Communications to the Autumn Meeting of the British Geriatrics Society

12 - 14 October 2011
Brighton Centre
Brighton

programme of abstracts
THURSDAY, 13 OCTOBER

PLATFORM PRESENTATIONS

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FRIDAY, 14 OCTOBER

PLATFORM PRESENTATIONS

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DOES OXYGEN SATURATION AFFECT VASCULAR COMPLIANCE IN ACUTE ISCHAEMIC STROKE?

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¹. Brighton and Sussex Medical School, Academic Department of Geriatrics. ². Stoke Stroke Research Group, Stoke-on-Trent

Introduction

Vascular compliance is an independent predictor of cardiovascular events and in acute stroke may be an important prognostic factor. The aim of the study was to investigate a relationship between oxygen saturation and vascular compliance in acute stroke.

Methods
Ambulatory monitoring of heart rate (HR), blood pressure (BP), and ECG was undertaken within 48 hours of stroke onset using Triholter machine (Novacor, France). Vascular compliance was measured from Q-KD interval (time from QRS onset on ECG, to the last Korotkoff sound). Readings were taken at regular intervals (half hourly daytime, and hourly nighttime), and corrected for HR of 60 beats per minute, and systolic BP of 100 mmHg. Oxygen saturation was measured 4 hourly. Oxygen saturation and Q-KD were analysed for any correlation using Pearson's correlation coefficient (PCC).

Results
Twenty ischaemic stroke patients (40% males) with an average age of 75 (range 49-91) years were recruited. Average time from admission to ambulatory monitoring was 21 hours, 4 minutes. Average oxygen saturation was 97% (range 94-100%). Average QKD was 192 ms (range 158ms - 263ms). There was a positive correlation (0.17) between oxygen saturation and vascular compliance (p= 0.0001, 95% CI -107.28 to 83.12).

Conclusions
A positive correlation between oxygen saturation and vascular compliance in acute stroke was found. These results may suggest a plausible pathophysiological mechanism for better outcomes in patients with higher oxygen saturation. Increasing oxygen saturation may improve blood flow to the ischaemic penumbra by improving vascular compliance properties in acute stroke.
DOES SPIRONOLACTONE IMPROVE EXERCISE CAPACITY IN FUNCTIONALLY IMPAIRED OLDER PEOPLE WITHOUT HEART FAILURE?

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Introduction
Maintaining muscle function is vital to preserve physical function and reduce disability in later life. Recent evidence suggests that blockade of the renin-angiotensin-aldosterone system may have a role in improving physical function in older people through its effects on cardiovascular and muscle function. We hypothesised that inhibition of the renin-angiotensin-aldosterone system with spironolactone would improve physical function in older people without heart failure.

Methods
In a double-blind, randomised controlled trial 120 participants, aged >65 years with functional impairment were randomized to receive 25mg spironolactone or placebo for 20 weeks. The primary outcome was the change in six-minute walking distance over 20 weeks. Secondary outcomes were change in Timed-Get-Up and Go test, Incremental Shuttle Walk Test, health related quality of life (EuroQol EQ-5D, Visual Analogue Scale and Functional Limitation Profile) and measures of psychological state (Hospital Anxiety and Depression Scale).

Results
Participants’ mean age was 75 years (SD 6), 65/120 (54%) were male. Of the 112 participants who completed the study 95% (106/112) remained on medication at 20 weeks. There was no significant change in six-minute walking distance at 20 weeks between spironolactone and placebo groups [mean change -3.2 (95% CI -28.9 to 22.5, p=0.81) metres] Quality of life however significantly improved at 20 weeks, with a rise in EuroQol EQ-5D score of 0.10 (95% CI 0.03 to 0.18, p<0.01) in the spironolactone group relative to the placebo group. There were no significant differences in between-group change for the other secondary outcomes.

Conclusion
Spironolactone was well tolerated, but did not improve physical function in older people without heart failure. Quality of life improved, but the biological plausibility and possible mechanisms for this require further study.
SODIUM DYSREGULATION AND ITS ASSOCIATION WITH MORTALITY

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1. Peninsula Medical School, University of Exeter, 2. The Royal Devon and Exeter NHS Foundation Trust. *Equal contribution - therefore regarded as co-first authors

Introduction
Impaired sodium homeostasis is a recognised indicator of reduced physiological reserve in elderly patients. We explored the prognostic information contained within hyper- and hyponatraemia with regard to mortality.

Methods
From January to April 2011, an audit was conducted exploring investigation of hyponatraemia in over 65s in an acute teaching trust. This is a secondary analysis performed with permission of the Caldicott Guardian. Admission demography and biochemical readings including albumin, serum sodium, CRP and leucocytes were recorded. Length of stay was detailed.

Results
Complete datasets were available for 1171 patients. Of these 62 were hypernatraemic (mean age 81.3± 8.7) and 155 were hyponatraemic (mean age 81.1±7.1). The mortality, if sodium regulation was abnormal (i.e. either hypo or hypernatraemic) was 12.5% vs. 5.74% for normal sodium on admission (p<0.001). The age-sex adjusted Cox proportionate hazard ratio for mortality was 2.04 (95%CI 1.28-3.26); p=0.003 in those with abnormal sodium regulation. This was only marginally attenuated by adjustment for conventional prognostic indicators including CRP, white cell count and urea (Fully adjusted HR 1.70 (1.01-2.90); p=0.04). In this model the only other contributant to the variance in mortality was CRP (HR 1.04 (1.02-1.06) for every 10mg/L). Adjusting for the aetiology of hyponatraemia (SIADH or iatrogenic) made no substantive difference.

Conclusion
These data verify the significance of impaired homeostasis in the assessment of geriatric hospitalised patients. Further, the independence from precipitant (i.e. whether iatrogenic or SIADH) suggest that this autoregulatory failure may be a feature of "terminal decline" in geriatric practice. Acute phase markers of disease process, however, do not carry the same prognostic information.
NORMAL AGE RELATED COGNITIVE CHANGE IS HALF EXPLAINED BY GENES - A TWIN STUDY

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Introduction
Cognitive performance at a single time point is significantly heritable, but to date there has been an intriguing failure of twin studies to show heritability of cognitive change with ageing. Heritability is, however, found in longitudinal studies of brain morphology changes. The lack of evidence for heritability of change in cognitive performance could be due to practice effects, short time intervals, or could be because cognitive ageing is environmentally mediated or stochastic. We show heritability of the first factor of the Cambridge Neuropsychological Test Automated Battery (CANTAB) over ten years, suggesting that genetics do play a part in cognitive change with age.

Methods
324 healthy individuals aged over 55 in the UK twin register were tested twice with a ten-year interval with CANTAB. Battery tests used were Paired Associates Learning (errors), Pattern Recognition Memory (latency), Delayed Matching to Sample (latency), Spatial Working Memory (errors), Simple Reaction Time (latency), Five-Choice Reaction Time (latency), and Spatial Span. As these measures are correlated, factor analysis was performed on change scores adjusted for baseline score. Structural equation modeling with MX software was used to provide heritability estimates.

Results
The first factor from factor analysis of CANTAB change scores adjusted for baseline performance was strongly associated with age (-3.6 years per sd, p=1.7e-13). Factor 1 loads on measures of response latency, indicating it may be a measure of processing speed. Heritability (A) was estimated as 47% (CI95 27-62%) and unshared environment (E) as 53% (CI95 38-73%).

Conclusions
This study shows heritability of cognitive change against current published research. While numbers are small, the heritability finding may be due to direct computerised measurement of task response times. This cognitive performance measure may be more closely correlated with the morphological brain changes known to be heritable, and more accurately measure a phenotype of interest.
GENETIC VARIATION IN THE GALECTIN-3 GENE ASSOCIATES WITH COGNITIVE FUNCTION AT OLD AGE

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Objective
Inflammation plays an important role in the development of cognitive decline and dementia in old age. Galectin-3 is known for its role in acute and chronic inflammation. Moreover, in mouse models it is shown that galectin-3 has a regulatory role in the brain. We assessed whether genetic variation in the LGALS3 gene, encoding for galectin-3, associates with cognitive function in an elderly population.

Methods
All 5804 participants of the PROspective Study of Pravastatin in the Elderly at Risk (PROSPER) were genotyped for the rs4644, rs4652, and rs1009977 polymorphisms in the LGALS3 gene. Cognitive function was assessed with a neuropsychological test battery. Cross-sectional associations between the polymorphisms and cognitive function were assessed with linear regression. Longitudinal associations between polymorphisms, haplotypes and cognitive function were assessed with linear mixed models. All associations were adjusted for sex, age, education, country, treatment with pravastatin, and version of test where appropriate.

Results
Subjects carrying the variants alleles in the LGALS3 polymorphisms had significantly higher baseline CRP levels (p<0.01). Furthermore, we demonstrated that carriers of the variant alleles had significantly worse performance on all four cognitive tests at baseline and during follow-up compared to homozygous carriers of the wild-type allele (all p<0.05). The haplotype with all three variants present was associated with worse performance on attention and immediate memory (all p<0.03) compared to the reference haplotype without variants. For the other tests the same trend was observed, although not significant.

Conclusion
We are the first to show that genetic variation in the LGALS gene is associated with cognitive function in an elderly population. Carriers of genetic variants have decreased performance on four cognitive function tests. Further research is warranted to confirm and explain these results to unravel the biology of cognitive decline and dementia.
INTRAMYOCELLULAR LIPID CONTENT IN FAMILIAL LONGEVITY: THE LEIDEN LONGEVITY STUDY

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Introduction
We designed the Leiden Longevity Study to examine familial determinants of longevity in humans. In this study, long-lived families were selected consisting of nonagenarian siblings and their middle-aged offspring, with the partners thereof as controls. Recently, we showed that the middle-aged offspring had lower prevalence of major age-related diseases, including diabetes. Non-diabetic offspring showed lower fasting glucose levels, better glucose tolerance and enhanced skeletal muscle insulin sensitivity compared to the controls, while the groups were similar in age, sex, body composition and lifestyle characteristics. Our aim was to determine whether the enhanced insulin sensitivity in offspring enriched for longevity was reflected by lower intramyocellular lipid (IMCL) content, a marker of mitochondrial function and insulin sensitivity.

Methods
We aimed to determine the IMCL content in 60 subjects from the Leiden Longevity Study, 30 offspring and 30 partners thereof as controls. IMCL content was assessed using short echotime proton magnetic resonance spectroscopy (1H-MRS) of the anterior tibial muscle using a 7 tesla MR-scanner. IMCL was calculated relative to the creatine CH3 signal. Physical activity was assessed using the IPAQ questionnaire.

Results
Preliminary data were available for 30 subjects, comprising 16 offspring and 14 controls. Baseline characteristics for the offspring and controls were similar with regard to age, sex, body mass index and IPAQ score. The offspring showed lower IMCL/creatinine ratio than the controls (2.16 +/- 0.41 vs 3.59 +/- 0.43, p=0.024). Furthermore, IMCL content tended to show an inverse association with the age of death of the oldest parent (p=0.089).

Conclusions
Offspring of nonagenarian siblings predisposed for longevity show lower IMCL content compared to age, sex and environmentally matched control subjects. These findings suggest that the enhanced insulin sensitivity found in familial longevity could be explained by IMCL content, and hint at a role of mitochondrial function in familial longevity.
Background
Plasma concentrations of C-reactive protein (CRP), a marker of chronic inflammation, have been associated with cognitive impairment in old age. However, it is unknown whether CRP is causally linked to cognitive decline.

Methods
Within the Prospective Study of Pravastatin in the Elderly at Risk (PROSPER) trial, with 5804 participants with a mean age of 75 years, we examined associations of CRP levels and its genetic determinants with cognitive performance and decline over 3.2 years mean follow-up.

Results
Higher plasma CRP concentrations were associated with poorer baseline performance on the Stroop test (P=0.001) and Letter Digit Tests (P<0.001), but not with the immediate and delayed Picture Learning Test (PLT; both P>0.5). In the prospective analyses, higher CRP concentrations associated with increased rate of decline in the immediate PLT (P=0.016), but not in other cognitive tests (all p>0.11). Adjustment for prevalent cardiovascular risk factors and disease did not change the baseline associations nor associations with cognitive decline during follow-up. Four haplotypes of CRP were used and, compared to the common haplotype, carriehships associated strongly with levels of CRP (all P<0.007). In comparison to strong associations of APOE with cognitive measures, associations of CRP haplotypes with such measures were inconsistent and of negligible clinical importance.

Conclusion
Plasma CRP concentrations associate with cognitive performance in part through pathways independent of (risk factors for) cardiovascular disease. However, lifelong exposure to higher CRP levels does not associate with poorer cognitive performance in old age. The current data weaken the argument for a causal role of CRP in cognitive performance.
CROSS-VALIDATION OF NEW CUT-OFF VALUES FOR HIGH-RISK WAIST CIRCUmFERENCE IN OLDER ADULTS: RESULTS FROM FOUR COHORT STUDIES

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Introduction
The applicability of the currently used WHO waist circumference cut-offs in older adults has been questioned. New cut-offs of 99 cm in women and 106 cm in men were suggested based on the association with several obesity-related health outcomes. Our aim was to cross-validate these cut-offs for adults aged over 70 years in four cohort studies from four different countries.

Methods
Data of participants aged ≥70 years of the Health, Aging and Body Composition (Health ABC) study (n=1310), the Invecchiare in Chianti (InCHIANTI) study (n=673), the Aging, Gene/Environment Susceptibility-Reykjavik (AGES-Reykjavik) Study (n=5117) and the Longitudinal Aging Study Amsterdam (LASA) (n=1204) were used. Prevalence ratios (PR) of high-risk versus normal waist circumference and the Net Reclassification Improvement (NRI) of the waist circumference categories according to the WHO and the new cut-offs were assessed. Cross-sectional associations with knee osteoarthritis, mobility limitations, pain, cardiovascular disease, diabetes and urinary incontinence were studied.

Results
In women, applying the new cut-off value improved the discrimination of individuals with health problems in association with the majority of outcomes in all cohorts both in terms of the PR and the NRI. The NRI’s found consistently represented a 5-10% increase in correctly classified women when applying the new cut-off. In men, results were less consistent. The contrast between the low and high risk waist circumference categories improved in some of the associations assessed, while it deteriorated in other associations and/or in other cohort studies. No significant change was found in association with the health outcomes according to the NRI in men.

Conclusions
An upwards shift of the waist circumference cut-off from 88 to 99 cm in older women improved the discrimination between persons with and without obesity-related health outcomes. In men, no advantage was seen of using 106 cm instead of the WHO cut-off of 102 cm.
THE PROGNOSTIC VALUE OF MUSCLE STRENGTH IN SPORADIC AND FAMILIAL LONGEVITY

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Leiden University Medical Center, Department of Gerontology and Geriatrics

Introduction
Low muscle strength has been shown to be associated with increased morbidity and mortality in diverse samples of middle-aged and elderly people. However, the oldest-old population representing sporadic longevity is under-represented in such studies and the value of muscle strength as marker of exceptional familial longevity has not been previously explored.

Methods
To study the association between muscle strength and sporadic longevity we included 555 85-year-old participants from the Leiden 85-plus Study. All participants were followed for survival.

To investigate the value of muscle strength as marker for exceptional familial longevity we included middle-aged offspring of nonagenarian siblings from the Leiden Longevity Study and their partners as age and environmentally matched controls (n=672). Though of the same chronological age, these offspring have a younger biological age than their partners. Handgrip strength was used as a proxy for overall muscle strength.

Results
During a follow-up period of 9.5 years, 80% participants died. Risk for all-cause mortality was elevated among participants in the lowest tertile of handgrip strength at age 85 years and 89 years (HR 1.35, 95%CI 1.00-1.82 and HR 2.04, 95%CI 1.24-3.35).

No significant difference in handgrip strength was seen between the offspring of the nonagenarian siblings and their partners after adjustment for potential confounders.

Conclusions
Handgrip strength is a predictor of all-cause mortality in the oldest-old population representing sporadic longevity. Application of handgrip dynamometry as a screenings tool in a multidimensional geriatric assessment may help identify older people at risk for morbidity and mortality. Although midlife handgrip strength has previously been shown to be an important prognostic indicator of survival, it is not a marker of exceptional familial longevity in middle-aged adults. This suggests that the genetic component of susceptibility to extreme survival is likely to be separated from that of muscle strength.
GENOME WIDE ASSOCIATION STUDY OF LDL-CHOLESTEROL. THE FIRST RESULTS OF THE PROSPER/PHASE STUDY

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Introduction
LDL-cholesterol concentrations vary between subjects. This variation can partially be explained by genetic factors. Most of the loci associated with LDL-cholesterol concentrations have been identified in middle-aged populations. We aimed to determine with the PHArmacogengenic study of Statins in the Elderly at risk (PHASE) whether a genome wide association study (GWAS) in an elderly population (mean 75 years) at risk for vascular diseases (PROSPER study), would identify the same loci as in middle-aged populations.

Methods
The GWAS was conducted using the Illumina 660K-Quad beadchips. After a stringent quality control 557,192 SNPs in 5,244 subjects were available for analysis. Imputation up to 2.5 million autosomal CEPH HapMap SNPs was performed with MACH imputation software. The GWAS for LDL-cholesterol is assessed with an additive linear regression model in PROBABEL software, adjusted for age, sex, and country of origin.

Results
Forty-two SNPs reached the GWAS significant threshold of \( p=5.0e-08 \) in 5 genomic loci (APOE/APOC1; LDLR; FADS2/FEN1; HMGCR; PSRC1/CESR5). The top SNP (rs445925, chromosome 19) with a \( p \)-value of \( p=2.8e-30 \) is located within the APOC1 gene and near the APOE gene. The second top SNP (rs6511720, chromosome 19) with a \( p \)-value of \( p=5.22e-15 \) is located within the LDLR gene. All 5 genomic loci were previously associated with LDL-cholesterol levels, no novel loci were identified.

Conclusion
Most of the loci associated with LDL-cholesterol concentrations have been identified in middle-aged populations. With the GWAS in the PROSPER/PHASE study we confirm the previously found genetic associations with LDL-cholesterol levels in an elderly population. The main locus responsible for the variation in LDL-cholesterol levels is the chromosome 19 locus, with genes present as APOE, APOC1, and LDLR. The next step of the PROSPER/PHASE study is to identify the genetic variation responsible for the variation LDL-cholesterol lowering in response to statin treatment in cooperation with other large trials.
NEONATAL HANDLING RESCUES LATER-LIFE COGNITIVE IMPAIRMENT PROGRAMMED BY EARLY-LIFE GLUCOCORTICOID TREATMENT

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Leiden University Medical Centre/ Leiden Amsterdam Centre for Drug Research, Leiden University, The Netherlands

Introduction
Synthetic glucocorticoids such as dexamethasone are the common treatment for prematurity-associated morbidity such as bronchopulmonary dysplasia. Despite the short term benefit on lung development, both human and animal studies have reported adverse neurodevelopmental effects. Additionally, rodent studies revealed a significantly shortened lifespan.

Previous studies in our laboratory, investigating the long-lasting effects of neonatal dexamethasone treatment in rats, have revealed relatively mild effects. However, our within-litter design required daily marking of the neonates for identification throughout the postnatal period. This resulted in a substantial amount of handling, which is known to induce, by enhancing maternal care, long-lasting phenotypic alterations that could potentially overrule dexamethasone-induced alterations. To investigate the use of handling as an intervention strategy for dexamethasone-induced alterations, we studied the effects of neonatal dexamethasone on adult phenotype in a handling vs non-handling context.

Methods
Rat pups were injected with tapering doses of dexamethasone or saline on pnd 1, 2 and 3. Half of the animals was daily handled for 15 min on pnd 1-21, whereas the other half was not handled. In adulthood animals were tested for startle reactivity, pre-pulse inhibition, spatial learning and endocrine stress responsiveness.

Results
We report that neonatal dexamethasone treatment and handling both reduced adult startle reactivity and endocrine responsiveness. For pre-pulse inhibition we observed that dexamethasone treatment decreased the sensitivity for handling effects. Spatial learning however is affected by dexamethasone treatment in non-handled animals, an effect that can be fully restored by handling.

Conclusions
We conclude that neonatal exposure to glucocorticoids and handling interact in shaping the adult behavioural and endocrine phenotype of the animal. The cognitive impairment observed in dexamethasone-treated animals can be rescued by neonatal handling, suggesting an amazing plasticity in the function of brain areas such as hippocampus, that is programmed by early-life experiences.

The support by LifeSpan is gratefully acknowledged.
GLUCOSE METABOLISM IN BIRTH WEIGHT DISCORDANT MONOZYGOTIC TWINS. RESULTS FROM THE DANISH TWIN REGISTER

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Introduction
Low birth weight has been associated with adverse health outcome in adulthood. Previous studies on twins indicated higher risk of type 2 diabetes in twins, however, we recently found that twins and singletons have the same risk of diabetes. The aim of the present study was to investigate fasting blood glucose and oral glucose tolerance in birth weight discordant monozygotic (MZ) twins.

Methods
Participants were recruited from the Danish Twin Register, which comprise more than 70,000 twins. Information on birth weight was available in 37,000 individuals. The 10% most birth weight discordant MZ twins (n=600) were selected and used for the invitation of participants. In all, 320 participants were recruited for the study. Fasting blood glucose (FG) was measured prior to and after a standard 2 hours oral glucose tolerance test (OGTT). Homeostatic model assessment of insulin resistance (HOMA-IR) and beta-cell function (HOMA-BC) were determined using standard equations.

Results
FG and OGTT were available in 300 non-diabetic individuals. Difference in birth weight was >200 grams. There was no significant difference in levels of FG and OGTT. Similarly, there was no difference even when calculations were repeated in participants with a birth weight difference of >500 grams. In addition, there was no difference in HOMA-IR and HOMA-BC.

