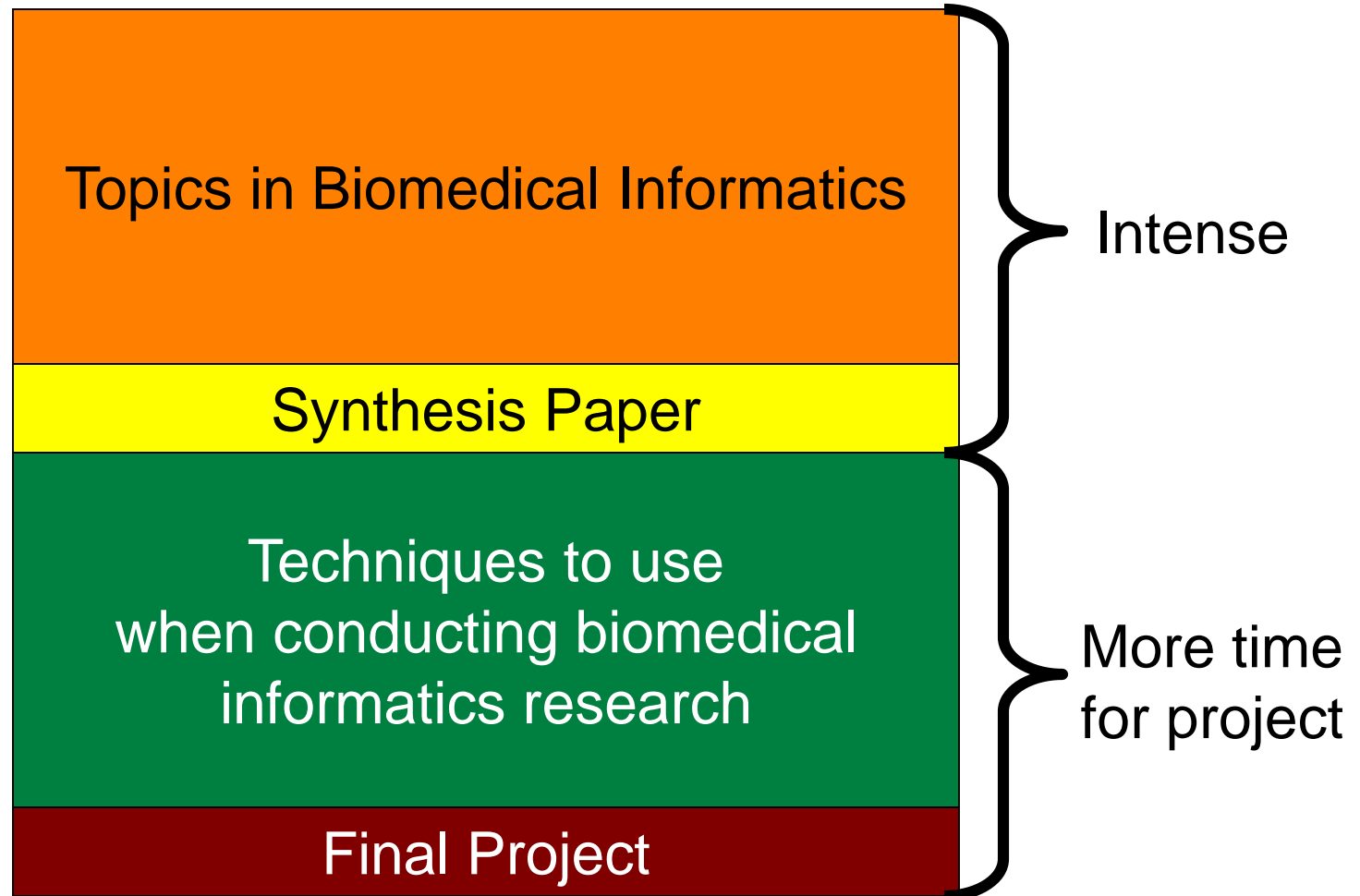


Introduction to Biomedical Informatics

Who is this class for?

- People interested in biomedical informatics or interdisciplinary research
- People interested in gaining research skills
- People interested in user interface design, human computer interaction, ubiquitous computing
- There will be *a lot* of reading
- There will be *a lot* of group collaboration
 - There will be *some* programming within groups

What are we going to do in this class?



Class Goals

1. To develop the skills and practices necessary to collaborate with medical researchers and create assistive and performance support applications.
2. To develop practical research oriented skills for interdisciplinary (or transdisciplinary) research.
3. To provide an overview of ongoing and emerging research topics in biomedical informatics.

