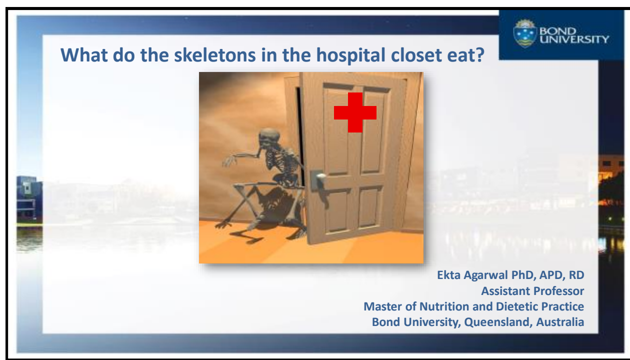

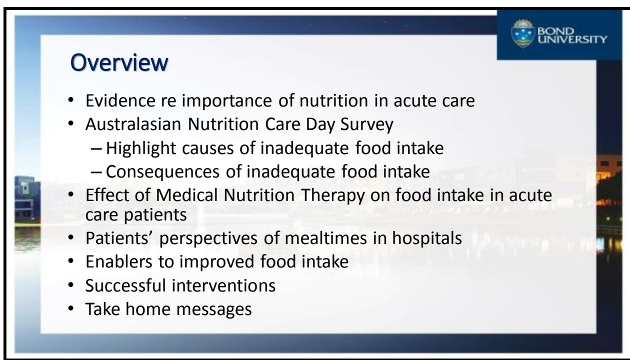

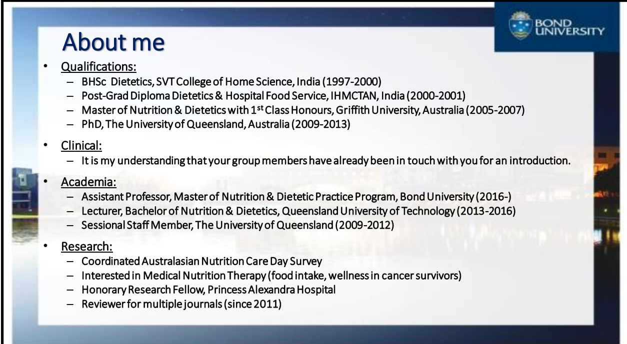

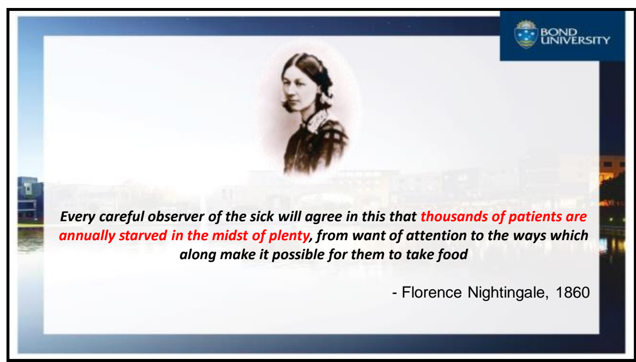

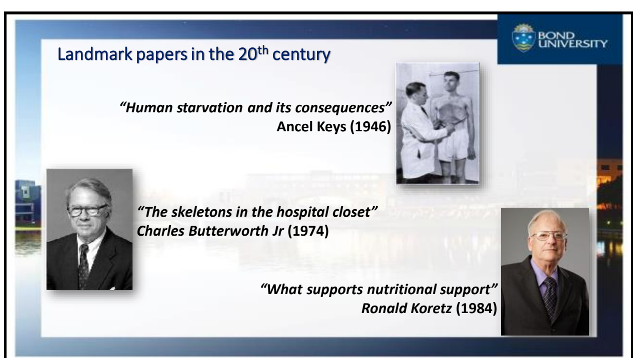

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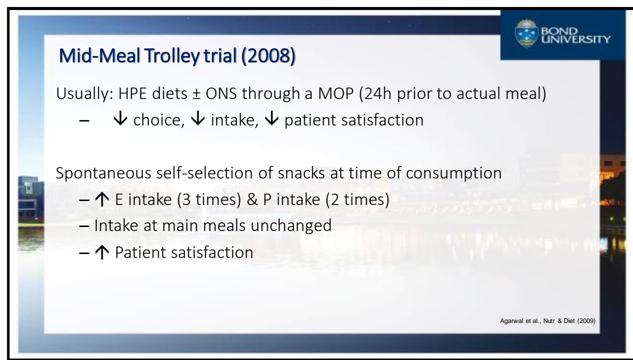
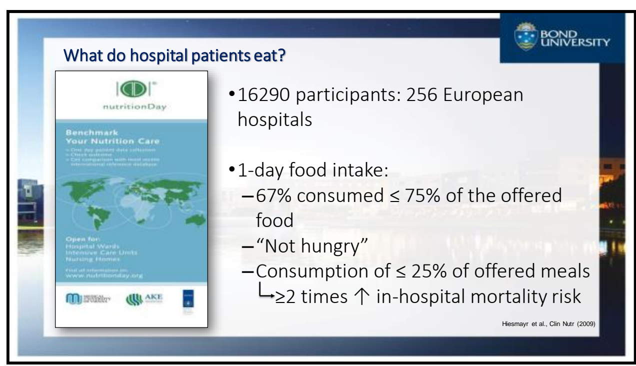
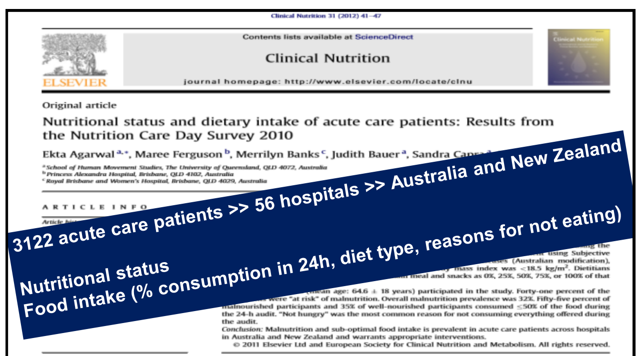
Nutrition & Dietetics 2009; 66 (Suppl. 3): S1

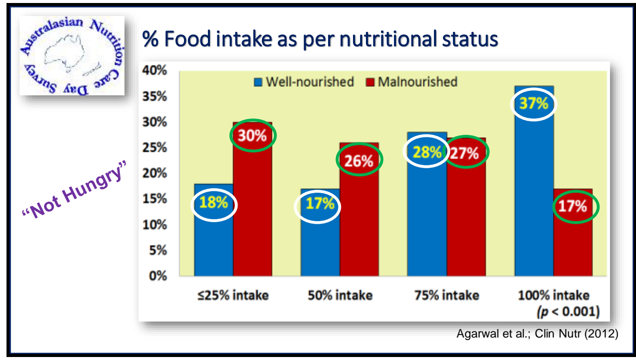
Evidence based practice guidelines for the nutritional management of malnutrition in adult patients across the continuum of care

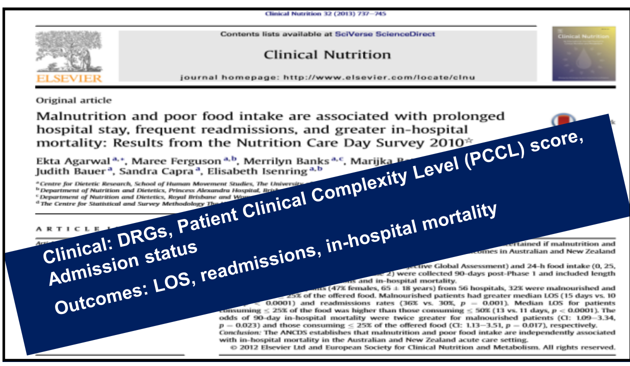
Level I	Level II	Level III
Improved outcomes if nutritional goals aim to optimise nutritional status and prevent decline	Food modification → Energy intake & weight Feeding support → energy intake, body composition & life expectancy	Nutrition support team →cost and complications
ONS → body composition, weight	ONS → Energy intake	ONS → Healthcare costs
Individualised nutritional support (mixed approaches)→ LOS, complications, risk of infection	Individualised nutritional support (mixed approaches)→ wound healing	

