

Innovation and social change

John Cooper





Futurology

Herman Kahn



Change

The extraordinary and accelerating advances that are taking place in smart phone telemedicine, miniaturisation, nano-sensors, robotics, pharmaceutical/ genomics

Their co-existence with system failure and a polarising society – first and third world health provision within the same service

Their ability to extend medicine's reach to the excluded or underserved

The changes which they will catalyse in the health professions and the buildings types

The likelihood of their narrowing or widening the health gap between rich and poor

Digital/technological change

Using today's or yesterday's technology: Catch up

Social institutions or personal privatisation

Technology that will encourage locational change

Provision or personal responsibility

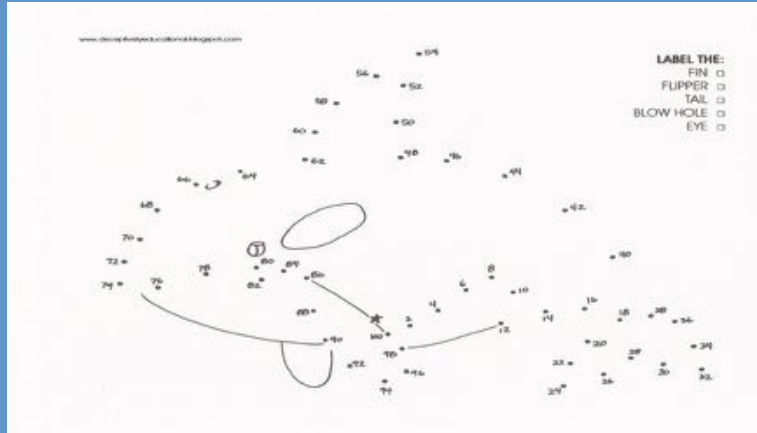
Technology that will push responsibility towards the patient

Process change: Technology that will encourage process change

Gee Whizz change: Technological inflation

Digital/technological change

Using today's or yesterday's technology: Catch up



Health networks

Knowledge share

Data share

Social media

Digital/technological change

Provision or personal responsibility

Technology that will push responsibility towards the patient

Insurance terms

Patient networks

Health records

Home care

Digital/technological change

Social institutions or personal privatisation

Technology that will encourage locational change

Home
Nursing homes
Pharmacy
Cyber café
Health kiosk

Digitalising the home

Surgeries
Drop in centres
Healthy living centres

Remote consultation

Resource centres
Community hospitals

Mobile technology

DTCs
Secondary care
Tertiary care

Digital/technological change

Process change

Technology that will encourage process change

Miniaturisation

Smartphone hub technology

Remote diagnosis

Social media

Home care

Home

Health and social care centres up to 10k close to home

Community care centres 100k heart of the community

Specialist care centres 250k, 500k, 1000k on central city sites

Self care
Monitoring
Automated treatment
Information and advice
NHS direct

Social care
Primary care
Outreach care
Information and advice

Basic diagnostic services
Day interventions
Minor injuries
Nurse led inpatient care
Intensive rehabilitation
Chronic care management

Planned interventions
Emergency care
Complex diagnostic treatment & inpatient care



Digital/technological change

Gee Whizz change:





YOUR PERSONAL "FLYING CARPET" Step into it, press a button, and off you go to market, to a friend's home, or to your job. Take off and land anywhere; no parking problems. Plug in to any electric outlet for recharging. They're waiting on it!

MORE POWER TO YOU!

America's independent light and power companies build for your new electric living

Tomorrow's higher standard of living will put electricity to work for you in ways still unheard of!

The time isn't too far off. On experts say, when you'll wash your dishes without soap or water—ultrasonic waves will do the job. Your beds will be made at the touch of a button. The 300° homework

will be made interesting and even exciting when they are able to dial a library book, a lecture or a classroom demonstration right into your home—with sound. (Some of this is happening already.)

To enjoy all this, you'll want a lot more electric power, and the independent electric companies of America are already building

new plants and facilities to provide it. Right now these companies are building at the rate of \$5,000,000,000 a year, and planning to double the nation's supply of electricity in less than 10 years.