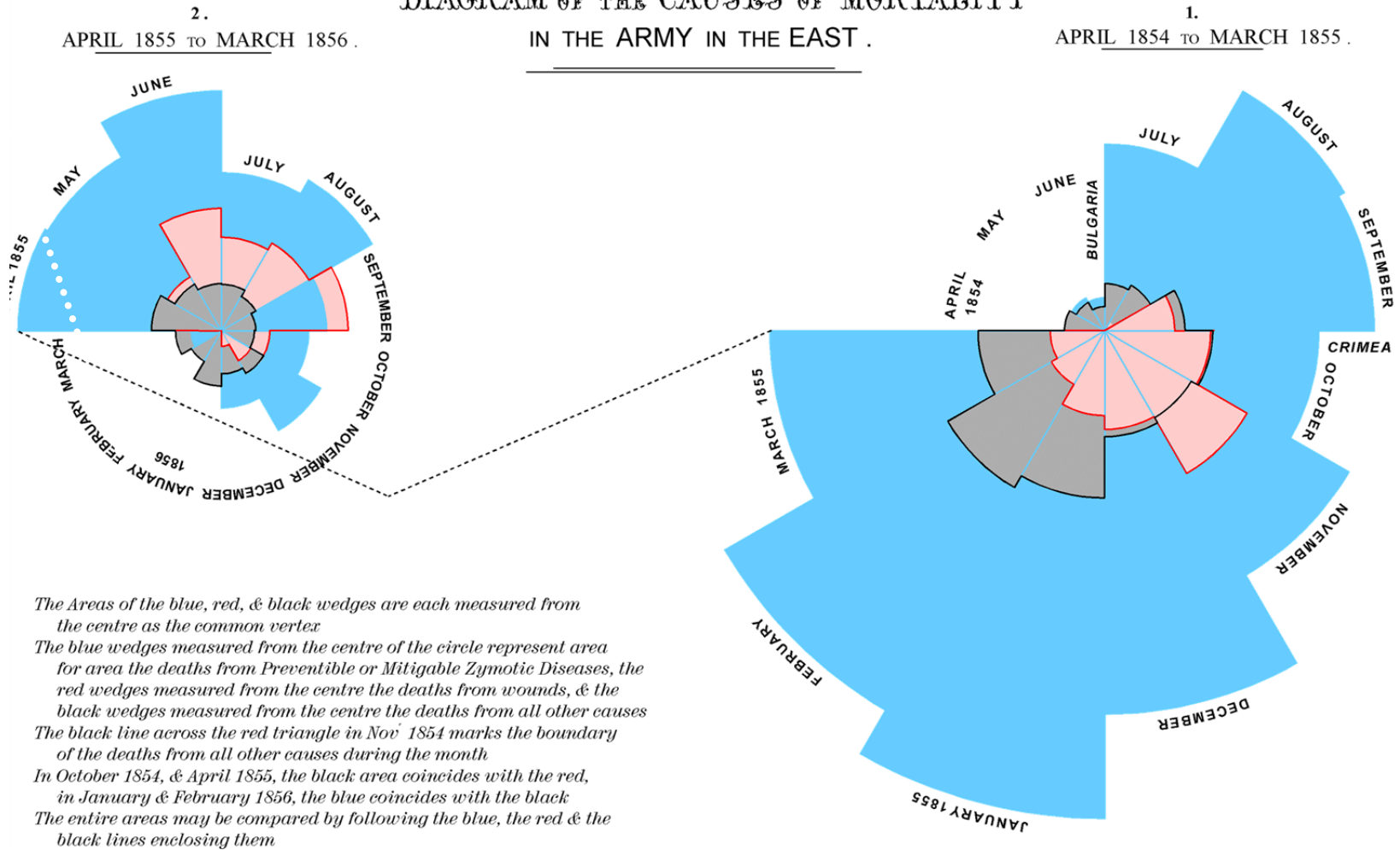
A definition

“The field that is concerned with the **optimal use of information**, often **aided by the use of technology and people** (researchers, practitioners, users, etc.), to improve individual health, health care, public health, and biomedical research”

- *Hersh, 2010*



DIAGRAM OF THE CAUSES OF MORTALITY IN THE ARMY IN THE EAST.



Standard idea of biomedical informatics

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Accepting answers



jlahfiloj

What causes the urge to constantly raise one's eyebrows?

I dont know why, but I constantly feel the urge to raise my eyebrows (have gotten lines on my forehead lately from it) , not like it is involuntary, it just feel like an urge to relieve muscle tension. Is it eyestrain from computer maybe or something maybe more serious?

anybody know about this problem with themselves or other people?

39 minutes ago - 3 days left to answer. - 5 answers - [Report Abuse](#)

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Answers

Show: [Total rating higher than -5](#)



freshblis...

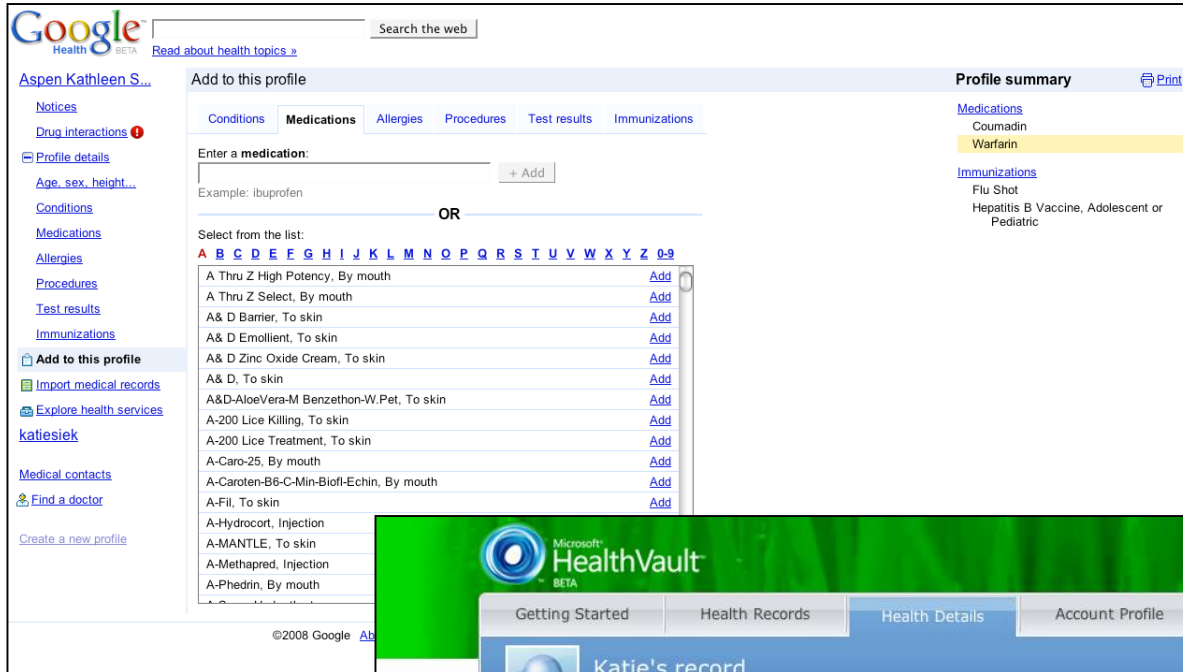
You might need glasses, you might have stress in the back of your neck or tension in shoulders. You might want to try a massage - it cant hurt - and it'll feel good even if it doesnt help.

(Stress in those areas could cause the big muscle that cover the top of your head to contract - its the cause of tension headaches when its acute - perhaps chronically at a lower level it could cause this....I'll admit I'm making a guess here.)

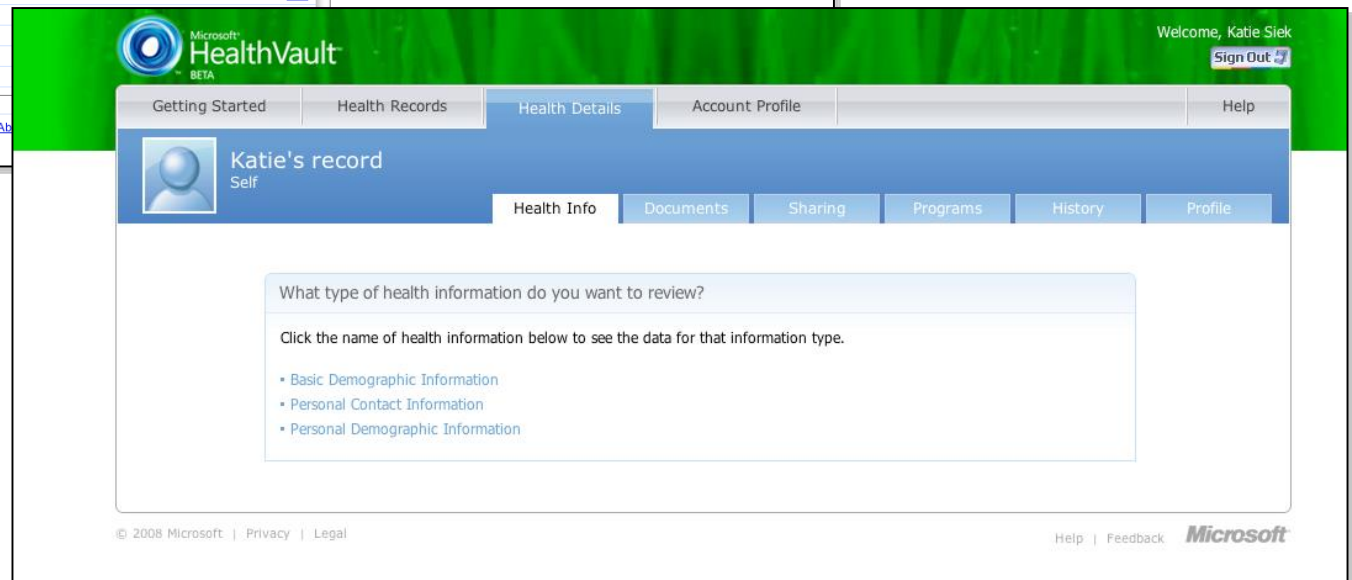
Then, there is a possibility that for you its a physical habit - in the same way that some people adapt "slouching" as a physical habit.

