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The next generation underwriting: All the buzz words put to use?

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Evolution of underwriting from today to tomorrow…

Models rely on experience of professional judgment
Solid statistical basis but always historical
May convert into automatic rule based model
Time lag in requesting supplementary information
Basic health questionnaire still essential

Medical information obtained by connected devices
Use of electronic recorded data
Social media and predictive methods
Algorithms analysis in few seconds
Potential to automate
Improved turnaround time
Premium adjustment as per health profile

Data protection!

How Target Figured Out A Teen Girl Was Pregnant Before Her Father Did

Every time you go shopping, you share intimate details about your consumption patterns with retailers. And many of those retailers are studying those details to figure out what you like, what you need, and which coupons are most likely to make you happy. Target TGT -0.89% , for example, has figured out how to data-mine its way into your womb, to figure out whether you have a baby on the way long before you need to start buying diapers.

Charles Duhigg outlines in the New York Times how Target tries to hook parents-to-be at that crucial moment before they turn into rampant -- and loyal -- buyers of all things pastel, plastic, and miniature. He

Fitness tracking app Strava gives away location of secret US army bases

Data about exercise routes shared online by soldiers can be used to pinpoint overseas facilities

Latest: Strava suggests military users 'opt out' of heatmap as row deepens

Thirty-six-year-old Kelli Rowlette claims a fertility doctor was aware he used his own sperm to impregnate Rowlette's mother. Photo / Getty Images

news.com.au

ıs had her entire life turned on its head after she completed a genealogy test ır ancestry site and received shocking results.

, who lives in Washington state, US, said she learned through an Ancestry.com ıt her biological father was her parents' fertility doctor.

te, 36, has taken legal action against reproductive specialist Dr Gerald E. :er he was revealed as her DNA match through the site, the Daily Beast

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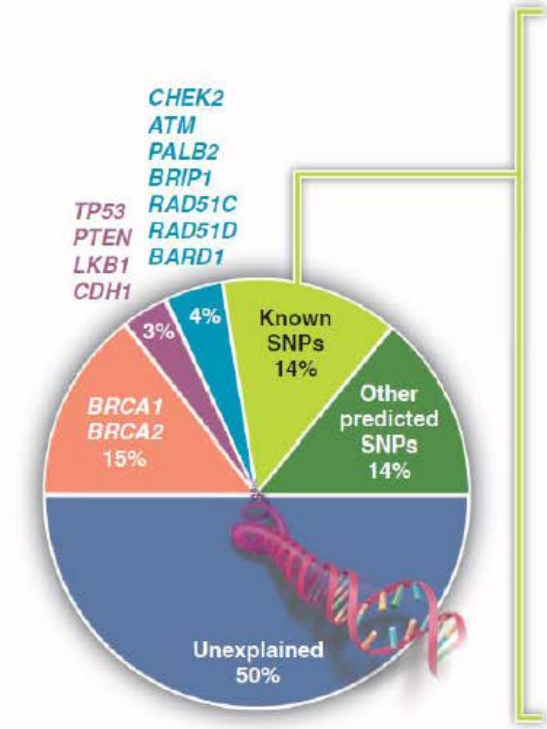
Two decades after BRCA gene



Locus	SNP	Odds ratio
6q14.1	rs17529111	1.97
*BRCA2	rs11571833	1.44
CCND1	rs75915166	1.38
ESR1	rs3757318	1.33
FGFR2	rs2981579	1.33
CCND1	rs554219	1.33
FGFR2	rs2981582	1.26
*MERIT40	rs8170	1.26
TERT	rs10069690	1.24
DNAJC1	rs11814448	1.22
CCDN1	rs614367	1.21
MKL1	rs6001930	1.21
MDM4	rs4245739	1.19
ESR1	rs2046210	1.16
HNF4G	rs2943559	1.14
5p12	rs10941679	1.13
12p13.1	rs12422552	1.13
MAP3K1	rs889312	1.12
TCF7L2	rs7904519	1.12
22q12.2	rs132390	1.12
2p24.1	rs12710696	1.11
2q31.1	rs2016394	1.1
SLC4A7	rs4973768	1.1
EBF1	rs1432679	1.1
FTO	rs11075995	1.1
1p11.2	rs11249433	1.09