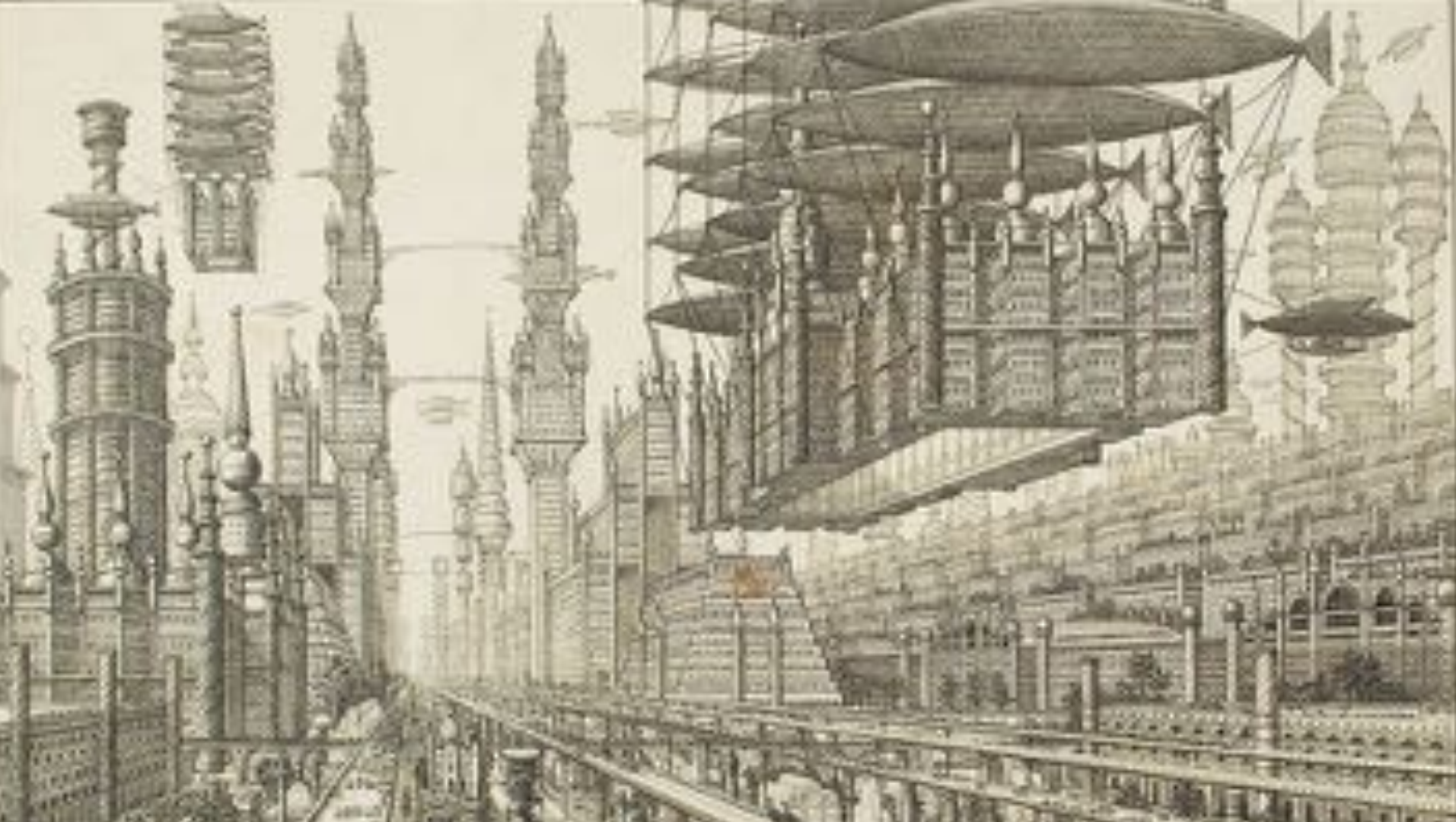
America has always had the best electric power service in the world. The electric companies are resolved to keep it that way,

AMERICA'S INDEPENDENT ELECTRIC LIGHT AND POWER COMPANIES

(Primary contact on request through this magazine.)

