

Date: Wednesday, November 2, 2016

Time: 2pm-5pm

Place: The Jackson Lab

10 Discovery Dr, Farmington, CT 06032

Host: Mike Hyde, JAX

Agenda:

Introduction: Mike Hyde

Update on JAX: Ed Liu

**Discussion: Establishing CT Initiative to Advance Precision Medicine
– what would that look like?**

—comparing the California model

—possibilities and barriers

JAX: Mike Hyde

Jackson laboratory has been at UCHC with the state for the last five years for the business plan focused on actionable medical research targeted toward precision diagnosis and treatment. The company has a commitment to computational biology and statistical inferences with regard to the diagnosis and treatment of diseases. As for data, the company manages 6 petabytes of data, two thirds of which (4 PB of data) has been generated by the UCHC the facility alone. In the five years that JAX has been at UCHC it has developed two times the amount of data that had been generated by JAX in the 85 years since it was founded in 1929.

ED LIU:

- Discussion of concept stage of plan to accelerate the introduction of precision medical using genomic data to predict health outcomes. The proposed concept could demonstrate the utility of a practical approach while addressing privacy and use of data issues through a careful

economic focus, using hard metrics in a short timeframe to potentially generate revenues and jobs.

- Of great interest for this business proposal is the existence of clear courses of treatment to maximize health. One example was the Bracken one mutation, in which early detection is clearly a positive, but whether elimination of the disease is possible it may be questionable and the economics also remain unclear.
- **It is the position of JAX, however, that a business partnership such as being proposed at this time has the potential to provide a practical demonstration of the business development and job creation potential for this type of business plan.** Need to show this can pay off – there are models around the country showing it does and can.
- Concern that genetics may be only one element of the process, and could lead to extensive treatments that could further increase the cost of any project.
- **Geisinger Medical Center** a hospital in Danville, Pennsylvania, serving as the primary hospital for the Danville-based Geisinger Health System, a primary chain of hospitals and clinics, was cited by Ed Liu as a potential partner with JAX and Helix, www.helix.com, a personal genomics company headquartered in the San Francisco Bay Area (San Carlos, CA) and operates one of the world's largest next-generation sequencing laboratories in San Diego. with a simple but powerful mission: **to empower every person to improve their life through DNA.** Helix is creating an ecosystem where people can explore diverse and uniquely personalized applications provided by high-quality partners. Helix handles sample collection, DNA sequencing, and secure data storage so that its partners can develop on-demand products in areas such as health, fitness, nutrition, lifestyle, genealogy, and inherited traits.
- **Helix announced two weeks ago partnerships with National Geographic, Mount Sinai, and innovative developer Exploragen** to bring DNA-powered insights to everyday products and experiences. Helix provides people with access to data and information about their DNA, through uniquely personalized applications from some of the world's most trusted companies. **Helix also announced a new strategic investment from Kleiner Perkins Caufield & Byers, a leading venture and growth investor.**

- Helix believes that the genomics industry is no longer just about clinical precautions and general health. It's quickly touching all areas of our lives, from family planning, to nutrition, to ancestry. The company is presently building a powerful platform for DNA discovery that enables anyone to connect with relevant, personalized applications from consumer brands, healthcare providers, and innovative developers. The company notes that consumer genomics is an industry that's poised to take off as DNA data becomes more accessible and innovative. **DNA applications across a wide range of categories will soon be commonplace.**
- **What is the business model?** Ed Liu described the potential partnership as having the capacity to scan entire populations to identify patients with actionable criteria that the partnership could focus on. He recognizes that even if they find the gene in a patient that would have the potential for treatment needs, it is unknown at this time whether cost or prevention of morbidity would be at all possible.
- **The point of this partnership is in fact to jump into a pilot program to answer those questions.** Liu has clearly given deep thought to the economics of exome sequencing through such a partnership the sketching that such screenings cost \$2-4,000 per test today, thus still expensive, and finding the funding for such testing remains an open question.
- **Potential:** Helix could use a Connecticut-based population bio bank to conduct the tests, then storing the data in an HIPPA compliant database of analyzed information. While the test today would probably incorporate the fundamental 56 genes recognized with treatment potential, this existing data could be built upon mature years asked, expanding the number of genes tested, and focus on future treatment procedures. Such a longitudinal testing regime, with follow up over time with these initial patients, should prove positive in the population based on the results of such testing and surveillance of patients, hospitals, and related research. **As genetic testing and healthcare treatments accelerate in their capacity for addressing diseases, this program would ultimately be cost-effective to payers by demonstrating whether or not intervention helps sure illnesses.** Sources of funds could eventually include insurance companies, but