Good Luck

Different Idea, Same Medium

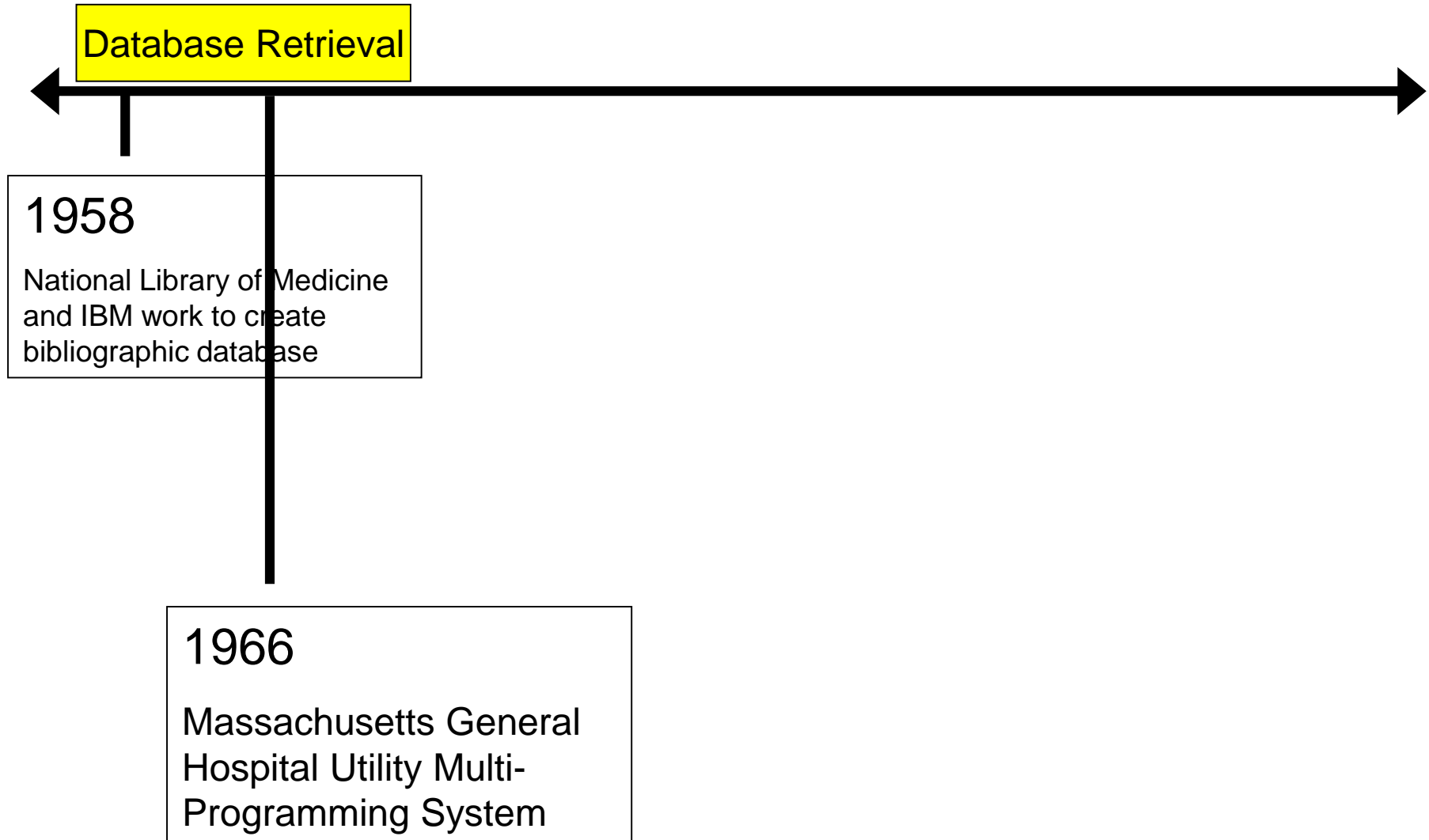


This screenshot shows the Google Health user interface. At the top, there is a Google logo with 'Health BETA' and a search bar. Below the logo, a sidebar on the left contains navigation links: 'Aspen Kathleen S...', 'Notices', 'Drug interactions', 'Profile details', 'Age, sex, height...', 'Conditions', 'Medications', 'Allergies', 'Procedures', 'Test results', 'Immunizations', 'Add to this profile', 'Import medical records', 'Explore health services', 'katiesiek', 'Medical contacts', 'Find a doctor', and 'Create a new profile'. The main content area is titled 'Add to this profile' and features tabs for 'Conditions', 'Medications', 'Allergies', 'Procedures', 'Test results', and 'Immunizations'. The 'Medications' tab is active, showing a form to 'Enter a medication' with an example 'ibuprofen' and a '+ Add' button. Below this is a list of medications to choose from, each with an 'Add' link. To the right, a 'Profile summary' section shows 'Medications' (Coumadin, Warfarin) and 'Immunizations' (Flu Shot, Hepatitis B Vaccine, Adolescent or Pediatric).