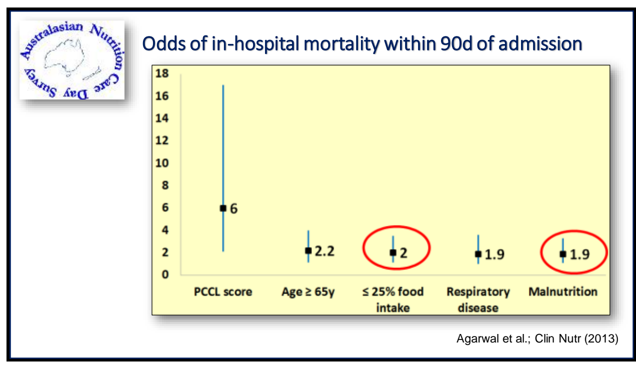

Mid-Meal Trolley trial (2008)
Usually: HPE diets ± ONS through a MOP (24h prior to actual meal)
– ↓ choice, ↓ intake, ↓ patient satisfaction
Spontaneous self-selection of snacks at time of consumption
– ↑ E intake (3 times) & P intake (2 times)
– Intake at main meals unchanged
– ↑ Patient satisfaction
Agarwal et al., Nutr & Diet (2009)

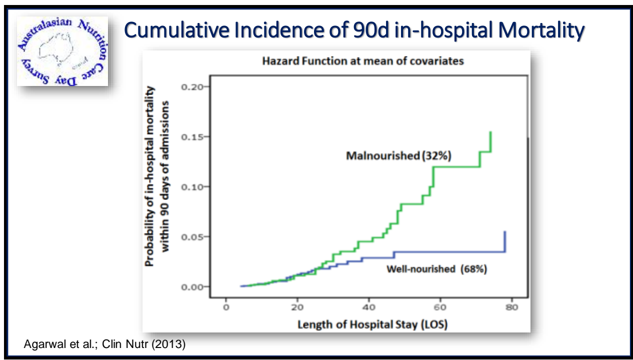

What do hospital patients eat?
nutritionDay
• 16290 participants: 256 European hospitals
• 1-day food intake:
– 67% consumed ≤ 75% of the offered food
– "Not hungry"
– Consumption of ≤ 25% of offered meals
↳ ≥2 times ↑ in-hospital mortality risk
Hiesmayr et al., Clin Nutr (2009)


Clinical Nutrition
Original article
Nutritional status and dietary intake of acute care patients: Results from the Nutrition Care Day Survey 2010
3122 acute care patients >> 56 hospitals >> Australia and New Zealand
Nutritional status
Food intake (% consumption in 24h, diet type, reasons for not eating)

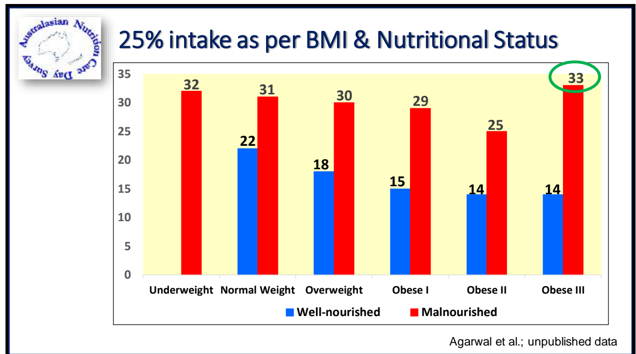

% Food intake as per nutritional status
Well-nourished
Malnourished
"Not Hungry"
≤25% intake
50% intake
75% intake
100% intake
(p < 0.001)
18%
30%
17%
26%
28%
27%
37%
17%
Agarwal et al.; Clin Nutr (2012)

