Background Robots are increasingly being used to support management in certain areas of healthcare education. However, the potential application of robotics in palliative care education or simulation has not been explored.
Aim This collaborative project between Computer Science and Palliative Care aimed to program a robot to convey emotion in response to human interaction, in order to develop a robotics program for potential use in palliative care education.
Methods The Nao robot is an autonomous, programmable humanoid robot that is controlled by a Linux-based operating system. The robot has capabilities for voice recognition and sound localisation (in-built microphones), multilingual text-to-speech synthesis (in-built speakers) and vision, which include facial and shape recognition (in-built high definition cameras). The robot was programmed by a computer scientist to convey ten emotions (relaxed, anger, withdrawn/sad, lightly crying, heavy sobbing, happy/excited, scared, tired, laughing and dancing) through its posture, movement and speech, in response to human-voiced questions and interaction.
Results The robot was successfully programmed to convey the ten target emotions in response to direct questions posed by a human subject. Discussions around the robot's displayed emotions were explored (e.g. "why are you sad?") to assess the potential of human-computer interaction. The robot continues to acquire a growing lexicon of vocabulary, in addition to an increasing number actions and responses. The robot acts both autonomously and through direct instruction of the operator.
Conclusions We have successfully programmed a robot to interact with humans and display emotional responses. This technology could potentially be used to develop innovative ways to engage individuals in discussion about palliative care issues and create opportunities to use robots for interactive educational activity. Consequently, further research can explore the potential to use robotic technology in palliative care for education, and to promote discussion with the public (e.g. children) and healthcare professionals.

O-8 IN SILICO MODELLING OF THE PLASMA MORPHINE CONCENTRATION AND THE LEGAL DRIVING LIMIT

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Background The legal blood morphine concentration for driving in England and Wales has been set at 80 µg/L, based on consensus. There is little information regarding the doses likely to cause levels above this limit. Knowledge of the dose-concentration relationship would aid doctors' prescribing decisions and individualised advice. The aim of this study was to investigate the *in silico* relationship of oral morphine dose and plasma concentration in the context of a morphine plasma concentration of 80 µg/L in different patient groups.
Methods A dose-concentration *in silico* model for different genders, ages and morphine formulations was generated using Simcyp, a population-based pharmacokinetic simulator. This software simulates absorption and metabolism in a physiology based modelling platform, calculating a range of steady state dose-plasma concentrations across a diverse population. The morphine model created was validated against clinical pharmacokinetic data for oral immediate-release and modified-release preparations. This model calculates only morphine concentrations not its active metabolites; in line with the driving law.
Results Older age, female gender, modified-release formulation and renal dysfunction were associated with higher plasma concentrations at steady state. Except in females over 80 years old or in people with impaired renal function, morphine doses below 120 mg/d were unlikely to result in a morphine plasma concentration above 80 µg/L. In males less than 40 years old with normal renal function, doses up to 250 mg/d were unlikely to result in a morphine plasma concentration above 80 µg/L. An immediate-release morphine dose taken alongside modified-release morphine leads to a higher plasma concentration.
Conclusion These derived morphine dose-concentrations could provide a reference frame for the prescribing clinician. However, the decision and communication to the patient must primarily take into account clinical judgment, the individual patient's level of impairment and insight for any given dose and plasma concentration.

O-9 PHASE 3 STUDY TO EVALUATE THE EFFICACY AND SAFETY OF NALDEMEDINE FOR THE TREATMENT OF OPIOID-INDUCED CONSTIPATION (OIC) IN CANCER PATIENTS

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Background While opioid analgesics play a central role in managing cancer pain, opioid-induced constipation (OIC) is one of the most common side effects. Naldemedine is a peripherally-acting µ-opioid receptor antagonist being developed to treat OIC.
Methods Studies consisted of a 2 week randomised double-blind placebo-controlled treatment period (DBT) followed by a 12 week open-label extension (EXT). In DBT, cancer patients with OIC, defined as ≤5 spontaneous bowel movements (SBMs) 14 day before randomization, were randomised 1:1 to oral naldemedine 0.2 mg QD or placebo. Patients who completed DBT could receive naldemedine in EXT. The primary endpoint of DBT was SBM responder rate (percentage of patients with ≥3 SBMs/week and an increase from baseline of ≥1 SBM/week) in the naldemedine group compared with placebo. The primary objective of EXT was to assess long-term safety.
Results A total of 193 patients were randomised in DBT, and 131 patients were enrolled in EXT. In DBT, significantly higher SBM responder rate was observed in naldemedine compared with placebo (71.1% vs 34.4%, respectively; $p<0.0001$). Naldemedine improved change from baseline in the frequency of SBMs (5.16 vs 1.54, $p<0.0001$), SBMs with a feeling of complete evacuation (2.76 vs 0.71, $p<0.0001$) and SBMs without straining (3.85 vs 1.17, $p=0.0005$) per week. Incidences of adverse event (AE) reported during treatment period in DBT were 44.3% and 26.0% in naldemedine and placebo,

respectively. Diarrhoea was the only AE observed in ≥5% of patients in either group (19.6% vs 7.3%). No clinically meaningful changes in opioid withdrawal scores and pain intensity were observed in both groups. In EXT, 107 patients completed a 12 week treatment with naldemedine 0.2 mg QD, and the safety profile was similar to that in DBT.
Conclusions Naldemedine improved the symptoms of OIC and was generally well tolerated.