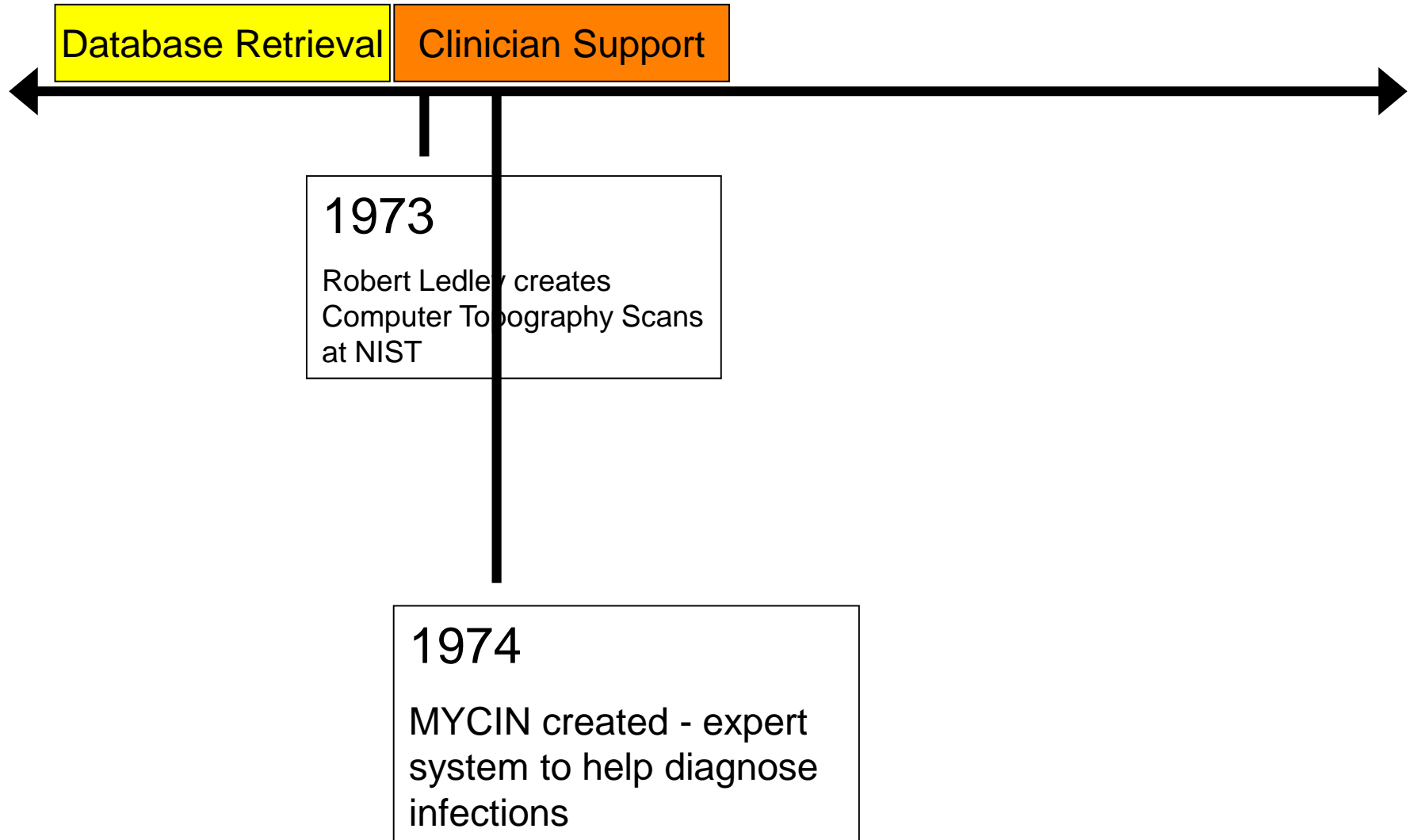


This screenshot shows the Microsoft HealthVault user interface. At the top, there is a Microsoft HealthVault logo with 'BETA' and a green background. Below the logo, a navigation bar contains links: 'Getting Started', 'Health Records', 'Health Details', 'Account Profile', and 'Help'. The 'Health Details' tab is active, showing 'Katie's record Self'. Below this, a 'Health Info' section contains a list of health information types: 'Basic Demographic Information', 'Personal Contact Information', and 'Personal Demographic Information'. The footer includes copyright information for Microsoft and links for 'Help', 'Feedback', and 'Microsoft'.

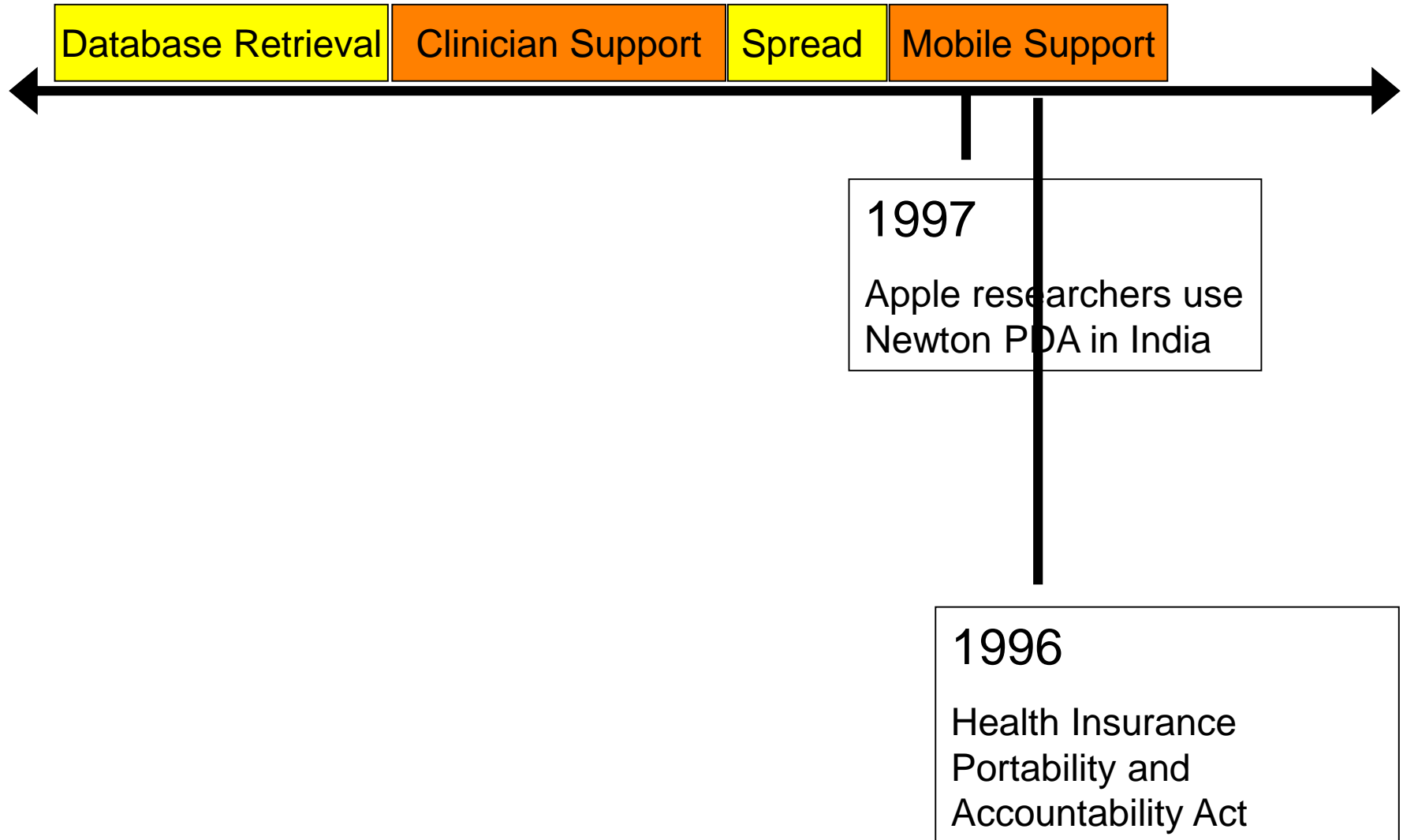
Key piece missing in the definition - *information technology*



