Your Presenters Today

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Bio: Esmond Kane currently serves as Chief Information Security Officer (CISO) at Steward Health Care, a 35 hospital, multi-state healthcare conglomerate that provides world class care to more than 2 million patients annually. In his role at Steward, Esmond's focus has been on transforming Stewards approach to information security, threat and risk management to comply with industry frameworks, regulations and best practices.

Esmond has over 20 years' experience leading IT and Security programs in multiple industries and before joining Steward served as Deputy CISO at Partners Healthcare in Boston working with executives and advisors to apply his diverse and deep knowledge on cyber security and business practice.

Richard Staynings
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Bio: Richard Staynings is a globally renowned thought leader, author, public speaker and advocate for improved cybersecurity across the Healthcare and Life Sciences industry. He has served on government committee of enquiries into some of the worst healthcare cybersecurity breaches. He has also been a board member of AEHIS – (the Association for Executives in Healthcare Information Security) and has served on the International HIMSS Privacy and Cybersecurity Committee. Advising various governments and leading healthcare providers, Richard has helped formulate long term strategies and tactical action plans for improved cybersecurity and patient safety across the industry and across the world.

A recovering CIO, CISO, & CTO, Richard currently serves as Chief Security Strategist for Cylera, a New York based Healthcare IoT Security Innovator. He is also author of Cyber Thoughts, a leading healthcare cybersecurity blog.
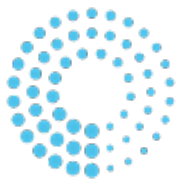
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Never let a good crisis go to waste!

危機 Wéijī

The Chinese use two characters to write the word 'crisis'. One character stands for danger; the other for opportunity. In a crisis, be aware of the danger--but recognize the opportunity.

The COVID-19 pandemic has jarred a highly regulated, conservative and unadventurous industry to think outside of the box and come up with innovative ways of treating patients when almost nobody wants to go anywhere near a hospital or clinic at the risk of coming into contact with sick people or carriers of the coronavirus.

Rising delivery costs and declining revenues threaten the very future of many smaller rural hospitals in particular where a large percentage of patients are on Medicaid or Medicare.
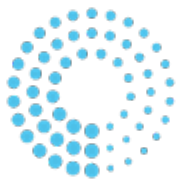
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We need to get a lot smarter how we deliver medical services!

An apple a day

In a matter of months, Covid-19 has done more to transform Healthcare digitally than an entire decade of curated investment encouraged by the 2009 Health Information Technology Economic and Clinical Health (HITECH) Act.

Care in the home is always preferred, it has dramatic positive benefits on patient outcomes. Telemedicine and Telehealth is now essential to stem the pandemic and "flatten the curve". As we look forward to life in the new normal, after Coronavirus, the radical and profound change in the delivery of care promised by HITECH will continue.

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US Healthcare was broken before Covid-19

Our brave doctors and nurses work in an inefficient legacy system from the 1940s that has struggled to contain costs, and to provide healthcare services to all who need them.

Yet healthcare has changed from palliative care model to a **highly interventionist** model seemingly without making improvements in Public Health or Population Health.

The US has some of the world's highest levels of obesity, diabetes, malnutrition, hypertension, stroke, and heart disease. Each is extremely expensive to treat. *The American Heart Association 2019*

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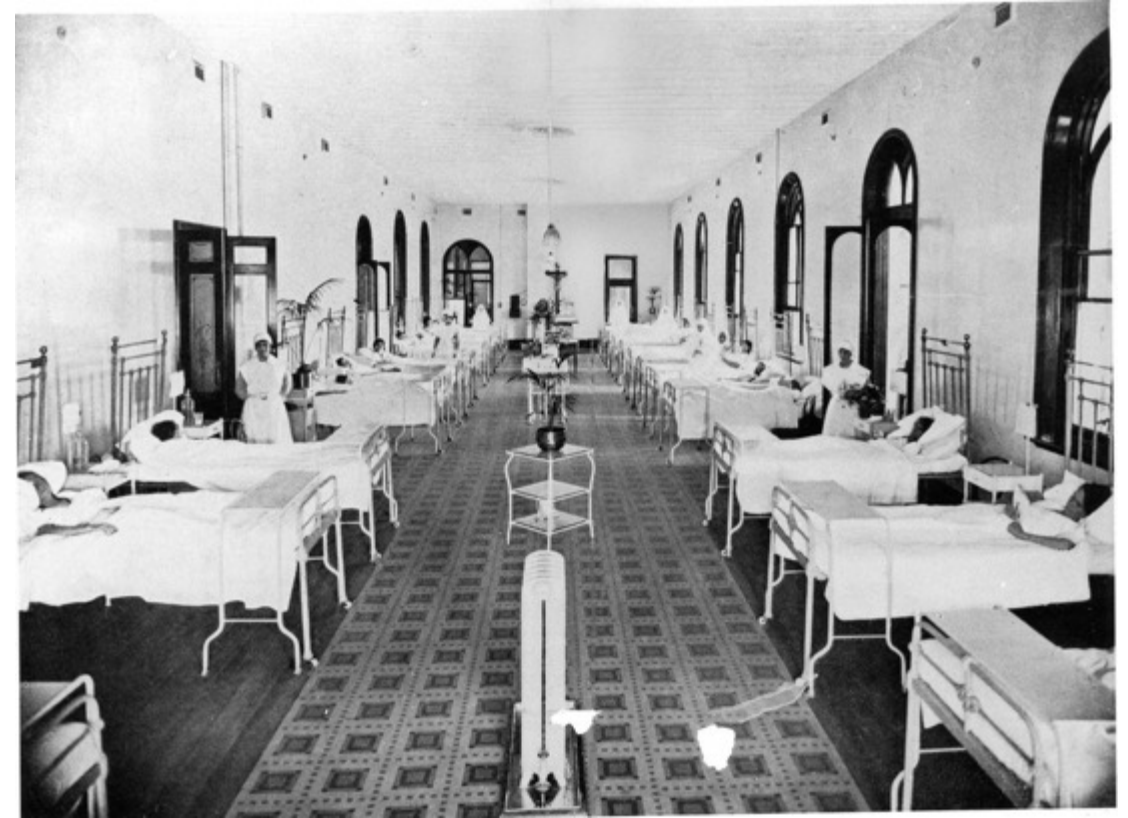
Today, chronic disease accounts for approximately 75% of the nation's aggregate health care spending
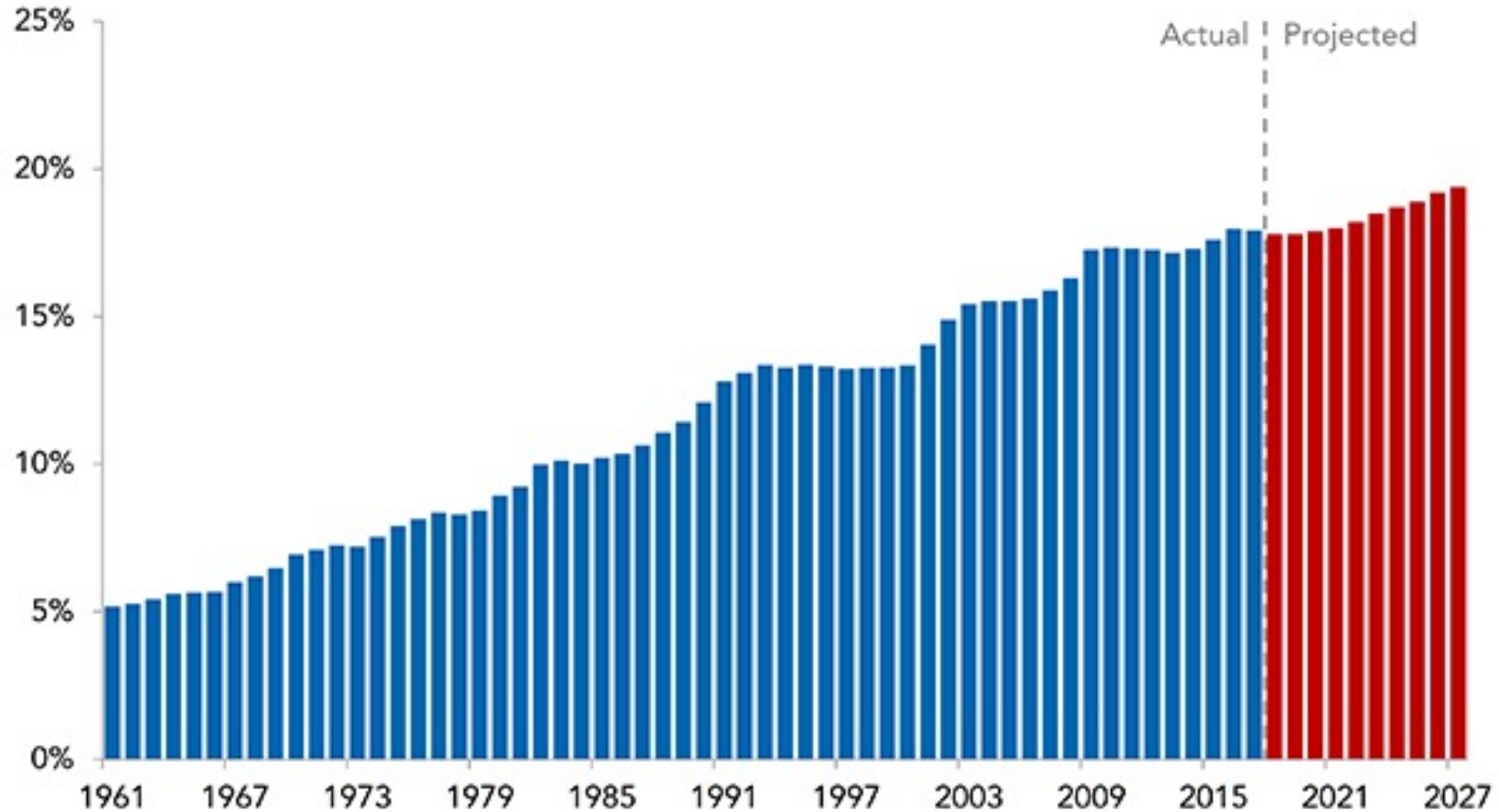
CDC 2020

