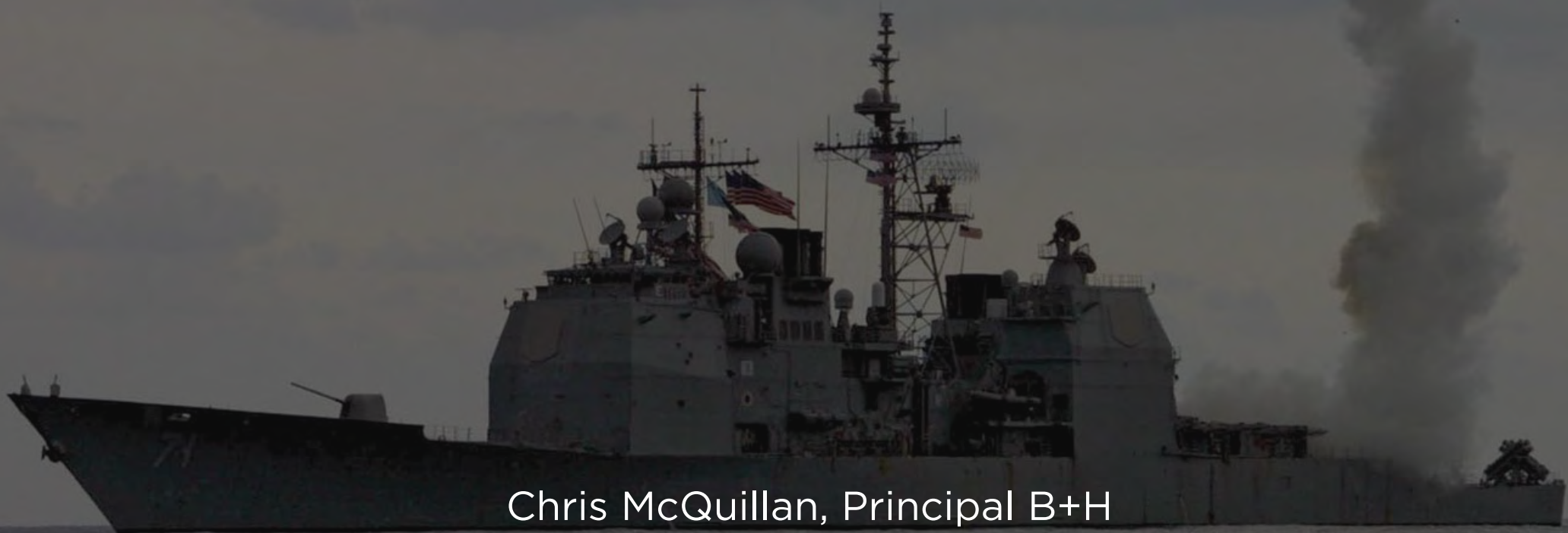
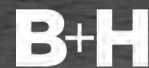


