May 2023

Industry Highlights on
Healthcare

The Origin Rx

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Exploring Foundation Models in Healthcare

Sanjana Basu, an Investor at Radical Ventures, believes AI will impact everything and is excited about technically differentiated teams applying AI to solve problems across sectors. Sanjana shares her insights on AI (and specifically, foundation models such as GPT-4) in Healthcare, and provides a toolkit to develop task specific Healthcare models.

AI is now part of every executive's vocabulary, and businesses everywhere are leveraging foundation models, the most popular amongst them being large language models (e.g., GPT3, GPT4). A recent example in healthcare is Epic integrating GPT-4 into its EHR[1]. Epic owns the highest share of the U.S. acute care hospital market[2] and hopes to increase provider productivity and reduce the administrative burden of clinicians through this partnership. Another recent example is Google's medical large language model[3], Med-PALM, which is being released to a select group of Google Cloud customers to explore use cases as they investigate safe and responsible ways to use the technology.

- *What is a Foundation Model?*

The term foundation model was coined by Stanford HAI in 2021 to describe a growing number of models trained using self-supervised learning on large amounts of broad data with the ability to adapt to a wide range of downstream tasks[4].

- *Foundation Models: A Tool in the Toolkit of Health Machine Learning Researchers & Engineers*

In theory, multi-modal generalized healthcare models have the potential to significantly reduce the cost of developing and deploying models for singular clinical or administrative tasks, specifically, costs associated with data acquisition, labeling, and pipelining. Foundation models then become just another tool in the toolkit of machine learning researchers and engineers working to solve the plethora of problems in the healthcare domain.

Healthcare is ideally suited to the development of foundation models. The scale of healthcare data keeps multiplying. We are now close to a point when digital data outpaces data lying within healthcare organization siloes. Unlocking this data has been hard, and existing legacy systems make it tough to leverage that data effectively for healthcare decisions. This makes collecting clinically validated healthcare data to train algorithms costly and time-consuming, impacting the market speed for healthcare AI algorithms.

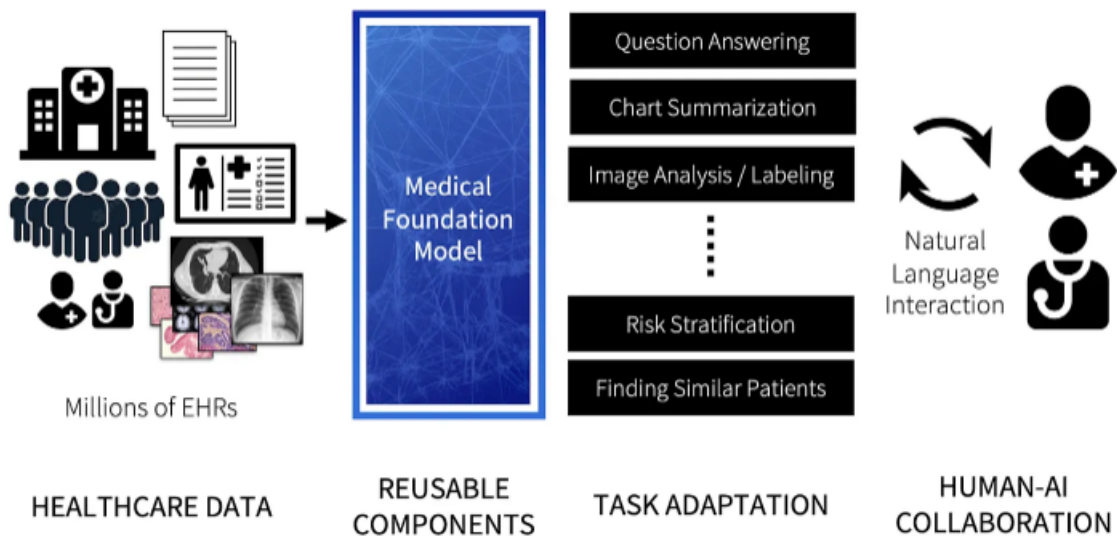1   https://medcitynews.com/2023/04/epic-to-integrate-gpt-4-into-its-ehr-through-expanded-microsoft-partnership/
2   https://klasresearch.com/report/global-non-us-emr-market-share-2022-the-impact-of-the-pandemic-s-second-year/2034
3   https://cloud.google.com/blog/topics/healthcare-life-sciences/sharing-google-med-palm-2-medical-large-language-model
4   https://arxiv.org/abs/2108.07258

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Exploring Foundation Models in Healthcare

Source: Stanford HAI piece on How Foundation Models Can Advance AI in Healthcare

- *How can Foundation Models be Leveraged in Healthcare?*

The lowest hanging fruit is general and administrative tasks. These tasks have created massive inefficiencies in the healthcare system and have a higher margin for error than clinical decisions. We will see the development of models that support the downstream tasks associated with note-taking & summarization, patient data identification & redaction, billing & revenue cycle management, and administrative navigation & coordination in multi-stakeholder healthcare systems.