US Healthcare costs have increased drastically

Outstripping GDP growth

Costs are out of control

With a silver tsunami of baby boomers retiring and hitting Medicare the US will struggle unless changes are made

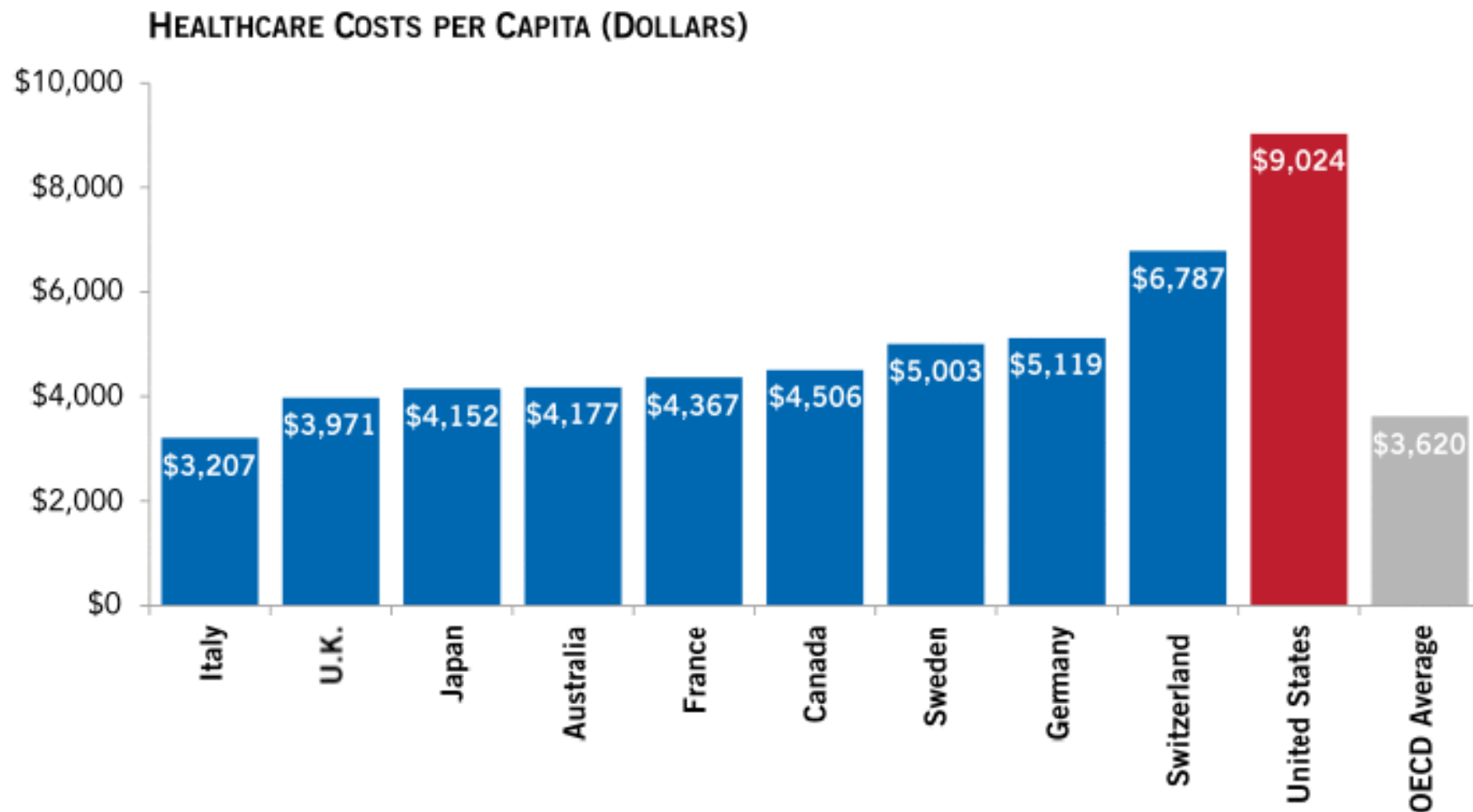## NATIONAL HEALTH EXPENDITURES (% OF GDP)

Actual | Projected

SOURCE: Centers for Medicare and Medicaid Services, *National Health Expenditure Data*, February 2019. Compiled by PGPF.