# WHAT NAVAL HISTORY CAN TEACH HOSPITAL DESIGN ABOUT VULNERABILITY



Chris McQuillan, Principal B+H



Advance Strategy™

# OVERVIEW

A Surprisingly  
Brief History of  
the Battleship

What the  
Navy Learned

The  
Vulnerability  
of the Modern  
Hospital

Lessons in  
Adaptation

Our  
Challenges



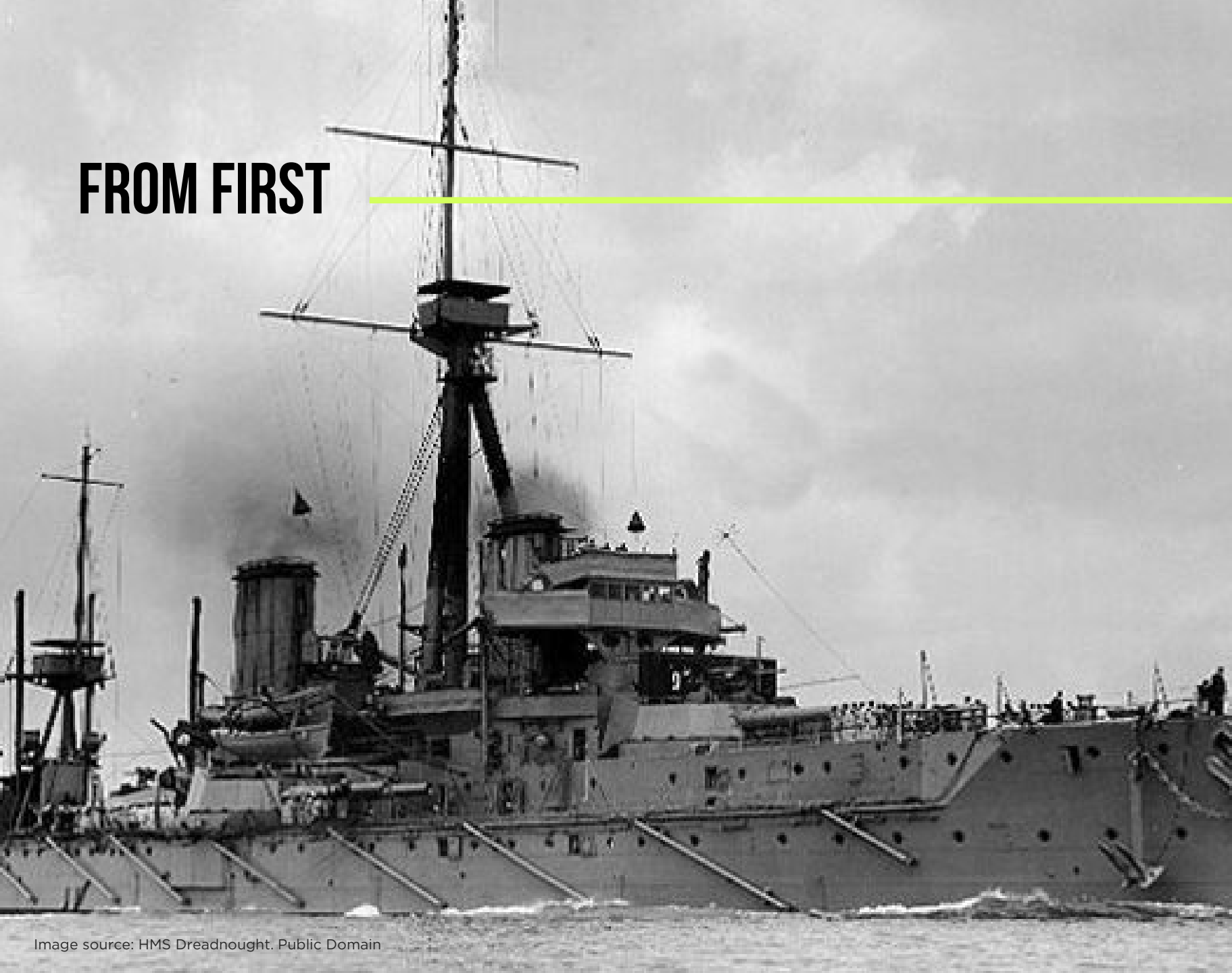
**Downsize**  
**Distribute**  
**Data**

A photograph of a battleship's deck, featuring three large gun barrels pointing forward. The ship's superstructure, including radar masts and a flag, is visible in the background. The sky is overcast and grey. The text "A SURPRISINGLY BRIEF HISTORY OF THE BATTLESHIP" is overlaid in the center in a bright yellow-green color.

# A SURPRISINGLY BRIEF HISTORY OF THE BATTLESHIP

# FROM FIRST

---



## HMS DREADNOUGHT

1906 launched

1914-18 WWI – saw no  
significant action

1920 sold for scrap



# TO LAST

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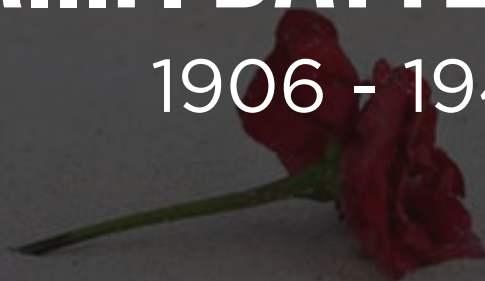
IGN YAMAMOTO

