

Real-world clinical impact of coronary computed tomography angiography-derived fractional flow reserve

Coronary computed tomography angiography with selective coronary computed tomography angiography-derived fractional flow reserve is increasingly being used for non-invasive assessment of patients with stable chest pain. The prospective ADVANCE registry is looking to determine the impact of this investigation on decision making, downstream invasive coronary angiography, revascularization and major adverse cardiovascular events.

In a large international multicentre population, computed tomography angiography-derived fractional flow reserve modified the treatment recommendation in two-thirds of subjects compared to coronary computed tomography angiography alone, was associated with less negative invasive coronary angiography, predicted revascularization, and identified subjects at low risk of adverse events through 90 days (<https://doi.org/10.1093/eurheartj/ehy530>).

How the modern team can learn together in the busy workplace

A new report from the Royal College of Physicians will help health-care teams make the most of daily learning opportunities in the workplace (<https://www.rcplondon.ac.uk/file/11710/download?token=LaFaf1XJ>).

High-quality learning opportunities are essential for clinicians in training, both for the successful completion of their training and to ensure high standards of care, but learning can be affected by pressures and insufficient attention to learning opportunities provided by day-to-day practice.

The report explains how to increase the use and effectiveness of opportunistic learning on the wards and in clinics, with an emphasis on team learning, while also valuing the power of individuals, and the importance of dedicating time to professional development.

Workplace warning signs from national survey must be heeded to protect training

High quality on-the-job training for doctors in the UK could be at risk if warning signs in the workplace go unheeded, cautions the General Medical Council.

The alert comes as the regulator publishes a full review of its latest annual national training surveys (https://www.gmc-uk.org/-/media/documents/training-environments-2018_pdf-76667101.pdf), which collate the views and experiences of more than 70 000 doctors in training and senior doctors who act as trainers.

The General Medical Council found that while trainers and training organizations continue to provide high quality medical education, trainees rated their experience as worse when they had poor handovers, inadequate inductions and gaps in rotas. They believe that these areas should be seen by employers as indicators of more significant problems that can affect the quality of trainee doctors' education and development.

Commenting on the findings, Professor Ravi Mahajan, President of the Royal College of Anaesthetists, said: 'The report highlights

how heavy workloads affect patient safety and fatigue is a contributing factor that collectively accounts for many doctors feeling burnt out. We're pleased ... [that] collaborative action being taken to address this issue.'

Danny Mortimer, chief executive of NHS Employers, said: 'It is reassuring to see the majority of doctors in training are satisfied with the standard of teaching and clinical supervision they receive. However, it is concerning that both trainers and doctors in training reported that intense workloads can disrupt training and possibly lead to some trainees working beyond their clinical knowledge. The investment announced for the NHS has to help alleviate the pressure on our services and teams.'

Mr Mortimer concluded: 'We will continue to work with employers to ensure doctors feel supported within their working environments, and they will want to review their survey data with their doctors to agree areas where changes can be made to improve the experience of doctors in training.'

Place of death and factors associated with hospital death in patients who have died from liver disease

A national population-based, observational study using the National Death Registration Database from the Office for National Statistics, 2001–14, examined the place of death and factors associated with hospital death for people who died from liver disease (Peng et al, 2019). All non-accidental adult deaths (hospital and non-hospital) from liver disease in England were included. Explanatory variables were underlying cause of death, contributory causes of death (number and specific causes), age at death, sex, marital status, year of death, index of multiple deprivation, rural or urban settlement, and residential region.

A total of 135 953 decedents were included, of whom 56 065 (41.2%) died from alcohol-related liver disease. Annual deaths from liver disease increased from 7811 in 2001 to 11 017 in 2014. Hospitals were the main place of



Dr Jen-Kuei Peng, Cicely Saunders Institute of Palliative Care, Policy & Rehabilitation, King's College London, London

death (66.9%; 95% confidence interval 66.6–67.1) for patients who died from liver disease. The proportion of hospital deaths reduced from 71.5% in 2001 to 60.0% in 2014.

The authors concluded that the high risk of hospital death in patients with sepsis, hepatorenal syndrome or peritonitis warrants further investigation, and the low chance of hospital death in patients with alcohol-related disorders also needs to be

explored. Prevention strategies and end-of-life care services are urgently needed to prevent and tackle harms from liver disease.

Peng JK, Higginson IJ, Gao W. Place of death and factors associated with hospital death in patients who have died from liver disease in England: a national population-based study. *Lancet Gastroenterol Hepatol.* 2019 Jan;4(1):52–62. [https://doi.org/10.1016/S2468-1253\(18\)30739-0](https://doi.org/10.1016/S2468-1253(18)30739-0)

Outcomes of medically managed patients with myocardial infarction

A study compared outcomes associated with medical management of ST-elevation and non-ST-elevation myocardial infarction in patients presenting to hospitals with and without onsite catheterization facilities (Kaul et al, 2018).