Conclusion
There was no difference with regard to fasting blood glucose or OGTT between MZ birth weight discordant MZ twins. Similarly, neither HOMA-IR nor HOMA-BC differed. There results are not supporting a substantial impact of birth weight on glucose metabolism and diabetes.

## POSTER PRESENTATIONS

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AUDIT TO DEMONSTRATE IMPROVEMENT IN ORTHOGERIATRIC PATIENT CARE AT THE PRINCESS ROYAL UNIVERSITY HOSPITAL, BROMLEY

C A Morgan, K Varadharajan, O Martinovic, A Abdulla

Evidence Base
The British Orthopaedic Society and BGS have advised various models of orthogeriatric care. The creation of new medical team and junior doctor rotation in Ortho-geriatrics with the intention to improve quality of post-operative care in older patients admitted with fractured neck of femur in our trust. The post was also used as an opportunity to educate junior doctors and their orthopaedic colleagues in order to improve patient care as a whole and reduce length of stay. This study was designed to assess whether these objectives were met by auditing several aspects of post-operative care in fractured neck of femur patients.

Method
Three aspects of care were audited: prescription of bone protection at discharge, length of stay and identification of cause of fall. An audit cycle was completed. The data was gathered prospectively for the first 6 months of the new rotation and compared with 4 months of retrospective data pre-implementation of these posts. Statistical analysis performed using Chi squared test, unless otherwise stated.

Results
170 patients were included.

Patients discharged on bisphosphonates: Prior to creation of orthogeriatric post (56%), post 2 months (68%, p=0.1255), second 2 months after creation of ‘orthogeriatric proforma’ (94.5%, p=<0.0001) the next 2 months (100%, p=0.0003)

Patients discharged with Calcium and Vitamin D3 supplentation: Prior to orthogeriatrics (69%), first 2 months (79%, p=0.2948), second 2 months (94.3%,p=0.0083), next 2 months (94.1%,p=0.0383).

Mean Length of stay of patients: pre-orthogeriatrics (26.2 days), post-intervention and final 2 months, 21.8 days (p=0.53).

All patients in the 6 months post creation of orthogeriatric rotation had a cause of fall identified.

Conclusion
This study demonstrates an excellent educational opportunity for junior doctors, but also a statistically significant improvement in the quality of post-operative care of the elderly patient.
AUDIT OF BED RAIL ASSESSMENT AND USE IN CARE OF THE ELDERLY WARDS

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Rehabilitation and Elderly Medicine Unit, City Hospitals Sunderland NHS Foundation Trust

Evidence Base
Approximately one quarter of falls are from bed, and bed rails are commonly used in hospitals for falls prevention. Evidence is limited, but it has been suggested the aim should be to reduce inappropriate use, rather than aim for a universal reduction in bed rails use (Healey F et al, Age and Ageing, 2008, 37(4): 368 - 378).

Change Strategies
A baseline cross-sectional audit of the use of bed rails in 145 inpatients was completed in June 2009, including whether bed rails were in use, if appropriate assessments had been documented, and whether bed rails were suitable.

The trust bed rail policy was summarised into a one-page flow chart, and this was followed by a period of education and training with staff. A repeat cross-sectional audit was completed in February 2011 of 154 inpatients.

Change Effects
The proportion of patients with bed rails in use was reduced from 34.5% to 22.1%. Documentation of assessments for bed rail use improved in all patients, from 36.6% completed on hospital admission to 69.5%, and from 51.2% completed on the Care of the Elderly wards to 85.7%.

In each audit there was a wide range of comments documented to describe whether bed rails were appropriate. There was greater detail documented in the assessment made in the repeat audit, and an improvement from 48% to 61.8% of the patients with bed rails in use having been assessed as suitable.

Regular assessment for continued use of bed rails also improved. The proportion of patients with bed rails in use and an assessment within the last 24 hours improved from 56% to 76.5%.

Conclusions
Development of an easy-to-use flow-chart, supported by a period of training and education, led to an improvement in assessment and appropriate use of bed rails.
AN AUDIT OF RISK ASSESSMENT FOR AND PRESCRIPTION OF DVT PROPHYLAXIS ON ACUTE CARE OF THE ELDERLY WARDS USED AS A SURROGATE TO SHOW EFFECTIVENESS OF ACUTE CARE ELDERLY NURSES IN WISHAW GENERAL HOSPITAL

J Lonnen, A Irvine, B Adler

Care of the Elderly, Wishaw General Hospital

Evidence-base
Hospital acquired venous thromboembolism (VTE) is a significant cause of mortality with 25000 deaths per annum in England and Wales. The NICE guideline states that all medical patients should be assessed for risk of VTE and this assessment should be documented in the notes (NICE CG 92).

This audit assessed whether a risk assessment had been carried out (as evidenced by documentation in the notes) and whether VTE prophylaxis was being used appropriately.

The duties of Acute Care of the Elderly (ACE) nurses vary according to the model of acute care. While ACE nurses are widely felt to have an important role, their contribution to patient care can be hard to show objectively.

Change Strategies
Change strategy 1 (after cycle 1): education of junior and senior medical staff, highlighting the importance of VTE risk assessment and appropriate prescribing, by presenting the audit results at a unit meeting.

Change strategy 2 (after cycle 2): ACE nurse added VTE risk assessment to her admissions proforma and reminded consultants to complete this on their post take ward round.

Change Effects
Change Strategy 1: no improvement in VTE risk assessment documentation or appropriate prescription rates.

Change strategy 2: documentation of risk assessment increased from 33% to 84%. Appropriate prescription of prophylaxis increased from 75% to 100%

Conclusions
Educating medical staff is important in improving outcomes, however due to the high turnover of medical staff and on-call commitments that prevent consistent attendance at unit meetings, it is difficult to achieve sustained change in practice using this method alone. The ACE nurse is a permanent member of staff, who is present at post take ward rounds Monday to Friday. This audit has demonstrated that intervention by ACE nurse is effective in achieving change in practice and improving adherence to guidelines.
DO DOCTORS DOSE ADJUST ORAL PARACETAMOL ACCORDING TO PATIENTS WEIGHT?

J A McGonigle, A L Cunnington

Care of the Elderly Department, Glasgow Royal Infirmary, Glasgow

Evidence Base
Paracetamol is one of the most commonly prescribed analgesics in hospital. A recent case study published in the British Medical Journal highlighted the association between acute liver failure and previously thought safe doses of oral paracetamol (divided doses that total 4g daily) in patients with certain risk factors. These risk factors include chronic alcoholism, malnutrition, starvation and drugs that induce cytochrome P450. Our hospital guidelines suggest Doctors should “consider dose reduction” of oral paracetamol in adult patients with low body weight (<50kg) as is recommended for intravenous paracetamol dosing. This is 15mg/kg every 4-6 hours (maximum 60mg/kg daily). There is however no specific guidance in the British National Formulary. We wished to study paracetamol prescribing in our inpatient population under 50kg given local recommendations.

Changes Strategies
Over a 3 week period we identified 42 patients weighing under 50kg who were prescribed oral paracetamol. Dose and dose adjustments were documented. This first loop of the audit and the evidence behind dose modification were presented at the departmental audit meeting. In addition ward pharmacists highlighted dosing to junior doctors. A re-audit was then undertaken.

Change Effects

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<th>Base Line Audit</th>
<th>Repeat Audit</th>
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<tr>
<td>No. of Patients &lt;50kg</td>
<td>42</td>
<td>38</td>
</tr>
<tr>
<td>No. with dose adjustment</td>
<td>7 (17%)</td>
<td>15 (39%)</td>
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Conclusions
Education in the form of presentation and discussion at the departmental meeting plus pharmacy input was partially effective in paracetamol dose reduction in underweight patients. This audit however did not measure whether "consideration of dose reduction" did occur in those underweight patients whose dosages were not adjusted.

As low body weight and concomitant paracetamol prescription are not uncommon in our inpatients we feel that clearer guidance is urgently required. However we do acknowledge that currently a robust evidence base for dose reduction is lacking.
IMPROVING POST-FALL MANAGEMENT USING AN ACTION DOCUMENT

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¹. Frenchay Hospital, North Bristol NHS Trust, 2. Southmead Hospital, North Bristol NHS Trust

Evidence base
Previous audit work at North Bristol Trust showed that patients falling in hospital do not receive essential medical and nursing care consistently post-fall. In addition, the drive to identify triggers for falls and the actions to prevent recurrent falls was inadequate.

Change strategies
The Plan Do Study Act (PDSA) method was used to develop a tool to record information post-fall (for example location, time, circumstances) and prompt staff to provide essential care when assessing patients. The objectives being to improve and standardise the care received post-fall, and reduce overall hospital falls rates and injurious falls.

After a period of stabilisation (during which continuous audit and feedback was obtained), the Action Document was rolled out to all wards, embedded in hospital policy and now forms part of the Trust Falls Care Bundle. The use of this document and the current management of patients post-fall has recently been re-audited.

Change effects
The Post Falls Action Document is widely accepted by all staff groups although completion is much higher amongst nursing than medical staff (96% v 20%).

Timing, location, and cause for falls, incidence of dementia/delirium, and number of injuries are not significantly different.

There has been a reduction in recurrent falls (52% v 18%) and overall Trust Falls Rate (7.9 to 6.1 per 1000 bed days).

Reporting of falls to medical teams and family have improved (26% v 84% and 9% v 20% respectively).

Conclusion
The Post Falls Action Document is a useful tool for improving the standard of care. As part of the Falls Care Bundle it has contributed to an overall reduction in falls rate, probably by reducing recurrent falls. However we suspect its usefulness is limited by high turnover of junior doctors who may not be aware of the Document or be inclined to fill it in. A Falls training package being introduced at Medical Induction sessions from August 2011 may overcome this problem.
DETECTION OF COGNITIVE IMPAIRMENT IN ACUTE GERIATRIC MEDICAL PATIENTS

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¹ Department of Ageing and Health, Stirling Royal Infirmary, ² Department of Old Age Psychiatry, Bonnybridge Hospital

Evidence Base
Pre-existing cognitive impairment in the elderly is a recognised independent risk factor for the development of delirium. This leads to adverse effects on the patient’s physical, emotional and cognitive health and is associated with longer hospital admissions, impaired functional status and an increased mortality risk. Cognitive impairment is often poorly documented amongst elderly patients and consequently the diagnosis of delirium is often not considered. The morbidity is substantial but delirium is treatable if identified promptly.

Change Strategies
As the first stage in improving identification of cognitive impairment amongst acute elderly medical admissions, a prospective audit of AMT documentation in patients aged 75 and over, admitted via medical admissions unit for >24 hours in April 2010 was undertaken. The results were presented at the hospital medical meeting and subsequently at a delirium study day in September 2010; open to all staff. A second cycle in December 2010 also recorded documentation of cognitive impairment on the patient’s discharge letter.

Change Effects
Both audit cycles demonstrated the majority of patients are not having baseline cognitive testing documented. In April 2010, 20% of 66 patients had an AMT recorded and this was essentially unchanged in December at 21% of 88 patients. There was also a failure to document collateral history of cognitive impairment. A key finding was the under-reporting of cognitive impairment on the discharge letter, with only 24% having this recorded.

Conclusion
This audit has demonstrated that we are failing to screen patients for cognitive impairment. Our intervention strategy, which relied solely on educational intervention, has proven to be ineffective. Other methods like using nurse practitioners to directly screen all admissions for cognitive impairment may be more effective. This failure is putting patients at an increased risk of delirium being missed.
ASSESSMENT OF NEWLY DEVELOPED WARFARIN REVERSAL GUIDELINES FOR PATIENTS PRESENTING WITH FRACTURED NECK OF FEMUR

L Miller, A Al-Helou, P Swailes, S Srinivas, J M Orgee

Background
Current Best Practice Guidelines suggest that patients presenting with fractured neck of femur should have surgery within 36 hours. For patients taking warfarin, reversal of anticoagulation is usually required to meet this time-frame; uncertainty surrounding how to achieve reversal without precipitating thrombotic complications can result in delays however.

Innovation
We developed warfarin reversal guidelines in April 2009 to address this issue. This retrospective audit assesses the effectiveness of our guidelines with reference to a variety of outcomes including: time to INr <1.5, time to theatre, percentage of patients reaching theatre <36 hours and rate of thrombotic complications. In November 2010 all patients who had been admitted with a raised INR following institution of the guidelines were identified; an identical number of patients were sequentially identified retrospectively from guideline institution. Results were analysed using one-way analysis of variance, chi-squared analysis and two-sided t-tests (SPSS).

Evaluation
28 patients were identified pre- and post-guidelines; 21 and 24 patients were included in the final analysis. There was no significant difference between the groups with respect to age or proportion of low or moderate-high risk patients (with respect to the risk of thrombotic complications with anticoagulation reversal). Following institution of the guidelines there was a statistically significant increase in the proportion of patients receiving vitamin K (57% vs. 92% (p=0.006)) and statistically significant decreases in the time to reach INR <1.5 (mean(SD) 63(26) vs. 23(7) hours (p<0.001)), time to surgery (mean(SD) 68(31) vs. 34(20) hours (p<0.001)) and proportion of patients achieving theatre <36 hours (10% vs. 67% (p<0.001)) for pre- and post-guideline groups respectively. No thrombotic complications were identified in either group.

Conclusions
Our warfarin reversal guidelines were successful in facilitating a significant reduction in time to target INR and improved the proportion of patients achieving theatre within 36 hours of admission without evidence of thrombotic complications.
CAN EDUCATING JUNIOR DOCTORS IMPROVE THE DIAGNOSIS OF DELIRIUM AND DEMENTIA OF ELDERLY CARE PATIENTS IN A DISTRICT GENERAL HOSPITAL?

T Thorp, N Arulraj, D McGowan

*Royal Lancaster Infirmary, University Hospital of Morecambe Bay*

**Evidence-base**
The prevalence of delirium on a typical geriatric ward is 33%. The National Institute of Health and Clinical Excellence (NICE) recommends that all patients at risk of delirium should be screened for cognitive impairment on admission. Our objective was to improve cognitive screening and the diagnosis of delirium and dementia on two elderly medicine wards in a district general hospital.

**Change Strategies**
There were 3 audits and 2 interventions. The pre-intervention audit identified the prevalence of cognitive screening methods and detection of delirium and dementia in 44 patients between July to August 2010. All junior doctors on the elderly care unit then had a one hour educational seminar based on the NICE delirium guidelines at the end of August 2010. A further audit of 50 patients was repeated between September to November 2010 (first post-intervention audit). A 20 minute seminar highlighting the NICE guidelines and audit results took place in December 2010 to a new group of junior doctors. A further 29 notes were reviewed in February 2011 (second post-intervention audit).

**Change Effects**
The number of patients screened for cognitive impairment improved from 44% in the pre-intervention audit to 66% and 72% in first and second post-intervention audits respectively. The number of patients identified as ‘confused’ who had cognitive testing was maintained at 88% in both first and second audits. The number of confused patients with a diagnosis improved from 66% to 94% from the first to the second audit. The diagnosis of delirium was 10% in the first audit and 41% in the second.

**Conclusion**
Educating junior doctors working on elderly care wards improves the detection of delirium and dementia. Screening rates for cognitive impairment can be maintained by continual education.
DO ELDERLY FEMALES WITH FRAGILITY FRACTURE BENEFIT FROM A BONE MINERAL DENSITY?

N Arulraj, M Jani, C Greenbank, M Bukhari

Royal Lancaster Infirmary, University Hospital of Morecambe Bay

Background
National institute of health and clinical excellence (NICE) recommends that all women above the age of 75 with a fragility fracture, be treated with a bisphophonate and bone mineral density (BMD) measurement be at the discretion of the clinician. Data previously published suggests that this will over treat patients (1). Our objective was to determine the proportion of elderly females with fragility fracture who would be over treated using the NICE guidelines in a population referred to a district general hospital.

Search Method
We included all elderly females above the age of 75 with a fragility fracture who have had their BMD measured using a dual X-ray absorptiometry machine at the Royal Lancaster Infirmary between the periods of June 2004 to July 2010. The BMD measurement at the femoral neck and lumbar spine (L1 to L4) was then used to stratify the patient into T scores as per the World Health Organisation (WHO) classification.

Results
We identified 2055 patients of whom 997 (48.5%) had a fragility fractures. Mean age of the fragility fracture group was 80 years, with a mean BMI of 26.4 and mean BMD T score -2.27. In this group, the proportion with T score <-2.5 of the femoral neck (FN), lumbar spine (LS) and both was 49%, 34% and 24.7% respectively. 47% had T score between -1 and -2.5 in FN whilst 4% were normal. 41% had normal BMD. 20% had T score <-2.5 in the LS but not FN and 48% had T score <-2.5 in FN but not LS.

Conclusion
Based on the BMD of elderly females with fragility fractures, 41% would be over treated if NICE guidance is followed. Although T scores are not perfect predictors of fracture, the balance between risk and benefit needs to be evaluated.

EVIDENCE-BASED CLINICAL PRACTICE GUIDELINE ON MANAGEMENT OF PAIN IN OLDER PEOPLE: PHARMACOLOGICAL APPROACHES

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Introduction
The lack of guidelines on management of pain in older people prompted a joint venture between the British Geriatrics Society & British Pain Society. A multidisciplinary panel was convened and a systematic review of the literature between 1996 and 2010 was conducted looking at the different aspects of management of pain.

Methods
The two main databases searched were PubMed and CINAHL. AMED, PsycInfo and Scopus were also used to refine some of the searches. A total of 5000 references were assessed. Evidence was graded and a score assigned to each reference. Papers were exchanged amongst the group and a second reviewer independently assigned a score. Papers considered to be acceptable were incorporated into matrices and were then included in the recommendations.

Results/Conclusions
Few studies investigating the effects analgesic drugs have been performed specifically in older people. Lower doses than for younger adults may be required and should be titrated to response.

Paracetamol is an effective analgesic, particularly for musculoskeletal pain and is well tolerated. It is important the recommended maximum daily dose is not exceeded.

Although NSAIDs are effective analgesics, their side effect profile requires great caution. If essential, the lowest dose should be used for the shortest period and be reviewed regularly.

Opioids have efficacy in non-cancer pain as well as cancer pain and should be considered for moderate to severe pain. Side effects, particularly constipation, should be anticipated and prophylactic treatments prescribed.

Tricyclic antidepressants or anti-epileptics may be considered for neuropathic pain. Although tricyclic antidepressants are effective, anti-cholinergic side effects may be problematic. The lowest possible dose should be initiated and increased very slowly based on response and side effects.

Topical lidocaine and capsaicin have limited efficacy in the management of localised neuropathic pain and topical NSAIDs may be suitable for non-neuropathic pain.
SERVICE REDESIGN IN ACUTE MEDICINE OF THE ELDERLY WARDS

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Background
The Royal Infirmary of Edinburgh (RIE) is a major acute teaching hospital serving a population of around 800,000. The Medicine of the Elderly (MoE) service faces increasing pressures with an ageing population, the need to meet a variety of healthcare targets and increasing financial constraints. The RIE MoE department used Lean methodology to identify opportunities to redesign its service to allow streamlining of the patient journey and reduce length of stay (LoS) in its acute MoE wards (82 beds).

Innovation
In 2010 the following interventions were introduced in the MoE department at RIE:

• The Elderly Care Assessment Team (ECAT) was developed to improve access to MoE services by facilitating rapid transfer to the specialist wards from the Medical Assessment Unit.
• ECAT pro-actively reviewed older people admitted to other specialities to enable transfer of suitable patients into MoE services including off-site rehabilitation.
• Adjustment of job plans to allow daily consultant level input on each ward with daily rapid multi-disciplinary team discussion of all patients to facilitate discharge planning.
• Increased use of estimated date of discharge and criteria led discharge, focussing on discharge before 11am to improve patient flow.
• Improved use of existing hospital electronic health record system to streamline referral for rehabilitation.
• Completion of discharge summaries on day before discharge.

Evaluation

<table>
<thead>
<tr>
<th>Yearly mean LoS (days)</th>
<th>Discharges before 11am (% of total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 2009 - March 2010</td>
<td>20</td>
</tr>
<tr>
<td>April 2010 - March 2011</td>
<td>16</td>
</tr>
</tbody>
</table>

Conclusions
Improved, timely access to MoE services via ECAT, daily senior input and a number of other interventions have contributed to improved patient flow and reduced LoS in our unit.
Background
Malnutrition is common among hospitalised elderly people. The nutritional status of older adults may be influenced by many factors, including dementia, mood and functional limitations.

Thus appropriate assistance at mealtimes is important. A number of interventions, including the use of lunchtime volunteers have been recommended.

We carried out two audits of lunchtime meal support to older patients on a general elderly care ward. As a standard we identified that all patients who needed support at mealtimes should receive it. The first audit took place in 2007 and the re-audit in 2010. All patient meals delivered at lunchtime over a five day period were observed prospectively. Information was recorded regarding medical and psychiatric diagnoses, need for assistance at mealtime and whether assistance was given. Qualitative information regarding observed barriers to good nutrition was also collected for each meal observed. Data collection on both occasions was performed by individuals not involved with mealtime ward duties or activities so did not affect usual practice.

Change Strategies
Following the first audit the following changes were introduced; (i) recruitment of lunchtime volunteers to help patients (ii) increased staff awareness of nutrition through ward based clinical governance (iii) national implementation of MUST.

Change Effects
A total of 131 (94% of all meals given out) in the first audit and 136 (97%) in the re-audit were observed.

69% of the population were identified prospectively as potentially needing help at mealtimes in the first survey and 59% in the second. In these vulnerable groups, help was given to only 47% in 2007, but improved to 91% in 2010.