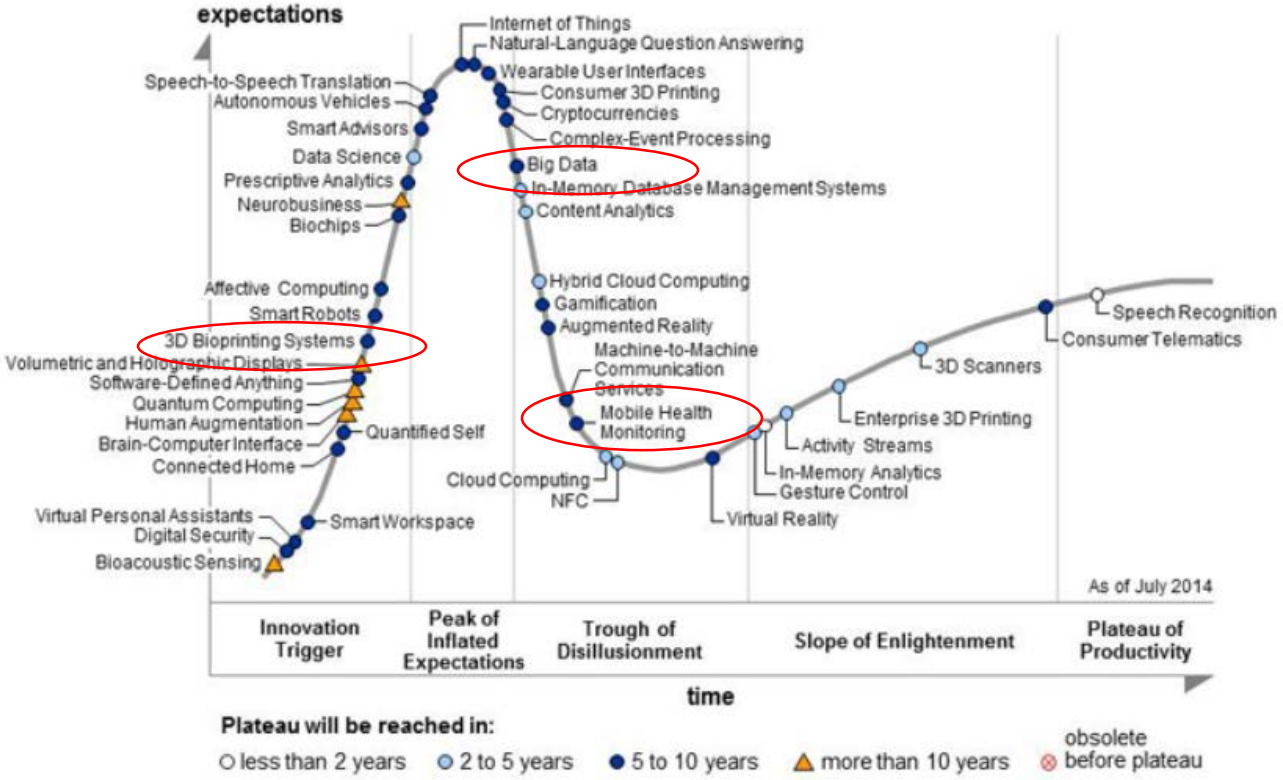
Locus	SNP	Odds ratio
8q24	rs13281615	1.09
TOX3	rs3803662	1.09
CDYL2	rs13329835	1.09
1p13.2*	rs11552449	1.08
2q35	rs16857609	1.08
RANBP1	rs204247	1.08
ZMIZ1	rs704010	1.08
12q24	rs1292011	1.08
3p26.2	rs6762644	1.07
8p21.1	rs9693444	1.07
8q24.21	rs11780156	1.07
LSP1	rs3817198	1.07
CCDC88C	rs941764	1.07
TET2	rs9790517	1.06
CDKN2A/B	rs1011970	1.06
TGFBR2	rs12493607	1.05
9q31.2	rs10759243	1.05
DNAJC1	rs7072776	1.05
19q13.31	rs3760982	1.05
RAB3C	rs10472076	1.04
ANKRD16	rs2380205	0.98
*CASP8	rs1045485	0.97
7q35	rs720475	0.96
CHST9	rs1436904	0.96
FTO	rs17817449	0.95
18q11.2	rs527616	0.95

