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Objectives

Identify a future-informed business opportunity.

- → Report on future of healthcare data
- → Viable business plan
- → Go to market strategy
- → UI/UX prototype



3. Working plan

| WORKING PLAN | | March | | | | April | | | | May | |
|--------------------------|-----------|-------|------|-------|-------|-------|-----|-------|-------|-------|-----|
| Activities | Deadlines | 27-5 | 6-12 | 13-19 | 20-26 | 27-2 | 3-9 | 10-16 | 17-23 | 24-30 | 1-7 |
| 1. Project definition | | | | | | | | | | | |
| 2. Research | | | | | | | | | | | |
| 2.1 Stakeholders | | | | | | | | | | | |
| 2.1.5 Insights workshop | | | | | | | | | | | |
| 2.2 Scanning | | | | | | | | | | | |
| 2.2.4 Insights workshop | | | | | | | | | | | |
| 2.3 Validation | | | | | | | | | | | |
| 3. Business Model | | | | | | | | | | | |
| 4. Prototype | | | | | | | | | | | |
| 4.1 Prototype 1.0 | | | | | | | | | | | |
| 4.2 Prototype 2.0 | | | | | | | | | | | |
| 4.1 Prototype 3.0 (high- | difelity) | | | | | | | | | | |
| 5. Outreach (HC-BC confe | rence) | | | | | | | | | | |
| 5.1 Landing page (draft) | | | | | | | | | | | |
| 5.2 Landing page | | | | | | | | | | | |
| 6. Printed Book | | | | | | | | | | | |
| 6.4 Printed version | | | | | | | | | | | |
| 7. Branding | | | | | | | | | | | |
| 8. Booth | | | | | | | | | | | |

4. Challenges

- Healthcare business model is changing
- Regulatory landscape is limiting
- Official Future favors 'the big guys
- We're not technologists or clinicians

5. Baseline Forecast

The clinical business model is changing:

- Consolidating from private, independent practice, toward group and systems settings.
- Shifting from fee-for-service to value-based care.
- Personalizing care based on big data + analytics.
- Responding to meet changing user expectations.
- Accommodating new information technologies into the clinical workflow.



6.1 Increase in Health Data

Volume of healthcare data

2013: 153 exabytes

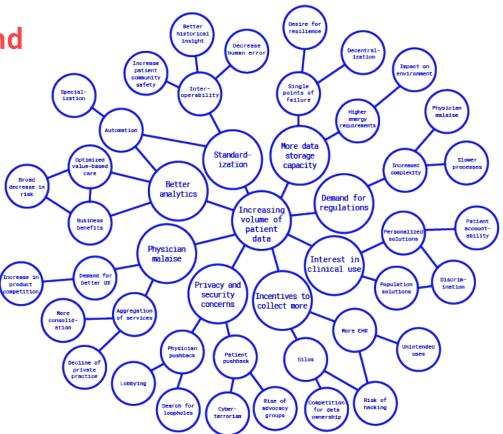
2020: 2,314 exabytes

The global healthcare analytics market is expected to reach \$8.7 Billion by 2020 from \$5.8 Billion in 2015, at a CAGR of 26.5% during the forecast period.

6.1 Data

Available, secure, and useful data?

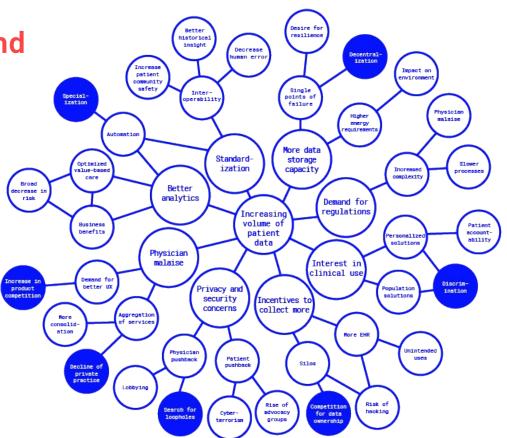
Assumption: The volume of data will continue to increase and will be readily accessible to the interested stakeholders. The influx of patient data combined with powerful new data analysis tools will drive down costs, improve patient outcomes, and offer new opportunities for profitability. Ubiquitous sensors, data storage, and (potentially) blockchainenabled transactions and cybersecurity will facilitate the flow and processing of data.



