2017
HORIZON SCAN
ROUNDUP

Part 2

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

CADTH

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Table of Contents

CADTH

Organizations Included in this Roundup

ASCO
American Society of Clinical Oncology (US)

CADTH
Horizon Scanning (Canada)

Cleveland Clinic Innovations (US)

ECRI Institute (US)

ISCRR
Institute for Safety, Compensation and Recovery Research (Australia)

Medgadget

The Medical Futurist

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

NIHR-DEC
National Institute for Health Research Diagnostic Evidence Co-operative Horizon Scanning Programme (UK)

Scottish Health Technologies Group (UK)

Senate of Canada Standing Senate Committee on Social Affairs, Science and Technology (Canada)

2017 Horizon Scan Roundup

Introduction

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 service scans and monitors health information resources to identify promising health technologies not yet widely used in Canada. Summaries of current information about a selection of these technologies are published in the *Issues in Emerging Health Technologies* bulletins and the *Health Technology Update* 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 37 titles issued in the last six months of 2017 by 11 international horizon scanning services and other organizations recognized for their identification of innovative health technologies. New horizon scanning publications are organized by medical specialty categories in this report. The focus of the Roundup is on medical technologies including medical devices, diagnostic tests, biomarkers, programs, and procedures. For more information about the horizon scanning agencies whose work is included in this report, please visit their websites.

These horizon scanning reports were last reviewed on January 18, 2018.

Arthritis

Promonitor for Monitoring Response to Biologics in Rheumatoid Arthritis
NICE

Promonitor is a diagnostic assay that measures drug and anti-drug antibody levels in patients taking biologic therapies for rheumatoid arthritis. The technology is used in addition to standard monitoring. It aims to reduce overall drug costs through dose reduction or cessation of ineffective drug treatments.

Cancer, Imaging, and Radiology

Caris Molecular Intelligence for Guiding Cancer Treatment
NICE

Caris molecular profiling uses biomarkers to analyze the individual patient's tumour and identify which therapies, including those in ongoing clinical trials, may be effective. Caris Molecular Intelligence (formerly called Caris Target Now) is for patients with solid tumours who have already undergone standard therapies to determine the next treatment options. It is an additional cost to standard care.

Clinical Cancer Advances 2018
ASCO

ASCO's 13th annual review of advances in oncology highlights the first chimeric antigen receptor (CAR) T-cell therapies for certain types of leukemia and lymphoma, tissue-agnostic therapy or precision medicine, immune checkpoint inhibitors (immunotherapies), and tumour-treating fields for glioblastoma.

HTG EdgeSeq ALK*Plus* Assay EU for ALK Status Testing in Non-Small-Cell Lung Cancer
NICE

This in vitro diagnostic test identifies ALK (anaplastic lymphoma kinase) status in patients with non−small cell lung cancer. Identifying mutations in the *ALK* gene can help guide drug treatment. The HTG EdgeSeq assay costs more than current ALK test methods, such as fluorescence in situ hybridization (FISH) and can be used only with the HTG EdgeSeq analyzer.

L-Dex U400 for Lymphoedema After Breast Cancer Treatment
NICE

Lymphedema (swelling and discomfort due to the buildup of lymph fluid) is a common adverse event after breast cancer treatment. Currently, the main method used to detect lymphedema is limb circumference measurement. The L-Dex U400 uses bioimpedance spectroscopy to detect fluid buildup before it is clinically evident. This may allow earlier interventions, such as exercise therapy, compression bandages, or surgery.

Patient-Controlled Carbon Dioxide Tissue Expansion for Breast Reconstruction
CADTH

Tissue expanders are used in women who choose breast reconstruction after a mastectomy to create space for the insertion of a breast implant. The AeroForm Tissue Expander System uses carbon dioxide gas, contained in a tiny implanted canister, and is self-administered daily using a remote control device. The AeroForm system is an alternative to conventional tissue expansion, which requires a series of saline solution injections administered by a physician over a period of months.

Radiation Dose Monitoring Software For Medical Imaging With Ionising Radiation
NICE

This briefing covers eight radiation dose monitoring software technologies that collect information on patient exposure to radiation from diagnostic imaging and X-ray guided procedures. The software technologies included are DOSE, DoseM, DoseMonitor, DoseTrack, DoseWatch, DoseWise, OpenREM, and teamplay. OpenREM is open source and freely available; the other technologies have an annual, per-hospital cost. Software that automatically collects radiation exposure may reduce specialist staff time needed to manually calculate exposures.