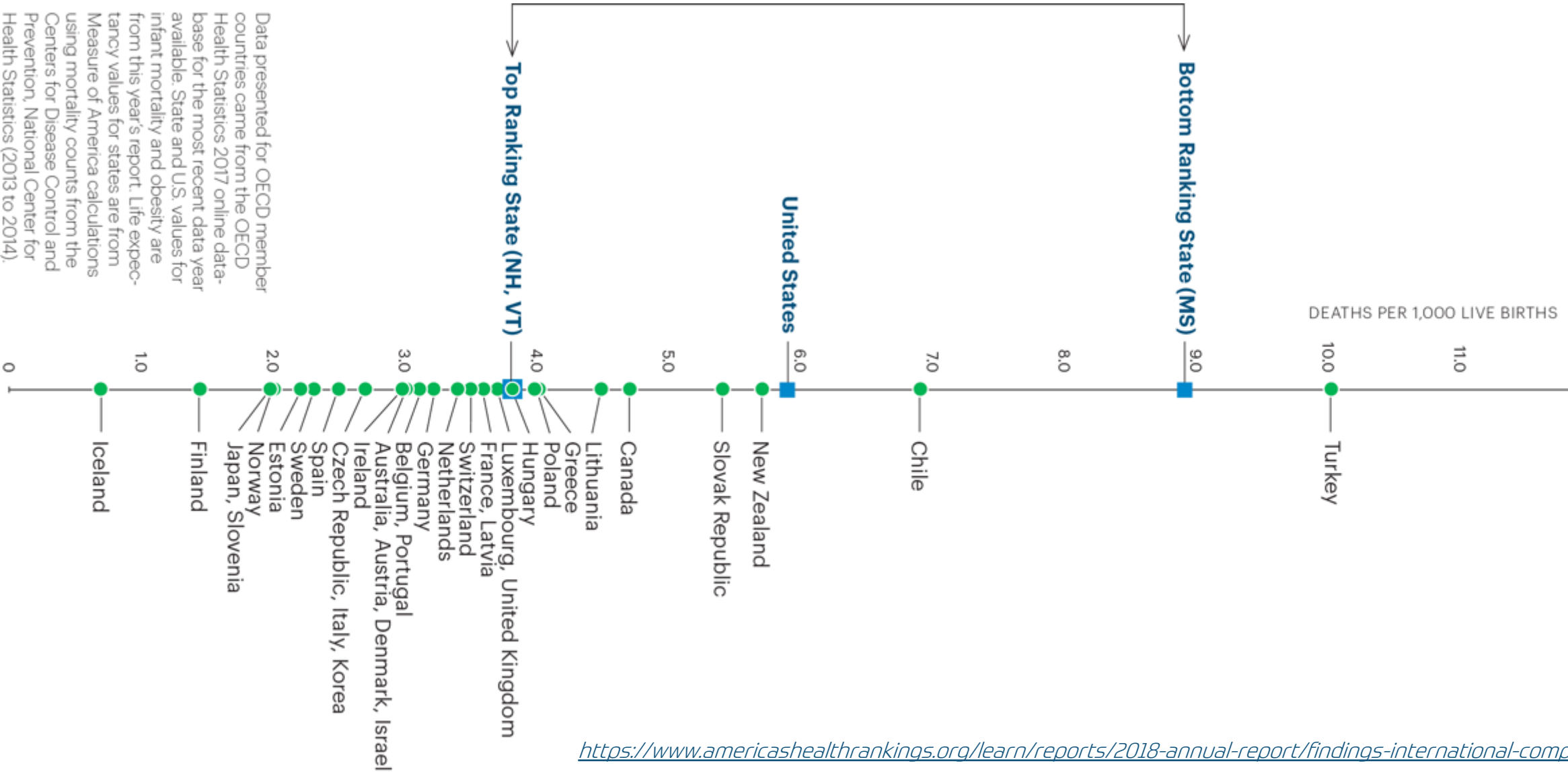© 2019 Peter G. Peterson Foundation

PGPF.ORG

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US spends per capita, twice that of other countries

The US has worse healthcare outcomes than many developing nations let alone OECD countries.

HEALTHCARE COSTS PER CAPITA (DOLLARS)

Country	Cost
Italy	$3,207
U.K.	$3,971
Japan	$4,152
Australia	$4,177
France	$4,367
Canada	$4,506
Sweden	$5,003
Germany	$5,119
Switzerland	$6,787
United States	$9,024
OECD Average	$3,620

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Infant mortality rates – OECD nations

Top Ranking State (NH, VT)

United States

Bottom Ranking State (MS)

Infant mortality rates in OECD countries and top and bottom ranking states in the U.S.

DEATHS PER 1,000 LIVE BIRTHS

0   1.0   2.0   3.0   4.0   5.0   6.0   7.0   8.0   9.0   10.0   11.0   12.0

Iceland

Finland

Japan, Slovenia

Norway

Estonia

Sweden

Spain

Czech Republic, Italy, Korea

Ireland

Australia, Austria, Denmark, Israel

Belgium, Portugal

Germany

Netherlands

Switzerland

France, Latvia

Luxembourg, United Kingdom

Hungary

Poland

Greece

Lithuania

Canada

Slovak Republic

New Zealand

Chile

Turkey

Mexico

The advent of technology has changed processes

- Which should come first the chicken or the egg?
- The applications we select greatly influences our clinical workflows
- But technology has changed the medical services we can now provide to customers – our patients
- Technology has driven great advances in medicine and patient outcomes – but at a cost
- Life expectancy has steadily increased since WWII

78.54 years (2017)

United Kingdom
81.16 years

United States
78.54 years

China
76.47 years
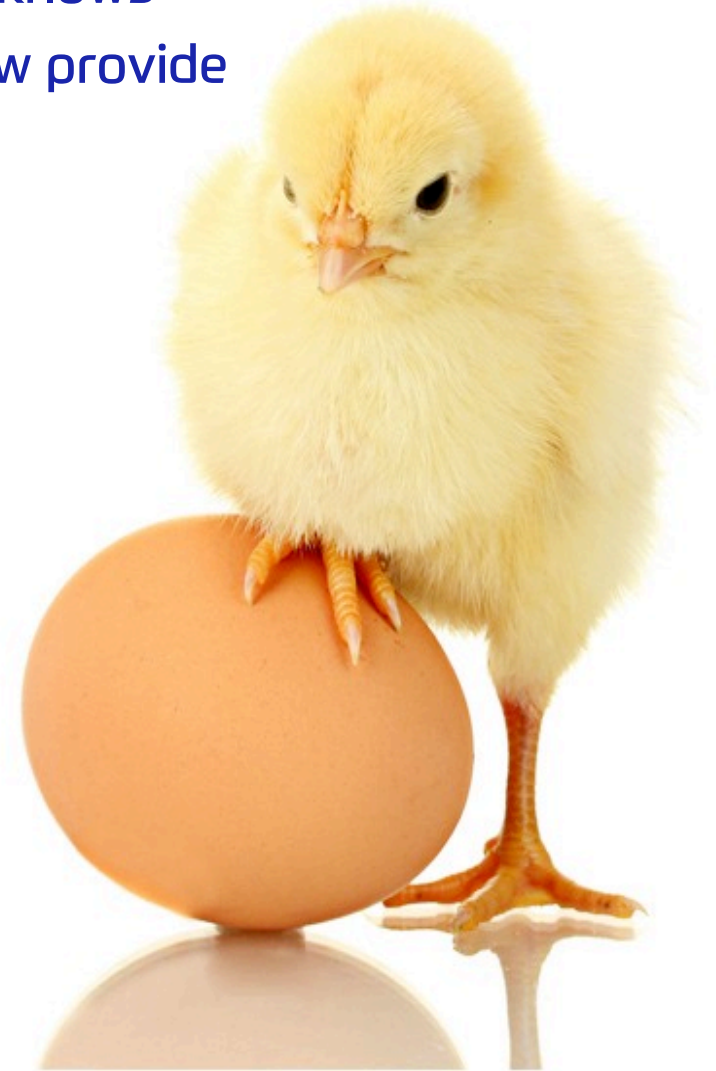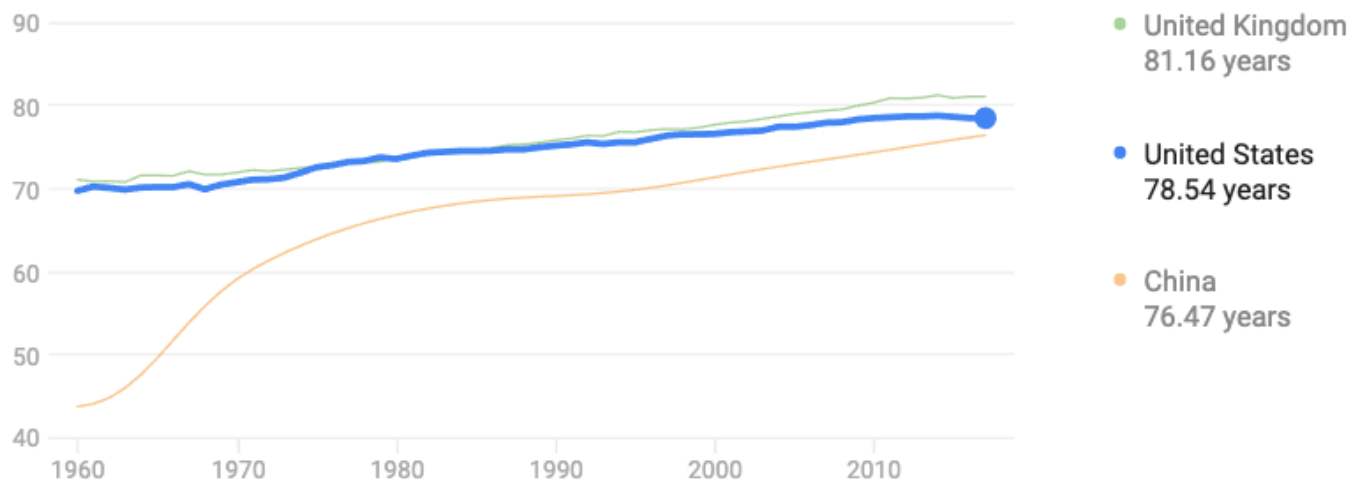
We treat the SYMPTOM – rather than the CAUSE