perhaps grants, donations, and commissioned studies could help along the way.

Comments and questions:

- The cost of the testing could be borne by patients, perhaps in conjunction with other sources of payment which would probably evolve over time as results demonstrate practicality in terms of increased health care or prevented illnesses. JAX already performs interpretation of genomic and genome data, in conjunction with education for patients and providers alike. **Some of this work is funded by the Ford foundation** and its main facility, today.
- One caution: that while this business proposal has great merit and potential, he is a practicing physician is anxious that **all such work be linked to clinical teams, through bridges and pipelines, for practical use Connecticut could lead in this regard, noting that other areas of the country and world are already working on this process.** "PDF" records are not useful in the clinical setting since they cannot be manipulated. **EHR vendors too often are the advisors to clinical teams and other providers, locking those practitioners into long-term contracts in order to continue ownership and protection of the data which they do not share** **Strong feelings that any such partnership should provide open access to the genomic data** which must be transferable to patients and shared among clinical teams, at the least in order to bolster the concept of long-term relationships for the greater good of all.
- Helix process currently allows for release of information to patients, calling it a "social parameter" that allows that if a doctor wants the patient's data, the company will download, and **provided at a cost.** Interoperability of patient data is a real problem, and that it must not be locked up and left unusable. **Prioritization of data is required** in order to prevent a barrage of information without clear ways (applications?) to integrate that data into a usable form. This the **"fire hydrant problem, in which a vast amount of information that may be useless or conflicting** is poured into a clinical team at a time when they really need streamlined and focused access.
- Helix only requires payment for data or information that "you" use, a business plan and that he approves of but which perhaps could be modified at the request of the group.

- **Who is “you”: patients or doctors? It is well-established that personal health information belongs to the individual patients** themselves and would, subject to a privacy release from the patient, but could be shared among that “vetted partners,” offer services to patients (e.g., Mayo Clinic, National Geographic (for its ancestry documentation,) Sloan Kettering, et al.). Under the Helix business plan, customers only pay for the data they request and receive from the company.
- “who is Helix’s customer, patients or doctors and hospitals?”

Cost of the HELIX model: cost of a Helix test under the terms of the contemplated business model would be approximately \$150 per patient per test (presumably paid for by the state as part of a wellness program), the patients would be required to pay helix proximately \$2000 to receive results from the test.

There is diverse discussion concerning whether or not insurance providers would assume any of those costs even in the context of a wellness program, since such testing could be considered a step in an exploratory experiment. It is currently unclear how many patients would in fact move forward from such a screening to explore the results of the key 56 genes.

Ed Liu pointed out that such a test would cost \$4-5000 today. Inside Jackson laboratories itself, the company pays for annual “whole battery” tests for employees who volunteer. He noted further that the company’s medical insurance premiums have not really increased over the last seven years. **The proposal is highly scalable (10-10,000 patients, for instance) to fit the appetite and goals of the state as an employer.**

- **Potential problems:** such testing can often lead to **over-diagnosis and treatment regimens**, an observation that was concurred with by the insurance providers in the room. Perhaps a small pilot could alleviate such dangers by focusing on strict time intervals, and, in the evaluation of potential costs regarding hospitalization and other treatment options, since primary care can be very expensive. It would be important, she noted, to carefully measure acceptance by patients and clinicians, on a low or high scale can be accurately measured.