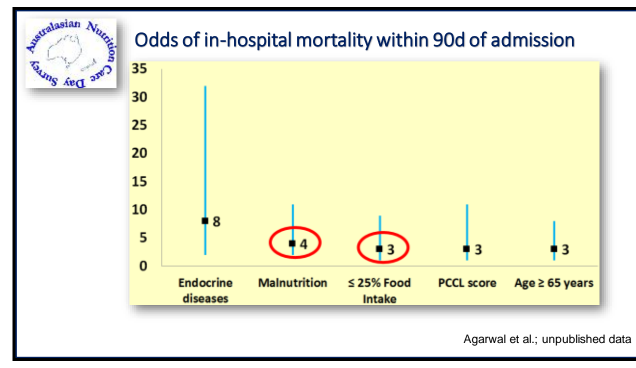

Clinical Nutrition
Original article
Malnutrition and poor food intake are associated with prolonged hospital stay, frequent readmissions, and greater in-hospital mortality: Results from the Nutrition Care Day Survey 2010
Clinical: DRGs, Patient Clinical Complexity Level (PCCL) score,
Admission status
Outcomes: LOS, readmissions, in-hospital mortality

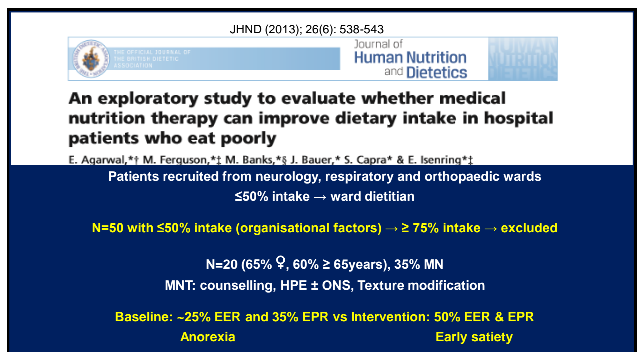

Odds of in-hospital mortality within 90d of admission
PCCL score
6
Age ≥ 65y
2.2
≤ 25% food intake
2
Respiratory disease
1.9
Malnutrition
1.9
Agarwal et al.; Clin Nutr (2013)

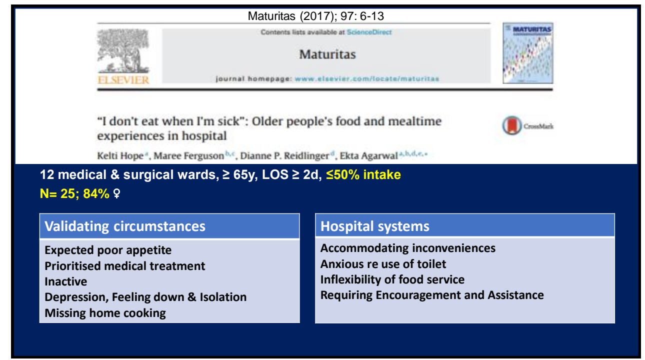

Cumulative Incidence of 90d in-hospital Mortality
Hazard Function at mean of covariates
Probability of in-hospital mortality within 90 days of admissions
Malnourished (32%)
Well-nourished (68%)
Length of Hospital Stay (LOS)
Agarwal et al.; Clin Nutr (2013)