Polio Patients in Iron Lungs before widespread vaccination
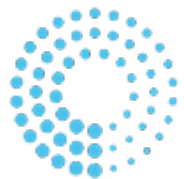

Robotic Surgery

- Invasive medical procedures are very expensive in the US
- US pharmaceutical prices are out of control
- Yet, in the US we spend very little on prevention or public health compared to other countries

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We need Public Health in order to improve Healthcare

- Chronic disease affects health and quality of life, but it is also a major driver of health care costs and has a related impact on business such as absenteeism.

- Chronic disease accounts for approximately 75 percent of the nation's aggregate health care spending - or an estimated $5,300 per person in the U.S. each year.

- Chronic disease constitutes an even larger proportion of spending - 96 cents per dollar for Medicare and 83 cents per dollar for Medicaid.

- 45% of all Americans suffer from at least one chronic disease.

- More than two-thirds of all deaths are caused by one or more of five chronic diseases: heart disease, cancer, stroke, chronic obstructive pulmonary disease, and diabetes.

- More than one in four Americans have multiple chronic conditions (MCC)

- Much of chronic disease is preventable

National Association of Chronic Disease Directors, 2020
https://www.chronicdisease.org/page/whyweneedph2imphc

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https://silverfernhealthcare.blog/2020/04/29/will-covid-19-push-us-to-tackle-our-chronic-disease-epidemic/

The Silver Tsunami

- An aging population consumes a greater proportion of a population's healthcare resources

- Most will be on Medicare – even the poor ones eventually

- Poor people have more chronic disease so we may need to spend more money on Medicaid to increase healthcare access to save money on Medicare

Public Health is an economic utility – especially in times of pandemic and systemic disease

Cost-Shifting is no longer an option
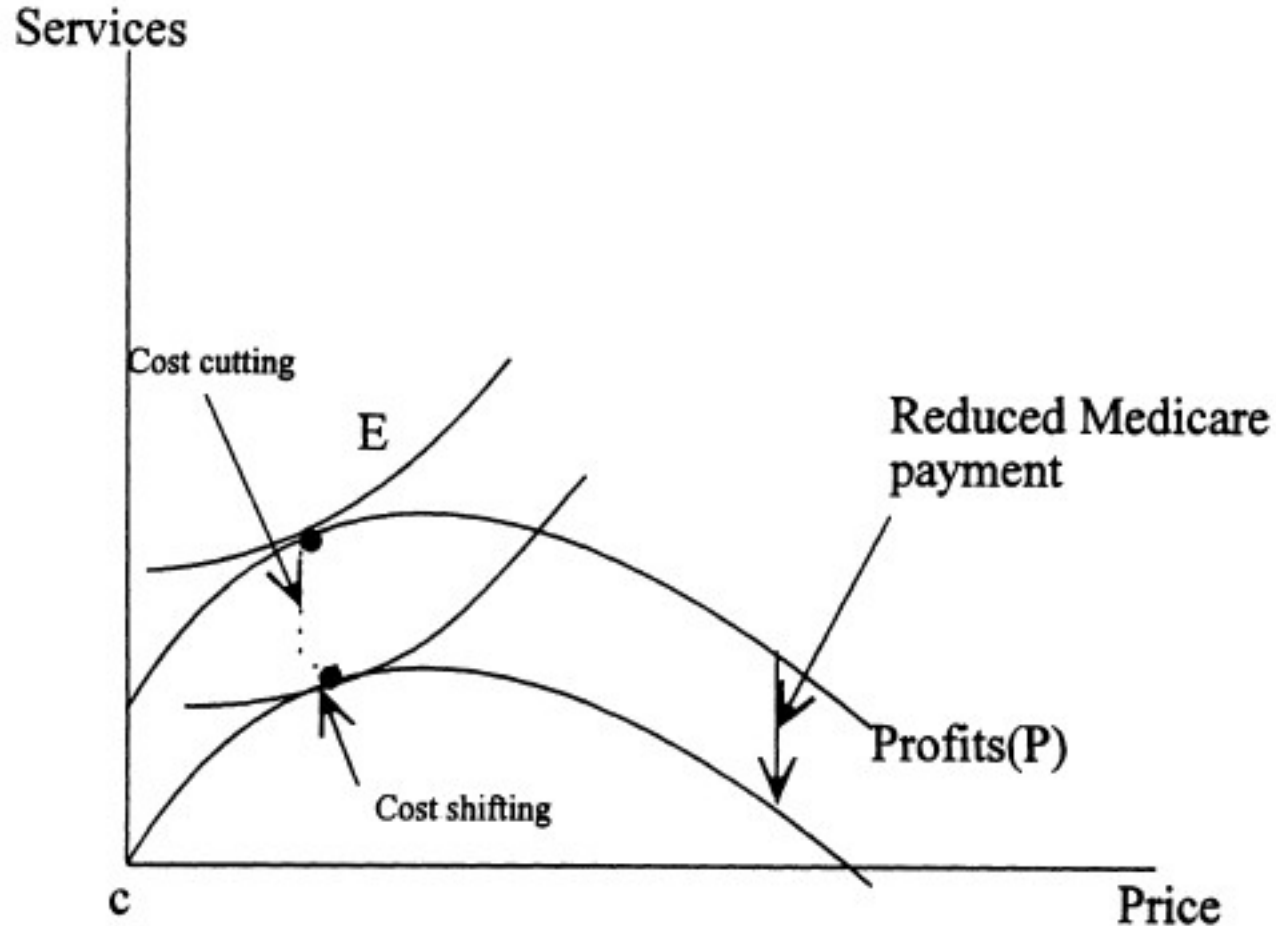
- Medicare, Medicaid, and IHS payments all static

- Growing number and percentage of government patients

- Most of those people are sicker and will require more services

- Shifting costs to patients covered by insurance becomes less effective

- Insurance companies not accepting rising medical costs

- Results in reduced reimbursement rates for providers

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Balance-Billing was just outlawed by HHS

Epidural from out-of-network anesthesiologist? $1,600

Blindsided by balance billing

Same employer.
Same insurance.
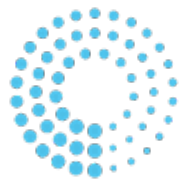Same procedure.
Same hospital.
Drastically different bills.

Epidural from in-network anesthesiologist? $ 0

https://blogs.Cylera.com

The King is Dead: Long Live the King!

The King in His Castle

Why do we still expect sick, elderly, or infirm patients to drag themselves into the city center during winter weather to see a doctor, then have to wait for hours because we can't seem to drive efficient scheduling & workflows?

- X-Ray

- CT Scan

- Specialist consult

Why not just book an online appointment for a video consult and arrange to have your pictures taken at a local center rather than at the city's main General Hospital?

