

Primary Care and Uncertainty

October 20, 2007

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 - www.healthandeverything.org
- For more information you can write to me
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Three parts of this talk

- Brief History of Ideas about health, disease and primary care
- Our current understanding of health, disease and care
- The future of our understanding of health, disease and primary care

HAMURABI

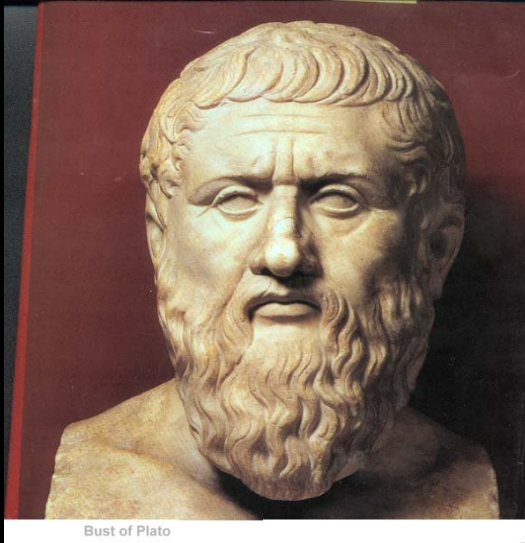




Ancient Physicians and Health

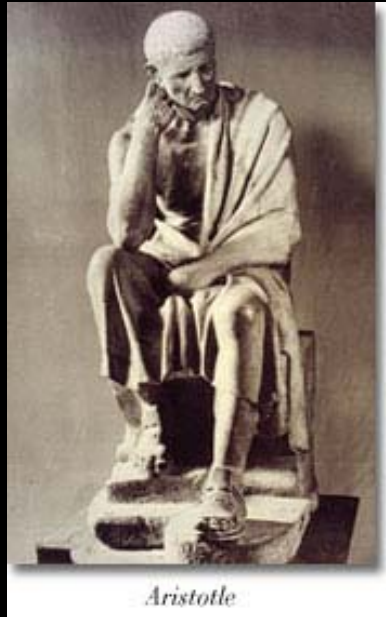
- Struggle between powerful authoritarian doctors and primary care doctors goes back to ancient Mesopotamia
- Ashipu and Asu
- Ashipu: organs and gods
- Asu: bone setting, surgery and poultices

Ancient Western Medicine



Bust of Plato

Plato

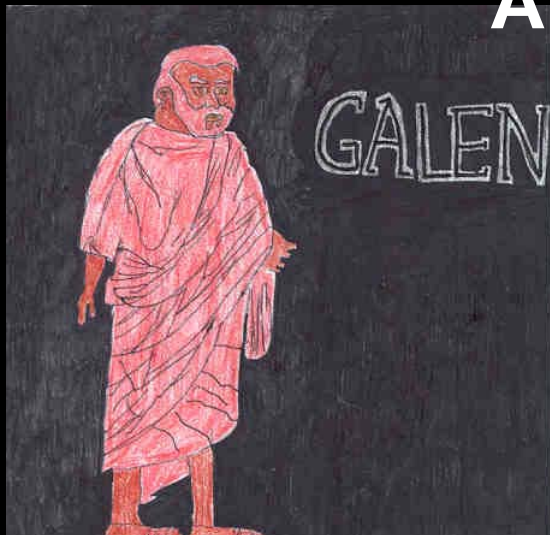


Aristotle

Aristotle Hippocrates



**5th & 4th
Century BC**



Galen

**2nd & 1st
Century BC**



Aristotle

- Proportionality of elements
 - “if the disproportion of the hot and cold elements is the cause of ill health, their proportion is the cause of health” (Posterior Analytics Book I part 13).
- For Aristotle, medical interventions have health as their final cause, and the rebalancing of the elements as their means.
- Galen had the longest lasting medical framework (1400 Years)
- Still around: Hot soup for a cold
- Four humours



Hippocrates

- Sort of like Homer.
- Writings occur over a 200 yr period
- Lots of practical medical interventions
- Much clinical material
 - “It is best to wait until a tumor is large enough to cut out...better than all the poisons use to shrink it.” On Cancer
- Struggle among different followers



Galen's Humours

- Most long lived integrated theory of medicine
- Refer to character and sense of self
- Connected to social and physical environments
- Temperament and physiology interactive,
 - Being angry increases the flow of black bile.
 - More black bile can make someone angry.
- Illnesses were “distempers” (Disorders)
- Regimens tempered the humours



Primary Care through Galenic Era

- Increasingly academic
- Rebalancing interventions
 - changes in environment
 - adjustments of lifestyle
 - Galenic medications remain part of the medicine cabinet including laxatives and purgatives.
 - cupping, purges and bleeds
 - Gwyneth Paltrow
- Later academic dominance to 19th C.
- Much primary care by new herbalists
- E.g. Women's role in 17th C.
- Lives on in complementary medicine



Summer

Fire

Yellow Bile (**Liver**)

Choleric

Youth

Autumn

Earth

Black Bile (**Spleen**)

Melancholy

Adulthood

Spring

Air

Blood (**Heart**)

Sanguine

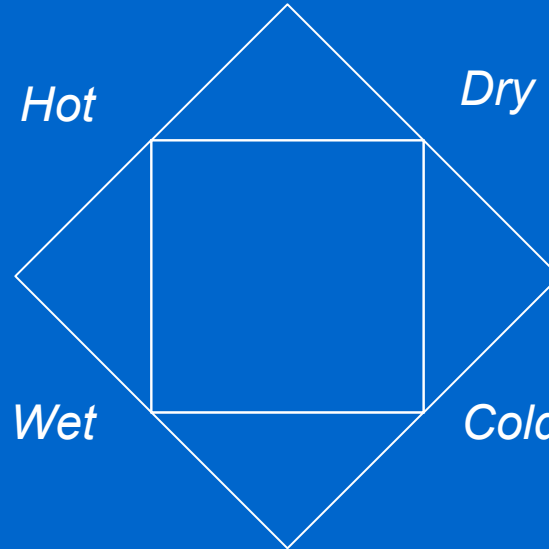
Childhood

Hot

Dry

Wet

Cold



Winter

Water

Phlegm (**Brain**)

Phlegmatic

Old Age



Mediaeval Vision of Health

- Continued Galenic + God's lessons
- Garden of Eden Concept of Health
 - no illness, no aging and no pain. Significantly
- Fall
 - women would feel the pain of childbirth
- Similar to WHO definition
 - “a complete state of physical, mental and social well-being.”
- Only by regaining paradise will mankind recover this state.
- WHO account of health may express the wish to create a man-made paradise.