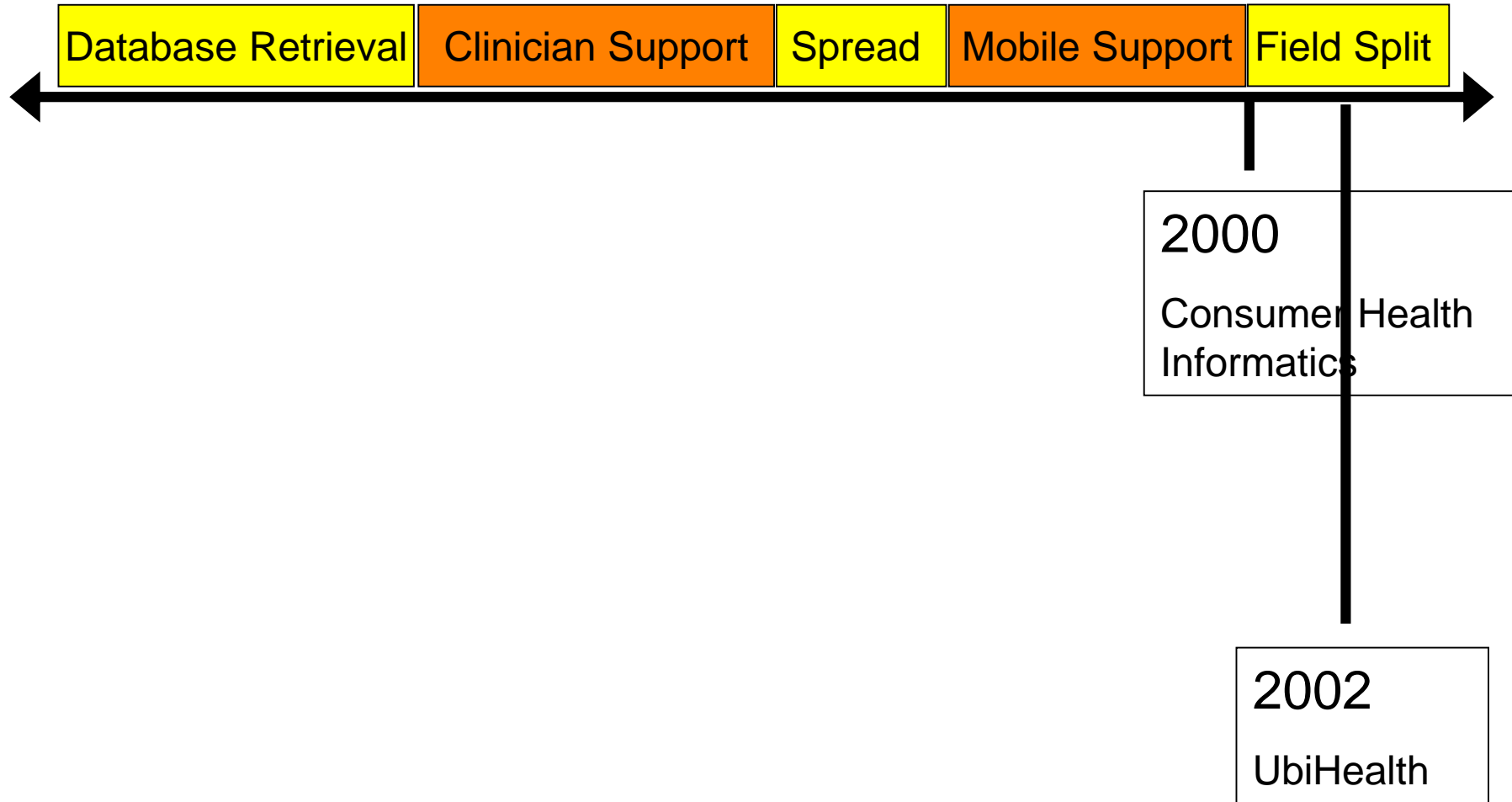
Key piece missing in the definition - *information technology*



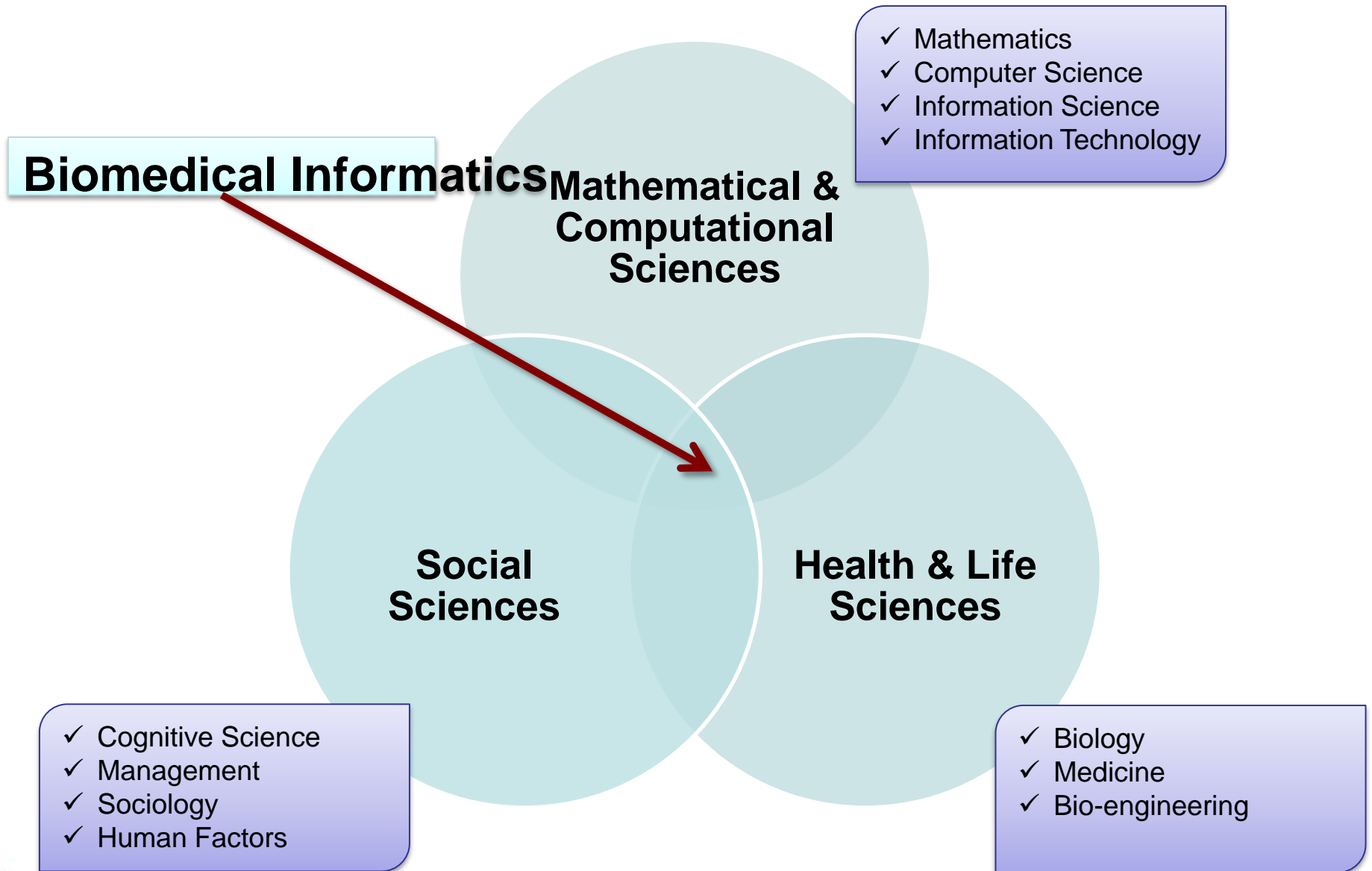
Key piece missing in the definition - *information technology*