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Telehealth and Telemedicine are the future

- Physicians can see 4 times as many patients via telehealth consults than in-person

- The cost per patient consult are less than half than office visits

- Patients waste less time traveling to a doctors office, and waiting for their appointment

- Telehealth boosts patient satisfaction scores

- Patients are at considerably less risk of contracting something contagious while at the doctors' office
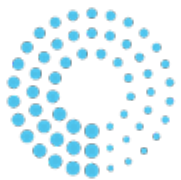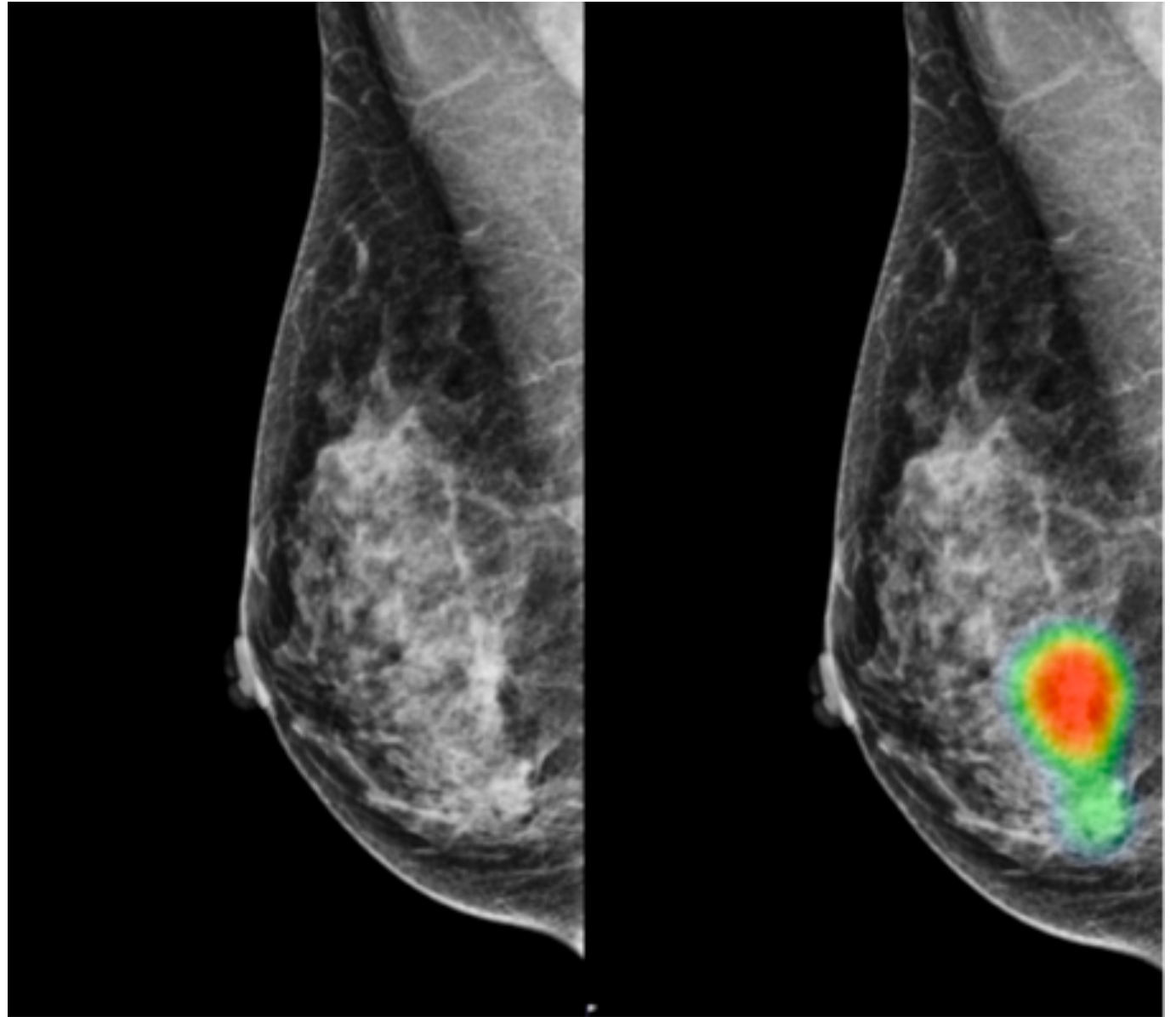
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AI, ML and Automation

AI will be widely used to read and interpret CT scans leading to:

- Earlier diagnosis

- Earlier less invasive treatment

- Enhanced patient outcomes

- Increased economic activity

- Increased patient longevity
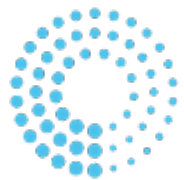
- Lower total healthcare costs

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The 2025 Paradigm Shift

As healthcare becomes ever more reliant upon digital technology, many things will change:
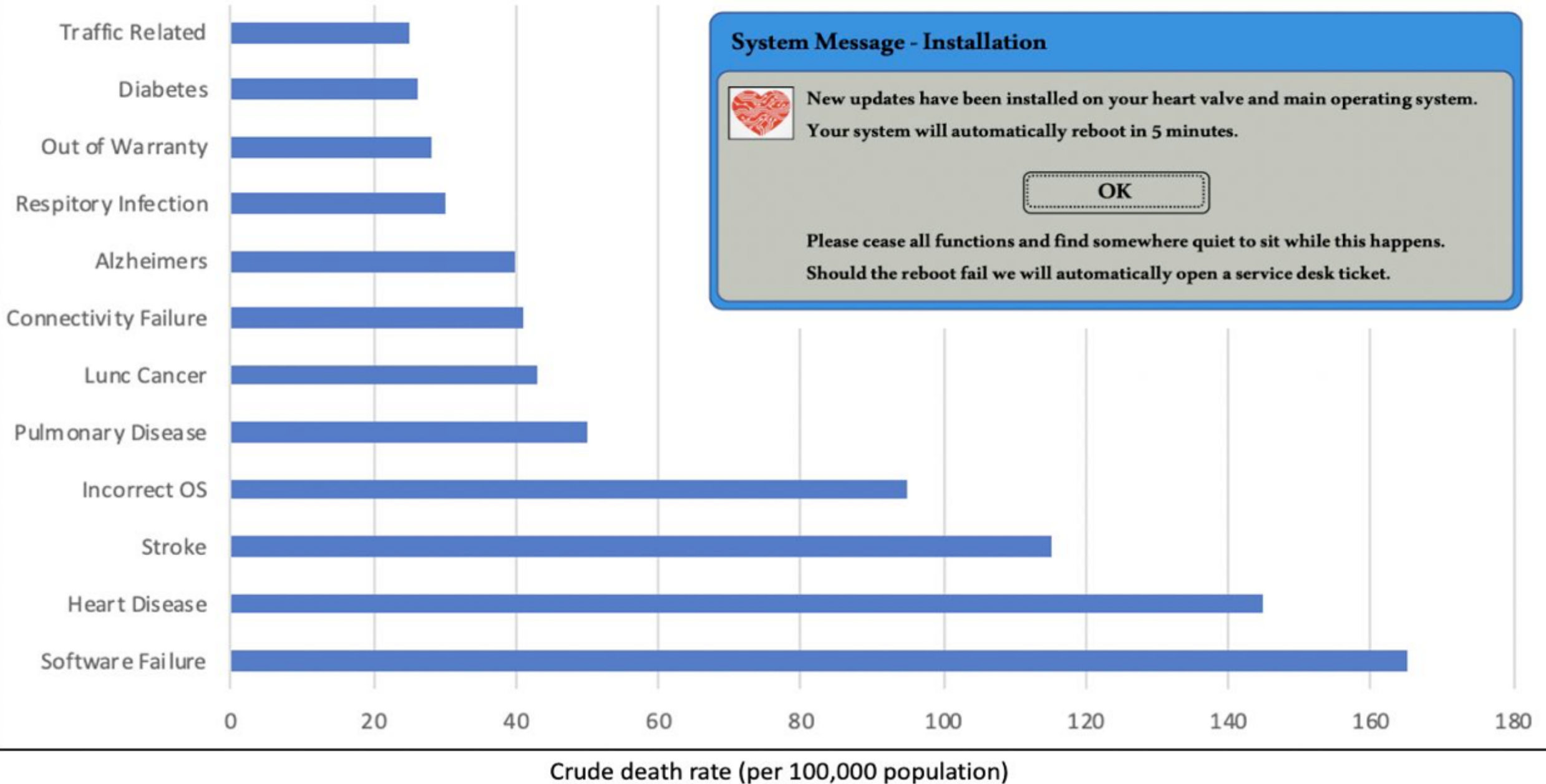
1. IT Services will become as critical as clinical staff to deliver quality health services

