THE ORIGIN Rx

Your healthcare capital markets prescription

Healthcare Industry Update

Monday, June 18th, 2018

THE ORIGIN RX

Medicine in the making

Canadian capital markets have been focused on the legalization of recreational cannabis and what the legislation and emerging market dynamics will look like. To that end, another hurdle was cleared on June 8th, when Canada's Senate passed Bill C-45 in a 56-30 vote, in favor of legalizing the recreational use of marijuana. The bill will go back to the House of Commons, where the government will decide whether to approve, reject or modify the changes before returning it to the Senate for another vote.

Today we're looking more closely at cannabis-extracted pharmaceuticals, with the pending FDA NDA review of the first cannabis extracted pharmaceutical product – the PDUFA date for Epidiolex – expected by June 27. Epidiolex is UK-based GW Pharma's lead cannabinoid product candidate. GW's formulation of purified CBD is being developed to treat several rare childhood-onset epilepsy disorders. On April 19 the FDA's Peripheral and Central Nervous System Drugs Advisory Committee unanimously recommended supporting the approval of the NDA for the investigational CBD oral solution for specified indications. If approved, Epidiolex would be the first pharmaceutical formulation of purified, plant-based CBD, a cannabinoid lacking the "high" associated with marijuana, and the first in a new category of anti-epileptic drugs.

There are 127 clinical studies listed with the FDA (clinicaltrials.gov) involving CBD, 288 studies involving THC, and more than 650 studies involving cannabis and cannabinoids in general (excludes suspended, withdrawn and terminated studies). Trials at all phases include studies of imaging, dependence, anxiety, palliative, schizophrenia and epilepsy. Both academic researchers and corporates are sponsoring the studies. They are looking at a variety of API formulations, such as oral, topical and vaporized solutions as well as smoked in certain instances.

The study of pharmaceutical cannabinoids is hardly brand new. In fact, the removal of cannabis from Schedule I of the Controlled Substances Act to allow medical and adult use has been proposed many times since 1972. Patents issued by the US PTO, describing the therapeutic potential for cannabinoid compounds, have also been around for decades. For example, a patent describing cannabinoids as antioxidants and neuroprotectants dates back 15 years. Coincidentally that patent is owned by the US Department of Health & Human Services (HHS, the FDA's parent agency); kind of interesting given cannabis' current scheduling meaning it's prohibited from having medical value and from being manufactured by pharma companies.

If Epidiolex is shown to have medical value and receives full FDA approval, we expect it to be a game-changer for therapeutics derived from the cannabis plant. Approval will likely trigger the declassification or reclassification of how cannabis and its derivatives are classified in the Controlled Substances Act. So far, the FDA has approved only synthetics Marinol and Cesamet, that resemble or are identical to THC to treat nausea from chemotherapy and other conditions. These are listed at Schedule III and Schedule II, respectively.

In order for Epidiolex to win complete approval and be commercialized, it must receive a positive decision by the U.S. Drug Enforcement Administration (DEA) and the HHS. One of the obstacles to date has been the presence of other cannabinoids in plant-extracted CBD, particularly psychoactive THC. But changes are happening. On June 13 the U.S. Senate passed a farm bill backed by Senate Majority Leader Mitch McConnell 20 to 1, legalizing hemp and making it a mainstream crop after decades of prohibition. Hemp is defined as a variety of cannabis with THC levels no greater than 0.3%. GW's Epidiolex is derived from their own proprietary strain of cannabis, not described as hemp or marijuana.

Epidiolex is indicated for the treatment of debilitating and often fatal forms of epilepsy. Full FDA approval would mean parents have a medication available in a standard dose available for their children to be treated legally. The first step may lead to the removal of cannabis from Schedule 1 of the Controlled Substance Act, and the federal legalization of cannabis. Further, the potential approval of Epidiolex could trigger a domino effect of controlled clinical trials and approvals for other uses of CBD and THC.

