CADTH

2016 HORIZON SCAN ROUNDUP

Part 2

A Compilation of New and Emerging Health Technologies From Around the World

CADTH

About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada's health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs and medical devices in our health care system.

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2016 Horizon Scan Roundup (Part 2)

CADTH's Horizon Scanning service identifies and monitors new and emerging health technologies likely to have a significant impact on health care in Canada. The program systematically scans and monitors health information resources to identify promising health technologies not yet in wide use in the Canadian health care system. It then provides summaries of current information about the use, effectiveness, cost, and implementation of these technologies, which it publishes regularly in bulletins and newsletters.

Part of CADTH's horizon scanning process involves monitoring what other international horizon scanning agencies and services have been tracking and evaluating for their own jurisdictions. The resulting "roundup" is a compilation of 60 titles published in the last six months of 2016 by 12 major international horizon scanning services and selected health organizations recognized for their identification of innovative technologies. Part 1 of the 2016 Horizon Scan Roundup is available on our **website**. The materials have been organized into the medical specialty categories used to categorize CADTH's own reports. The focus of this roundup is restricted to non-drug medical technologies including medical devices, laboratory tests, biomarkers, programs, and procedures. For more information about the horizon scanning agencies whose work is included in this report, visit their websites listed on this page.

Horizon scanning reports last reviewed January 6, 2017.

Arthritis

FLEXISEQ for Osteoarthritis

NICE

Flexiseq (also called TDT 064) is a water-based gel for the treatment of osteoarthritis symptoms. The gel is applied to the skin over the affected joint twice daily and contains tiny spheres of fat designed to penetrate the skin, lubricate the joint, and reduce pain — although how this might work is not fully understood. Flexiseq might be an alternative to oral or topical NSAIDS, or as an add-on to other treatments for osteoarthritis.

Cancer, Imaging, and Radiology

Axxent Electronic Brachytherapy System for Early Stage Breast Cancer

NICE

The Axxent System (Axxent eBx) delivers single-dose radiotherapy during breast-conserving surgery for early-stage breast cancer. Although the cost per patient is higher than with conventional external beam radiotherapy, radioisotopes are not used and there are no capital costs involved, such as the costs of purchasing, housing, or maintaining a linear accelerator.

BioZorb Tissue Marker

HealthPACT

BioZorb is a tissue marker implant intended to help radiation oncologists see the site of the tumour after breast cancer surgery. This allows for better targeting of radiation therapy post-surgery.

Blood and Stool Biomarker Testing for Colorectal Cancer Screening (Update)

HealthPACT

This brief updates an earlier 2014 review on blood and stool screening tests to detect colorectal (bowel) cancer, and includes new evidence on the fecal occult blood test, DNA-based stool tests (ColoVantage and Cologuard tests), and the blood-based Epi proColon screening test.

Cerenkov Luminescence Imaging (CLI) for Intraoperative Assessment of Surgical Margins

AGENAS

The LightPath Imaging System, based on Cerenkov Luminescence Imaging, or CLI, is an alternative to lab-based histopathology of tumours that may allow a more accurate determination of tissue margins during cancer surgery. It can be used in surgery for various types of cancers, including breast, prostate, and gastrointestinal cancers. Improved intraoperative tumour assessment could reduce the damage to healthy tissue and reduce the need for subsequent surgery to remove cancerous tissue that was initially missed.

Computed Tomography to Rule Out Suspected Appendicitis in Adults and Reduce the Negative Appendectomy Rate (NAR)

HealthPACT

CT, with or without contrast agents, is highly accurate for diagnosing appendicitis. It can reduce a misdiagnosis that may lead to the surgical removal of a normal appendix — negative appendectomy — which carries risks to the patient and results in extra costs to the health care system. However, CT is more expensive than ultrasound, and it exposes patients to ionizing radiation.