Locus	SNP	Odds ratio
CDCA7	rs1550623	0.94
10q26.12	rs11199914	0.94
COX11	rs6504950	0.94
*SSBP4	rs4808801	0.94
2q35	rs13387042	0.93
PDE4D	rs1353747	0.93
11q13.1	rs3903072	0.92
11q24.3	rs11820646	0.92
PAX9	rs2236007	0.92
RAD51L1	rs999737	0.92
NRIP1	rs2823093	0.92
PEX14	rs616488	0.91
FOXQ1	rs11242675	0.91
8q21.11	rs6472903	0.91
RAD51L1	rs2588809	0.91
LGR6	rs6678914	0.9
NTN4	rs17356907	0.9
2q14.2	rs4849887	0.89
9q31	rs865686	0.89
ZNF365	rs10995190	0.86
ADAM29	rs6828523	0.84
MERIT40	rs2363956	0.82
TERT	rs2736108	0.77
PTHLH	rs10771399	0.72

* Denotes coding variant

Source: Fergus J. Couch et al. Science 343, 1466 (2014)

Hype cycle of emerging technologies



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Source: Gartner (August 2014)

Few examples from Medical advances and insurance impact

- Combination drug therapy extends HIV survival making insurance offer-able
- Hepatitis C cure comes to market
- Targeted cancer immunotherapy matures – Strengthening of Medical insurance assumptions
- Minimally invasive and robotic surgery in CI products
- Human genome discoveries & wearables – Health management opportunity
- Use of CT Angio / EBCT for insurance underwriting
- NT-ProBNP as routine requirement for underwriting
- Troponin T in CI definitions

Collaborative partnerships outside insurance industry

Plug and Play is a seed and early-stage investment firm focusing on technology start-ups

PLUG AND PLAY
Silicon Valley in a Box®

- Every year, P&P review 5,000 start-ups and invest in 160
- Connect 180 corporate partners to start-ups directly in their space
- Start-ups in the community have raised over $3.5b funds

Insurers joining program aimed at selecting the most promising Insurtech start-ups

- SCOR and ReMark join other leading (re)insurers in reviewing and selecting the most promising start-ups based on their potential
- We work with program participants offering guidance and development support and mentoring
- At the end of 12-week program, the start-ups present their ideas to investors and insurance executives at Plug & Play EXPO

Aflac, AON, Maiden Re, The Hartford, American National, Admiral, HDI, Nationwide, Travelers, USAA, SOMPO Digital Lab, Dai-ichi Life, Markel, SCOR, Farmers Insurance, Swiss Re, BNP Paribas, compare.com, Allianz, Deloitte., Munich RE, talanx., State Farm, AVIVA

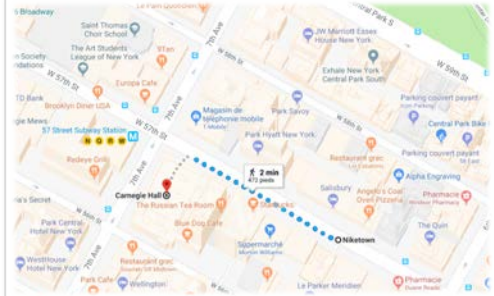
A device to improve survival from heart attack

Device to monitor heart rate, detect cardiac incident and trigger emergency response

475,000

Deaths from heart attacks in the US every year

Connecting heroes with victims – “heroes” get a notification and directions to the victim