Clinical foundation models may take longer to reach the mainstream and will be rightfully held to a higher standard of safety and reliability. Multi-modal generalist medical foundation models have the promise to deliver on multiple target tasks but will come up against a few challenges and will be leveraged differently[5]. Clinical AI that solves varied human health conditions has a very low to negligible margin for error. Stanford HAI recently called for a Medical Holistic Evaluation Language Model "(HELM")[6] that builds upon the HELM[7] project that improved the transparency in evaluating Large Language Models. When medical foundation models become safe to use, they will be fine-tuned with small, high-quality, unbiased, task-specific 'designer datasets' to accurately support clinical decision-making.

Foundation models are being deployed at scale and revolutionizing everything we do. While the adoption of foundation models in healthcare will be slower relative to other sectors, it will usher in a new era of health AI deployments by making the process more efficient.

5 https://www.nature.com/articles/s41586-023-05881-4
6 https://hai.stanford.edu/news/shaky-foundations-foundation-models-healthcare
7 https://crfm.stanford.edu/helm/latest/

- On May 18ᵗʰ, **Forum Health, LLC ("Forum Health")**, a US-based network of integrative and functional medicine providers, announced that it has acquired **Hormones by Design**, a network of clinics in Texas providing hormone replacement therapy, lab testing and aesthetic treatments, for an undisclosed amount. The acquisition more than doubles Forum Health's presence in Texas

- On May 12th, **Dentalcorp**, Canada's largest consolidator of dental practices, announced they were terminating their strategic review process, previously announced in November 2022, citing the reason that offers received did not reflect fair value of the company

- On May 11ᵗʰ, **OCLI Vision**, a US-based network of ophthalmology practices, supported by the management and administrative services of **Spectrum Vision Partners**, which is backed by **Blue Sea Capital**, a US-based PE firm, announced its acquisition of **Crossroads Eye Care Associates**, an eye care practice based in Pittsburgh, for an undisclosed amount. The deal expands OCLI Vision's footprint in Pennsylvania

- On May 5ᵗʰ, **Thurston Group**, a US-based PE firm, through its portfolio company **ARC Health**, a US-based group of mental healthcare practices, announced its acquisition of **Positive Change Counseling Center ("PCCC")**, a mental health practice in San Diego and Ventura counties, for an undisclosed amount. The partnership with ARC Health will enable PCCC to access additional resources and support to further develop its practice and expand its reach throughout the region

- On May 3ʳᵈ, **HouseWorks, LLC. ("HouseWorks")**, a provider of personal care services across the Northeastern US, announced its acquisition of **Care and Help Home Care**, a home care provider serving the greater Philadelphia, Allentown, Harrisburg, and Pittsburgh area, for an undisclosed amount. The acquisition expands HouseWorks' existing network in Pennsylvania, ensuring that its 'BetterCare at Home' model can be accessed by Medicaid, pediatric, and dual-eligible clients

- On May 3ʳᵈ, **Option Care Health, Inc. (Nasdaq: OPCH)**, a US-based provider of home and alternate site infusion services, announced that it has entered into a definitive agreement to acquire **Amedisys, Inc. (Nasdaq: AMED)**, a US-based provider of home health, hospice and high-acuity care, for US$3.6 billion. For the 12-months ending March 31ˢᵗ, 2023, Amedisys had revenue of US$2.2 billion and EBITDA of US$201 million. The combined entity will have comprehensive capabilities across the alternate site care spectrum, while also being positioned to move deeper into value-based care

- On May 2ⁿᵈ, **Medical Specialists of the Palm Beaches ("MSPB")**, a primary care-focused, multi-specialty physician group practice in South Florida, backed by **Ascend Partners**, a US-based healthcare-focused PE firm, and **CareAbout Health**, a US-based healthcare management services organization, announced that it has acquired **Cohen Medical Associates**, a primary care practice with five physicians across two locations in Delray Beach, FL, for an undisclosed amount. This acquisition will increase MSPB's primary care provider network by approximately 15% and will support Cohen Medical Associates' expansion into value-based care

