Effect of an environmental cleaning bundle on health-care-associated infections

An Australian study (https://doi.org/10.1016/S1473-3099(18)30714-X) introduced the REACH cleaning bundle, a multimodal intervention focusing on optimizing product use, technique, staff training, auditing with feedback, and communication, for routine cleaning.

After the intervention, vancomycin-resistant enterococci infections reduced from 0·35 to 0·22 per 10 000 occupied bed-days (P=0·0340). The incidences of *Staphylococcus aureus* bacteraemia (P=0·2180) and *Clostridioides difficile* infections (P=0·4655) did not change significantly. The authors concluded that the bundle was successful at improving cleaning thoroughness and showed promise in reducing vancomycin-resistant enterococci infections.

Resistance training may help prevent type 2 diabetes

A randomized controlled trial points to the benefits of exercise, especially resistance training, for preventing type 2 diabetes (https://doi.org/10.1002/dmrr.3143). A total of 172 people aged 55–75 years who had prediabetes were assigned to a control group, an aerobic training group, a resistance training group, or an aerobic training plus resistance training group. Supervised exercise programmes were completed for 60 minutes per day, three non-consecutive days per week for 24 months.

The incidence of type 2 diabetes decreased by 74%, 65% and 72% with aerobic plus resistance training, resistance training and aerobic training respectively compared with controls. After 24 months, cumulative diabetes incidence was significantly lower in the aerobic plus resistance training, resistance training, and aerobic training groups compared with controls (21%, 26% and 22% *vs* 69% respectively). Resistance training and resistance plus aerobic training were as effective as isolated aerobic training in preventing progression to type 2 diabetes.

Pre-hospital advanced airway management for adults with out-of-hospital cardiac arrest

A cohort study using a nationwide, population-based registry in Japan was performed to determine survival associated with advanced airway management compared with no advanced airway management for adults with out-of-hospital cardiac arrest (Izawa et al, 2019).

Consecutive adult patients with out-of-hospital cardiac arrest were separated into two sub-cohorts by their first documented electrocardiographic rhythm: shockable (ventricular fibrillation or pulseless ventricular tachycardia) and non-shockable (pulseless electrical activity or asystole). Patients were sequentially matched with patients at risk of advanced airway management within the same minute on the basis of time-dependent propensity scores. The main outcome measure was survival at 1 month or at hospital discharge within 1 month.

Of 310 620 eligible patients, 41.2% in the shockable cohort and 42.0% of the non-shockable cohort received advanced airway management during cardiopulmonary resuscitation. In the shockable cohort, survival did not differ between patients with and those without advanced airway management, while in the non-shockable cohort, patients with advanced airway management had better survival than those with no advanced airway management.

Dr Junichi Izawa, Assistant Professor and Research Fellow, Department of Anesthesiology, The Jikei University School of Medicine, Tokyo, Japan

Lead author Dr Junichi Izawa, Assistant Professor and Research Fellow, Department of Anesthesiology, The Jikei University School of Medicine, Tokyo, Japan, said: 'These findings suggest that different airway management strategies should be used on the basis of the initial electrocardiographic rhythm. The results also imply that we should account for resuscitation time bias in observational resuscitation research.'

Izawa J, Komukai S, Gibo K et al. Pre-hospital advanced airway management for adults with out-of-hospital cardiac arrest: nationwide cohort study. BMJ. 2019 Feb 28;364:l430. https://doi.org/10.1136/bmj.l430

Link between complications during birth and later social anxiety in children

A new study indicates that complications during birth may increase the risk that children will develop social anxiety by their pre-teen years (Suarez et al, 2019).

A total of 149 children aged 9–12 years were screened for behavioural inhibition – a tendency to exhibit a fearful disposition and withdrawal in unfamiliar contexts and situations – and assessed for social anxiety symptoms using parent- and child-reports. Participants were drawn from a larger laboratory study of temperament, attention and anxiety.

A total of 37 children (25%) experienced perinatal complications, and perinatal complication status did not differ with age or gender. Results indicated that children who experienced perinatal complications demonstrated higher levels of behavioural inhibition and social anxiety than children who did not experience complications. Furthermore, there was an indirect effect between perinatal complications and social anxiety via behavioural inhibition, suggesting that behavioural inhibition acted as a pathway between birth complications and social anxiety symptoms.

'This study sets the stage for future longitudinal work examining whether childhood temperament is a developmental path by which birth complications lead to social anxiety symptoms,' said lead author Dr Santiago Morales, of the Department of Human Development and Quantitative Methodology, University of Maryland, Maryland, USA.