Overall help was given at almost 50% of all meals delivered in 2010, compared to just 16% in 2007.

Conclusions
Assistance at mealtimes in hospital is important for large numbers of older patients. Simple interventions are effective in helping hospitalised patients to maintain their nutrition.
THE FUTURE IS FRAIL: AN INNOVATIVE APPROACH TO MANAGING PATIENTS IN CARE HOMES

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Background
An increasing frail population in care homes is coupled with increasing acute hospital admissions. Although attempts have been made to improve this, little collaborative working exists due to fragmented, poorly coordinated services with immense communication difficulties. The NHS fails to provide a proactive, coordinated, cost-effective service for a cohort of patients that are due to expand in numbers significantly over the next 20 years.

Innovation
An innovative nursing role was introduced to provide clinical care and education/training for care home staff targeting 5 care homes in Gateshead with the highest hospital admission rates. A joint working arrangement with care home staff, a GP with an interest in Geriatrics and a Community Geriatrician was quickly established. Patients were case managed ensuring they all received a Comprehensive Geriatric Assessment and subsequently a personalised care plan and action plan. Weekly multi-disciplinary team discussions coupled with family forum meetings helped implement care plans, provide treatment and allow an opportunity for learning.

Evaluation
Clinical audit was undertaken to capture the impact of the role and demonstrated a reduction in hospital admissions of 45.5%, saving 440 bed days with an estimated cost saving of £243,146 compared to admission data in the previous 12 months. Qualitatively, overwhelming support was demonstrated from staff, patients and families who had all worked collaboratively over the course of the pilot.

Conclusions
This innovative role to provide proactive care in care homes resulted in fewer hospital admissions producing associated savings. Our pilot suggests a cost saving approach to a new integrated care pathway for care home patients, which could be expanded upon to develop a comprehensive frailty service with an ethos of patient centeredness at its core. Further studies are needed to confirm our findings and assess the full impact on other outcomes such as quality of life and mortality.
CAN OBJECTIVE FRAILTY ASSESSMENT BE PART OF CGA AND FUTURE CARE PLANNING?

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Introduction
Most health professionals use the word Frailty and when asked the meaning “they know it when they see it”. Frailty is regarded as a state of risk for adverse outcomes. We explore the usefulness of widely used Edmonton Frailty scale (EFs) as part of comprehensive Geriatric Assessment (cGA) to predict the likelihood of re-admission and death in the acute setting. Re-admission rates can be viewed as a crude marker of quality of care.

Method
Patients aged over 70 admitted to acute medical wards were randomly selected over a ten week period. EFs took 20 minutes to administer to consenting participants. Subsequent re-admission within 28 days and death was assessed using hospital records and GP contact after discharge.

Results
Out of 134 patients, 97 (72.3%) agreed to be interviewed. Mean age was 78.6 years and 50.5% were women. 58% of patients were on more than 5 medications and 50% were unable to draw a clock. Only 2 patients were from care homes. 26 patients were readmitted and 2 patients died within 28 days. Frailty score was higher at 8.96 for patients who were readmitted within 28 days as compared to 7.74 who were not readmitted during this period.

Using the logistic regression, the odds ratio (95% ci) per increase in frailty score and of an event (readmission or death) is 1.149 (1.003, 1.316); p=0.045. An individual with a score of 12 is twice as likely to be re-admitted or die compared to an individual with a score of 7 with the same characteristics (e.g. age, sex, length of stay).

Conclusion
This data shows that it is feasible to use EFS as part of CGA in our clinical practice. This may help to individualize care plans, target effective interventions and engage community services in advance for very frail elderly patients.
NON-PHARMACEUTICAL APPROACH TO MANAGING BEHAVIOURAL DISTURBANCE IN DEMENTIA PATIENTS IN A NURSING HOME SETTING

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Introduction
Patients with dementia often exhibit mental state disturbances including confusion, agitation and aggression. These are often managed with potentially harmful psychotrophic drugs. In this study we hypothesised that optimising sensory awareness of residents to their environment would reduce the number of documented aggressive episodes [verbal/physical abuse to staff and other service users].

Method
During this 4-month study, the researcher documented aggressive episodes in a private nursing home unit in Dundee, Scotland before, during and after the implementation of the following changes:

1. Residents had their hearing aids and glasses cleaned and fitted on a daily basis to maximise each resident’s sensory awareness.

2. Living conditions were altered with improved lighting and signing.

Information regarding all behavioural incidents was obtained from handover sheets and daily progress notes within the residents care plans. The gross number of incidents and the number of incidents per service user was documented.

Results
Following the implementation of this program, the number of documented aggressive episodes reduced throughout the study period with an overall reduction of 25%. This was accompanied by a reduction in the severity of injuries associated with these incidents with no hospital admissions compared to 3 prior to the changes implemented by the study. Interestingly, residents noted to be particularly aggressive at the start of the study did not respond to the non-pharmaceutical changes.

Conclusion
The study concluded that non-pharmaceutical measures aimed at maximising the ability of residents to sense their environment could reduce aggression. This strategy does not have the side effects of neuroleptic drugs that are commonly used to control behavioural problems in dementia patients. Importantly, the study has suggested that residents can be selected for neuroleptic prescription in line with their response to a non-pharmaceutical program. Further work is required to determine if these findings can be reproduced in other homes in the UK.
CAN WE REDUCE IN-PATIENT FALLS IN THE ACUTE HOSPITAL SETTING?

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**Background**

This project was initiated as a result of root cause analyses into falls resulting in fractures on the Elderly Care wards in an acute hospital. These investigations highlighted poor assessment and documentation of falls risk and no evidence that effective measures were in place to reduce risk. Review of the DATIX incident reports showed that most falls are unwitnessed and occur near the patients’ bedside.

**Innovation**

A falls risk assessment tool and individually targeted care plan was developed in line with available guidelines. Based on the risk assessment a traffic light system was used to identify patients at high risk using red cards at the bedside and on mobility aids. A mobility assessment was performed by the physiotherapists and displayed at the bedside.

**Evaluation**

6 months after introduction and staff training, an audit of the use of the tools was performed on the 62 in–patients on the Elderly Care wards. 82% of patients had a falls care plan completed and actioned. 56% has a risk assessment tool completed and 71% of these were coded red i.e high risk of falls using the traffic light system. 52% had a mobility assessment performed and displayed clearly at the bedside. In a previous audit in 2010 when STRATIFY was in use, 46.9% had a risk assessment performed and only 50% had a falls care plan completed. Review of DATIX shows falls are reducing with a 25% reduction in falls reported in the first quartile of 2011 compared to the same quartile in 2010.

**Conclusions**

This system has resulted in better documentation of falls risk and actions taken to reduce falls and initial results indicate that falls are decreasing. It has proved easy to implement but ongoing training is required to increase uptake and ensure falls prevention remains a high priority.
ADVANCE CARE PLANNING IN HOSPITAL FOR NURSING HOME RESIDENTS PROMOTES COMMUNITY BASED END OF LIFE CARE - PROACTIVE ELDERLY ADVANCE CARE (PEACE) PILOT

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Background
The majority of older people die in hospital, despite preferences to die at home. Medical escalation decisions are often not made prior to hospital admission. Advance care planning should be part of clinical care for all nursing home residents.

Innovation
PEACE, an advance care planning document, was implemented at 2 London hospitals targeting patients being transferred to care homes (nursing). This document anticipates specified probable events in these chronically ill frail adults, and indicates agreed (or best interest) advice on when to hospitalise. PEACE completion was a collaborative process with the patient and family, led by the Elderly care team. Patients moved to the care home with the PEACE document, copied to the GP. We report the results from one site.

Evaluation
Over 6 months, PEACE was completed for 23 (39%) of the 59 patients transferred. Outcomes were measured for 55 patients, 4 being lost to follow up.

Readmitted to hospital within 9 months of transfer

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEACE</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>No PEACE</td>
<td>16</td>
<td>18</td>
</tr>
</tbody>
</table>

PEACE was associated with a lower readmission rate (OR 0.265, CI 0.074-0.953, p=0.042). Three of the four readmission events were clinically consistent with the PEACE care plan.

A greater proportion of patients with PEACE died compared with those without (62% vs 38%, p=0.091). This likely reflects patient selection for PEACE.

Place of death within 9 months of transfer

<table>
<thead>
<tr>
<th></th>
<th>Hospital</th>
<th>Care Home</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEACE</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>No PEACE</td>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>

OR 0.278, CI 0.022-3.45, p=0.28

Conclusions
This small study shows that use of PEACE reduces readmissions, in accordance with care intentions. The low rate of deaths in hospital (more so with PEACE) suggests a shift of clinical practice in local care homes.
PERMANENT PACEMAKER IMPLANTATION SYMPTOMS IMPROVEMENT SURVEY ON PATIENTS WITH TILT TABLE TEST CONFIRMED CAROTID SINUS SYNDROME

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Introduction
Carotid sinus syndrome (CSS) is a cause of syncopal collapse sometimes associated with presyncopeal dizziness. Permanent pacemaker (PPM) implantation is indicated for symptomatic asystolic pauses of > 3 seconds (Cardioinhibitory CSS (CICSS)) and for CISS with a systolic blood pressure drop of > 50 mmHg (Mixed CISS (MCSS)) after carotid sinus massage.

Aims
To identify if symptoms improve after insertion of a PPM for patients suffering from CICSS or MCSS.

Methods
Living patients, identified following a Head Up Tilt Table Test (HUT) with CICSS or MCSS, from 2005 through 2008, were contacted by telephone and sent a questionnaire to identify those with continuing symptoms after PPM implantation.

Results
82 (4%) of 2012 HUT patients suffered from CICSS or MCSS. 64 patients underwent PPM insertion. 54 were living at the survey time in 2010; the patient response rate to the questionnaire was 50 of 54 sent (93%). Prior to PPM, 24 had syncope only, 17 syncope and dizziness and 9 only dizziness. Of the 50 respondents post PPM insertion, 31 were symptom free and 19 had persistent symptoms (16 with dizziness and 3 with syncope). 3 of persistent dizziness have had MCSS. All patients with syncope and dizziness have the syncope cured by PPM. There was no prior PPM associated dizziness in patients with persistent syncope.

Conclusion
Patients with syncope are more likely to be cured of with PPM insertion than those with dizziness.
DELIRIUM AND COGNITIVE IMPAIRMENT ARE HIGHLY PREVALENT IN ADMISSIONS TO ACUTE MEDICINE: A CONSECUTIVE PATIENT SURVEY USING THE CAM, DSM IV AND MMSE

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Background
Recent NICE guidelines emphasize the importance of recognition and prevention of delirium. However, there are few UK data on delirium and cognitive impairment in unselected admissions to acute general medicine (AGM). We therefore aimed to audit consecutive admissions to AGM >70 years to assess feasibility of routine cognitive screening and to determine rates of delirium, associated diagnoses, distribution of MMSE scores and length of stay.

Methods
Consecutive admissions to AGM over an 8 week period in 2010 were screened for delirium on arrival and daily thereafter using the Confusion Assessment Method (CAM) and DSM IV criteria by the medical team. MMSE was attempted on all patients during admission. History of dementia, discharge diagnosis and length of stay were recorded.

Results
Among 97 patients (mean age 83 years sd 6.4, 48% male), 11% had known dementia. Delirium on admission was seen in 32 (33%), incident delirium in 15 (15%) with an overall occurrence rate of 40%. Delirium was associated with infection (57% vs 27%) and longer length of stay (23 vs 8 days). MMSE was performed in 87% of patients staying >48 hours vs 62% staying <48 hours. MMSE<24 was present in 39 (49%) patients (64% vs 36% in patients with vs without delirium). MMSE scores were normally distributed (median 18, IQR10) in patients with delirium but skewed towards higher values (median 26, IQR 9) in those without delirium.

Conclusion
Our data show that delirium is highly prevalent in elderly AGM patients, occurring in 40% although only around 10% had known dementia. Even in patients without overt delirium, low MMSE scores were prevalent. Screening using the CAM and MMSE by the medical team is feasible in elderly patients admitted for more than 2 days and should be performed routinely in this high risk patient group.
CAN PARKINSON’S PATIENTS ‘GET IT ON TIME’? - A NATIONAL SURVEY OF PARKINSON’S DISEASE MEDICATION AVAILABILITY

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Background
Parkinson’s disease (PD) patients admitted to acute trusts are frequently subject to erroneous drug omissions associated with poor outcomes¹. We hypothesised that a lack of medication availability, particularly during out of hour’s periods, may contribute to these omissions.

Sampling Methods
The medicines information pharmacist at each English adult acute trust was asked to complete a questionnaire regarding PD medication availability and the provision of prescribing guidelines.

Results
Responses were received from 127 trusts (78.9%).

<table>
<thead>
<tr>
<th>Medication</th>
<th>Stocked in Out of Hours Medication Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-beneldopa</td>
<td>104 (81.9%)</td>
</tr>
<tr>
<td>Dispersible Co-beneldopa</td>
<td>87 (68.5%)</td>
</tr>
<tr>
<td>Oral Agonist</td>
<td>48 (37.8%)</td>
</tr>
<tr>
<td>Rasagiline/Selegiline</td>
<td>35 (27.5%)</td>
</tr>
<tr>
<td>Stalevo</td>
<td>30 (23.6%)</td>
</tr>
<tr>
<td>Rotigotine</td>
<td>33 (26%)</td>
</tr>
<tr>
<td>Apomorphine</td>
<td>33 (26%)</td>
</tr>
</tbody>
</table>

Options for paraenteral treatment were limited, with 21.7% of trusts failing to stock either Rotigotine or Apomorphine in general pharmacy stock (71.7% of trusts stock Rotigotine, 66.1% stock Apomorphine).

Fewer than a quarter of trusts provided prescribing guidelines for PD patients admitted with an impaired swallow (23.6%), impaired absorption (20.5%) or requiring medication dose conversions (13.4%).

Conclusions
The provision of PD medications by acute trusts, particularly during out of hour’s periods, is limited. Despite Co-careldopa being on the WHO essential medicines list, nearly 20% of acute trusts fail to provide an L-dopa preparation in out of hour’s stock.

Patients with advanced PD or compromised swallow requiring Apomorphine are particularly poorly served; with nearly three quarters of trusts not providing Apomorphine in out of hours stock and a third of trusts not stocking Apomorphine at all.

Prescribing guideline provision was also limited to less than a quarter of acute trusts.

In order to reduce medication delays and omissions in PD patients, trusts must improve the availability of both medications and prescribing guidelines to those managing PD patients as part of the acute take.

A SURVEY OF CORONER’S REFERRALS AND POST-MORTEM (PM) DISCREPANCIES BETWEEN CLINICAL AND AUTOPSY DIAGNOSIS

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Background
We sought to identify the indications for Coroner’s referrals and autopsy and to compare ante-mortem and post-mortem diagnosis in hospitalised adults.

Sampling Methods
In December 2010 there were 71 adult deaths at BTUH reported to the Coroner. Only 21/71 (15%) underwent PM at Coroner’s request. Retrospective case review of 20 records with an autopsy and 43 records without an autopsy was completed.

Results

<table>
<thead>
<tr>
<th>Indication for Coroner’s referral</th>
<th>Number (Total 63)</th>
<th>Number Autopsies (Total 20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death within 24 hours of admission</td>
<td>27</td>
<td>6</td>
</tr>
<tr>
<td>Unknown cause of death</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>Death occurring after an operation</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>No apparent indication for referral</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Possible case of neglect</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

The mean age of death for cases undergoing autopsy was 77 (SD 13) and 55% of them were females. 3/20 (15%) cases had major discrepant diagnoses with potential impact on survival whilst 7/20 (35%) had major discrepant diagnoses with no impact on survival. 4/20 (20%) autopsies failed to identify the immediate cause of death. 2/20 (10%) of patients had an unnecessary PM as diagnosis had been ascertained, whilst 4/43 (9%) of patients with uncertain diagnoses did not undergo PM. 7/43 (16%) Coroner’s referrals were unnecessary according to legal guidelines and 3/43 (7%) of death certificates produced by Coroner were incorrect.

Conclusions
1. Post-mortems remain an excellent educational tool. There should be more regular review of autopsy reports to identify deficiencies in standards of care.

2. Despite modern diagnostics we still have discrepancies between clinical and autopsy diagnosis, which reiterates the need for higher post-mortem rates. Few autopsies are now requested for clinical reasons without involving the Coroner.

3. The Coroner’s system is undergoing reform and an effective system and uniform referral mechanism would help clinicians. Training and guidelines for doctors on circumstances where Coroner should be notified of death is necessary.
THE INCIDENCE OF DELIRIUM AMONGST ELDERLY SURGICAL AND ORTHOPAEDIC PATIENTS USING CONFUSION ASSESSMENT METHOD SCREENING

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Introduction
Studies have shown that delirium occurs in 14-56% of elderly hospitalised patients and is associated with long-term poorer outcome, increased length of stay, increased hospital mortality and discharge to nursing home placement. Confusion Assessment Method (CAM) screening has been validated as a screening tool for the detection of delirium in acute hospital admissions.

Methods
We performed CAM screening for delirium on all elective and emergency surgical and orthogeriatric patients over 65 years admitted over a 4 week period. CAM screening was performed on first review and subsequently on a twice weekly basis until discharge. The likely cause of the delirium, patient demographics and timing of delirium was documented in addition to any previous history of cognitive impairment.

Results
106 patients underwent CAM screening. 24 patients were orthopaedic patients admitted for fractured neck of femur. 82 patients were elective and emergency surgical admissions. Of the 24 orthopaedic patients admitted during this time period, 5 were CAM positive for delirium (21%). All patients developed delirium in the post-operative setting. The commonest cause of delirium was post-operative infection. 3 of the 5 patients subsequently died during their inpatient admission. Of the surgical patients, 12 of the 82 patients (15%) developed delirium during the course of the admission. Two subsequently died during the admission. The commonest causes for delirium in the surgical setting were myocardial infarction, hospital acquired pneumonia and surgical complications post-op.

Conclusions
Delirium is a common complication amongst elderly surgical and orthopaedic patients. Although the numbers are small, the development of delirium amongst elderly orthopaedic and surgical patients is a significant predictor of mortality. All elderly patients admitted under the orthopaedic and surgical teams should undergo CAM screening on a regular basis to ensure early detection and appropriate management of these frail, elderly patients.
CHOOSING GERIATRICS: A SYSTEMATIC REVIEW EXAMINING GERIATRICS CAREER CHOICE IN US AND THE UK

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Scope
In the UK geriatrics remains a popular specialty and the majority of training posts are filled. In contrast, the US has a severe shortage of geriatricians and difficulty recruiting junior doctors to training posts. This systematic review aims to summarise and compare the factors that influence US and UK doctors to select a career in geriatrics, and determine whether either system can learn from the other in terms of successful recruitment of specialists.

Search Methods
Database search of PubMed, Embase, ERIC using Mesh terms “geriatrics” and “career choice” or the closet set of search terms available. Manual searches using reference lists obtained from articles indentified through database searches. Inclusion criteria: US or UK based study, survey or qualitative study, medical training, post 2000.

Results
7 US and 3 UK studies met eligibility criteria. Positive attitudes towards the elderly amongst undergraduate medical students correlated with an interest in geriatric medicine in the US and UK. However, surveys from both countries indicate that trainees choose geriatrics as a career relatively late in their training and rarely as undergraduates. Reasons for interest in geriatrics including pre-university contact with the elderly and exposure to positive role models in the clinical environment were cited in both countries. Although some negative perceptions of geriatrics such as associations with low prestige and low earning potential were also shared, such negative perceptions appeared to be more extensive in the US studies.

Conclusion
Many factors influencing perceptions of geriatrics as a career choice are shared between trainees in the US and UK. The longer duration of specialty training in the UK allows junior doctors to select geriatrics later on their career than in the US. The extent of negative perceptions of geriatrics prevalent in the US may go some way towards explaining the shortage of geriatric trainees.
EFFICACY OF COMMON TREATMENTS FOR ORTHOSTATIC HYPOTENSION – A SYSTEMATIC REVIEW

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Scope
Orthostatic hypotension (OH) is common, affecting up to 30% of older adults. It is strongly associated with hypertension, in addition to conditions causing autonomic failure. A range of non-pharmacological and pharmacological therapies are used to treat OH, but doubt exists as to which treatments work best.

Search Methods
We performed a systematic review to assess the evidence for all treatments for OH. Our search included the following databases: MEDLINE; EMBASE; CINAHL; and the Cochrane library. We searched grey literature and references from included studies and other reviews. A pre-specified protocol was followed, and two reviewers independently assessed the first 20 articles, with the remainder assessed by one of the two. Included studies had to be randomised, placebo-controlled trials of either parallel-group or crossover design. Interventions included non-pharmacological and pharmacological therapies. The primary outcome assessed was change in magnitude of systolic postural drop.

Results
Our search strategy identified 1466 titles, with 36 trials fulfilling the inclusion criteria. We identified a heterogeneous population and a wide variety of study methods, precluding meta-analysis. Most trials were of poor quality with a high risk of bias. Changes in postural drop and improvement in symptoms were frequently inconsistent. The following treatments had minimal impact upon postural drop: sleeping head-up; fludrocortisone; dihydroxyphenylserine; pindolol; and Camphor-Crataegus berry compound. Some interventions (midodrine, pyridostigmine, glypressin) elevated overall blood pressure, but increased the postural drop. Interventions that improved the postural drop included: compression bandages; yohimbine; dihydroergotamine; indomethacin; potassium chloride; oxilofrine; and clonidine.