Adam and Eve Leave the Garden





Some Visions of Modern Medical Science

- Some of modern medicine has its roots in the early stages of modernity as far back as Paracelsus, Galileo, Descartes and others like Robert Boyle and members of the Royal Academy.

Paracelsus





Paracelsus' Chemical Metaphor

- Theopharastus Bombastus von Hohenheim: (1493-1541)
- burned Galen's books in the town square;
- major influence on 17th century scientific practices
- body chemical retort
 - food, liquids and air
 - blood, muscle and various excreta.
- Health: appropriate chemical reactions
- Disease
 - chemical imbalances
 - Poisons
- Cures testable

Francis Bacon





Francis Bacon

- Father of Modern Scientific procedures
- Accumulate all Scientific Knowledge
- Fruits of Science
- Gain complete power over nature
- Advocates Royal Society

René Descartes





René Descartes' Mechanical Man

...if the body of man be considered as a kind of machine, so made up and composed of bones, nerves, muscles, veins, blood, and skin, that although there were in it no mind, it would still exhibit the same motions which it at present manifests involuntarily, and therefore without the aid of the mind....

René Descartes
Meditations, Book VI



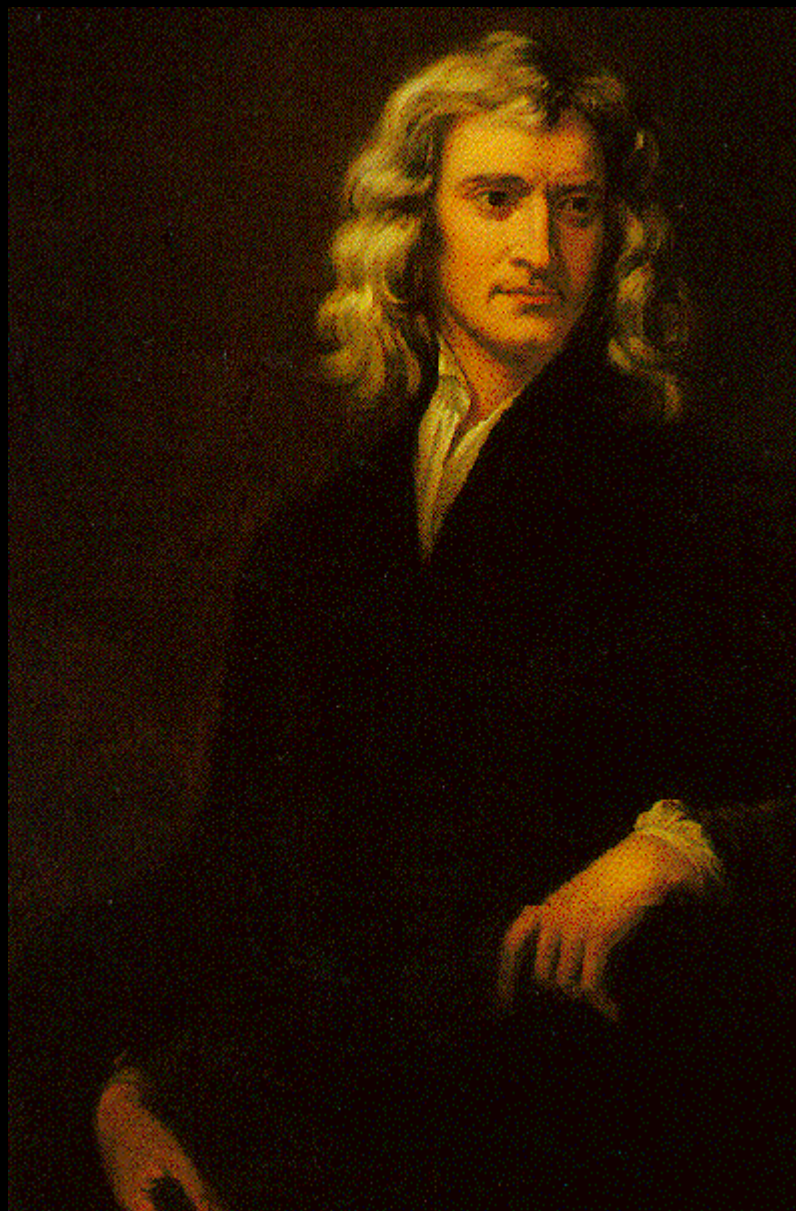
A Geometry of Health

- “Healthy” machine runs smoothly
- Descartes said in the Discourse “The preservation of health has always been the principle end of my studies” he hoped to devise “a system of medicine which is founded on infallible demonstrations.”

Gottfried von Leibniz



Isaac Newton



Star Trek Tricorder





The Tricorder (Wired, 2007)

- Bones McCoy made *Star Trek's* portable black box famous by using it to diagnose ailments without ever touching a patient. Now, studies show that the tricorder is closer to becoming reality, because of new medical-imaging technology and a new state of matter.
- "When we were conceptualizing (our experiment), we saw the ultimate device should be noninvasive, giving you the molecular details of the disease going on inside the body," said Howard Chang of Stanford University's Comprehensive Cancer Center. "I think a tricorder is a useful idea.... It shows the gap between what we have now and what we hope technology will achieve in the end."