**1937** launched

**1945** sunk by bombers

# R.I.P. BATTLESHIP

1906 - 1945





# THE UNEXPECTED FOE

WORLD WAR I

... A foreshadowing  
of unsuitability

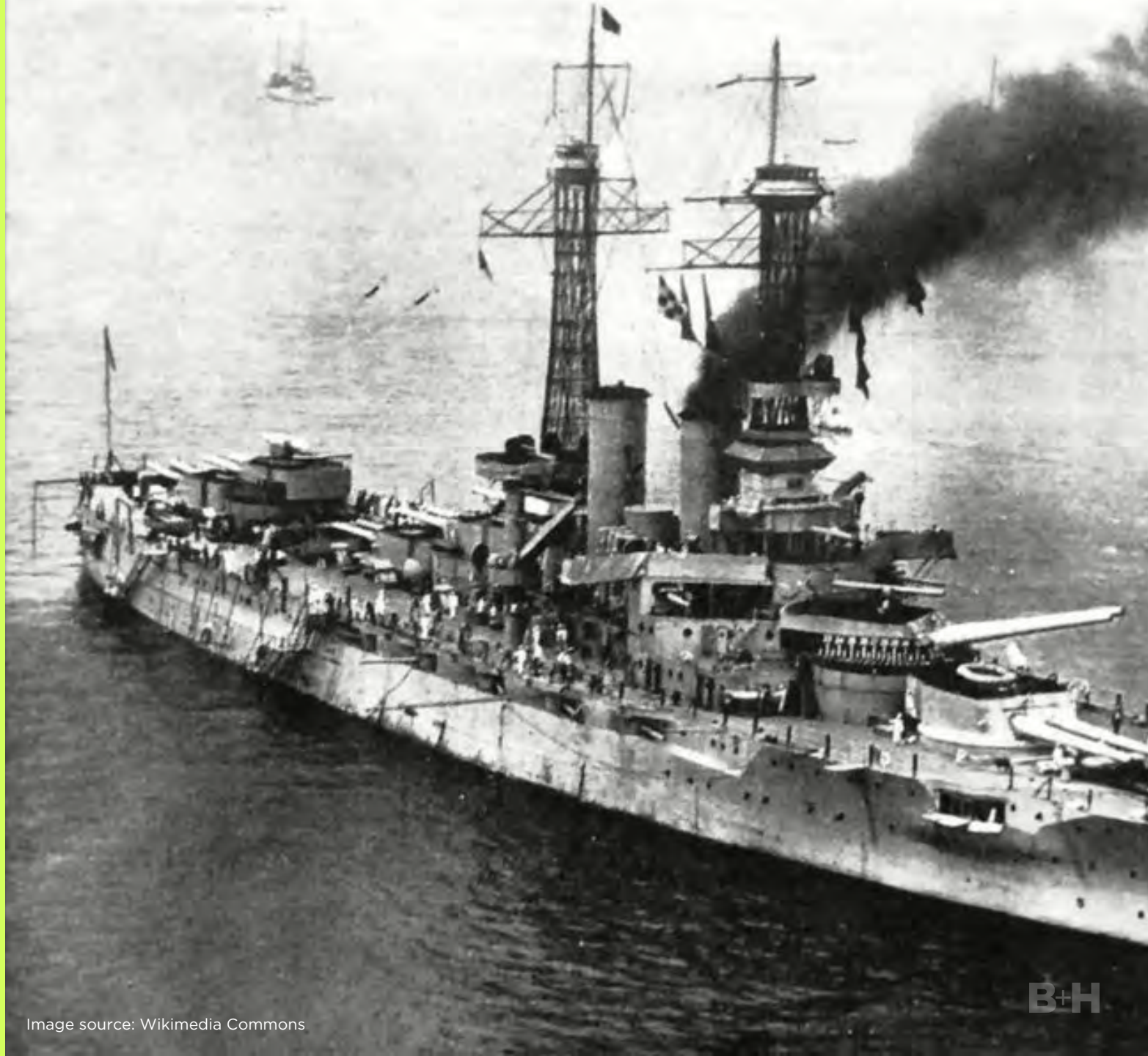


Image source: Wikimedia Commons

# THE UNEXPECTED FOE

WORLD WAR II

...A very large target, a small  
and pervasive assailant



Image source: Wikimedia Commons



# WHAT THE NAVY LEARNED

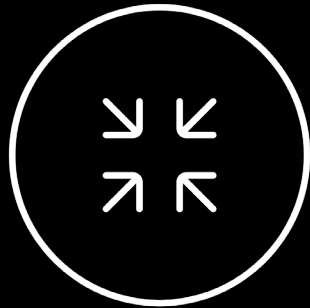




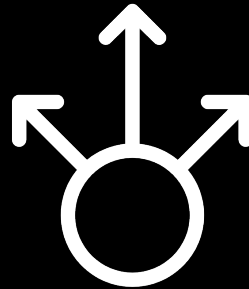
**THE SOLUTION WAS WRONG  
FROM THE BEGINNING.**

# THE 3 D'S OF STRATEGIC WARFARE

---



Downsize



Distribute



Data





# DOWNSIZE

- + Smaller, more specialized equipment (aircraft)
- + Greater inter-functionality







# DISTRIBUTE

- + Broad distribution of assets
- + More autonomous tools (missiles and drones)





# DATA

+ Intelligent data acquisition and diagnostics



Image source: Wikimedia Commons



An aerial photograph of a turbulent ocean surface with dark, swirling water and white foam from breaking waves. The overall tone is dark and moody, with a greenish-blue color palette.

# THE VULNERABILITY OF THE MODERN HOSPITAL

Packed with the best technology  
and sitting low in the water.