Cardiovascular

Arctic Sun 5000 for Therapeutic Hypothermia After Cardiac Arrest
NICE

The Arctic Sun 5000 is used to induce mild hypothermia in adult patients who are comatose after having a sudden heart attack and intends to reduce the risk of brain injury and improve neurological outcomes. The system uses four gel pads covering at least 40% of the patient's body to provide rapid cooling, maintain temperature, and rewarm. The pads are used in conjunction with an indwelling temperature probe; thus, the system is less invasive than endovascular cooling systems and more efficient than external systems.

Biopatch for Venous or Arterial Catheter Sites
NICE

The Biopatch is a sterile foam dressing that contains the antiseptic agent chlorhexidine gluconate and is intended to reduce the risk of infection in patients with venous or arterial catheters. The patch is applied to venous and arterial catheter access sites before catheter insertion and continuously releases chlorhexidine gluconate for seven days.

VEST External Stent for Coronary Artery Bypass Grafts
NICE

VEST (venous external support) is an external stent for use in some patients undergoing coronary artery bypass graft surgery (CABG). The device provides external support to vein grafts and may help prevent closure or obstruction of the graft, reduce the progression of vein graft disease, and minimize the need for subsequent interventions.

Endocrine, Nutrition, and Metabolic

ACT Now!
Scottish Health Technologies Group

ACT Now! is a brief, self-guided program designed to help people living with type 2 diabetes, with a history of poor glycemic control, improve glycemic control and emotional well-being. Using a mixture of face-to-face meetings with a psychologist and Web-based support material, the program aims to help participants identify what is important in their lives, set goals and priorities, and affect changes in behaviour that may indirectly have a positive effect on diabetes risk factors and health outcomes.

Aptiva for Painful Diabetic Neuropathy
NICE

A non-drug option for the treatment of painful diabetic neuropathy, Aptiva uses modulated electrical pulses (frequency rhythmic electrical modulated system) intended to improve the flow of oxygen to nerve cells. Electrode pads connected to the lower leg and foot administer electrical pulses for a session lasting 35 minutes. Ten daily sessions, three times per year, are recommended. Aptiva could be used to replace or in addition to existing drug therapy.

FreeStyle Libre for Glucose Monitoring
NICE

The FreeStyle Libre is a flash glucose monitoring (a type of continuous glucose monitoring) system intended to reduce routine fingerstick testing in people living with insulin-dependent diabetes. The system consists of a skin patch sensor (applied to the upper arm to continuously read glucose levels in the fluid surrounding the cells) and a reader to download data from the sensor when the two are in close proximity. The reader then displays current glucose levels, a trend graph for the previous eight hours, and an indication of whether levels are trending up or down.

Health app: GDm-Health for People With Gestational Diabetes
NICE

GDm-Health is a mobile app developed and based in the UK for use by people with gestational diabetes. The android and iOS app is designed to download blood glucose readings from a reader and deliver them to a health care provider via a secure website. Users can also include notes to help explain unusually high readings. The clinician website identifies users who need intervention and prioritizes those who need a review by a midwife. It also allows clinicians to set alerts (e.g., for high and low readings), to communicate with users via text messaging, and to communicate with other health care providers in the circle of care.

Gastroenterology and Liver

Point-of-Care and Home Faecal Calprotectin Tests for Monitoring Treatment Response in Inflammatory Bowel Disease
NICE

For people living with inflammatory bowel disease, fecal calprotectin, a marker of intestinal inflammation, may be used to monitor disease remission and response to treatment. This report identified five technologies for testing fecal calprotectin at the point-of-care or at home. Home testing allows patients to monitor levels and send results to their health care provider using a smartphone app. These tests are intended for use in addition to clinical observations and patient-reported symptoms.

Point-of-Care Testing for *Heliobactor pylori* Infection
NIHR-DEC

Heliobactor pylori (H. pylori) is a common bacterium that can cause stomach upset, peptic ulcers, and gastric cancers. New diagnostic tests that use non-dispersive isotope selective infrared spectroscopy (NDIRS) have been developed for use in primary care settings. NDIRS is intended as a rapid and inexpensive way to detect active *H. pylori* infection and confirm eradications outside the clinical laboratory setting. This report identifies seven technologies from three manufacturers (Kibion, Otsuka, and Fischer ANalysen Instrumente).

Infectious Disease and Infection Control

FebriDx for C-Reactive Protein and Myxovirus Resistance Protein A testing in Primary Care
NICE

FebriDx is a rapid, point-of-care blood test that detects two biomarkers: C-reactive protein and myxovirus resistance protein A. C-reactive protein is elevated in patients with bacterial infections, whereas myxovirus is elevated in those with viral infections. The test may help primary care providers to distinguish bacterial from viral acute respiratory tract infections and identify whether and which antibiotics are needed. FebriDx would be an add-on cost to standard practice.

