

Slide fra præsentation

Her er en version af de slides, der blev præsenteret mandag d. 24. maj 2018.

Jeg håber præsentationen var inspirerende og du er meget velkommen til at skrive hvis der er specielle områder du er interesseret i eller med generel tilbagemelding på præsentationen.

Jeg er også meget interesseret i at høre hvis du kender til spændende projekter eller selv er i gang med spændende projekter, der kan forandre vores sundhedsvæsen.

Du kan fange mig på mailen: thomas@kiteinvent.com

På LinkedIn poster jeg interessante trends, så der kan du også enten connecte eller følge mig: www.linkedin.com/thomasr

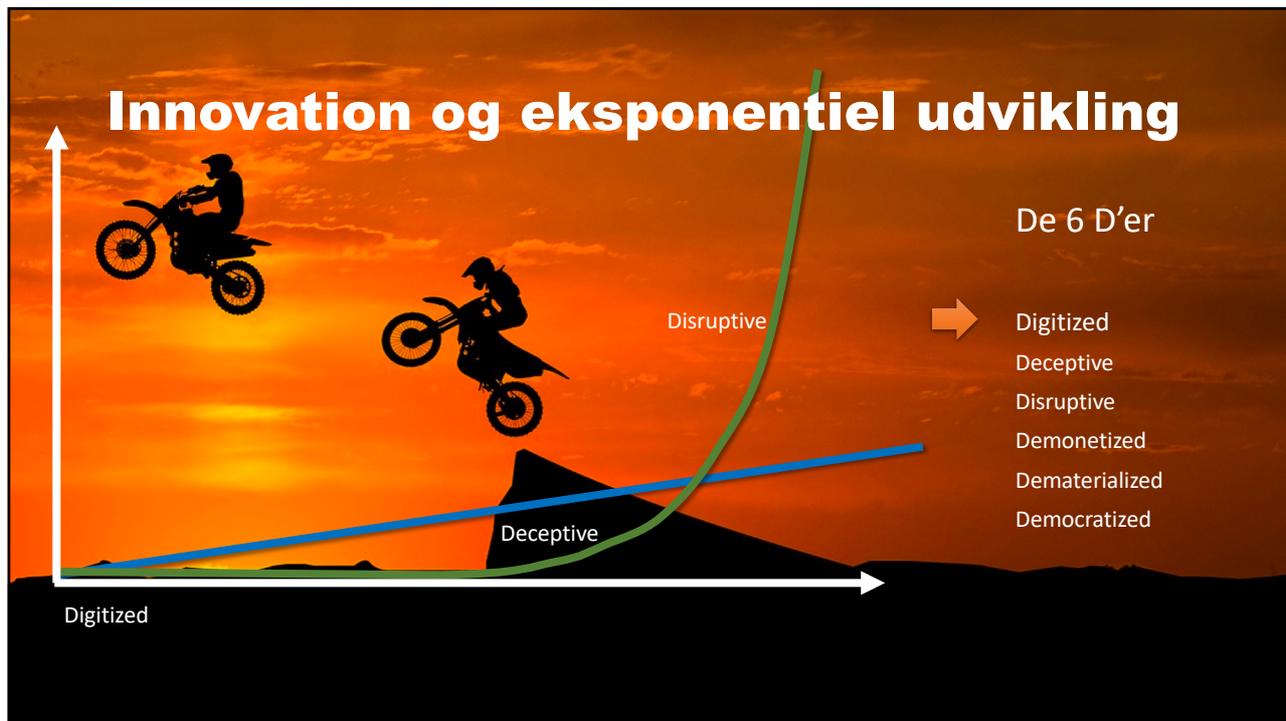
På Twitter deler jeg links som jeg finder interessante indenfor trends i sundhed @thomasrdk

God fornøjelse,

Thomas Riisgaard Hansen

KITE INVENT





Digitalisering af sundhed



Digitalisering af vores
sundhedstilstand

KITE INVENT

Mobilt og billigere

AliveCor – Kardia Mobile



Sædkvalitet på mobilen



Philips Lumnify



Mobil CT & MR (forskning)



Nye datakilder

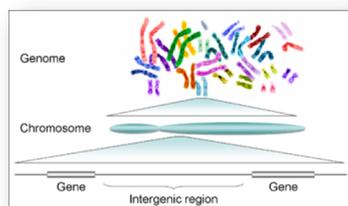
SniffPhone (Volatile Organic Compounds)



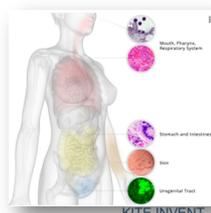
Digital spor



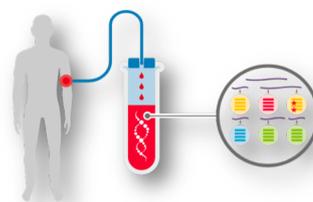
Genanalyse



Mikrobiome - analyse



Liquid Biopsy



Kontinuerlig måling (semi)

Apple Watch (f.eks. Puls og motion)



Nokia Smart Weight



Freestyle Libre (Blodsukker)



Health Toilet (forskning)



KITE INVENT

Digitalisering af sundhed



Digitalisering af vores sundhedstilstand

- Mobilt og billigere (Store apparater bliver billige og kompakte)
- Nye sensorer og datakilder
- Fra enkelt måling til (semi)-kontinuerlig måling



Digitalisering af vores rationalisering

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Adgang og udveksling af data

EPJ API'er



Code. Build. Integrate.
Connect with the Epic network faster.

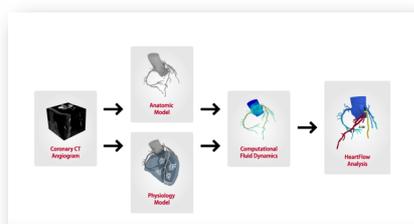
Optimize speed, the integration and revision process, enhance IT with our operations, use of their third party application providers, or a direct manufacturer. With clear rules to help connect, integrate and get you control of the most connected organizations in the industry.

View on the site, read more about our support for REST and try out our sandbox.

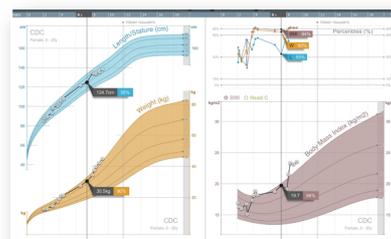
Integrate with Epic
Explore integrated products

- Registration
- Scheduling
- Financial
- Clinical
- Analysis
- Public Health
- Operations

Analyser i skyen - Heartflow



App's i EPJ'en - SmartOnFHIR



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Blockchain

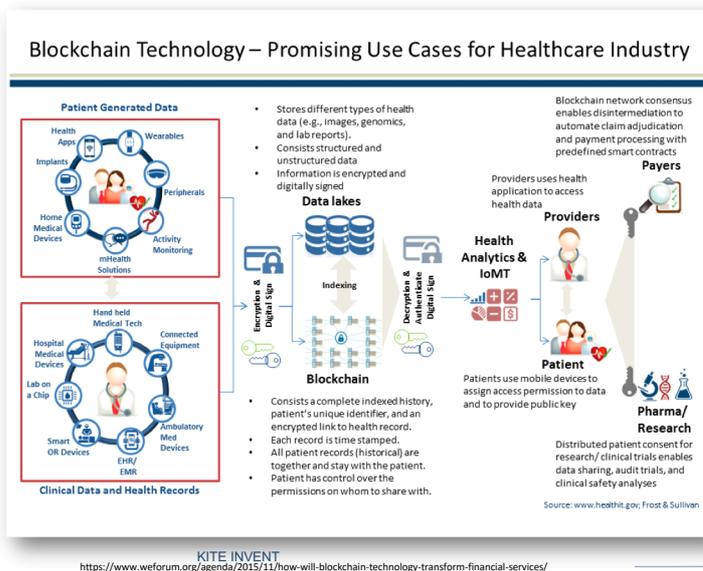
Problemstillinger

Integration

Sikkerhed

Unik ID

Innovation



Kunstig Intelligens indenfor sundhed

HIMSS18 Is All About Artificial Intelligence in Healthcare

The 2018 HIMSS Conference and Exhibition will be all about applying machine learning and artificial intelligence to the biggest problems in healthcare.