Conclusions
Commonly used interventions for orthostatic hypotension have a limited, poor quality evidence base to support their use. High-quality trials examining change in blood pressure, symptoms and quality of life are required.
STR TRAINING DIARIES ARE A USEFUL TOOL TO EVALUATE THE EFFECT OF CLINICAL ROTAS ON TRAINING

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Background
Recent changes to Specialty Registrar (StR) training rotas in Geriatrics across the UK have reduced the proportion of time available for specialty training. National Health Service monitoring exercises measure compliance with the European Working Time Directive but not how rotas affect training. We set out to evaluate an electronic diary as a means of monitoring such effects.

Sampling Methods
Geriatrics StRs in Mid-Trent were asked to complete an electronic diary recording hours spent working across 33 sub-domains under the headings General Internal (GIM), Geriatric and Academic medicine. The diaries were completed daily for 8 weeks during 2009 and, following recent changes to several GIM rotas, for 4 weeks in 2011. The duration of the 2011 survey was reduced to improve completion rates. To allow for the difference in absolute hours between iterations, analyses were based on proportion of time spent in each domain.

Results
12/17 (71%) and 16/16 (100%) diaries were completed at the first and second iterations respectively. The proportion of time spent on annual leave was not significantly different between iterations. Time was divided between (% of rostered hours at first: second iterations) GIM (41.3%:41.5%), geriatrics and subspecialties (26.6%:23.2%), academic medicine (16.2%:16.1%), ward work (14.2%:11.6%) and rostered leave (1.7%:7.6%). Differences achieved statistical significance (p<0.05; Mann-Whitney U) for rostered leave only.

Conclusions
StRs found the electronic diary usable. Significantly more time was spent on GIM and routine ward work than specialty training at both iterations. The increase in rostered leave between iterations, without affecting the proportion of time spent on annual leave or in training, is likely to indicate a further decrease in time available for training across all domains. We are considering the implications of these findings locally. The tool could be used regionally or nationally to better understand differences between training rotations.
WITHDRAWN
DEFINING SARCOPENIA: THE IMPACT OF DIFFERENT DIAGNOSTIC CRITERIA ON THE PREVALENCE OF SARCOPENIA IN A LARGE MIDDLE AGED COHORT

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Leiden University Medical Center, Department of Geriatrics and Gerontology

Introduction
Sarcopenia, low muscle mass, is an increasing problem in our ageing society. The prevalence of sarcopenia varies extremely between elderly cohorts ranging from 7 to over 50 percent. To define sarcopenia, a variety of diagnostic criteria have been formulated. We assessed the degree of agreement between commonly used diagnostic criteria of sarcopenia and the effect on estimates of prevalence in one cohort.

Methods
Body composition values as measured by bioimpedance analysis and handgrip strength measurements were obtained in 654 subjects (329 women and 325 men) of the Leiden Longevity Study. We investigated the prevalence of sarcopenia, emerging from seven different diagnostic criteria described in the literature, stratified by gender and age (below 60 years, 60 to 69 years and 70 years and above). The degree of concordance of sarcopenia within individuals applying the diagnostic criteria was assessed.

Results
In males (mean age 64.5 years), the prevalence ranged from 0% to 28.6% in the lowest age category, from 0% to 17.7% in the middle and from 0% to 21% in the highest age category depending on the applied diagnostic criteria. In females (mean age 61.8 years) the prevalence ranged from 0% to 18.8%, 0% to 21.2% and 0 to 19.4% in the lowest, middle and highest age category. Only two participants (0.3%) were identified as sarcopenic according to all diagnostic criteria that marked prevalence above 0%.

Conclusions
The number of subjects classified as having sarcopenia varies widely when different diagnostic criteria are applied in one cohort. Such disagreement is clinically unacceptable. It is of utmost importance reach a consensus definition in order to make studies comparable and for implementation of treatment for sarcopenia in clinical care.
PREVALENCE OF OSTEOPOOROSIS IN OLD SUBJECTS ATTENDING A FALLS CLINIC

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Introduction
Osteoporosis is a metabolic condition of bone resulting in altered micro-architecture and vulnerability to fragility fractures. Adult female prevalence is 10% aged over-60 and 40% aged over-80. In men over 60, osteoporosis prevalence is 12%. Little data reports osteoporosis prevalence in the very elderly and falling populations. One study reports prevalence in fallers aged over 50 at 42% in women and 32% in men. We studied the prevalence of osteoporosis specifically in elderly fallers attending a falls clinic.

Methods
We measured non-dominant forearm bone mineral density using peripheral DEXA in 476 patients attending a falls clinic from 2006 to 2011. Data were subjected to Chi-squared analysis.

Results

<table>
<thead>
<tr>
<th>Age</th>
<th>Normal BMD % (T-Score:&gt; -1)</th>
<th>Osteopaenia % (T-Score:-1 to -2.49)</th>
<th>Osteoporosis % (T-Score:&lt;-2.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>65-79</td>
<td>37(n=22)</td>
<td>22(n=27)</td>
<td>35(n=21)</td>
</tr>
<tr>
<td>80+</td>
<td>20(n=20)</td>
<td>6(n=12)</td>
<td>19(n=19)</td>
</tr>
<tr>
<td>All</td>
<td>26(n=42)</td>
<td>12(n=39)</td>
<td>25(n=40)</td>
</tr>
</tbody>
</table>

159 men and 317 women aged over 65 attended the clinic. T-scores were obtained for all. Men aged from 65-97; women 65-101. Subjects were then sub-grouped into “younger-old” (aged 65-79), and older-old (80 years and above). For both age groups, osteoporosis was more common in women than in men (younger-old: 48% vs 28%; χ2= 24.8; p=<0.0001 and older-old: 72% vs 61%; χ2=10.6; p=0.0011). Furthermore for both sexes, osteoporosis was more common in older-old compared to the younger-old group (men: 61% vs 28%; χ2= 66.7; p<0.001 and women: 71% vs 48%; χ2= 46.1; p<0.001).

Conclusions
Osteoporosis is more common in women than in men and is more prevalent with increasing age in both sexes. Contrary to previous studies, osteoporosis is more prevalent amongst older fallers than the general population.
**24-HOUR GLUCOSE RHYTHMS IN AGEING AND LONGEVITY**

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**Introduction**

Disturbances in glucose metabolism are increasingly being associated with various age-related diseases, also in non-diabetics. It is unclear how daily fluctuations in glucose contribute to the ageing process. Furthermore, conventional measurements either consist of a limited amount of data per day, do not assess physiological conditions or are very invasive. We aimed to explore the glucose metabolism under everyday living conditions in ageing and familial longevity.

**Methods**

By use of a continuous glucose monitoring (CGM) system (iPro2, Minimed, Medtronic), 24-hour glucose rhythms were generated in 21 healthy (10 young vs 11 old, age range 25–72 years), and in 20 non-diabetic, participants of the Leiden Longevity Study, consisting of 10 offspring of long-lived, nonagenarian siblings, and 10 partners thereof as controls (offspring vs controls, age-range 52 – 72 years). Outcome parameters included mean total, diurnal (06:00 – 00:00) and nocturnal (00:00 – 06:00) glucose, and glycemic variability as measured by total standard deviation (SDt). Differences between groups were assessed by non-parametric testing.

**Results**

In the young vs old comparison, the older group (median age 55 yrs) showed higher diurnal glucose levels (5.5 mmol/L vs 4.7 mmol/L, \(p = 0.003\)) and nocturnal glucose levels (5.2 mmol/L, vs 4.7 mmol/L, \(p = 0.005\)) compared to the younger group (median age 29 yrs). Glycemic variability was similar between groups. Nocturnal glucose levels were lower in offspring vs controls (4.6 mmol/L, vs 5.2 mmol/L, \(p = 0.042\)). Diurnal glucose levels and glycemic variability were similar between groups. In both comparisons, sex and body mass index were similar.

**Conclusions**

These first data show that CGM is a sensitive measurement to detect differences in glucose rhythms under physiological conditions. First analyses suggest that mean glucose levels may increase with age, and that nocturnal glucose levels may be a sensitive measure of familial longevity. Additional data are currently being acquired.
THE CLINICAL AND HAEMATOLOGICAL PRESENTATION OF INFECTION IN OLDER ADULTS

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Introduction
Atypical presentations of various illnesses in older persons have been well described in the literature. Studies performed some years ago suggested that older people may not have pyrexia with infection. Our study aims to formally assess the temperature and white cell response of older adults with confirmed infection compared to younger adults.

Methods
This was a retrospective study of patients who were admitted to an acute hospital between December 2009 and August 2010 with a primary diagnosis of pulmonary or urinary tract infection. Casenotes were reviewed seeking definitive evidence of infection based on clinical, microbiological or radiological findings. There were no exclusion criteria.

Results
Of the 314 adults who were admitted with infection, 147 casenotes could be studied in detail. 108 were found to have definite evidence of infection (table 1).

Table 1. Temperature and Neutrophil response by age

<table>
<thead>
<tr>
<th>Age</th>
<th>Number Total=108</th>
<th>Apyrexia</th>
<th>Low-grade pyrexia Temp 37.2-37.90C</th>
<th>Pyrexia Temp &gt;380C</th>
<th>Raised Leucocyte Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60</td>
<td>9 (8.3%)</td>
<td>3/9</td>
<td>3/9</td>
<td>3/9</td>
<td>8/9</td>
</tr>
<tr>
<td>60-69</td>
<td>19 (17.5%)</td>
<td>10/19</td>
<td>2/19</td>
<td>7/19</td>
<td>17/19</td>
</tr>
<tr>
<td>70-79</td>
<td>25 (23.1%)</td>
<td>14/25</td>
<td>6/25</td>
<td>5/25</td>
<td>19/25</td>
</tr>
<tr>
<td>80-89</td>
<td>41 (37.9%)</td>
<td>29/41</td>
<td>3/41</td>
<td>9/41</td>
<td>33/41</td>
</tr>
<tr>
<td>&gt;90</td>
<td>14 (12.9%)</td>
<td>7/14</td>
<td>3/14</td>
<td>4/14</td>
<td>9/14</td>
</tr>
</tbody>
</table>

39 patients had pointers to a diagnosis other than infection. There was a significant negative correlation between first recorded temperature and age, (-0.1350C lower for each year, p=0.043), but no significant correlation between age and neutrophil count. Individuals with an absent pyrexial and white cell response were significantly older (median age 85) than those with either pyrexia or leukophilia (median age 79) and those with both pyrexia and leukophilia (median age 77) (p= 0.015).

Conclusion
Our study demonstrates a strong trend towards apyrexia and poor neutrophil response to infection in older patients, particularly in the very elderly. Future studies should be able to delineate the pathophysiological basis underlying this important clinical feature.
AN ETHNOGRAPHIC STUDY OF CULTURAL DIVERSITY AND DEMENTIA IN SCOTTISH CARE HOMES: IMPLICATIONS FOR ‘PERSON-CENTRED’ CARE

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Introduction
The interplay between cultural diversity, dementia and care processes is of relevance for people living in care homes. An individual’s formative culture is an important part of selfhood, while dementia is often associated with the erosion of self. People with dementia are particularly vulnerable to this in long-stay care settings. Research took place in 6 care homes in urban and remote areas of Scotland, to gain insights into how well considerations of cultural diversity are incorporated into maintaining selfhood in ‘person-centred’ care approaches.

Methods
Firstly, the literature was searched to make a list of ‘aspects of care’ deemed to be vital to person-centred/culturally-effective approaches for people with dementia. Then, 16 social care workers were interviewed about, and observed in, their interactions with care home residents. The workers and residents were from diverse cultural backgrounds. Data from interviews and observation was analysed to provide a picture of how strongly these ‘aspects of care’ occurred in the care workers’ perceptions and practice.

Results
The strongest ‘person-centred/culturally-effective’ care was linked to small care homes in remote areas of Scotland. Key themes affecting care included ‘knowing the person’ and ‘links to the community’

The weakest ‘person-centred/culturally effective’ care was associated with large care homes in urban regions. Key themes affecting care included ‘communication difficulties’ and ‘pressures on staff’.

Other influences also affected the results. For example, inter-generational cultural changes between ‘young and old’ led to difficulties in cultural understanding between workers and residents, as did the availability of resources.

Conclusion
The intersections of culture and processes of care in care homes are poorly understood, but can affect residents’ quality of life greatly. Acknowledgement of this and further work in the area is necessary in moving towards true ‘person-centred’ approaches to care.
ESTABLISHING BASELINE SYSTOLIC BLOOD PRESSURE WHEN DIAGNOSING ORTHOSTATIC HYPOTENSION

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Introduction
Diagnosing orthostatic hypotension (OH) is essential given that it is associated with falls, reduced quality of life, functional dependence and increased mortality. Current diagnostic methods vary, but generally include a supine rest period to achieve a baseline blood pressure (BP). Diagnosing a drop in BP is totally dependent upon this baseline value but there is little evidence to inform practice, although it is assumed that with rest BP will stabilise and become less variable.

Methods
336 consecutive patients (prospectively powered: ß 0.8, α 0.05) referred to Newcastle’s Falls and Syncope Service underwent a 10 minute supine rest prior to standing. Those with dysrhythmias or taking fludrocortisone or midodrine were excluded. Beat-to-beat systolic BP (sBP) values were recorded for each patient for 10 minutes during rest as per usual practice (Taskforce, CNSystems). sBP values were divided into minute means.

Results
Mean age 71 (range 18-96), 40% male, 40% taking antihypertensives. 24% were diagnosed with OH (on clinical and BP data). Mean sBP during 1st minute rest was 132 mmHg±24 and in the 10th minute was 131±25 (Paired t-test 2.02, df 317, p 0.044), reaching a nadir of 129±26 in minute 6 with a minute-by-minute rise thereafter. Mean sBP variability (SD) was 4.2±2.4 for minute 1 and 4.0±2.4 for minute 10 (Paired t-test 0.861, df 317, p 0.39), reaching a nadir during the 3rd minute (3.5±2.1) but increasing thereafter.

Conclusions
Although a 10 minute supine rest period is common place when establishing a baseline sBP this data does not support this practice. This prospectively powered data suggests that sBP is at its most stable in the 3rd minute but becomes more variable after this. More evidence is required to establish what makes an ideal baseline BP value and how to achieve this.
DOES VITAMIN D SUPPLEMENTATION IMPROVE MARKERS OF VASCULAR HEALTH IN POST MYOCARDIAL INFARCTION PATIENTS? A RANDOMISED CONTROLLED TRIAL

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Introduction
Low vitamin D levels are common in patients with vascular disease, and are associated with a higher incidence of future vascular events. We tested whether vitamin D supplementation could improve markers of vascular health in patients with a history of myocardial infarction.

Methods
Parallel group, placebo controlled, double blind randomised trial. Patients with a history of myocardial infarction at least 6 weeks previously were randomised to receive 100,000 units of oral vitamin D3 or placebo at baseline, 2 months and 4 months. Outcomes were measured at baseline, 2 and 6 months. Endothelial function, measured as reactive hyperaemia index on fingertip plethysmography (EndoPAT), was the primary outcome. Secondary outcome measures included blood pressure, cholesterol, C-reactive protein, von Willebrand factor, tumour necrosis factor alpha, E-selectin, thrombomodulin and 25-hydroxyvitamin D levels.

Results
75 patients were randomised, mean age 66 years. 52 (69%) were male. 74/75 (99%) completed 6 month follow up. 25 hydroxyvitamin D levels increased in the intervention group relative to placebo (+13 vs +1 nmol/L, p=0.04). There was no between-group difference in change in reactive hyperaemia index between baseline and 6 months (-0.18 vs -0.07, p=0.40). Of the secondary outcomes, only C-reactive protein showed a significant decline in the intervention arm relative to placebo at 6 months (-1.3 vs 2.0 mg/L, p=0.03). Systolic blood pressure (+1.4 vs +2.3 mmHg, p=0.79), diastolic blood pressure (+2.0 vs +0.8 mmHg, p=0.54) and total cholesterol (+0.26 vs +0.24 mmol/L, p=0.88) showed no between-group difference at 6 months.

Conclusions
Vitamin D supplementation did not improve markers of vascular health in post myocardial infarction patients.
BLOOD PRESSURE MEASUREMENT IN HOSPITAL; AN OPPORTUNITY TO IMPROVE HYPERTENSION MANAGEMENT

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Introduction
Hypertension is a major risk factor for morbidity and mortality. Many community studies report under treatment in spite of excellent outcome data with drug therapy, including in the elderly where the magnitude of treatment benefit is greater than in younger patients. Little is known however about Blood Pressure (BP) control amongst hospital inpatients, a group in whom BPs are measured daily and for whom the opportunity to optimise therapy is readily available with frequent medical ward reviews.

Our objectives therefore were to assess the prevalence of hypertension amongst medical inpatients and level of BP control, also noting their additional risk factors for cardiovascular disease.

Methods
Retrospective analysis of 120 admissions via the acute medical take noting hypertension diagnosis, age >65yrs, co morbidity including diabetes, hyperlipidaemia, heart disease, cerebrovascular disease and chronic kidney disease (levels III-V), and mean BP values within desired target range on discharge.

Results
120 patients; male 53%. Age range; 32-96, median 65yrs.

Hypertension diagnosed in 45% (prior diagnosis 41%, newly diagnosed 4%) of whom 67% were age >65yrs, cerebrovascular disease 37%, diabetes 37%, angina/prior myocardial infarct 33%, and cardiac failure 15% respectively. Of those that had total cholesterol measurements 61% were elevated. Mean BP was above target range on discharge in 35% of the hypertensives of whom 69% were >65yrs and 42% had prior history of Stroke/Transient ischaemic attack. Advice for BP follow-up was given to General Practitioners in only 16% of these.

Conclusions
Almost half our inpatient cohort was hypertensive and the majority were elderly with additional risk of vascular disease. BP was poorly controlled in over a third on discharge. The inpatient setting could be used to greater advantage in order to optimise hypertension management in general medical admissions, the majority of whom are elderly and therefore should have most to gain.
RIGOROUS CONTROL OF BLOOD PRESSURE IS JUSTIFIED IN OLDER PEOPLE WITH CHRONIC KIDNEY DISEASE

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Chronic kidney disease (CKD) is highly prevalent in older people and is associated with changes in cardiovascular (CV) function. Doubt exists concerning the current optimal BP targets in this group, primarily due to a perceived risk of inducing additional CV instability and increasing falls risk.

Methods
We recruited 61 subjects (including non-CKD controls). AHT was fully withdrawn for 2 weeks before initial assessment of body composition (bioimpedance analysis) and function (Timed get Up and Go test (TUG)), CV function (pulse wave velocity (PWV) and baroreflex sensitivity (BRS). AHT was restarted to a target BP 130/80mmHg. We repeated assessment 4 weeks after full AHT titration (AHTr) and after a further 12 months follow-up (FU). Falls diaries were maintained.

Results
Mean age was 76±4yrs, mean eGFR (CKD group) was 42±14ml/min/1.73m². AHT used was in line with current guidelines (mean achieved BP 128/69 mmHg). Improvements in PWV (13 to 12 m/s, p<0.001) and BRS (4.2 to 5.7 ms/mmHg, p=0.002) with AHTr were sustained over 12 months. Muscle mass fell with AHTr and at FU (0.7, p=0.031; 1.0kg, p=0.020). A trend to bone mass reduction after AHTr (0.03kg; p=0.085) was confirmed at FU (0.6kg; p=0.021). TUG fell over the year by 8 to 9 s (p=0.001). Falls rates were low, with only 27 episodes (0.5 falls/patient/year; range 0-6 per individual). No associations were noted with AHT, BRS or BP. Overall response to AHT was similar between patients with CKD or preserved renal function.

Conclusion
AHT use in older patients rapidly results in both a sustained improvement in CV function and alteration of humoral markers of CV health, which are partially reversed over time. Body composition and function decline, this does appear to be clinically significant. Concern that older patients with CKD may have a different risk/benefit profile for aggressive AHT than younger patients appears unfounded.
GERIATRIC MEDICINE TRAINING FOR FOUNDATION YEAR 2 (FY2) DOCTORS: CAN A FIVE SESSION COURSE POSITIVELY CHANGE PERCEPTIONS AND TRAINEES’ CLINICAL APPROACH?

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Introduction
To meet the challenge of a rapidly ageing society, we must create training programmes that meet the needs of a complex population. Many practising clinicians have had little or no undergraduate or post-graduate training in geriatric medicine. Oliver (JRSM 2008 101:168-174) contends that lack of knowledge leads to negative attitudes toward elderly people.

Thus, we devised a five session teaching programme for FY2 doctors in a district general hospital (DGH). This focused on commonly encountered problems of old age and used action research to develop the intervention and our understanding of the challenges faced by FY2 trainees.

We wished to discover if such a teaching intervention could lead to a change in clinical approach and perceptions.

Method
The teaching programme included sessions focusing on delirium, dementia, falls, continence and complexity. The complexity session included the presentation of a piece of reflective writing. The end-of-programme questionnaire asked participants to consider what they considered to be the take home message. The free-text responses were thematically coded.

Results
In total, 32 trainees participated during the project. 22 completed the post-programme questionnaire and submitted 9 reflective essays.

Themes from the complexity session:
• Ageing and disease are different
• The elderly are diverse – they are not all frail!
• Embarrassing complaints (e.g. incontinence) should be sensitively sought and managed
• “Hear the patient's voice”

Take home messages included:
• Looking after the elderly is rewarding – “I can promote better attitudes and understanding”
• The need for diagnostic rigour – “social admission is not a diagnosis”
• Utilise a systematic approach to avoid being overwhelmed by multiple problems

Conclusions
A relatively short intervention can change both perceptions and self-reported clinical approach. A similar programme could be replicated by other DGHs. What is unknown is whether the reported perceptual changes will persist and translate into better care. Further research is required.
Introduction
Physical and psychosocial wellbeing are important domains of successful ageing. The aim of the present study was to test whether separable classes of individuals that display different profiles across domains of wellbeing exist and, if they do, to identify their characteristics.