Gallium-68 Prostate-Specific Membrane Antigen Positron Emission Tomography/Computed Tomography Scans for Diagnosing and Restaging Recurrent Prostate Cancer

HealthPACT

Gallium-68 prostate-specific membrane antigen (Ga68-PSMA) is an imaging agent used with positron emission tomography and CT (PET/CT) for staging and managing prostate cancer. It may provide better diagnostic accuracy than existing tests, such as the F18 PET/CT, and could be used in addition to or as a replacement for other imaging modalities, including bone scans, MRI, and PET/CT with other radioactive tracers. Whether it should be used in initial patient diagnosis or in managing recurrent prostate cancer is not yet clear. Because of its short half-life, it is produced in-house by centres using this technology. At least four Ga-68 generators are in place in Australia.

MR-LINAC Image Guided Radiotherapy for Cancer Treatment

NIHR-HSRIC

MR-LINAC is a radiotherapy treatment system that includes a 1.5 Tesla MRI system with a linear accelerator. It allows real-time visualization of tumours during radiation treatment, potentially enabling more accurate targeting of tumours and less damage to healthy adjacent tissue. Several MR-LINACs are now installed worldwide, including one in Canada at the Sunnybrook Health Sciences Centre in Toronto.

Neuroblate System for Precise Brain Tumour Treatment

NIHR-HSRIC

The NeuroBlate System is used in conjunction with MRI guidance to deliver targeted thermal laser energy to treat brain tumours, particularly those considered inoperable because of their location in the brain. NeuroBlate is also under development for the treatment of focal brain lesions causing epilepsy. Because the treatment does not require craniotomy (removing part of the skull to expose the brain), its use might reduce surgical risks, patient recovery time, and length of hospital stay.

Novilase Laser Therapy System for Ablation of Benign Tumours of the Breast

NIHR-HSRIC

The Novilase laser therapy system uses ultrasound guidance to deliver local hyperthermia to destroy benign (and malignant) breast cancers. (See the following item.) It is a less invasive alternative to lumpectomy, as only a small incision is needed and so patient recovery time is reduced. The procedure takes about 30 to 60 minutes and can be performed under local anesthesia in an outpatient setting.

Novilase Laser Therapy System for Ablation of Malignant Tumours of the Breast

NIHR-HSRIC

See previous description.

OSNA for Colon Cancer Staging

NICE

OSNA — one-step nucleic acid amplification — is a molecular lab test for use in colon cancer patients to detect whether cancer has spread to the lymph nodes. Unlike standard histopathology, in which lymph node samples are prepared and then examined under a microscope, OSNA can analyze the lymph node as a whole, potentially improving the accuracy of cancer staging.

SentiMag and Sienna+ for Sentinel Lymph Node Localisation in Breast Cancer (Update)

HealthPACT

The Sentimag magnetic sensor and associated Sienna+ tracer (containing a solution of iron oxide particles) are used during breast cancer surgery to determine if cancer has spread to the lymph nodes. The technology may offer an alternative to radioisotope tracing, without the risks associated with manufacturing, transporting, and disposing of radioisotopes. This publication updates a 2014 brief with information from five new trials.

Surefire Infusion System
HealthPACT

The Surefire Infusion System is an antireflux catheter used for chemoembolization treatment (injecting cancer drugs directly into a tumour) of liver cancer. Because the design of the catheter prevents reflux, it reduces the impact of the treatment on healthy tissue. And, as the coils for standard coil embolization are not required, there is a potential cost savings, with the procedure time also being reduced.

Cardiovascular

Absorb Bioresorbable Vascular Scaffold for Coronary Artery Disease
NICE

Stents are very small tubes placed into the narrowed arteries of the heart in some patients with coronary artery disease. They are used to prevent damage to the heart or reduce symptoms such as pain and tightness in the chest. The Absorb Bioresorbable Vascular Scaffold is a drug-eluting (coated in a medication to help prevent future narrowing of the artery) stent designed to be completely resorbed by the body after three years. Resorbing the device may help avoid complications from leaving traditional stents in place, such as clotting and re-narrowing of the artery.

Impella 2.5 for Haemodynamic Support During High-Risk Percutaneous Coronary Interventions
NICE

The Impella 2.5 is a small, catheter-based pump that is placed within the left ventricle of the heart during percutaneous coronary interventions — procedures to place small stents in narrowed blood vessels to improve blood flow to the heart. The pump provides temporary support to a patient's circulatory system: It protects the heart by improving blood flow through the heart and reducing the amount of work the heart does during the procedure. Unlike other pumps currently used in these procedures, the Impella 2.5 is mechanical and may be useful in patients with irregular heartbeats because it operates independently of the patient.