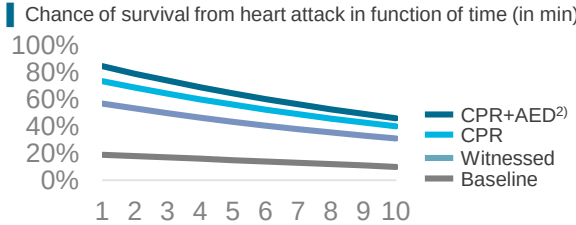


The “hero” gets a notification and directions on the “hero” app

”Hero network” (voluntary) of > 1m people with CPR Knowledge already in place

Network to reach 2-3M people, covering all key areas in the US

Improving survival rates by bringing help earlier to victims of cardiac arrest



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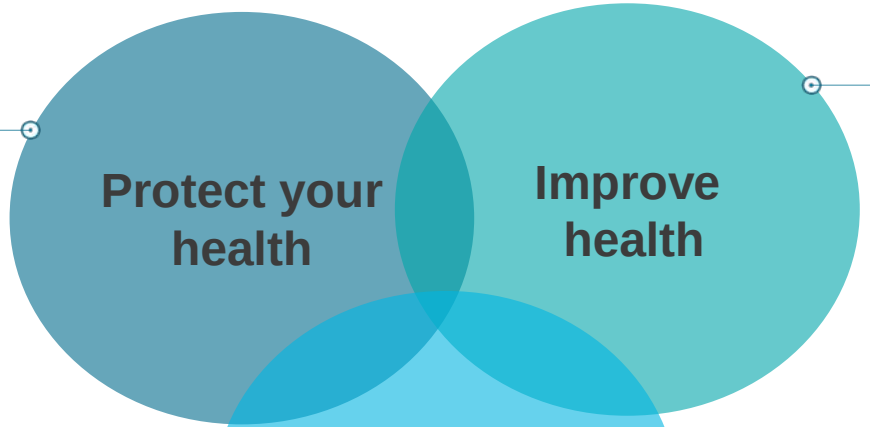
1) Website: https://www.ibeat.com/
2) CPR = Cardiopulmonary Resuscitation; AED = Automated External Defibrillator

The Diabetes medical product proposition in Hong Kong

Managing Diabetes wirelessly



- Make medical protection accessible to people with diabetes
- First in the market

- Embedded insurtech solution for disease management
- Self monitoring and real time feedback available to the customer

- Waived / reduced premium loading upon good diabetic control
- Extra incentive for the customer to stay engaged

Dynamic underwriting for Diabetics

3-way partnership with a unique proposition

MetLife — Health 2 Sync — SCOR The Art & Science of Risk

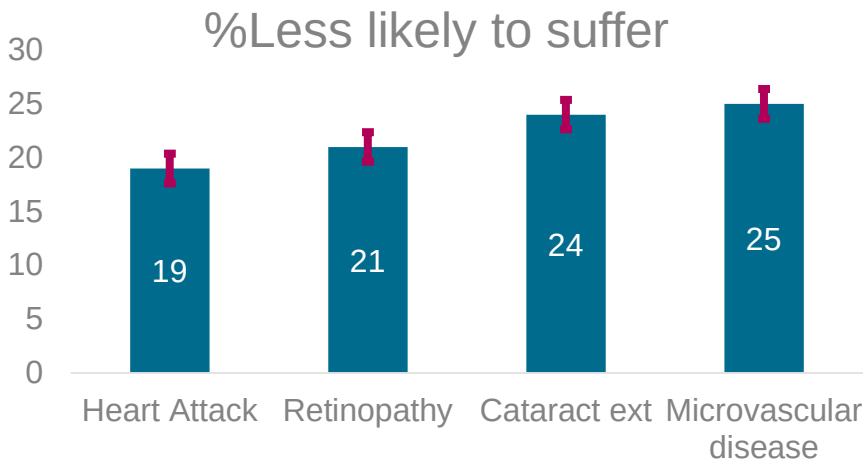
- Accept people with diabetes per underwriting criteria
- Reward the customer with premium discount for health improvement based on active management of their condition

- Record keeping on the app for the blood glucose and daily activity data
- Reminders and tips provided to customers for timely adjustments
- Data sharing with family

- Work with Health2Sync to come up with an integrated solution
- Design re-underwriting criteria upon health improvement
- Quantify expected level of improvement on morbidity

The impact of managing Diabetic risk

HbA1c
improved by
1 %-point
from 7% to 6%



*United Kingdom Prospective Diabetes Study Group: Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). Lancet 352: 837–853, 1998

Digital wellness platform with AI-enabled health advice

Online questionnaire

Two or more of the following trigger a fast online screening

- Hypertension
- Hyperlipidaemia
- Diabetes
- Atrial fibrillation
- Smoker
- Obese & Overweight
- Lack of physical exercise
- Family history of stroke