Method
We used latent class analysis to explore possible classes among people with scores representing physical fitness, perceived quality of life, and level of emotional distress at age 70 in the Lothian Birth Cohort 1936. Demographic, personality, cognition, health and lifestyle variables were used to characterise the resulting classes.

Results
We accepted and present a five-class solution. The majority of the sample (n = 515, 47.2%) could be classed as High Wellbeing; they scored highly across all three domains. Average Wellbeing (n=417, 38.3%) and Poor Wellbeing (n=37, 3.4%) classes were also identified. Contrasting patterns of wellbeing across domains were noticed in the two final classes: one class was physically fit but had relatively high emotional distress (n = 60, 5.5%); and another was in relatively poor physical condition but showed relatively little emotional distress (n=62, 5.7%). Most individuals were relatively healthy; however, salient differences that distinguished amongst the classes included smoking and drinking behaviors, personality domains, and disease indices.

Conclusion
The majority of individuals showed relatively high to average scores across domains, and separable classes of individuals were discovered who had consistently low scores across domains, or contrasting scores. Emotional stability, physical fitness, and personality domains were amongst the prominent variables that distinguished amongst these classes. The results support a multidimensional construct of wellbeing in old age, with some evidence that distinctive classes of individuals with uneven profiles exist.
BIOMARKER PREDICTORS OF FRAILTY: FINDINGS FROM THE HERTFORDSHIRE AGEING STUDY

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Introduction

Frailty is a multidimensional geriatric syndrome characterised by reduced reserve and increased vulnerability to disease; conferring high risk for falls, disability, hospitalisation and mortality. It is increasingly recognised that frailty is reversible in nature with early detection and simple treatments.

Age-related changes in the immune-endocrine axis are implicated in a wide range of age-related disease processes, causing significant morbidity and mortality. Associations have been demonstrated with frailty however longitudinal studies are lacking. Identifying the biochemical changes that precede frailty will add to our understanding of its aetiology and facilitate its early recognition and prevention.

This study investigated the associations between biomarkers of the immune-endocrine axis and frailty ten years later among participants in the Hertfordshire Ageing Study.

Methods

We studied 254 participants (153 men, 101 women) from the Hertfordshire Ageing Study at baseline and 10 year follow up. They completed a health questionnaire and attended clinic for collection of blood samples for immune-endocrine analysis. Fried frailty was assessed at 10 year follow-up.

Results

Average age was 67.1 years; median follow-up time was 10.2 years; prevalence of Fried frailty was 5.2% (men), 11.9% (women), (p=0.05 for gender difference). Higher levels of ESR, neutrophils, monocytes, lymphocytes, T4 and lower levels of DHEAs were all significantly associated with increased odds of frailty at 10 year follow-up. This was unaltered by adjustment for gender, age, and duration of follow-up. However, the associations between ESR (p=0.05) and T4 (p=0.07) were attenuated by also adjusting for height, weight for height, smoking, alcohol, social class and walking speed.

Conclusion

Immune-endocrine biomarkers can predict the likelihood of frailty in 10 years. This adds to our understanding of the aetiology of frailty and age related disease processes. There is the potential for the early identification of individuals at risk of frailty and targeted intervention.
THE RANGE AND DETERMINANTS OF GRIP STRENGTH IN OLDER MEDICAL IN-PATIENTS IN MALAYSIA

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Introduction
Grip strength has been proposed as a clinical marker of sarcopenia. Normative ranges and key determinants in older Caucasian populations are being established but research in other ethnic groups is limited.

Methods
Patients aged >65 years (+6 months) admitted to the Geriatric Ward of University Hospital, Kuala Lumpur were prospectively, consecutively recruited within 7 days of admission. Exclusion criteria were inability to use the dynamometer or consent. Maximum grip strength from three attempts in both hands, anthropometric data, co-morbidity, medications, three-item Barthel Score, falls history and MMSE were recorded.

Results
80 patients of Chinese (57.5%), Malay (18.8%) and Indian (20.0%) ethnicity were recruited. Baseline characteristics by gender are tabulated below.

<table>
<thead>
<tr>
<th></th>
<th>Men (n=28)</th>
<th>Women (n=52)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Grip Strength (kg)*</td>
<td>18.4 (6.9)</td>
<td>12.6 (5.7)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Age (years)*</td>
<td>80.5 (9.1)</td>
<td>77.8 (6.2)</td>
<td>0.12</td>
</tr>
<tr>
<td>Height (cm)*</td>
<td>164.2 (11.1)</td>
<td>150.8 (5.2)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>BMI (Kg/m²)*</td>
<td>21.6 (4.8)</td>
<td>23.6 (3.9)</td>
<td>0.05</td>
</tr>
<tr>
<td>Barthel (3 item score)#</td>
<td>6.0 (4.0 – 8.0)</td>
<td>6.0 (4.0 – 8.0)</td>
<td>0.76</td>
</tr>
<tr>
<td>Total No of Co-morbidities#</td>
<td>5.0 (4.0 – 5.5)</td>
<td>4.0 (3.0 – 5.0)</td>
<td>0.25</td>
</tr>
<tr>
<td>Total No. of Medications#</td>
<td>5.0 (4.0 – 7.0)</td>
<td>4.0 (2.0 – 7.0)</td>
<td>0.37</td>
</tr>
<tr>
<td>MMSE#</td>
<td>23.5 (19.5 – 26.0)</td>
<td>19.0 (12.0 – 26.0)</td>
<td>0.02</td>
</tr>
<tr>
<td>Falls in Last Year (% Yes)</td>
<td>35.7</td>
<td>34.6</td>
<td>0.92</td>
</tr>
</tbody>
</table>

Gender was a clear determinant of grip strength. Multiple linear regression adjusting for gender, revealed significant associations (regression coefficient, 95% confidence interval) between grip strength and BMI (0.56, 0.26 – 0.87; P=<0.0001), age (-0.28, -0.45 – -0.97; P=0.003), three-item Barthel score (0.97, 0.42 – 1.52; P=0.001) and MMSE (0.42, 0.24 – 0.60; P=<0.0001).

Conclusions
This preliminary study of the range and associations of grip strength in older, medical in-patients in Malaysia identified similar determinants to those in Caucasian populations, but lower grip strength values. Further work is warranted in non-Caucasian populations.
INTRODUCTION

Offspring of subjects enriched for familial longevity have a lower prevalence of diabetes, myocardial infarction and hypertension. It is unknown whether the innate immunity contributes to this difference. A low pro-inflammatory capacity of the innate immune system is associated with decreased survival, and both pro- and anti-inflammatory cytokine production capacities are known to decline with age. The objective of this study was to investigate the capacity of the innate immune system in individuals enriched for familial longevity, compared to controls.

METHODS

From the Leiden Longevity Study, we included 196 middle-aged offspring of long living siblings (>90 years of age) together with their 196 partners. We measured ex vivo cytokine responses after 24 hours lipopolysaccharide-induced release assays with ELISA. The pro-inflammatory cytokines, TNFα, IL-1β and IL-6, and the anti-inflammatory cytokines, IL-10 and IL1-RA, were measured.

RESULTS

The offspring and partners were similar in age, body mass index, and hematological characteristics. After correction for gender and age, there were no significant differences between the offspring and partners for all pro- and anti-inflammatory cytokine production capacities (all p-values > 0.05).

The 22 diabetic subjects, from the 392 study participants, had a significantly lower TNFα production capacity (7354 pg/ml vs 9963 pg/ml, p = 0.03), and a significantly higher IL1-RA production capacity (94238 pg/ml vs 67225 pg/ml, p < 0.001). Moreover, in all study participants, a 1% increase in glycated hemoglobin was associated with a 436 pg/ml increase in IL-10 production (p = 0.048) and a 7790 pg/ml increase in IL1-RA production (p = 0.001).

CONCLUSIONS

Although the offspring of the Leiden Longevity Study have less age related co-morbidities, a difference in cytokine production capacities could not be demonstrated. Diabetic subjects have a lower pro-inflammatory production capacity, and a higher anti-inflammatory cytokine production capacity.
DIFFERENCES IN SUSTAINED ATTENTION BETWEEN OLDER FALLERS AND NON-FALLERS IS NOT INFLUENCED BY TIME OF DAY

A M O’Halloran¹,², N Pénard¹,², A Galli¹,², T Foran¹, C W Fan¹, C Cunningham¹, I H Robertson¹,², R A Kenny¹,²

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Background
The aim of this study was to test the home deployment of the sustained attention to response task (SART), previously used in the clinical setting, to inform behaviour patterns of sustained attention among older fallers and non-fallers at four time-points throughout the day.

Methods
A case control study was performed in the home setting and data was collected on N = 34 participants (Mean Age: 72.2 yrs, Non-Fallers = 17; Fallers = 17). Fallers experienced ≥1 fall in the past year. Participants completed a comprehensive physical, cognitive and psychosocial assessment in the clinic. Participants then completed the SART in the home at four time periods through the day, in the morning (09:00-10:00), post lunch (13:00-13:30), mid-afternoon (15:30-16:00) and evening (18:00-18:30).

Results
None of the SART measures showed significant time of day variations within either fallers, non-fallers or across the sample as a whole (p > 0.05). Differences in sustained attention were observed with greater variability of response times (p < 0.001), higher commission errors rates (p = 0.043) and higher omission error rates (p = 0.001) among fallers compared to non-fallers. Mean reaction time on the SART did not differ significantly between fallers and non-fallers (p = 0.25). Multivariate logistic regression modelling revealed that the variability of reaction time (OR = 1.03, 95% CI: 1.01 – 1.05, p = 0.017) and age (OR = 1.23, 95% CI: 1.02 – 1.49, p = 0.028) explained between 49% (Cox and Snell R2) and 65% (Nagelkerke R2) of the variance between fallers and non-fallers. Variability in sustained attention and age improved the accuracy of the model, to discriminate between fallers and non-fallers, from 50% to 85.3%.

Conclusion
The falls history of the older adult had a greater impact on variability of sustained attention than diurnal variation.
SIMPLE PREDICTORS OF FALLS FOR COGNITIVELY IMPAIRED RESIDENTIAL CARE DWELLERS

J C Whitney¹, S R Lord², J C T Close², S H D Jackson¹


Background
Falls and related injuries are common in residential care. Although some interventions have effectively prevented falls in this population, meta-analysis suggests no overall positive effect. Cognitive impairment (CI) has not been adequately considered in some studies. To design effective targeted falls prevention interventions for those living in residential care, a better understanding of the risk factors associated with falls in residents with CI is required.

We conducted a large prospective study using easily collectable data to determine falls risk factors in those with CI.

Methods
Residents in 7 nursing/residential homes aged ≥60 with a mini mental state examination (MMSE) of <27, who were not bedbound or terminally ill were included. Demographics, medical history, medication use, cognition (MMSE), function (Barthel, balance and sit-to-stand ability) and behaviour (neuro-psychiatric inventory (NPI) and impulsivity) were recorded at baseline. Falls were recorded over the following 6-months. Data were analysed for differences between fallers and non-fallers. Continuous variables were dichotomised using cut-points with optimal sensitivity/specificity using the Youden index. Dichotomous variables were entered into multiple logistic regression analysis.

Results
Two hundred and forty residents took part in the study. In the follow-up period, 134 (56%) fell. Fallers had worse Barthel, NPI, MMSE and impulsivity scores and took more medications. Those with urinary incontinence, requiring nursing care and on CNS drugs in particular hypnotics/anxiolytics or anti-depressants were also more likely to fall. Logistic regression analysis identified Barthel<72 (OR=2.9 [95%CI1.6-5.4]), MMSE<17 (OR=2.3 [95%CI1.2-4.3]), requiring >6 medications (OR=3.3 [95%CI1.8-6.2]) and use of hypnotic/anxiolytic medications (OR=3.9 [95%CI1.0-14.9]) as independent and significant predictors of falls. The relative risk of falling with ≥3 of these risk factors was 3.0 [95%CI 2.0-4.6].

Conclusions
Risk factors for falls in those with CI in care homes include behaviour, cognition, function and medication use. Interventions to prevent falls in this group should target these risk factors.
NEW FALLS RISK FACTORS IN OLDER PEOPLE WITH COGNITIVE IMPAIRMENT LIVING IN RESIDENTIAL CARE

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¹. King's Health Partners, London, UK, 2. Neuroscience Research Australia, Sydney, Australia

Background
Falls are common in residential care. To design effective targeted falls prevention interventions for this population, a better understanding of the risk factors associated with falls in residents with cognitive impairment (CI) is required.

Methods
A subset of residents from 7 nursing/residential homes involved in a larger study, willing to undertake in-depth assessment, aged ≥60 with an Addenbrooke’s Cognitive Examination Score (ACE-R) of ≤82, who were not bedbound or terminally ill took part.

Demographics, medical history, medication use, detailed cognitive testing, mood, anxiety and physical function were recorded at baseline. Falls were recorded over the following 6-months. Data were analysed for differences between fallers and non-fallers and entered into multiple logistic regression analysis.

Results
110 residents took part in the study. In the follow-up period, 57 (52%) fell. Fallers had worse behaviour on the neuropsychiatric inventory, were more impulsive, more anxious, had worse balance and worse cognition (using ACE-R). Those who fell in the previous year, had a diagnosis of hypertension or took anti-depressants were also more likely to fall. Logistic regression analysis identified attention and orientation (from ACE-R) <9 (OR=5.5 [95%CI2.1-14]), being unable to stand with eyes closed (OR=3.1 [95%CI1.2-8.2]), requiring >5 medications (OR=3.4 [95%CI1.3-9.0]) and scoring >2 on the Goldberg Anxiety scale (OR=3.4 [95%CI1.1-10.6]) as independent and significant predictors of falls. All the participants with all four of these risk factors fell during follow-up.

Conclusions
We have carried out an in-depth prospective study which confirms that multiple medications and postural instability are risk factors for falls and identified anxiety and specific domains of cognition as new risk factors in cognitively impaired residential care dwellers. This will inform the design of future interventions.
VITAMIN D STATUS AMONGST FALLERS WITH OSTEOPOROSIS ATTENDING A FALLS CLINIC

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*Department of Elderly Care Medicine, Northwick Park Hospital, Watford Road, Harrow, Middlesex*

Introduction
Impaired vitamin D status (vitamin D insufficiency and deficiency) is common in the elderly and is associated with falls and fractures. Vitamin D and calcium supplementation may reduce falls and vitamin D insufficiency in a falls clinic population has been established (Dhesi et al. Age and Ageing 2002; 31:267-71). However, data on vitamin D and bone mineral density (BMD) in fallers is lacking. We aimed to establish the prevalence of impaired vitamin D status in outpatient fallers with osteoporosis.

Methods
We measured forearm BMD using a peripheral DEXA scan and serum 25-OHD in 343 patients attending a falls clinic between 2006 and 2011. Chi-squared test was utilized for statistical analysis.

Results
There were 119 men (mean age 80, range 43-95) and 240 women (mean age 80, range 52-99). Osteoporosis was more common in women than in men (61% vs 54%, X² = 5.08, p=0.02). Impaired vitamin D status among those with osteoporosis was common at 71% in both sexes, but more so in men than women (78% vs 68%, X² = 10.91, p=0.001). Vitamin D deficiency among those with osteoporosis was similar in both sexes (12% vs 13%).

<table>
<thead>
<tr>
<th>Serum Vitamin D</th>
<th>Normal Bone Density % (T-Score &gt;-1)</th>
<th>Osteopaenia % (T-Score -1 to -2.49)</th>
<th>Osteoporosis % (T-Score &lt;-2.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td>Men</td>
</tr>
<tr>
<td>Normal (&gt;75nmol/l)</td>
<td>30</td>
<td>34</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>(n=9)</td>
<td>(n=11)</td>
<td>(n=7)</td>
</tr>
<tr>
<td>Insufficient (25-74nmol/l)</td>
<td>63</td>
<td>50</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>(n=19)</td>
<td>(n=16)</td>
<td>(n=17)</td>
</tr>
<tr>
<td>Deficient(&lt;25nmol/l)</td>
<td>7</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(n=2)</td>
<td>(n=5)</td>
<td>(n=1)</td>
</tr>
</tbody>
</table>

Conclusions
Impaired vitamin D status is common in subjects with osteoporosis attending a falls clinic. Current data reinforce the importance of replenishing vitamin D levels before initiating anti-resorptive therapy and also support the use of empirical vitamin D replacement in fallers.
THE RELATIONSHIP BETWEEN HYPONATRAEMIA AND LENGTH OF STAY IN ELDERLY CARE PATIENTS


1. The Royal Devon and Exeter NHS Foundation Trust, 2. Peninsula Medical School, University of Exeter. *Equal contribution – therefore regarded as co-first authors

Introduction
Elderly patients have attenuated inflammatory responses. Hyponatraemia is thought to be a measure of impaired homeostatic regulation and may have independent prognostic information. We wished to determine the independent importance of hyponatraemia as a prognostic indicator for length of stay.

Methods
This is a secondary analysis of audit data, performed with permission of the Trust Caldicott Guardian. We collected demographic and biochemical information for all patients over 65 admitted through the emergency medical unit in a teaching Hospital over 4 months. Length of stay and discharge location were recorded. Multivariate regression established the independence of prognostic indicators for length of stay.

Results
Of 1,183 admissions, complete dataset was available for 1,171 subjects, 185 subjects had recurrent admissions, therefore only the first presentation was included, and a further 43 admissions were hypernatraemic and analysed separately. 219 patients had a sodium ≤ 134mmol/dl. Age was similar in those with and without hyponatraemia (81 vs 80 years; p=0.4), although it was more common in women than men (25% vs. 19%; p=0.009). Length of stay was longer in those with hyponatraemia compared to those without (8.9 (95%CI, 7.7-10.2) vs. 6.2(5.7-6.8) days; p<0.001). There was a continuous association with reducing sodium and length of stay such that for every 4mmol/dl drop, length of stay was extended by 1 day (p<0.001). This was independent of age, sex, admission CRP, urea or white cell count (fully adjusted beta-regression coefficient between length of stay and sodium -0.23 (-0.36 - -0.11); p<0.001). This was independent of whether the hyponatraemia was iatrogenic or due to SIADH.

Conclusions
Hyponatraemia is the most significant prognostic indicator of length of stay for patients over 65. This is independent of conventional prognostic indicators or of precipitant, suggesting hyponatraemia is a good measure of elderly patient physiological reserves.
PREDICTIVE VALIDITY OF A NUTRITION SCREENING TOOL: CLINICAL OUTCOMES AT ONE YEAR

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Introduction
A nutrition screening tool (NST) identifies patients who are at risk of malnutrition and may require intervention. The aim of this study was to establish the predictive validity of an NST (Weekes et al, Clinical Nutrition, 2004, 23:1104-12) in stroke and elderly care patients. The key clinical outcomes chosen were mortality and length of hospital stay (LOS).

Methods
We aimed to recruit all patients admitted to the stroke unit and three elderly care wards over two months. Following screening, patients were categorised as being at low, medium or high risk of malnutrition. Hospital records were reviewed retrospectively to establish cumulative LOS and mortality at one year after admission.

Results
Of 208 patients who were admitted, 182 (88%) were screened; mean age was 75 years (range 25 – 106).

<table>
<thead>
<tr>
<th>NST risk category</th>
<th>Mortality at 1 year (n=182)</th>
<th>LOS at 1 year (n=138)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alive</td>
<td>Dead</td>
</tr>
<tr>
<td>low risk (50%, n=91)</td>
<td>79 (87%)</td>
<td>12 (13%)</td>
</tr>
<tr>
<td>medium risk (18%, n=33)</td>
<td>27 (82%)</td>
<td>6 (18%)</td>
</tr>
<tr>
<td>high risk (32%, n=58)</td>
<td>32 (55%)</td>
<td>26 (45%)</td>
</tr>
</tbody>
</table>

There was a statistically significant difference in mortality rate between NST risk categories, with more deaths in the high risk patients (45%). This association remained significant (p<0.001) after adjustment for the effects of age and sex (logistic regression).

LOS at one year for those who survived was not significantly different between groups although LOS in the high risk group tended to be longer. Age had a significant effect on the ranked LOS (p<0.001), suggesting it may be an important predictor of this outcome (univariate ANOVA).

Conclusion
This NST can be used to predict mortality but not LOS at one year in stroke and elderly care patients. Further research is needed in other populations.
**HOW MOBILE ARE OLDER IN-PATIENTS ON ACUTE MEDICAL WARDS JUST PRIOR TO DISCHARGE?**

S C Haslam¹, N I H A Mashod¹, M E Burnett², A Aihie Sayer¹,²,³,⁴, H C Roberts¹,²,³,⁴

¹. Academic Geriatric Medicine, 2. Faculty of Health Sciences, 3. MRC Lifecourse Epidemiology Unit, 4. Biomedical Research Unit Nutrition Diet & Lifestyle, University of Southampton.

**Introduction**

Immobility is recognised to be associated with muscle loss and poor outcomes including functional decline and new care home placement among hospitalised older people. Clinical staff aim to maintain mobility but how much patients really move about on busy acute wards is unknown.

**Methods**

Subjects were recruited either just before hospital discharge or when they were deemed fully mobile by ward staff. Activpal accelerometer monitors were attached to patients' legs between 9am and 5pm, and on 3 consecutive days for a subgroup of 6 patients. The proportion of time upright (standing or walking), sitting and lying down was recorded, as were their Barthel scores.