Futurology

the future is nearly always defined
- obviously - by present possibilities

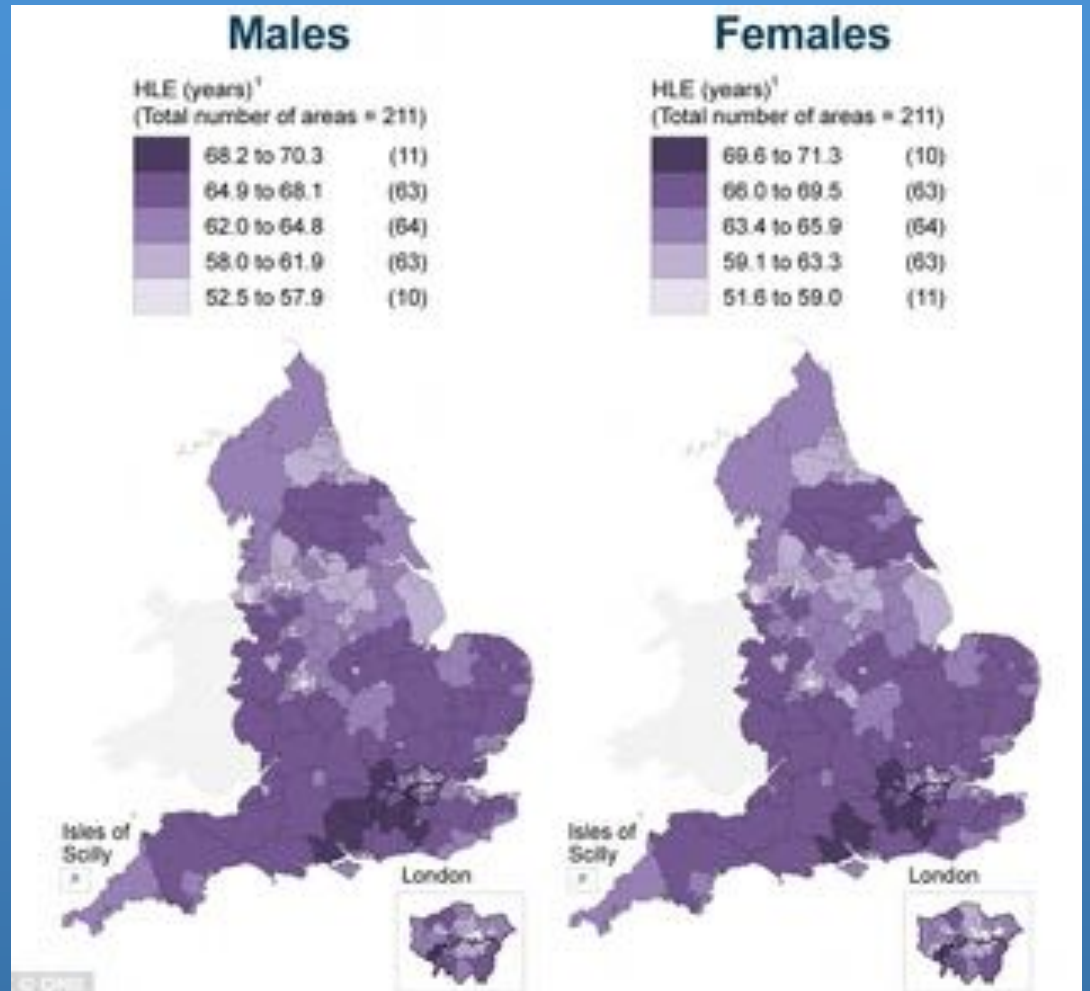




dystopia



dystopia





CIGAR

BLOW UP

BEST SILK

TOOTH
TOOTH
TOOTH

FINE BRAND
OUR OLD W

LOZENGES

WINES
AND
SPIRITS

MUSIC
HALL
CAFE

ST. HATE

TRY OUR 1890

FURNITURE

CARPETS

COFFEE

HOT LUNCHES



HAIR-D

RESTAURANT





BREAKING POINT

A large crowd of people, many wearing head coverings, is seen from a high angle, filling a grassy field. In the foreground, a man in a dark suit and light blue tie stands looking towards the camera. The background is filled with a dense sea of people, some looking towards the camera, others looking away. The overall scene suggests a large gathering or a protest.

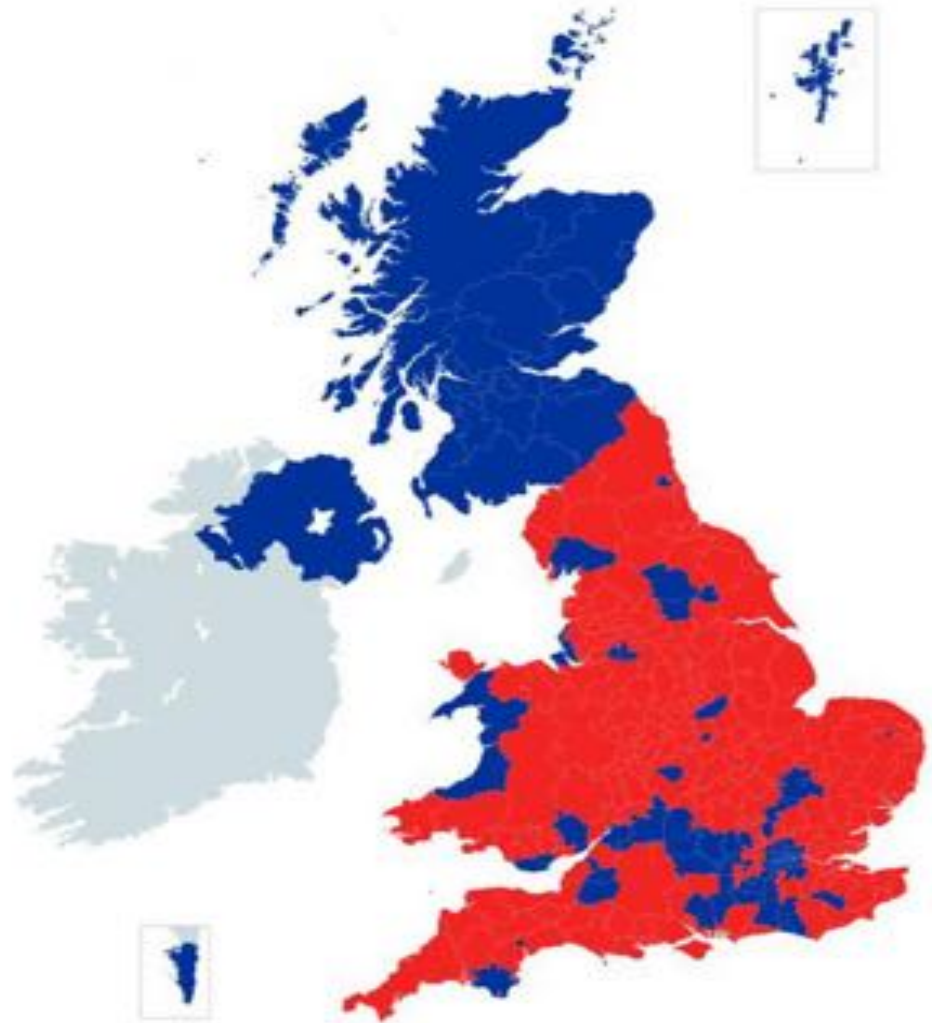
The EU has failed us all

We must break free of the EU and take

our borders.

