

2016

# HORIZON SCAN ROUNDUP

Part 1

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

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**Funding:** CADTH receives funding from Canada's federal, provincial, and territorial governments, with the exception of Quebec.

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## Horizon Scan Agency Websites Included in This Roundup

### AHRQ

Agency for Healthcare Research and Quality  
Healthcare Horizon Scanning System (US)

### CADTH

Horizon Scanning (Canada)

### Cleveland Clinic Innovations (US)

### ECRI Institute (US)

### EuroScan

International Network on New and Emerging  
Health Technologies

### HealthPACT

Health Policy Advisory Committee on  
Technology (Australia)

### The King's Fund (UK)

### McGill-TAU

Technology Assessment Unit of the McGill  
University Health Centre (Canada)

### NECA H-SIGHT

National Evidence-Based Healthcare  
Collaborating Agency Horizon Scanning  
Service of Innovative Global Health  
Technology (South Korea)

### NICE

National Institute for Health and Clinical  
Excellence Medtech Innovation Briefings (UK)

### NIHR-HSRIC

National Institute for Health Research Horizon  
Scanning Research & Intelligence Centre (UK)

## 2016 Horizon Scan Roundup

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 79 titles published in late 2015 and the first six months of 2016 by 11 major international horizon scanning services and selected health organizations recognized for their identification of innovative technologies. 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 the horizon scan websites listed on this page.

Horizon scanning reports last reviewed July 7, 2016.

## Anesthesia and Pain Management

### High Definition Transcranial Direct Current Stimulation for the Treatment of Fibromyalgia Pain

NIHR-HSRIC

High-definition transcranial direct current stimulation has been developed to treat fibromyalgia pain that is resistant to treatment with analgesics such as paracetamol, Aspirin, and ibuprofen. The technology consists of headgear fitted with electrical conductors that apply weak electrical currents to certain areas on the scalp. Treatment is delivered once daily, five days per week, for three to four weeks.

### ReActiv8 Implantable Device for Treating Chronic Low Back Pain

NIHR-HSRIC

ReActiv8 is a device for treating chronic low back pain that persists for more than 90 days despite treatment with medication or physiotherapy. It consists of a pulse generator and leads (wires) that are implanted into the lower back. The patient uses a remote control to deliver 30-minute treatment sessions two times per day, during which the device alternately contracts and relaxes the multifidus muscle found along the length of the spine to stabilize the lower back in order to relieve lower back pain.

## Arthritis

### Potential High-Impact Interventions Report – Priority Area 01: Arthritis and Nontraumatic Joint Disease

AHRQ

Of the emerging interventions for treating arthritis and non-traumatic joint disease, a monoclonal antibody for the treatment of either psoriatic arthritis (inflammatory arthritis connected to the skin condition of psoriasis) or ankylosing spondylitis (arthritis affecting the spine) has been identified as potentially having a high impact on health care or the health care system.

## Cancer, Imaging, and Radiology

### Aquilion PRIME CT Scanner for Imaging Coronary Artery Disease in Adults in Whom Imaging is Difficult

NICE

The Aquilion PRIME is another new-generation CT scanner for imaging in patients with diagnosed or suspected coronary artery disease who have conditions that make it difficult to obtain good-quality cardiac images using earlier CT scanner models. Like the SOMATOM Definition Edge CT scanner (in this section), it can be used to determine if revascularization is required.

### Cellvizio Confocal Endomicroscopy System for Characterising Pancreatic Cysts

NICE

Cellvizio is a confocal laser endomicroscopy system that allows physicians to look for cysts in the pancreas and visually determine whether a cyst is potentially malignant. It captures real-time, microscopic video images of tissues during endoscopy. The images are intended to be used together with information obtained using standard biopsies to guide treatment decisions.

### Update: Gene Expression Profiling of Breast Cancer

HealthPACT

Several gene expression tests have been developed to guide treatment decisions for women with breast cancer that is either lymph node-negative or -positive. Measuring the levels of gene expression in RNA extracted from tumour samples is intended to help identify patients who are most likely to respond to chemotherapy. It also helps in the assessment of the risk of their cancer recurring.

### ImmunTraCkeR-Melanoma for Metastatic Melanoma Immunotherapy

NIHR-HSRIC

ImmunTraCkeR-Melanoma is a blood test that helps determine if a patient with advanced and/or metastatic melanoma is likely to benefit from immunotherapy. Cancer immunotherapy enhances the ability of the immune system to destroy cancer cells; however, it can cause serious side effects and only a few patients respond to treatment. ImmunTraCkeR-Melanoma measures the diversity of T cell receptors in the patient's blood sample to predict if immunotherapy is likely to be effective.