Source: Xtelligent Media

Anvendelsesområder

Behandling og diagnostik

Afregning

Beslutningsstøtte

Cybersecurity

Folkesundhed (Population health)

Personlig medicin

Eksempel: IBM Watson Oncology

<https://www.youtube.com/watch?v=G6GjfHl4ucw>

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Algoritmerne bliver godkendt

FDA News Release

FDA permits marketing of clinical decision support software for alerting providers of a potential stroke in patients

For Immediate Release February 13, 2018

Summary FDA permits marketing of clinical decision support software for alerting providers of a potential stroke in patients

News & Events

Home > News & Events > Newsroom > Press Announcements

FDA News Release

FDA permits marketing of artificial intelligence-based device to detect certain diabetes-related eye problems

For Immediate Release April 11, 2018



EDITORIAL · 13 MARCH 2018 · CORRECTION 26 MARCH 2018

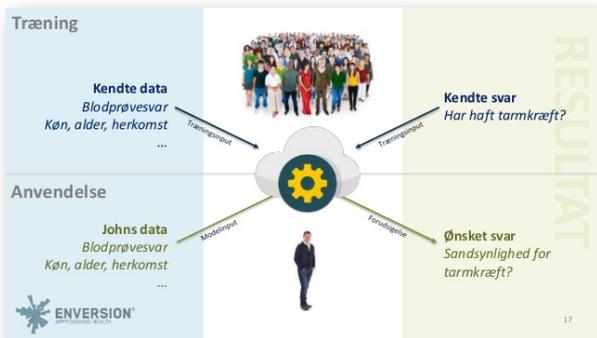
AI diagnostics need attention

Computer algorithms to detect disease show great promise, but they must be developed and applied with care.

<https://www.nature.com/articles/d41586-018-03067-x>

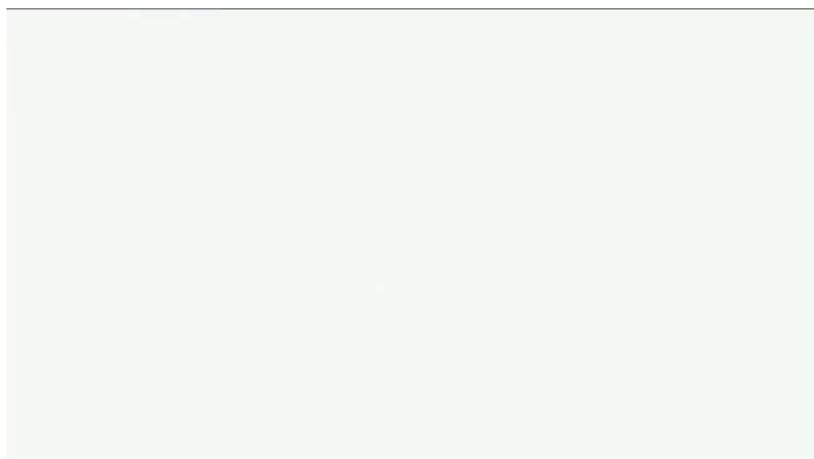
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Udvalgte danske eksempler



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Google Duplex



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Digitalisering af sundhed



Digitalisering af vores sundhedstilstand

Mindre og billigere (Store apparater bliver billige og kompakte)

Nye sensorer og datakilder

Fra enkelt måling til (semi)-kontinuerlig måling



Digitalisering af vores rationalisering

Big data og interoperabilitet

Algoritmer og kunstig intelligens

Visualisering og applikationer



Digitalisering af vores handlinger

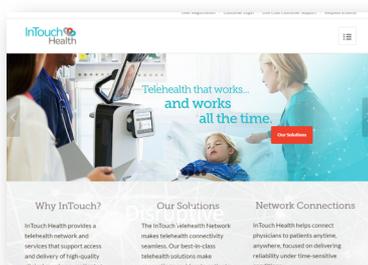
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Robotter i healthcare



Operationsrobotter

(f.eks. Intuitive Surgical)



Telepresence robotter

(F.eks. InTouch Health)



Servicerobotter

(Mange se f.eks. <http://medicalfuturist.com/category/blog/technological-change/robotics/>)

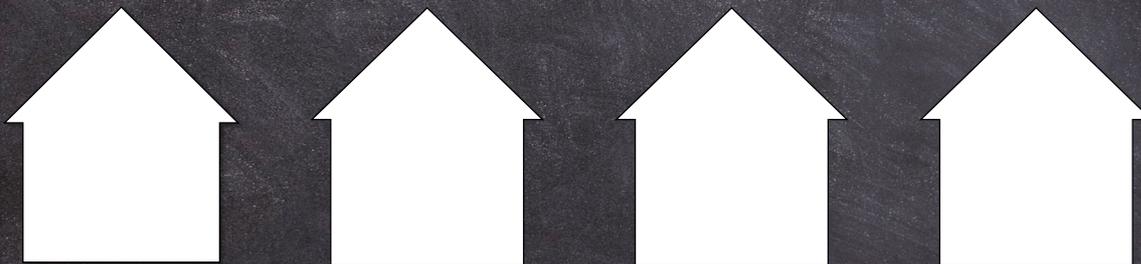
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Digitalisering af sundhed

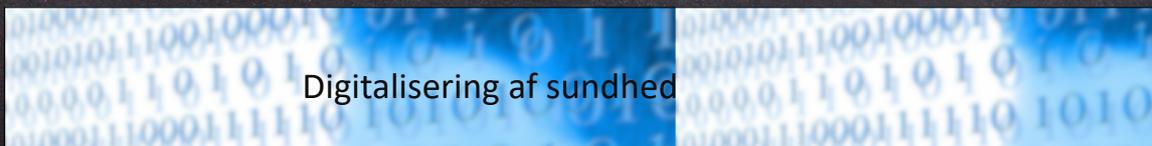
	<p>Digitalisering af vores sundhestilstand</p>	<p>Mindre og billigere (Store apparater bliver billige og kompakte)</p> <p>Nye sensorer og datakilder</p> <p>Fra enkelt måling til (semi)-kontinuerlig måling</p>
	<p>Digitalisering af vores rationalisering</p>	<p>Big data og interoperabilitet</p> <p>Algoritmer og kunstig intelligens</p> <p>Visualisering og applikationer</p>
	<p>Digitalisering af vores handlinger</p>	<p>Behandlingsrobotter</p> <p>Servicerobotter</p>

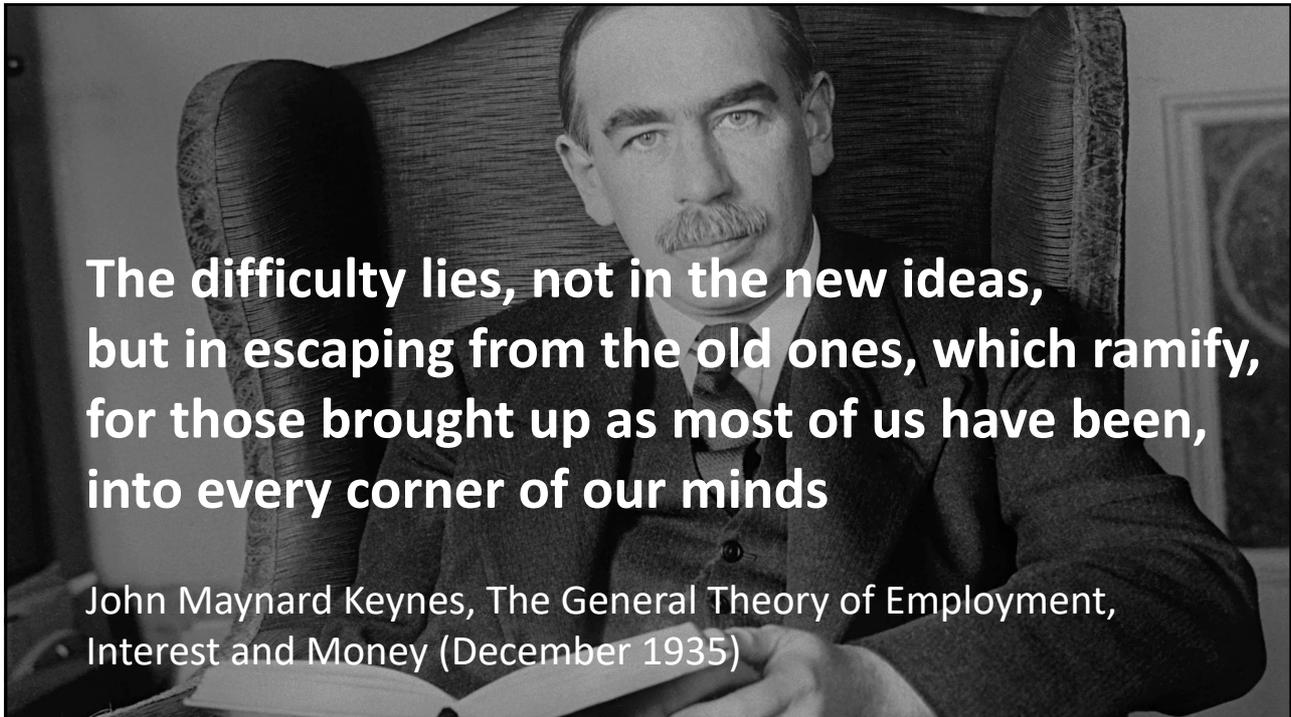
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Datadrevne serviceydelser