Medical advice

Fill **questionnaire** and have a **specialised stroke doctor** analyse it…

….or have **AI-enabled digital doctor** give you an answer

Preventive care or treatment

Depending on condition, get **preventive care or treatment** in hospital network

+

And a cloud-based **preventative plan**

Insurance

Dedicated stroke insurance

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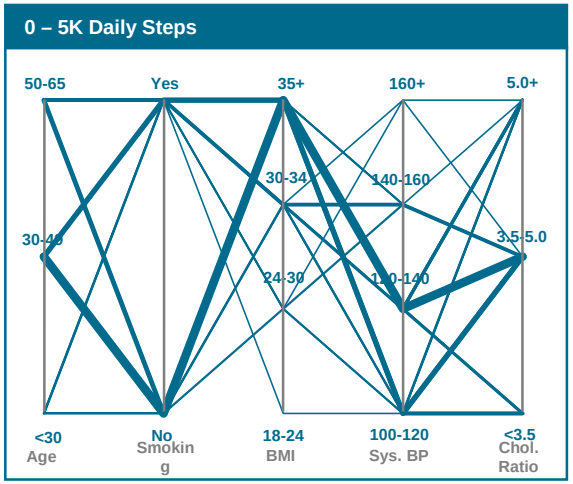
Data that are considered to be “more shareable” by customers

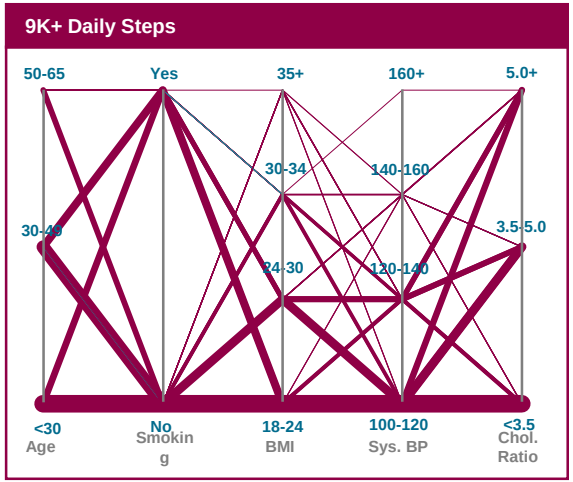
On average, consumers in APAC are **willing** to share **4 / 5 out of 8 types** of UW critical health information**.**

Percentage of people willing to share information with an insurer

Biological Age Model - Data behind the model

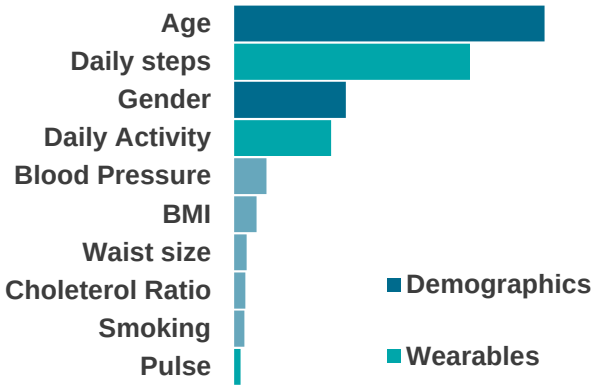
Through a partnership with Vivametrica, SCOR has access **to personal health data** on **18,000 individuals**, with a **20-year follow-up period**.