Fungitell for Antifungal Treatment Stratification
NICE

Fungitell is a rapid (one-hour) laboratory test that can detect the presence of pathogens that cause fungal infections. Fungal infections are particularly common in patients who receive stem cell or organ transplants, people with HIV, and people on immunosuppressants. Fungitell is used in addition to standard care to guide whether or not antifungal treatments can be stopped.

A Rapid Test for Microbial Identification in Patients With Suspected Sepsis
CADTH

The FilmArray Blood Culture Identification panel is a rapid diagnostic test that can detect 24 sepsis-related pathogens (bacteria and yeast) and three antimicrobial resistance genes in patients who are suspected of having sepsis. A blood culture is still required, but the FilmArray panel can identify the specific pathogens much more quickly (in about an hour) than laboratory blood cultures. This rapid identification may help to ensure that the patient quickly receives appropriate antibiotics, and the test could play a part in antimicrobial stewardship programs.

Kidney and Urology

Farco-Fill Protect for Indwelling Urinary Catheterisation
NICE

The Farco-fill Protect is a broad-spectrum antimicrobial agent (0.3% triclosan) solution in a syringe used in Foley catheter balloon catheters. The device is intended to reduce bacteria in the urine in patients requiring long term indwelling urinary catheters, which in turn may reduce blockages due to encrustation and, potentially, the frequency of catheter changes. Whether it reduces the rate of catheter-related urinary tract infections is not yet clear.

Memokath-028, 044 and 045 Stents for Urethral Obstruction
NICE

These Memokath stents are intended to relieve blockages of the urethra and bladder neck or outlet (e.g., in men with benign prostatic hypertrophy). They are a less invasive alternative to existing urethral stents or indwelling catheters. The stents are made from a nickel–titanium alloy and may be easier than other stents to insert and remove. The stents could reduce the need for indwelling catheter changes and, consequently, the number of hospital visits for patients and the workload for community nursing services.

Urethrotech UCD for Difficult or Failed Catheterisation
NICE

The Urethrotech urethral catheterization device incorporates guidewire technology that facilitates the navigation of the catheter around an enlarged prostate. When the catheter is correctly positioned, the guidewire is withdrawn from the body. It is intended to be used in men after standard catheterization methods have failed and may be an alternative to more invasive cystoscopy and suprapubic catheterization.

Palliative and Long-Term Care

Mepilex Border Dressings for Preventing Pressure Ulcers
NICE

Mepilex Border dressings are intended for prevention of pressure injuries, specifically on the heel and sacrum. The multi-layered dressings can mitigate the effects of pressure and shear on the skin, helping to prevent a pressure injury from developing. The dressings are meant to complement other prevention strategies and are for patients of all ages.

Respiratory

Nasal Alar SpO2 Sensor for Monitoring Oxygen Saturation by Pulse Oximetry
NICE

The Nasal Alar SpO2 sensor attaches to the nasal ala (fleshy part of the nose) and performs continuous monitoring of peripheral oxygen saturation (SpO2). This single-use device is unique in using the nasal ala; traditional pulse oximetry sensors are commonly placed on a finger or toe. The Nasal Alar SpO2 sensor aims to improve accuracy and reliability of SpO2 measurement and could facilitate monitoring in patients with poor peripheral perfusion, for whom traditional sensors may be less effective. It can be used in all care settings and is indicated for both adult and pediatric patients who weigh at least 30 kg.

PleuraFlow Active Clearance Technology for Maintaining Chest Tube Patency
NICE

After cardiothoracic surgery or chest trauma, chest drains may be needed to evacuate blood, fluid, and air from the pleural space and allow the lungs to expand properly. However, the tube that is inserted into the chest for drainage is at risk of becoming blocked by the matter that flows through it. The PleuraFlow Active Clearance Technology is a chest drain that comes with a built-in system to prevent and clear occlusion of the tube, thus improving patient outcomes through reduced chest drain complications.

Thora-3Di for Assessing Asthma in Children
NICE

Thora-3Di is a non-invasive, non-contact device to measure respiratory function for diagnosing and managing children with asthma. The standard measurement method, spirometry, requires the patient to perform specific breathing manoeuvres during testing, which can be challenging for pediatric patients. The potential advantage of Thora-3Di lies in its ability to acquire various types of respiratory function data while the patient is breathing normally and sitting still for a few minutes.

Other

Health App: ChatHealth Communication Platform in School Nursing Services
NICE

ChatHealth is an app developed to allow adolescents to text school nurses with health questions anonymously and receive replies confidentially. The annual costs are based on the number of nurses providing the service, with an additional monthly fee per user. ChatHealth may increase access to and use of school nursing services and allow more efficient use of nursing staff time.