Suarez GL, Morales S, Metcalf K, Pérez-Edgar KE. Perinatal complications are associated with social anxiety: Indirect effects through temperament. Infant Child Dev. 2019 Mar 19. https://doi.org/10.1002/icd.2130

Risk of subsequent primary neoplasms in survivors of adolescent and young adult cancer

The Teenage and Young Adult Cancer Survivor Study is a population-based cohort of survivors of cancer diagnosed when aged 15–39 years in England and Wales. Follow up was from 5-year survival until the first occurrence of death, emigration, or study end date.

A new analysis (Bright et al, 2019) focussed on the risk of specific subsequent primary neoplasms after 16 types of adolescent and young adult cancer. It reported absolute excess risks and cumulative incidence of specific types of subsequent primary neoplasm after each type of cancer.

Professor Michael Hawkins, Chair in Epidemiology & Director of Centre, Centre for Childhood Cancer Survivor Studies, Institute of Applied Health Research, University of Birmingham, Birmingham

A total of 12 321 subsequent primary neoplasms were diagnosed in 11 565 survivors, most frequently among survivors of breast cancer, cervical cancer, testicular cancer and Hodgkin lymphoma. Lung cancer accounted for a notable proportion of the excess number of neoplasms across all adolescent and young adult groups investigated.

The finding that a small number of specific subsequent primary neoplasms account for a large percentage of the total excess number of neoplasms in long-term survivors of certain types of cancer helps to inform priorities for clinical long-term follow up. The prominence of lung cancer after each of these cancers indicates the need for further work to prevent and reduce the burden of this cancer in future survivors of adolescent and young adult cancer.

Corresponding author Professor Michael Hawkins, Chair in Epidemiology & Director of Centre, Centre for Childhood Cancer Survivor Studies, Institute of Applied Health Research, University of Birmingham, Birmingham, noted: 'After the most common teenage and young adult cancers we have identified just a small number of cancer types which account for a substantial proportion of the excess number of cancers observed, thus providing a basis for focusing surveillance.'

Bright CJ, Reulen RC, Winter DL et al. Risk of subsequent primary neoplasms in survivors of adolescent and young adult cancer (Teenage and Young Adult Cancer Survivor Study): a population-based, cohort study. Lancet Oncol. 2019 Feb 20. pii: S1470-2045(18)30903-3. https://doi.org/10.1016/S1470-2045(18)30903-3

Incidence of head injury and traumatic brain injury among people with Alzheimer's disease

Injuries caused by falling are a major health concern among the older population. For older people, falls are the leading cause of head injuries, and those with cognitive disorders have a further increased risk of falling.

A register-based study was conducted on a nationwide cohort to compare the incidence of head injury and traumatic brain injury among persons with and without Alzheimer's disease (Ilmaniemi et al, 2019). This included all community-dwelling persons diagnosed with Alzheimer's disease in Finland in 2005–2011, excluding those with previous head injuries. Each person with Alzheimer's disease was matched with a person without Alzheimer's disease and previous head injury with respect to age, sex and university hospital district.

Persons with Alzheimer's disease had a 1.34-fold higher risk of head injuries and 1.49-fold higher risk of traumatic brain injuries after accounting for competing risks of death and full adjustment by socioeconomic status, drug use and comorbidities.

The authors concluded that persons with Alzheimer's disease are more likely to have a head injury or traumatic brain injury than those without. The findings highlight the importance of fall prevention, as head injuries can shorten the life expectancy and deteriorate a person's functional capacity.

Ilmaniemi S, Taipale H, Tanskanen A, Tiihonen J, Hartikainen S, Tolppanen AM. Incidence of head injury and traumatic brain injury among people with Alzheimer's disease. J Epidemiol Community Health. 2019 Feb 19. pii: jech-2018-211960. https://doi.org/10.1136/jech-2018-211960

Evidence standards framework for digital health technologies

NICE has updated its evidence standards framework for digital health technologies (https://www.nice.org.uk/Media/Default/About/what-we-do/our-programmes/evidence-standards-framework/digital-evidence-standards-framework.pdf). This sets out evidence standards for both the clinical and economic impact of new digital health technologies and outlines the evidence innovators need to help develop a case for their use in the NHS.

Air pollution causes 800 000 extra deaths a year in Europe

Using a new method of modelling, researchers found that outdoor air pollution caused an estimated 790 000 extra deaths in the whole of Europe in 2015 (https://doi.org/10.1093/eurheartj/ehz135).

Emergency readmissions published for first time in 5 years

NHS Digital have released new experimental statistics (https://digital.nhs.uk/data-and-information/publications/clinical-indicators/ccg-outcomes-indicator-set/current), showing that emergency readmissions nationally (excluding cancer and obstetrics) have increased from 12.5% in 2013–14 to 13.8% in 2017–18 (CCG Outcomes Indicator Set indicator 3.2 and NHS Outcomes Framework indicator 3b).