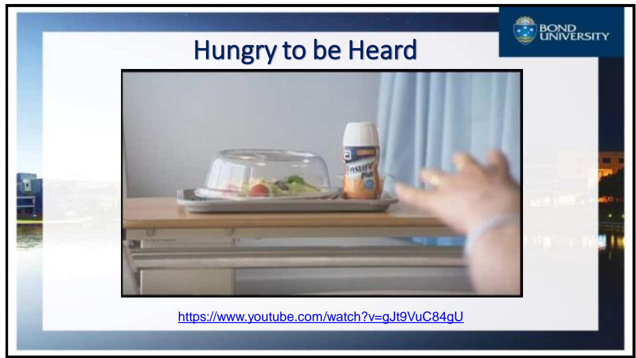
Patient 1
Patient 2

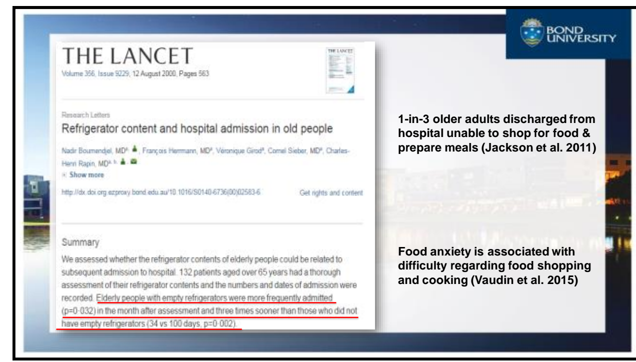

25% intake as per BMI & Nutritional Status
Underweight
Normal Weight
Overweight
Obese I
Obese II
Obese III
Well-nourished
Malnourished
Agarwal et al.; unpublished data


Odds of in-hospital mortality within 90d of admission
Endocrine diseases
Malnutrition
≤ 25% Food Intake
PCCL score
Age ≥ 65 years
Agarwal et al.; unpublished data


JHND (2013); 26(6): 538-543
Journal of Human Nutrition and Dietetics
An exploratory study to evaluate whether medical nutrition therapy can improve dietary intake in hospital patients who eat poorly
E. Agarwal, M. Ferguson, M. Banks, J. Bauer, S. Capra & E. Isenring
Patients recruited from neurology, respiratory and orthopaedic wards
≤50% intake → ward dietitian
N=50 with ≤50% intake (organisational factors) → ≥ 75% intake → excluded
N=20 (65% ♀, 60% ≥ 65years), 35% MN
MNT: counselling, HPE ± ONS, Texture modification
Baseline: ~25% EER and 35% EPR vs Intervention: 50% EER & EPR
Anorexia
Early satiety


Maturitas (2017); 97: 6-13
Maturitas
"I don't eat when I'm sick": Older people's food and mealtime experiences in hospital
Kelti Hope, Maree Ferguson, Dianne P. Reidlinger, Ekta Agarwal
12 medical & surgical wards, ≥ 65y, LOS ≥ 2d, ≤50% intake
N= 25; 84% ♀
Validating circumstances
Expected poor appetite
Prioritised medical treatment
Inactive
Depression, Feeling down & Isolation
Missing home cooking
Hospital systems
Accommodating inconveniences
Anxious re use of toilet
Inflexibility of food service
Requiring Encouragement and Assistance





THE LANCET

Volume 356, Issue 9229, 12 August 2000, Pages 563

Research Letters

Refrigerator content and hospital admission in old people

Nadir Boumendjel, MD[a], François Herrmann, MD[a], Véronique Girod[a], Cornel Sieber, MD[a], Charles-Henri Rapin, MD[a, b]

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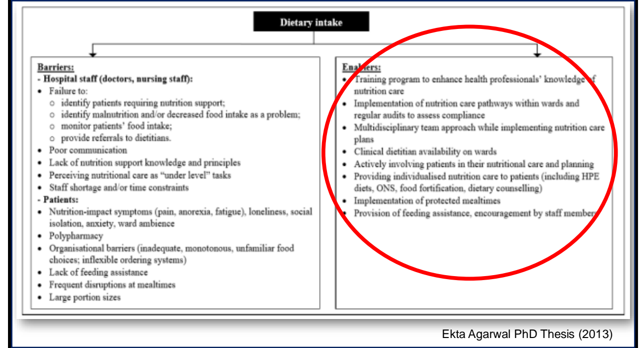
http://dx.doi.org.ezproxy.bond.edu.au/10.1016/S0140-6736(00)02583-6 Get rights and content

Summary

We assessed whether the refrigerator contents of elderly people could be related to subsequent admission to hospital. 132 patients aged over 65 years had a thorough assessment of their refrigerator contents and the numbers and dates of admission were recorded. Elderly people with empty refrigerators were more frequently admitted (p=0·032) in the month after assessment and three times sooner than those who did not have empty refrigerators (34 vs 100 days, p=0·002).