Robert Boyle





Robert Boyle

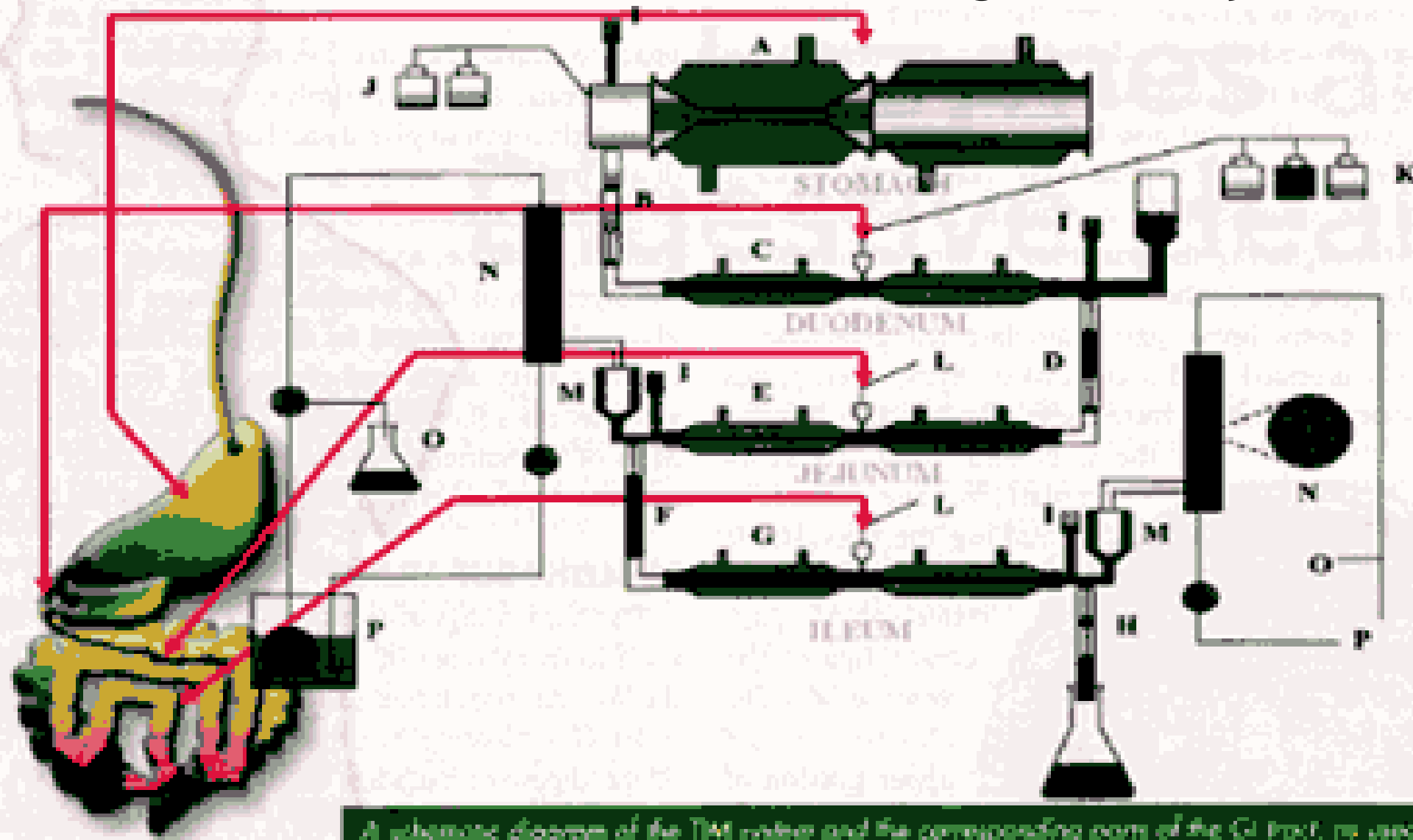
- “Corpuscular mechanical” account of health
 - Atomic and chemical constituents of the human body followed mechanical laws of nature
 - Helped to set the research agenda for medicine for the next 300 years.
 - An ordered world in which diseases and their causes can be readily identified, and in which pharmaceutical and surgical cures can restore the smooth functioning to the body.



Robert Boyle II

- Over the last ten years Boyle's work has been examined more carefully
- Boyle's own health and general state
- Search for the philosopher's stone
 - Return to an Edenic State
 - Immortality
 - Freedom from illness and pain

The Mechanical Digestive System



A schematic diagram of the TMS system and the corresponding parts of the GI tract, re-use on digestive enzymes by TMS. A gastric compartment, B pyloric sphincter, C duodenal valve, D peristaltic valve; E jejunal compartment, F peristaltic valve, G ileal compartment, H ileal valve, I pH electrodes, J gastric secretion bottles with acid and enzymes, K duodenal sac with bile, pepsinogen, bicarbonate, L secretion of bicarbonate to control the intestinal pH system, M hollow fiber semi-permeable membrane system, N water absorption system, O pH control system, P pH control system.

Star Trek Tricorder





Tricorder Part 2

- Star Trek's medical tricorder approaches reality; The holy grail of medicine?
- Dr Leonard "Bones" McCoy on Star Trek, would just have to wave his medical tricorder over any Star Trek crew member laying in his sickbay to locate an ailment and just like magic --wounds would miraculously heal.
- Is this the holy grail of medicine?
- Well, it's not just science fiction any more--- we could see such a contraption, thanks to the USA army and the Defense Advanced Research Projects Agency (DARPA)
- AcousTx products based on the application of therapeutic energy, today announced the award of a multi-phase contract by the Defense Advanced Research Projects Agency (DARPA). The award, potentially up to \$30 million over four years, is contracted through the US Army Medical Research and Materiel Command and is in support of DARPA's Deep Bleeder Acoustic Coagulation (DBAC) program. Phase I funding is approximately \$8 million.