All patients with ST-elevation myocardial infarction ($n=10\,563$) or non-ST-elevation myocardial infarction ($n=15\,358$) in Alberta, Canada between April 2010 and March 2016 were categorized according to availability of catheterization facilities at the hospital they presented to and their management strategy (medically managed with or without coronary angiography).

Overall, 51% presented to hospitals without catheterization facilities, and 34% were managed medically (18% without coronary angiography and 16% after coronary angiography). Rates of medical management were higher at hospitals without *vs* those with catheterization facilities. However, both the rate of presentation to hospitals without



Dr Padma Kaul, Professor, Department of Medicine, School of Public Health, Alberta, Canada

catheterization facilities and medical management differed by type of myocardial infarction. The lack of catheterization facilities at the presenting hospital was associated with a lower risk of mortality among patients medically managed after coronary angiography, but only in patients with non-ST-elevation myocardial infarction.

Lead author Dr Padma Kaul, Professor, Department of Medicine, School of Public Health, Alberta, Canada,

commented: 'Our population-based study shows that in the "hub-spoke" model of care in Alberta, Canada, patients presenting to a hospital without catheterization facilities are appropriately triaged and have similar outcomes to patients presenting at hospitals with cardiac catheterization facilities.'

Kaul P, Savu A, Hamza S et al. Outcomes of medically managed patients with myocardial infarction. *Eur Heart J Acute Cardiovasc Care*. 2018 Nov 13;2048872618812135. <https://doi.org/10.1177/2048872618812135>

Omission is a common cause of medication administration errors leading to death

Medication administration errors leading to death are common with anticoagulants and antibiotics in particular, according to a study that analysed incidents reported in England and Wales (Härkänen et al, 2018).

Medication administration errors reported in acute care in 2007–16 ($n = 517\,384$) were obtained from the National Reporting and Learning System for England and Wales. Incidents reported as resulting in death ($n = 229$) were analysed. Drugs were classified by two researchers using the British National Formulary. Drug categories were described by medication administration errors' year, location, patient age, and error category based on the incidents' original classification.

Errors were most often reported on wards (66.4%), and in patients aged over 75 years (41.5%). The most common error category

was omitted medicine or ingredient (31.4%), and the most common drug groups were cardiovascular (20.1%) and nervous system (10.0%). Most errors in patients under 12 years of age concerned drugs used to treat infection, whereas cardiovascular drugs were most common among other age groups.

In order to prevent these most serious of medication administration errors, interventions should focus on avoiding dose omissions, and administration of drugs for patients over 75 years old, as well as safe administration of parenteral anticoagulants and antibacterial drugs.

Härkänen M, Vehviläinen-Julkunen K, Murrells T, Rafferty AM, Franklin BD. Medication administration errors and mortality: Incidents reported in England and Wales between 2007–2016. *Res Social Adm Pharm*. 2018 Nov 22. pii: S1551-7411(18)30635-1. <https://doi.org/10.1016/j.sapharm.2018.11.010>

Commission on the Future of Surgery report

The Commission on the Future of Surgery (<https://futureofsurgery.rcseng.ac.uk/>) identified advances in medicine and technology that are likely to change surgical care. It analysed evidence and assessed the implications of such developments for patients, the surgical profession and the health-care system.

Too much or too little sleep linked to increased risk of cardiovascular disease and death

An international study of over 116 000 people (<https://doi.org/10.1093/eurheartj/ehy695>) found that people who slept for longer than the recommended 6–8 hours a day had an increased risk (ranging from 5–41%) of dying or developing cardiovascular diseases. They also found a 9% increased risk for people who slept a total of 6 or fewer hours, but this was not statistically significant.

National Cardiac Audit Programme

The National Cardiac Audit Programme's annual report (<https://www.nicor.org.uk/national-cardiac-audit-programme/>) has found that application of diagnostic tests remains high, prescribing rates of key medicines for those with heart failure and a reduced left ventricular ejection fraction have increased, and mortality remains static, albeit high.

Restoring forearm rotation in an amputee with a transradial osseointegrated prosthesis

A new artificial joint has restored important wrist-like movements to a forearm amputee, something which could dramatically improve amputees' quality of life (<https://doi.org/10.1109/TNSRE.2018.2880948>).