Dietary intake

Barriers:

- **Hospital staff (doctors, nursing staff):**
  - Failure to:
    - identify patients requiring nutrition support;
    - identify malnutrition and/or decreased food intake as a problem;
    - monitor patients' food intake;
    - provide referrals to dietitians.
  - Poor communication
  - Lack of nutrition support knowledge and principles
  - Perceiving nutritional care as "under level" tasks
  - Staff shortage and/or time constraints
- **Patients:**
  - Nutrition-impact symptoms (pain, anorexia, fatigue), loneliness, social isolation, anxiety, ward ambience
  - Polypharmacy
  - Organisational barriers (inadequate, monotonous, unfamiliar food choices; inflexible ordering systems)
  - Lack of feeding assistance
  - Frequent disruptions at mealtimes
  - Large portion sizes

Enablers:

- Training program to enhance health professionals' knowledge of nutrition care
- Implementation of nutrition care pathways within wards and regular audits to assess compliance
- Multidisciplinary team approach while implementing nutrition care plans
- Clinical dietitian availability on wards
- Actively involving patients in their nutritional care and planning
- Providing individualised nutrition care to patients (including HPE diets, ONS, food fortification, dietary counselling)
- Implementation of protected mealtimes
- Provision of feeding assistance, encouragement by staff members

Ekta Agarwal PhD Thesis (2013)

Clinical Nutrition 33 (2014) 1101–1107

Multidisciplinary, multi-modal nutritional care in acute hip fracture inpatients – Results of a pragmatic intervention☆

CrossMark

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Hip fractures
Elderly
Hospitals
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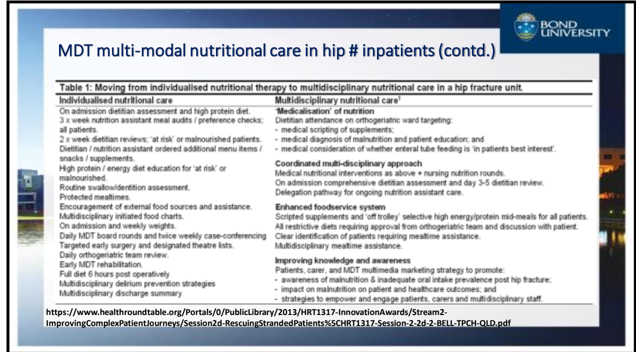
SUMMARY

Background & aims: Malnutrition is highly prevalent and resistant to intervention following hip fracture. This study investigated the impact of individualised versus multidisciplinary nutritional care on nutrition intake and outcomes in patients admitted to a metropolitan hospital acute hip fracture unit.

Methods: A prospective, controlled before and after comparative interventional study aligning to the CONSORT guidelines for pragmatic clinical trials. Randomly selected patients receiving individualised nutritional care (baseline) were compared with post-interventional patients receiving a new model of nutritional care promoting nutrition as a medicine, multidisciplinary nutritional care, foodservice enhancements, and improved nutrition knowledge and awareness. Malnutrition was diagnosed using the Academy of Nutrition and Dietetics criteria.

Results: Fifty-eight weighed food records were available for each group across a total of 82 patients ($n = 44$, $n = 38$). Group demographics were not significantly different with predominantly community dwelling (72%), elderly (82.2 years), female (70%), malnourished (51.0%) patients prone to co-morbidities (median 5) receiving early surgical intervention (median D1). Multidisciplinary nutritional care reduced



MDT multi-modal nutritional care in hip # inpatients (contd.)

Table 1: Moving from individualised nutritional therapy to multidisciplinary nutritional care in a hip fracture unit.