### The LightPath Imaging System for Intra-operative Tumour Assessment

NIHR-HSRIC

The LightPath Imaging System provides real-time molecular imaging during breast or prostate cancer surgery. It is intended to improve the ability of surgeons to differentiate between healthy and cancerous tissue, thereby helping ensure that all affected tissue has been removed during surgery. This could reduce the need for additional surgeries and treatment to address cancerous tissue that was left behind.

## **Lonestar Chemical Detection System for Colorectal Cancer Diagnosis** NIHR-HSRIC

Lonestar is a new technology that could potentially be used for the early diagnosis of colorectal cancer. It analyzes urine or stool samples for volatile organic compounds, which may indicate the presence of colorectal cancer. Lonestar could be a potential non-invasive alternative to colonoscopy; and, for some patients, its ability to process urine samples may make it a preferable to current biomarker testing techniques, which can analyze only stool samples.

## **Lonestar Chemical Detection System for Lung Cancer Diagnosis** NIHR-HSRIC

The Lonestar analyzer can also be used to analyze a patient's breath sample for the presence of volatile organic compounds, which could indicate lung cancer. If the compounds are detected, additional diagnostic tests can be ordered to confirm a diagnosis. Lonestar is potentially a quicker and less-invasive alternative to X-ray, CT scan, bronchoscopy, and biopsy, and may lead to an earlier diagnosis than these currently used methods.

## **Update: Magnetic Resonance Thermometry-Guided Laser Interstitial Thermal Therapy for Intracranial Neoplasms**

HealthPACT

Magnetic resonance thermometry-guided laser interstitial thermal therapy is a potential treatment for intracranial neoplasms (brain tumours). It is performed by inserting a probe into the tumour to deliver light energy that raises the temperature of, damages, and eventually destroys the tumour cells.

## **Update – Microwave Ablation for Hepatic Tumours**

HealthPACT

Microwave ablation is a minimally invasive intervention for patients with liver tumours who are not candidates for treatment with surgery or chemotherapy. Inserted through a small incision in the skin under local sedation and guided by ultrasound, the device destroys tumours using heat created using electromagnetic energy. Compared with radiofrequency ablation, microwave ablation can destroy larger tumours and is less painful, and it allows more than one tumour to be ablated simultaneously.

## **myPlan Test for Early-Stage Lung Adenocarcinoma Prognosis** NIHR-HSRIC

The myPlan Lung Cancer test is a prognostic test intended to help guide decisions regarding treatment for patients with early-stage lung adenocarcinoma, the most common type of lung cancer. The test measures the expression levels of certain genes in lung tumour samples, which, along with additional information, helps assess how quickly the cancer is likely to progress and helps to determine whether to treat the cancer with surgery alone or with a more aggressive treatment plan.

## Potential High-Impact Interventions Report – Priority Area 02: Cancer

AHRQ

Of the emerging interventions for cancer, a new stool-based molecular screening test for colorectal cancer has been identified as potentially having a high impact on health care or the health care system.

## Prolaris Gene Expression Assay for Assessing Long-Term Risk of Prostate Cancer Progression

NICE

The Prolaris test has been developed to guide treatment decisions for patients with low- or intermediate-risk, localized prostate cancer. It generates a score based on gene expression levels in ribonucleic acid (RNA) extracted from tumour samples. The score is used, alongside other clinical and pathological information, to determine the aggressiveness of prostate cancer and, therefore, whether treatment is necessary or if active surveillance is appropriate.

## SIR-Spheres for Treating Inoperable Hepatocellular Carcinoma

NICE

SIR-Spheres is an internal radiation treatment for inoperable hepatocellular carcinoma. It consists of very small resin microspheres that contain radioactive yttrium-90. As with TheraSphere (described in this section), the microspheres are injected into the artery in the liver, delivering radiation directly to the tumour and limiting the amount of radiation the healthy tissue is exposed to.

## Somatom Definition Edge CT Scanner for Imaging Coronary Artery Disease in Adults in Whom Imaging is Difficult

NICE

The SOMATOM Definition Edge is a new-generation CT scanner that can be used for cardiac imaging to determine if revascularization (surgery to restore adequate blood flow) is needed when coronary artery disease has been diagnosed or is suspected. It is intended as an alternative to earlier generation CT scanners in cases where obtaining good-quality cardiac images is difficult because of obesity, high levels of coronary calcium, arrhythmias, high heart rates, stents, or bypass grafts.

