Transitioning to Data Related Careers in Healthcare

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Ravi Patel
Program Director, Health Data Science
Insight
Ravi Patel
Program Director
Health Data Science

linkedin.com/ravikpatel-phd/
ravi@insightdata.com

Grad 2014
Bachelors in Biochemistry

2014-2019
PhD. Molecular Pharmacology

2019
Insight Health Data Science Fellowship

2019-
current
Insight Data Science Program Director
Insight Health Data Science Program Director
Today we will cover

- Why are careers in data important?
- Health industry trends
- What does a data related career in healthcare look like?
  - Data Scientist at a Healthcare company
  - Computational Biologist
- What does it take to get a job in this field?
- Insight Data Science and Transitions
- Q&A
Why are careers in data important?
Why are these careers booming?

- **Information Explosion & Big Data**
  - People were ready to share information
  - We had means of sharing the information
- **Data Driven Decisions**
  - Not taking decisions based on “gut”.
  - Better understanding of users.
  - Personalized services: Recommendations.
- **Technology Advancements**
  - NGS
  - EHR
  - Drug discovery platforms
  - Digital health
What can you work on?
Different Roles in the data space

Data Scientist / Data Analyst
- Product Analytics
- Understanding Business
- Understanding Data

Data Engineer
- Data Pipelining
- Distributed Storage
- Scalability

Data Product Manager
- Market analysis
- Future of Data products
- Business growth

ML Engineer / AI Professional
- Designing ML Algorithms
- Productionalizing ML models

Data Infrastructure Engineer / DevOps
- Designing infrastructure
- Automated deployments
- Handling Dev pipelines
What do data scientists do?

Obtain  Scrub  Explore  Model  Interpret
There are many unique challenges to analyzing health data:

- HIPAA + PHI
- Socioeconomic inequalities
- Health tech literacy
Health researchers are primed to address these critical data challenges

“The best data scientists tend to be ‘hard scientists,’ rather than computer science majors”

-DJ Patil, U.S Data Chief
Health researchers make great data scientists

- Data Intuition
- Critical Thinking
- Statistics
- Domain Expertise
- Communication
- Coding
What does health data science look like in practice?
The health and biotech sectors are growing and generating huge amounts of data.
Digital Therapeutics

- **Focus**: Chronic diseases
- **Product**: Digital prescription apps + tests
- **Data**: Survey data + text entries + app engagement + Clinical tests
- **Projects**:
  - User adherence to prescriptions
  - Classification of depression severity
  - Signal processing used for screening patients and monitoring disease

**15 Therapies**
- **Multiple Options**
  - Varied mechanisms, efficacy, side effects and tolerability

**Top 5 Drug Spend**
- **High Cost**
  - $60–80,000 per year, over $14B spend, with unguided use

**950K Patients**
- **$2-4M Lifetime Cost**
- **50% Disability**

**Strikes Early**
- Late 20's average onset, affects 3:1 women to men

**Chronic Disease**
- Long term costs include medical, drug, ancillaries and disability

**Progressive**
- Symptom burden and co-morbidities impact employment
Public Health Management

- **Focus**: Developing countries and non-profit organizations
- **Product**: Develop software platforms for harnessing PHI
- **Data**: Longitudinal PHI
- **Projects**:
  - Anomaly detection for malaria outbreaks
  - Time series analyses for resource allocations
  - Outbreak investigations
**Focus**: Molecular biology techniques to diagnose a disease

**Product**: Diagnostic test and interpretation of result

**Data**: NGS + Clinical Assay + Clinical tests

**Projects**:
- Diagnose a genetic disease
- Work with high dimensional data
- Build pipelines to support new product features

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100X fewer false positives

The false positive rate of noninvasive prenatal screening (NIPS) is 100x lower than serum screening in patients <35 years old.\(^3\)

50% of hereditary cancers are non BRCA1/2

At least 50% of hereditary cancers are caused by genes other than BRCA1 and BRCA2.\(^4\)

86% of affected pregnancies no longer missed

86% of affected pregnancies detected by expanded carrier screening (ECS) are missed when screening for cystic fibrosis and spinal muscular atrophy alone.\(^1\)

76% of couples took action

76% of couples found by ECS to be at risk for severe or profound conditions pursued alternative reproductive actions such as prenatal diagnosis or IVF with preimplantation genetic diagnosis.\(^2\)
AI and Healthcare

- **Focus**: Using deep learning to solve challenging healthcare problems
- **Product**: Develop software
- **Data**: Drug Screening + Clinical Data + Medical imaging
- **Projects**:
  - Develop an in silico drug screening method
  - Diagnose disease
  - Work with medical imaging
INSIGHT HEALTH DATA FELLOWS PROGRAM

An intensive 7-week program for PhDs and MDs leading to a career in health data science.

APPLY NOW  READ THE WHITE PAPER

Want to be notified of future dates?  CLICK HERE
Start by asking lots of questions

What is data science, computational biology and where do I fit in? Which industries am I interested in?

What companies/institutes are at the intersection of those two things?

How can I best prepare?
How do you get these jobs?
1. **Knowledge/Skills**

- Understanding Concepts related to each role
- Knowing the fundamentals
  - Stats, Computer Science, Math, Programming, Analytical Thinking, domain knowledge
- Knowing the tools
  - Pandas, Numpy, Scikit learn
- Understand how to apply the knowledge to industry problems
  - Reading blogs
  - Attending meetups
  - Knowing to ask the right questions?
- Applying the relevant tools / techniques to relevant problems
  - Understanding trade-offs
  - Doing Projects
2. Build Evidence

- Your PhD project
  - Can you add a “DS-like” component
- Doing small non-academic projects
  - What is the industry tackling?
  - Can you do something unrelated to your research
- Post your code on Github
- Write a blog post
- Can people outside your field understand what you did?
3. Network

● Know the right people to talk to
  ○ Hiring Managers
  ○ Technical Recruiters

● Know how to pitch yourself
  ○ Tailor a pitch for each role you apply to.
  ○ Use career fairs effectively, don’t just drop in your resume.

● Meet the right people
  ○ Meetups, Hackathons, Fellowships/Internships/Bootcamps, Code for America, Insight

● Know to have technical conversations (Knowledge about the field will help here)
Interview Process (Internship & Full-time)

- **Preparing a good resumé to get a foot in the door!**
- A quick phone screen to get you started
- Take home assignment
  - Timed Coding assignment (HackerRank, Leetcode)
  - Technical assessment over video conference or phone
  - Take home Data Challenges
- **Onsite**
  - 4-6 hours
  - Mix of Behavioural, Technical and data oriented.
  - Speak to multiple team members
  - Topics: Designing data platforms, Whiteboarding coding questions, Technical conversations
Most importantly, be open to rejection and learn from your mistakes.
Insight
Transition to Careers in Data
Summary of Insight

Full-time program

Scholarships available

Collaboration and mentoring

Interview Prep

Meet teams hiring data scientists, computational biologists, bioinformaticians, etc.
Join the community! Learn the domain!
Build your network! Get a job!

Questions?
Careers in Data, making the transition, or Insight?

Ravi@InsightDataScience.com