The Boyle Legacy

- **The Future Of Extreme Longevity**
- Terry Grossman is doing the rounds to talk about his new book "Fantastic Voyage: Live Long Enough to Live Forever." "In our new book, Ray Kurzweil and I make the scientific case that immortality is within our grasp. We explain how to slow down aging and disease processes to such a degree that you can remain in good health until the more radical life extending and life-enhancing technologies - now in the research and testing pipeline - become available." I'm less optimistic about the future of healthy life extension medicine and the ability of present day techniques to affect the aging process. This is why I believe that we must all get involved to ensure that serious anti-aging research is funded in time for us to benefit from it.



Other Traditions Have Roots

- Thomas Sydenham (the modern “Hippocrates” and a forerunner of Osler) adopts neither Galen nor modern scientific approach.
- Clinical experience and understanding the individual case
- Diseases as natural kinds
- One of John Locke’s mentors



Four Big Visions

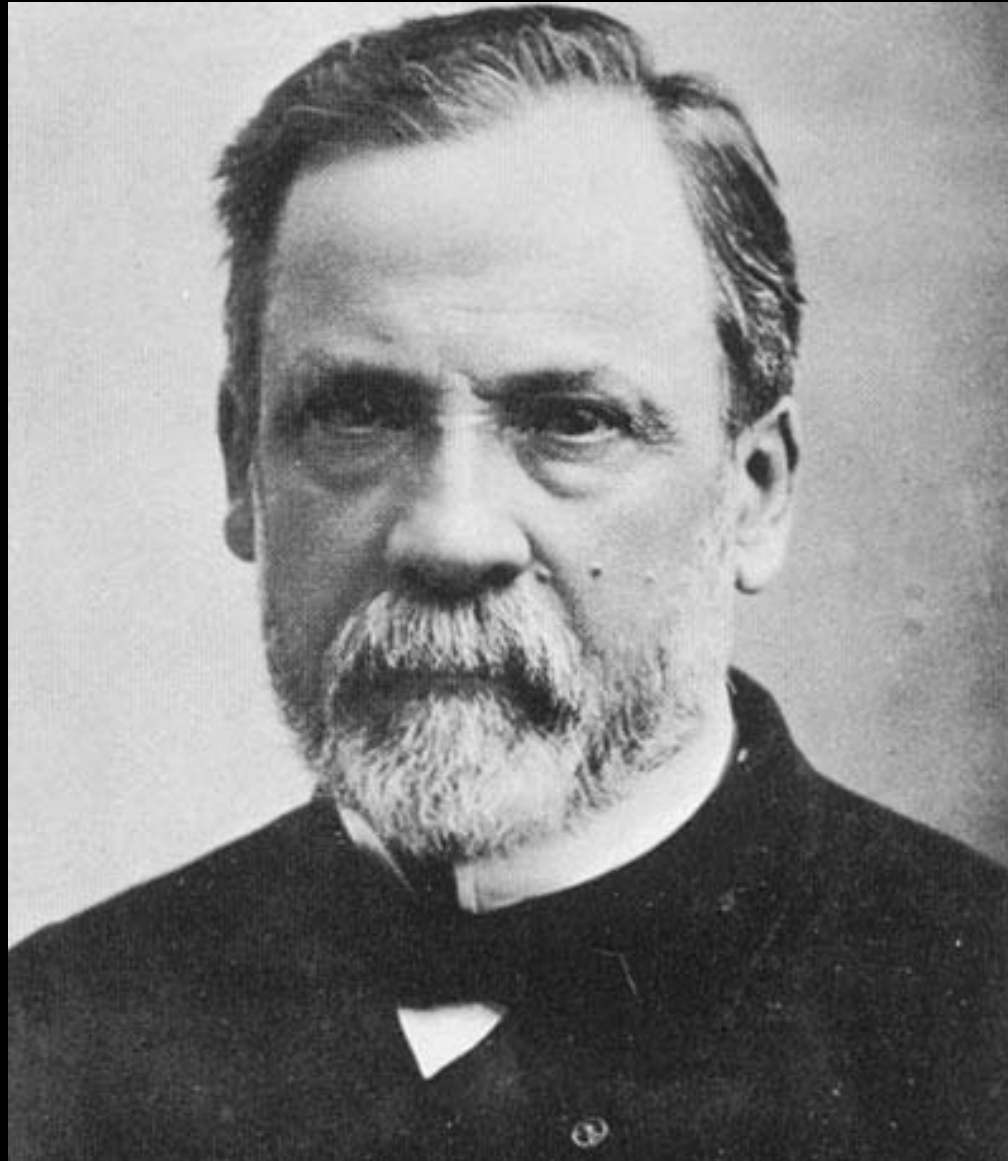
	Ancient Sources	Early Scientific Sources
Control Over Nature	Greek Myth	Francis Bacon “fruits of science”
Mathematical certainty in knowledge	Plato forms	René Descartes Geometry of medicine
Free of all illness “War on disease”	Panacea and Eden	Robert Boyle “evidence based”
Extreme Longevity	Greek Gods Eden	Robert Boyle



Scientific Medicine

- Began to come to fruition with Koch and Pasteur
- Vaccination for many diseases
- Elimination of some diseases like small pox and more complete understanding of others, e.g. polio and cholera

Louis Pasteur



Robert Koch





Early 20th Century

- Most diseases understood from acute episodes
 - Cancer
 - Heart Attacks
 - Stroke
- Massive increase in the number of modern hospitals
- Professionalization of Medicine (Flexner) and medical education
- Introduction of new specialization