## STAR Tumor Ablation System

HealthPACT

The STAR Tumor Ablation System has been developed for the palliative treatment of metastatic spinal tumours as an alternative to existing radiotherapy techniques or surgery for pain control. The device has an instrument with a flexible tip for delivering radiofrequency ablation into the vertebra to heat and destroy the tumour. The minimally invasive, outpatient procedure is said to take less than 90 minutes and is performed using local anesthesia and moderate sedation.

## TheraSphere for Treating Operable and Inoperable Hepatocellular Carcinoma

NICE

TheraSphere is an internal radiation treatment for both operable and inoperable primary hepatocellular carcinoma (or cancer that starts in the liver). It consists of tiny glass microspheres containing radioactive yttrium-90, which are injected into the artery in the liver that supplies blood to the tumour. This allows radiation to be delivered directly to the tumour and limits the amount of radiation exposure to the healthy tissue.

## Cardiovascular

### Cardiac Resynchronization Therapy in Heart Failure

McGill-TAU

Cardiac resynchronization therapy is a treatment for heart failure that involves the implantation of a biventricular pacemaker to keep the right and left ventricles of the heart pumping together normally. It is intended for use in patients with heart failure who are experiencing severe symptoms and are not responding to conventional treatment.

### CareLink Network Service for Remote Monitoring of People with Cardiac Devices

NICE

CareLink allows clinicians to remotely monitor patients with Medtronic-implanted cardiac devices. The service collects and transmits data from the devices, and will send an alert whenever a clinical event is detected or the device is not functioning properly. Carelink is intended to shorten the time to treatment in the case of an adverse event, as well as reduce the need for in-person follow-up appointments and the use of health care resources.

### ClearWay RX for Drug Delivery to Coronary Artery Thrombotic Lesions

NICE

ClearWay RX is a balloon catheter that can be used in the treatment of patients who have experienced acute coronary syndrome events such as heart attack or unstable angina. The technology allows medication to be delivered directly to a blood clot, allowing for a higher concentration of the drug to reach the clot than is possible when the medication is administered intravenously.

### Endovascular Clot Retrieval with Thrombolysis for Ischaemic Stroke

HealthPACT

Endovascular clot retrieval is a treatment for ischemic stroke that involves using devices inserted into the artery via a microcatheter to dislodge and remove the clot. This technique is used when the administration of a clot-dissolving agent into the artery or vein is not effective.

## **LATITUDE NXT Patient Management System for Monitoring Cardiac Devices at Home**

NICE

LATITUDE NXT is a remote monitoring system for use with compatible Boston Scientific-implanted cardiac devices. It collects and transmits data from the devices to clinicians, and sends alerts if it detects an adverse event or if the device is not working properly. The system is intended to be used in place of in-person follow-up appointments and could result in fewer hospital visits and more timely identification of adverse events.

## **Portable Compression to Prevent Venous Thromboembolism After Hip and Knee Surgery: The ActiveCare System**

CADTH

ActiveCare is a portable compression system designed for the prevention of venous thromboembolism (a blood clot that forms in a vein deep inside the body) after surgery to the hip or knee. The system delivers a sequence of compressions and decompressions synchronized with the patient's respiration and blood flow. It is a potential alternative to drug therapy; for example, with antithrombotic (blood-thinning) medications.

## **Potential High-Impact Interventions Report – Priority Area 03: Cardiovascular Disease**

AHRQ

Emerging cardiovascular interventions identified as potentially having a high impact on health care or the health care system include a wearable artificial heart driver for patients waiting for a heart transplant, a leadless pacemaker for the treatment of bradycardia (slow heart rate), a specially equipped ambulance for the pre-hospital treatment of stroke, a system for pumping warm blood through donated hearts to keep them beating until they can be transplanted, and an implantable device for wirelessly monitoring the pulmonary artery pressure and heart rate of patients with heart failure.

## **Screening for Coronary Artery Disease Using CT Calcium Scoring**

HealthPACT

CT calcium scoring – measuring the amount of calcification in the coronary arteries using a CT scan – is a method for screening asymptomatic patients for coronary artery disease. Patients who receive a positive diagnosis can then manage the disease using lifestyle modification and medications.

## **TactiCath Quartz Catheter for Percutaneous Radiofrequency Ablation in Atrial Fibrillation**

NICE

TactiCath Quartz is another new model of a single-use, radiofrequency ablation catheter to treat patients with cardiac arrhythmias such as symptomatic atrial fibrillation. Like the ThermoCool SmartTouch, it uses contact force-sensing technology to provide real-time measurements of the force being applied during the ablation procedure.