Health App: Sleepio for Adults With Poor Sleep
NICE

Sleepio uses cognitive behavioural therapy as a self-help tool for individuals with insomnia. As a phone app, it may reduce the need for, and consequently the costs of, in-person therapy for sleep disorders. It may also improve access to cognitive behavioural therapy. The app can link to wearable fitness trackers that monitor sleep patterns.

Trends and Forecasts

CADTH — 2017 *Horizon Scan Roundup Part 1*
The first part of the 2017 roundup of horizon scanning reports from CADTH and other agencies covering the period January to June 2017.

Cleveland Clinic Innovations — 2018 Top 10 Medical Innovations
Technologies included in the 2018 top 10 list include hybrid closed-loop insulin delivery systems for type 1 diabetes, neuromodulation to treat obstructive sleep apnea, gene therapy for inherited retinal diseases, the unprecedented reduction of LDL cholesterol, the emergence of distance health, next-generation vaccine platforms, targeted breast cancer therapies for patients who are BRCA1 or BRCA2 positive, enhanced recovery after surgery, centralized monitoring of hospital patients, and scalp cooling for reducing chemotherapy-induced hair loss.

ECRI Institute — 2018 Top 10 Hospital C-Suite Watch List
The latest annual C-suite list includes the reSET and Opioid Addiction Recovery Support (OARS) apps for opioid and other types of addiction; direct-to-consumer genetic testing; acuity-adaptable rooms to reduce patient handoffs, improve safety and workflow, and reduce hospital costs; the Confirm Rx insertable cardiac monitor to prevent stroke in patients with atrial fibrillation; virtual reality to reduce pediatric pain and anxiety; NeuroAD, a device that delivers non-invasive transcranial magnetic stimulation for patients with Alzheimer disease; TAP (touch-activated phlebotomy) microneedles for blood draws; the Embrace Neonatal MRI; GammaTile Cesium-131 intraoperative brachytherapy for brain tumours; and microhospitals to provide health care in rapidly growing suburban areas.

Medgadget — Best Medical Technologies of 2017
The Medgadget highlights of innovative medical technologies from 2017 include pills as devices (e.g., ingestible diagnostic devices, for microneedle drug delivery as an alternative to insulin injections, and for compliance with medication); heart pumps; prostheses with sensory capability, exoskeletons for children with cerebral palsy, and brain-computer interfaces to improve communication for individuals with disabilities such as Amytrophic Lateral Sclerosis; an artificial womb for premature babies; miniaturized point-of-care diagnostic devices; deep learning or machine-based learning devices and apps; and surgical innovations for wound retraction and protection and for closing surgical incisions.

The Medical Futurist — The 10 Most Exciting Digital Health Stories of 2017

Dr. Bertalan Meskó highlights 2017 developments in digital health, including diabetes care, radiology and artificial intelligence, precision medicine in cancer care, wearable health technologies, medical communication using chatbots, and drugs with sensors.

Senate of Canada, Standing Senate Committee on Social Affairs, Science and Technology — Challenge Ahead: Integrating Robotics, Artificial Intelligence and 3D Printing Technologies Into Canada's Healthcare Systems

The Senate report reviews the potential implications of robotic technologies, artificial intelligence, and 3 D printing in health care, including ethical and privacy issues, effects on home care, rural and remote care delivery, and impacts on the workforce.

Horizon Scanning Newsletters and Multi-Topic Reports

CADTH — *Health Technology Update* — Issue 19, September 2017

In this issue:

- New disinfection technologies to reduce health care–associated infections

- Blue-violet light disinfection for hospital rooms

- A pulsed-xenon UV light disinfection system for hospital rooms

- A countertop UV-C light disinfection system for mobile devices

- Antimicrobial compressed salt for high-touch surfaces

- Shark skin–like micropatterned surfaces to reduce bacterial adhesion

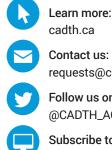### ISCRR — Horizon Scanning Newsletter — Issue 5, July 2017

In this issue:

- GLITter: Psychoeducational intervention for back pain

- Intravenous immunoglobulin therapy for spinal cord injury

- Ronopterin for prevention of secondary injury in traumatic brain injury

- Emego for people with severe disabilities who use assistive technologies

- Aurix therapy for pressure ulcers

- Model of care for musculoskeletal pain and depression

- DermaTherapy for pressure ulcer prevention

- UrgoStart dressing for chronic wounds

- Online training for chronic knee pain

ISCRR — Models of Care for the Management of Persistent Musculoskeletal Pain and/or Depression

This brief describes four interventions for the management of persistent musculoskeletal pain or depression. The interventions include Green Light Imaging Interpretation to Enhance Recovery GLITtER (a psychoeducational intervention for low back pain), Internet-delivered training for pain-coping skills, collaborative care for older patients with mild depression, and an integrated approach for chronic musculoskeletal pain and depression in primary care.

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