# THE VULNERABILITY OF THE MODERN HOSPITAL

- 2,500 beds
- 50,000 ER visits/year
- 40,000 inpatient surgeries/year
- 40,000 outpatient surgeries/year
- 14,000 births/year
- 50 ORs
- 200,000m<sup>2</sup> floor areas
- Concentrated diagnostics
- 5-20% negatively pressured rooms
- Food Court
- Shopping Mall



**EMERGENCY**

---

**Coronavirus  
disease (COVID-  
19) outbreak**

BESIEGED BY A MICROSCOPIC VIRUS





Wikimedia Commons

AT RISK FROM UNPREDICTABLE EVENTS

B+H



UNPREPARED FOR TECH INNOVATIONS

**CNN** health Life, But Better Fitness Food Sleep Mindfulness Relationships LIVE TV Edition

## 1 in every 500 US residents have died of Covid-19

By **Madeline Holcombe**, CNN  
Updated 2:11 AM ET, Thu September 16, 2021



**More from CNN**

-  Donald Trump's mental health becomes an issue again
-  John McEnroe calls Emma Raducanu's US Open win 'crazy' and...

**THE LOST SONS**  
A CNN FILM  
A stolen baby.  
A lifetime of questions.  
An ending you won't believe.  
**CNN** SUN SEPT 26 9P ET 

# ILL EQUIPPED TO COMBAT THE UNEXPECTED

The USA, the world's richest nation, is caught in a Battleship situation.



# LESSONS IN ADAPTATION

The best responses are small scale,  
distributed, and informed by data.










# DOWNSIZE

## LEUMIT HEALTH MOBILE TESTING

- Israel's Leumit Health Services Organization partnered with the Israeli Army to build a mobile testing unit.

**CTECH** 24/7 Buzz Startups VC @Finance @Work Innovation Opinions

by **CALCALIST** Homepage > News




## Israeli Army Partners With HMO to Develop Innovative Coronavirus Testing Unit

The unit allows for taking coronavirus samples while maintaining complete separation between the person being tested and the medical professional administering the test

CTech 10:29 05.05.20

**TAGS:** [IDE](#) [Army](#) [Covid-19](#) [Leumit](#) [HMO](#) [Coronavirus](#)

Founded in 1933, Leumit Health Services has over 720,000 members in Israel, and runs 320 medical centers and 150 pharmacies throughout the country.




The new testing unit. Photo: Leumit



# DOWNSIZE

## PING AN GOOD DOCTOR

- 1000 AI powered clinics
- Across 8 Chinese provinces
- 3+ million healthcare users served
- 100+ common medications stored cryogenically on site



TOPICS

MAIN MENU

ASIA

EMEA

Global Edition

# Ping An Good Doctor launches commercial operation of One-minute Clinics in China

The company announced last week that it had placed its One-minute Clinics across 8 provinces and cities in China and signed service contracts for nearly 1,000 units.


By **Dean Koh** | January 07, 2019 | 03:46 am

SHARE

< Share 2

f

in




Ping An Good Doctor's first One-minute Clinic in Wuzhen, outside of Shanghai. Credit: Ping An Good Doctor.

Last year, Ping An Good Doctor, a one-stop healthcare ecosystem platform from China, **piloted unstaffed clinics** that employ artificial intelligence called "One-minute Clinics"

mobihealthnews

Unlocking the power of technology in healthcare

Learn More







# Downsize

## TENCENT'S DOCTORWORK

- Private offline care through a sharing model for staff and equipment.
- Doctorwork practitioners are part-time and work full-time at nearby hospitals.

The screenshot shows a news article on the EqualOcean website. The header is blue with the EqualOcean logo and navigation links: Sectors, News, Analysis, Research, and Companies. The article title is 'Tencent Trusted Doctors Becomes Unicorn Completing a New USD 250 Million Financing'. Below the title, it indicates the category 'Healthcare', the author 'Yusuf Tuna', and the date 'Apr 24, 2019 09:50 AM (GMT+8)'. The article text states: 'Tencent Trusted Doctors announced that it has completed a new round of financing of USD 250 million. Tencent Trusted Doctors stands as the "China's basic medical service provider" and determined to kill all the inefficiencies.'



# DOWNSIZE

## MOBILE IMAGING

- Cart-based ultrasound machines the size of refrigerators are now available as attachments for smart phones.







# DOWNSIZE

## NANOROBOTS AND INGESTIBLE DEVICES

- Once swallowed, ingestible devices in capsules will perform tasks in the gastrointestinal system, from delivering treatment to isolating foreign objects.