## **THERMOCOOL SMARTTOUCH Catheter for Percutaneous Radiofrequency Ablation in Atrial Fibrillation**

NICE

THERMOCOOL SMARTTOUCH is a new single-use, radiofrequency ablation catheter for treating cardiac arrhythmia patients, such as those with symptomatic atrial fibrillation. As with conventional devices, it delivers radiofrequency energy that creates scar tissue, thereby blocking abnormal heart rhythms. However, it also has a sensor for measuring the force being delivered to help ensure it is sufficient to create an effective amount of scar tissue but not so much as to risk damage.

## **Transcatheter Mitral Valve Replacement for Severe Mitral Regurgitation**

HealthPACT

Transcatheter mitral valve replacement is a potential, minimally invasive alternative to open heart surgery for patients who have severe mitral valve regurgitation due to a damaged mitral valve. The procedure involves using a catheter inserted either through the femoral artery in the groin, a large artery in the chest, or the tip of the left ventricle to place the replacement valve into the heart, where it expands, pushing the damaged valve away as it takes its place.

## **Update – Ultra-filtration for Patients with Decompensated Heart Failure**

HealthPACT

Ultrafiltration is a technique for managing fluid overload in patients with heart failure. A machine removes blood, passes it through a filter that removes the excess water, and then returns it to the patient. Fluid overload is caused by the inability of the heart to adequately circulate fluid through the body, which results in an excess of fluid in the organs.

## **Use of Biventricular Pacing in Atrioventricular Heart Block**

McGill-TAU

Biventricular pacing is a potential alternative to right ventricular pacing for the treatment of atrioventricular heart block – a disorder of the electrical signals between the upper and lower chambers of the heart. The suggestion that pacing the right ventricle only could negatively impact the left ventricle, eventually causing heart failure, has led to interest in biventricular pacing as a way to treat atrioventricular heart block, while protecting left ventricle function.

## **Dermatology, Wounds, and Injuries**

### **Mersey Burns for Calculating Fluid Resuscitation Volume when Managing Burns**

NICE

The Mersey Burns mobile app has been developed to determine the volume of resuscitation fluids needed by burn injury patients. After entering a patient's age, weight, and percentage of the body that has been burned, the app calculates the amount of IV fluid that should be administered. It is intended as an alternative to conventional paper chart and calculator methods.

## Ear, Nose, and Throat

### Chordate System S100 for Chronic Non-allergic Rhinitis

NIHR-HSRIC

The Chordate System S100 has been developed to treat non-allergic rhinitis. It delivers vibrations to the inside of the nose, which stimulates the mucous membranes and the nervous system in order to relieve stuffiness. The treatment is intended as an alternative to nasal sprays and surgery, and can be performed in an outpatient setting in less than 30 minutes.

### Otovent Nasal Balloon for Otitis Media with Effusion

NICE

Otovent has been designed to equalize air pressure in the middle ear by opening the Eustachian tubes (which connect the middle ear to the back of the throat) to allow trapped fluid to drain out. The device consists of a nose piece attached to a latex balloon, which the patient inflates using his or her nose. It is a potential alternative to surgery for the treatment of glue ear in children, in which fluid is trapped in the middle ear.

### Radiofrequency Ablation for Hypertrophy of the Inferior Nasal Turbinates

HealthPACT

Radiofrequency ablation is a new treatment option for chronic nasal obstruction due to inferior turbinate hypertrophy (chronic swelling of bones in the nose). It uses radiofrequency energy to destroy cells in the turbinate tissues to temporarily reduce their size. The technique is a potential alternative to surgery (turbineotomy) and can be performed in an outpatient setting under local anesthetic.

## Endocrine, Nutrition, and Metabolic

### CORTRAK 2 Enteral Access System for Placing Nasoenteral Feeding Tubes

NICE

The goal of the CORTRAK 2 Enteral Access System (EAS) is to guide the placement of nasogastric feeding tubes in patients who, for a short term, need to be fed directly into the stomach or small intestine. The technology uses an electromagnetic sensor to track the path of the feeding tube, as it is inserted through the nose, into either the stomach, duodenum, or jejunum. The tube's path is displayed on an LCD monitor and watched by the trained operator performing the procedure. Once tube placement is complete, the transmitting stylet on the tube can be disconnected and removed while the tube itself is left in place.