BIGGEST MOVERS

Recent News[1]

Markets have been positive so far in June with the TSX increasing 1.8% and the NASDAQ increasing 2.7%. It's been a mixed bag in healthcare subsectors, which follow in this report. A selection of the largest share price movers in the healthcare space during the recent period is included below:

- **TherapeuticsMD** (NasdaqGS:TXMD, +18%): TherapeuticsMD operates as a women's health care product company. Strong share price performance was driven by its first FDA-approved drug, IMVEXXY, an estradiol vaginal insert for the treatment of moderate-to-severe dyspareunia, a symptom of vulvar and vaginal atrophy, due to menopause. It is currently the only product specifically designed to be applicator-free
- **GT Biopharma** (OTCPK:GTBP, +35%): GT Biopharma is an immuno-oncology biotechnology company focused on treatments based on its proprietary platforms. Recent share price increase was attributable to positive clinical results from interim review of phase 1/2 clinical trial of OSX-1550, a bi-specific scFv recombinant fusion protein-drug conjugate that targets cancer cells expressing the CD19 receptor, the CD22 receptor or both
- **Dova Pharmaceuticals** (NasdaqGM:DOVA, +30%): Dova Pharmaceuticals is a clinical-stage pharmaceutical company focused on acquiring, developing and commercializing drug candidates. Recent share price appreciation was driven by the company's announcement of FDA-approval and the availability of DOPTELET in the U.S. for the treatment of thrombocytopenia in adult patients with chronic liver disease who are scheduled to undergo a procedure. DOOPTELET is the company's first commercial product launched in the U.S.
- **OrganiGram Holdings** (TSXV:OGI, +12%): OrganiGram Holdings is a Canadian producer and distributor of medical marijuana. Notable share price performance was driven by the announcement that Health Canada approved an expansion of its cultivation license, a suite of new products unveiled, a permit to export medical cannabis to Australia, as well as closed deals with Hyasynth Biologicals and Eviana Health
- **Nektar Therapeutics** (NasdaqGS:NKTR, -37%): Nektar Therapeutics is an American biopharmaceutical company based in San Francisco, California. Recent share price decline was as a result of its skin cancer drug study falling short of investor expectations. Patients diagnosed with melanoma did not react to experimental treatment as well as previous studies
- **Jounce Therapeutics** (NasdaqGS:NKTR, -30%): Jounce Therapeutics is a clinical stage immunotherapy company that develops therapies for the treatment of cancer. Share prices fell following the company's released preliminary results for its lead drug candidate, JTX-2011, monoclonal antibody for cancer treatment. The drug failed to deliver robust patient responses either as a stand-alone treatment or in combination with Bristol-Myers Squibb's Opdivo

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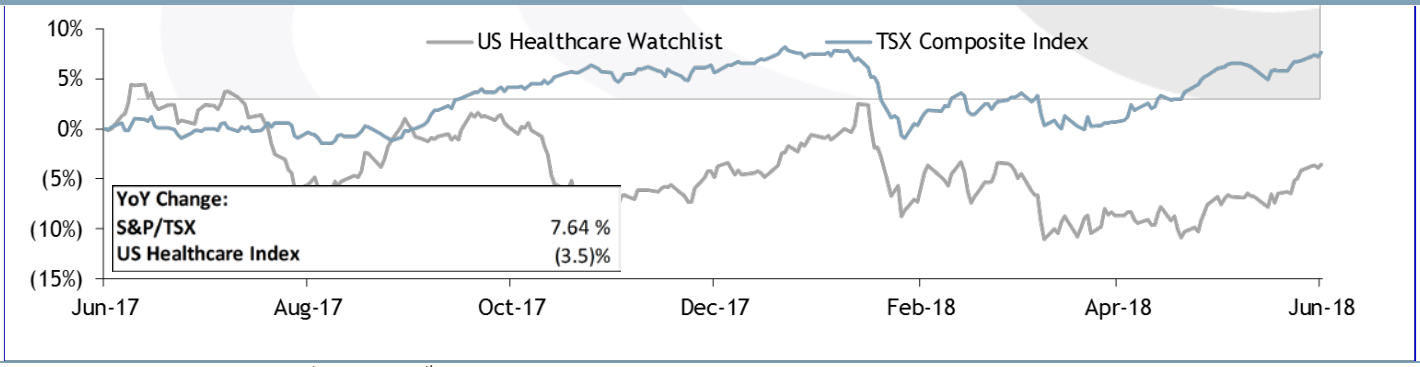
Note 1: For the period June 1st to June 14th, 2018