Lutonix Drug-Coated Balloon for Peripheral Arterial Disease
NICE

In patients with peripheral artery disease (a narrowing of the blood vessels that reduces blood flow to the arms and legs), angioplasty — using a tube to insert a balloon or stent into the narrowed artery — is sometimes used to help restore more normal blood flow to the affected limb or limbs. The Lutonix DCB, or drug-coated balloon, also known as the LUTONIX 035, is used after a non-drug-coated balloon catheter has been used to partially open a narrowed artery. It delivers the medication paclitaxel to help prevent re-narrowing. The balloon is also coated with a drug that may improve delivery of the paclitaxel to the artery wall, where it is intended to be used, instead of being lost during placement of the balloon.

OCS Heart System for Heart Transplant

NICE

The Organ Care System (OCS) Heart is a portable system designed to preserve a donated heart outside the body in a beating and normothermic (or nearly normal) temperature state from the time the heart is retrieved until it is transplanted. Normothermic storage and transportation may help reduce the deterioration of heart tissue that occurs when an organ is stored and transported cold, and in turn allow donated hearts to be transported over longer times and distances than current cold systems. The OCS Heart system lets transplant teams retrieve donor hearts after circulatory death, when the heart and lungs can no longer function, which may help increase the number of hearts available for donation.

Ovation Abdominal Stent Graft System

HealthPACT

The Ovation Abdominal Stent Graft System is used for the repair of abdominal aortic aneurysms — the expansion or ballooning of the aorta. Unlike existing stent grafts, which are small tubes usually made from a combination of wire and fabric that expand to seal off the damaged area, the Ovation System forms its seal using a polymer-filled sealing ring. This innovation may allow the device to be used in patients who are at high risk of complications from traditional open surgery, but are unable to have endovascular surgery because the anatomy of their aorta is not suitable for other stent graft devices.

Sternal Talon for Sternal Closure in Cardiothoracic Surgery

NICE

The Sternal Talon is a new device used to close the sternum after surgery. Surgeons hook the device around the open breastbone and close it to the desired position using a built-in clamp. One or more of the devices may be needed to completely close the sternum, and traditional materials, like wire, may still be necessary in some patients. While the Sternal Talon may be more stable than traditional closure methods, potentially allowing patients to return to normal activities sooner, the device is much more expensive than current devices and methods.

REVIEW — New and Emerging Angioplasty Technologies for Severe Lower Limb Ischaemia

NIHR-HSRIC

Lower limb ischemia is a severe form of peripheral artery disease that occurs when blood flow to the legs is extremely restricted by hardened and narrowed arteries. It causes pain and wounds that will not heal, and may possibly lead to amputation. This report discusses 31 new and emerging technologies for treating severe lower limb ischemia. The technologies include a variety of balloons and stents all designed to help expand narrowed arteries.

Dermatology, Wounds, and Injuries

CelluTome Epidermal Harvesting System for the Treatment of Acute or Chronic Wounds

HealthPACT

Chronic wounds, such as pressure ulcers and diabetic foot ulcers, place a significant burden on patients and the health care system. These types of wounds are often treated using skin grafts. The Cellutome System uses suction and heat to form small blisters in the upper layer of the skin to create skin grafts over a period of 30 to 40 minutes, while leaving the deeper layers of skin intact. The device may help reduce the need for general anesthesia and surgery for skin graft patients.

UrgoStart for Chronic Wounds

NICE

The UrgoStart is a wound dressing for use in chronic wounds or non-healing acute wounds. The dressings contain a new technology — nano-oligosaccharide factor or NOSF — that prevents protease activity, which, when present, may make wounds heal less readily. The UrgoStart would be used as an alternative to existing dressings for the care of advanced wounds.

Woundchek Protease Status for Assessing Elevated Protease Status in Chronic Wounds

NICE

The Woundchek diagnostic product is a point-of-care test designed to detect the presence of increased protease activity, which can be a sign of impaired wound healing. The test takes 15 minutes to complete and is intended to help care providers decide on the most appropriate dressing to use to treat chronic wounds such as diabetic foot ulcers. If elevated protease activity is detected, dressings designed to inhibit protease activity — such as the UrgoStart (previously mentioned) — could be used to help speed healing.