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6.2 Increasing adoption of EHR

2012: 39.6%

2013: 48.1%

2014: 50.4%

2015: 62.8%

2016: 59%

"Only 34 percent of doctors surveyed by the American Medical Association said they were happy with their electronic systems."

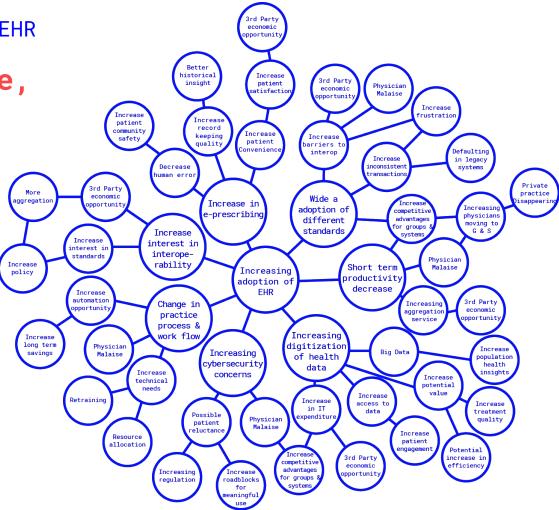
2017: New regulations make more difficult for providers to get paid without an EHR - but some are still holding out.

6.2 Increasing adoption of EHR

Efficient, effective, personalized care?

Assumption: The complete implementation of EHR (Electronic Health Records) will contribute to a more efficient health system and better health outcomes.

Identifiable data gathered by physicians will contribute to the creation of hyper-personalized care and the implementation of a value-based system. Large amounts of data will contribute to reducing the national expending on health care, making the system more sustainable.

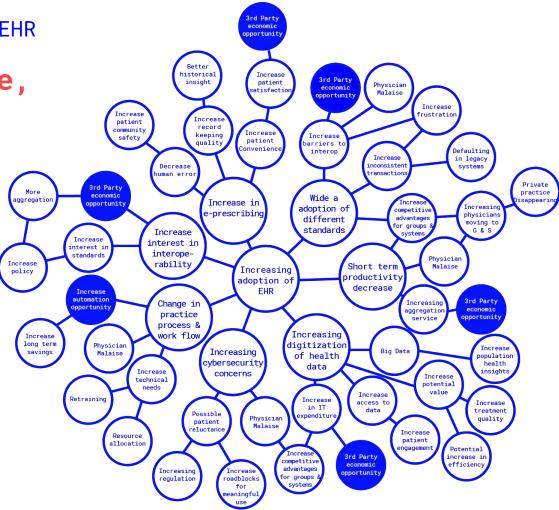


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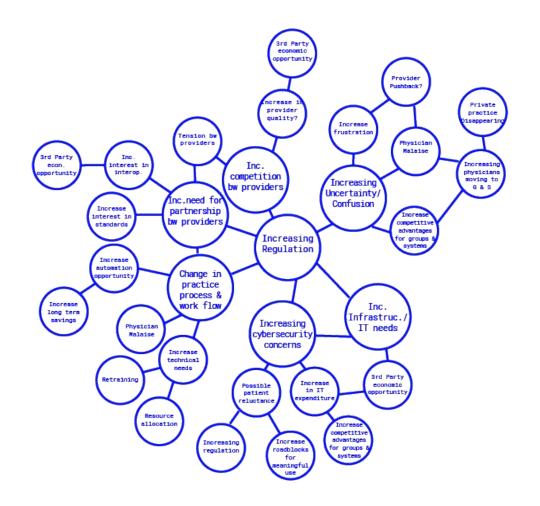
6.3 Regulation

A PhD in 'Maze Navigation'

An overburdened, under-resourced public health care system, and profit-motivated private payers, are spearheading the push from fee-for-service to value-based care – allegedly, "quality vs. quantity" of treatments.