US HEALTHCARE WATCHLIST

News Scan[1]

- The US Healthcare Watchlist Index lost approximately 3.5% over the last twelve months, while the TSX Composite Index gained 7.6% over the same period. Some events making news this month:
- On June 12th, **Johnson & Johnson**, a diversified healthcare and consumer company, accepted private equity firm **Platinum Equity**'s US$2.1 billion buyout offer for the company's **LifeScan Inc** business, which makes blood glucose monitoring products
- On June 12th, **Flex Pharma Inc.**, a biotechnology company, announced its plans to stop two ongoing mid-stage trials, testing its lead drug, FLX-787, to treat neuromuscular diseases, following safety concerns
- On June 11th, **Roche Holding AG**, a Swiss multinational healthcare company, announced FDA approval for Venclexta in combination with Rituxan for the treatment of chronic lymphocytic leukaemia or small lymphocytic lymphoma.
- On June 8th, **Roche Holding AG** received FDA approval for MabThera/Rituxan for the treatement of adults with moderate to severe pemphigus vulgaris (PV), a rare, and potentially life-threatening condition characterized by progressive painful blistering of the skin and mucous membrane. MabThera/Rituxan is the first biologic therapy approved by the FDA for PV
- On June 8th, **Amgen Inc.**, an American multinational biopharmaceutical company, announced that the European Commission (EU) approved Prolia for the treatment of bone loss associated with long-term systemic glucocorticoid therapy in adult patients at increased risk of fracture. The EU's decision was based on the positive results of a Phase 3 study that evaluated the safety and efficacy of Prolia compared with risedronate in patients receiving glucocorticoid treatment
- On June 8th, private company **Acelity LP Inc.**, the world's largest wound care company, and **Crawford Healthcare**, a rapidly growing UK-based advanced wound care and dermatology company, announced an agreement for Acelity to acquire Crawford and all of its assets for an undisclosed amount
- On June 7th, **Bayer**, a German multinational, pharmaceutical and life sciences company, announced that it successfully completed the acquisition of **Monsanto** for US$56.3 billion in cash and US$128.0 per share. Bayer received approval from the **U.S. Justice Department's** Antitrust Division after it agreed to sell US$9 billion in assets to German chemical company, **BASF**
- On June 5th, **Gilead Sciences Inc.,** a research-based biopharmaceutical company, and **Hookipa Biotech AG,** a clinical-stage biotech company, announced that they have entered into a research collaboration and license agreement that grants Gilead exclusive rights to Hookipa's TheraT and Vaxwave arenavirus vector-based immunization technologies for two major chronic infectious disease indications, hepatitis B and HIV
- On June 4th, **AbbVie Inc.**, a biopharmaceutical company, announced the closing of its tender offer, in which the company accepted for purchase 72,815,534 common shares, at a price of US$103.0 per share, for an aggregate cost of US$7.5 billion. These shares represent 4.6% of shares outstanding