Emergency Care

SMARTChip for Early Diagnosis of Suspected Stroke

NIHR-HSRIC

SMARTChip is a point-of-care test intended for use by paramedics and emergency room clinicians to help in the early diagnosis of a stroke. The test examines a patient's blood for purines, a product released by cells during the stress caused by a stroke. After calibrating the test, a drop of blood from the patient is tested, with results available in three to five minutes. SMARTChip would be used in addition to existing stroke protocols such as FAST.

Endocrine, Nutrition, and Metabolic

Point-of-Care Devices for Detecting Diabetic Polyneuropathy

NIHR-DEC

Damage caused to nerves throughout the body, referred to as neuropathy, is a common serious complication of diabetes that can lead to infections, chronic wounds, and even death. This report summarizes the accuracy and usefulness of three devices — Sudoscan, Neuropad, and NC-Stat DPNcheck — designed to help screen for diabetic neuropathy at the point of care. The tests may be helpful for determining which patients do not have diabetic neuropathy.

Point-of-Care HbA1c Tests: Diagnosis of Diabetes

NIHR-DEC

This report summarizes the available evidence on using hemoglobin A1C (glycated hemoglobin) to diagnose type 2 diabetes in primary care settings. These point-of-care hemoglobin A1C tests are intended to quickly and accurately diagnose type 2 diabetes when a patient first meets with a clinician, and may help reduce the time to diagnosis and the need for repeated follow-up visits. Claims for 19 different devices are presented and the clinical evidence is summarized for 13 devices currently being marketed.

SugarBEAT, Eversense, and FreeStyle Libre Glucose Monitoring Systems for Diabetes Mellitus

NIHR-HSRIC

The potential impact of three continuous glucose — or sugar — monitors for people with diabetes are discussed in this report. The SugarBEAT measures a person's sugar levels using a skin patch that can be worn for 12 to 24 hours, connected by Bluetooth to a smartphone, smartwatch, or tablet app. The Eversense is a small sensor inserted under the skin (for up to 90 days) to measure sugar levels. Measurements are sent from the sensor to a transmitter worn on the skin that calculates current sugar levels and sends this information wirelessly to an app. The FreeStyle Libre is a skin patch sensor that measures sugar levels in the fluid between cells for up to 14 days. A separate reader is placed near the patch and displays recent and current sugar levels.

All three devices are intended to be used in addition to traditional finger-prick blood glucose monitoring; however, unlike the other two devices, the FreeStyle Libre does not need to be calibrated with a finger-prick blood sample prior to use. These devices may help people living with diabetes avoid the inconvenience and discomfort of regular blood sugar testing and provide additional information about glucose levels to both patients and their clinicians.

Eye and Vision

Argus II Retinal Prosthesis System (Update)

HealthPACT

This brief provides an update of a 2013 publication, and covers four recent clinical trials of the Argus system (six more trials are ongoing). The system may improve functional vision, functional outcomes, and quality of life in patients with blindness due to advanced retinitis pigmentosa, in follow-up to three years.

Navilas 577 Laser System for Retinal Laser Photocoagulation
NIHR-HSRIC

The Navilas laser system is used for laser photocoagulation to treat conditions such as diabetic retinopathy and age-related macular degeneration. Laser photocoagulation involves cauterizing proliferative blood vessels in the eye. The system combines fluorescein angiography and optical coherence tomography with other imaging techniques (for example, navigated photocoagulation) intended to improve the precision of treatment. Fewer follow-up visits may be needed for additional treatments, such as anti-vascular endothelial growth factor injections.

New and Emerging Health Technologies for Cataracts
HealthPACT

This overview looks at new technologies for the prevention, diagnosis, and treatment of cataracts — a common cause of blindness, making cataract surgery a common procedure. Most new evidence is on the treatment of cataracts, with little on screening and diagnosis, and there is a lack of truly innovative treatments. Cataract surgery to replace the natural lens with an artificial intraocular lens remains the mainstay of treatment.