Key Indicators

In $CAD millions	Market Cap	TEV	TEV / Revenue 2023E	2024E	TEV / EBITDA 2023E	2024E	Price % of 52-Week High
dentalcorp Holdings Ltd.	1,367.0	2,631.7	1.8x	1.6x	9.9x	8.8x	54.3%
Neighbourly Pharmacy Inc.	923.5	1,219.1	1.3x	1.2x	12.1x	9.3x	76.4%
CareRx Corporation	130.9	226.1	0.6x	0.5x	7.5x	5.8x	48.0%
Akumin Inc.	47.7	2,237.3	2.1x	2.0x	10.7x	9.5x	16.9%
Average			**1.5x**	**1.3x**	**10.1x**	**8.4x**	**48.9%**

▶ On May 22nd, **Pear Therapeutics ("Pear")**, a developer of digital therapeutics to treat conditions including insomnia and substance use disorder, sold in an auction after filing for bankruptcy, to four separate companies for aggregate proceeds of US$6.05 million. Pear went public in June, 2021 by a SPAC at a valuation of US$1.6 billion and was the first to obtain regulatory clearance for a digital therapeutic, but observers cited challenges obtaining reimbursement

▶ On May 19th, **WELL Health Technologies Corp. ("WELL")** announced the acquisition of **MCI Medical Clinics (Alberta) Inc. ("MCI AB")** from **MCI Onehealth Technologies Inc.** for total consideration of $2 million. MCI AB offers a range of primary care services, with 50 physicians at 5 clinics in the greater Calgary area and is expected to contribute $10 million of annual revenue. The acquisition represents an opportunity for WELL to bring its practitioner enablement platform to more providers and expand access to healthcare services in Alberta.

▶ On May 19th, **Aspirion**, a US-based technology-enabled healthcare revenue cycle management provider for complex claims and revenue integrity, announced that it has acquired **FIRM Revenue Cycle Management Services, Inc. ("FIRM RCM")**, a US-based company that assists hospitals in recovering denied, unpaid, and underpaid medical insurance claims, for an undisclosed amount. FIRM RCM will leverage Aspirion's technology platform for a better client experience

▶ On May 16th, **Reveleer**, a US-based healthcare-focused workflow, data, and analytics company, announced its acquisition of **MDPortals**, a US-based prospective risk adjustment platform, for an undisclosed amount. This acquisition augments Reveleer's retrospective and prospective risk adjustment solution by allowing payers and providers to close care gaps at the point of care while accurately and efficiently reflecting the true Risk Adjustment Factor (RAF) score for members

▶ On May 9th, **QuestionPro**, a US-based provider of survey and research, data and insights services, announced its acquisition of **Patient Safety Group ("PSG")**, a US-based technology platform that helps health systems and hospitals collect and analyze patient and employee safety insights for better health outcomes, from **Smart Patients, LLC**, a US-based online community of patients affected by a variety of illnesses, for an undisclosed amount. PSG's data collection platform will augment QuestionPro's analytic abilities and provide customers a more holistic solution

▶ On May 8th, **Ucardia**, a US-based cardiac conditioning software developer, announced that it has reached an agreement to acquire **Phas3**, a US-based provider of home-based virtual cardiac rehab and support for back-end claims processing, for an undisclosed amount. This acquisition will result in a comprehensive solution covering all facets of cardiac rehabilitation, conditioning, and remote monitoring