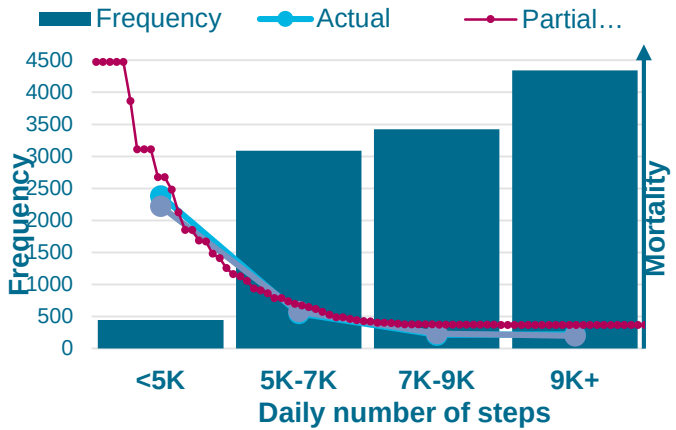


Identifying new ways to predict health status

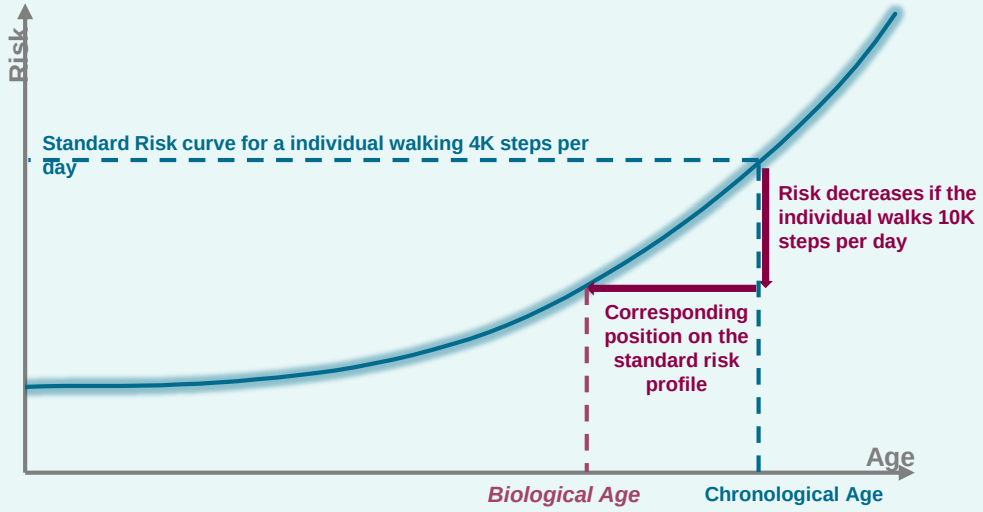
Key variables in BAM



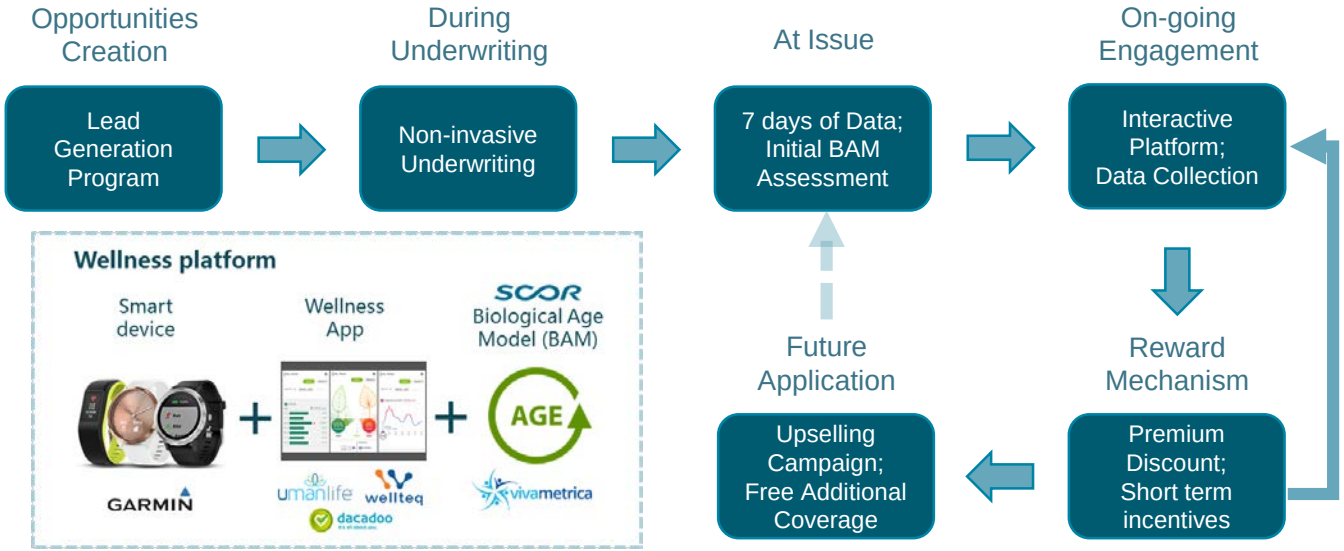
Steep improvement of mortality and critical illness risks