Years of increasing regulations and incentives around use of data, efficiency and quality of care, and more, are culminating in 2017's MIPS & MACRA, which require more IT infrastructure, increase reporting requirements for providers, asking them to prove:

- > Clinical Practice Improvement
- > Quality of Care (?)
- > Meaningful Use of Tech/Data
- > Efficient Use of Health System Resources



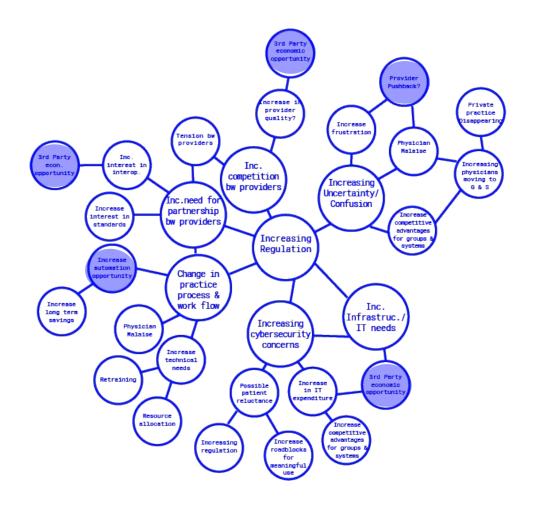
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7. Trends

| MACRO | Smart, Sensing, Connected | MICRO | Fee-for-Service to |
|----------------|--------------------------------------|---------------------|---|
| TREND | Everything (IoT) | TREND | "Value-Based Care" |
| MACKO | Digital native consumer expectations | MICRO | Electronic Health Record (EHR) |
| TREND | | TREND | use |
| MACRO | Power Shift from | MACRO | Unhealthy American lifestyle |
| TREND | Providers > Payers | TREND | |
| MACRO TREND | Increasing lifespan | MICRO TREND | More people suffering from chronic diseases |
| MACRO TREND | Increasing healthcare expenditure | S MICRO TREND | Consolidation of services into groups & systems |

7. Trends

| MICRO TREND | Profit margins for providers are decreasing | СУСИ | Political (Public vs. Private Payers) |
|-----------------------|---|-----------------------|--|
| FAD | 'Big Data' as inherently valuable | FAD | 'Digital Health' as a cure-all |
| FAD | 'Big Data' as a cure-all | WILD CARD | Political Uncertainties: ACA? |
| DISCO NTINU LTY | Major Discovery (i.e., curing cancer) | DISCO NTINU ITY | Major Outbreak (i.e., Zika) |
| | | | |

8. Critical uncertainties

- Political climate
- Cybersecurity
- Attitudes toward privacy
- Barriers to interoperability
- Seachange in power structure
- Long-term viability of private practice.

9. Alternative futures

| | Easy to Unlock Value | Data | |
|-----------------------------|-------------------------------|-------------------------------|-------|
| Self Health (+) | | The Swedish States of America | (+) |
| Hypochrondrimania (-) | | Big BrotheRx (-) | |
| Burden of Health Care costs | | | |
| People | | | Payer |
| My Health Wallet (+) | | US V.A. (-) | |
| Work to Live (-) | | If It Ain't Broke (+/-) | |
| | ifficult O Unlock Value | | |

10. Opportunities

- 1. Universal Physician Identity
- 2. Universal Patient Identity
- 3. Ancillary services
- 4. Layers of communications
- 5. Health journeys
- 6. Balancing Accountability/"Value"
- 7. Patient Advocacy into the journey
- 8. Care Coordination Tool for Providers

11. Next steps

- PrototypingValidation

 - **Outreach**

Thank you!

APPENDIX

In Summary

 $\textbf{DEMAND} \rightarrow \textbf{Older},$ sicker Americans with changing expectations.

 ${f CONSOLIDATION}
ightarrow {f Independent practices}$ are closing and moving toward bigger groups and systems.

TECHNOLOGY → Challenges <u>and opportunities</u>.



6. Physicians of the future

- 73% of medical graduates now say they plan to avoid private practice
 a 50% drop since 2008 from the same survey.
- 73% of medical school grads worry about being able to share files between different practices/systems
- 87% support creating a universal patient record.