Genetic variants associated with thiopurine-induced myelosuppression in patients with IBD

A case-control study (https://doi.org/10.1001/jama.2019.0709), using data from 961 thiopurine-exposed patients of European ancestry with inflammatory bowel disease (IBD), identified three coding NUDT15 variants that were associated with thiopurine-induced myelosuppression.

About a third of patients with IBD are treated with a thiopurine, but about 7% of patients develop bone marrow suppression. DNA from 491 patients with IBD who suffered thiopurine-induced bone marrow suppression and 679 controls were analysed to identify genes which may be associated with this adverse reaction.

The researchers found an association between mutations in NUDT15 and bone marrow suppression. Lead author Dr Gareth Walker, Department of Gastroenterology, Royal Devon and Exeter Hospital NHS Foundation Trust, Exeter, said: 'We hope that once a predictive test is developed, patients will be able to have a simple blood test before starting these drugs. This will allow doctors to modify treatments, either by reducing the dose or opting for different treatment altogether.'

Genetic causes in smokers and non-smokers for risk of developing chronic obstructive pulmonary disease

Genetic differences help explain why some people who have never smoked develop chronic obstructive pulmonary disease, and why some smokers are at higher risk of getting the disease than other smokers (Shrine et al, 2019).

Researchers measured 20 million differences in the DNA in each of the 400 000 people who took part and compared them to measurements of lung function. They found 139 new genetic differences that influence lung health and chronic obstructive pulmonary disease. These increase someone's risk of developing chronic obstructive pulmonary disease, in addition to smoking.

The researchers divided people into 10 different genetic risk groups, depending on the number of DNA differences shown to affect lung health. Eight out of 10 smokers in the highest genetic risk group develop chronic obstructive pulmonary disease. People who have never smoked were overall at very much lower risk, but around 2 in 10 non-smokers in the highest genetic risk group still develop chronic obstructive pulmonary disease. In all, 279 differences in the DNA were found to affect lung health and the risk of chronic obstructive pulmonary disease.

Professor Louise Wain, British Lung Foundation Professor of Respiratory Research, Department of Health Sciences, University of Leicester, Leicester

Lead author Professor Louise Wain, British Lung Foundation Professor of Respiratory Research at the University of Leicester, said: 'It is well established that smoking is a major risk factor for chronic obstructive pulmonary disease, yet the mechanisms which cause smokers and non-smokers alike to develop chronic obstructive pulmonary disease are poorly understood.

She added: 'Our study provides vital clues as to why some people develop chronic obstructive pulmonary disease and others do not, and new knowledge that will help to develop new treatments to halt the decline in lung function observed in patients with chronic obstructive pulmonary disease.'

The genetic differences identified were also important contributors to chronic obstructive pulmonary disease risk in other ethnic groups, including African American and Chinese populations. If these genetic differences can be used to develop new treatments, these could impact on global health.

Shrine N, Guyatt AL, Erzurumluoglu AM et al. New genetic signals for lung function highlight pathways and chronic obstructive pulmonary disease associations across multiple ancestries. Nat Genet. 2019 Mar;51(3):481–493. https://doi.org/10.1038/s41588-018-0321-7

Clinical and molecular characterization of early-onset colorectal cancer

The incidence of colorectal cancer is increasing in adults under 50 years of age. A retrospective review of over 36 000 patients aimed to identify clinical and molecular features unique to early-onset colorectal cancer that differentiate these patients from patients 50 years old or older (Willauer et al, 2019).

Baseline characteristics were evaluated according to the colorectal cancer onset age with three independent cohorts. A fourth cohort was used to describe the impact of age on the consensus molecular subtype (CMS) prevalence.

Early-onset patients were more likely to have microsatellite instability, synchronous metastatic disease, primary tumours in the distal colon or rectum, and fewer BRAF V600 mutations than patients 50 years old or older.

Patients aged 18–29 years had fewer adenomatous polyposis coli mutations and an increased prevalence of signet ring histology than patients under 50 years of age.

In patients younger than 40 years, CMS1 was the most common subtype. Early-onset patients with inflammatory bowel disease were more likely to have mucinous or signet ring histology and less likely to have adenomatous polyposis coli mutations than early-onset patients without predisposing conditions.

Not only is early-onset colorectal cancer distinct from traditional colorectal cancer: further investigations should be performed for both very young patients with colorectal cancer (18–29 years) and those with predisposing conditions. The aetiology of the high rate of CMS1 in patients under 40 years of age needs further exploration.

Willauer AN, Liu Y, Pereira AAL et al. Clinical and molecular characterization of early-onset colorectal cancer. Cancer. 2019 Mar 11. https://doi.org/10.1002/cncr.31994

Improved acute kidney injury recognition and management not caused by introducing NHS e-alert

A study describes the impact of an electronic-alert (e-alert) system to address inconsistencies in recognition and management of acute kidney injury within acute medicine (West Midlands Acute Medicine Collaborative, 2019).