The concept of Biological Age



Example of BAM application



SCOR-engineered algorithms that used the SEER data set

NIH NATIONAL CANCER INSTITUTE
Surveillance, Epidemiology, and End Results Program

SEER

20 US states registries on all cancer types
9,675,661 detailed cases of patient with cancer (2016)
Data regularly updated and validated

Evidence-based rating established on individual prognostic factors

- *Individual patient data-set obtained from the Surveillance, Epidemiology and End Results (SEER) Program of the National Cancer Institute (NCI) USA* [1]
- *Creation of an adaptive algorithm that estimates individual patient survival prognostic*

- **Individual data collected at inception**
- **SOLEM online interrogation**
- **SOLEM: estimate of individual overall and conditional survivals**
- **SOLEM: Proposal for evidence-based rating**

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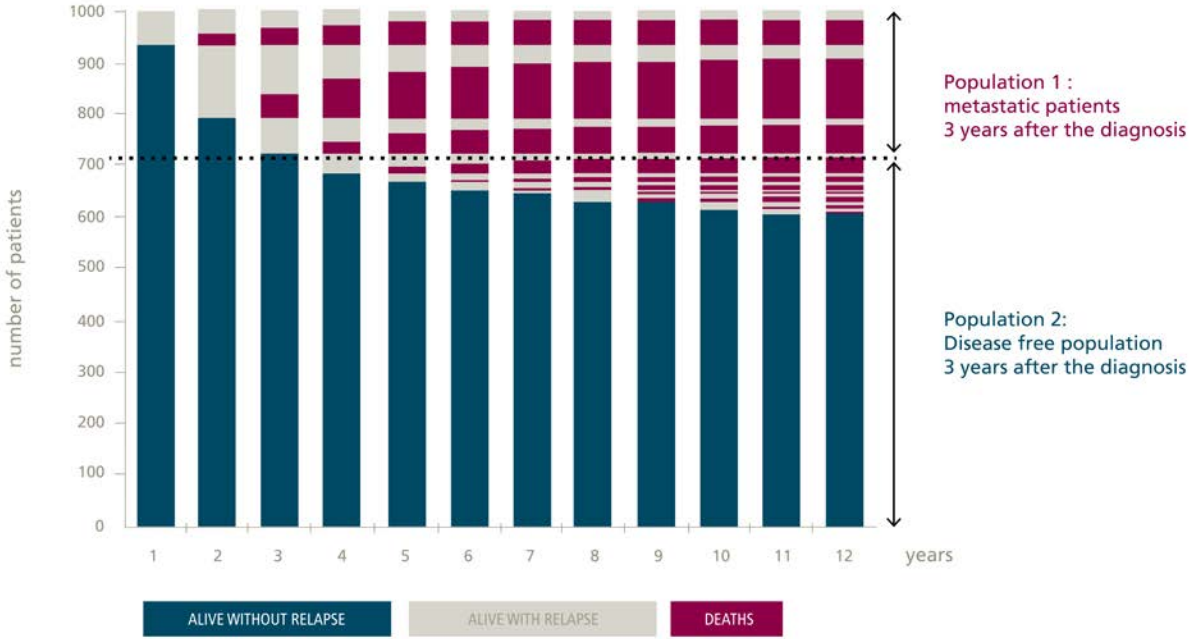
1) This data set is updated over years and incorporates most recent prognostic factors

Outcome of patients with breast cancer at 3 years of diagnosis

pT2N1M0 Grade 3 HR- breast cancer



- In this example, after 3 years of follow up one third of the patients are likely to relapse
- After 3 years of follow up:
  - The probability of relapsing increases up to 10 years then stabilize
  - Less than 10% of patients are likely to relapse or died from breast cancer

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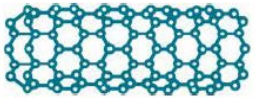
Other Medical developments to influence insurance

Health & Chronic disease management through internet of things

Robotic Surgeries & Prothesis (Bionics)

Nanodrugs



Reduction in accidental injuries

Antibiotic Resistance

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