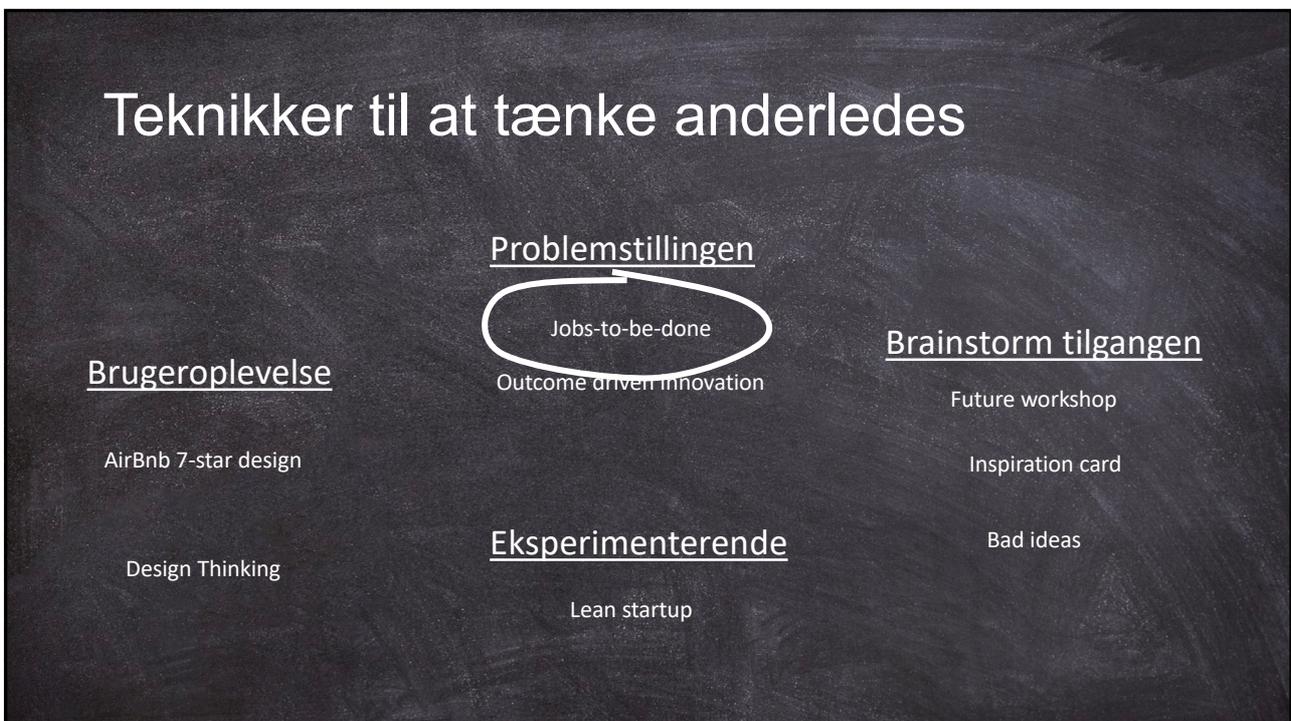
PLATFORMSTREND



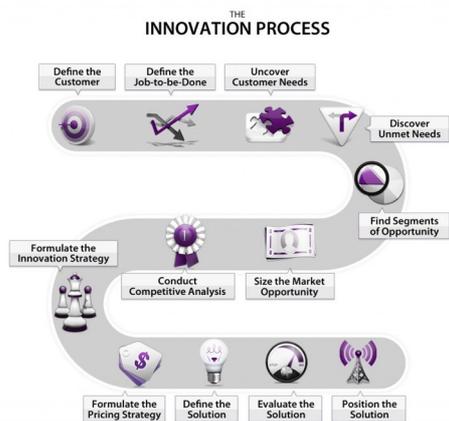


The difficulty lies, not in the new ideas,
but in escaping from the old ones, which ramify,
for those brought up as most of us have been,
into every corner of our minds

John Maynard Keynes, The General Theory of Employment,
Interest and Money (December 1935)



Outcome driven innovation



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Teknikker til at tænke anderledes

Brugeroplevelse

AirBnb 7-star design

Design Thinking

Problemstillingen

Jobs-to-be-done

Outcome driven innovation

Ekspementerende

Lean startup

Brainstorm tilgangen

Future workshop

Inspiration card

Bad ideas

7-star design

Mindre god service eller bagud i forhold til hvad konkurrenterne tilbyder



Forventelig god service



Bedre end forventet



Markant bedre end forventet



<https://www.youtube.com/watch?v=qV7I5ImqMnI>

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Øvelse: Datadrevne sundhedsløsninger

- 1: Find en sundhedsydelse I er fagligt involveret i eller bruger af
- 2: Kom med et bud på hvordan 5, 6, 7, 8, 9 ... stjerner ser ud!
Hvilke sundhedsdata kan hjælpe med at realisere den?

Datadrevne sundhedstrends



PLATFORMSTREND

Digitalisering af sundhed



Fra sygdom til sundhed

Diabetes

Hvem kender deres risiko for at få Diabetes i %?

Hvem har en ide om hvor stor sandsynligheden ca. er (stor, mellem, lille)?

Hvem har ingen anelse om deres risiko?

Diabetes - handlinger

Hvad vil jeg gøre hvis jeg kendte risikoen?

Hvor stor skulle risikoen være før jeg gjorde noget?

Hvad bør staten, regioner og kommuner gøre?

Formlen for sundhed

GENETIK



+

LIVSSTIL

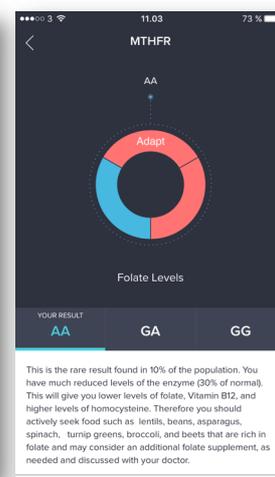


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Genanalyse: 23andme og Orign

Genetic Risk Factors		Inherited Conditions	
REPORT	RESULT	REPORT	RESULT
Alzheimer's Disease	Variant Present, Higher Risk	Bloom Syndrome	Variant Present
Factor XI Deficiency	Variant Absent, Typical Risk	Cystic Fibrosis	Variant Absent
Inherited Thrombophilia	Variant Absent, Typical Risk	Sickle Cell Anemia	Variant Absent
Parkinson's Disease	Variant Absent, Typical Risk	Tay-Sachs Disease	Variant Absent

Traits		Drug Response	
REPORT	RESULT	REPORT	RESULT
Bitter Taste Perception	Unlike to Taste	Clopidogrel (Plavix®) Efficacy	Reduced
Eye Color	Likely Brown	Proton Pump Inhibitor (PPI) Metabolism	Reduced
Lactose Intolerance	Like Tolerant	Mefenamic Acid (Ponstan®) Sensitivity	Typical



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Formlen for sundhed

GENETIK



+

LIVSSTIL



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Forebyggelse

Healthy Living Is the Best Revenge

Findings From the European Prospective Investigation Into Cancer and Nutrition–Potsdam Study

Earl S. Ford, MD, MPH; Manuela M. Bergmann, PhD; Janine Kröger; Anja Schienkiewitz, PhD, MPH; Cornelia Weikert, MD, MPH; Heiner Boeing, PhD, MSPH

Background: Our objective was to describe the reduction in relative risk of developing major chronic diseases such as cardiovascular disease, diabetes, and cancer associated with 4 healthy lifestyle factors among German adults.

Methods: We used data from 23 153 German participants aged 35 to 65 years from the European Prospective Investigation Into Cancer and Nutrition–Potsdam study. End points included confirmed incident type 2 diabetes mellitus, myocardial infarction, stroke, and cancer. The 4 factors were never smoking, having a body mass index lower than 30 (calculated as weight in kilograms divided by height in meters squared), performing 3.5 h/wk or more of physical activity, and adhering to healthy dietary principles (high intake of fruits, vegetables, and whole-grain bread and low meat consumption). The 4 factors (healthy, 1 point; unhealthy, 0 points) were summed to form an index that ranged from 0 to 4.