All admissions to included acute medical units were screened for acute kidney injury before and after the e-alert was introduced. In the 10 units that participated in both phases, recognition of acute kidney injury by clinicians significantly improved from 67.9% in 2015 to 76.1% in 2016 (P=0.04). However, further analysis found that the presence of an e-alert had a limited effect on recognition and management, suggesting it was not the primary cause of the improvements. Furthermore, the documentation of acute kidney injury by clinicians did not appear to be linked to the presence of an e-alert.

Corresponding author Dr Adam Seccombe, Acute Medicine Research Fellow and Honorary Acute Medicine Consultant, Acute Medical Unit, University Hospital Birmingham NHS Foundation Trust, Birmingham, commented: 'This multi-site study is important for two reasons. First, it provides data that highlight the areas of acute kidney injury recognition and management that must be urgently addressed, as well as suggesting that the NHS e-alert system had no immediate impact on acute kidney injury management. Second, and perhaps more importantly, this project (led by a trainee) shows what trainees can achieve when they are offered both support and time to work independently.'

Dr Adam Seccombe, Acute Medicine Research Fellow and Honorary Acute Medicine Consultant, Acute Medical Unit, University Hospital Birmingham NHS Foundation Trust, Birmingham

Several avenues have been identified that should be explored before attempting to improve the recognition and management of acute kidney injury further.

West Midlands Acute Medicine Collaborative. The impact of the NHS electronic-alert system on the recognition and management of acute kidney injury in acute medicine. Clin Med (Lond). 2019 Mar;19(2):109-113. https://doi.org/10.7861/clinmedicine.19-2-109

Is recovery quicker from laparoscopic or open adhesiolysis for adhesive small bowel obstruction?

An international, multicentre, parallel, open-label trial, conducted in Finland and Italy, randomly assigned patients aged 18–95 years who had adhesive small bowel obstruction that had not resolved with conservative management to have either open or laparoscopic adhesiolysis (Sallinen et al, 2019). The trial only included patients with high likelihood of a single adhesive band. The primary outcome was postoperative length of hospital stay assessed at time of discharge.

A total of 566 patients were assessed for eligibility, of whom 104 patients were randomly assigned to the open surgery group (n=51) or to the laparoscopy group (n=53). Of these patients, 100 were included in the modified intention-to-treat analyses (49 in the open surgery group, 51 in the laparoscopy group). The postoperative length of hospital stay for the open surgery group was on average 1·3 days longer than that in the laparoscopy group. Postoperative complications (Clavien-Dindo any grade) were seen in 21 (43%) patients in the open surgery group and 16 (31%) patients in the laparoscopy group within 30 days. One patient died in each group within 30 days.

The authors concluded that laparoscopic adhesiolysis provides quicker recovery than open adhesiolysis in selected patients with adhesive small bowel obstruction.

Sallinen V, Di Saverio S, Haukijärvi E et al. Laparoscopic versus open adhesiolysis for adhesive small bowel obstruction (LASSO): an international, multicentre, randomised, open-label trial. Lancet Gastroenterol Hepatol. 2019 Apr;4(4):278-286. https://doi.org/10.1016/S2468-1253(19)30016-0

Video-observed therapy effective for tuberculosis treatment

Directly observed treatment has been the standard of care for tuberculosis for nearly 30 years, but it is inconvenient for patients and service providers. A multicentre, analyst-blinded, randomized controlled superiority trial (Story et al, 2019) tested whether levels of treatment observation improved with video-observed therapy.

Participants were patients aged at least 16 years with active pulmonary or non-pulmonary tuberculosis who were eligible for directly observed treatment; they were randomly assigned to either video-observed or directly observed treatment. Video-observed therapy was provided by a centralised service in London. Patients were trained to record and send videos of every dose ingested 7 days per week using a smartphone app.

The study involved 226 patients; 112 were randomly assigned to video-observed therapy and 114 to directly observed treatment. Of the patients on video-observed therapy 78 (70%) achieved ≥80% scheduled observations successfully completed during the first 2 months compared with 35 (31%) of those on directly observed treatment. In the restricted analysis, 78 (77%) of 101 patients on video-observed therapy achieved the primary outcome compared with 35 (63%) of 56 on directly observed treatment. Stomach pain, nausea and vomiting were the most common adverse events reported.

Video-observed therapy was a more effective approach to observation of tuberculosis treatment, and is likely to be preferable for many patients. It provides a more acceptable, effective and cheaper option for supervision than directly observed treatment.

Story A, Aldridge RW, Smith CM et al. Smartphone-enabled video-observed versus directly observed treatment for tuberculosis: a multicentre, analyst-blinded, randomised, controlled superiority trial. Lancet. 2019 Feb 21. pii: S0140-6736(18)32993-3. https://doi.org/10.1016/S0140-6736(18)32993-3