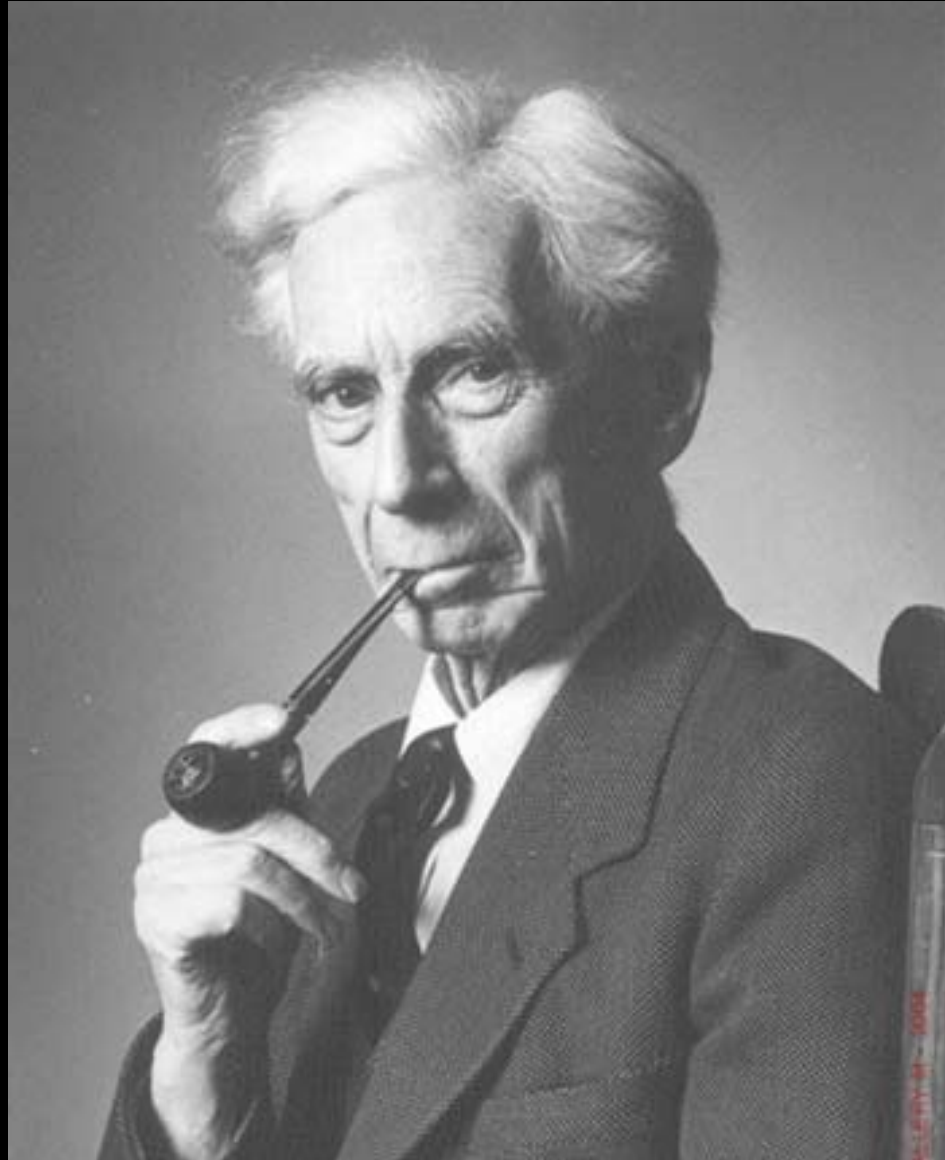
Philosophical Reinforcement

- The early Wittgenstein
 - Logical Positivism
 - Extreme view of knowledge and science
 - Only evidence is scientific evidence

The Early Wittgenstein



Bertrand Russell



The Vienna Circle (Schlick)





The Promise for Primary Care

- Compete Instrumental diagnosis
- Clear and complete protocols for intervention
- High degree of certainty about interventions and outcomes
- “Scientific medicine will create a population free of illness”



More Successes

- Molecular Biology and Genomics
 - Identification of the molecular processes of cell maintenance and division
 - A better understanding of enzymes, viruses and bacteria
 - A deeper understanding of cellular structures and the process of mutation
 - A general understanding of the nature of cellular diseases like cancer



Greater Knowledge & Differentiation

- Division of labour in the acquisition of medical knowledge - worry about growing level of specialization as early as 1950
- Fear that medicine would become too instrumental and technical and lose the human connections became intense by 1970.



The Introduction of Uncertainty

- Non-linearity In Mathematics, Physics, Philosophy
- Some concern about the limits of mechanistic scientific enquiry
- Questions about the impact of technology on the human experience
- The worry about the loss of human values
- Recognizing and coping with uncertainty

Giambattista Vico (1668-1744)



Nicholas Lobachevsky 19th c.