Results: During a mean follow-up of 7.8 years, 2006 participants developed new-onset diabetes (3.7%), myocardial infarction (0.9%), stroke (0.8%), or cancer (3.8%). Fewer than 4% of participants had zero healthy factors, most had 1 to 3 healthy factors, and approximately 9% had 4 factors. After adjusting for age, sex, educational status, and occupational status, the hazard ratio for developing a chronic disease decreased progressively as the number of healthy factors increased. Participants with all 4 factors at baseline had a 78% (95% confidence interval [CI], 72% to 83%) lower risk of developing a chronic disease (diabetes, 93% [95% CI, 88% to 95%]; myocardial infarction, 81% [95% CI, 47% to 93%]; stroke, 50% [95% CI, –18% to 79%]; and cancer, 36% [95% CI, 9% to 57%]) than participants without a healthy factor.

Conclusion: Adhering to 4 simple healthy lifestyle factors can have a strong impact on the prevention of chronic diseases.

Arch Intern Med. 2009;169(15):1355-1362

Fire kriterier

1. BMI < 30
2. Ingen rygning
3. Mindst 3,5 timers bevægelse om ugen
4. Spise sundt

Effekt

- 78 % lavere risiko for kroniske sygdomme
- 93 % diabetes
- 81 % Blodprop i hjertet
- 50 % Slagtilfælde
- 36 % cancer

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Priser på diabetes i Danmark

Danmark, 2016



252.750 personer

93 %



31,8 milliarder kr. om året

Reduktion



235.050 personer



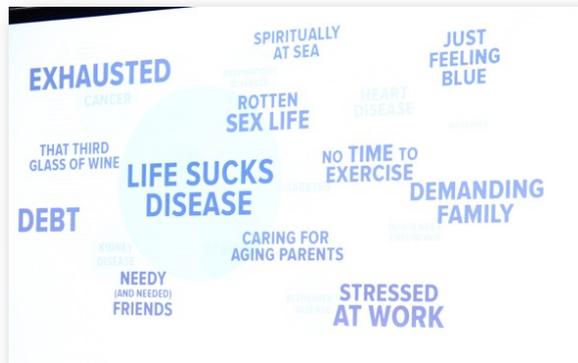
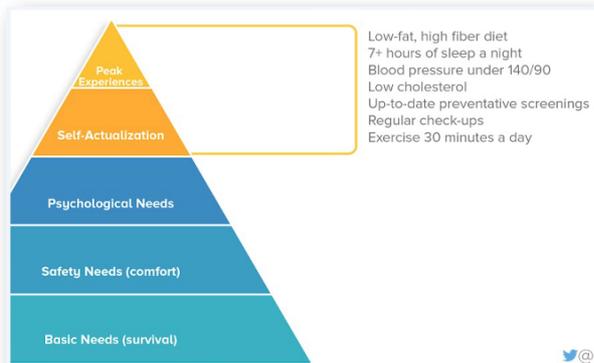
29,5 milliarder om året

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Løsningen !!!

1. BMI < 30
2. Ingen rygning
3. Mindst 3,5 timers bevægelse om ugen
4. Spise sundt

Forebyggelse: Alexandra Drane (Eliza Corp)



KITE INVENT

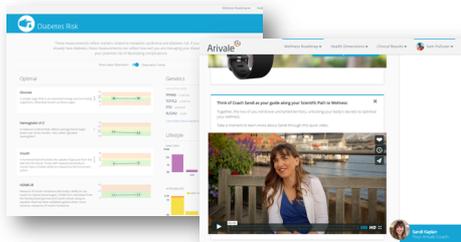
Fra "Vital værdier" til "Livs værdier"



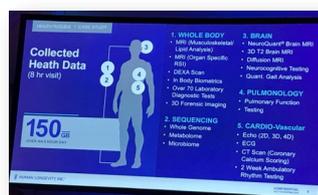
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Eksempler på livsstilsændringer

Arivale



Health Nucleus



LivaHealth

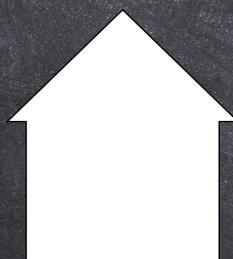
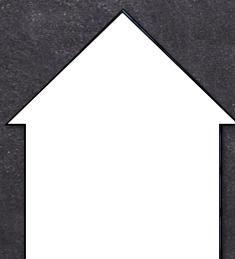


Lyft og AARP

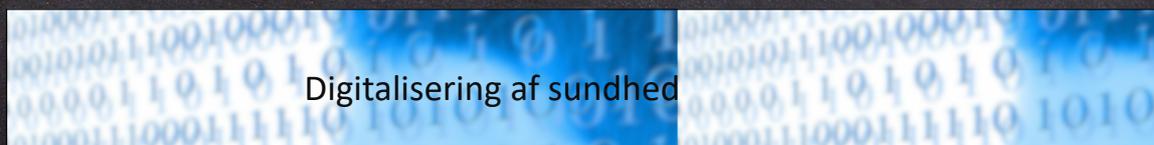


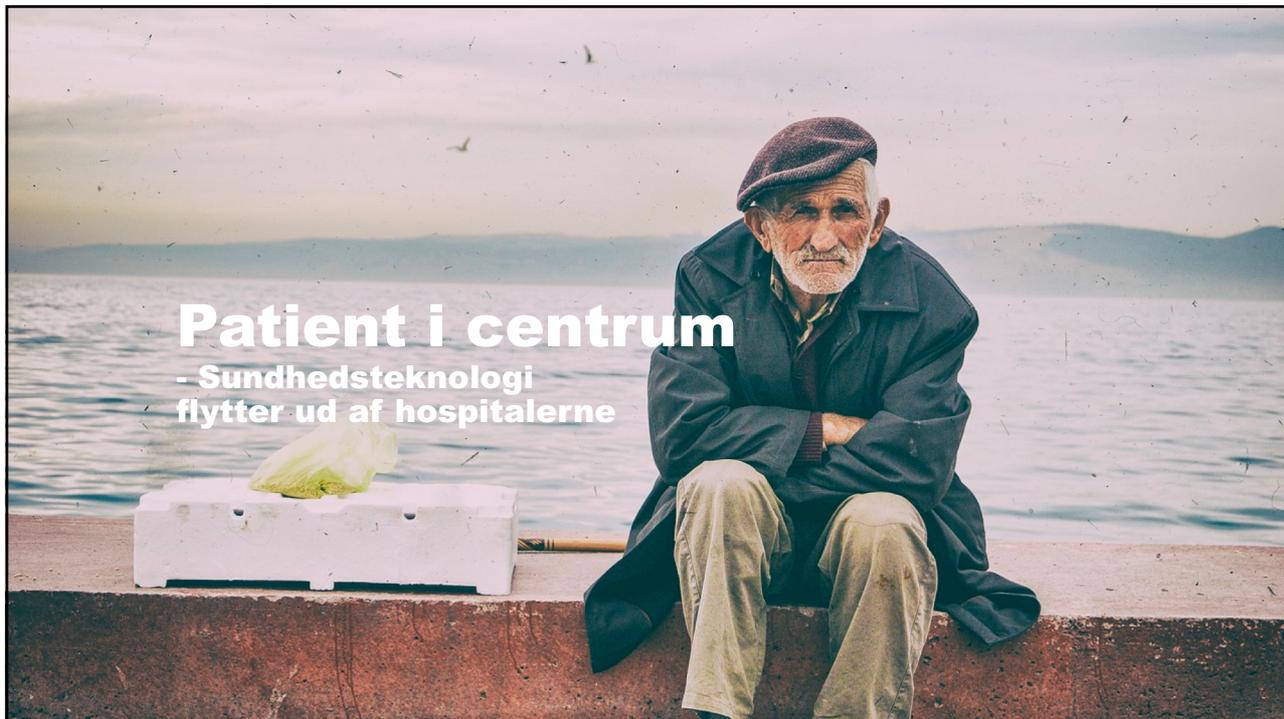
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Datadrevne sundhedstrends