Dystopia

The health of a nation



Nine years old and all to play for





ROBOT WAREHOUSES

Manpower shortages in the future may require mechanized handling of the necessities of life—food, clothing, building components and so on. As the population grows, the size of storage facilities will have to keep pace. Here is a

robot warehouse of the future, operated by a corps of mechanical men controlled by a lone operator in a control capsule suspended from a ceiling monorail. Directed electrically, never tiring, a robot warehouseman would pursue his duties as energetically as the proverbial ant.



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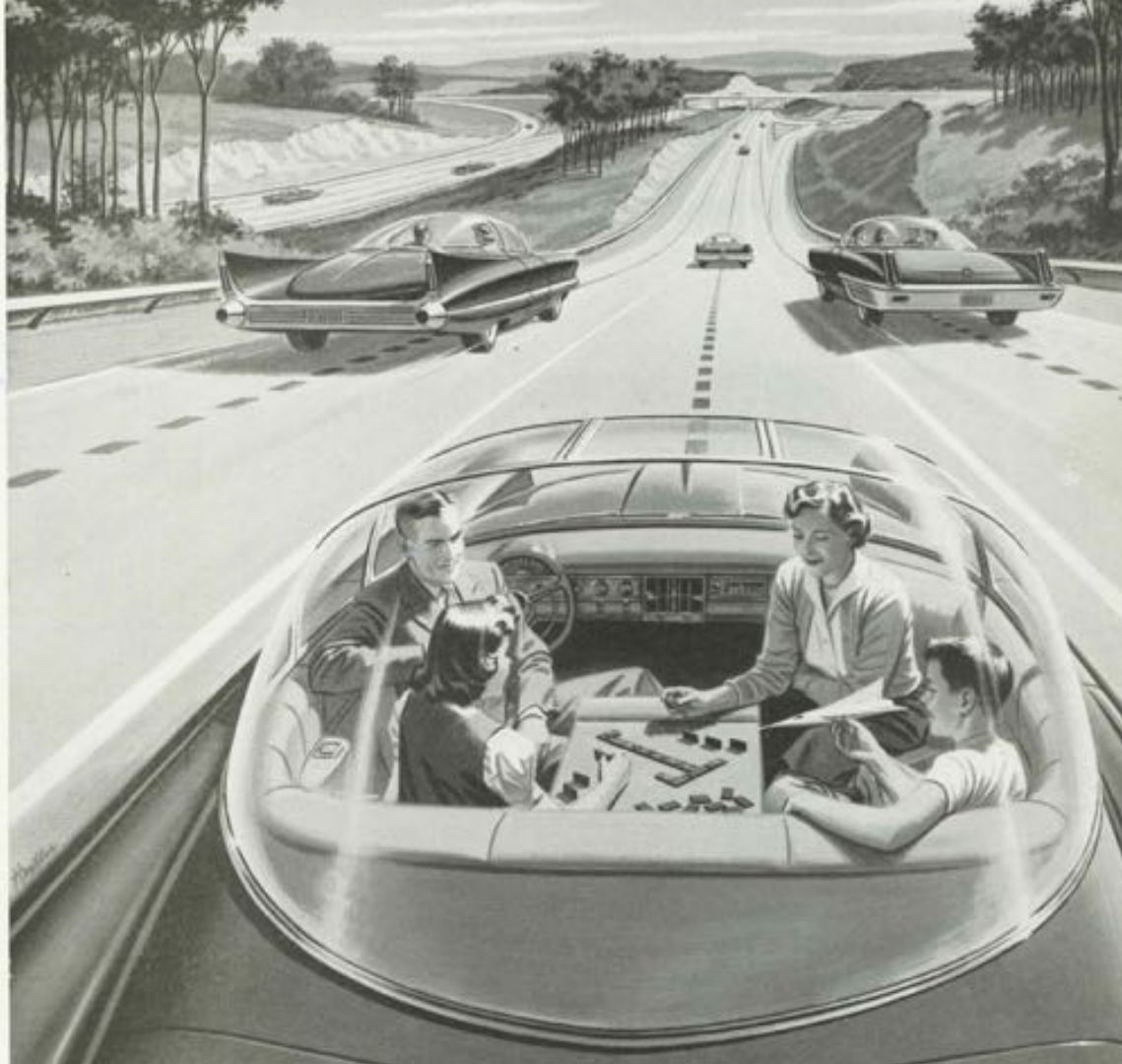
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Lets believe in
the future for
fifteen minutes
like we used to