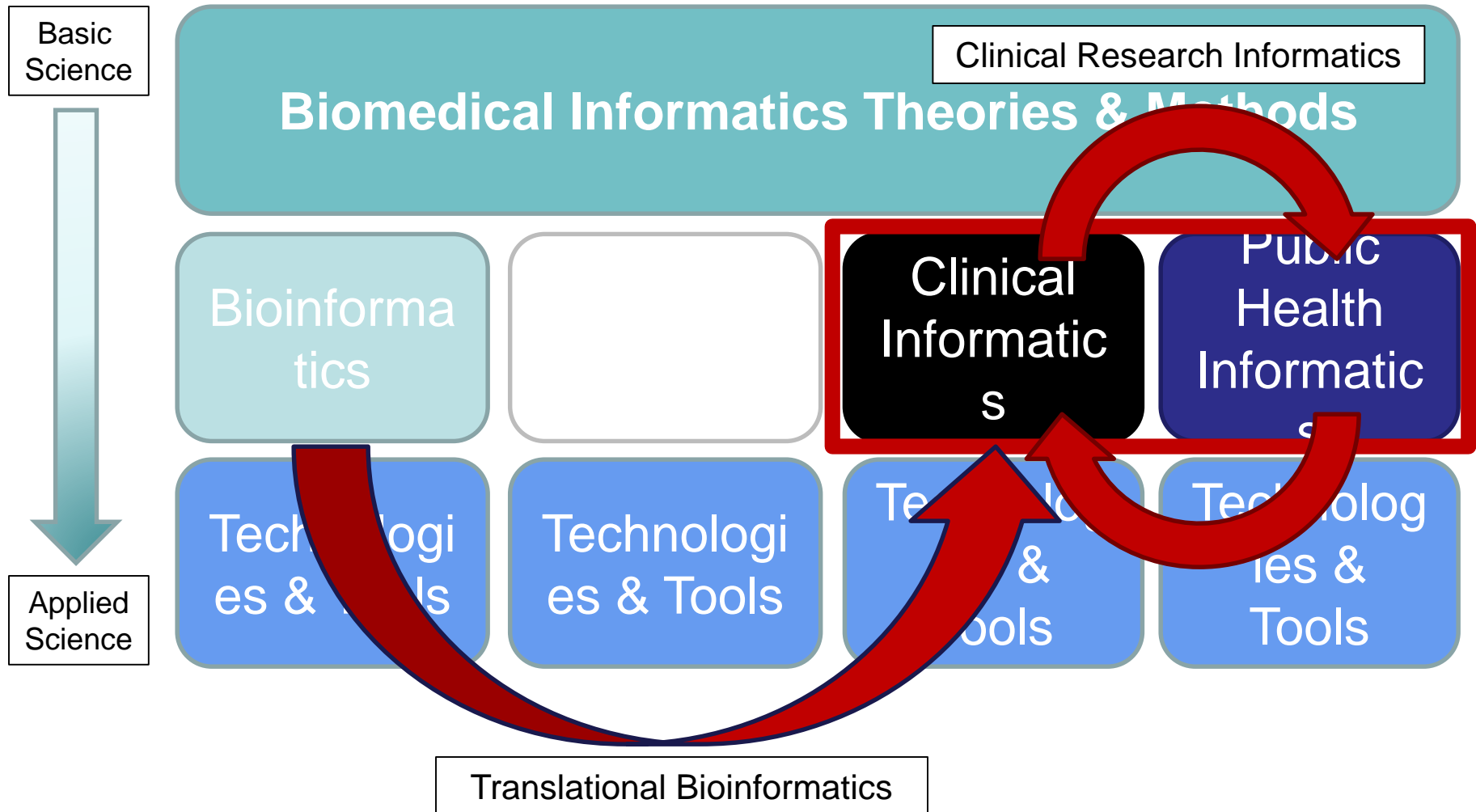
Key piece missing in the definition - *information technology*



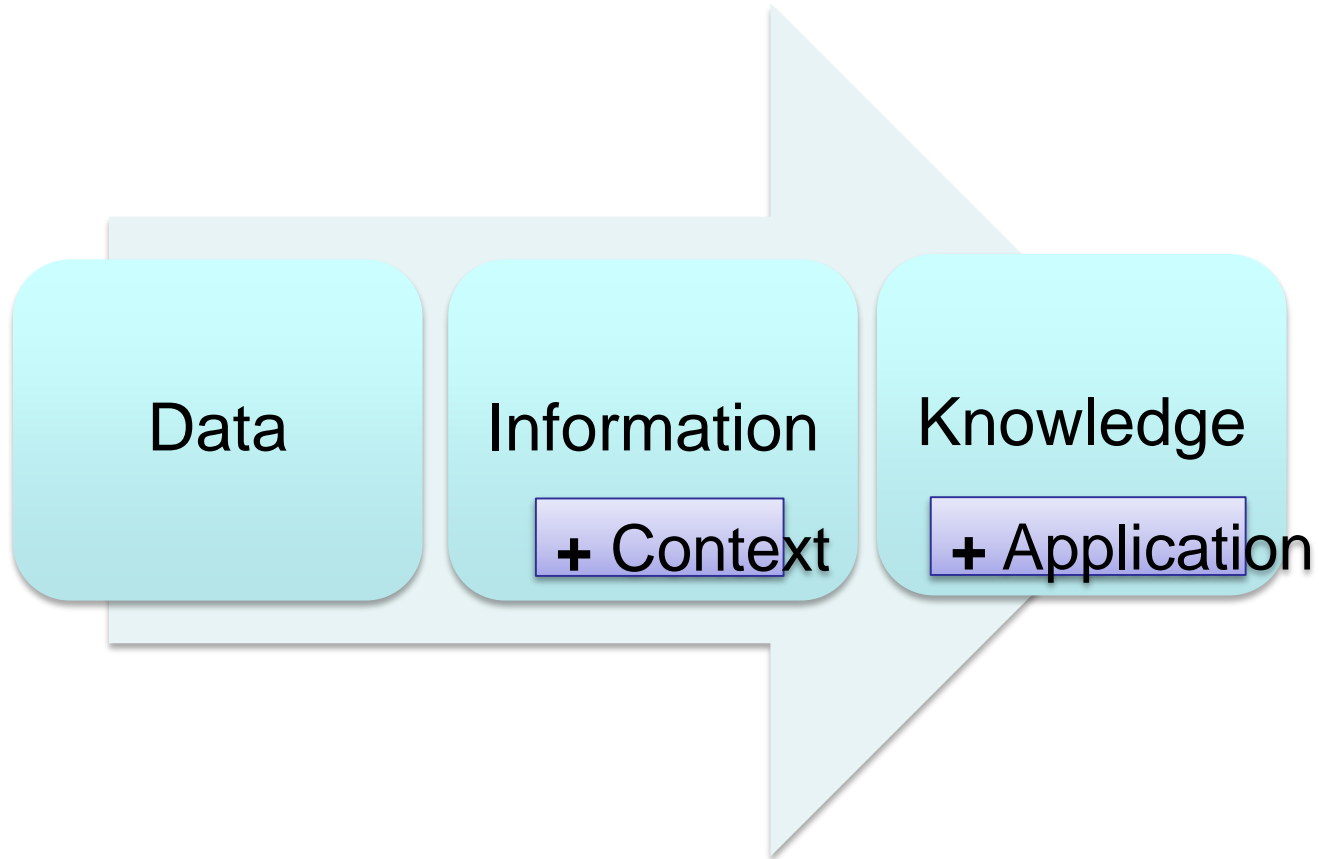
Another Way of Thinking About BMI (for visual learners)