Relative Performance Index



Note 1: For the period June 1st to June 14th, 2018

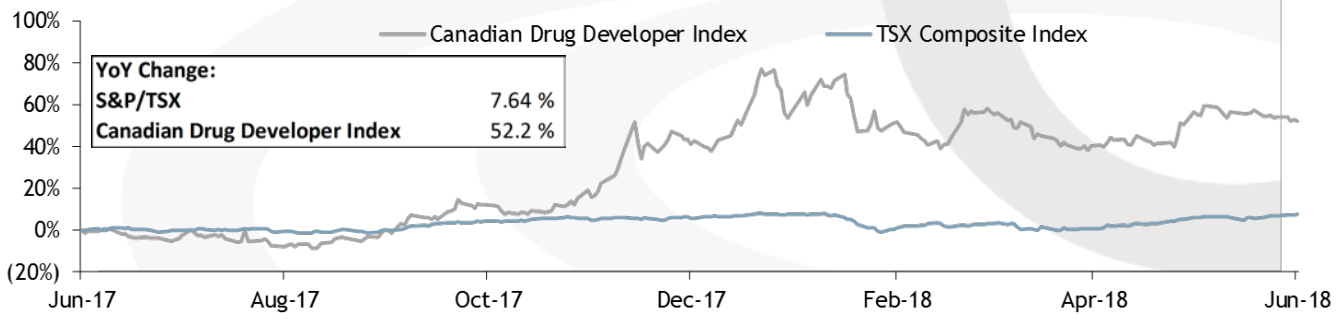
US Healthcare Watchlist Constituents: *Johnson & Johnson, Pfizer Inc., Roche Holding AG, Novartis AG, Merck & Co., Inc., AbbVie Inc., Amgen Inc., Medtronic plc, Gilead Sciences, Inc., Bayer AG, Abbott Laboratories, Bristol-Myers Squibb, GlaxoSmithKline plc, Eli Lilly and Company, AstraZeneca PLC, Celgene Corporation, Allergan plc, Boston Scientific Corporation, Mylan N.V., Teva Pharmaceutical Industries, Mallinckrodt Public Limited Company, Endo International plc*

CANADIAN DRUG DEVELOPERS

News Scan[1]

- The Canadian Drug Developers Index gained approximately 52.2% over the last twelve months, while the TSX Composite Index gained 7.6% over the same period. Some events making news this month:
- On June 11th, **Aquinox Pharmaceuticals,** a clinical-stage pharmaceutical company discovering and developing novel drug candidates to treat inflammation, inflammatory pain, and blood cancers, announced initiation of dosing in ProShip, a Phase 2 proof-of-concept clinical trial evaluating the efficacy and safety of once-daily Rosiptor in chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS), a urological condition characterized by chronic pelvic pain and voiding symptoms without evidence of urinary tract infection. There are currently no FDA approved treatment options for CP/CPPS
- On June 8th, **Resverlogix Corp.,** a late-stage clinical biotechnology company focused on patients with high-risk cardiovascular disease, diabetes mellitus, and chronic kidney disease, announced it has opted not to proceed with the previously announced public offering of units, based on the recent assessment of market conditions. On April 17th, the company filed the preliminary short form prospectus
- On June 7th, **Resverlogix Corp.** announced it is seeking a partnership with an existing stakeholder to fight against HIV-1. Resverlogix continues the development of apabetalone, an advanced epigenetic drug for the reduction of major adverse cardiac events in high-risk cardiovascular disease patients with type 2 diabetes mellitus and low levels of high-density lipoprotein, as well as in chronic kidney disease and Fabry disease
- On June 6th, **Zymeworks Inc.,** a clinical-stage biopharmaceutical company focused on the discovery, development and commercialization of next-generation multifunctional biotherapeutics, filed a preliminary prospectus for an offering of its common shares. The Offering of 6,210,000 common shares, including a fully-exercised overallotment option of 810,000 additional shares, at a price of US$15.75 for aggregate gross proceeds of approximately US$97.8 million, subsequently closed on June 11th
- On June 5th, **Oncolytics Biotech Inc.**, a Calgary-based company developing an intravenously delivered immuno-oncolytic virus called REOLYSIN for the treatment of solid tumors and hematological malignancies, closed its previously announced public offering of 1,532,278 common shares, include 160,065 additional shares exercised by underwriters, for aggregated gross proceeds of approximately US$8.9 million at $5.83 per share