The future





Smart phones

66% of UK adults have smart phones

Telemedicine – remote consultation

Telemedicine – security and policing

Smart phones





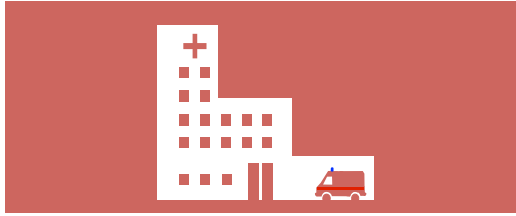
Pre-institutions



Pre-institutions



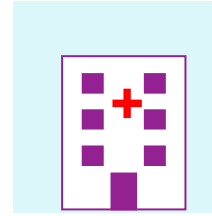
Major Hospital



Specialist Hospital



Elective Hospital

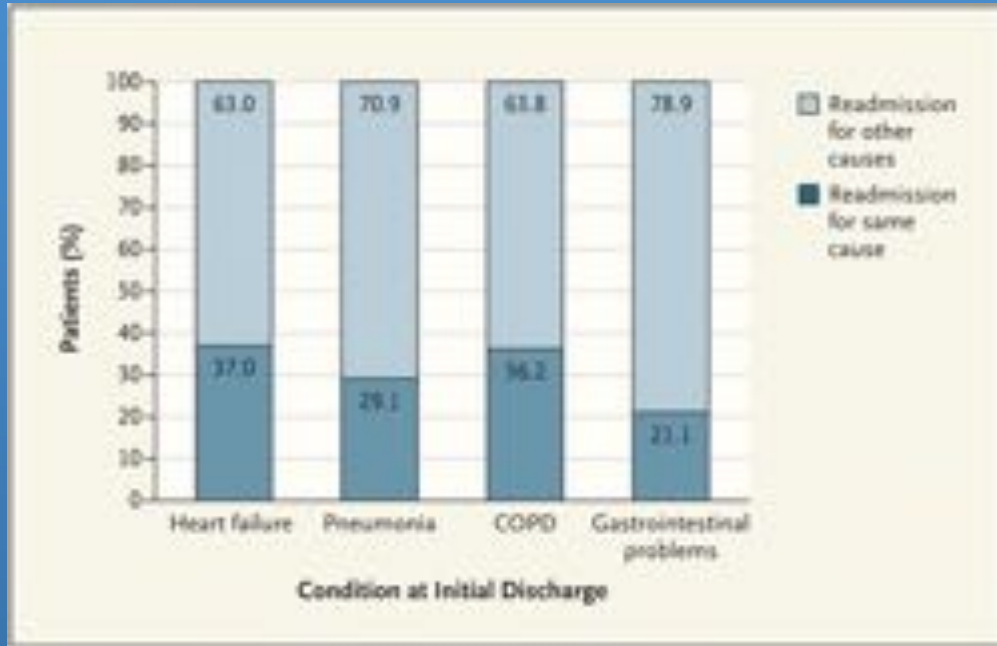


Community Hospital



Digital/technological change

The need for locational change



Krumholz

Digital/technological change

The need for locational change

The average age of hospital patients is now over 80

The median age of patients admitted with hip fracture is 84, of whom one in three have dementia, one in three suffer delirium and one in three never return to their former residence.

Most patients over 85 go to hospital because of an emergency, and stay on average for about 12 days

Digital/technological change

The need for locational change

The majority of people nursed at home and who get help with activities of daily living such as washing, dressing and eating are 75 or older.

Older patients account for more than half the caseload of district nurses: 850 000 patients over 75

400,000 people over 75 receive home care from social services

2.5 million people over 75 also have some kind of informal care at home from close family members, neighbours and friends.

Digital/technological change

The need for locational change

Public investment in infrastructure

Commercial opportunity

Want to know more about
home insulation products
or Government Grants?

CONTACT US





Divorcees

Born out of wedlock

Gays

Transgenderers





Mental health

HIV

Smoking

Diet

Child care



Digital/technological change

Old Age



Digital/technological change

Old Age



Remote medicine



Physical change

Estate opportunities



Old Ave

Smart phones

66% of UK adults have smart phones

Telemedicine – remote consultation

One in six consultations – 15% - in the USA are now virtual



Smart phones

Self treatment – extreme EXAMPLE

Diabetes patients are hacking their way towards a bionic pancreas

After reducing the cost of a CGM by [hacking my CGM Transmitter](#) and getting xDrip up and working I started work on building the Android App porting over the community code to native Android



To my surprise with no mobile development experience 2 months later I have a working open loop [DIY Artificial Pancreas](#).

Smart phones

Chronic Disease Management

Caveat 95% of health care apps are consumer-only products

- Asthma monitoring
- Wireless shoe insoles for diabetic patients
- Diabetes patients manage their glucose levels, diet and weight with web portal links to clinicians
- Hub for cardiac monitoring