Combining Basic and Applied Science Across Domains

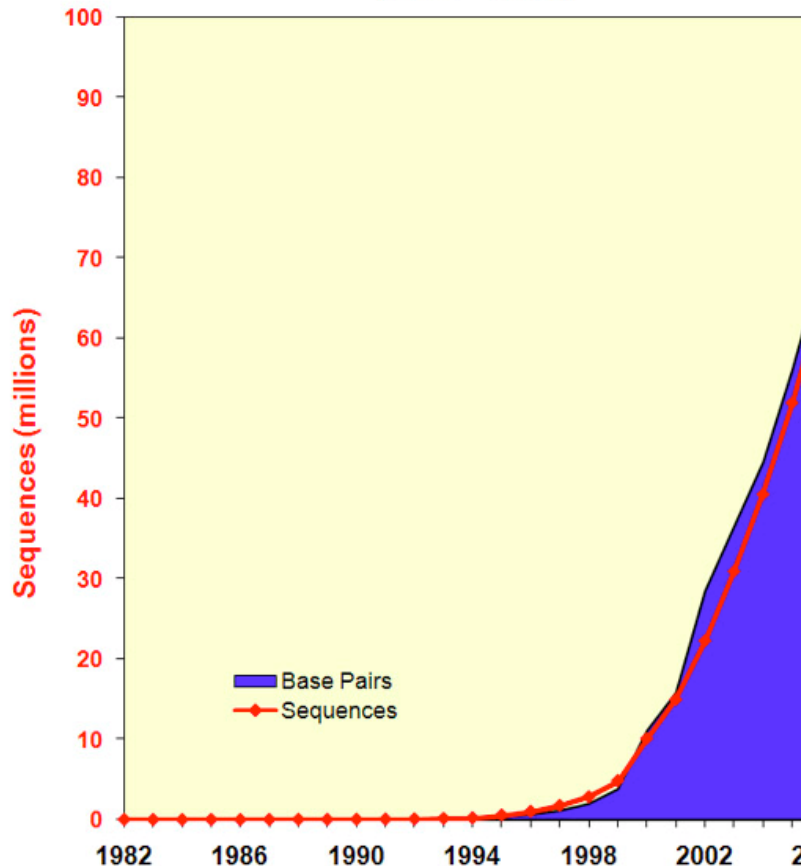


The Central Dogma of BMI



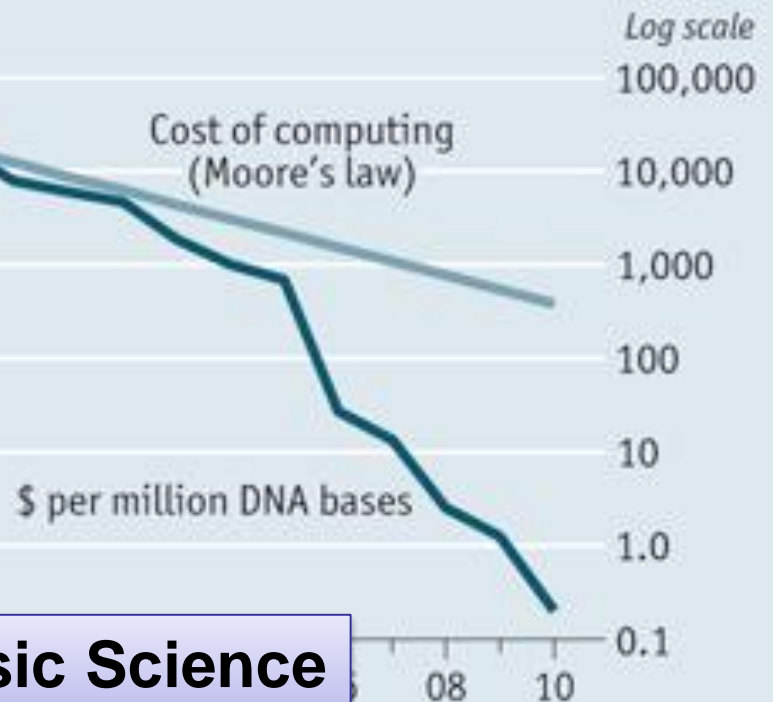
Data Tsunami Facing the Life Sciences

Growth of GenBank
(1982 - 2008)



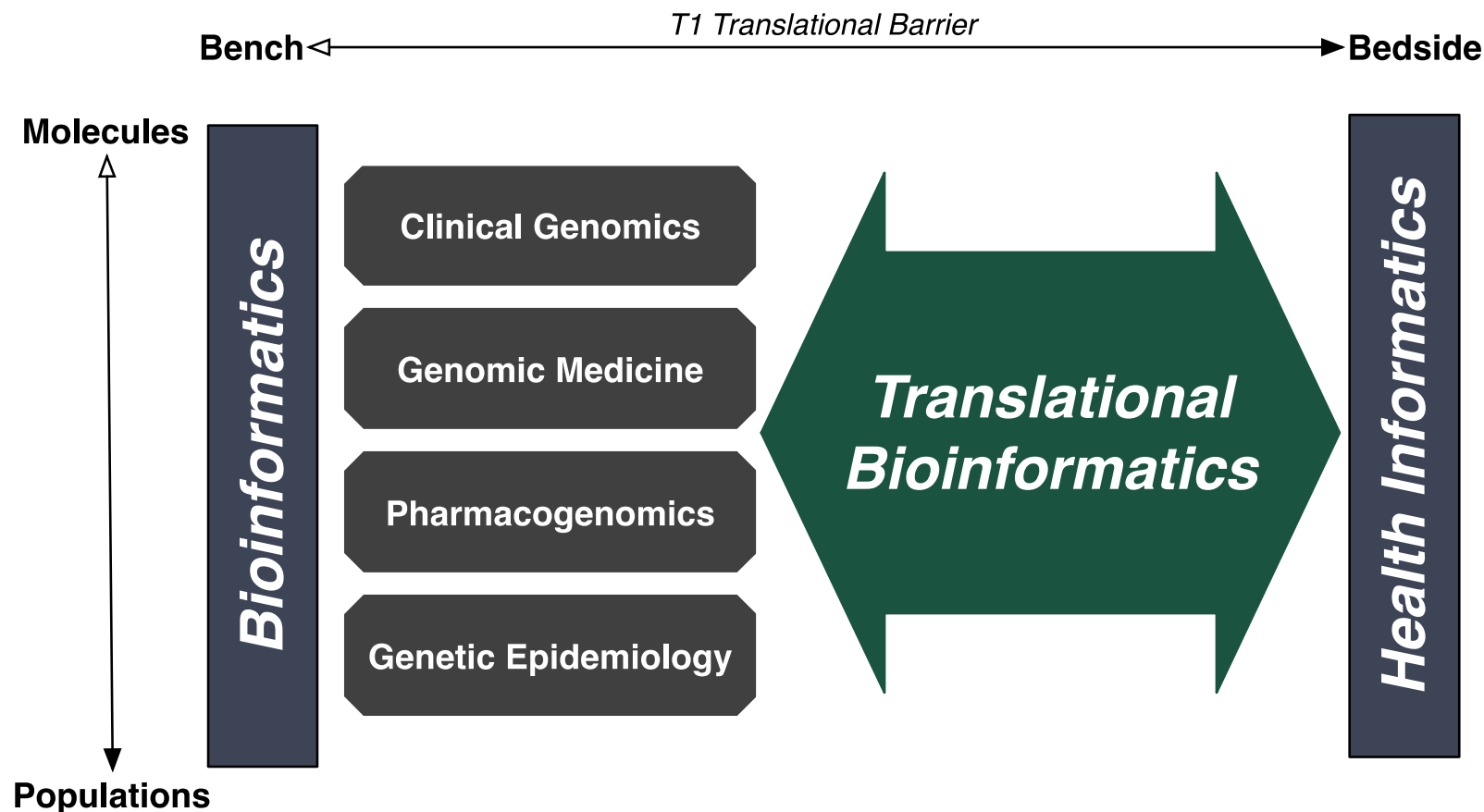
Baseline information

Cost of genome sequencing compared with Moore's law for computers



How Do We Make These Basic Science
Innovations Relevant To The Clinical
Domain?