# DISTRIBUTE

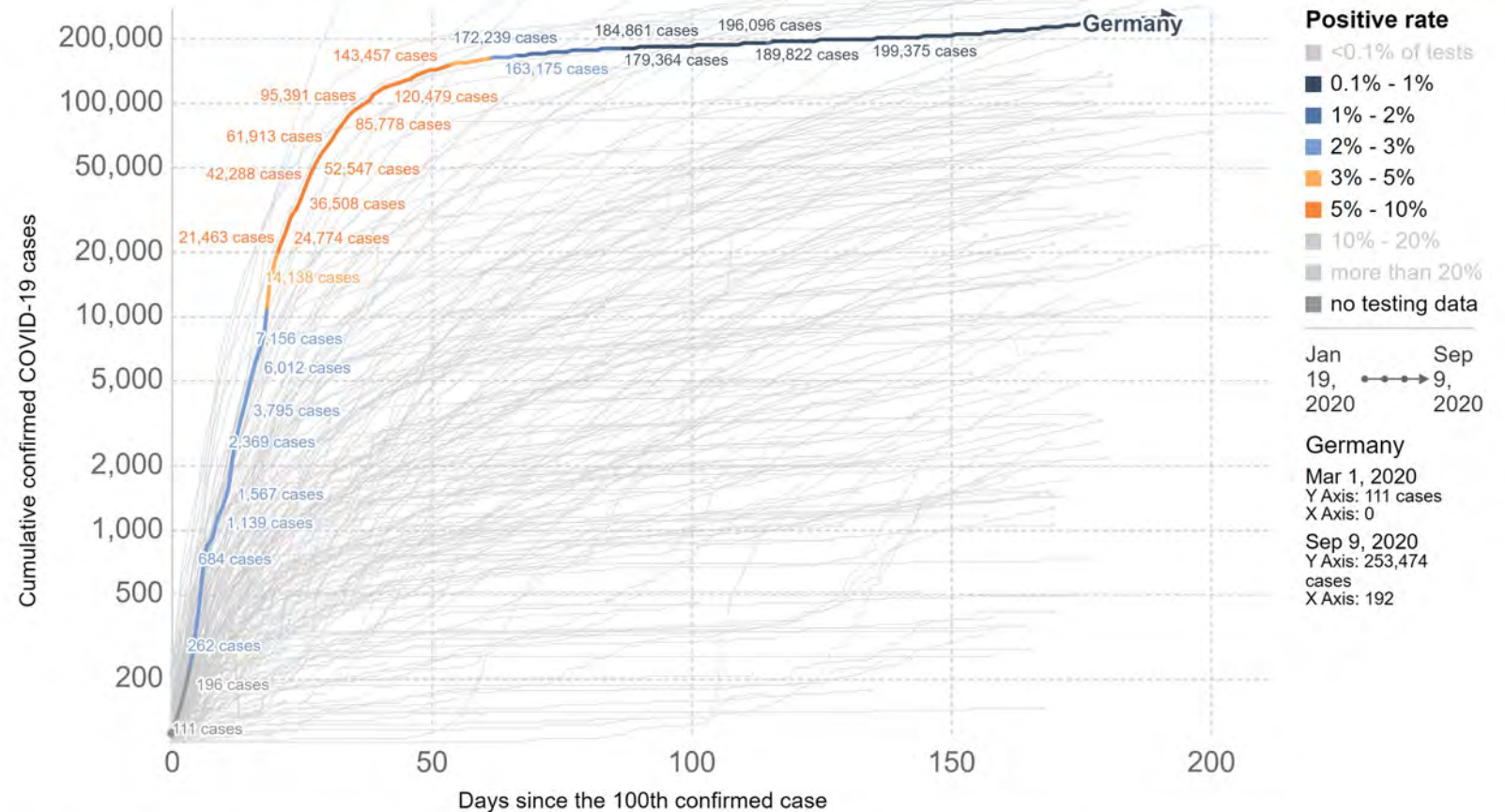
## DECENTRALIZED DECISION-MAKING

- Germany's decentralized healthcare system facilitated quick and comprehensive testing.

## Cumulative confirmed COVID-19 cases

The number of confirmed cases is lower than the number of actual cases; the main reason for that is limited testing.

Our World  
in Data



Source: European CDC – Situation Update Worldwide – Last updated 9 September, 13:35 (London time), Official data collated by Our World in Data  
CC BY





# DISTRIBUTE

## REMOTE ROBOT SURGEONS

- Remote-controlled robot surgeons allow people to access world-leading expertise and better healthcare without having to travel.





## IN-HOME CARE

- Sulli the Diabetes Guru can answer questions about diabetes, including condition, diet, exercise, medication, and monitoring.