PLATFORMSTREND





Patient i centrum

- Sundhedsteknologi flytter ud af hospitalerne

Dynamikken omkring sundhedsydelse



Hospitaler



Praktiserende læge



Borgerens hjem

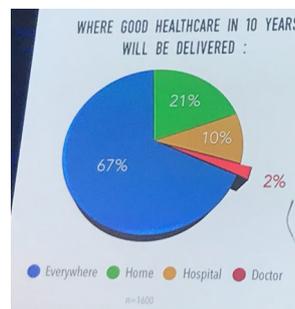


Overalt



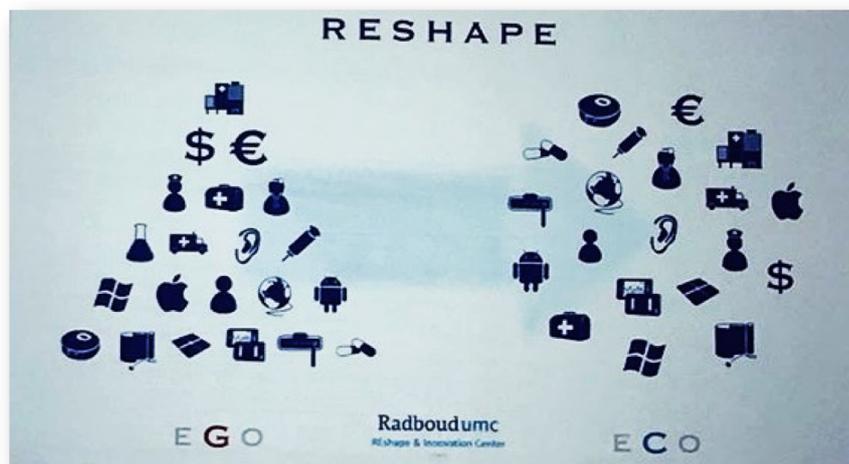
Nye patienter

1. Flere ældre
2. Nye komplekse behandlingsformer f.eks. genterapi m.m.



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Fra Ego til Eco: Lucian Engelen



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Patienten i centrum

1. Giv patienten adgang til egne og hospitalets data på en let tilgængelig måde



2. Lad patienten diagnosticere sig selv

3. Gør sundhedsydelser tilgængelige hvor patienten er

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Eksempel: Brugeroplevelse - Apple Health

Apple Health (Sundhed)



Apple Health EPJ (IOS 11.3)



Is Apple poised to enter EHR market? New patents have the industry buzzing

Apple is not the lone tech giant showing an interest in healthcare: Amazon, too, has kept a close eye on the market.

By [Bernie Monegan](#) | November 22, 2017 | 01:09 PM



JUN 16, 2015 @ 09:29 AM 13,183 VIEWS

The Little Black Book of Billionaires

Why Apple Is The Most Important Health Company In The World



Unity Stoakes, CONTRIBUTOR

I cover global health innovation and the reimagining of healthcare. [FULL BIO](#)

Opinions expressed by Forbes Contributors are their own.



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Patienten i centrum

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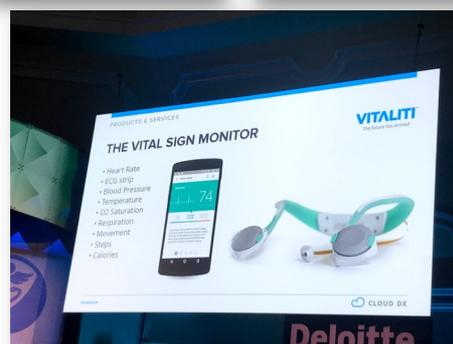
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Qualcomm Tricorder XPRIZE

Krævede diagnoser(10): Blodmangel, Atrieflimre, KOL, Diabetes, Leucytosis, lungebetændelse, akut mellemørebetændelse, søvnapnø, Urinvejsinfektion, Absence of condition

Valgfri diagnoser (Valg af 3): Kolesterol screening, madforgiftning, HIV screening, Hypertension, Hypothyroidism/Hyperthyroidism, melanom, Kysseysyge, kighoste, helvedesild, Streptokokkhalsinfektion

Krævede vitalværdier (5): Blodtryk, puls, iltmætning, temperatur, respirationsfrekvens.



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Patienten i centrum

- 1.** Giv patienten adgang til egne og hospitalets data på en let tilgængelig måde



- 2.** Lad patienten diagnosticere sig selv

- 3.** Gør sundhedsydelser tilgængelige hvor patienten er

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Nye sundhedsspillere: CVS og Walgreen



Price List

Affordable health care in your neighborhood

You'll find the most payment prices for our services below. We accept most insurance, too.

If you will be using insurance, we recommend contacting your insurance company before your visit to be sure that the services you're seeking is covered. Your payment responsibility may vary based on your insurance coverage.

If you're uninsured or prefer to pay out of pocket, we welcome cash, check¹ and credit cards.

Our charges are based on the number of payments or conditions a patient has, and whether we provide more than one service. Most visits fall within the ranges provided but charges can exceed these ranges in more complex cases.

Make sure to check the individual [service pages](#) for age and service restrictions.

Let, tests and add-on services may result in additional charges. Let's and tests cannot be purchased separately and are only performed as part of a standard visit.

[Main Services](#) | [Minor Injuries](#) | [Skin Conditions](#) | [Wellness & Chronic](#)

[Immunizations & Vaccines](#) | [Prescriptions & Services](#) | [Travel Health](#) | [Women's Services](#) | [Labs](#)

Table:

Minor Injuries \$50 - \$120

- Allergy consultations
- Diagnoses & treatments
- Diagnoses & ear infections
- Flu-like symptoms
- Cuts
- Infections & rashes
- Minor ear conditions
- Minor eye conditions
- Minor nose conditions
- Minor sore throats
- Minor urinary tract infections
- Other

Minor Urges \$50 - \$120

- Bug bites & stings
- Minor burns
- Minor cuts, blisters & sores
- Splinter removal
- Sore, swollen & joint pain
- Scabies & scabies removal
- Tick bites

Skin conditions \$50 - \$120

- Axne
- Acne
- Acne
- Chicken pox



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Forward – alternativ forebyggelse/lægepraksis

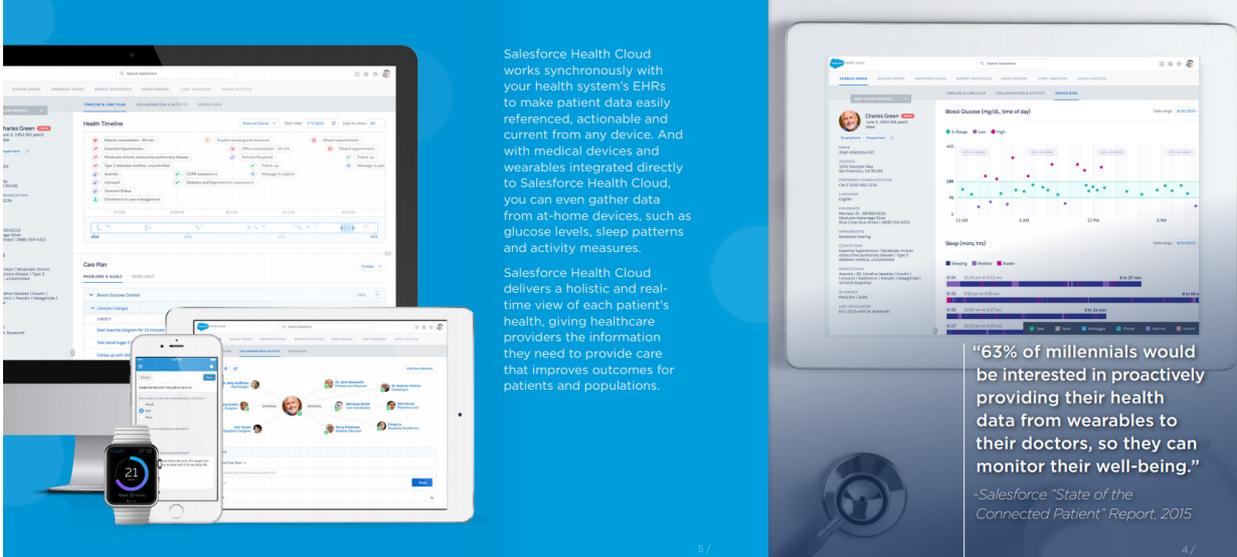






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Nye teknologiske spillere: Salesforce



Salesforce Health Cloud works synchronously with your health system's EHRs to make patient data easily referenced, actionable and current from any device. And with medical devices and wearables integrated directly to Salesforce Health Cloud, you can even gather data from at-home devices, such as glucose levels, sleep patterns and activity measures.