Relative Performance Index



For the period June 1st to June 14th, 2018

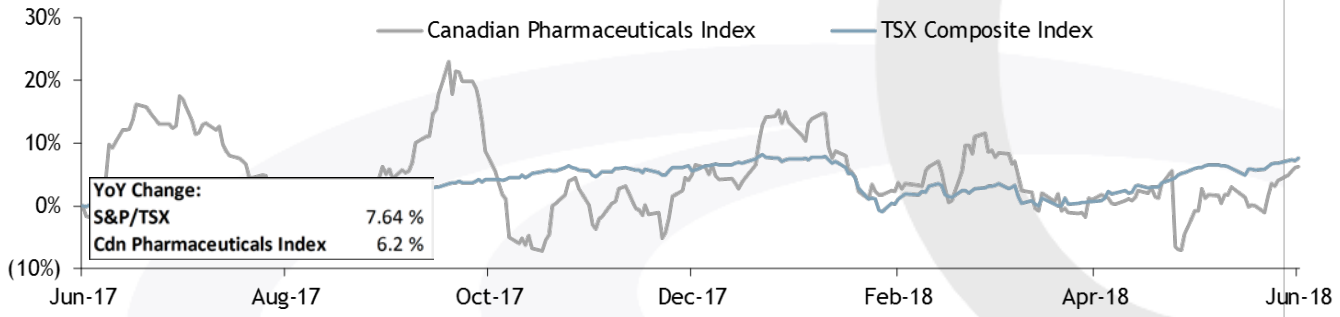
Canadian Drug Developers Constituents: *ProMetic Life Sciences Inc., Clementia Pharmaceuticals Inc., Aurinia, Pharmaceuticals Inc., Arbutus Biopharma Corporation, Resverlogix Corp., Aquinox Pharmaceuticals, Inc., Zymeworks Inc., ImmunoVaccine Inc., InMed Pharmaceuticals Inc., Sierra Oncology, Inc., Tetra Bio-Pharma Inc., Oncolytics Biotech Inc., Cardiome Pharma Corp., Acerus, Pharmaceuticals Corporation, ProMIS Neurosciences Inc., Aeterna Zentaris Inc., Trillium Therapeutics Inc.*

CANADIAN PHARMACEUTICALS

News Scan[1]

- The Canadian Pharmaceuticals Index gained approximately 6.2% over the last twelve months, while the TSX Composite Index gained 7.6% over the same period. Some events making news this month:
- On June 12th, the subsidiary of **Valeant Pharmaceuticals**, **Bausch + Lomb**, a global eye health company, announced the introduction of Ocuvite Blue Light eye vitamins, a nutritional supplement formulated with lutein and zeaxanthin, the two carotenoid pigments naturally found in the eye
- On June 1st, **Valeant Pharmaceuticals Inc.,** a multinational specialty pharmaceutical company based in Laval, Canada, announced that it has entered into a new credit agreement effectuating a full refinancing of its secured revolving and term loan credit facilities, and closed the previously announced offering of US$750 million aggregate principal amount of 8.5% senior notes due in 2027
- On June 7th, **Concordia International Corp**., an international specialty pharmaceutical company focused in specialty, off-patent medicines, announced that the previously announced recapitalization transaction has received the requisite level of debtholder approvals. The majority of affected debtholders were in favour of the approval of the Canadian Business Corporations Act Plan
- On June 7th, **Acerus Pharmaceuticals Corporation,** a Canadian pharmaceutical company, announced that it has entered into a revised agreement with **Mackie Research Capital Corp.,** to increase the size of its previously announced bought deal offering to C$5,750,010 of units at the price of C$0.30 per unit. Each unit comprises one common share and one common share purchase warrant at an exercise price of C$0.40 at any time up to 24 months following the closing date. The Company also granted an overallotment option to underwriters to purchase up to an additional 15% of the total units offered up to 30 days after the closing dated