### Glucose Pop Test for Monitoring Saliva Glucose in Diabetes Mellitus

NIHR-HSRIC

The size of a credit card, this device tests the level of glucose in a person's saliva. It is intended for patients with type 1 and type 2 diabetes, and it is less invasive than fingerstick testing because all the patient has to do is lick the reagent pad on the device. In response, the reagent pad changes colour, quickly indicating the level of glucose, which the company claims accurately reflects blood glucose levels.

## MiniMed 640G System with SmartGuard for Managing Blood Glucose Levels in People with Type 1 Diabetes

NICE

This system is designed to continuously monitor blood glucose levels and deliver insulin to maintain glucose levels within a pre-set range. It has automatic stop and restart functions, and an algorithm to predict when blood glucose will fall below a pre-set level.

## New and Emerging Health Technologies for Diabetes

HealthPACT

This report examined three innovative health technologies for the treatment of type 1 diabetes: stem cell transplantation, islet cell transplantation, and the artificial pancreas. The report also identified several new and emerging technologies for diagnosis, insulin delivery, blood glucose monitoring, treatment, and prevention of mostly type 2 diabetes.

## REVIEW – New and Emerging Non-invasive Glucose Monitoring Technologies

NIHR-HSRIC

A total of 40 new and emerging technologies for non-invasive glucose monitoring (monitoring of glucose levels without compromising the skin barrier) are presented in this report. The technologies range in their potential sites of testing including skin, tear fluid, saliva, and breath. The report provides information on the technologies and views of health care professionals and potential users.

## Potential High-Impact Interventions Report – Priority Area 07: Diabetes Mellitus

AHRQ

Emerging diabetes interventions identified as potentially having a high impact on health care or the health care system include a therapy for type 2 diabetes that involves a small pump implanted under the skin to deliver a steady dose of the drug exenatide, provided in a formulation that remains stable within the body for at least one year so that only yearly implantations are needed; the use of bariatric surgery, regardless of patient BMI, to restore metabolic function and thereby treat type 2 diabetes; a small device for delivering an ultra-rapid-acting form of inhaled insulin powder to treat both type 1 and type 2 diabetes; and an implant for treating diabetic macular edema that provides sustained release of the corticosteroid fluocinolone acetonide into the eye and can work for up to 36 months.

## Potential High-Impact Interventions Report – Priority Area 10: Obesity

AHRQ

Emerging obesity interventions identified as potentially having a high impact on health care or the health care system include two intragastric balloon systems – one that consists of a silicone balloon that is placed in the stomach using endoscopy and then filled with saline using a tube, and another similar technology that uses two balloons to fill a greater volume of the stomach. Both systems use saline with methylene blue dye that will change the colour of patients' urine if the balloons rupture to alert them.

## Eye and Vision

### [Icare Rebound Tonometer to Measure Intraocular Pressure](#)

NICE

Icare tonometers are portable, hand-held devices that measure the fluid pressure inside the eye (intraocular pressure) to detect the risk of glaucoma. Icare tonometers come in four models, all of which use the same rebound technology – including a forehead support and a probe that briefly makes contact with the eye.

## Gastroenterology and Liver

### [Endoscopic Control of Gastrointestinal Bleeding Using Sprayed Hemostatic Powder](#)

NECA-HSIGHT

The EndoClot Polysaccharide Hemostatic System was developed to stop bleeding inside the gastrointestinal tract. It works by spraying a powder on internal lesions using an endoscope – a tube placed down a patient’s throat into the stomach. The powder absorbs water from blood, which speeds up clotting and stops a broad range of bleeding.

### [Update: Enhanced Liver Fibrosis Test](#)

HealthPACT

This report presents an updated summary of evidence on non-invasive tests for liver fibrosis, including the Enhanced Liver Fibrosis (ELF) test. In light of new drug treatments for hepatitis C becoming available in Australia in early 2016, and the publication of new guidelines, HealthPACT provides advice in this report as to how to apply liver fibrosis testing technologies.

### [IBSchek for Post-Infectious Irritable Bowel Syndrome](#)

NIHR-HSRIC

This new blood test can quickly diagnose a patient with irritable bowel syndrome (IBS) caused by a previous infection of the digestive system (e.g., food poisoning). The test works by detecting antibodies that arose from the previous infection and that may now be attacking the human intestine in an autoimmune response. If the antibodies are found, the patient can be diagnosed as having IBS without needing to undergo more invasive tests.