▶ On May 3rd, **Centene Corporation (NYSE: CNC)**, a US-based healthcare enterprise, announced that it has signed a definitive agreement to sell **Apixio**, a US-based artificial intelligence platform that enables value-based care, to **New Mountain Capital**, a US-based PE firm, for an undisclosed amount. The transaction will help Apixio develop into a 'connected care' platform to enable the shift to outcomes-based reimbursement models
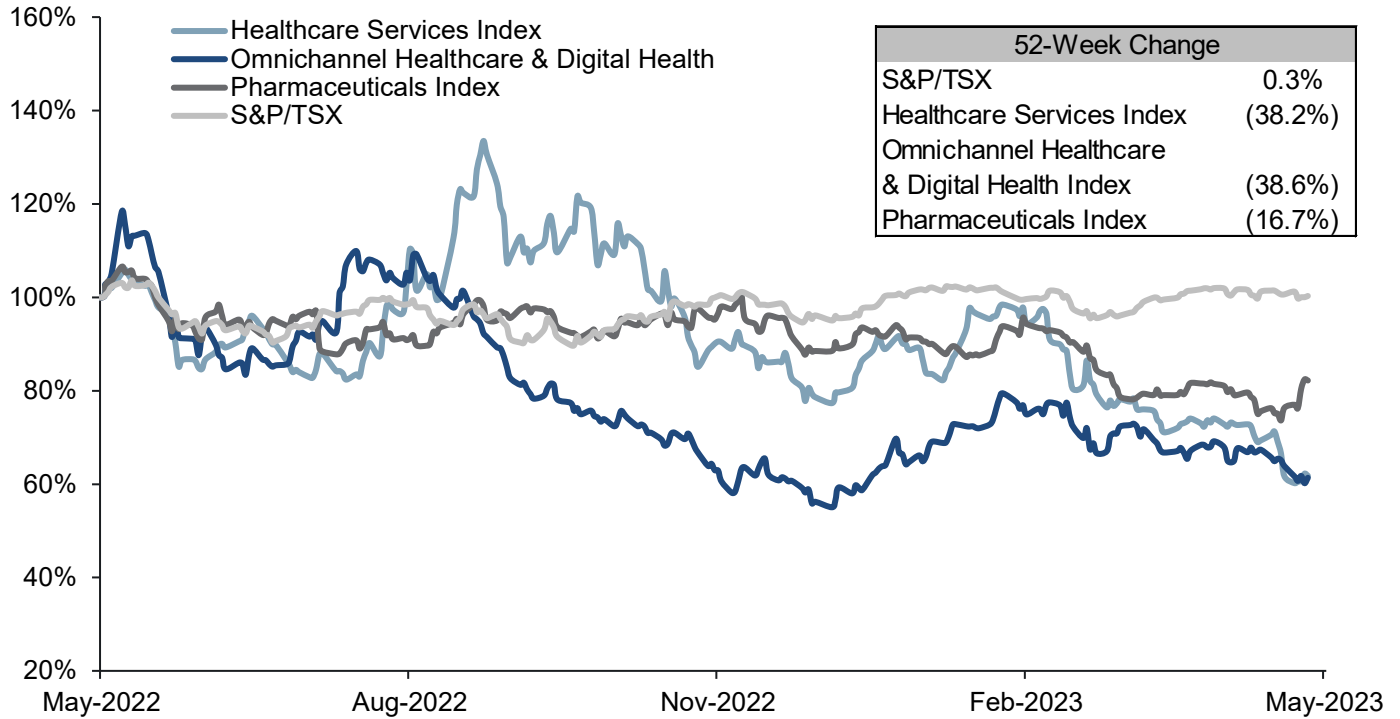
Key Indicators

In $CAD millions	Market Cap	TEV	TEV / Revenue		TEV / EBITDA		Price % of 52-Week High
			2023E	2024E	2023E	2024E	
WELL Health Technologies Corp.	1,081.3	1,476.3	2.1x	1.9x	12.8x	11.0x	77.4%
Dialogue Health Technologies Inc.	236.3	181.5	1.7x	1.3x	neg	31.1x	76.9%
Vitalhub Corp.	116.5	100.2	2.0x	1.8x	8.4x	6.9x	84.0%
CloudMD Software & Services Inc.	55.8	58.9	0.5x	0.5x	neg	14.1x	34.3%
Think Research Corporation	26.4	69.5	0.8x	0.7x	9.8x	6.5x	39.1%
LifeSpeak Inc.	24.4	104.3	1.9x	1.7x	6.7x	5.5x	17.7%
MCI Onehealth Technologies Inc.	9.2	28.1	na	na	na	na	10.7%
Average			**1.5x**	**1.4x**	**8.9x**	**11.5x**	**44.7%**

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▶ On May 22nd, **AVROBIO**, a clinical stage gene therapy company, announced the sale of its program for the treatment of cystinosis to Novartis for $87.5 million in cash. AVROBIO retains full rights to its portfolio of first-in-class hematopoetic stem cell gene therapies for Gaucher disease type 1 and type 3, Hunter syndrome and Pompe disease. The transaction strengthens AVROBIO's balance sheet and adds to Novartis' pipeline of gene therapies

▶ On May 10th, **Syneos Health, Inc. ("Syneos") (Nasdaq: SYNH)**, a US-based fully integrated biopharmaceutical solutions organization, announced that it has entered into a definitive agreement to be acquired by a consortium of private investment firms composed of **Elliott Investment Management**, **Patient Square Capital**, and **Veritas Capital**, for US$7.1 billion. For the 12-months ending March 31st, 2023, Syneos had a revenue of US$5.4 billion and an EBITDA of US$662 million. The transaction will accelerate Syneos' growth and help drive its digitalization