**Results**

16 female patients (mean age 84.9 years, range 79-95) wore the monitors on 28 days in total, mean duration 461 minutes (range 306-561). Patients spent only median duration of 25 minutes (IQR 15-36) standing or walking, compared to sitting (median 261.5 minutes, IQR 151-362) or lying down (median 128 minutes, IQR 0-297). The time upright represented a median of only 4.9% (IQR 3.2-10.6 %) of the time monitored. These patients’ mean Barthel score was 81.3/100 points.

**Conclusions**

Patients in this study were very sedentary, and time upright did not correlate with Barthel score. This may represent a lack of opportunity rather than ability to mobilise, especially as monitoring covered the most active times of day. Attention should be refocused on general mobility of inpatients.
CAN ILLNESS SEVERITY SCORES MISGUIDE US IN THE SEVERELY ILL ELDERLY?

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Introduction
The use of severity of illness tools has been proposed to help tier allocation of care setting. Such tools, however, can be poorly predictive of outcomes, particularly in the elderly [Sikka P et al, Intensive Care Med 2000 Dec;26(12):1803-10] and some studies suggest that functional status is more prognostic in this group [Covinsky KE et al, J Gen Int Med 1997: 12(4):203-8]. The Appropriateness Evaluation Protocol (AEP) [Gertman PM & Restuccia JD Medical Care 1981: 19(1)7-17] is a tool which proposes admission criteria based only on physiological and laboratory parameters, for example persistent fever or extreme electrolyte abnormalities. This tool has recently informed a national bed utilisation review [Feely E, HSE, 2008]. Our aims were to assess the clinical utility of this tool in the elderly.

Method
We studied patients aged 65 years or over who died within 10 days of admission over a 2-year study period in 4 acute hospitals in South Munster. Proximate death was used as a robust measure of validity of admission. The Hospital In-Patient Enquiry Scheme was used to determine which patients died. We used analytical retrospective cohort study design to allocate the AEP criteria using the Emergency Department (ED) records.

Results
490 patients met our inclusion criteria and had charts available for review. 54% were female, median age was 82 years. The median length of stay until death was 4 days. 23.3% were coded as severely unwell on arrival to ED, however 30.4% of our cohort did not meet criteria for admission using the AEP.

Conclusion
Our study demonstrates that the AEP missed almost one-third of our moribund elderly patient cohort on admission. Hence we conclude that tools such as this may misguide us in assessing the severely unwell elderly and should not be used alone to guide appropriateness of admission.
THE DEVELOPMENT AND FEASIBILITY OF THE PERSON, INTERACTIONS AND ENVIRONMENT (PIE) METHOD FOR OBSERVING THE EXPERIENCES OF PEOPLE WITH DEMENTIA IN GENERAL HOSPITAL WARDS FOR USE IN A NATIONAL CLINICAL AUDIT

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Introduction
There is much evidence to suggest that care standards for people with dementia in general hospitals could be improved. Methods to describe the experiences of people with dementia are required to guide improvements. The research objective was to develop and feasibility test a method for directly observing patient experiences suitable for multi-site use in the National Audit of Dementia.

Methods
A preliminary observational tool was developed, based on a literature review and consumer input, to evaluate key elements of person-centred care in relation to Personalised care, Interactions with staff and the Environment (PIE). Following a preparatory training workshop, clinical leads in seven NHS Trusts (elderly care, medical, surgical wards) were asked to use PIE. Feasibility was assessed against pre-stated minimum requirements of at least 4hrs ward observation of 5-10 patients to include a morning and meal-time, and the completion of reflection and action planning datasheets. Acceptability was assessed by semi-structured interviews with staff.

Results
76 patients in 18 wards were observed. The minimum requirements for data collection were fulfilled. PIE was reported to be easy to use and particularly helpful in enabling staff to view care from the patient perspective (“it’s like having a story unfolding in front of your eyes”, “you don’t always experience that as a member of staff because you’ve got your own priorities”). Analysis of the datasheets showed that staff gave rich descriptive and honest accounts of patients’ experiences, thereby providing a valid basis for the generation of ideas for action e.g. to provide a more stimulating environment, improve use of person-centred information, improve team-working at meals.

Conclusions
The PIE observational method was feasible and acceptable to staff for use in a range of general hospital wards.
BLOOD PRESSURE MEASURES AND COGNITIVE DECLINE IN THE OLDEST OLD: LEIDEN 85-PLUS STUDY

B Sabayan, R G J Westendorp, A J M de Craen

Leiden University Medical Center, Department of Gerontology and Geriatrics, Leiden, The Netherlands

Introduction
The association of hypertension and cognitive decline in the very old is not fully determined. In this study we investigated the association of blood pressure and future cognitive decline among elderly people.

Methods
In this study 572 elderly subjects from the Leiden 85-plus Study were included. All the participants were 85 years at baseline. On average, participants were followed for 3.2 years. Blood pressure was measured at baseline. A cognitive test battery, including MMSE, Stroop test, Letter Digit test, Immediate Memory test and Delayed Memory test, was used to evaluate cognitive function at baseline and it was repeated yearly thereafter. The association of baseline blood pressure with baseline cognitive function and decline in cognitive function, defined as (first cognitive score-last cognitive score)/years of follow up), was evaluated by linear regression models adjusted for sex and education level.

![Table 1: Cross-sectional association of blood pressure and cognitive function at age 85](image)

<table>
<thead>
<tr>
<th></th>
<th>Systolic blood pressure Beta (SE)</th>
<th>Diastolic blood pressure Beta (SE)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMSE</td>
<td>0.4 (0.11) &lt; 0.001</td>
<td>0.71 (0.23)</td>
<td>0.002</td>
</tr>
<tr>
<td>Stroop</td>
<td>-2.26 (0.9) 0.013</td>
<td>-4.44 (1.73)</td>
<td>0.011</td>
</tr>
<tr>
<td>Letter digit</td>
<td>0.22 (0.18) 0.22</td>
<td>0.46 (0.34)</td>
<td>0.176</td>
</tr>
<tr>
<td>Immediate memory</td>
<td>0.13 (0.06) 0.025</td>
<td>0.21 (0.11)</td>
<td>0.059</td>
</tr>
<tr>
<td>Delayed memory</td>
<td>0.18 (0.07) 0.011</td>
<td>0.33 (0.14)</td>
<td>0.017</td>
</tr>
</tbody>
</table>

Results
Both higher systolic and diastolic blood pressure were associated with better cognitive outcomes at baseline (table 1). In the longitudinal analysis, each 10 mmHg increase in baseline systolic blood pressure was associated with 0.13 point increase in decline of MMSE score (P= 0.007). Each 10 mmHg increase in baseline diastolic blood pressure was associated with 2.1 point increase in Stroop score (P= 0.032). The remainder of associations between baseline blood pressure measures and cognitive decline were not significant.

Conclusions
In the oldest old, higher systolic and lower diastolic blood pressure might be beneficial for the specific cognitive domains.
NEURAL COMPENSATION IN SARCOPENIA

C G M Meskers¹, A B Maier², A C Schouten³, J H Arendzen¹, J H de Groot¹


The neural system may modify the role of low muscle mass or sarcopenia in mobility disorders in elderly. We aimed to discern muscle from neural system behaviour as a function of age and history of falls. As both systems are within a closed loop, separation requires a formal system identification approach.

Continuous force perturbations evoked by a haptic rotational wrist manipulator had to be actively resisted. Muscular and neural contributors to total wrist stiffness were quantified and identified by neuromuscular modelling. Active muscle stiffness and reflex gain, i.e. neural reflex loop “strength” were assessed in 54 healthy subjects of 9 to 84 years of age, divided over five bins of increasing mean age. A sixth group consisted of elderly patients with a history of falls.

Active stiffness increased with age to 10.1 Nm SD 2.1 at middle age and decreased at old age (7.21 Nm, SD 3.5) and in patients with a history of falls (6.21 Nm SD 3.6, ANOVA group effect F=3.1, p=0.002). Contrastingly, reflex gain was higher in healthy elderly with a further increase in patients with a history of falls (ANOVA group effect F=2.66, p=0.03).

Increased reflex gain in aforementioned groups is in sharp contrast to an expected simultaneous decline with muscle function and may indicate neural compensation. Neural system function should not be ignored in understanding and treating mobility disorders in elderly.
CHANGE IN FIVE-CHOICE REACTION TIME MAY BE A NOVEL MARKER FOR EARLY VASCULAR CHANGE AFFECTING COGNITION

C J Steves¹, T Spector¹, S Jackson²

¹. Dept of Twin Research and Genetic Epidemiology, Kings College London, 2. Clinical Age Research Unit, Kings College Hospital NHS Foundation Trust

Introduction
Mounting evidence indicates that midlife vascular risk (particularly blood pressure) and physical activity affect the development of cognitive disorders such as dementia, but most cognitive tests are not sensitive enough to pick up changes in early ageing. This study was designed to investigate the environmental determinants of longitudinal change scores on the Cambridge Neuropsychological Test Automated Battery (CANTAB).

Methods
324 healthy women aged over 55 in the UK twin register were tested twice with a ten year interval with the CANTAB. Independent variables included physical measures from baseline and at year 8. Analyses used multiple linear regression of significantly correlated variables (adjusting for twin data). Five tests were chosen a priori to be good candidates for age-related change. Here we report findings for one: five choice reaction time (fcrt)

Results
Fcrt latency (msec) in 2009 was subtracted from baseline and adjusted for baseline performance. This measure was strongly associated with age (beta= -0.033, p<0.001). Ischaemic heart disease at baseline was negatively associated with change in fcrt as was systolic blood pressure (SBP) in 2007. Physical strength in 1999 was positively associated. In a separate analysis examining determinates of quality of life, change in fcrt is significantly associated, despite adjusting for age, education and occupation (beta=1.2 p<0.04).
THE RELATIONSHIP BETWEEN VITAMIN D AND COGNITION IN THE ELDERLY

K McCarroll\(^1\), M Casey\(^2\), J B Walsh\(^3\), B Lawlor\(^3\), J Scott\(^4\), A Molloy\(^4\), H McNulty\(^5\), M Ward\(^6\), J J Strain\(^6\), C Cunningham\(^2\)

\(^1\). Mercers's Institute for Research on Ageing, St. James's Hospital, Dublin, Ireland, \(^2\). Dept of Gerontolgy, St. James's Hospital, Dublin, \(^3\). Dept of Old Age Psychiatry, St. James's Hospital, Dublin, \(^4\). Dept of Biochemistry, Trinity College, Dublin, \(^5\). Biomedical Sciences Research Institute, University of Ulster, Coleraine

Introduction
Increasing evidence supports a role for vitamin D in the aetiology of cognitive impairment. We aimed to explore the relationship between serum 25 hydroxyvitamin D [25(OH)D] and cognition in older adults.

Methods
An analysis of data obtained from participants of the TUDA (Trinity, University of Ulster, Dept of Agriculture) cross sectional study was performed. Participants were community dwelling adults aged over sixty who attended a geriatric outpatient service. Those taking vitamin D supplements or cod liver oil were excluded in the analysis. All subjects underwent a detailed assessment which included completion of the Timed Up and Go (TUG), Centre for Epidemiologic Studies Depression Scale (CES-D) and Mini Mental State Examination (MMSE). Serum 25(OH)D was measured with liquid chromatography mass spectrometry (LCMS).

Results
398 subjects were included in the analysis. 61% were female and overall mean age was 79.8 ± 6.9 years with a mean 25(OH)D of 33.7 ± 22.1 nmol/l. Serum 25(OH)D was significantly associated with MMSE scores before and after adjustment for age, gender, social class, education, month, global solar radiation, body mass index and sun holiday travel (β coefficient 0.71, p = 0.008). The relationship remained significant after further adjustment for stroke history (p = 0.008), depression (p = 0.023) and TUG (p = 0.011).

Conclusion
The findings suggest that vitamin D may play a role in cognitive impairment for which supplementation may be beneficial.
SUBCLINICAL THYROID DISORDERS AND COGNITIVE DECLINE IN OLD AGE: RESULTS FROM THE PROSPEER STUDY

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Introduction
Subclinical thyroid disorders have been implicated as a risk factor for cognitive decline in old age, although results are inconsistent. Cardiovascular disease, which contributes to cognitive decline in old age, has been associated with subclinical thyroid disorders. We investigated the association between subclinical thyroid disorders and cognitive decline in the PROspective Study of Pravastatin in the Elderly at Risk (PROSPER).

Methods
PROSPER consisted of 5,804 participants aged 70-82 years with pre-existing vascular disease or at risk thereof. Thyroid function was determined at baseline. Cognitive performance was tested at baseline and at four different time points during a mean follow-up of 42 months, using four neuropsychological performance tests.

Results
We studied 5,384 participants. Subclinical hyperthyroidism was found in 166 (3.1%) participants, 387 (7.2%) participants had subclinical hypothyroidism. We found no consistent association of subclinical hypo- or hyperthyroidism with altered cognitive performance (compared to euthyroid participants) at baseline or during follow up. However, subclinical hyperthyroidism was associated with a lower body mass index (p<0.01), LDL cholesterol (p=0.02), total cholesterol (p=0.01) and lower prevalence of vascular disease at baseline (p=0.02) when compared to participants with euthyroidism. Subclinical hypothyroidism did not associate with cardiovascular disease or risk factors thereof.

Conclusion
We found no consistent evidence for an association of subclinical thyroid disorders and cognitive performance in a large cohort of elderly subjects with pre-existing vascular disease or at risk thereof.
WITHDRAWN
HYPERNATRAEMIA IN MEDICAL ADMISSIONS IS NOT AN INDICATOR OF INCREASED MORTALITY

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Introduction
Hypernatraemia has long been regarded as a potential indicator of mortality. O'Donoghue et al, showed that patients who acquired hypernatraemia in a medical / intensive care unit (ICU) had a 33.5% mortality rate compared with 7.7% in those who remained normonatraemic[1]. A similar outcome in ICU patients was observed by Darmon et al[2]. In contrast, Palevsky et al, found that patients with hospital-acquired hypernatraemia had a similar mortality rate to those with normonatraemia[3].

We studied the predictive value of hypernatraemia as an indicator of survival in medical admissions.

Methods
The hospital laboratory database of an UK General Hospital was searched to identify blood samples where the serum sodium was ≥150 mmol/L or higher. The total study period was 30 months.

Clinical records were examined to identify reasons for admission and outcome; death or discharge. Patients admitted for surgical procedures were excluded.

However it is to be noted that the diagnosis, aetiology of hypernatraemia and concomitant medical illness were not considered in the analysis.

Patient data divided into two columns (survivor/not survivor) and was ranked according to the highest recorded sodium. The proportion of patients who died or survived at each sodium concentration was calculated to allow a receiver-operator curve (ROC) to be plotted.

Results
During the study period 492 patients were identified to have been admitted to hospital with hypernatraemia or developed hypernatraemia during their hospital stay; with Sodium ≥150 mmol/L. Of these, 277 were admitted to medical wards.

Figure 1 (not published here, as per the rules for abstract submission) shows the ROC plot of death vs. survival. Although the dotted line lies above the solid line of identity, there is little discriminatory value; i.e. if hypernatraemia was a good predictor of patients who would not survive the area under the curve would be expected to be significantly greater.

Conclusion
Hypernatraemia in medical admissions is not an indicator of increased mortality.
Introduction
Whilst herpes zoster (HZ) and post-herpetic neuralgia (PHN) are prominent among elderly populations, UK-specific patient reported outcome (PRO) data on the debilitating impact of these conditions is limited. To address these limitations a large-scale UK cross-sectional study has recently been conducted, findings from which are discussed.

Methods
A combined total of 382 HZ and PHN patients over the age of 50 were recruited from 49 LREC-approved sites throughout the UK. Participants were required to complete validated PRO measures of pain and health-related quality of life (HRQoL), including the Zoster Brief Pain Inventory (ZbPI) and the Medical Outcomes Study Short-Form 36 (SF-36).

Results
Pain was a prominent symptom among patients, with more than 50% reporting experiencing pain in the preceding 24 hours at levels typically considered to have a significant impact on HRQoL (i.e. ZbPI worst pain ≥ 5). This was reflected in SF-36 domain and summary scores that were significantly lower in HZ and PHN patients compared to age-matched norms (p < 0.05). When compared to normative samples, clinically meaningful differences were observed among HZ and PHN samples across SF-36 domains assessing aspects of physical and mental well-being. In both groups, HRQoL was inversely associated with levels of reported pain.

Conclusions
This study represents the largest cross-sectional investigation of HZ and PHN burden conducted in the UK to date. Findings indicate that the acute presentation of HZ and the development of PHN, the commonest complication of HZ and that can persist for several months, are painful experiences that can have a significant impact on the physical and mental wellbeing of HZ/PHN sufferers.
Introduction
The lack of guidelines on management of pain in older people prompted a joint venture between the British Geriatrics Society & British Pain Society. A multidisciplinary panel was convened and a systematic review of the literature between 1996 and 2010 was conducted on different aspects of management of pain.

Method
The two main databases were PubMed and CINAHL. AMED, PsycInfo and Scopus were also used to refine some of the searches. A total of 5000 references were assessed. Evidence was graded and each reference scored. Papers were exchanged and a second reviewer independently assigned a score. Acceptable papers were incorporated into matrices and included in the recommendations.

Results/Conclusions
Recommendations are summarised below:

Self-management
1. A range of self-management techniques/practices should be considered for use in conjunction with other methods; 2. Arthritis /Chronic Disease Self-Management Programmes and close derivatives like the Expert Patient Programme, delivered in isolation without ongoing support, cannot yet be recommended to decrease pain and increase function; 3. Self-management programmes with mechanisms for longer term support/maintenance may be beneficial.

Physical activity
1. Increasing activity by way of exercise should be considered; 2. Exercise should involve strengthening, flexibility, endurance and balance; 3. The person’s preference for the exercise type should be strongly considered; 4. Motivation and barriers to activity should be discussed and planned for. 5. Exercise should be customised to individual capacity and needs; 6. Maintenance of productive activity should be facilitated.

Assistive devices

Psychological approaches
1. Elderly nursing home residents with chronic pain may benefit from cognitive-behavioureal approaches; 2. There is limited/ weak evidence of benefit from mindfulness, meditation and enhancing emotion regulation.
EVALUATING THE USE OF THE BARTHEL INDEX IN OLDER PATIENTS ADMITTED FOR ELECTIVE HIP AND KNEE SURGERY

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Introduction
The Systematic Assessment of Older People in Elective Surgery (SCOPES) service aims to recruit older patients who are at high risk of post-operative complications following elective hip or knee replacement for pre-operative Comprehensive Geriatric Assessment (CGA). High length of stay (LoS) is commonly used as a proxy for post-operative complications. We have previously demonstrated the Edmonton Frail Scale (EFS) to be predictive of LoS in this cohort but this is not usually measured in clinical practice. We set out to assess whether the Barthel Index, which is routinely used, would have similar predictive properties.

Method
The EFS (scores 0-17, high scores indicating frailty) and modified BI (scores 0-20, low scores indicating functional dependency) were collected as part of routine pre-operative assessment of all patients over 70 presenting for elective hip or knee replacement over a 6 month period. LoS was collected from our elective orthopaedic database.

Results
LoS data was available for 50 patients who had completed their inpatient stay at the time of analysis. Mean EFS score was 3.3 (SD 1.96, range 0-8), median BI was 20 (IQR 1, range 11-20) and LoS 7.8 (SD 8.30, range 3-56). As expected, EFS had a significant positive correlation with LoS (Spearman’s rho=0.368; p<0.01) and negative correlation with BI (Spearman’s rho=-0.621; p<0.01). There was no association between BI and LoS.

Conclusions
BI is not useful as a screening tool for high LoS and demonstrated a ceiling effect which draws into question its ability to describe clinical variability in this cohort. Extended activity of daily living scales are now being evaluated as an alternative measure of functional ability.
MODIFYING THE SIX MINUTE WALK TEST TO BETTER DETECT FATIGUABILITY – A PROSPECTIVE STUDY

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Background
The six minute walk test is a test of endurance that is widely used, reliable and easily completed by older people, but which has inadequate responsiveness to change in endurance. We aimed to modify the six minute walk test to better detect fatigue on endurance testing.

Methods
Prospective study of older Day Hospital patients (n=10) and older people recruited via community adverts (n=10). Participants undertook a standard six minute walk test at baseline, followed after rest by a repeat six minute walk test with a 1 minute pretest walk phase. This modified six minute walk test was repeated 1 week later. Total distance walked, distance walked in the first and last two minutes of each test was recorded. Distances were compared using Pearson's correlation coefficients, and the difference between the last and first 2 minutes was calculated for each test. Reliability was assessed using intraclass correlation coefficient, comparing baseline and one week test distances.

Results
Mean participant age was 75 years; 8/20 were male and 8/20 used walking aids. Mean six minute walk distance was 359 metres (range 92 to 613m). Little evidence of increased fatigue was seen comparing the six minute walk distance with the modified six minute walk distance (mean difference 12m; 95%CI -15 to 39m). There was little difference between distance walked in the first and last two minutes on either the six minute walk test (10m; 95%CI 3 to 17m) or the modified six minute walk test (7m; 95%CI 1 to 13m). Reproducibility over one week for the difference between first and last two minutes was poor (ICC=0.50; 95% CI 0.09 to 0.77).

Conclusion
Modifying the six minute walk by lengthening the test or comparing the first and last two minutes is unlikely to improve the ability of the test to reliably detect fatiguability.
CAN SIMPLE INTUITIVE QUESTIONS IDENTIFY PATIENTS IN THE LAST YEAR OF THEIR LIFE? - A PRAGMATIC STUDY COMPARING THE “PAIRED SURPRISE QUESTIONS” WITH THE “SINGLE SURPRISE QUESTION”

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Introduction
Identifying patients in the last year of life is an important first step in improving the quality of care given. A recommended method of identifying this group of patients is to ask the intuitive question Q1: “Would I be surprised if this patient was to die within the next year?” We looked to determine the usefulness of using this approach and whether the accuracy can be improved with the addition of another question Q2: “Would I be surprised if this patient was alive in a year’s time?”

