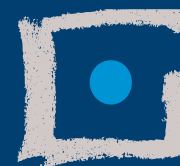


MEDICLINIC

GROUP





THE HOSPITAL OF THE FUTURE:

**RADICAL RETHINK OR
REMAINING THE SAME
AT THE CORE?**

THE ROLE OF INNOVATION

Dr. Tyson B. Welzel

CONFLICT OF INTEREST

THIS PRESENTATION DOES NOT REPRESENT OR ENDORSE A PARTICULAR PRODUCT, COMPANY OR INTEREST GROUP.



TABLE OF CONTENTS

1. Hospital of the Future – Time Frames
2. Hospital of the Future – Roles
3. Hospital of the Future – Possibilities
4. Q&A



HOSPITAL OF THE FUTURE

TIME FRAME



WHAT ARE YOU IMAGINING?



WHAT TIME FRAME ARE WE REFERRING TO?

FUNDAMENTAL TO THE FRAMING OF THE
CHALLENGE IS OUR OWN TIME FRAME:



MORE ON TERMINOLOGY

FUTURISM ≠ FUTUROLOGY

- **Futurism** now describes the art movement of the 1920s & 30s
- **“Futurist”** refers to people who attempt to understand the future
 - Synonyms of the latter: *trend analysts, futurologists, prospectivists, foresight practitioners and horizon scanners*
 - Interdisciplinary and systems thinking to advise private and public organizations on such matters as diverse global trends, possible scenarios, emerging market opportunities and risk management.

WE ARE TERRIBLE AT GUESSING THE FUTURE!

- **Political and sociocultural predictions: Generally bad**
- **Scientific predictions (incl. healthcare): Generally good**
- **Generally, we under- or overestimate the time it will take to change**

Kulkova, J. et al. (2023) Medicine of the future: How and who is going to treat us?
<https://doi.org/10.1016/j.futures.2023.103097>

WE ARE TERRIBLE AT GUESSING THE FUTURE!

- Jules Verne has made many predictions but was **way out about the time frame**
 - Believed that newscasting, solar sails and video conferencing would take place **by 2889**
- We confuse the challenge of **picturing change** (“What is going to happen?”) with the **improbability of change** (“It will never happen!”)



Pasricha, L. (2019) Why are we so bad at predicting what will happen to us in the future?
<https://ideas.ted.com/why-are-we-so-bad-at-predicting-what-will-happen-to-us-in-the-future>
Jules Verne: (1889; 1865) “In the Year 2889” & “From the Earth to the Moon”
<https://www.latimes.com/archives/la-xpm-1996-03-03-tm-42636-story.html>

Photo: Hanna-Barbera/Everett Collection

WHY ARE WE TERRIBLE?

- **Biases**
 - Overly optimistic
 - Predict based on our past experiences
 - Availability bias
 - Confirmation bias
- **Humans are bad at synthesising large amounts of data**
 - Humans are very bad at understanding statistical trends and long-term changes.
- **We're bad at knowing which factors are the most important**

Ossola, A. (2019) Why are humans so bad at predicting the future?
<https://qz.com/1752106/why-are-humans-so-bad-at-predicting-the-future>

WE ARE TERRIBLE AT GUESSING THE FUTURE!

