3
	Intervention	6	2

Proportion of Brief stays

A brief stay is 3 days of less, with frequency expected to increase in the post-intervention period if the intervention led to earlier discharge to palliative care or other community services.

The proportion of brief stays was not significantly different between Cases and Controls during the intervention (baseline Chi Sq. = 0.021, p = 0.884). Post intervention, the difference between the Intervention and Control groups was larger, but was not statistically significant (Chi Sq. = 2.98, p = 0.085).

Number of brief stays

	B_During		C_Post	
Length of stay	Control	Intervtn	Control	Intervtn
Brief	126 (38.9%)	114 (38.0%)	53 (40.2%)	29 (28.4%)
Long	198 (61.1%)	186 (62.0%)	79 (59.8%)	73 (71.6%)
Total	324	300	132	102

Discharge destination

Distribution of discharge destination

Overall, there was no difference in mode of discharge of first admission between the intervention or control groups either during the intervention period (Chi Sq.= 2.12, p = 0.714, df = 4) or post-intervention (Chi Sq. = 4.57, p = 0.334, df = 4).

Looking at the most common reasons for discharge, there was also no difference between intervention or control groups on being discharged to a nursing home (as opposed to any other form of discharge) during (Chi Sq. = 0.00, p = 0.96, df = 1) or after (Chi Sq. = 0.22, p = 0.640, df = 1) the intervention.

Considering rates of 'discharge Home' (as opposed to any other method of discharge), there was also no difference between intervention or control groups during (Chi Sq. = 0.04, p = 0.847, df = 1) or post intervention (Chi Sq. = 0.08, p = 0.772, df = 1).

Mode of discharge, first admission (index)

	b_During			c_Post		
mode of separation description	Control	Intervtn	% different	Control	Intervtn	% different
Discharge Home	73.91	75.26	1.35	68.83	65.08	-3.75
Transfer to Nursing Home	15.94	15.26	-0.68	22.08	17.46	-4.62
Transfer to Other Hosp	6.28	4.21	-2.07	2.60	9.52	6.92
Death	3.86	4.74	0.88	6.49	6.35	-0.14
Discharged Own Risk	0	0.53	0.53	0	0	0
Transfer to Palliative Care Unit	0	0	0	0	1.59	1.59

Mode of discharge, second admission (post-intervention)

	b_During			C_Cost		
mode of separation description	Control	Intervtn	% different	Control	Intervtn	% different
Discharge Home	66.23	76.56	10.33	68.75	64	-4.75
Transfer to Nursing Home	20.78	10.94	-9.84	15.62	12	-3.62
Transfer to Other Hosp	6.49	3.12	-3.37	6.25	8	1.75
Death	6.49	7.81	1.32	9.38	16	6.62
Transfer to Other Acomm	NA	1.56	NA	NA	NA	NA

Emergency Department presentations

There appears to be a decrease in the rate of ED presentation in the intervention group (from 52% to 42.7%) whereas an increase in ED presentation was observed in the control group (from 48% to 42.7%) but data needs to be viewed with caution as it is unknown if patients died in the 6-month post-intervention period as they were followed up for 3 months only.

Emergency Department - Time to re-visit (days)

Is there a difference in Time to Revisit between Cases and Controls during the intervention?

- First to Second admission: No, t = 0.53, p = 0.594
- Second to Third admission: No, t = 0.831, p = 0.409

Is there a difference in frequency of ED Revisit between Cases and Control post-intervention? Yes, twice as many patients in the intervention group returned to the ED within 30 days (59% vs. 25.6% respectively) and the difference post intervention was significant **(Chi Sq. = 6.94, p < 0.001)**.

Participant group	n	Mean (days)	lowCI	upperCI
b_During Control	183	34.89	30.15	39.63
b_During Intervtn	141	37.03	31.09	42.97
c_Post Control	65	41.85	33.11	50.59
c_Post Intervtn	61	33.17	26.70	39.64

The between-group difference in time to ED revisit was statistically significant First to Second admission: **t = 2.50, p = 0.015*** However, the direction of this outcome was the opposite of the expected, with patients in the intervention group also returning to the ED sooner than those in the control group.

Length of stay in the Emergency Department and Discharge method

During the intervention period the average length of stay was 6.8 hours for the control group, compared to 6.6 hours for the intervention group. This difference was not significant (F = 0.62, p = 0.432).

Re-admission rate and Time to Re-admission

There was no statistically significant difference in Re-admission rates between cases and controls during or after the intervention.

Patient_Group	Patients to re-admit	Re-admission rate
b_During x Control	77	34.8%
b_During x Intervention	64	32.0%
c_Post Control	32	14.5%
c_Post Intervention	25	12.5%

Time to re-admission

Is there a difference in Time to Readmission between Cases and Controls during the intervention?

- Overall: No, F = 0.065, p = 0.799
- First to Second admission: No, F = 0.05, p = 0.816
- Second to Third admission: No, F = 0.06, p = 0.814