2. Cybersecurity will become ever more important to protect IT, OT and IoT systems from becoming compromised, and potentially patient lives held to ransom

3. The rate of change in our industry will exponentially increase as we expand the use of AI, ML, big data, and advanced analytics

4. Automation will increase, there will be more devices and more digital nurses

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Top 12 Casues of Deaths (Upper Middle Income Countries) In 2025

Chart — Crude death rate (per 100,000 population):

Cause	Crude death rate (per 100,000 population)
Software Failure	~165
Heart Disease	~145
Stroke	~115
Incorrect OS	~95
Pulmonary Disease	~50
Lunc Cancer	~43
Connectivity Failure	~41
Alzheimers	~40
Respitory Infection	~30
Out of Warranty	~28
Diabetes	~26
Traffic Related	~25

System Message - Installation

New updates have been installed on your heart valve and main operating system.
Your system will automatically reboot in 5 minutes.

OK

Please cease all functions and find somewhere quiet to sit while this happens.
Should the reboot fail we will automatically open a service desk ticket.

Cybersecurity becomes THE greatest Patient Safety Risk

Hospitals Targeted by Cyber Attack During Covid-19 Crisis

https://blog.Cylera.com

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Zero Trust security model

Zero Trust says to trust no one, both inside and outside of the network.
Use visibility, analytics and automation to keep policies in check.

ZERO TRUST DEVICES

ZERO TRUST PEOPLE

ZERO TRUST DATA

ZERO TRUST NETWORKS

ZERO TRUST WORKLOAD
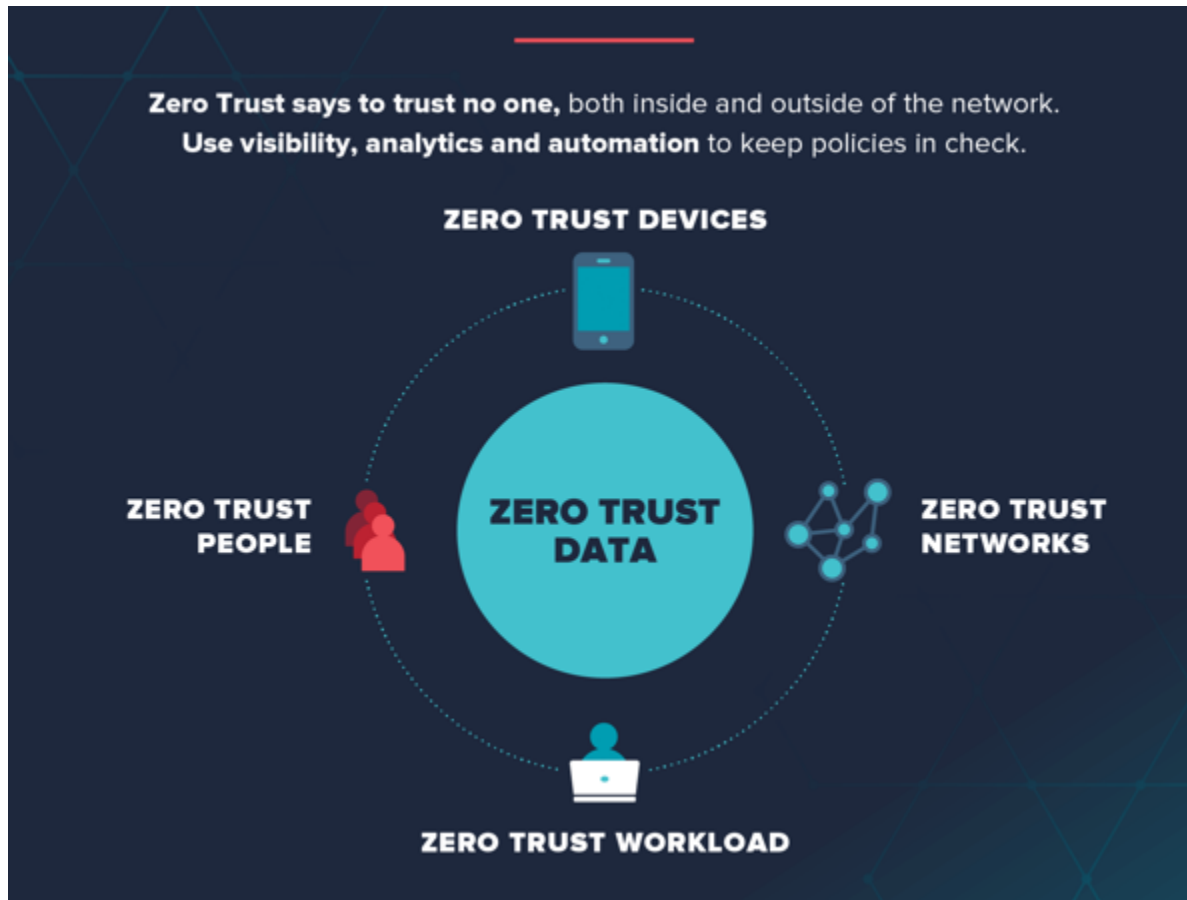
Covid-19 has driven:

- A massive increase in remote working from home for the non-clinical workforce
- Resulting in the need for more granular user access permissions and the adoption of Roles Based Access Control

Massive growth in HIoT devices has:

- Necessitated new tools to identify, profile and risk assess network assets.
- Led to improved asset utilization and cybersecurity risk analysis
- Microsegmentation of hospital networks

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Lasting effects

Just as the Coronavirus will stick around for many years, after the epidemic dies down, many of its lasting effects will likely persist.

- Remote work where feasible (WFH)
- Telehealth / Telemedicine
- Increased use of AI & automation
- Cost containment measures
- No more balance billing
- Increased focus on the Public Health of society
- Bigger government role in Healthcare
- Localization of medical supply chains
- Increased role for IT
- Increased need for cybersecurity