REVIEW — New and Emerging Health Technologies for Corneal Disorders
NIHR-HSRIC

This review used a range of sources including patients, clinical experts, and industry to identify technologies — such as drugs, biological therapies devices, and procedures — in development for congenital and acquired corneal disorders. Many of the technologies, including some of those involving regenerative medicine, are expected to be commercially available within the next few years.

Gastroenterology and Liver

Linx Reflux Management System (Update)
HealthPACT

This update reviews the evidence on the Linx Reflux Management System published since the original review in 2013. The system is comprised of a small band of titanium beads with magnetic centres that help close the opening to the lower esophageal sphincter, preventing gastroesophageal reflux.

Stretta System for Gastro-Oesophageal Reflux Disease
NICE

The Stretta system applies radiofrequency energy to thicken the tissue of the lower esophageal sphincter to treat severe gastroesophageal reflux. The treatment can be performed under sedation or general anesthesia as an outpatient or day procedure.

Infectious Disease and Infection Control

Alere Afinion CRP for C-Reactive Protein Testing in Primary Care

NICE

Quickly determining whether an infection is viral or bacterial may help clinicians to prescribe antibiotics more appropriately. Like the QuickRead go CRP test described further on in this section, the Alere Afinion CRP is a point-of-care test designed to help clinicians distinguish between bacterial and viral lower respiratory tract infections, such as pneumonia. Using a finger-prick sample of blood, the test measures the amount of C-reactive protein in the body. (The protein is produced in response to a variety of causes, including bacterial infection.) Test results are available in about four minutes.

CytoSorb Therapy for Sepsis

NICE

Cytokines are produced by the body as an inflammatory response to severe infection and, when excessive, can lead to sepsis or septic shock. CytoSorb is designed to help reduce the levels of cytokines in the blood, which may in turn help reduce patient morbidity and mortality. When connected to a blood pump such as a dialysis machine, the single-use device adsorbs cytokines from the blood as it passes through the device. The CytoSorb would be used in addition to standard care for sepsis.

Point-of-Care Testing for Influenza

CADTH

The ability to quickly confirm influenza infection may help clinicians' treatment decisions, such as when to provide patients with antiviral medications. New rapid influenza tests, such as the cobas Liat System, that use viral RNA to confirm infection may be as accurate as traditional laboratory testing and more accurate than existing rapid influenza tests that rely on viral antigens for diagnosis.

QuikRead Go for C-Reactive Protein Testing in Primary Care

NICE

The QuikRead go CRP is a diagnostic point-of-care test for use in patients with suspected lower respiratory tract infections, such as pneumonia. Using a finger-prick sample of blood, the test measures the amount of C-reactive protein in the body in about two minutes. Elevated levels of C-reactive protein may indicate a bacterial infection and help guide clinicians in the appropriate use of antibiotics.

Kidney and Urology

InFlow Intraurethral Valve-Pump for Atonic Bladder

NIHR-HSRIC

The inFlow is a non-surgical urinary device used to treat women with atonic bladder (a bladder that fails to empty normally). This condition is due to an impaired ability of the detrusor muscle to contract, and may be caused by spinal cord injury, diabetic neuropathy, or multiple sclerosis. Urinary retention can result in recurrent urinary tract infections. The inFlow valve and pump, containing a magnet, are inserted into the urethra at the opening to the bladder, to pump urine out of the bladder. Using an external controller, the magnet allows the pump to be activated by the patient. The inFlow may be an alternative to intermittent catheterization or the use of indwelling urinary catheters, and may increase patient quality of life. The system needs to be replaced monthly.

Periplex for the Detection of Acute Infection in Peritoneal Dialysis

NIHR-HSRIC

The Periplex is designed to allow patients to self-test their used dialysis fluid for an indication of infection after it is removed from the abdomen. Results are available to be read in five minutes. When a positive test result is found, patients can contact their health care provider for appropriate care. Earlier diagnosis of infection may lead to earlier treatment at home, while potentially avoiding the need to be hospitalized.