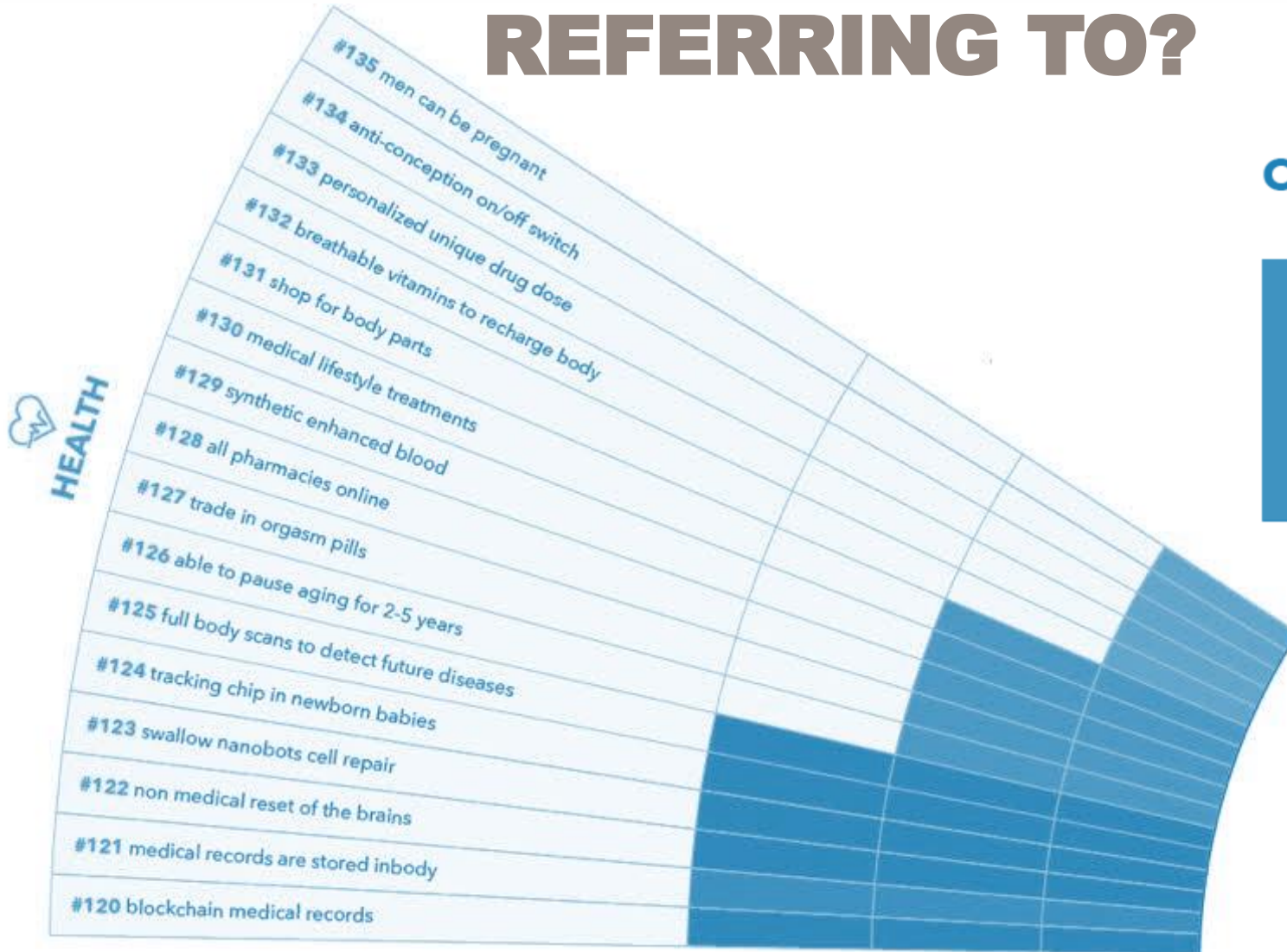
- **“Nuclear-powered vacuum cleaners will probably be a reality within ten years.”**
(Alex Lewyt, president of Lewyt vacuum company, 1955)
- **“Everyone will be carrying genome cards with available cures by 2020.”**
(Laurie Garrett, 1996)
- **“Machines will be capable, within twenty years, of doing any work a man can do.”**
(Herbert Simon, 1965)

Jules Verne: “In the Year 2889” & “From the Earth to the Moon”
<https://www.latimes.com/archives/la-xpm-1996-03-03-tm-42636-story.html>

WHAT HAPPENED ON 30 NOVEMBER 2022?



WHAT TIME FRAME ARE WE REFERRING TO?



Considered normal in:



Do not forget the societal and technology context!