Internet of Everything – over 1 trillion connected devices

2025

5 BILLION	25+ MILLION	25+ BILLION	50 TRILLION
People	Apps	Intelligent Systems	GBs of Data

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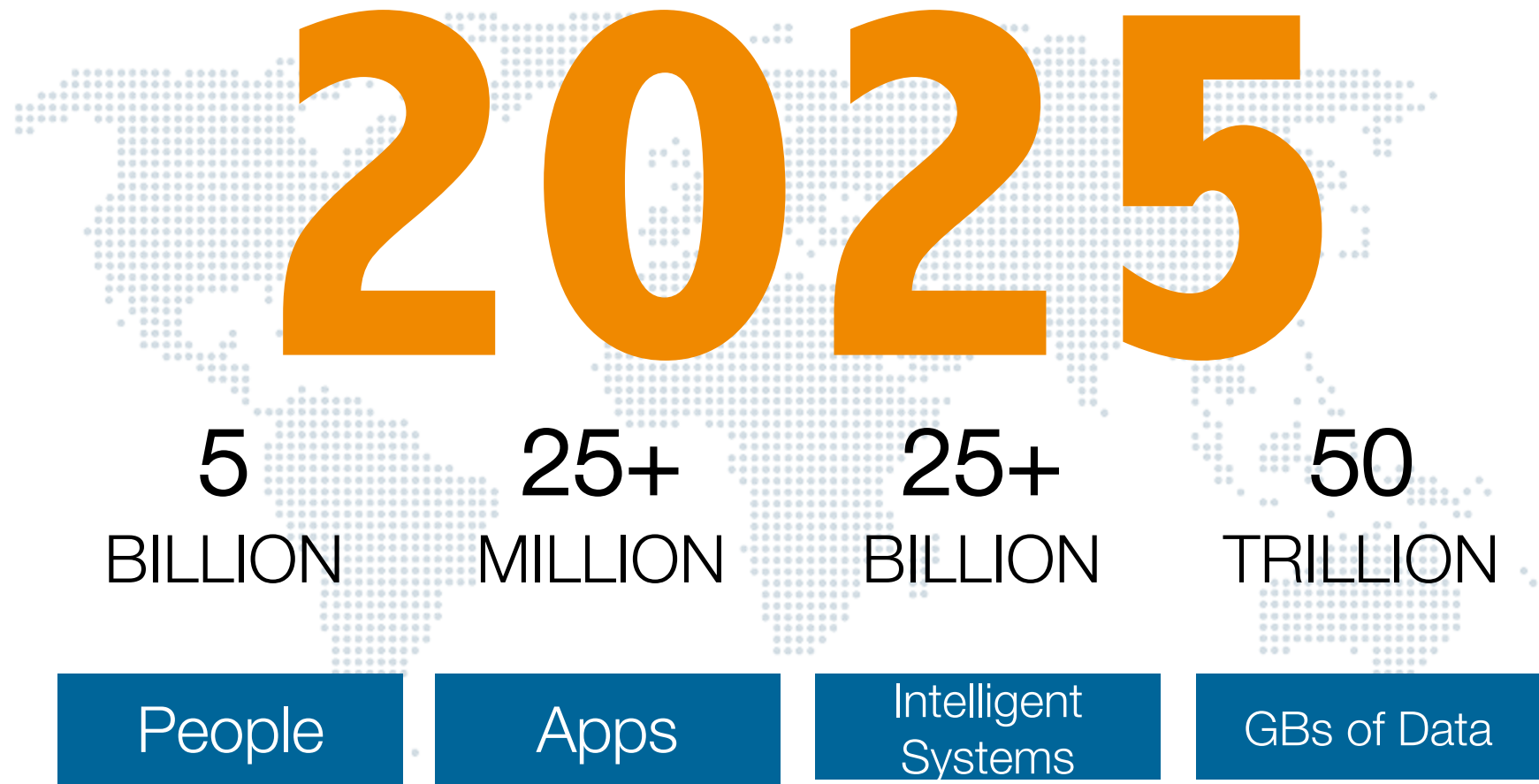
Internet of dangerous things – Healthcare IoT (HIoT)
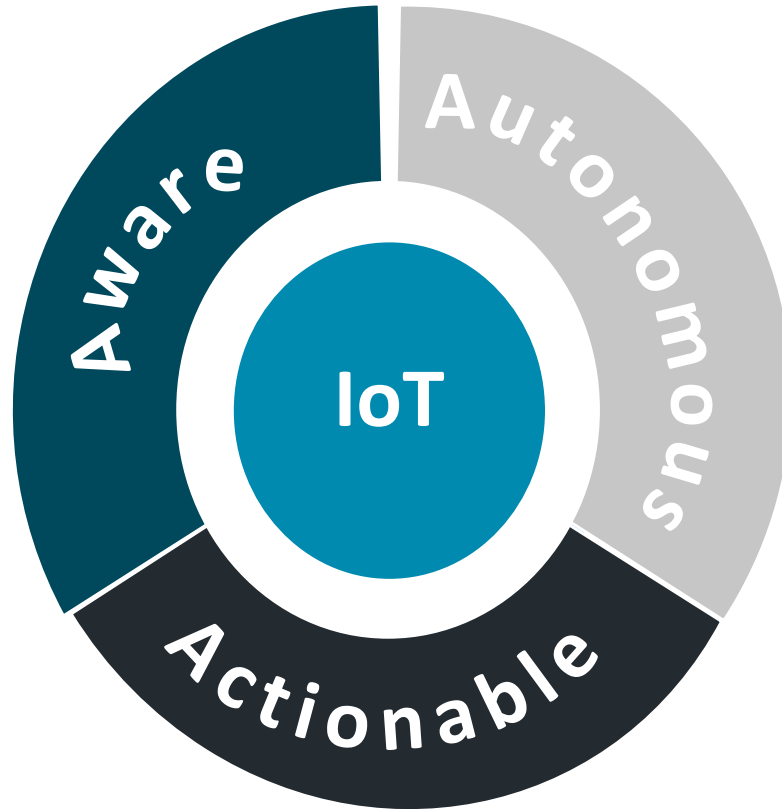
Internal — Pacemakers and defibrillators

Stationary — IV pumps and fetal monitors

Consumer — Fitness tracking devices

Wearable — Insulin pumps

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Innovation at the pace of a pandemic

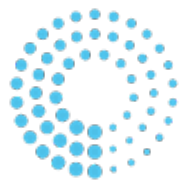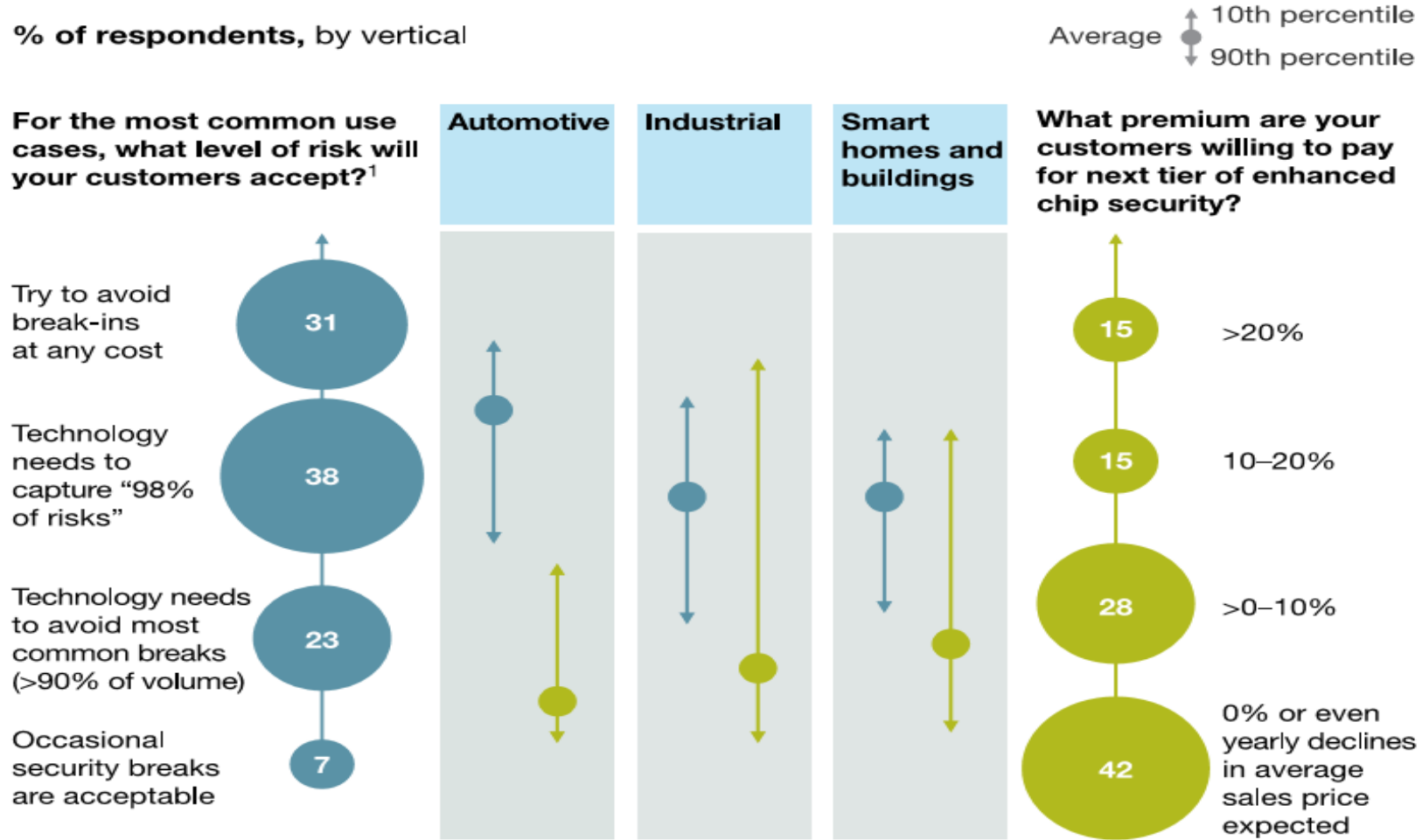**% of respondents,** by vertical