Individualised nutritional care	Multidisciplinary nutritional care[1]
On admission dietitian assessment and high protein diet. 3 x week nutrition assistant meal audits / preference checks; all patients. 2 x week dietitian reviews; 'at risk' or malnourished patients. Dietitian / nutrition assistant ordered additional menu items / snacks / supplements. High protein / energy diet education for 'at risk' or malnourished. Routine swallow/dentition assessment. Protected mealtimes. Encouragement of external food sources and assistance. Multidisciplinary initiated food charts. On admission and weekly weights. Daily MDT board rounds and twice weekly case-conferencing Targeted early surgery and designated theatre lists. Daily orthogeriatric team review. Early MDT rehabilitation. Full diet 6 hours post operatively Multidisciplinary delirium prevention strategies Multidisciplinary discharge summary	**'Medicalisation' of nutrition** Dietitian attendance on orthogeriatric ward targeting: - medical scripting of supplements; - medical diagnosis of malnutrition and patient education; and - medical consideration of whether enteral tube feeding is 'in patients best interest'. **Coordinated multi-disciplinary approach** Medical nutritional interventions as above + nursing nutrition rounds. On admission comprehensive dietitian assessment and day 3-5 dietitian review. Delegation pathway for ongoing nutrition assistant care. **Enhanced foodservice system** Scripted supplements and 'off trolley' selective high energy/protein mid-meals for all patients. All restrictive diets requiring approval from orthogeriatric team and discussion with patient. Clear identification of patients requiring mealtime assistance. Multidisciplinary mealtime assistance. **Improving knowledge and awareness** Patients, carer, and MDT multimedia marketing strategy to promote: - awareness of malnutrition & inadequate oral intake prevalence post hip fracture; - impact on malnutrition on patient and healthcare outcomes; and - strategies to empower and engage patients, carers and multidisciplinary staff.

https://www.healthroundtable.org/Portals/0/PublicLibrary/2013/HRT1317-InnovationAwards/Stream2-ImprovingComplexPatientJourneys/Session2d-RescuingStrandedPatients%5CHRT1317-Session-2-2d-2-BELL-TPCH-QLD.pdf

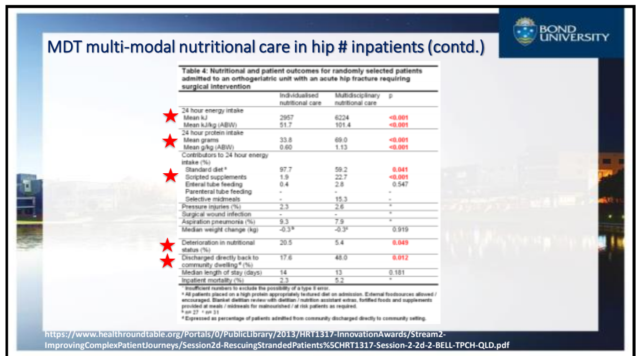
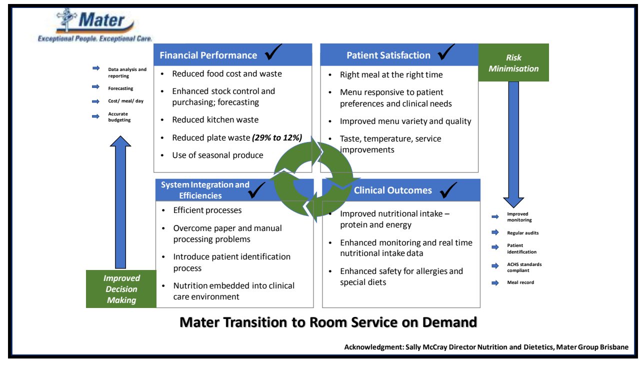
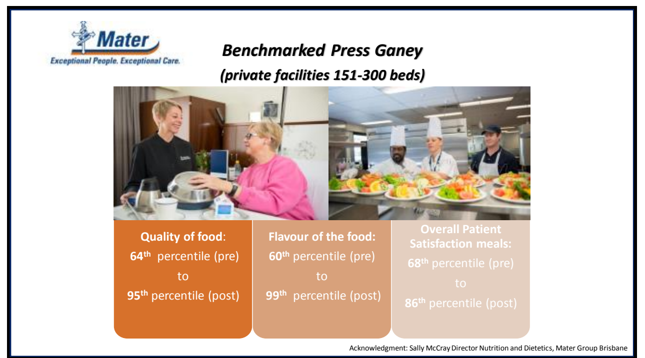