£74.55

Smart phones: remote examination



Smart phones: guidance and discourse



the support network

Smart phones: guidance and treatment

Our Clinical Programs make outreach
5x - 15x Better

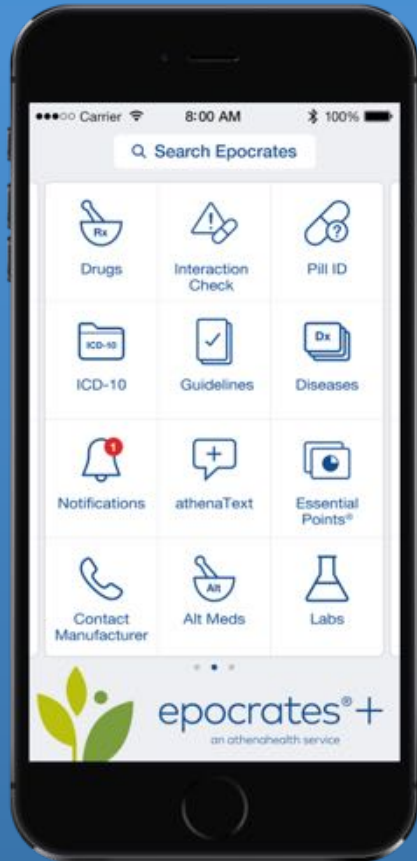


Convert Machine Learning Predictions to Clinical Actions

Clinical Intuition Behind Models & Predictions

Depression Program	Co-Morbid Depression Program (Diabetes & Heart Disease)	Behavioral Health Program	Chronic Pain Program	Heart Disease Program	Robust R&D Pipeline
8+ MM Patients	13+ MM Patients	7+ MM Patients	100+ MM Patients	5 MM Patients	20+ MM Patients

Smart phones: reference and networking



Hand held technology:

Cambridge University Colormetrix



The app, developed by researchers at the University of Cambridge, accurately measures colour-based, or colorimetric, tests for use in home, clinical or remote settings, and enables the transmission of medical data from patients directly to health professionals.

Decentralisation of healthcare through low-cost and highly portable point-of-care diagnostics has the potential to revolutionise current limitations in patient screening.

Hand held technology:

Tricorder Prize



Hand held technology:

Tricorder Prize



The devices are expected to accurately diagnose 13 health conditions

10 required core conditions

3 elective conditions

5 real-time health vital signs, independent of a health care worker or facility,

Hand held technology:

Tricorder Prize

Required Core Health Conditions (10):

Anaemia, Atrial Fibrillation (AFib), Chronic Obstructive Pulmonary Disease (COPD), Diabetes, Leukocytosis, Pneumonia, Otitis Media, Sleep Apnea, Urinary Tract Infection, Absence of condition.

Elective Health Conditions (Choice of 3):

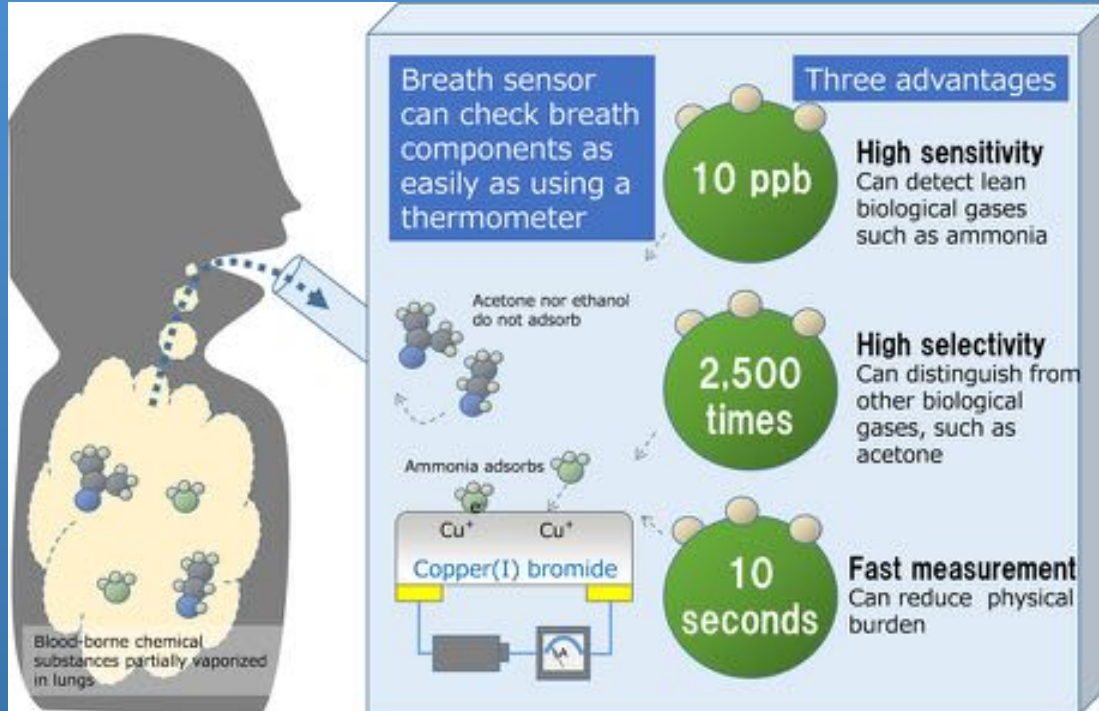
Cholesterol Screen, Food-borne Illness, HIV Screen, Hypertension, Hypothyroidism/Hyperthyroidism, Melanoma, Mononucleosis, Pertussis (Whooping Cough), Shingles, Strep Throat.