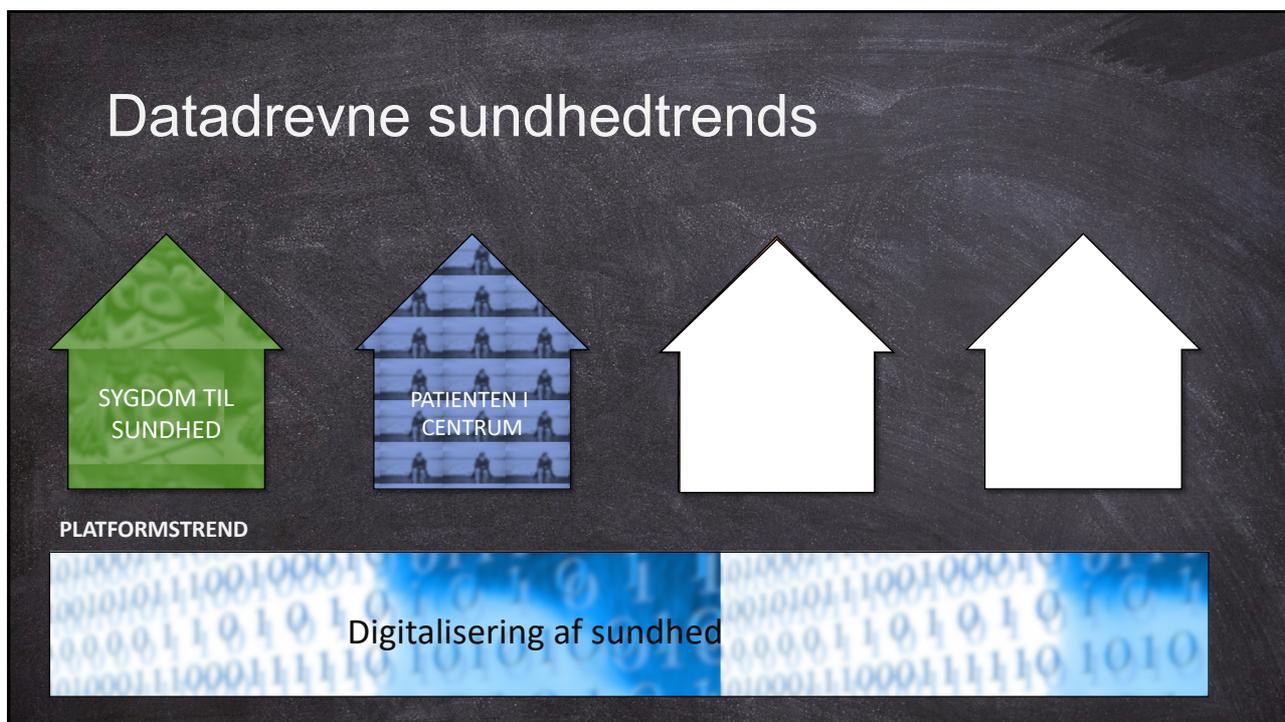
Salesforce Health Cloud delivers a holistic and real-time view of each patient's health, giving healthcare providers the information they need to provide care that improves outcomes for patients and populations.

"63% of millennials would be interested in proactively providing their health data from wearables to their doctors, so they can monitor their well-being."

-Salesforce "State of the Connected Patient" Report, 2015

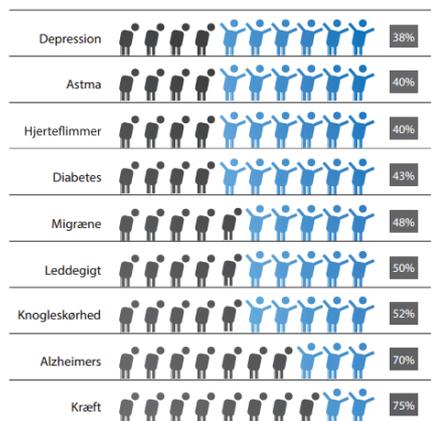
Patienten i centrum - øvelse

Kom op med de tre største forandringer
Region Midtjylland står overfor hvis
sundhedsydelserne for alvor flytter ud af
hospitalerne?