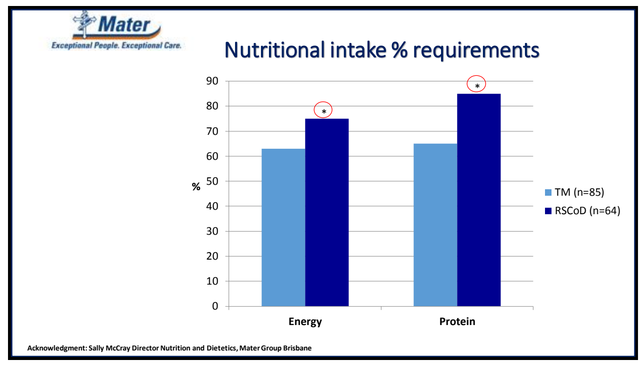
Table 4: Nutritional and patient outcomes for randomly selected patients admitted to an orthogeriatric unit with an acute hip fracture requiring surgical intervention

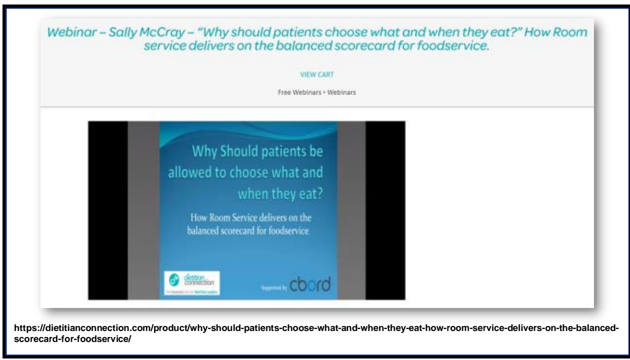
	Individualised nutritional care	Multidisciplinary nutritional care	p
24 hour energy intake			
Mean kJ	2957	6224	<0.001
Mean kJ/kg (ABW)	51.7	101.4	<0.001
24 hour protein intake			
Mean grams	33.8	69.0	<0.001
Mean g/kg (ABW)	0.60	1.13	<0.001
Contributors to 24 hour energy intake (%)			
Standard diet ª	97.7	59.2	0.041
Scripted supplements	1.9	22.7	<0.001
Enteral tube feeding	0.4	2.8	0.547
Parenteral tube feeding	-	-	-
Selective midmeals	-	15.3	-
Pressure injuries (%)	2.3	2.6	*
Surgical wound infection	-	-	*
Aspiration pneumonia (%)	9.3	7.9	*
Median weight change (kg)	-0.3 [b]	-0.3 [c]	0.919
Deterioration in nutritional status (%)	20.5	5.4	0.049
Discharged directly back to community dwelling [d] (%)	17.6	48.0	0.012
Median length of stay (days)	14	13	0.181
Inpatient mortality (%)	2.3	5.2	*

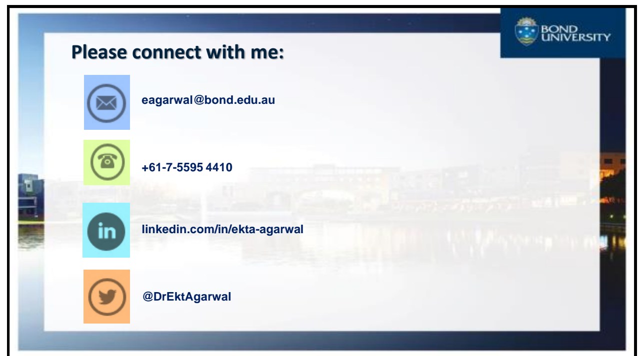
* Insufficient numbers to exclude the possibility of a type II error.
ª All patients placed on a high protein appropriately textured diet on admission. External foodsources allowed / encouraged. Blanket dietitian review with dietitian / nutrition assistant extras, fortified foods and supplements provided at meals / midmeals for malnourished / at risk patients as required.
[b] n= 27 [c] n= 31
[d] Expressed as percentage of patients admitted from community discharged directly to community setting.







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