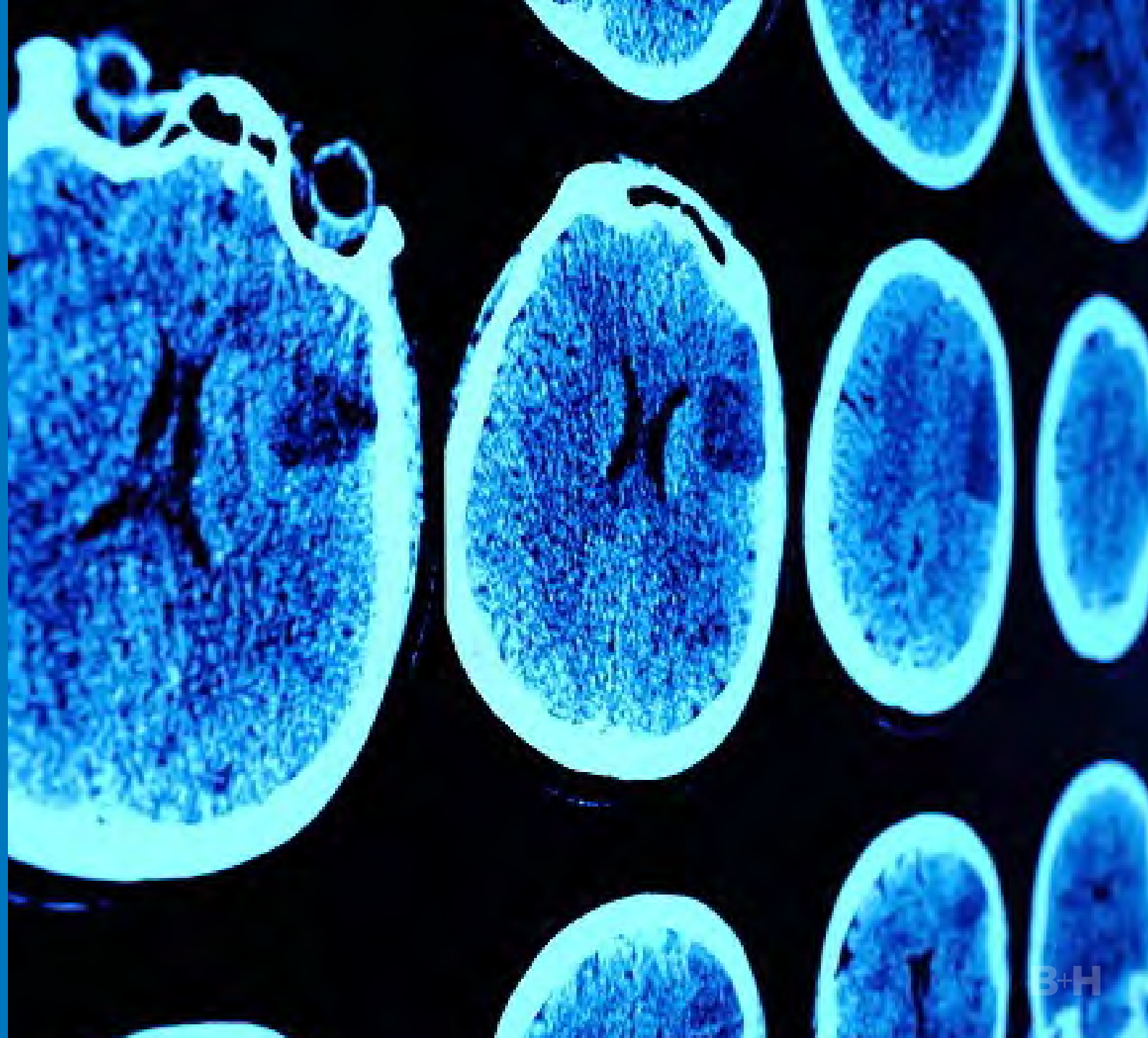




**DATA**

## THE HEALTHCARE CLOUD

Google and Change Healthcare are using machine learning to make the massive amounts of medical imaging data collected more actionable for use at the point of care.