Personlig medicin

Andelen af patienter, som ikke har gavn af medicinen



Kilde: FDA "Paving the Way for Personalized Medicine", oktober 2013

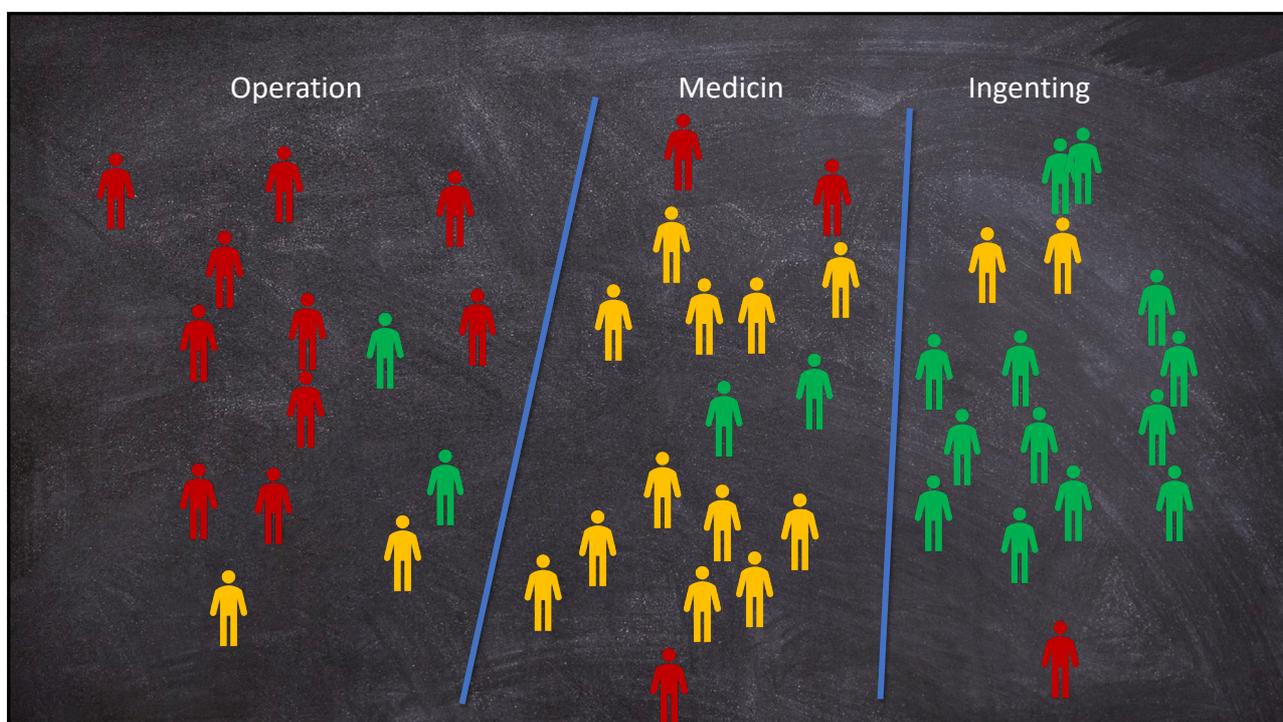
Rigtige medicin til rigtige patient

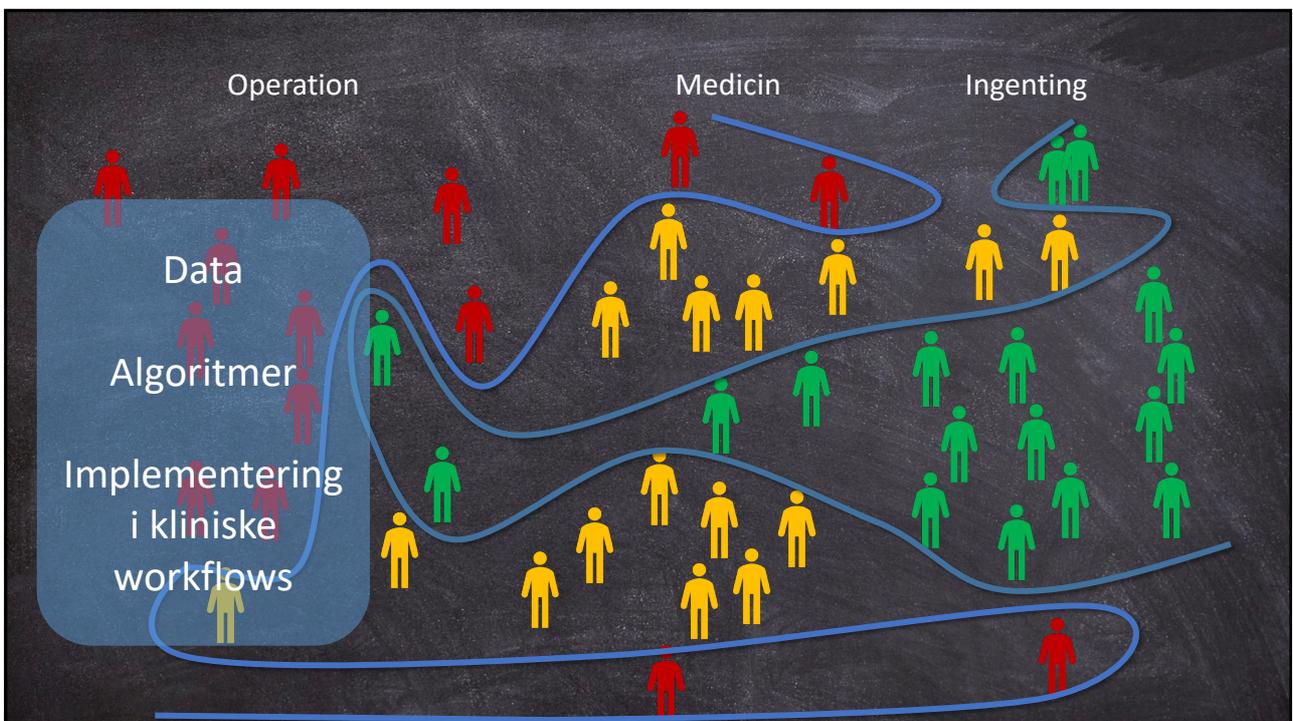
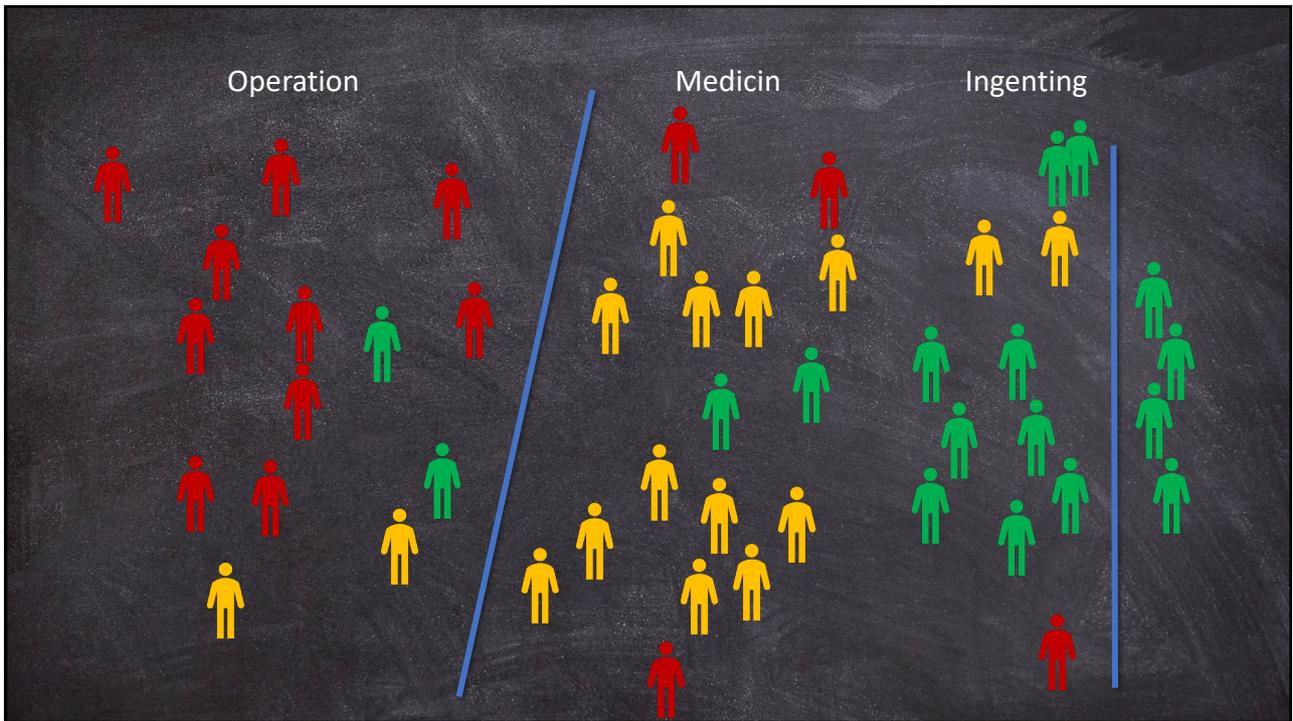
Færre bivirkninger

Bedre behandling

Reducere udgifter til medicin

KITE INVENT





Farmakogenetik: Eksempel

pro.medicin
INFORMATION TIL SUNDHEDSFAGLIGE

Menu

A-Z søgning

Information til patienten om Marevan

Indlægsedler for Marevan

Marevan

Warfarin B01AA03

Amning | Andre anvendelsesområder | Anvendelsesområder | Bivirkninger | Bloddonor | Dispenseringsform | Doping | Doseringsforslag | Egenskaber, håndtering og holdbarhed | Farmakodynamik | Farmakokinetik | Firma | Forgiftning | Forsigtighedsregler | Foto og identifikation | Graviditet | Hjælpestoffer | Indholdsstoffer | Instruktionsregler | Interaktioner | Kontraindikationer | Pakninger, priser, tilskud og udlevering | Patientsikkerhed | Schengen-attest (pillepas) | Substitution | Tilskud | Trafik

Coumarinderivat. Indirekte virkende antikoagulan.

Anvendelsesområder

Forebyggelse og behandling af dyb trombose og tromboemboliske komplikationer.
Se endvidere:
Vitamin K-antagonister

Induktorer af CYP2C9 eller CYP3A4 kan nedsætte den antikoagulerende virkning, mens hæmmere af CYP2C9 og CYP3A4 eller konkurrerende substrater for disse isoenzymer kan forstærke den antikoagulerende virkning. Se endvidere tabel 2 i [Elimination og cytokrom P450-systemet](#).

Gene	Important Variants	Variation	Consequence of Variation	Effect on Enzyme Activity	Selected Medication Substrates
CYP2D6	CYP2D6*3	2549 del A (rs4986774)	Frameshift mutation, premature stop	Absent activity	Amisulpride, atomoxetine, carvedilol, chlorpheniramine, chlorpromazine, citalopram, clomipramine, clozapine, codeine, desipramine, desipramine, dextromethorphan, doxepin, flecainide, fluoxetine, thioroxamine, gefitinib, haloperidol, imipramine, maprotiline, metoprolol, mirtazapine, nortriptyline, morphine, nortriptyline, paroxetine, risperidone, risperidone, thioridazine, timolol, tubocurarine, tramadol
	CYP2D6*4	1846G>A (rs382097)	Splicing defect	Absent activity	imipramine, maprotiline, metoprolol, mirtazapine, nortriptyline, morphine, nortriptyline, paroxetine, risperidone, risperidone, thioridazine, timolol, tubocurarine, tramadol
	CYP2D6*5	n/a	Whole gene deletion	Absent activity	
	CYP2D6*6	1707 del T (rs5030655)	Frameshift mutation	Absent activity	
	CYP2D6*9	2615_2617delAAG (rs5030656)	Deletion of 2615-2617	Reduced activity	
	CYP2D6*10	100C>T (rs1965852)	pro ³⁴ ier	Reduced activity	
	CYP2D6*17	1012C>T (rs28371766)	nu ¹⁰⁷ ile	Reduced activity	
	CYP2D6*29	3183G>A (rs59421318) and 4180G>C (rs6136812)	val ³³⁸ met and ser ⁴⁵⁶ lar	Reduced activity	
	CYP2D6*41	2988G>A (rs28371725)	Splicing defect	Reduced activity	
	CYP2D6*UN	n/a	Additional functional copies (2-13) of gene	Increased activity	

KITE INVENT

Genanalyse i valg af kræftbehandling

INDLAND

Solveigs kræftbehandling er skræddersyet til hendes gener: Jeg vil have et skud til i bøssen

Fordelene ved at få kortlagt sin arvemasse truffer ulemperne ved et nyt register, siger brystkræftpatient.