5. Drivers

Increase in Regulation

- An overburdened, under-resourced public health care system, and profit-motivated private payers, are spearheading the push from fee-for-service to value-based care - "quality vs. quantity" of treatments. The record-keeping and new workflow/process changes.

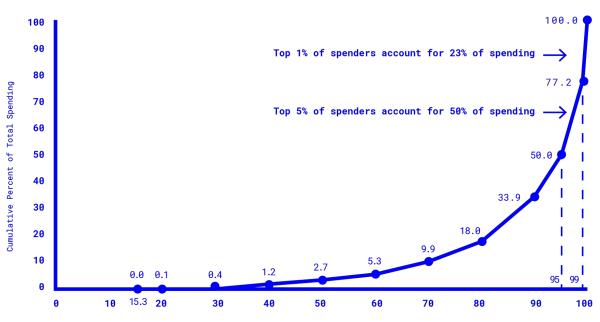
2. Increase in Data (Smart, Sensing, Enabled Everything)

- Health care follows a more universal trend - there's not just more healthcare data, there's more data of every kind. This will add to the data in the health system, and could provide useful comparison points, and enrich our understanding of clinical data in a more robust 'personal data profile.' Conversely, until we have meaningful tools to understand this data with, and a reimbursement model that allows for 'data review' time, it feels like more of a burden than a benefit to many stakeholders.

3. Increase in EHRs (Patient Record Digitization)

- While the EHR roll-out has been rough (and expensive) for health care orgs across the US, digital records of any kind are at least a little closer to being 'big data' than paper patient files — and we're finally seeing signals that interoperability (the ability to share patient files between separate EHRs) is possible, if still a ways away.

5. Drivers



Percent of Civilian Non-Institutionalized Population Ordered by 2012 Health Care Spending

Landscape Snapshot driving **TECH ADVANCES** CHANGING BIZ MODEL Technological advances in Market forces are driving other arenas are creeping healthcare providers into the health care system, toward larger groups and including smart devices, big systems (consolidation). data + analytics, digital communication tools. driving CHANGING CONSUMER driving influencing Baby boomers (60+) are aging, and need more healthcare than the **INCREASE IN COSTS** current system can afford. Digital Natives (35-) are growing Massive increase in up, and demanding more health care health care expenditures too - with a different set of to serve aging/sick baby driving expectations. boomers - pushing health care to 20% of GDP.

4. Baseline Forecast

The healthcare system is changing

- In WHERE healthcare is delivered: away from private, independent practice, toward group and systems settings.
- In HOW healthcare is reimbursed: from fee-for service to value-based care (quality of quantity).
- In WHAT healthcare is: toward personalized, data driven (quant>qual).
- In HOW data is collected, stored, shared, and used: there is more and more data with more and more uses.

APPENDIX: WHAT DO WE MEAN BY "THE FUTURE OF HEALTH DATA?

- → how and where it is collected
- → what data is collected
- → where it is stored
- → how it is secured
- → who owns it / accesses it
- → how it is used / who uses it
- → how it's shared
- \rightarrow the technologies that power all of this

APPENDIX: EMR, EHR, OR PHR?

Electronic Medical Record (EMR): digital versions of the paper charts that traditionally lined doctor office walls.

Electronic Health Records (EHR): which are meant to include all the records of care a patient gets, from a variety of doctors or labs

Personal Health Records (PHR): essentially the same as EHRs but are managed by the patient, not the doctors.

3. Pace Layers Analysis

- 1. Changes ability to 1. Infrastructure bill for services. economies of scale Push against FFS (fee benefits networks and for service). bigger players.
- 2. Economic Incentives
- 2. More providers have for providers to access to FHR
 - implement EHR 3. HIPPAA - Reg for data privacy

* Belief that health

Culture of Health

is valuable. Human

riaht

- 3. Push for adapting against to hack
- 2. EHR "hype" 2. Incentives to startups to solve for moving to EHR 3. Value assigned to

attractive target

are an expense

3. Increasing number of hacks data makes it more an

- * Patient population:
- older, sicker.