Average ↑ 10th percentile ↓ 90th percentile

For the most common use cases, what level of risk will your customers accept?[1]	Automotive	Industrial	Smart homes and buildings	What premium are your customers willing to pay for next tier of enhanced chip security?
Try to avoid break-ins at any cost — 31				15 — >20%
Technology needs to capture "98% of risks" — 38				15 — 10–20%
Technology needs to avoid most common breaks (>90% of volume) — 23				28 — >0–10%
Occasional security breaks are acceptable — 7				42 — 0% or even yearly declines in average sales price expected

Bruce Schneier: "It's no longer about data, it's about flesh and blood. It's your car, it's your thermostat, it's your heart defibrillator."

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Covid-19 Response

Corporate Priorities
During the COVID-19 Pandemic

IT Initiatives
During the COVID-19 Pandemic

Begin Immediate Work From Home: All Non-Essential Employees

1. Deploy MS Teams to all employees
2. Increase network bandwidth to key resources
3. Provide remote WFH support
4. Enable and monitor security infrastructure

Implement Social Distancing: Remaining Essential Employees

1. Determine facilities impact
2. Provide equipment sanitization procedures and materials
3. Update videoconferencing for remaining in-house users
4. Secure the data center

Enact Pandemic Policy

1. Review and assess other pandemic policies for IT impact
2. Facilitate training for IT staff on these policies
3. Enforce policies

Focus on Revenue
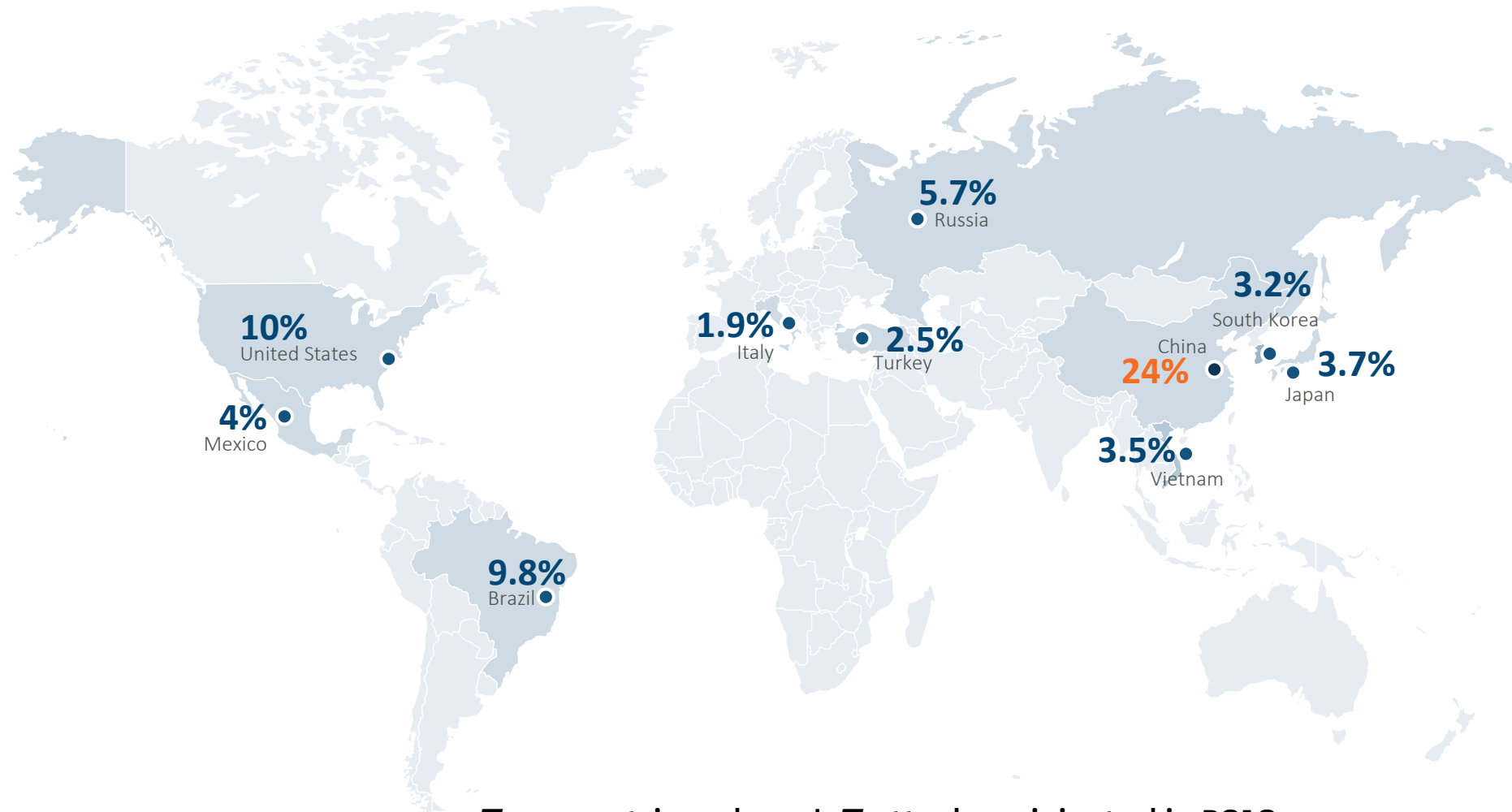
1. Determine and analyze key revenue processes
2. Determine IT impact on those processes
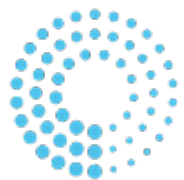3. Optimize processes for maximum technology impact

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IoT attacks: 24% originate from China

5.7% Russia

3.2% South Korea

10% United States

1.9% Italy

2.5% Turkey

China **24%**

3.7% Japan

4% Mexico

3.5% Vietnam

9.8% Brazil

Top countries where IoT attacks originated in 2018.

Source: Symantec, "Internet Security Threat Report," February 2019

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Elevated threat level

- **COVID-19 Phishing Attacks** have been observed across all healthcare sectors and related industries. Threat intel indicates an increase of roughly 20-30% in overall phishing. Threat actors are finding new and creative attacks, schemes, and scams to exploit the fear stemming from the pandemic.

- **Ransomware attacks continue,** including Maze most prominently, several well-known threat actor groups seem to have abandoned their initial vow to avoid the healthcare sector.

- **Citrix, Pulse VPN, and Remote Desktop (RDP) endpoints are being exploited.** The FBI has alerted to multiple actors scanning ports to identify Pulse Secure VPN servers that still remain unpatched. Multiple proof-of-concept exploit code examples have been released targeting vulnerable VPN servers.

- **Work from Home (WFH)** populations have increased dramatically as a result of COVID-19, increasing the attack surface for malicious actors targeting less-protected organizations with less agile IT operations.

- **Continued Global tensions,** in particular with China, create a ripe climate for disinformation, exploitation and opportunities for nation states to "hide in plain sight"

H-ISAC 2020

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The post pandemic world

Endpoint hygiene

- Identity and Access
- Content inspection and DLP
- Threat management and phishing
- Home networks
- Patching and Printing

Cloud acceleration

- Scaling SaaS
- Shadow IT

Furloughed projects

- Vendor backlog
- Pilot and project purgatory
- Zero Trust
- IoT

Business alignment:

- IT and InfoSec Criticality
- Regulations and Enforcement

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Questions?

THANK YOU

https://www.cyberthoughts.org/