Bernard Riemann



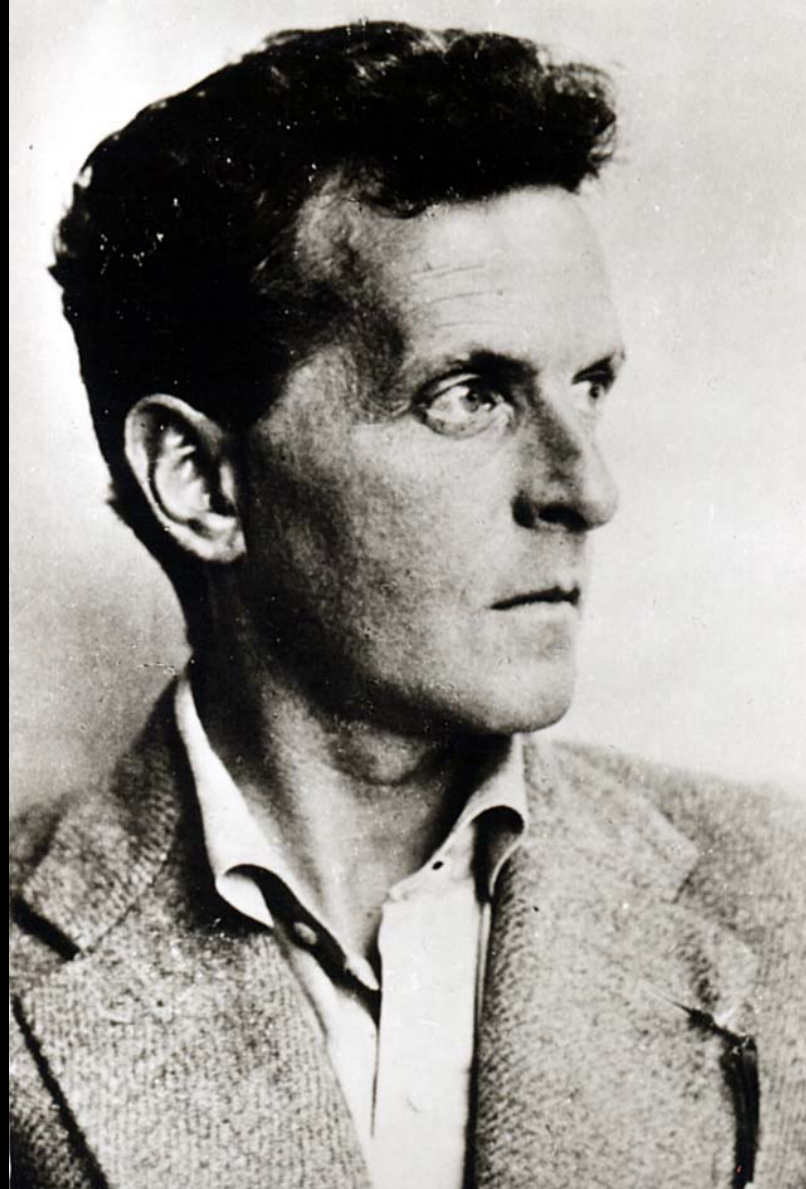
Werner Heisenberg



Kurt Gödel



The Late Wittgenstein



Rachel Carson



Hans Georg Gadamer



Elisabeth Kubler-Ross



Richard Rorty



Barbara Starfield



Ilye Prigogine





Example of Cancer Research

- Military Metaphor applied
- 1970 Nixon declares “war on cancer”
- Since then \$120 Billion spent on research
- Enormous Amount learned about the mechanisms of cell division and mutation



But No “Cure of Cancer”

- Growing belief that cancer cannot be understood as a “curable” disease
- Giving up the notion that we can identify the clear cause and the single cure
- Beginning to understand some limitations of imaging and genomics
- Literature even suggests that in some cases
 - The cost of eradicating all cancers cells may be harmful
 - That early detection and intervention may be harmful



Remember Hippocrates

- “It is best to wait until a tumor is large enough to cut out...better than all the poisons use to shrink it.” On Cancer



Four Big Visions

	Ancient Sources	Recent Sources
Live with not in control of nature	Biblical Sabbaticals	Rachel Carson
Complexity brings uncertainty	Aristotle: What is real is possible	Ilya Prigogone
Illness as part of a healthy human life	Hippocrates	Hans Georg Gadamer
Death as integral to life	Ecclesiastics	Elisabeth Kubler-Ross



Simple

Following a Recipe

- The recipe is essential
- Recipes are tested to assure replicability of later efforts
- No particular expertise; knowing how to cook increases success
- Recipes produce standard products
- Certainty of same results every time
- Optimism re results

Complicated

A Rocket to the Moon

- Formulae are critical and necessary
- Sending one rocket increases assurance that next will be ok
- High level of expertise in many specialized fields + coordination
- Rockets similar in critical ways
- High certainty of outcome
- Optimism re results

Complex

Raising a Child

- Formulae have only a limited application
- Raising one child gives no assurance of success with the next
- Expertise can help but is not sufficient
- Every child is unique
- Uncertainty of outcome remains
- Optimism re results



Complicated **Acute Diseases**



Complex **Chronic Diseases**

- Abrupt onset
- Often all causes can be identified and measured
- Diagnosis and prognosis are often accurate
- Specific therapy or treatment is often available
- Technological intervention is usually effective: cure is likely with return to normal health
- Profession is knowledgeable while laity is inexperienced
- No Voluntary Sector Associations for these condition e.g. Small Pox, Knee Replacement,

- Gradual onset over time
- Multivariate cause, changing over time
- Diagnosis is uncertain and prognosis obscure
- Indecisive technologies & therapies with adversities
- No cure, pervasive uncertainty: management, coaching & self care over time is needed to improve health
- Profession & laity must be reciprocally knowledgeable to improve health
- Voluntary Sector Associations are widespread and help define the distinction: Heart and Stroke, Asthma, Diabetes etc.



Two Camps

TRADITIONAL CHEM MEC

- Control Over Nature
- Mathematical certainty in knowledge
- Free of all illness (“War on disease”)
- Extreme Longevity

LIVING WITH COMPLEXITY

- Live with not in control of nature
- Complexity brings uncertainty
- Illness as part of a healthy human life
- Death as integral to life



Two Camps

Complicated Mechanical/Chemical

- Reductionists
- More instrumental
- Ever increasing certainty
- Protocols for all
- Extreme evidence base
- Multiple diagnoses
- Literal First

Complex Experiential

- Non-reductionist
- More relationship
- Coping with uncertainty
- Protocols for one
- Clinical experience
- Continuity of care
- Metaphorical first