Board of Innovation – Future Scan
<https://www.boardofinnovation.com/tools/future-scan/>

WHAT IS POSSIBLE VERSUS WHAT WE DO

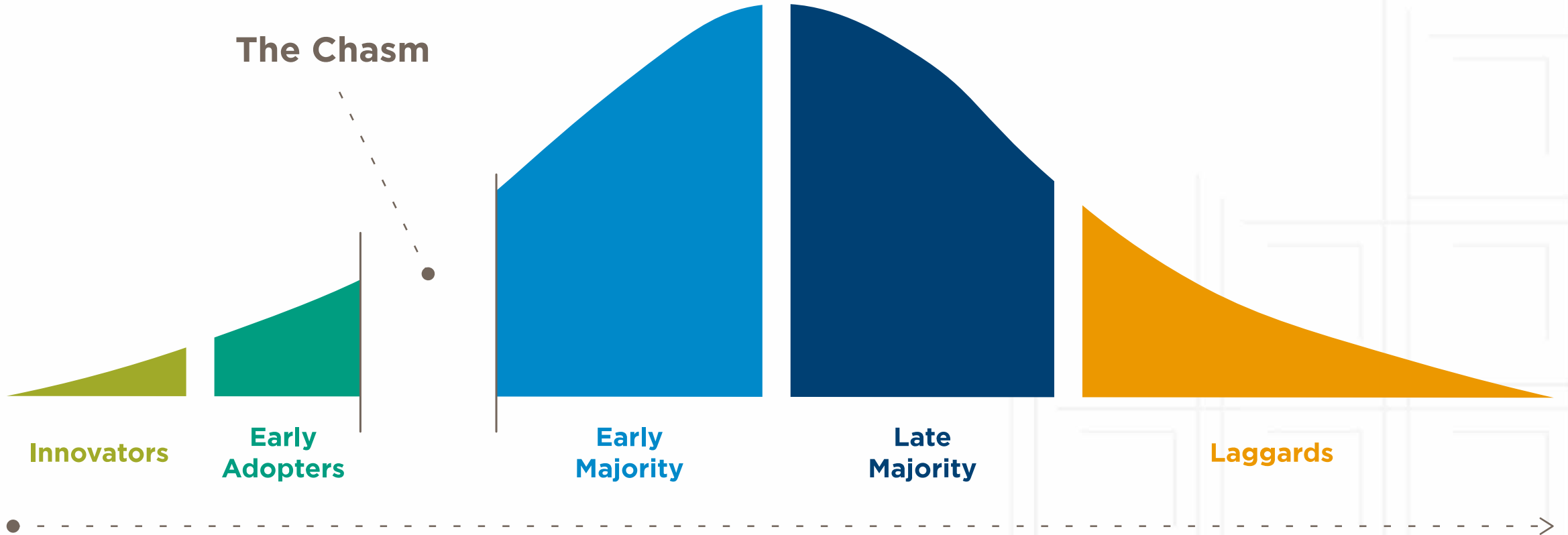
Example: CRISPR Prime derived cures

- **ZOLGENSMA for SMA**
Timing + USD 2.1 million price tag
- **32 gene therapies have been approved worldwide (as of April 2024)**
- **By 2025 it will be approving 10 to 20 cell and gene therapies / year (FDA)**
- **> 2000 gene therapies in development around the world.**
(1500 in preclinical development and <10 entering preregistration)
- **Could alter several AD genes in fetuses**

<https://www.fda.gov/news-events/press-announcements/statement-fda-commissioner-scott-gottlieb-md-and-peter-marks-md-phd-director-center-biologics>