Relative Performance Index



For the period June 1st to June 14th, 2018

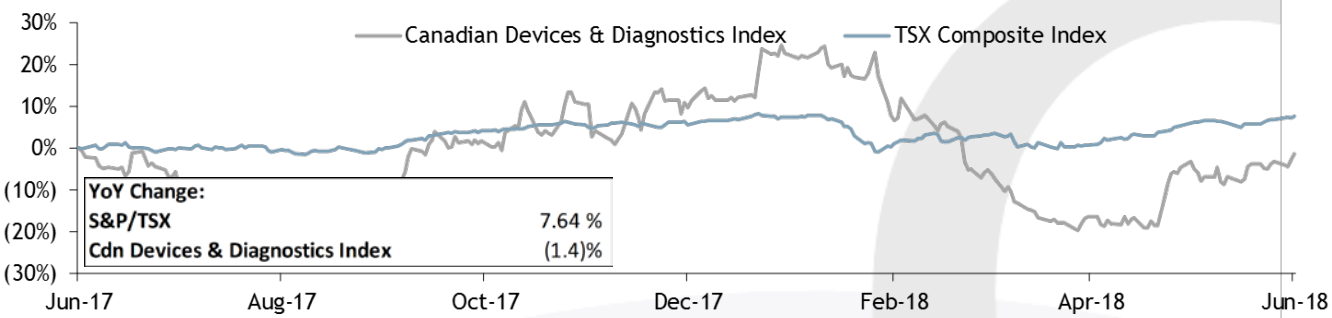
***Canadian Pharmaceuticals Constituents**: Valeant Pharmaceuticals International, Inc., Knight Therapeutics Inc., Concordia International Corp., Aralez Pharmaceuticals Inc., Theratechnologies Inc., Zomedica Pharmaceuticals Corp.*

CANADIAN DEVICES & DIAGNOSTICS

News Scan[1]

- The Canadian Devices & Diagnostics Index lost approximately 1.4% over the last twelve months, lagging the TSX Composite Index which gained 7.6% over the same period. Newsmakers for June 2018:
- On June 11th, **Lexington Biosciences Inc.,** a medical device company developing a non-invasive diagnostic device to measure and monitor cardiovascular health, announced that it has amended the terms of its previously announced brokered private placement. The company intends to sell up to 8,000,000 units at the price of C$0.25 per unit for gross proceeds of up to C$2.0 million. Each unit consist of one common share and one common share purchase warrant exercisable at C$0.375
- On June 1st, **Titan Medical Inc.,** a medical device company focused on the design, development and commercialization of a robotic surgical system for application in minimally invasive surgery, announced that it has applied to list its common shares on the Nasdaq Stock Market. The Board has approved a consolidation of the Company's outstanding common shares in a ratio of 1-for-30, which is expected to take effect prior to the opening trading date on June 19th