O-10 AN OBSERVATIONAL STUDY OF THE PREVALENCE OF VIVID DREAMS, NIGHTMARES AND SLEEP/NIGHT TERRORS IN PATIENTS WITH ADVANCED CANCER AND THEIR ASSOCIATION WITH OPIOD ANALGESICS

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Aim The aim of this study was to investigate vivid dreams, nightmares and sleep/night terrors in patients with advanced cancer.
Methods The study was a multicentre, prospective observational study. Single interviews were conducted with 174 patients and data were collected on their demographics, cancer diagnosis, co-morbidities, current medication and patient's assessment of the ECOG performance status. In addition data were collected on the frequency of vivid dreams, nightmares and sleep/night terrors, as well as the patient's sleep quality and physical and psychological symptoms (Memorial Symptom Assessment Scale and Pittsburgh Sleep Quality Index).
Results Sixty (34%) patients reported vivid dreams, 31 (18%) patients reported nightmares and 14 (8%) patients reported sleep/night terrors. Vivid dreams were associated with presence of psychological symptoms, but not physical symptoms (p=0.315). Nightmares were associated with presence of both physical and psychological symptoms. None of these phenomena were associated with the use of opioid analgesics.
Conclusion Vivid dreams are relatively common in patients with advanced cancer, although nightmares and sleep/night terrors occur less frequently in this population (and no more frequent than in the general population). Vivid dreams appear to be primarily associated with psychological problems, and so patients reporting these should be screened for psychological problems. Similarly, patients with nightmares should be screened for psychological problems, and have their physical symptoms adequately controlled.

Poster Presentations

P-11 WHAT DO END STAGE RESPIRATORY DISEASE PATIENTS GET FROM HOSPICE SERVICES?

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Background Non-malignant respiratory diseases (NMRD) are increasing in incidence and prevalence with figures rises with our globally ageing population. This coupled with multimorbidity is likely to increase the needs of individuals from a supportive and palliative care approach. The challenge within fiscally constraint health economies, is to ensure equity of care across all care settings so the individual gets care of an expected standard rather than duplication or omissions within the current services delivering the care.
Aim To explore how patients with non-malignant respiratory diseases traverse through the hospice organisation and how consistent is this approach across 3 hospice sites.
Method A retrospective case note of review of patients referred with NMRD to a hospice organisation within 1 year.
Results 169 case notes were identified with a convenient sample of 100 explored for further analysis. Length of contact varied for days to months (18) with median being 30–90 days. The majority of patients (97) had COPD, were Males (59) with median age 78 years. 63 patients had multi-morbidity (>2) with Heart Failure, IHD and Cancer being the most common. Only 60 cases had an identified carer with 50% having external professional help. Breathlessness (81) and anxiety (34) were the common presenting symptom with the vase majority of patients having a formal holistic clinical review (60), medication review (65) and attendance at a breathlessness management group (58). Opioids were commonly taken (57) along with benzodiazepines (58). Advance care planning (ACP) was attempted in the majority of cases with DNAR (63), PPOD (49) with only 15 cases explicitly reporting ceilings of care.
Conclusions Hospice care and the need for supportive and palliative care needs to dovetail with existing services and articulate clearly what and when it intends to provide input. Prognostic uncertainty, awareness and parallel planning for EOLC requires a whole systems approach.

P-12 USE OF ANXIOLYTIC AND ANTIPSYCHOTIC MEDICATIONS IN THE DYING PHASE AMONGST HOSPICE INPATIENTS

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Background Terminal agitation and delirium at the end of life are common.[1]Whilst anxiolytic and antipsychotic medications are widely used during the last week of life, clinical evidence regarding their use is limited.[2,3] Our aim was to audit current practice at two inpatient units.
Methods A retrospective audit was carried out of all patients who died during a four-month period (June to October 2015) at two hospices (n=75). Data were collected on whether anxiolytic and/or antipsychotic medications were used in the last week of life, the drug(s) and dose(s) administered, and the indication. Use of Levomepromazine and Haloperidol for nausea and vomiting were excluded. Audit standards were set according to guidance in the PCF-5[4] and a compliance target of 80% was set.
Results The median age was 79 years (range 32 to 94) and 80% of patients had a primary diagnosis of cancer. In total, 91.7% (n=33) of patients at Hospice 1% and 82.1% (n=32) at Hospice 2 received anxiolytic and/or antipsychotic medications during the last week of life. The most common indication at Hospice 2 was terminal agitation (n=16, 50%), compared with mixed terminal agitation and delirium (n=11, 33.3%) at Hospice 1. Midazolam was the most widely used drug (used in 77.8% of patients at Hospice 1, n=28, and 74.4% of patients at Hospice 2, n=29). Haloperidol was more widely used at Hospice 1 whereas Levomepromazine