## WEARABLES

- The average person is likely to generate more than 1 million gigabytes of health-related data in their lifetime. (IBM)
- The wearable tech market is likely to grow to \$54bn by 2023. (GlobalData)

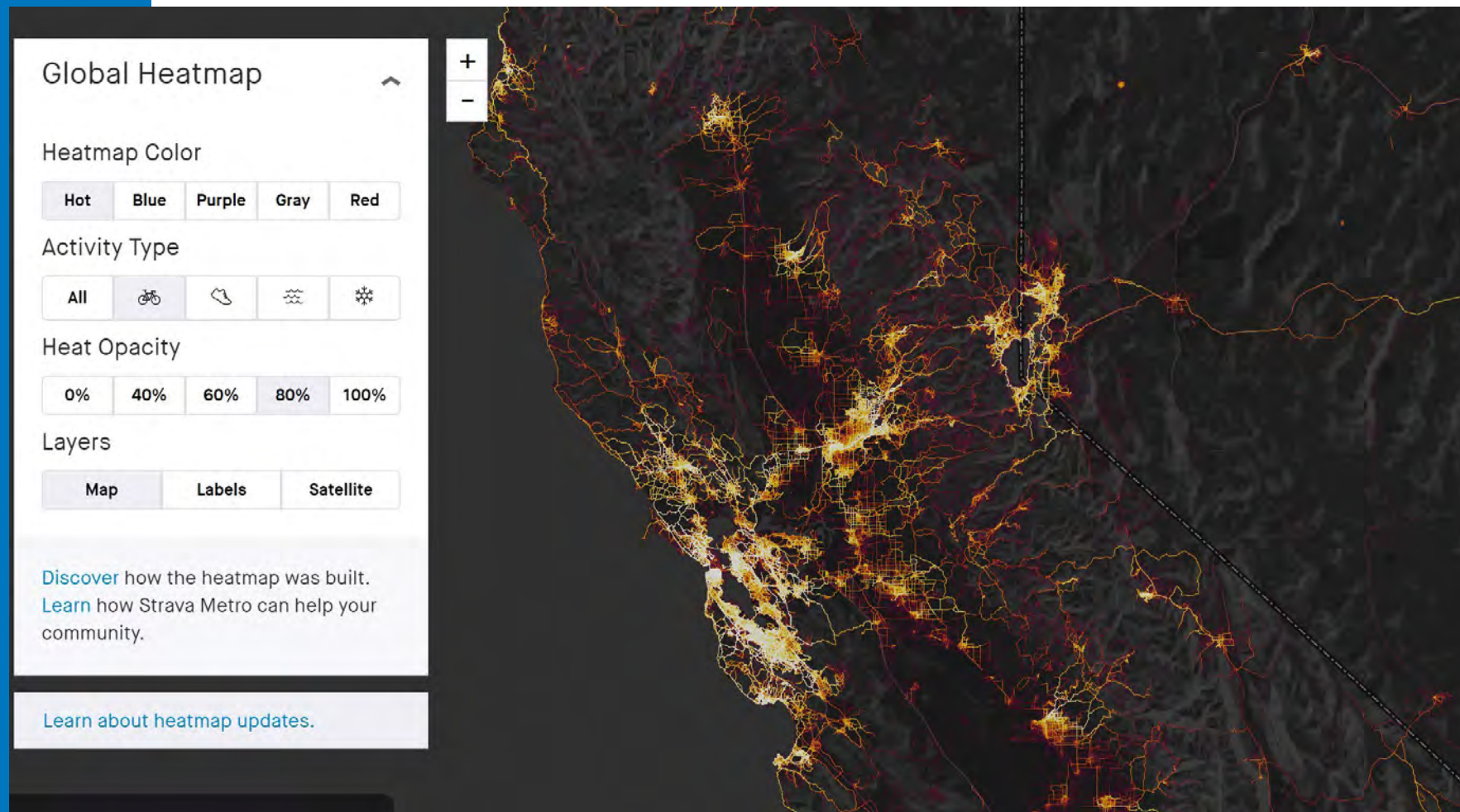






## STRAVA

- Beyond a fitness tracker, Strava is a social network for fitness with a user experience that encourages positivity.