Relative Performance Index



For the period June 1st to June 14th, 2018

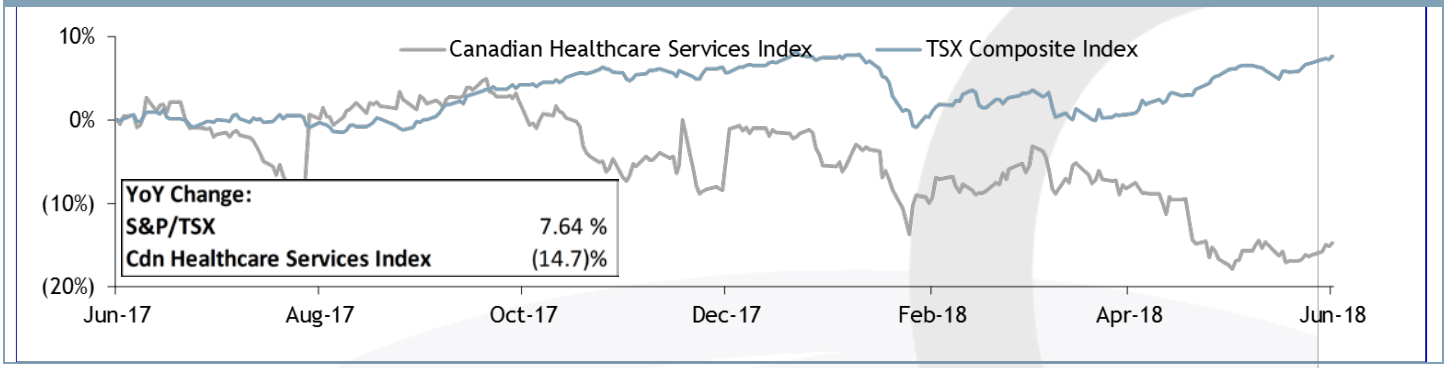
***Canadian Devices and Diagnostics Constituents**: CRH Medical Corporation, TSO3 Inc., Titan Medical Inc., Opsens Inc., Neovasc Inc., ChroMedX Corp., Profound Medical Corp., Covalon Technologies Ltd., Spectral Medical Inc., Hamilton Thorne Ltd.*

CANADIAN HEALTHCARE SERVICES

News Scan[1]

- Last twelve-month performance of the Canadian Healthcare Services index decreased 14.7%, while the TSX Composite Index increased 7.6% over the same period. In June, the following occurred in the Canadian healthcare services space:
- On June 11th, **Nova Leap Health,** a provider of personal home care and support services, completed its C$2.1 million acquisition of **Always Home HomeCare Services**, a Canadian home care agency, and its subsidiary **Always Safe Training.** Nova Leap has focused its acquisition strategy on the highly fragmented market of small privately held companies providing patient one-on-one care in their homes, as well as U.S. acquisitions including companies operating in New Hampshire, Rhode Island, Vermont and Massachusetts
- On June 4th, **Medical Facilities Corp.,** a company in partnership with physicians, owns surgical facilities in the United States which deliver innovative, high-quality medical care with the finest hospitality service, announced the completed sale of its 51% stake in **Integrated Medical Delivery (IMD)** to **N. Harris Computer Corporation.** The company decided to divest IMD to focus its efforts on growing its core business of partnering with physicians to own and operate high quality healthcare facilities, but it expects to maintain and continue a strong working relationship with IMD

Relative Performance Index



For the period June 1st to June 14th, 2018

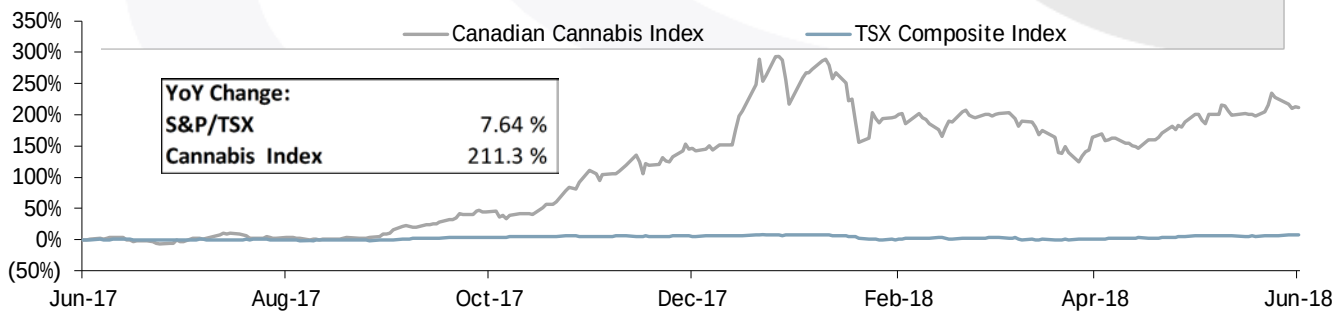
Canadian Healthcare Services Constituents: *Sienna Senior Living Inc., Extendicare Inc., Medical Facilities Corporation, Akumin Inc, Centric Health Corporation*