### [Potential High-Impact Interventions Report – Priority Area 11: Peptic Ulcer Disease and Dyspepsia](#)

AHRQ

Of the emerging interventions for treating peptic ulcer disease and dyspepsia, a gelatin capsule containing a small sponge attached to a string, which is swallowed by a patient to collect cells from the lining of the esophagus and is intended as an alternative to endoscopy for diagnosing Barrett esophagus, has been identified as potentially having a high impact on health care or the health care system.

## Radiofrequency Ablation for the Treatment of Barrett’s Esophagus with High-Grade and Low-Grade Dysplasia: An Update

McGill-TAU

Radiofrequency ablation is a technique that uses heat from an alternating electrical current to destroy precancerous tissue (dysplasia) on the esophagus. An updated review of the literature found good evidence for its effectiveness and safety in treating high-grade dysplasia. Radiofrequency ablation for low-grade dysplasia remains controversial because of the lack of data on diagnostic accuracy, and the possibility that low-grade dysplasia may resolve on its own without progressing to cancer. The McGill-TAU provides recommendations for the use of this technology.

## REVIEW – Regenerative Medicine for Gastrointestinal Diseases

NIHR-HSRIC

This report identifies 20 new and emerging technologies for the treatment of gastrointestinal diseases. In particular, it looks at technologies that can repair, replace, or regenerate damaged or diseased cells or tissues. The technologies are moving beyond simple stem cell transplantation to the use of cells in more complex approaches, such as stimulation of immune and repair systems, and targeting specific tumour antigens in cancer.

## Secca System for Faecal Incontinence

NICE

The goal of the Secca System is to tighten the internal anal sphincter muscle, increasing the ability to recognize and retain stools, and therefore reducing fecal incontinence (involuntary leakage of stools). It consists of a device that applies thermal energy from a radiofrequency source to the internal sphincter muscle in the anal canal. This therapy would be performed under general or local anesthesia by colorectal surgeons trained in using the Secca System. Limited evidence shows short-term improvements in fecal incontinence and quality of life.

## Gynecology and Obstetrics

### Potential High-Impact Interventions Report – Priority Area 12: Pregnancy, Including Preterm Birth

AHRQ

An antibody infusion to prevent mother-to-fetus transmission of cytomegalovirus, a weight management program for pregnant women, and a depression and anxiety treatment program for mothers of preterm infants are pregnancy and preterm birth interventions that are currently being tracked and may be identified as having a potential impact on health care or the health care system in the future.

## Infectious Disease and Infection Control

### ImmunoXpert for Diagnosing Bacterial and Viral Infections

NIHR-HSRIC

ImmunoXpert is a point-of-care blood test that is used, along with other clinical information, to determine if an infection is caused by bacteria or by a virus. The test provides results quickly – in 99 minutes – allowing patients with bacterial infections to begin treatment sooner than would be the case with a conventional lab test and preventing the misuse of antibiotics to treat viral infections.

### PATHFAST Presepsin Chemiluminescent Enzyme Immunoassay for the Diagnosis and Prognosis of Sepsis

HealthPACT

PATHFAST Presepsin has been developed for the rapid diagnosis of sepsis. This point-of-care test provides results in minutes and is intended to be an alternative to the blood culture test, which requires several days for processing.

### Potential High-Impact Interventions Report – Priority Area 09: Infectious Disease Including HIV/AIDS

AHRQ

Emerging infectious disease interventions identified as potentially having a moderately high impact on health care or the health care system include a vaccine currently under investigation for preventing Ebola virus disease.

### Xpert Carba-R to Identify People Carrying Carbapenemase Producing Organisms

NICE

Xpert Carba-R is designed to screen patients for carbapenemase-producing organisms so that measures can be put in place to prevent the transmission of these highly antibiotic-resistant bacteria to others within a hospital setting. It is a point-of-care device that gives results in approximately 50 minutes using one rectal swab specimen, compared with conventional culture-based tests that require three specimens collected at two-day intervals.

## Kidney and Urology

### BladderScan BVI 9400 3D Portable Ultrasound Scanner for Measuring Bladder Volume

NICE

BladderScan BVI 9400 is a portable ultrasound device that estimates bladder volume and is used in the diagnosis and assessment of urological conditions, including urinary incontinence and urinary retention. Portable bladder ultrasound devices are a non-invasive alternative to urinary catheterization for monitoring urine output and they require minimal training to operate.

## S-Cath System for Suprapubic Catheterisation

NICE

S-Cath is designed to guide suprapubic (through the abdomen) catheter insertion to drain urine from the bladder. It features a guidewire to improve the accuracy of catheter placement and, therefore, reduce the risk of bladder or bowel injury compared with conventional suprapubic catheter insertion. It could potentially also allow the procedure to be performed in an outpatient setting.