Point-of-Care Testing for Urinary Tract Infections

NIHR-DEC

Urinary tract infections, or UTIs, are a common reason for antibiotic prescriptions. Point-of-care (POC) tests could decrease the time to accurate diagnosis, and lead to the more appropriate use of antibiotics. POC tests could also reduce the number of laboratory tests and physician visits involved, and may also be beneficial to patients with indwelling urinary catheters. This report identifies 20 new POC UTI tests that can provide results in less than 24 hours.

Mental Health

GPS Locator Devices for People With Dementia

CADTH

People with dementia (such as Alzheimer disease) often wander. GPS locator devices can help promote safe walking and increase the autonomy of some individuals with early to moderate stages of dementia, reduce the anxiety of their caregivers, and reduce the time and resources needed to find missing people with dementia.

Nervous System and Neurology

Manus Parkinson's Pen for Parkinson's Disease

NIHR-HSRIC

The Manus Parkinson's Pen is a digital pen that could help clinicians in the diagnosis and monitoring of Parkinson disease. The pen contains movement sensors that connect wirelessly to software that both analyzes the data from the pen and helps support clinician decision-making. Patients use the pen on a tablet to complete a series of standardized writing exercises, while the pen and software record and analyze the hand's movement in order to detect abnormalities. The company claims the pen's measurements are more objective than current methods of evaluating Parkinson disease.

Orthopedics

Enhanced Recovery After Surgery Programs for Hip and Knee Arthroplasty

HealthPACT

Enhanced recovery-after-surgery programs are intended to standardize or optimize care before, during, and after surgery. While no single preferred program is identified, common characteristics between programs include patient education, standardized anesthesia and pain management, and early mobilization after surgery. Enhanced recovery-after-surgery programs may significantly reduce the length of stay and impact patient rehabilitation.

HyaloFast for Chondral and Osteochondral Lesion Repair

NIHR-HSRIC

Hyalofast is a customizable pad that can be cut and shaped to adapt to different types of chondral and osteochondral lesions — damaged spots in the cartilage between joints — in the knees, ankles, and other joints. The pads contain hyaluronic acid, an important factor in cartilage healing, and may help protect damaged cartilage as it heals, or help promote the growth of new cartilage.

Pediatrics

Tookie Vest for Oncology

NIHR-HSRIC

The Tookie is a wearable, polyester vest, with an antibacterial coating, that secures central venous catheters in children who are undergoing cancer treatment. Similar Tookie vests are in development for other pediatric conditions. The vest is intended to increase a child's safety by preventing catheter dislodgement and reducing infections, while allowing the child greater freedom of movement.

Rehabilitation

Emego for People Using Electronic Assistive Technologies

NIHR-HSRIC

Emego is a small, lightweight, wireless sensor that allows people with severely impaired upper limb mobility to activate a switch that pairs with existing adaptive technologies (such as communication software) to enable more independent living. The device is powered through small electrical signals produced by a person's muscles. It can be connected to a variety of muscle groups and uses a new type of sensor that does not require gel to make skin contact. The manufacturers claim Emego uses smaller electrical signals than existing sensors, meaning that it may be suitable for people with very limited muscle function.

Powered Lower Limb Exoskeletons for Spinal Cord Injury

ISCRR

This brief summarizes the available evidence for several powered, external, brace-like devices intended for use by people with lower limb weakness or paralysis. If proven to be effective, these exoskeleton devices could help support existing rehabilitation practices and possibly be used as an alternative to wheelchairs for improved mobility.

Respiratory

Alair Bronchial Thermoplasty System for Adults With Severe Difficult to Control Asthma

NICE

The Alair System is intended to reduce the amount of smooth muscle tissue — an excess of which causes increased restriction of the airway — in the lungs of adults whose asthma is very poorly controlled by standard methods. Using a narrow tube inserted through the nose, the device is placed into the lungs, where it is expanded until it contacts the airway walls. Heat energy is then used to reduce the thickness of the smooth muscle tissue in the treatment area. Treatment involves three separate 45- to 60-minute sessions.