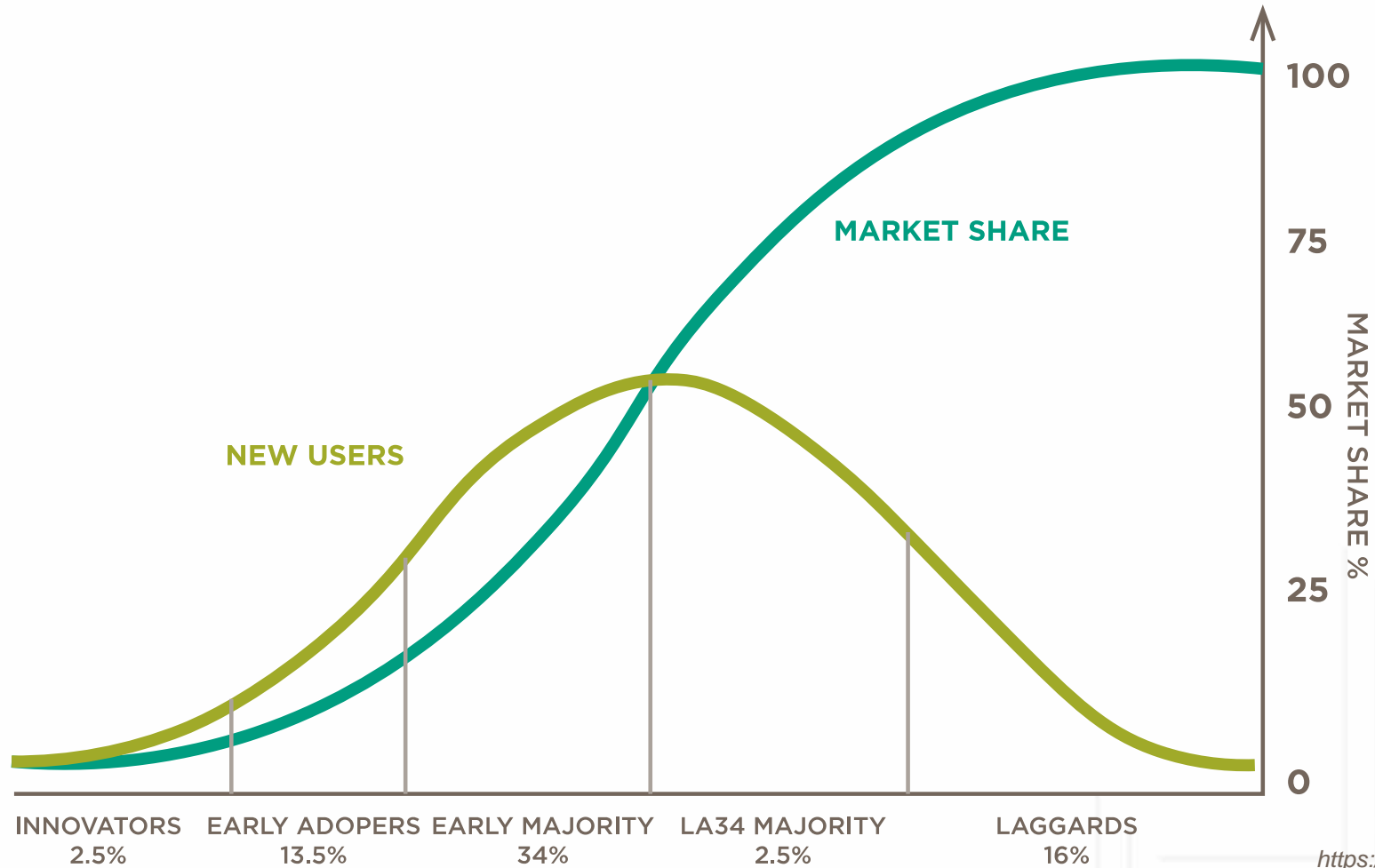
American Society of Gene and Cell Therapy, Gene, cell, & RNA therapy landscape report: Q1 2024 quarterly data report (ASGCT, 2024); <https://asgct.org/publications/landscape-report>.

READINESS FOR CHANGE



<https://www.newbreedrevenue.com/blog/product-adoption-curve>

DIFFUSION OF INNOVATIONS



<https://www.forbes.com/sites/andyswan/2020/04/12/how-to-spot-companies-accelerating-through-the-adoption-curve/?sh=4c6fa19e4231>

AND IN HEALTHCARE?