A BMI Solution to the Data Tsunami: Linking Molecules and Populations

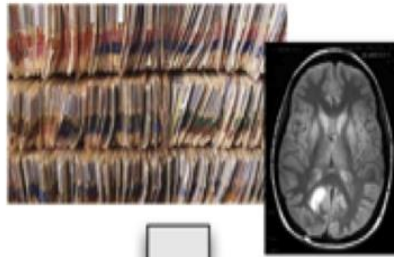


Sarkar IN, Butte AJ, Lussier YA, Tarczy-Hornoch P, Ohno-Machado L. "Translational Bioinformatics: Linking Knowledge Across Biological and Clinical Realms" *Journal of the American Medical Informatics Association*. 2011. Jul-Aug;18(4):354-7.

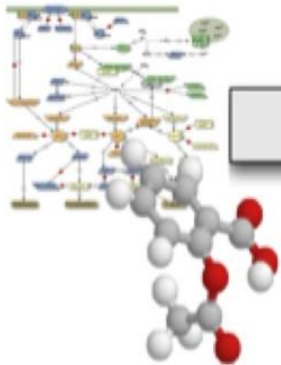
A Formal Definition for Translational Bioinformatics (TBI)

The development of storage, analytic, and interpretive methods to optimize the transformation of increasingly voluminous biomedical data into proactive, predictive, preventative, and participatory health. (Source: JAMIA)

Individual and/or Population Phenotype



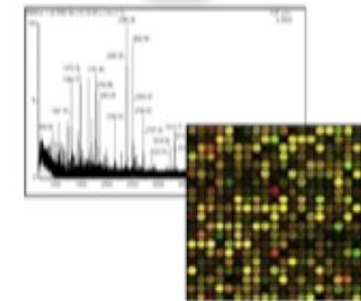
Biological Models and Technologies



Domain Knowledge

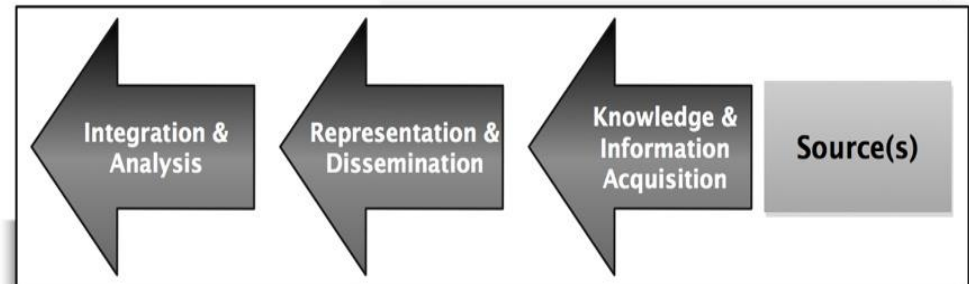


Translational
Biomedical
Knowledge

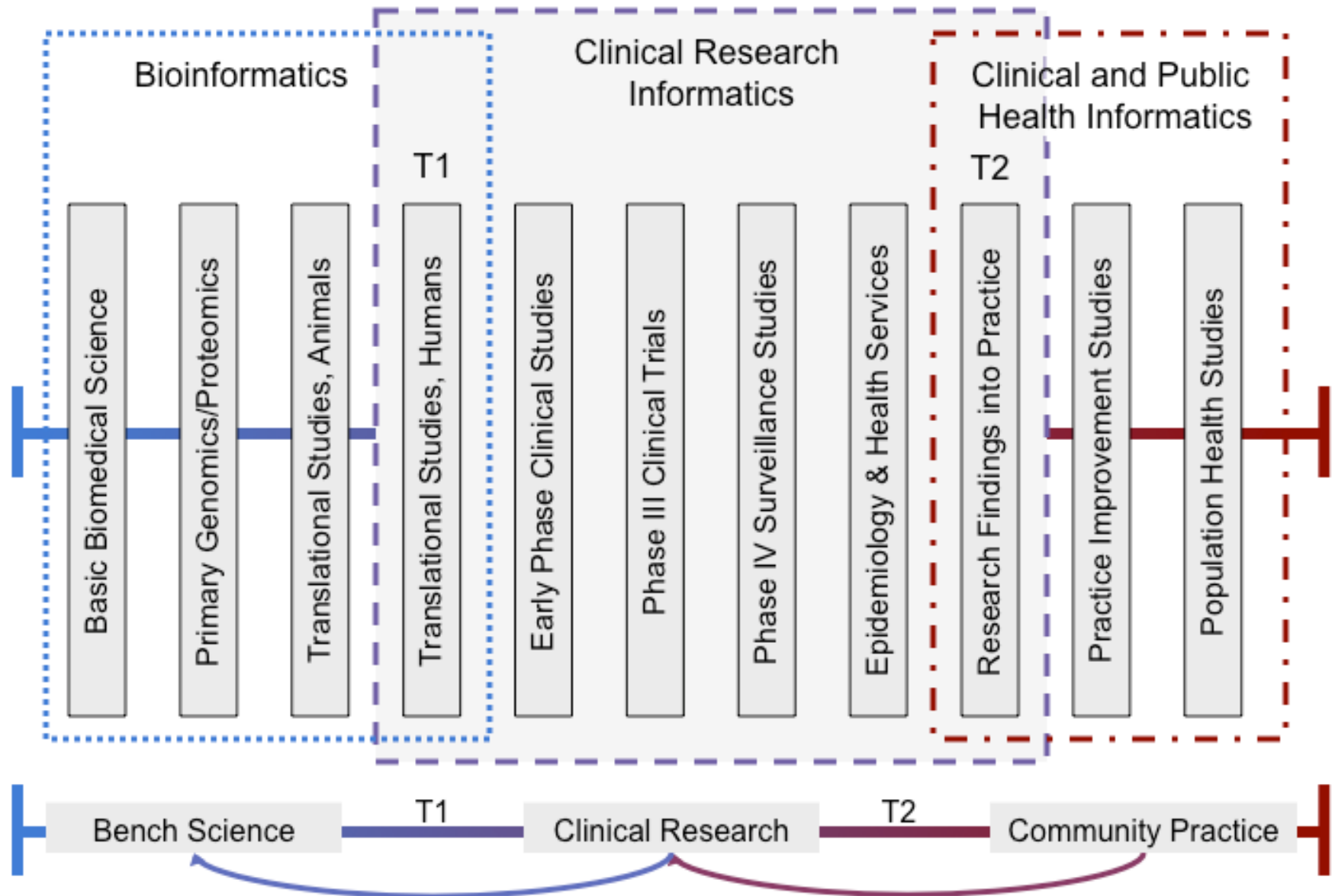


Individual and/or Population
Bio-markers

Knowledge & Information Translation



The Bigger Context: The Translational Spectrum



The Basics: Realizing a Learning Healthcare System is Hard!