Fractional Exhaled Nitric Oxide Monitoring in Paediatric Asthma Management

NIHR-DEC

When lung tissue becomes inflamed — as it does in people with asthma, particularly if it is not well-controlled — it releases nitrogen into exhaled breath. Fractional exhaled nitric oxide (FeNO) monitoring allows clinicians to evaluate the amount of nitrogen exhaled from the lungs and may provide them with additional information about children who would benefit from adjustment to their treatment regimens. FeNO monitoring may also be easier to administer and more reproducible in young children than other additional evaluations such as spirometry. This report summarizes the evidence of three hand-held FeNO monitoring devices — the Niox Mino, the Niox Vero, and the NObreath.

Neurally Adjusted Ventilatory Assist (NAVA)
NIHR-HSRIC

Neurally Adjusted Ventilatory Assist (NAVA) uses electrodes at the end of a tube inserted into the stomach of infants and children to measure the electrical signals produced by the diaphragm (the muscle that causes us to inhale air). The device is connected to a ventilator, and the information it collects is used to assist breathing by helping the ventilator more closely match the patient's own natural breaths. Using NAVA may help reduce the amount of time a patient requires ventilation and how long a patient ultimately spends in the hospital.

Other

FlexDex Needle Driver for Minimally Invasive Laparoscopic Surgical Suturing
NIHR-HSRIC

This device is a laparoscopic instrument for use during all types of laparoscopic surgeries that require intensive suturing inside the body. It may allow the surgeon more freedom of movement and control than existing instruments, and reduce operating procedure time. The FlexDex may also offer an alternative to more expensive, robotic-controlled devices.

Needle-Free Arterial Non-Injectable Connector
NICE

This single-use device connects to the sampling port of an arterial line. It allows blood samples to be collected more safely. The design incorporates a feature to stop injection errors — rare but potentially life-threatening — and it may reduce bacterial infection of the line (and the costs these incur), as well as blood loss during sample collection.

QTUG for Assessing Falls Risk and Frailty
NICE

QTUG (Quantitative Timed Up and Go) is a system of wearable sensors combined with a mobile health app. It is used to assess mobility, risk of falling, and frailty in elderly patients or people with conditions that affect gait. The device is an alternative to the conventional Timed Up and Go (TUG) test.

Visualase System for Minimally Invasive Soft Tissue Ablation
NICE

The Visualase laser system uses interstitial irradiation or thermal therapy with MRI imaging guidance to destroy soft tissue. The procedure is considered minimally invasive, and benefits may include shorter hospital stays and less scarring. It is intended for use in neurology, gastroenterology, and many other types of surgery (other than heart surgery). The laser is directed through a probe inserted using tiny holes and targeted to minimize damage to healthy tissue.

VitalPAC for Assessing Vital Signs of Patients in Hospital

NICE

Vitalpac is a mobile clinical software system that operates on Apple devices like the iPad, iPod, and iPhone. It is used to assess vital signs in acutely ill hospitalized patients. The Vitalpac can automatically provide a patient's early warning score, thereby eliminating the need for manual calculations and reducing the potential for error. The system is provided through an annual licence that includes training and ongoing support.

Trends and Forecasts

Medgadget's Best Medical Technologies of 2016

Medgadget's list of "important, innovative, and surprising" advances in medical devices from the past year includes brain-controlled arms and hands for people with quadraplegia, unmanned aerial vehicles (drones) to deliver medical supplies to remote locations, non-invasive blood glucose sensors for people with diabetes, and a virtual reality headset that may help diagnose and evaluate concussions.

The Medical Futurist — 20 Medical Technology Advances: Medicine in the Future – Part I and Part II

Looking further into the future than most topics covered in the *Roundup*, The Medical Futurist's list of advances identifies technologies such as 3-D printing, real-time diagnostics, microchips to run clinical trials, and artificial intelligence as areas where research currently underway could change the way we care for patients.

Medscape — 10 Tech Advances That Can Change Medicine

Included on this list are technologies whose potential is already being tested in practice, such as smartphone echocardiography and treating pain using virtual reality. Also included are advances in technologies such as artificial intelligence, gene editing, and ultra-portable labs, which may be closer to reality than previously anticipated.

MIT Technology Review — Technology Trends to Watch in Women's Health

The five technologies in this list include a patient-controlled device to expand tissue using an implanted carbon dioxide cartridge in women preparing for breast reconstruction surgery and a self-sampling kit for sexually transmitted infections that may be more convenient than in-office testing.

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