## Stenting Versus Medical Therapy for Atherosclerotic Renal Artery Stenosis

HealthPACT

Stenting is a potential treatment option for hypertension caused by the narrowing of the arteries that supply blood to the kidneys. It may provide a clinical benefit specifically to patients with flash pulmonary edema, severe refractory hypertension, or progressive decline in renal function.

## Mental Health

### AVATAR Therapy for Auditory Verbal Hallucinations in Psychosis

NIHR-HSRIC

AVATAR (AudioVisual-Assisted Therapy Aid for Refractory auditory hallucinations) therapy is a virtual reality computer program designed to treat auditory hallucinations caused by mental illnesses such as schizophrenia. The patient selects a computerized face and voice that resembles the hallucination, which are then controlled by the therapist, allowing the patient to have a conversation with and ultimately confront the hallucination. The program is intended for patients who are not responding to treatment with antipsychotic medication.

### Oxecam for Health Monitoring in Secure Mental Health Facilities

NIHR-HSRIC

Oxecam software analyzes images captured by digital video cameras set up in patients' rooms so that mental health facility staff can monitor the breathing, heart rate, and movement of patients from a remote location. Unlike in-person spot checks, this technology allows for continuous and unobtrusive monitoring, and alerts staff when a patient requires an immediate intervention.

### Potential High-Impact Interventions Report – Priority Area 04: Dementia (Including Alzheimer's Disease)

AHRQ

A computer-based tool for the early detection of age-related cognitive decline and dementia is currently being tracked and may be identified as having a potential impact on health care or the health care system in the future.

## Potential High-Impact Interventions Report – Priority Area 05: Depression and Other Mental Health Disorders

AHRQ

Of the emerging interventions for depression and other mental health disorders, an interactive text-messaging program intended to reduce hazardous alcohol use among at-risk patients has been identified as potentially having a high impact on health care or the health care system.

## Potential High-Impact Interventions Report – Priority Area 14: Substance Abuse

AHRQ

Of the emerging interventions for substance abuse, the use of telemedicine to deliver psychotherapeutic treatments for post-traumatic stress disorder has been identified as potentially having a high impact on health care or the health care system.

## Orthopedics

### Mobi-C for Cervical Disc Replacement

NICE

Mobi-C is a prosthetic spinal disc for adults with neck problems caused by cervical disc degeneration. It is surgically implanted and can replace one or two cervical discs (for two discs, two Mobi-C devices are needed). Limited evidence suggests Mobi-C is equally or more effective than anterior cervical discectomy and fusion. Patients may be eligible for Mobi-C if their cervical disc degeneration has not responded to at least six weeks of conservative management (such as rest or physical therapy), or if they have progressive signs or symptoms of degeneration.

## Pediatrics

### Neon EEG for Monitoring Neonatal Seizures

NIHR-HSRIC

Neon EEG is an electroencephalogram (EEG) monitor for detecting brain seizures in newborn babies. It consists of a series of adhesive EEG sensors that are incorporated into a single device, allowing the sensors to be placed on the scalp easily and all at once without the need for special training.

## Potential High-Impact Interventions Report – Priority Area 06: Developmental Delays, ADHD, and Autism

AHRQ

A new pediatric autism screening tool, which may help diagnose the disorder at a younger age so that treatment can begin sooner, is currently being tracked and may be identified as having a potential impact on health care or the health care system in the future.

## Rehabilitation

### Potential High-Impact Interventions Report – Priority Area 08: Functional Limitations and Disability

AHRQ

Emerging functional limitation-related interventions identified as potentially having a high impact on health care or the health care system include a screening tool for pediatric strabismus and amblyopia, a computerized prosthetic arm to restore arm function after amputation, and a battery-powered exoskeleton to enable mobility in patients with paraplegia.

### The Vivistim System for Upper-Limb Deficit after a Stroke

NIHR-HSRIC

The Vivistim System has been developed to restore lost arm function after a stroke. It includes a pulse generator that is implanted into a patient's neck to deliver an electric current to the vagus nerve during physiotherapy. It has been suggested that, by combining the nerve stimulation with arm exercises, the device can help stroke patients relearn how to move their arms.