Methods
A prospective observational cohort study. All patients admitted to an acute medical ward during a 10 month period were included. Patients were reviewed in the weekly multi-disciplinary team (MDT) meeting at which time Q1 and Q2 were posed to the team for each patient. The majority view was obtained and the response prognosticated as follows: Q1.YEȘ + Q2. NO = Good, Q1. NO + Q2. YEȘ = Poor and Q1. NO + Q2. NO = Uncertain. Those who were discharged or died before the MDT were excluded.

Results
Of the 238 patients admitted to the ward, 135 patients were discussed. 5 patients were lost to follow up. Data was analysed for 130 patients. The total mortality at one year was 47.69%. Those identified as having a poor prognosis by using Q1 had a mortality of 57%. By asking the two questions the accuracy increased to 80%.

Conclusion
The use of paired surprise questions may be better in identifying those at highest risk of death within the following year and helpful in effective targeting of services and resources.
DO THE BLOOD VESSELS SUPPLYING THE BRAIN STIFFEN AT THE SAME RATE AS THE OTHER BLOOD VESSELS OF ELDERLY PATIENTS WITH CKD?

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Introduction
Elderly CKD patients have an increased cardiovascular risk unexplained by traditional risk factors. Non-traditional risk factors including arterial stiffening are implicated. Aortic stiffness (measured by carotid-femoral pulse wave velocity (C-FPWV)) has been independently associated with cardiovascular morbidity and mortality. Arterial changes in small and mid-sized arteries are less well understood. We hypothesised that changes in the mid-cerebral artery would be directly related to changes in C-FPWV.

Method
Blood pressure and PWV were measured over 4 arterial segments at 0 and 12 months under standard conditions in 114 patients with CKD stages 3 & 4. Complior™ was used to measure C-FPWV and Carotid-Radial (C-R) PWVs.

Heart-Finger (H-F) and Heart-mid-cerebral artery (H-MCA) PWVs were calculated using offline analysis of finger plethysmography or transcranial Doppler with simultaneous ECG recording.

PWV was corrected for mean blood pressure and heart rate. Correlations between baseline values and change over 1 year were examined.

Results
Mean age (±SD) was 69(±11) years, mean eGFR 33(±11) ml/min/1.73m², mean SBP/DBP 155(±21)/83 (±12), mean number of antihypertensives 2.1(±1.3).

Adjusted mean PWVs were C-F 12.3(±2.4)m/s, C-R 10.6(±1.6)m/s, H-MCA 1.9(±0.3)m/s and H-F 5.4(± 0.6)m/s.

There was significant correlation between baseline H-F and H-MCA PWV (r=0.639, p<0.001), but not between baseline C-F, C-R and other PWV measurements. There was significant correlation between the rate of stiffening of C-F & C-R segments (r=0.239, p=0.027) and also H-F & H-MCA segments(r=0.420, p=0.001). There was an inverse correlation between the rate of stiffening of both C-F & C-R with H-MCA (r=-0.237, p=0.082 and r=-0.297, p=-0.031).

Conclusion
In elderly pre-dialysis CKD patients there was poor cross-sectional correlation between stiffness of large and small calibre arterial segments. Our data supports a hypothesis that stiffening of the large calibre arterial segments is associated with a decrease in stiffness in the arterial tree which supplies the brain.
CROSS-SECTIONAL OBSERVATIONAL STUDY OF ACUTE KIDNEY INJURY (AKI) IN ELDERLY MEDICAL INPATIENTS

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Introduction
Acute medical admissions are likely to have a deleterious effect on kidney function in a proportion of older patients. A decline in eGFR is associated with increased risk of both cardiovascular events and CKD.

The aims of this study were:
1. To establish the prevalence of CKD in elderly (≥70 years) patients admitted to Croydon University Hospital.
2. To identify patients discharged with a higher creatinine vs. admission and pre-admission levels.
3. To classify AKI in these patients and identify risk factors.

Method
We reviewed the notes of all elderly medical patients admitted in Mar-09 and documented: comorbidities, admission diagnoses, antibiotic and diuretics given, and intravenous contrast studies performed. Admission and discharge creatinines, eGFR and Hb were recorded as well as pre-admission and follow-up results.

Results
307 patients were studied. 137 male, 170 female. Mean age 81 years, mean LOS 12 days. Pre-admission creatinine and eGFR values were available in 209 patients. 121 had eGFR >60 (57.9%), 51 had stage 3a CKD (24.4%), 26 had stage 3b CKD (12.4%) and 11 had stage 4 CKD (5.3%). Admission and discharge creatinines were available in 246 patients. 73 (29.7%) left hospital with worse creatinine vs. admission creatinine. 12 (4.9%) had AKI stage 1. Pre-admission and discharge creatinines were available in 167 patients. 100 (59.9%) left with worse creatinine vs. pre-admission creatinine levels. 22 patients (13.1%) had AKI stage 1. Of those who left with a worse creatinine, 62% were followed up within 3 months. Preliminary analyses have not shown any statistically significant risk factors.

Conclusion
This study demonstrates a significant proportion of elderly patients suffer acute kidney injury during their hospital stay and leave the hospital with lower eGFR. Not all of these patients are followed up appropriately. This is likely to confer increased cardiovascular risk and increased risk of progressive CKD.
Introduction
Hand grip strength has been proposed as a clinical marker of sarcopenia. We aimed to determine if it was feasible and acceptable to measure grip strength in older medical in-patients in Malaysia.

Methods
Consecutive patients aged >65 years (+6 months) admitted to the Geriatric Ward of University Hospital, Kuala Lumpur were prospectively recruited. Exclusion criteria were inability to use the dynamometer or consent.

Maximum grip strength was ascertained after three attempts in both hands. Participants were then asked if they would do the test again or if they had experienced any pain or tiring. Additional information recorded included the Mini-Mental State Examination (MMSE) and three-item Barthel score.

Results
80/153 (52%) patients admitted to the ward during the study period were recruited (52 women; median age 79 years, range 64-100 years). Patients with low three-item Barthel (Median 6, range 0-8) and MMSE scores (median 21, range 4-30) were able to co-operate fully with the measurement.

Patients excluded were too unwell [n=34 (47%)], unable to consent [n=24 (33%)], unable to use the dynamometer [n=4 (5%)], declined [n=9 (12%)] or had other reasons [n=2 (3%)]. Reasons for being unable to use the dynamometer were burns to hands, injured fingers, gout in wrists and unable to sit up due to a pressure sore.

Although 11/80 (14%) reported discomfort and 14/80 (18%) tiring with the test, 76/80 (95%) reported that they would do the test again.

Conclusion
Grip strength measurement was highly acceptable to older medical in-patients in Malaysia. In terms of feasibility, 52% of patients approached participated in the study. The main limitations were acute illness and lack of capacity to consent rather than reluctance to participate. This is the first report of grip strength in this population and suggests that further work is warranted to establish normative ranges and determinants.
CONVERSION OF ESSENTIAL TREMOR TO PARKINSON'S DISEASE: A CASENOTE REVIEW

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Introduction
Although Essential Tremor (ET) and Parkinson's Disease (PD) are both disorders of old age, there is convincing evidence that they are aetiologically linked. This casenote review examines the clinical characteristics of patients presenting initially with ET who subsequently developed PD.

Methods
Results of 53 consecutive Dopamine Assisted Transporter scans (DAT-S) were reviewed. 16 patients with an initial diagnosis of ET and final diagnosis of PD supported radiologically were identified. Their casenotes were reviewed for disease duration, ages at diagnosis, clinical characteristics and response to therapy.

Results
Mean age at diagnosis of ET was 72.3 and PD 73.9 years. Tremor duration prior to PD diagnosis ranged from 1-40 years (mean 7.03, median 5.5 years). Laterality of ET was noted in 10 (62.5%) patients at presentation and corresponded in 87.5% with laterality of Parkinsonian signs and DAT-S results. 7 patients presented with red flag signs (Nahab et al, Practical Neurology 2007 Aug; 7(4):222-33) at the time of their ET diagnosis. This subset of patients had a duration of ET symptoms of less than 4 years (short latency (SL) group). The long latency (LL) group demonstrated no red flag signs and had lower rates of laterality and higher rates of positive family history compared with the SL group (56% vs. 71% and 43% vs. 33%, respectively).

Conclusions
The presence of red flag signs in the SL group suggests that some in this group were initially misdiagnosed as ET. Their absence within the LL group supports a robust initial diagnosis. The high degree of laterality of postural tremor and correlation with laterality of subsequent parkinsonian signs suggests that a clinical subtype of PD presents with postural tremor and that a common pathological process underpins both conditions. A larger, multi-site collaboration will help build upon these initial findings.
OLDER PARTICIPANTS CONTINUE TO BE EXCLUDED FROM PARKINSON’S DISEASE RESEARCH

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Introduction
The incidence of Parkinson's disease (PD) increases with age. A previous study of PD trials published between 1963 and 1993 demonstrated a tendency for older patients to be excluded (1). We aimed to assess the current potential for older patients to participate in ongoing studies regarding PD.

Method
Data regarding actively recruiting PD studies was extracted from the World Health Organisation Clinical Trials Registry Platform on the 2nd of April 2011. The primary outcome measure was exclusion on the grounds of an arbitrary upper age limit.

Results
206 studies included. 101 (49%) excluded participants by an arbitrary upper age limit. Mean upper limit 79.3yrs (range 64-95yrs).

Exclusion by age was significantly more common in studies with an estimated enrollment of fewer than 100 participants; OR 1.92 (95%CI 1.13-3.42) P=0.018.

Studies excluding by age had significantly lower estimated enrolment than trials without this exclusion criterion (mean estimated enrolment 141 vs 317 participants; P=0.029).

Exclusion by age was more common in surgical studies (57.1%), than in pharmacological studies (50.5%) or physio/occupational/speech therapy studies (42.9%), these differences were not statistically significant: P=0.54.

Rates of exclusion by age were not significantly influenced by private funding (P=0.158), study duration (P=0.577) or number of centres (P=0.379).

Conclusion
Exclusion of participants from PD research on the basis of an arbitrary upper age limit is common, with just under half of actively recruiting studies excluding participants on this basis. Studies with fewer than 100 participants were significantly more likely to exclude on grounds of age.

Unlike the previously published paper (1), our study is not subject to publication bias and reflects current practice in study design.

The ongoing exclusion of older patients limits the generalisation of findings from PD research to the large numbers of elderly PD patients seen in clinical practice.

EARLY MORTALITY IN AN INCIDENT COHORT OF PEOPLE WITH PARKINSON’S DISEASE AND PARKINSONISM

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Background
Mortality in people with Parkinson’s disease (PD) is higher than in controls, but it has been suggested that this difference does not occur until later in the disease process. We aim to describe early mortality compared with controls in a prospective incident cohort of people with parkinsonism and PD.

Methods
All patients identified during a four and a half year prospective incidence study of degenerative or vascular parkinsonism (defined by ≥2 cardinal motor features) were asked to consent to follow up for mortality through the NHS central register. Recruitment of an age and sex matched control from primary care lists was attempted for each patient. Baseline demographics, medical history, smoking history, disease severity (motor UPDRS) and clinical diagnosis were recorded. One year after the end of recruitment, mortality in patients and controls were compared. Analysis was carried out using Cox regression.

Results
Of 376 incident patients, 320 consented to follow-up (mean age 74, 61% men), 186 with PD (mean age 73, 58% men). 263 controls were recruited (mean age 75, 63% men). Follow-up was for a median of 21 months (IQR 12-34) for patients and 23 months (IQR 11-36) for controls. The hazard ratio for death compared with controls for patients with a clinical diagnosis of PD was 2.12 (95%CI 1.27-3.54) and for patients with other causes of parkinsonism was 3.39 (95%CI 1.99-5.76) after adjustment for age, gender, smoking, deprivation, vascular risk factors, and self reported depression and memory problems.

Conclusion
There was evidence of increased mortality in people with parkinsonism and PD compared with controls with a median follow up of less than 2 years.
PARKINSONISM INCIDENCE IN NORTHEAST SCOTLAND (THE PINE STUDY): THE INCIDENCE OF PARKINSON’S DISEASE AND PARKINONISM

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Background
There have been few high quality incidence studies of parkinsonism/ Parkinson’s disease (PD) worldwide and none from Scotland.

Aim
To calculate age and sex specific incidence figures for parkinsonism and PD in the North-East of Scotland

Methods
We performed a population based prospective incidence study of parkinsonian disorders from 37 general practices (population 317,884) in and around Aberdeen over three years. Combined with an earlier pilot study this gave a baseline population of 1,176,552 person-years. Patients were identified by direct referral by GPs and hospital doctors; by searching referral letters; and by regular searches of GP and hospital databases. Incident patients had to have ≥2 cardinal motor features with first diagnostic suspicion within the incident period. The most likely clinical diagnosis made by a movement disorder expert. Patients with drug-induced parkinsonism were excluded. Patients were followed up once a year and the diagnosis updated on clinical grounds. Incidence rates were calculated compared by age, gender and socioeconomic status.

Results
By March 2010, 376 incident patients (mean age 75 years, 232 men) had been identified. After a median of 21 months follow up, 341 (mean age 75 years, 209 men) had a clinical diagnosis of parkinsonism, of whom 206 (mean age 72 years, 121 men) had a diagnosis of PD. The crude annual incidence of parkinsonism was 29 per 100,000 (95% confidence interval 26-32) and PD 17.5 per 100,000 (95% CI 15-20). Incidence increased over the age of 60 with a peak between 80 and 89 (PD 136 per 100,000). PD was more common in men (age-adjusted ratio 1.80:1) but there was no difference by socio-economic status.

Conclusion
The incidence of PD in northeast Scotland is similar to most other high quality studies but with a higher mean age of diagnosis. Ongoing follow-up will provide important data on long-term prognosis.
THE INCIDENCE OF PROGRESSIVE SUPRANUCLEAR PALSY, MULTIPLE SYSTEM ATROPHY AND VASCULAR PARKINSONISM IN NORTHEAST SCOTLAND (THE PINE STUDY)

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Background
There have been few incidence studies of parkinsonian disorders other than Parkinson’s disease worldwide, and none in Scotland.

Methods
We performed a population based prospective incidence study of parkinsonian disorders from 37 general practices (population 317,884) around Aberdeen over three years. Combined with an earlier pilot study this gave a baseline population of 1,176,552 person-years. Patients were identified by direct referral by GPs and hospital doctors; by searching referral letters; and by regular searches of GP and hospital databases. Incident patients had to have ≥2 cardinal motor features with first diagnostic suspicion within the incident period. The most likely clinical diagnosis made by a movement disorder expert. Patients were followed up once a year and the diagnosis updated on clinical grounds. Incidence rates were calculated for progressive supranuclear palsy (PSP), parkinsonian-type multiple system atrophy (MSA) and vascular parkinsonism (VP), and compared by age and gender.

Results
By March 2010, 376 incident patients with parkinsonism (mean age 75 years, 232 men) had been identified. After a median of 21 months follow up, 42 (mean age 79 years, 29 men) had a diagnosis of VP, 18 of PSP (mean age 77.5 years, 8 men), and 19 of MSA (mean age 77.8 years, 15 men). The crude annual incidence of VP was 3.6 per 100,000 (95%CI 2.5-4.6), of PSP was 1.5 per 100,000 (95%CI 0.8-2.2), and of MSA was 1.6 per 100,000 (95%CI 0.9-2.3). Incidence of all three conditions peaked in the ninth decade. VP and MSA were more common in men.

Conclusion
This is the first prospective study to report age and gender specific incidences for these three conditions. The incidences of VP, PSP and MSA in Scotland are greater than those reported in previous studies.
DEPRESSION A MODIFIABLE FACTOR IN FEARFUL OLDER FALLERS TRANSITIONING TO FRAILTY?

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Introduction
Fear of falling is one of the most common fears amongst the community-dwelling aged and is as serious a health problem as falls themselves. Understanding fear of falling in fallers transitioning to frailty may help us identify effective strategies to reduce it in this already vulnerable group of older people. Our aim was to evaluate the psychological factors associated with fear of falling in a group of fallers transitioning to frailty when compared to robust or non-frail fallers.

Methods
Cross-sectional design where 301 fallers underwent assessment at the Technology Research for Independent Living (TRIL) Clinic in Dublin (http://www.trilcentre.org/).
Fear of falling was measured using the Modified Falls Efficacy Scale (MFES) and frailty was measured using the Biological Syndrome Model. Psychological measures included assessment of anxiety, depression, loneliness, personality factors, cognition and adverse life events.

Results
Frailer fallers had an increased fear of falling when compared to robust fallers. (p < .001) Age, female gender and lower cognitive scores were associated with greater fear of falling in the robust group. For those fallers who fulfilled either pre-frail or frail criteria, higher depression score was the only factor associated with fear of falling on multivariate analysis. The odds ratio of having case level depressive disorder (CESD-8 ≥ 4) if you were a frailer faller was significantly higher than if you were classified robust. (OR = 2.6, CI 1.3 - 5.2, p = .006)

Conclusion
Fallers at a transitional level of frailty may represent a particularly vulnerable group psychologically who would benefit most from interventional strategies with specific intervention components addressing depressive symptoms.
IMPROVEMENT IN MMSE AFTER TEMPORARY HEARING AUGMENTATION DOES NOT PREDICT FUTURE COGNITIVE DECLINE

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Introduction
Hearing impairment is common in older people and may pre-dispose to cognitive decline in later life. In our group’s previous study [MacDonald AA et al, Am J Geriatr Psych 2011], MMSE in non-delirious hospitalised patients improved with temporary hearing augmentation by a mean of 2 points. We hypothesised that those who had improved most with hearing augmentation (i.e. had the greatest functional hearing impairment) would show the greatest cognitive decline over time.

Methods
Participants in our previous study were followed up 30 months after enrolment. MMSE was assessed by a trained nurse in the participant’s home under optimal hearing conditions. We calculated the correlation coefficient of cognitive decline over time and improvement in MMSE with hearing augmentation, correcting for age, initial MMSE, Geriatric Depression Scale score and time to follow-up.

Results
Of the 134 participants in the original study’s intervention group in 2008, 53 (34 (64%) female, mean age 83.9y, SD 7.0) were recruited into the present study. Reasons for exclusion were: 67 died, 8 declined, 4 were not contactable, 1 relocated and 1 had delirium. Median MMSE was 26 (range 8-30). Surprisingly, the mean change in MMSE from baseline to follow-up was +0.28 (SD 4.9). MMSE improved in 45.3% of participants on reassessment while 18.9% displayed no change.

The partial correlation coefficient of the change in MMSE with hearing augmentation and subsequent cognitive decline was -0.10, p=0.49.

Conclusions
Improvement in MMSE with hearing augmentation did not predict cognitive decline. This questions the role of hearing impairment as a predictor of cognitive decline. However, a large proportion of patients’ MMSE scores improved over 30 months raising the possibility of initial undiagnosed delirium (even though this had been carefully screened for), or underscoring due to acute illness or survivor bias.
Introduction
Delirium is a common and serious problem, particularly amongst the hospitalised elderly. Most studies to date report epidemiology and outcomes in specialised units or selected populations, however this study reports the prevalence and impact of delirium among all hospitalised patients in an entire acute teaching hospital.

Methods
All patients in a tertiary referral hospital were included in a one-day point prevalence study of delirium in May 2010. Possible delirium was detected using screening tests for inattention. Senior psychiatrists subsequently definitively diagnosed delirium using DSM-IV criteria and the Delirium Rating Scale (DRS-R98). A review of potential associated factors was performed by chart review and six-month outcome analysis was then performed in November 2010 using hospital computerised patient records and GP telephone interviews.

Results
There were 358 in-patients in the hospital on the study day. 311 (87%) were included, 56.6% of patients being 65 years or older (n=176). 55 (17.6%) patients were diagnosed with delirium. Multivariate analysis identified advancing age and prior cognitive impairment as independent predictors of delirium (p < 0.01), consistent with previous reports. Delirium was associated with increased length of hospital stay and, at 6 months, significantly associated with increased institutionalisation and mortality even when analysis was performed controlling for these two potential confounders. For example, in patients aged over 75 years without baseline dementia (n = 46), at 6 months, patients with delirium (n = 17) had 35% LTC rates and 41% mortality, compared to 17% and 3% respectively in the non-delirious group (p < 0.01).

Conclusions
This is the largest point prevalence study in the field of delirium to date. Our results show that almost one in five hospital in-patients have delirium at any given time and that those affected are at significant risk of adverse outcomes. This highlights the burden of this under-recognised condition.
DEPRESSIVE SYMPTOMS AND OBESITY IN LATER LIFE

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Background
Depressive symptoms and obesity, both risk factors for unfavourable health outcomes, are mutually related although mixed results have been reported. We examined the relationship between obesity and depressive symptoms taking into account different measures for obesity, i.e. Body Mass Index (BMI), Waist Circumference (WC) and Waist Hip Ratio (WHR), as well as different depressive symptom clusters.

Methods
In 1284 individuals aged 50 through 70 participating in the Nijmegen Biomedical Study, we measured obesity (BMI, WC and WHR) and depressive symptoms using the Beck Depression Inventory (BDI). Principal components analysis of the BDI-items yielded two factors, representing a cognitive-affective symptom cluster and a somatic-affective symptom cluster. Multiple regression analyses corrected for confounders were conducted for each measure of obesity, with separate models testing the BDI sum score and both depression symptom clusters, respectively.