▶ On May 10th, **Swedish Orphan Biovitrum AB (publ) ("Sobi") (STO:SOBI)**, a Sweden-based specialized biopharmaceutical company, announced that it has agreed to acquire **CTI BioPharma Corp.**, a US-based biopharmaceutical company focused on blood related cancers and rare diseases, for US$1.7 billion. The acquisition complements and further strengthens Sobi's haematology franchise by adding VONJO (pacritinib), a novel oral kinase inhibitor

▶ On May 9th, **Gilead Sciences, Inc. ("Gilead") (Nasdaq: GILD)**, a US-based biopharmaceutical company, announced the acquisition of all outstanding shares of **XinThera**, a US-based biotech company developing small molecule drugs to treat cancer and immunologic diseases, for an undisclosed amount. The acquisition complements Gilead's existing clinical development priorities by adding additional pipeline assets for well-validated targets in oncology and inflammation

▶ On May 8th, **Baxter International Inc. ("Baxter") (NYSE:BAX)**, a US-based medtech company, announced that it has signed a definitive agreement to divest its **BioPharma Solutions** business, a standalone contract development and manufacturing organization (CDMO), to **Advent International** and **Warburg Pincus**, for US$4.25 billion. BPS is expected to generate revenue of US$600 million in 2023. The transaction streamlines Baxter's strategic focus while also helping it reduce its debt, supporting its capital allocation priorities

▶ On May 8th, **Recursion (NASDAQ: RXRX)**, a US-based clinical stage TechBio company focused on industrializing drug discovery, announced that it has signed agreements to acquire two Canadian companies in the AI-enabled drug discovery space, **Cyclica** and **Valence**, for US$40 million and US$47.5 million respectively. The acquisitions will bolster Recursion's digital chemistry and generative AI capabilities

▶ On May 2nd, **DuPont (NYSE: DD)**, a US-based technology-based materials and solutions provider, announced that it has entered into a definitive agreement to acquire **Spectrum Plastics Group ("Spectrum")**, a US-based advanced manufacturer of specialty medical devices and components, from **AEA Investors**, a US-based PE firm, for US$1.75 billion. Spectrum's EBITDA for 2023 is forecast to be US$110 million. Spectrum complements DuPont's existing offerings for biopharma and pharma processing, medical devices and medical packaging

Key Indicators

In $CAD millions	Market Cap	TEV	TEV / Revenue		TEV / EBITDA		Price % of 52-Week High
			2023E	2024E	2023E	2024E	
Bausch Health Companies Inc.	4,058.6	25,138.6	2.2x	2.2x	6.2x	5.8x	81.2%
Knight Therapeutics Inc.	539.9	444.7	1.4x	1.4x	8.8x	9.1x	79.7%
HLS Therapeutics Inc.	145.6	221.6	2.5x	1.7x	7.1x	4.3x	28.9%
Theratechnologies Inc.	118.3	155.2	1.3x	1.1x	neg	11.2x	32.5%
Cipher Pharmaceuticals Inc.	89.9	56.9	2.1x	1.9x	3.7x	3.5x	87.2%
Average			**1.9x**	**1.7x**	**6.4x**	**6.8x**	**61.9%**

Indexed Segment Performance[1]

Legend:
- Healthcare Services Index
- Omnichannel Healthcare & Digital Health
- Pharmaceuticals Index
- S&P/TSX

52-Week Change	
S&P/TSX	0.3%
Healthcare Services Index	(38.2%)
Omnichannel Healthcare & Digital Health Index	(38.6%)
Pharmaceuticals Index	(16.7%)

Charting the Course

▶ The TSX index increased 0.3% over the last 12-months, an improvement from April's 52-week decrease of 1.6%. The index moved into positive territory as inflation showed persistent signs of decelerating, with the Fed also signaling a potential end to its rate hike cycle

▶ Our Healthcare Services Index reflects a 12-month decrease of 38.2%, falling slightly from April's decrease of 37.1%, as the market continues to digests the higher cost of capital and labor

▶ Our Omnichannel Healthcare & Digital Health Index recorded a decline of 38.6% over the past 12-months, up materially from April's 51.4% drop, buoyed by recovering interest in the technology sector due to easing inflationary pressures and optimism about AI-related advancements

▶ Our Pharmaceuticals Index decreased 16.7% over the last 12-months, increasing significantly from April's 30.7% decline, due to better-than-expected earnings for the first quarter of 2023

1. Index segments are market prices for the companies in each category as noted in the earlier pages of the report.

About Us

Origin Merchant Partners is an independent investment bank that provides value added corporate finance, mergers and acquisitions and merchant banking services delivered by senior professionals. Our clients engage us for our dedicated, high level of service and independent advice to address their strategic and financial plans

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