Required Health Vital Signs (5):

Blood Pressure, Heart Rate, Oxygen Saturation, Respiratory Rate, Temperature

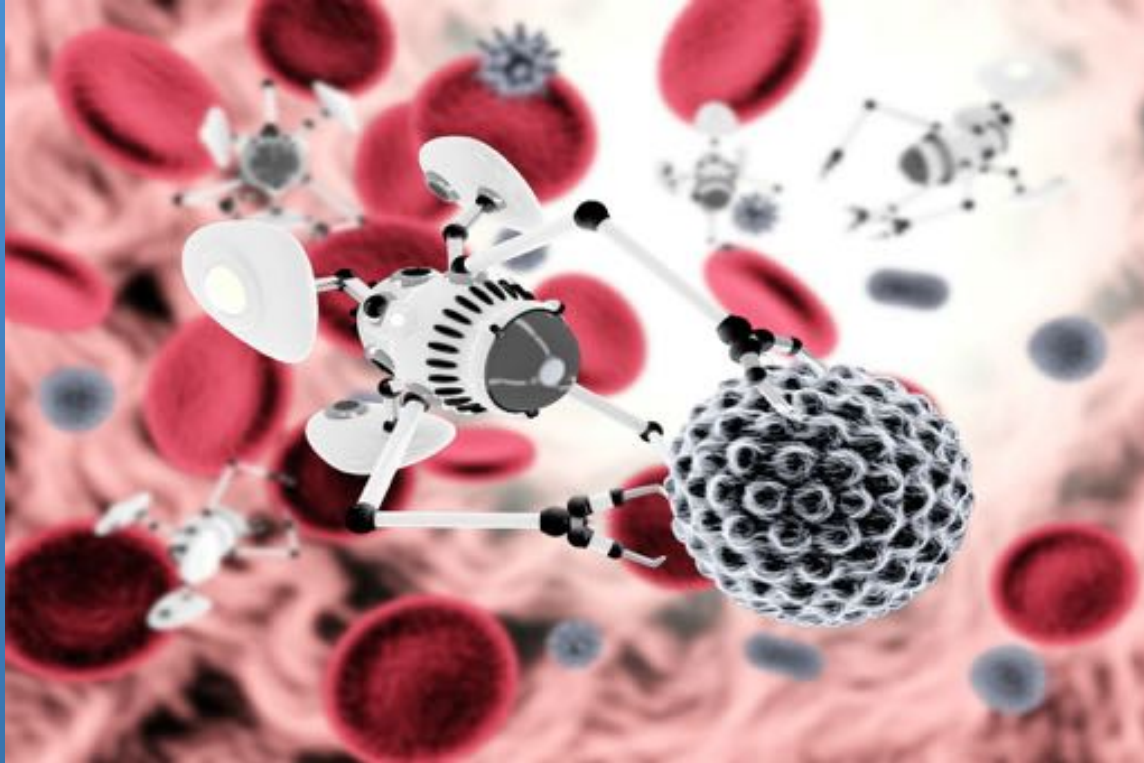
Diagnosis leaves the lab:

Minituarisation



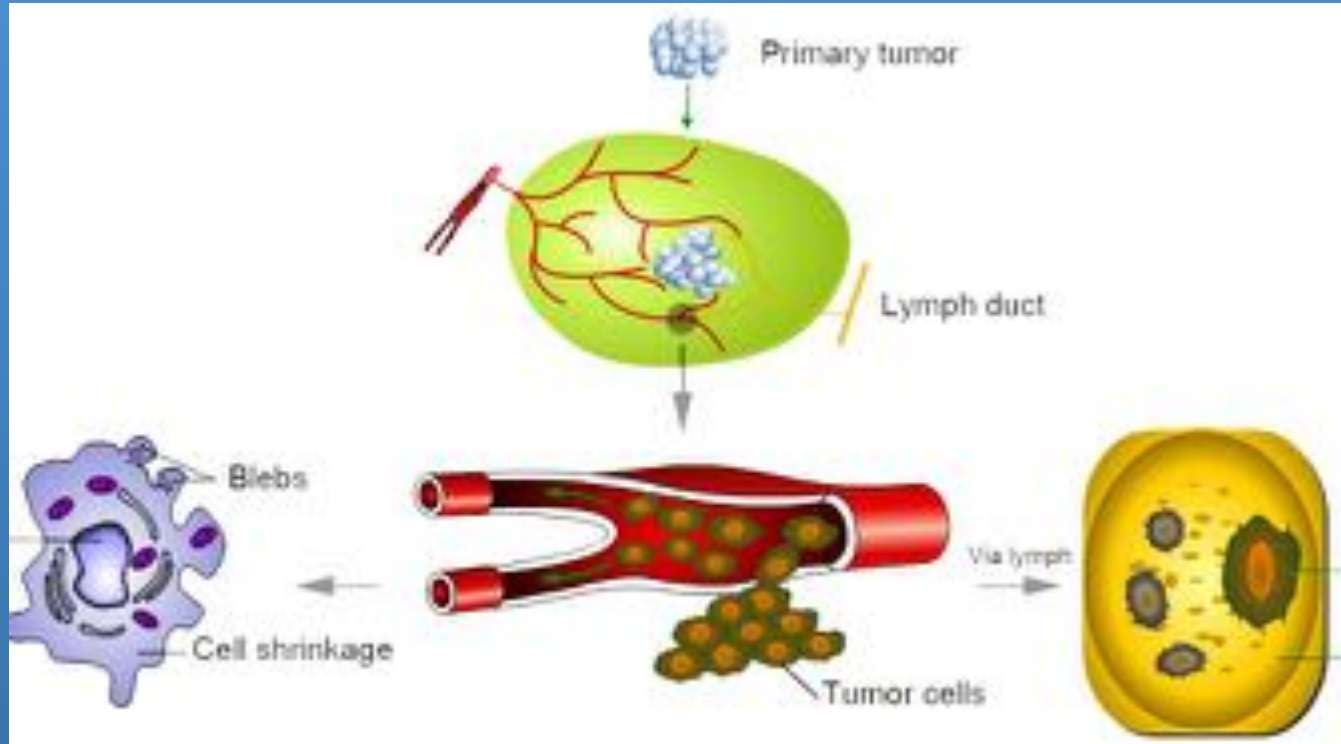
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Diagnosis leaves the lab:

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Pharma Advances:

Are we on the brink of
a Paradigm shift?