Results
We found a U-shaped relationship between BMI and depressive symptoms with increased depressive symptoms in both persons with under- and overweight (BMI < 20 kg/m² and BMI > 30 kg/m² ). In persons with a BMI ≥ 20 kg/m² the BMI was significantly associated with both the BDI sum score as well as cognitive and somatic-affective symptom clusters. The WC and WHR, however, were only associated with the somatic-affective symptom cluster.

Conclusions
Visceral obesity, which is more indicative of vascular risk than BMI, is specifically associated with somatic-affective depressive symptom cluster, which might suggest that these symptoms are primarily due to a (subclinical) somatic condition.
MMSE AND GDS SCORES: HOW STRONGLY ARE THEY CORRELATED?

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Introduction
Mini mental state examination (MMSE) and Geriatric Depression Scale (GDS) are validated screening tools for assessing cognitive impairment and depression, respectively. Pseudodementia is a recognised condition but MMSE and GDS are often not measured simultaneously. The relationship between MMSE and GDS scores has seldom been described. We determined the strength of association between MMSE and GDS scores in a community-dwelling group of older people who were participating in a separate study of the effect of hearing augmentation on MMSE scores.

Methods
MMSE and GDS (15 point questionnaire) were assessed simultaneously by a single trained nurse in the participant’s home under optimal hearing conditions. Participants with a positive Confusion Assessment Method, a validated screening test for delirium, were excluded. Spearman’s rank correlation coefficient between MMSE and GDS was calculated. Their relationship was assessed using non-parametric local linear regression smoothing with SPSS.

Results
53 participants (34 (64%) female, mean age 83.9y, SD 7.0) were included. 23 (43%) lived in their own home, 19 (36%) in care homes and 11 (21%) in sheltered housing. MMSE scores ranged from 8 to 30 (median 26) and GDS scores ranged from zero to 14 (median 5). The correlation coefficient for MMSE and GDS was -0.613 (p<0.001). The relationship was linear at high MMSE and low GDS scores. At MMSE scores of 24 or less it plateaued with an average GDS of 8 (Figure).

Conclusions
A strong association was found between MMSE and GDS. There are two potential implications; clinical and methodological. Firstly, a low MMSE score should prompt clinicians to consider underlying depression, a potentially treatable cause of cognitive impairment. Secondly, researchers and reviewers should consider interpretation of low MMSE scores alongside depression assessment.
CORRELATION BETWEEN UNHAPPY VERSUS SMILING FACES SCALE AND 15-ITEM GERIATRIC DEPRESSION SCALE IN THE ELDERLY IN NURSING HOMES

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Introduction
The Unhappy Versus Smiling Faces (UVSF) scale is a simple, vertical black-and-white visual analogue scale with faces at both ends. The aim of this study is to assess the validity of UVSF as a geriatric depression screening tool through correlation with the 15-Item Geriatric Depression Scale (GDS-15).

Methods
42 residents of a nursing home in Fremantle, Western Australia were interviewed. Each participant was asked the UVSF, GDS-15 and the Information/Orientation section of the Clifton Assessment Procedures for the Elderly (CAPE) questionnaire. The CAPE Physical Disability (CAPE-PD) score for each participant was obtained from carers. The relationships between independent and dependent variables were analysed.

Results
16 residents were depressed as assessed by the GDS-15. There was significant correlation between UVSF and GDS-15 scores (p<0.001, r=-0.632). Based on CAPE scores, physical disability and cognitive impairment was present in 81% and 64% respectively. There was significant correlation between physical disability and GDS-15 scores (p=0.001, r=0.480). No other significant associations were found with UVSF scores. Assuming an ideal GDS-15, a UVSF score of ≤ 5 would identify 92.3% of residents with depression.

Conclusion
The strong concordance of the UVSF to GDS-15, along with its simplicity and speed of administration highlights its utility as a 'case finding' tool for depression in the elderly and a potential alternative to the GDS in the future.
THE THRESHOLD FOR SENSING A RESISTIVE LOAD DURING TIDAL BREATHING RISES IN OLD AGE IN SUBJECTS WITH ASTHMA

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Introduction
In a previous study we showed that the ability to detect a rise in airflow resistance at rest was reduced in some non-asthmatic subjects in old age. This could alter the timing of rescue self-medication in patients with reversible airflow obstruction. We therefore conducted a further study to determine whether airflow resistance detection is attenuated in elderly subjects with asthma.

Methods
We studied 60 adult subjects with stable asthma (age range 20-88, 37 female). None had had an exacerbation of symptoms within the preceding 3 months. All were receiving long-term treatment (mean 4.2 years, range 1.8 – 28.0) with regular inhaled corticosteroids and rescue inhaled bronchodilators (48 subjects) or rescue bronchodilators alone. None had smoked and all had a forced expiratory volume in 1s > 70% of predicted. Progressive external airflow resistance loading was used to measure the inspiratory and expiratory load detection threshold (LDT) during tidal breathing at rest.

Results
The mean inspiratory LDT was 5.57 (4.33 SD) kPa.s/L in the 20-64 age group (n=32) and 15.6 (10.1 SD) kPa.s/L in those aged 65 and above (n=28) (p<0.0001). The inspiratory LDT was significantly correlated with age (r=0.5246, P<0.00008), mainly due to the effect of higher LDTs in about half of the subjects above the age of 65 years. There was no significant correlation with age-corrected forced vital capacity or respiratory rate.

Conclusions
The threshold for detecting external resistive loads during tidal breathing rises in old age in some, but not all, asthmatic patients. This appears to be a consequence of ageing processes rather than pathology, and might be due to a fall in proprioceptive acuity in elderly people. The finding has implications for treatment guidelines because some elderly subjects are likely to have reduced awareness of worsening airflow obstruction, and consequently delay their use of rescue treatments.
PREVALENCE OF SKIN MICROVASCULAR AUTOREGULATORY DYSFUNCTION IN PATIENTS WHO SUFFER STROKE OR TIA COMPARED TO THE GENERAL POPULATION


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Introduction
Presence of microvascular disease such as retinopathy and microalbuminuria are predictors of future stroke. Recently, microcirculatory dysfunction has also been intimated in the pathogenesis of stroke. We have previously described a distinct autoregulatory abnormality in the skin that predicts left atrial size, adverse cardiac remodelling and urinary albumin excretion rate (uAER) and accounts for associations between them in a healthy population sample. We wished to determine the prevalence of this microvascular abnormality in a cohort of patients after stroke/TIA.

Methods
This is an interim analysis of an ongoing epidemiological study comparing patients with history of recent stroke/TIA with healthy controls. All volunteers underwent basic demographic & biochemical screening and microvascular post occlusive reactive hyperaemia (PORH).

Results
56 patients were analysed (29 stroke/TIA and 27 healthy controls). In keeping with previous reports, uAER was higher in those patients with abnormal autoregulation, geometric mean 16.61 (95% CI 1.45-185.27) vs. 4.75 (2.85-7.92) p=0.03, however there was no difference between stroke survivors and controls 8.53 (95% CI 3.12-23.32) vs. 5.45 (1.96-15.17) p=0.4. The prevalence of microcirculatory dysfunction was higher in stroke survivors compared to controls (Table 1).

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<td>n</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>Age</td>
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<td>66±6</td>
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<td>Abnormal autoregulatory response</td>
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Table 1 – The frequency of microcirculatory autoregulatory dysfunction in those with and without stroke/TIA

Conclusion
Half of the stroke/TIA survivors had abnormal microcirculatory autoregulatory response; 2.5 fold higher than the general population. From this study, it is impossible to determine cause and effect, however previous studies have demonstrated association between this autoregulatory dysfunction, left atrial size, concentric left ventricular remodelling and microalbuminuria, each independent predictor of stroke. Therefore, we believe this may represent a pathogenic step in the development of micro-vascular disease, which, in turn, is implicated in the aetiology of stroke.
THE PREDICTIVE ADAPTIVE RESPONSE: A LIFE HISTORY MODEL OF BICYCLUS ANYNANA

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Introduction
The predictive adaptive response (PAR) is a hypothesis that explains the development of age related disease in humans from an evolutionary perspective. It is suggested that early nutritional status (in the womb) acts as a cue to direct development towards an optimal phenotype, which influences health later in life. The applicability of this concept to human life histories has been hampered by lack of convincing datasets that show the effect. In contrast, insects which live in seasonal environments are more suitable for testing the validity of the basic concepts of PAR. For instance, we have manipulated the larval and the adult stage environment of the tropical butterfly Bicyclus anynana in the laboratory. Individuals that were restricted in food during the larval stage coped better with forced flight during the adult stage compared to individuals with an optimal larval stage, suggesting that this phenotypic plasticity enhanced fitness.

Methods
We have tested whether this response could be adaptive in a field situation using an energy allocation model. All stages of the life history of the butterfly were modeled, and the optimal state dependent strategic decisions were calculated using dynamic programming. This allowed us to test whether in specific seasons the behavior of the individuals as observed laboratory could be adaptive in natural environments.

Results
The results from the model confirmed that the wet season individuals coped better with flight stress when they were restricted in nutrition during early development compared to individuals with an optimal larval stage, which was facilitated by altered allocation patterns during the pupal stage.

Conclusion
We conclude that for B. anynana early stage cues can direct development towards an optimal phenotype that influences life history later in life. In the future state dependent modeling could be used to study whether developmental plasticity is adaptive for longer-lived species with less predictable environments.
Computational Model of Pathological Cardiac Hypertrophy

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Introduction
Fetal undernutrition has a well established link to the programming of cardiovascular disorders in the adult but the underlying causes are ill understood. We have developed a computational model for pathological cardiac hypertrophy describing the transition of the cardiac system from an initial adaptive overgrowth to a maladaptive condition linked to compromised function and cardiac failure. A fundamental factor regulating hypertrophy is the phosphatase calcineurin and our model focuses on the different mechanisms regulating this molecule. One of these is the family of FoxO transcription factors which have been linked to the activation of an atrophy program counter-balancing hypertrophy.

Methods
We have developed a dynamic biochemical network model of the intracellular processes governing hypertrophy within a cardiomyocyte. We have parameterized the model with extensive time course data using a H9C2 cardiomyoblast cell line. We have used the model to investigate interventions that can rescue hypertrophy and tested predictions in the same cell line.

Results
Our results to date suggest that irreversible cardiac hypertrophy can be induced by the signaling network represented in the model. This network has clear links with nutritional status and the model offers some insight into how early life experience may affect the lifetime risk of hypertrophy. The model can be readily extended and we are currently investigating adding the molecular mechanisms that govern the metabolic changes associated with hypertrophy.
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**MUSCLE CHARACTERISTICS AND REGENERATIVE POTENTIAL IN PATIENTS WITH CHRONIC SYSTEMIC INFLAMMATION**

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**Introduction**

The age-related loss of skeletal muscle mass (sarcopenia) is a major contributor to disability and mortality. A decline in satellite cell number and regenerative potential, as well as muscle fiber type II atrophy and oxidative stress induced lipofuscin accumulation has been reported to occur during ageing. Clinical evidence for a strong correlation between chronic inflammation and age-related muscle wasting is increasing. This study aims to determine the impact of chronic systemic inflammation on age-related muscle characteristics and the in vitro regenerative potential of satellite cells. As a model for chronic inflammation, we examine muscle biopsies from patients with rheumatoid arthritis (RA) who have a significantly higher pro-inflammatory profile when compared to patients with osteoarthritis (OA).

**Methods**

During elective knee replacement surgery, two muscle biopsies were taken from the musculus vastus lateralis from patients with RA (n=10) and OA (n=27). An ATPase method was used to determine fiber type II atrophy. Lipofuscin accumulation was determined by auto-fluorescence measurement and satellite cell number by a Pax7 and NCAM labeling method. Regenerative potential was determined by measuring myogenic purity, viability, growth speed, maximum proliferative capacity, differentiation, mean telomere length and senescence/apoptosis associated protein expression of satellite cells in vitro.

**Results**

Mean age for the RA group was 63.6 years and for the OA group 66.0 years, with an equal distribution of females. Between both groups, no significant differences were found in the level of type II atrophy, lipofuscin accumulation, the number of satellite cells and their in vitro regenerative potential. Mean telomere length was slightly shorter in RA patients compared to OA patients.

**Conclusions**

We provide new evidence that chronic systemic inflammation does not affect age-related muscle characteristics, nor the in vitro regenerative potential of satellite cells. Future research should focus on inflammatory induced modifications of the muscle’s microenvironment in vivo.
DEVELOPMENTAL INFLUENCES ON SKELETAL MUSCLE GENE EXPRESSION IN COMMUNITY DWELLING OLDER MEN

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Introduction
Consistent relationships between lower birthweight and reduced adult grip strength, a key component of sarcopenia, have been demonstrated. Furthermore, a recent study has shown that low birthweight is associated with a reduced muscle fibre score in older men. However, the underlying molecular mechanisms are not known. Anabolic and catabolic pathways are important regulators of adult muscle but whether they are associated with growth in early life has not been previously explored. Our aim was to investigate the relationship between small size at birth and gene expression of key intracellular signalling molecules in skeletal muscle in later life.

Methods
Vastus lateralis muscle biopsies were obtained from men aged 68-76 years with lower (≤ 2.64kg, n=7) and higher (≥ 4.54 kg, n=12) birthweight. TaqMan PCR arrays were used to determine the expression profiles of 44 genes implicated in the regulation of skeletal muscle. Fold changes in gene expression were determined in the higher, relative to the lower birthweight group. Median levels of gene expression were compared using Mann-Whitney U tests.

Results
The genes MAPK8, IGFBP3 and LPL (lipoprotein lipase) showed fold changes of 4.90, 1.99 and 2.07 respectively (Mann-Whitney [M-W] p=0.144, p=0.031, p=0.073 respectively). The gene IL-15 showed a fold change of 0.51 (M-W p=0.042). There were no other significant fold changes in gene expression.

Conclusions
This is the first study of skeletal muscle gene expression in older men with historical records of birthweight. The results show that skeletal muscle of older men with higher birthweight display expression profiles associated with an increase in inflammation and apoptosis (MAPK8), cell growth (IGFBP3) and fat metabolism (LPL) whilst exhibiting lower expression profile of IL-15, a gene implicated in immune cell activation. Replication studies are now needed.
PREPAREDNESS FOR THE CAREGIVING ROLE: A PROTECTIVE FACTOR AGAINST DEPRESSION AND THE DESIRE TO INSTITUTIONALISE FOR OUR OLDER CAREGIVERS

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Introduction
Almost half of all dementia caregivers meet diagnostic criteria for depression. Knowledge of contributing factors allows us to intervene with supportive strategies. Preparedness is defined as perceived readiness for the caregiving role, it has not been sufficiently examined in dementia caregivers despite our clinical imperative to prepare them for their role. Our objective was to evaluate the relationship between caregiver preparedness, depression and the desire to discontinue care at home in dementia caregivers.

Methods
Primary caregivers of cognitively impaired patients were recruited in the course of the Enhancing Care in Alzheimer’s disease (ECAD) study. Caregiver depression was measured using the Center for Epidemiologic Studies Depression scale (CES-D 10). The desire to discontinue care was captured using the Desire to Institutionalise scale and preparedness for caregiving was measured with the Preparedness scale of the Family Care Inventory. The relationship between these measures was investigated using multiple regression analysis.

Results
108 caregivers were recruited, 56% fell into the category of older caregiver (≥ 65) in whom preparedness and neuroticism were the key predictors of depression scores even when controlling for a history of depression and severity of dementia. (p ≤ .001, p = .004, R2 = 0.497). For younger caregivers neurotic traits and presence of neuropsychiatric symptoms were the key predictors of depression. (p ≤ .001, p= .012, R2 = 0.677). A significant relationship was found in older caregivers between depression and the desire to discontinue care in the home; however examination of mediation effects revealed that it was the extent of caregiver preparedness that fully mediated this relationship. (Sobel test, z = 5.49, p≤ .001).

Conclusion
Caregiver preparedness predicts depression in older caregivers and represents a key factor in the desire to institutionalise. Interventions aimed at preventing depression in older caregivers and reducing early institutionalisation of dementia patients should consider caregiver preparedness be addressed.
THE ROLE OF DEPRESSION IN PREDICTING THE TIME TO DEVELOPMENT OF MILD COGNITIVE IMPAIRMENT: A COHORT STUDY

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Introduction

We set out to establish whether, in a population based cohort with normal cognition, the severity of depressive symptoms at baseline was related to the time taken for mild cognitive impairment (MCI) to develop and whether it interacted with other potential risk factors, including ApoE ε4 status and demographic and cognitive variables.

Methods

A cohort of 126 cognitively normal subjects were assessed for depressive symptoms at baseline using the Geriatric Depression Scale (GDS) then followed up over a 20 year period with regular cognitive assessments. 50 subjects developed MCI during follow up. We used the Accelerated failure time (AFT) model adapted to interval-censored data to model whether GDS and other factors, including ApoE ε4 status, predicted the time to development of MCI. The study was approved by the local ethics committee (COREC C1656).

Results

In ApoE ε4 non-carriers the degree of depressive symptoms measured by GDS at baseline was a predictor of the time to develop MCI in that an increase in GDS of one standard deviation (3.85) was associated with shortening of the time to conversion to MCI by 34% (p-value = 0.0024). This relationship remained statistically significant even after controlling for cognitive and other confounding variables. The relationship was not significant in ApoE ε4 carriers.

Conclusion

Depressive symptoms, as measured with the GDS, predict time to development of MCI in cognitively normal people who do not carry the ApoE ε4 allele. This finding may explain the conflicting results of other studies of the relationship between depression and incident MCI. It may also have a clinical application in helping to identify people at high risk of developing MCI as a target for future disease modifying therapies.
HOW HAS CARE HOME PRESCRIBING CHANGED IN 10 YEARS?

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Introduction
Elderly patients are susceptible to adverse drug events (ADEs) for a number of reasons. Inappropriate prescribing (IP) is known to increase the risk. The application of explicit tools has been successful in identifying cases of IP with the newly developed STOPP/START criteria now gaining acceptability. The objectives were to compare prescribing habits in 2 care home populations separated by a 10-year period and to identify significant trends suggesting appropriate or inappropriate prescribing using the prevalence of use of specific drug classes and the application of STOPP/START criteria.

Methods
Data were collected from South London care homes in 1998 and 2008. Trends in prescribing of antipsychotics, bisphosphonates and cardiovascular medication were analysed. Inappropriate prescribing was derived from the application of the STOPP/START criteria where clinical data were not required.

Results
Prescriptions were obtained from 2068 residents across 32 homes. Baseline characteristics were similar for both data sets. Prevalence of prescribing of antipsychotics decreased from 27.7% to 18.6% (p=0.001). Statistically significant increases of prescribing prevalence for proton pump inhibitors- 1998:126/1815 (6.95%), 2008:89/253 (35.2%) (p=0.001) with H2 receptor antagonist prescribing falling from 167/1815 (9.2%) in 1998 to only 1/253 (0.4%) in 2008 (p=0.001). ACE inhibitor prescribing tripled- 1998:138/1815 (7.6%), 2008: 58/253 (22.9%) (p=0.001), bisphosphonates increased- 1998:5/1815 (0.3%), 2008:49/253 (19.4%) (p=0.001) and antiplatelets doubled- 1998:559/1815 (30.8%), 2008:145/253 (57.3%) (p=0.001); with 943 counts of IP affecting 10.6% of 1998 prescriptions falling to 9.8% in 2008.

Conclusions
We have demonstrated reductions in neuroleptic prescribing prior to the 2009 publication of the National Dementia Strategy and a rise in prescribing of ACEIs, antiplatelet drugs and bisphosphonates. Inappropriate prescribing is reducing, although still prevalent, amongst patients in care homes.
ROUTINE USE OF THE STOPP-START TOOL COULD REDUCE THE NUMBER OF INAPPROPRIATE PRESCRIPTIONS IN CARE HOME RESIDENTS

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Introduction
Inappropriate prescribing in care homes is common. We used STOPP-START, a clinical tool designed to facilitate appropriate prescribing, to evaluate the prescriptions of a cohort of care home residents.

Methods
Data were collected as part of the Medical Crises in Older People Care Homes Outcome Study (MCOP-CHOS) - a prospective cohort study recording health status and healthcare resource use in residents of ten Nottinghamshire homes selected for representativeness on the basis of residential status and dementia registration. Prescriptions were recorded from medication administration records and diagnoses from GP records at recruitment. STOPP-START was applied independently by a GP and geriatrician, with differences resolved by consensus.

Results
227 residents were studied. The mean number of prescriptions and diagnoses per resident were 7.85 (range 0-39; SD 4.13) and 6.11 (range 1-15; SD 2.91) respectively. There were 320 STOPP and 252 START indications. The mean number of STOPPs per resident was 1.41 (range 0-8; SD 1.53) with the most common indications being duplicate prescription, opioids in dementia, proton pump inhibitors at high dose and aspirin without an indication (60, 37 and 35 STOPPs respectively). The mean number of STARTs per resident was 1.11 (range 0-6; SD 1.20) with the most common being antihypertensives, beta-blockers for angina and calcium/vitamin D for osteoporosis (41, 28 and 28 STARTs respectively). Median length of residence (LoR) in the care home was 79 days. There was a weak but significant negative correlation with STARTs and LoR (Spearman's rho=-0.18; p<0.01) but not with STOPPs.

Conclusions
STOPP-START is a screening tool and consideration of individual patient circumstances would be necessary before implementing the identified changes. However, there was evidence of both over and under-prescribing. The net difference between STOPPs and STARTs suggests that routine use of the tool would reduce the number of prescriptions.