The new artificial joint works with an osseointegrated implant system. An implant is placed into both the ulna and radius and then a wrist-like artificial joint acts as an interface between these two implants and the prosthetic hand. Together, this allows pronation and supination, giving much more naturalistic movements, with intuitive natural control and sensory feedback.

The joint's functionality was assessed in a patient by means of the Southampton Hand Assessment Procedure (SHAP) and the Minnesota Manual Dexterity test (MMDT), which indicated that axial rotation of the implants is required to preserve forearm rotation, to distribute loads equally over the two implants and to enable loading of the implants without unpleasant feelings for the patient. Higher function was recorded when the attachment device enabled forearm rotation.

Chemicals in personal care and household products linked to earlier puberty in girls

Certain chemicals in personal care and consumer products are associated with altered pubertal timing in animal studies. Researchers used data from the Center for the Health Assessment of Mothers and Children of Salinas longitudinal cohort study to assess their effects in humans (Harley et al, 2018).

The researchers measured concentrations of three phthalate metabolites, methyl and propyl paraben and four other phenols in urine collected from mothers during pregnancy and from children at 9 years of age. Pubertal timing was assessed among 179 girls and 159 boys every 9 months between the ages of 9 and 13 years.

In girls, earlier onset of pubic hair development and earlier menarche were linked to increased concentrations of various of these chemical. Regarding peripubertal biomarkers earlier breast development, pubic hair development and menarche were seen with methyl paraben, earlier menarche with propyl paraben, and later pubic hair development with 2,5-dichlorophenol. In boys no associations were seen with prenatal urinary biomarker concentrations and only earlier genital development was seen with propyl paraben.



Dr Kim Harley, Associate Professor in Public Health, Center for Environmental Research and Children's Health, School of Public Health, University of California, Berkeley, CA, USA

Associations of peripubertal measurements with parabens may reflect reverse causality: children going through puberty early may be more likely to use personal care products. This study contributes to a growing literature that suggests that exposure to certain endocrine disrupting chemicals may impact timing of puberty in children.

Lead author Dr Kim Harley, Associate Professor in Public Health, Center for Environmental Research and Children's Health, School of

Public Health, University of California, said: 'We already suspect that certain chemicals that are widely used in personal care products – like phthalates, parabens and triclosan – are endocrine disruptors. Additionally, we know that endocrine disrupting effects are particularly important during specific critical windows of development, such as in the womb or during puberty. This study is important because it is one of the first studies to look at human exposure in the womb and because it gives us a chance to examine exposures both in the womb and at puberty.'

Harley KG, Berger KP, Kogut K et al. Association of phthalates, parabens and phenols found in personal care products with pubertal timing in girls and boys. *Hum Reprod.* 2018 Dec 4. <https://doi.org/10.1093/humrep/dey337>

Risk factors for falling are different in older men vs older women

Different factors were associated with falling in men vs women in a Swedish study of 3112 community-dwelling adults aged 60 years and older (Ek et al, 2018).

An injurious fall was defined as a fall that required inpatient or outpatient care. Information was collected on participant and exposure characteristics using structured interviews, clinical examinations, and physical function tests at baseline.

In the short term, living alone, needing help with activities of daily living, and previous falls were independently associated with injurious falls in women,

whereas low systolic blood pressure, impaired ability to rise from a chair and previous falls were associated with injurious falls in men.

Long-term risk factors were underweight, cognitive impairment, use of medications associated with an increased risk of falling, and needing help with activities of daily living for women, and smoking, heart disease, impaired balance and a previous fall for men.

The results suggest that it may be possible to identify older men and women at short- and long-term risk of injurious falls. 'Despite the numerous

studies on risk factors for falls in older adults, studies examining sex differences are scarce,' said lead author Dr Stina Ek, of the Karolinska Institutet, in Sweden. 'The results of our study suggest that men and women have different fall risk profiles. If we take these sex differences into consideration in screening and prevention programmes for falls, we may potentially enable a better person-centred approach.'

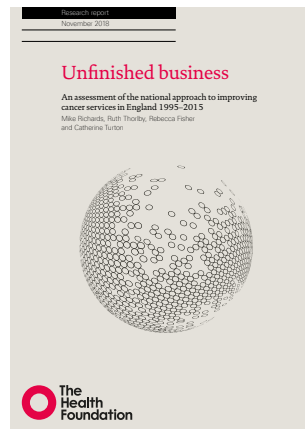
Ek S, Rizzuto D, Fratiglioni L et al. Risk factors for injurious falls in older adults: the role of sex and length of follow-up. *J Am Geriatr Soc.* 2018 Nov 29. <https://doi.org/10.1111/jgs.15657>

How have plans to improve cancer services in England fared over the last two decades?