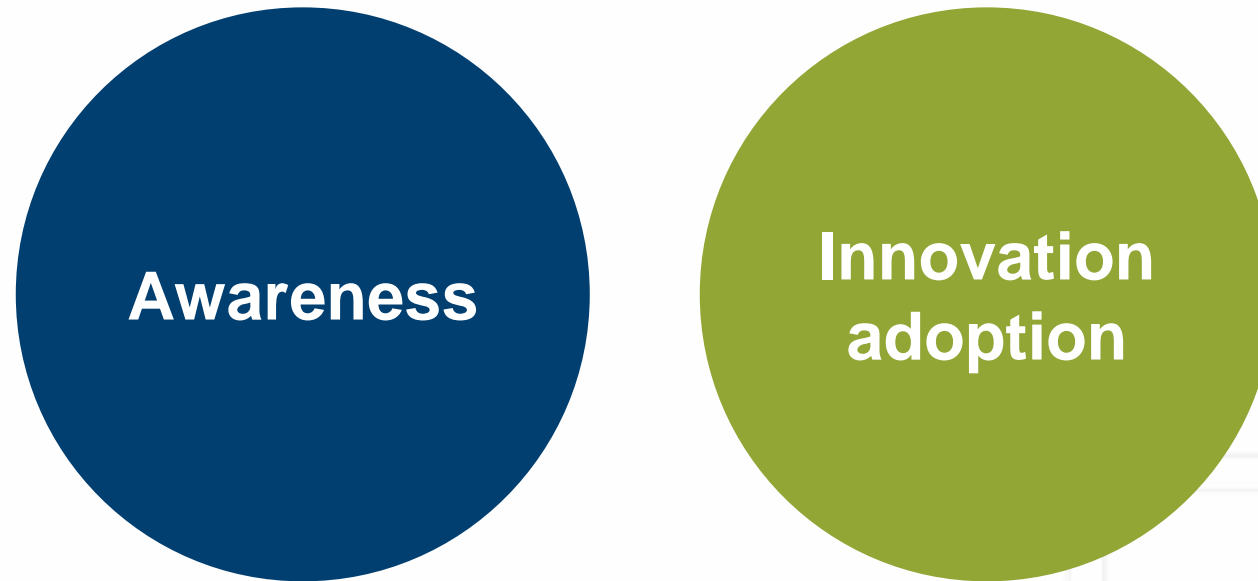
THE ANSWER IS 17 YEARS...

(the time taken from research evidence to clinical practice)

Morris, Z.S., Wooding, S., Grant, J. (2011). The answer is 17 years, what is the question: understanding time lags in translational research. *Journal of the Royal Society of Medicine (JRSM)*, 104(12):510-520..

WHY THE DELAYS?

FUNDAMENTALLY TWO DIFFERENT PROCESSES



Aggarwal, R., Anand, A., Singhal, S., & Bisht, M. (2019). Dependency and time delay-based innovation adoption modeling. *Mathematics in Engineering, Science & Aerospace (MESA)*, 10(2).

HOSPITAL OF THE FUTURE

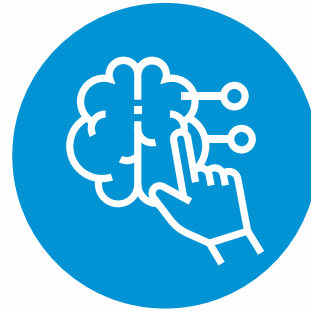
ROLE OF THE HOSPITAL



WHY DO HOSPITALS EXIST?



Concentration of services and equipment too expensive to be available in the home or in other centres



Allows for more efficient and effective care of several people if these need monitoring with intervention

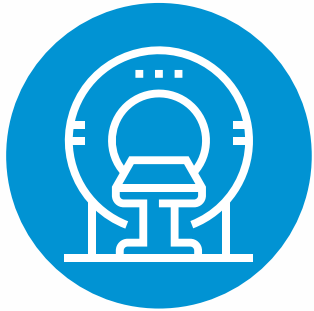


Concentrated services also allow for:

- Training of students / specialists
- Medical Research
- Resilience

Garrick R., Sullivan J., Doran M., Keenan J. (2019) The Role of the Hospital in the Healthcare System. In: Latifi R. (eds) The Modern Hospital. Springer, Cham. https://doi.org/10.1007/978-3-030-01394-3_6

CONCENTRATION OF SERVICES



High-cost equipment typically:

- Specialised theatres
- ICU & High Care
- Radiotherapy
- Radiology



Concentration of specialised
clinicians and nurses

Garrick R., Sullivan J., Doran M., Keenan J. (2019) The Role of the Hospital in the Healthcare System. In: Latifi R. (eds) The Modern Hospital. Springer, Cham. https://doi.org/10.1007/978-3-030-01394-3_6

WHAT SHOULD BE UNIQUE?



Healing environment:

- Auditory, olfactory and haptic environment



Technology and information integration

- Climate change & Environmental sustainability
- Resilience

Garrick R., Sullivan J., Doran M., Keenan J. (2019) The Role of the Hospital in the Healthcare System. In: Latifi R. (eds) The Modern Hospital. Springer, Cham. https://doi.org/10.1007/978-3-030-01394-3_6

HOSPITAL OF THE FUTURE

WHAT IS POSSIBLE?