Such a process could “get away from us” with no end to potential testing, with testers potentially attempting to “throw the kitchen sink at the problem, once identified.”

A strict focus on the critical genes that have been demonstrated to be a significant health potential problem, but stated that the reports that are being proposed may be to “blunderbuss” in scale and scope to be useful in the narrow goals being discussed.

Note was made of the **Geisinger Group** which is both a payer and provider of health services, and which is carefully tracking this type of testing and follow-up.

David Ledbetter is an noted expert on this issue, calling it the “variance of unknown significances,” i.e., “chasing tails.”

What would a CT Center for Precision Medicine look like?

Genomic research and treatments will transform medicine, but we need to have a much clearer idea of what states and organizations are currently pursuing this field in order to properly compete.

Perhaps a small pilot or demonstration would be useful in order to provide a “proof of concept,” similar to the California computational analysis and counseling program initiated with \$3 million and tied to the University of San Francisco by Gov. Brown two years ago. **Something like the California pilot could help this collaborative to create a “power center” with regard to the public policy goals that the group has identified.** By the creation of such an entity, the collaborative would be able to create an entity or platform for industry players to engage in this process by understanding the scope and scale, and goals, of the proposed project. The center could easily become a model worth pursuing, certainly at this stage since it demonstrates a public-private partnership between modest funding and gubernatorial support by the California combined with active engagement by a diverse group of healthcare industry participants.

Borrowing from the CA model:

That California program includes an asset demonstration and inventory, with a clear goal of establishing a purpose through competition. The problem remains the identification of useful assets that can be shared as data across

existing or potential silos. But identification of assets and methods of sharing data can be quite complicated and that any program that attempts to incorporate a “database by database” process will take forever and not succeed.

Idea addressing the “sharing data” issue by declaring it would be best to 1) put the data together in one place, such as in a bio bank; 2) with a workable mechanism for free-flowing access to the data; 3) use block chain technology for data protection and privacy in combination with open access, and 4) with strict notification to patients of the need and uses of the data in order to make open access by physicians, hospitals, and researchers possible and acceptable to patients.

Discussion of whether a “huge database” or ability to simply share the data in an open access process over various platforms would not in fact be preferable. There is a desperate need in any bio databank to resolve the data differences, it not being merely a sharing issue.

Nonhealth/SDH criteria can be extremely useful in diagnosis and treatment, the database should present data regarding smoking preferences in addition to whether the patient is taking their meds or not.

There are probably three variations to this model, 1) a very large centralized database; 2) a federated open access model; and 3) a hybrid model of those two, which does not currently seem to work and is very difficult with regard to privacy concerns and the partnership functions inherent in operating that model. Express the hope the technology may be able to solve the sharing issue, but resolution of differences within the data remains a serious problem.

Questions of who has the capacity to authorize action, the governor, the legislature, or the commission on economic competitiveness? While the group has always agreed that this healthcare data collaborative should ultimately be a private initiative, government continues to need to fulfill a role, not to control the effort or direct the goals, but it certainly needs to **play the facilitator** in the midst of these various groups and silos.

We need to form a body that truly represents the policy goals, not the organizational or stakeholder goals of each of the players around the table. Those appointees will need to look at the broad interests of the economic

development and public policy goals that are targeted. Continued attention to individual silos continues on a board that is formed, the process will either stall and die or become bogged down, and then die.

The goal of this group should therefore be to develop a structure that can be scaled up and launched in a concerted and well-funded effort toward achieving economic and public policy goals.

Suggestion that the state government needs to make the first move on this, and that the example about California's experiment of a SWOT analysis¹ is too little and too humble to truly succeed.

Next Steps?