Unfinished Business, a report from the Health Foundation (<https://www.health.org.uk/publications/unfinished-business>), looked at progress in cancer care over the last two decades. It found that progress had been made on reducing mortality, and improving the chances of survival and the experience of care, for people in England diagnosed with cancer, but despite persistent ambitions to be the best in Europe and the world, the gap in survival rates has not been closed.

It looked back to the launch of the NHS Cancer Plan in 2000, which noted that England had poorer survival than in other European countries and promised that by 2010 'our 5-year survival rates for cancer will compare with the best in Europe'.

The report sets out recommendations to



help close the gap in survival between England and other comparable countries and to help bring about radical improvements in early diagnosis and detection of cancer, such as increasing investment in diagnostic equipment, building public understanding of cancer symptoms, improving resourcing of primary care, greater support for GPs to refer more patients and supporting collaboration across primary and secondary care.

The report concludes that the disruption caused by the Health and Social Care Act 2012 led to a loss of momentum that is only recently being rebuilt, and highlights that it is crucial that local clinicians and managers are supported to work across organizational boundaries to improve care, share experience and learn improvement skills.

Risk of cervical cancer is increased in women with positive HPV, but no cellular abnormalities

Researchers have uncovered an increased risk of cervical cancer in women whose cervical cells test positive for certain high-risk human papillomavirus (HPV) types but do not show any signs of cellular abnormalities (Fröberg et al, 2018). The findings may help refine guidelines for cervical cancer screening.

A team of investigators at the Karolinska University Hospital and Institute in Sweden, along with collaborators in the United States, Slovenia and Belgium, conducted a study to determine what risk women may face if they test positive for HPV but their cervical cells do not show any indication of being cancerous on liquid-based cytology.

The study included 576 women with normal findings on liquid-based cytology of the cervix who were followed for 9 years. During that period, 92 women developed high-grade pre-cancerous cervical changes and four developed cervical cancer. These 96 women were compared with a control group of 480 women with normal findings on follow-up cervical cytology and matched by age.

All 576 baseline cervical samples were tested retroactively for HPV.

A positive HPV finding was much more common among the cases than among the controls. For women younger than 30 years, only HPV16 and HPV18 were present significantly more often among cases than controls and were therefore associated with an increased risk of pre-cancerous cervical changes and cervical cancer. For women aged 30 years and older, other HPV types in addition to HPV16 and HPV18 conferred significant risk.

Principal investigator Dr Sonia Andersson, of the Karolinska University Hospital and Institute in Sweden, emphasized: 'Women younger than 30 years old with a positive HPV16 or HPV18 finding need to be closely followed.'

Fröberg M, Östenson E, Belkić K et al. Impact of the human papillomavirus status on the development of high-grade cervical intraepithelial neoplasia in women negative for intraepithelial lesions or malignancy at the baseline: A 9-year Swedish nested case-control follow-up study. *Cancer*. 2018 Dec 10. <https://doi.org/10.1002/cncr.31788>

Surgical treatment and survival from colorectal cancer in Denmark, England, Norway and Sweden

Survival from colorectal cancer has been shown to be lower in Denmark and England than in comparable high-income countries. Data from national colorectal cancer registries were used to assess whether differences in the proportion of patients receiving resectional surgery could contribute to international differences in colorectal cancer survival (Benitez Majano et al, 2018).

This population-based study collected data from national colorectal cancer registries from all patients aged 18–99 years diagnosed with primary, invasive colorectal adenocarcinoma from 1 January 2010 to 31 December 2012, in Denmark, England, Norway and Sweden. Data for a total of 139 457 adult patients were included: 12 958 patients in Denmark, 97 466 in England, 11 450 in Norway and 17 583 in Sweden.

The age-standardized net survival was estimated using multivariable modelling, and the proportion of patients receiving resectional surgery was compared by stage and age. Logistic regression was used to predict the resectional surgery status that patients would have had if they had been treated as in the best performing country, given their individual characteristics.

Survival from colon cancer and rectal cancer in England and colon cancer in Denmark was lower than that in Norway and Sweden. Survival paralleled the relative provision of resectional surgery in these countries. Differences in patient selection for surgery, especially in patients older than 75 years or individuals with advanced disease, might partly explain these differences in international colorectal cancer survival.

Benitez Majano S, Di Girolamo C, Rachet B et al. Surgical treatment and survival from colorectal cancer in Denmark, England, Norway, and Sweden: a population-based study. *Lancet Oncol*. 2018 Dec 10. [https://doi.org/10.1016/S1470-2045\(18\)30646-6](https://doi.org/10.1016/S1470-2045(18)30646-6)