DNA sequencing

Immuno therapies

Therapeutic vaccines

Multi-drug therapies

Precision medicine



Pharma Advances:

Dosimetry

Oral drug delivery remains the preferred route of drug delivery.

Implantation

Novel technologies with improved performance, patient compliance and enhanced quality have emerged in the recent past.

3D printing

Oral fast-dispersing dosage forms, three-dimensional Printing (3DP) and electrostatic coating are a few examples of a few existing technologies with the potential to accommodate various physico-chemical, pharmacokinetic and pharma-codynamic characteristics of drugs

Consequences

Extend the personalisation of medicine with the mass distribution of hand-held devices

Provide the opportunity for the very early diagnosis of cancer

Change the relationship between patient and physician

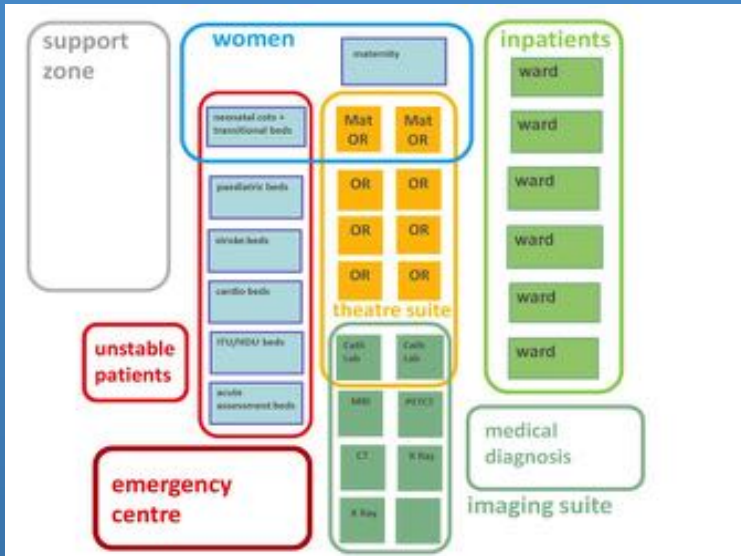
Mirror the transformation from main frame to desktop

The cost and availability of these tools will determine whether the health gap widens or narrows

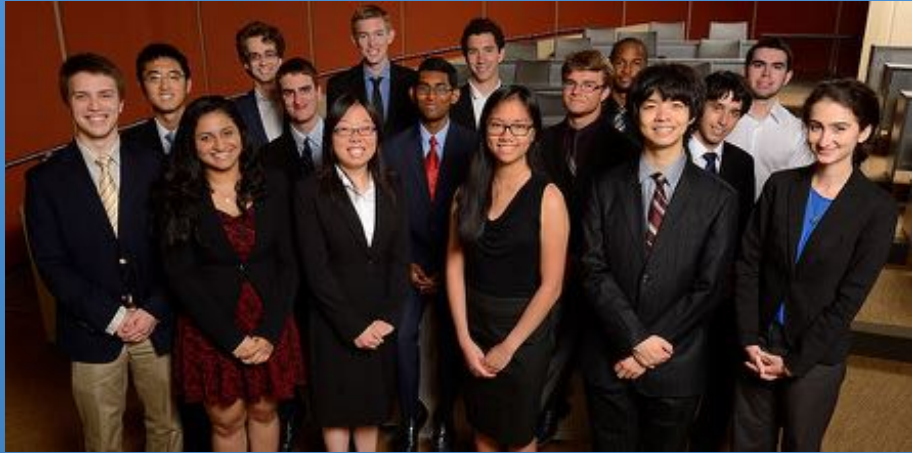
Consequences:

Hospitals becoming ED/surgicentres/ acute medicine centres
(almost certain)

attached to 'roomless data surveillance centres for remote monitoring
(quite likely)



Consequences:



First world health care in third world surroundings as technological inflation consumes the budget and the high costs of infrastructure renewal or change become unaffordable

Consequences:



The significant cost differences between remote and person to person consultation may fracture medicine and create a two tier system for both physicians and patients

Consequences



There is the strong likelihood that the personalisation of healthcare will shift responsibility to the individual with profound consequences on insurance based health care systems in terms of proactive engagement and also penalties

Consequences

Much of this will lead to an element of commercial participation – and also privatisation.

Much of these changes fall in the realm of public health and social services

We have the ability to harness many of the advances that take place for the public good

We should not allow the health gap between the rich and poor to get any wider

It is of vital importance that bodies such as the NHS develop strategies

There is huge political capital in many of these changes



thank you