CHDC partners have engaged in critical and thoughtful discussions with great focus. As we are reaching a critical point in this time-limited process,

CHDC needs to develop individuals from each leg of the health care system (insurers, providers, and research) to build teams, without silos, in order to create pilot demonstration projects. Each team and project must have a mandate to tackle issues such as privacy and open access to standardized data. Ultimately, those teams will then be in a position to be able to report to the full or management group about the path forward and each of the critical issues.

A pilot application will need to have the correct stakeholders in each of them will need to cooperate in such demonstration projects with support and constructive activities. Joe added that in order to build a successful venture as proposed by this group, **each of the members of the group must take ownership and supply the most qualified person to leave the effort, without regard to individual silos.**

Role of the feds? it may be possible for a planning process incorporating members of the group to be funded by the federal government through a There is real pushback on engaging the Medicaid population at this early stage. Seems more appropriate to bring them in later, once established. The economic development goals of the group are not necessarily relevant to the federal money, but a steering committee should be formed in order to guide

¹ Alternatively called a SWOT matrix, an acronym for strengths, weaknesses, opportunities, and threats and is a structured planning method that evaluates those four elements of a project or business venture)

the effort and perhaps focusing on the Medicare population. Department of Social Services and other agencies, state and federal, have very complicated processes and may require substantial private investment prior to engaging with a state collaborative of this nature.

- HIT issues and multi-payer initiatives can indeed be funded through government planning grants related to Medicaid. Maybe petition the federal government to help Connecticut build a highway, perhaps at 90/10% funding, in order to create ramps for Medicare patients to engage in this proposed process. CMS funding could possibly provide a monetary foundation for planning for precision medicine if it meets the rigid federal parameters. Mark added that genomics involves complex planning challenges (e.g., algorithms) and that the pitch would be to have the federal government support Connecticut's thought leaders to solve a problem that can be scaled up to benefit the entire nation.
- The first steps are to develop the plan and the players, and that funding can probably be found if the ideas and personnel are strong enough. The legislative mandate was founded on the idea that the healthcare industry in the state should have a future and become competitive on a global stage.

California's pilot program is like trying to build a bike while writing it, a slow process, but at least public and with reasonable funding.

Connecticut clearly has abundant resources, but tends toward a systemic hostility toward cooperation and collaboration, which in a small state like Connecticut, is clearly not a positive direction or relationship basis on which to proceed toward enhanced success.

Summarizing the path forward:

- create a group focused on precision medicine
- analysis of assets
- develop reasonable and pragmatic goals
- CMS opportunity to utilize Medicare/Medicaid funding
- explore partnerships with helix, using her, and IBM, and
- create report to legislature for January 17, 2017.

The “group” should have its focus on preventative medicine as an economic driver, the Holy Grail that was envisioned by the legislature in the past legislative session.

Treatment goals should be express and on the table for all project ideas, along with an ROI of sufficient value to attract investment dollars.

In order to assure the private sector becomes engaged in this process that each pilot team needs to include investors among its members. Perhaps **adding formality to the groups, bylaws, etc., might prove useful in attracting matching funding from government entities while ensuring that economic development remains key, by attracting more skin in the game.**

Group needs to establish clear communication between the elements of government, legislative and executive, each of which often has insights on only parts of the elephant, but fails to see the entire animal. Healthcare data collaboration simply makes sense in an economy that needs major help and job creation.

Healthcare players should create “centers of excellence” for various or specific diseases, concentrated on certain populations, and tying all of that to data analytics and advanced treatments.

Cleveland Clinic model is another model that this group could adopt and pursue. Unlike CT, The Cleveland Clinic, has demonstrated the ability to collaborate as to treatment, funding, and personnel, and as a result has built a strong and very positively viewed brand for its healthcare.

Geisinger has also successfully created a specialty with a very strong brand, but questions of whether the statutory frame in Connecticut might hold hospitals back in this state from similarly developing brands of that nature.

Next meeting at Yale/New Haven, November 16, 9 AM to noon