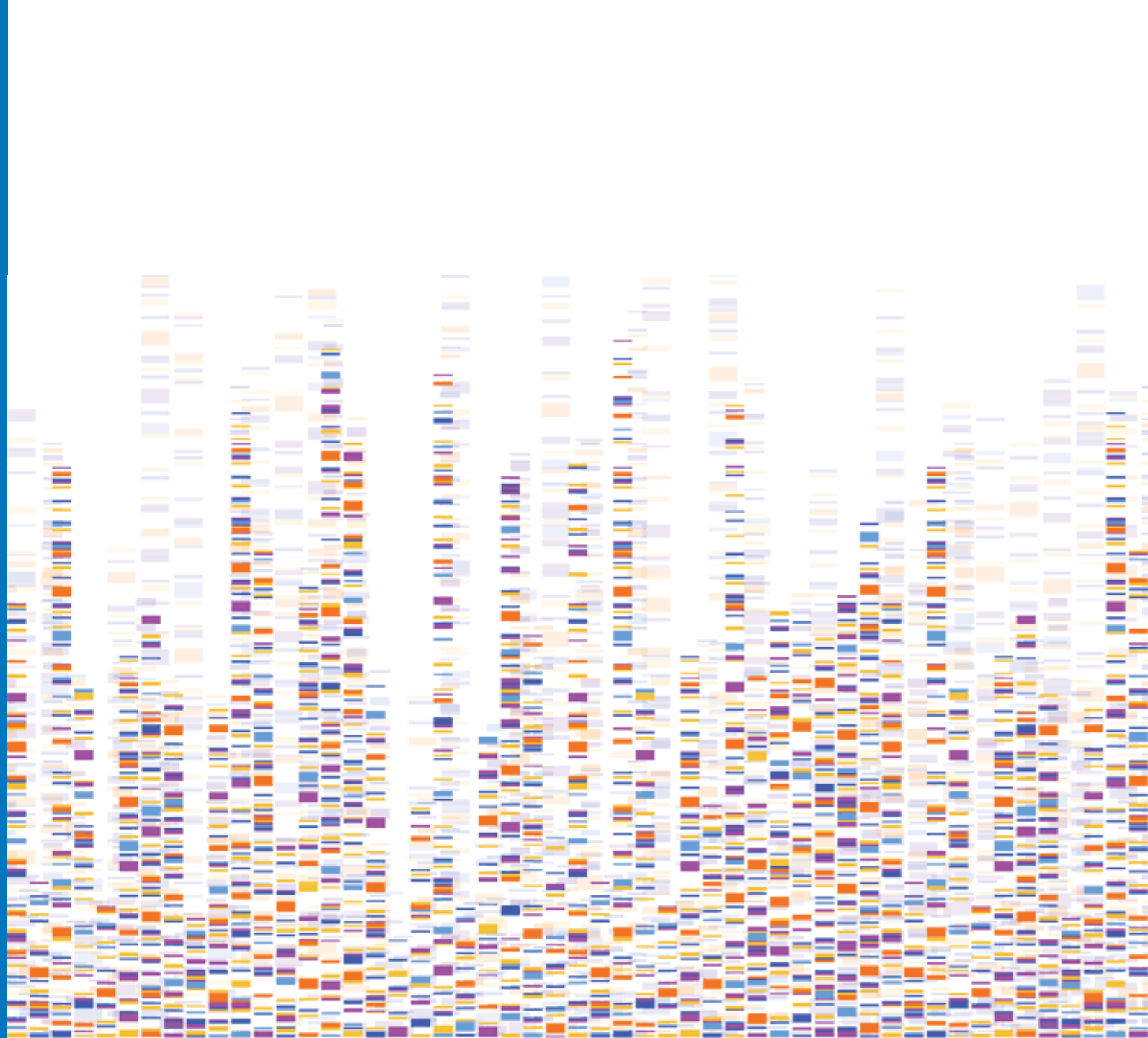




# DATA

## GENETIC TESTING

- In five years, genome mapping will cost less than an X-ray.
- The DNA sequencing market will be worth \$10.35 billion by 2025 as patients push for deeper insights into their genetic risks for disease. (Meticulous Research)





## OUR CHALLENGE

The future is already here —  
we just don't know what to do with it.



LONG HELD

# BELIEFS

+ HEALTHCARE HAPPENS IN A **BUILDING**

+ DIAGNOSIS AND TREATMENT MUST  
BE IMPARTED BY **HUMANS**

+ HEALTHCARE IS  
**RESPONSIVE + CURATIVE**

NEW

# REALITIES

+ HEALTHCARE FOLLOWS THE PERSON

+ DIAGNOSIS + TREATMENT ARE IMPARTED IN  
A HUMAN + MACHINE PARTNERSHIP AND CAN BE 'PLACELESS'

+ HEALTHCARE IS  
PREDICTIVE + PREVENTIVE

**WE DON'T GO TO BANKS ANYMORE**





WE DON'T GO TO THE CINEMA ANYMORE



**WE DON'T GO TO THE OFFICE ANYMORE**



A photograph of a busy hospital corridor. In the center, a male nurse in beige scrubs and a stethoscope walks towards the camera, pushing a medical cart with an oxygen tank. To his left, a man in a black shirt stands with his back to the camera, looking at a smartphone. Further left, another person in white scrubs stands near a glass door. In the background, several other people, including a man in a blue shirt and a man in a white shirt, are walking. On the right side of the corridor, a patient is lying in a hospital bed, and a woman in a red shirt is standing nearby. The corridor has large windows on the left and glass doors. The overall atmosphere is clinical and active.

**WHY WOULD WE GO TO A HOSPITAL?**



**B+H** | Healthcare

Connect with one of our studios.