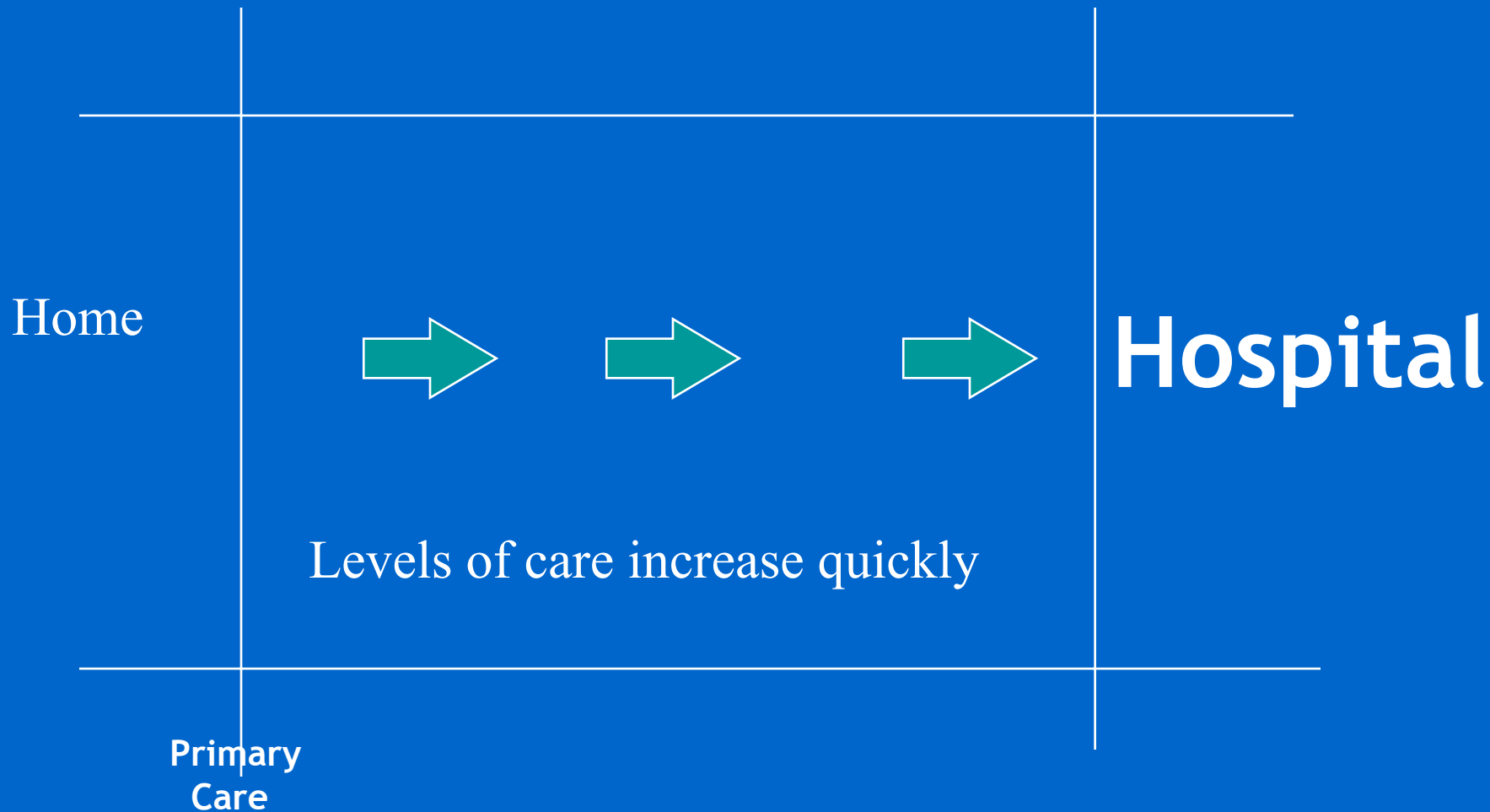


The Future of Illness

- Increased instrumental care
- Move towards machine driven services
- Increased capacity to pigeon hole individuals into clusters
- Increased response to complex nature of care
- Move towards person driven services
- Increased emphasis on the uniqueness of individuals