## Respiratory

### FebriDx for Use in the Differentiation of Acute Viral and Bacterial Febrile Respiratory Infections

NIHR-HSRIC

FebriDx is a single-use, point-of-care testing device that helps diagnose whether a respiratory infection is viral or bacterial. The device requires a fingerstick blood sample and contains two test strips – one to measure myxovirus resistance A, which is elevated by viral infections, and the other to measure C-reactive protein, which is elevated by bacterial infections. The test takes less than two minutes to perform and provides results within 15 minutes.

### Non-Invasive Open Ventilation (NIOV) System for Respiratory Insufficiency

HealthPACT

NIOV is a small, wearable, positive pressure ventilator. The device is designed to provide oxygen and air to patients with respiratory failure caused by conditions such as chronic obstructive pulmonary disease, interstitial lung disease, and neuromuscular conditions. It is intended for patients who can spontaneously breathe on their own.

### Potential High-Impact Interventions Report – Priority Area 13: Pulmonary Disease, Including Asthma

AHRQ

Emerging pulmonary disease-related interventions identified as potentially having a high impact on health care or the health care system include two portable warm blood perfusion systems developed to better preserve, and even improve, the condition of donor lungs compared with standard cold storage methods.

## REVIEW – Emerging Technologies for the Diagnosis, Treatment and Management of Refractory Asthma

NIHR-HSRC

Emerging technologies identified for refractory asthma include two tests for guiding lebrikizumab or tralokinumab treatment, a portable device for exhaled nitric oxide at home, a point-of-care test for assessing airway inflammation, a device for monitoring fractional exhaled nitric oxide, a bronchial thermoplasty tool to reduce the amount of smooth muscle in the lungs, an air filtration device that removes allergy particles at the bedside, and a new dry powder inhaler device.

## Other

### EarlySense for Heart and Respiratory Monitoring and Predicting Patient Deterioration

NICE

EarlySense is a system used to monitor heart rate and respiratory rate in hospitalized patients (non-intensive care). The system includes a sensor placed under the patient's mattress to continuously collect data and to send alerts if the patient's heart or respiratory rate changes. The display unit at the bedside shows the data; high and low threshold alerts can be set for each patient.

### PIFA PlussPF4 for Heparin-Induced Thrombocytopenia

NIHR-HSRC

This point-of-care test is used to exclude and identify patients who may have heparin-induced thrombocytopenia (HIT). HIT is an adverse reaction to the drug heparin, which is used to stop blood clotting in patients – for example, following major surgery, a heart attack, a stroke, or deep vein thrombosis. Patients with HIT will actually experience more blood clotting from heparin and will need a different anticoagulant medication. The PIFA PlussPF4 test uses a small blood sample from a fingerprick, and the result is available in about an hour.

### Potential High-Impact Interventions Report – Cross-Cutting Interventions and Programs

AHRQ

Emerging cross-cutting interventions and programs identified as potentially having a high impact on health care or the health care system include a technology for tracking medication adherence in patients with chronic conditions requiring long-term drug therapy – which consists of an ingestible sensor embedded in an oral pill or capsule medication that transmits data to a monitor; 3-D printed biomodels, based on a patient's own anatomy, that enable surgeons to plan for and practice surgeries; and a program for improving surgical outcomes in patients who will be undergoing major abdominal surgery by assessing patient-specific risks and providing physical training and lifestyle modification about a month before the surgery.

## Trends and Forecasts

### Top 10 Medical Innovations for 2016

Cleveland Clinic Innovations

Among the top 10 technologies anticipated to have an impact on health care in 2016 are water purification systems for the prevention of infectious diseases, cell-free fetal DNA testing using the mother's blood, cancer screening via protein biomarker analysis, naturally controlled artificial limbs, frictionless remote monitoring using wearable technology, and neurovascular stent retrievers to remove blood clots.

### 2016 Top 10 Hospital C-suite Watch List

ECRI Institute

Technologies anticipated to have an impact on health care in 2016 include mobile stroke units, wireless wearable sensors, miniature leadless pacemakers, blue-violet LED light fixtures to prevent infections, new robotic-assisted surgical platforms, spectral computed tomography, a new injected bioabsorbable hydrogel (SpaceOAR), and warm perfusion systems that preserve donor organs.

### The Digital Revolution: Eight Technologies that Will Change Health and Care

The King's Fund

This report identifies eight promising developments: the smartphone (for example, for large-scale data collection for research), at-home or portable diagnostics, smart or implantable drug delivery mechanisms, digital therapeutics (such as computerized cognitive behavioural therapy), genome sequencing, machine-learning applications in health care, decentralized health records using blockchain technology, and online connected communities (for example, peer-to-peer support networks).

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