-Diverse ethnicity.

- Millenials driving behavior. having more data low input on how to use it. 5. Increasing concern on implications for

Regulation

6. Deceasing margins.

4. Stated goal of

Babyboomers

attacks 4. Investments in infrastructure to

store/collect data.

4. Assumption that all

1. Margins are

for private

practitioners.

decreasing

data will be worth something. 5. Millenials are a consumer-"premium" money making opp. BBs

Providers & Payers

6. Hyper-efficient use

of physician time.

4. Increasing production of data 5. Patients as

health services.

Patient Data

6. "Digital Health" fad

7. Bernie vs Paul Rvan

- today's debate about

- * Discovery
- Cure for cancer

Human Physiology

- * Outbreak
- * Trans humanism

7. Market-based vs single payer debate

More regulation.

- 8. Charging regulation/guidelines: MIPS, MACRA, ,etc.
- reimbursement. 10. Push for patient

- Infrastructure
- 6. Changing physician specialty, priorities, and digital fluency
 - 7. Discontinuity if single payer happened would require huge infrastructure changes. 8. Charging

MIPS, MACRA, ,etc.

Innovators want to

innovate

10. Proofing if PCD

actually save \$

9. Payers wont to save.

regulation/quidelines:

- this.
- telemedicine reimbursements driving "innovation" in the space.

9. Digital health/

engagement running out

telemedicine

11. Social security is

9. Digital health/

10. Patient-centered health care is trending

| Consolidation: private practice > groups and systems | bill for service and for servi | inst FFS (fee benefits bigger conomic Incentives providers to lement EHR . HIPPAA - Reg for lata privacy | s of scale decreasing for prival players. More providers have cess to EHR 3. Push for adapting against to hack attacks | incentives to 2. Expression of the control of the c | HR "hype" 3. Increasing number of hacks |
|---|--|---|--|--|--|
| * Patient population: - older, sicker Millenials driving behaviorDiverse ethnicity. | * Belief that health is valuable. Human right | 4. Stated goal of having more data low input on how to use it. 5. Increasing concern on implications for Babyboomers | Investments in infrastructure to store/collect data. | 4. Assumption that all data will be worth something.5. Millenials are a money making opp. BBs are an expense | 4. Increasing production of data 5. Patients as consumer-"premium" health services. |
| Human Physiology | Culture of Health | Regulation | Infrastructure | Providers & Payers | Patient Data |
| * Discovery - Cure for cancer * Outbreak * Trans humanism | | 6. Deceasing margins.More regulation.7. Market-based vs single payer debate | 6. Changing physician specialty, priorities, and digital fluency | 6. Hyper-efficient use of physician time.7. Discontinuity - if single payer happened would require huge infrastructure changes. | "Digital Health" fad Bernie vs Paul Ryan - today's debate about this. |
| | 9. tel reim 10. Pu engage | security is | 9. Inr inr | novators want to driv the sporting if PCD 10. Pa | Digital health/ emedicine reimbursements ing "innovation" in bace. tient-centered care is trending |

| 3. Pace Layers Analys | sis | bill for a | services. economi inst FFS (fee benefi | | asing priva | | |
|--|-------|---------------------------|--|---|----------------|--|--|
| | | for | | . More providers have access to EHR | star | rtups to solve for ring to EHR | EHR "hype" |
| 1 | | | . HIPPAA - Reg for lata privacy | Push for adapting against to hack attacks | | 3. Value assigned to data makes it more an attractive target | 3. Increasing number of hacks |
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| * Outbreak * Trans humanism | | | 7. Market-based vs single payer debate | 1 | | 7. Discontinuity - if single payer happened | 7. Bernie vs Paul Ryan - today's debate about |

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| | tel | Digital health/ Lemedicine nbursement. | Iı | Innovátors want to transcription to the drivers of | 9. Digital health/ celemedicine reimbursements diving "innovation" in space. |
| | 10. Po engage | ush for patient ement | | | Patient-centered th care is trending |
| | 11. Social running out | security is | | | |