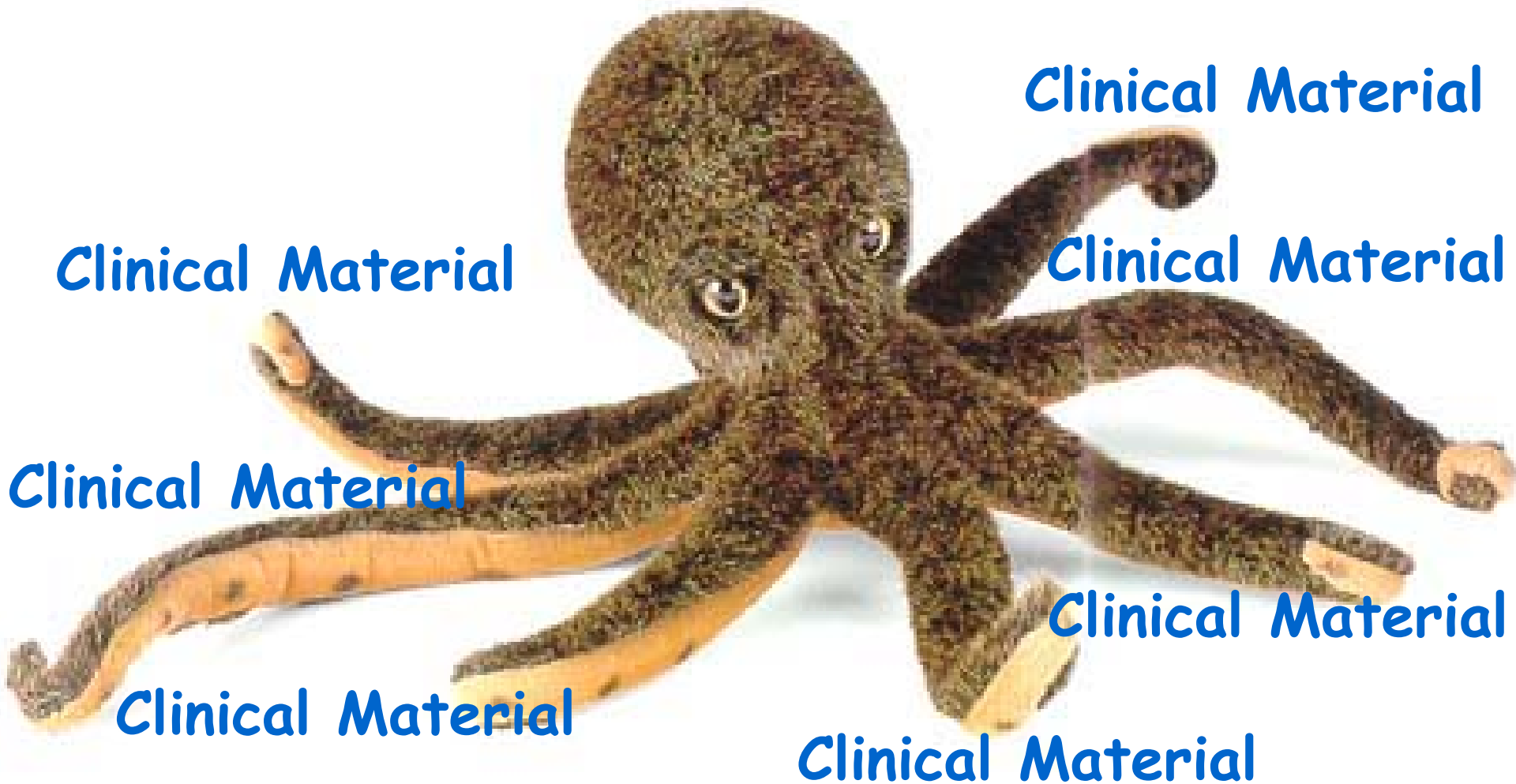


The Current Vector of Care





The Octopus Hospital



Clinical Material

Clinical Material

Clinical Material

Clinical Material

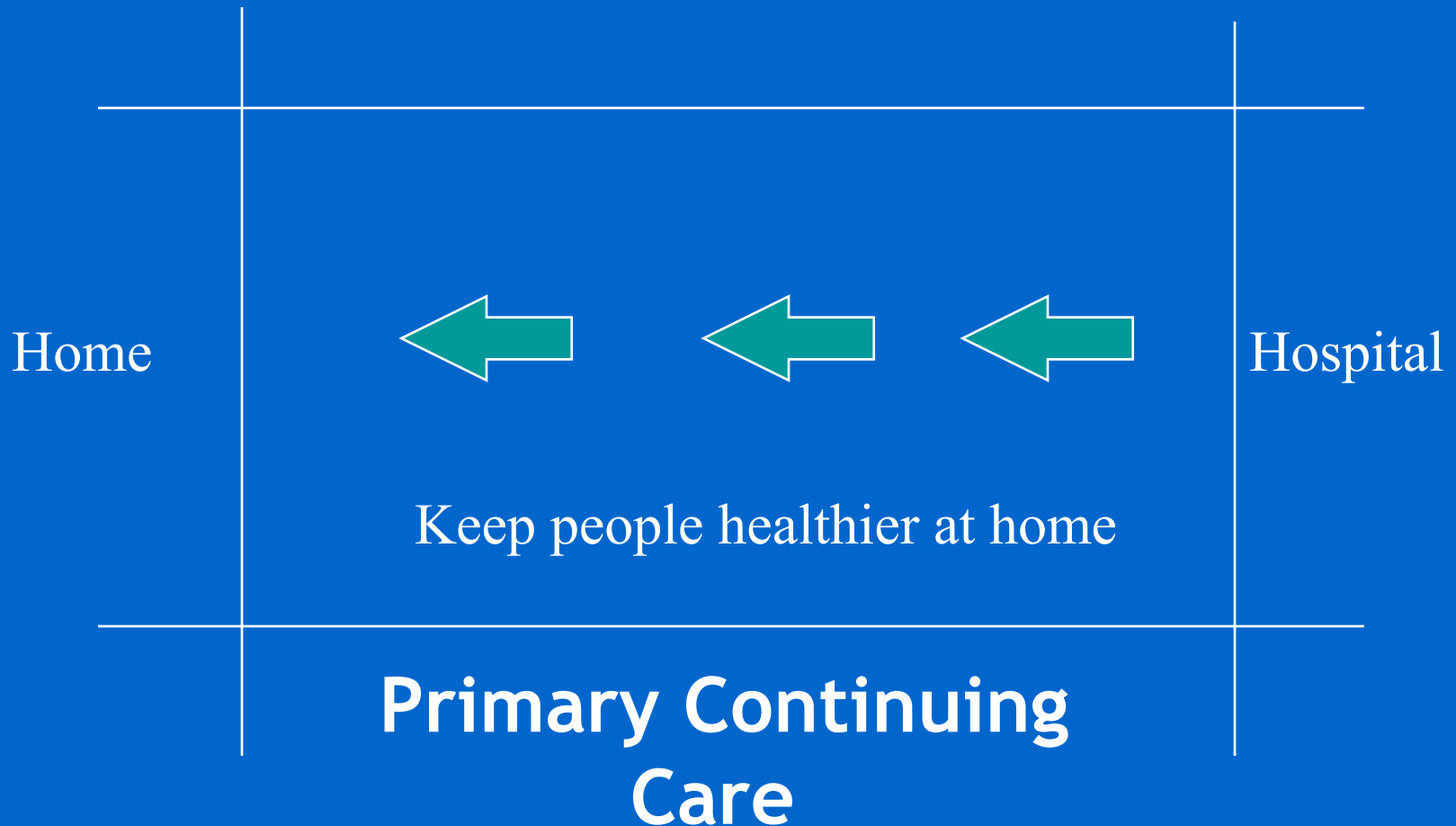
Clinical Material

Clinical Material

Clinical Material



Another Vector of Care





The Future of Primary Care

- Learning to bear and share the uncertainty
- Rebalancing the equation between the two camps
 - Using technology appropriately
 - Maintaining human relationships
- Finding a new metaphor for the future