CANNABIS

News Scan[1]

- As of June 15th, the ACMPR has authorized 109 licensed producers. Last twelve-month performance of the Cannabis Index was approximately 211.3% dwarfing the 7.6% gain of the TSX Composite Index over the same period. Highlights of cannabis news for June 2018:
- On June 14th, **The Organic Dutchman Holdings** announced that it has entered into a strategic partnership with **Epican Medicinals**, a vertically-integrated Jamaican cannabis company, and the company is expected to acquire a 49% stake. This partnership will add an additional 14,000 kgs, taking TGOD's total organic funded capacity to 130,000 kgs
- On June 14th, **Hiku Brands Company** and **WeedMD** announced that WeedMD has obtained an interim order from the Ontario Superior Court of Justice authorizing the holding of a special meeting of WeedMD shareholders to consider the previously announced merger. The vote is to be held on July 11th
- On June 13th, **Canopy Growth Corp.** announced that it is offering C$400 million aggregate principal amount of convertible senior notes maturing in 2023. Then on June 15th, the company granted the initial purchasers of the notes an option to purchase up to an additional C$100 million aggregate principal amount of notes, totalling C$500 million
- On June 13th, **Choom Holdings**, a retail and high-grade handcrafted cannabis supplier, announced a non-brokered private placement for gross proceeds of up to C$10 million, including a C$7 million lead order from **Aurora Cannabis**
- On June 12th, **Aurora Cannabis** signed a binding term sheet with privately-held **Anandia Laboratories** to acquire all the outstanding common shares in an all-share transaction valued at approximately C$115 million on a fully diluted basis. Anandia is established in science, genetics, and independent cannabis product testing. The acquisition well positions Aurora to develop new cannabis cultivars with its Anandia's intellectual property
- On June 11th, **Aurora Cannabis** announced signing of a cannabis flower and trim supply agreement with **Ascent Industries Corp's** wholly-owned subsidiary, **Agrima Botanicals Corp.**, a licensed producer of medical cannabis. Under the terms of the Agreement, Agrima will supply Aurora with up to 20,000 kg of dried cannabis flower and up to 6,000 kg of cannabis trim per year from its Canadian cultivation facilities
- On June 11th, **PRØHBTD**, the leading cannabis lifestyle media and brand platform, announced that it has raised USD $12 million in funding, US$8 million of which was recently secured from a Series A round of investment and the remaining US$4 million came from seed funding
- On June 11th, **MPX Bioceutical Corporation** announced that it has completed an acquisition of 100% of the issued and outstanding shares of **Canveda**, for C$3.1 million in cash and C$15 million in shares. With the funds, Canveda is ready to commence its first production run, with annual production capacity of 1,000-1,200 kg
- On June 7th, **Terrascend Corp.** announced the formation of a strategic joint venture with **Cistron Corp.**, with the launch of **Ascendant Laboratories Inc.**, a science and innovation company dedicated to the advancement of cannabinoid expressing plant biology

Relative Performance Index



For the period June 1st to June 14th, 2018

Cannabis Index Constituents: *Canopy Growth Corporation, Aurora Cannabis Inc., Aphria Inc., MedReleaf Corp., CannTrust Holdings Inc., CanniMed Therapeutics Inc., Cannabis Wheaton Income Corp., OrganiGram Holdings Inc., The Supreme Cannabis Company, Inc., The Hydropothecary Corporation*

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