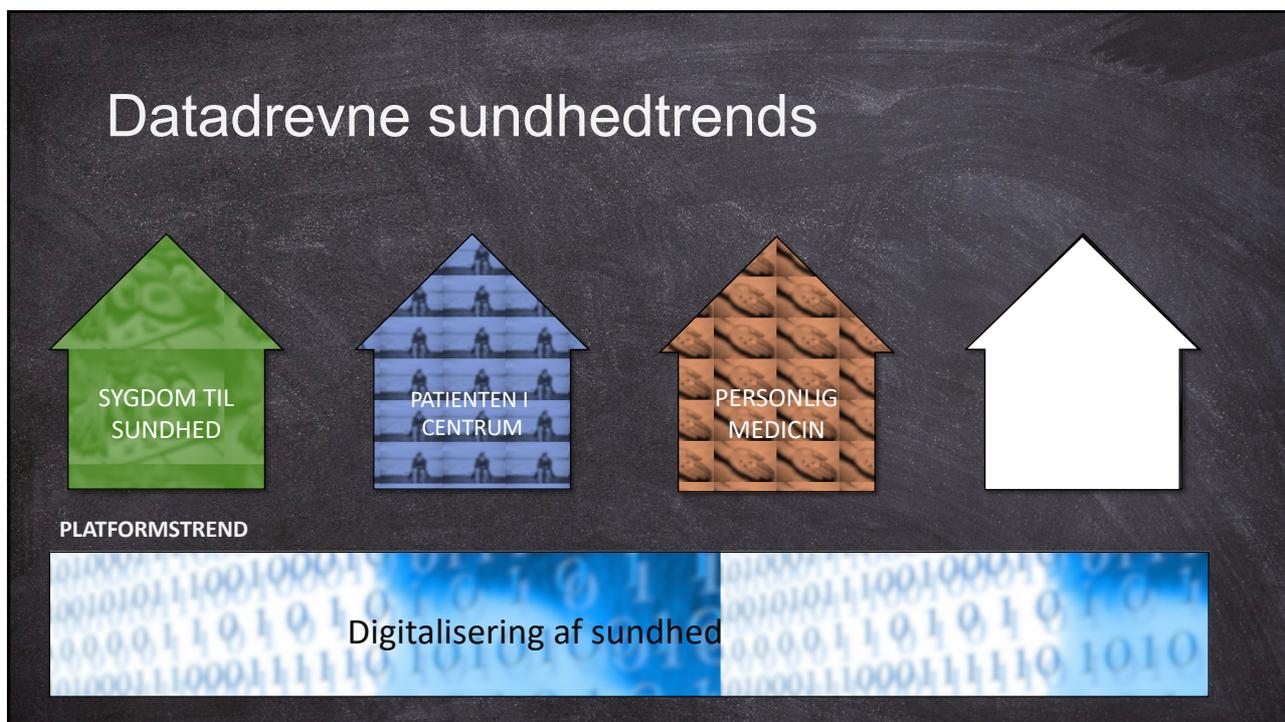


af [Lisebeth Qvaloy](#) og [Solveig Bjørndal](#) | [Helseprofil](#) | [Video](#) | [09.05.2017](#) | [113](#)

Et sted i Solveig Sæviens' gener er der en defekt. Den er arvet fra far, og hun har knæ 12 år siden fik brystkræft, som siden har spredt sig til hendes knogler og lever, så hun i dag er uheldigvis syg. For fem uger siden blev hun tilknyttet et medicinsk forsøg på Finsen-centret på Rigshospitalet efter en kortlægning af sin arvemasse. Behandlingen er målrettet lige præcis den genetiske defekt, hun har.

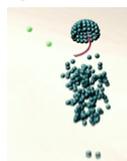
”Behandlingen er målrettet lige præcis den genetiske defekt, hun har.”

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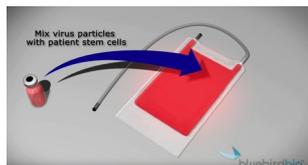


Genterapi

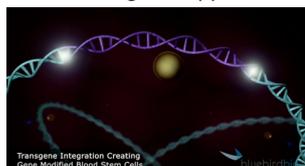
1. Design genændring og virus



2. Tag stamceller og genmodificer dem



3. Genmodificerede stamceller sendes tilbage i kroppen

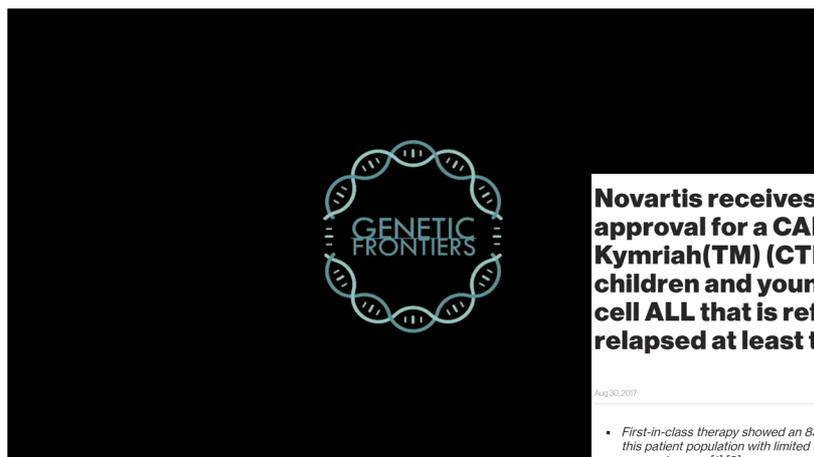


4. Stamcellerne laver nye modificerede celler



KITE INVENT <https://www.youtube.com/watch?v=Ex560Gnk5rE>

CAR-T



Novartis receives first ever FDA approval for a CAR-T cell therapy, Kymriah(TM) (CTL019), for children and young adults with B-cell ALL that is refractory or has relapsed at least twice

Aug 30, 2017

- First-in-class therapy showed an 83% (52/63) overall remission rate in this patient population with limited treatment options and historically poor outcomes (11?)

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Priser

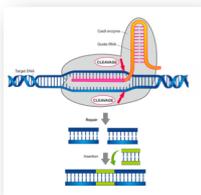
Goldman Sachs asks in biotech research report: 'Is curing patients a sustainable business model?'

Tae Kim | @firstadopter
 Published 3:15 PM ET Wed, 11 April 2018 | Updated 7:20 PM ET Wed, 11 April 2018


KITE INVENT

Fremtiden behandlingsformer

Genterapi og CRISPR



Syntetisk biologi og "Project Write"



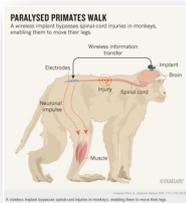
2 ekstra genetiske bogstaver



AI Diagnostik



Hjerne-interface



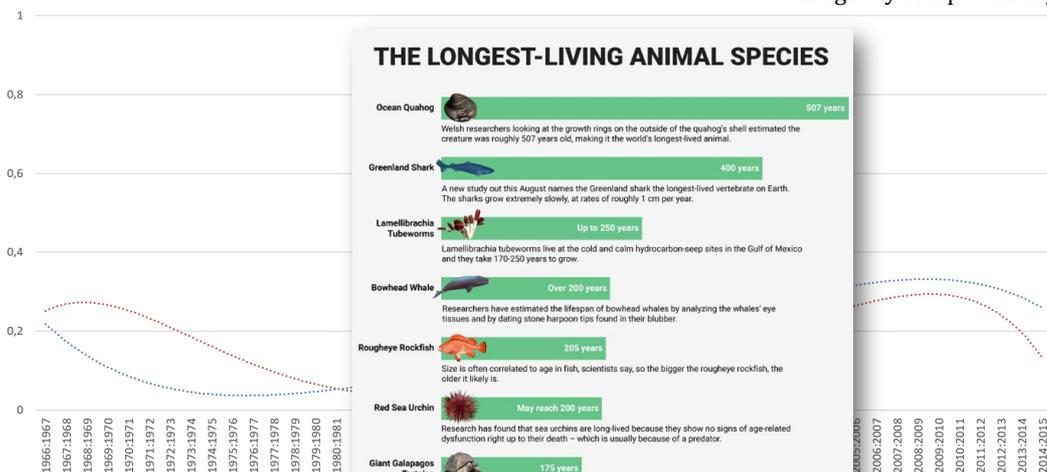
Syntetiske organer



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Hvad viser denne graf?

Longevity escape velocity



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Datadrevne sundhedstrends



PLATFORMSTREND



Tusind tak for jeres tid - Spørgsmål?

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