CONUNDRUM



Still building and maintaining very large bricks and mortar structures – long depreciation cycles



Simultaneous increasing technology advances allowing faster migration of care



Millennials and Gen Z demanding virtual and/or connected care that is convenient and tailored

RETHINKING THE HOSPITAL SPACE



Planning for reuse of existing space (“stranded assets”)
Increased use of robotics



Hospitals becoming data centres as well as care centres (virtual care coordination)



Merging of traditional roles and footprint

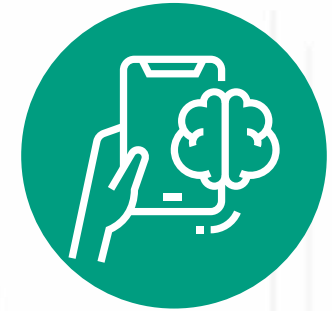
WHERE COULD IT GO?



Autonomous surgical robots
High-tech “stasis” pods being developed



Ability to control differentiation and migration of stem cells



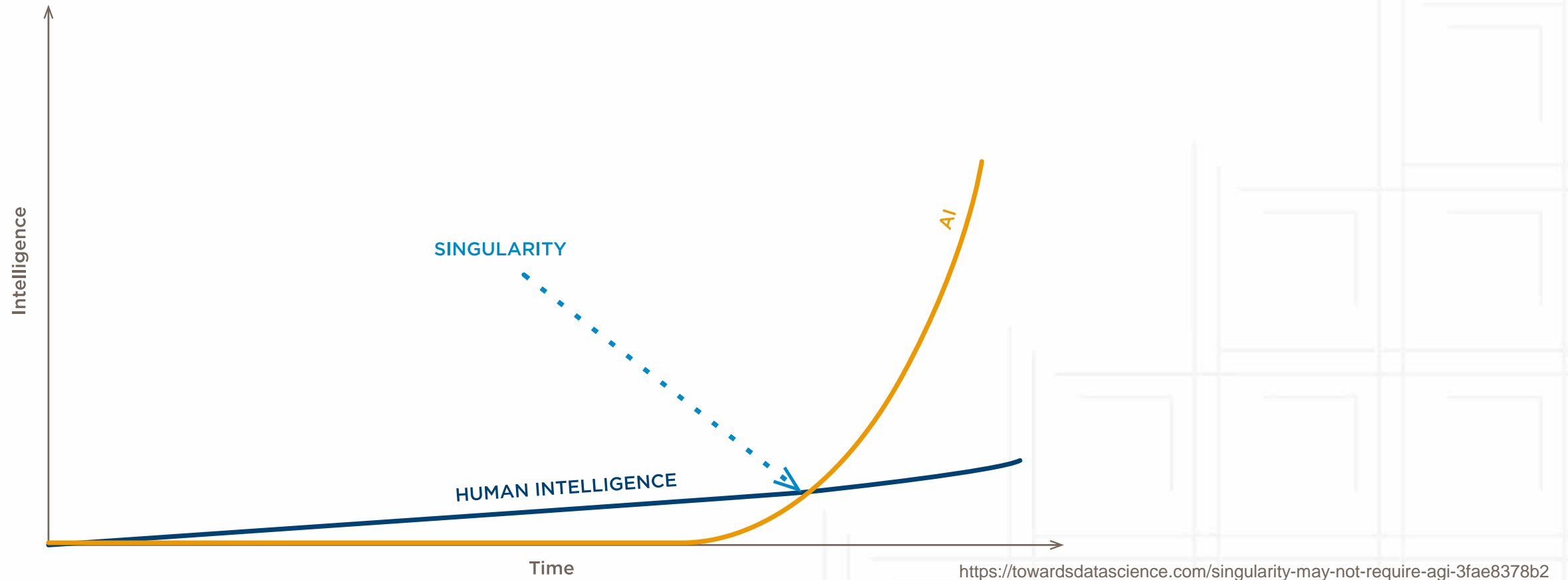
Power of brain-computer interfacing
“Download” of consciousness

BY WHEN?

<https://qz.com/889581/hi-tech-pods-that-allow-human-beings-to-hibernate-for-long-distance-space-travel-are-about-to-become-a-reality/>

SINGULARITY

FUTURE POINT AT WHICH AI CAN IMPROVE ITSELF FASTER THAN HUMANS CAN



Q & A

