

# Causation in Medicine

## **Conference on Conceptual Revolutions: From Cognitive Sciences to Medicine**

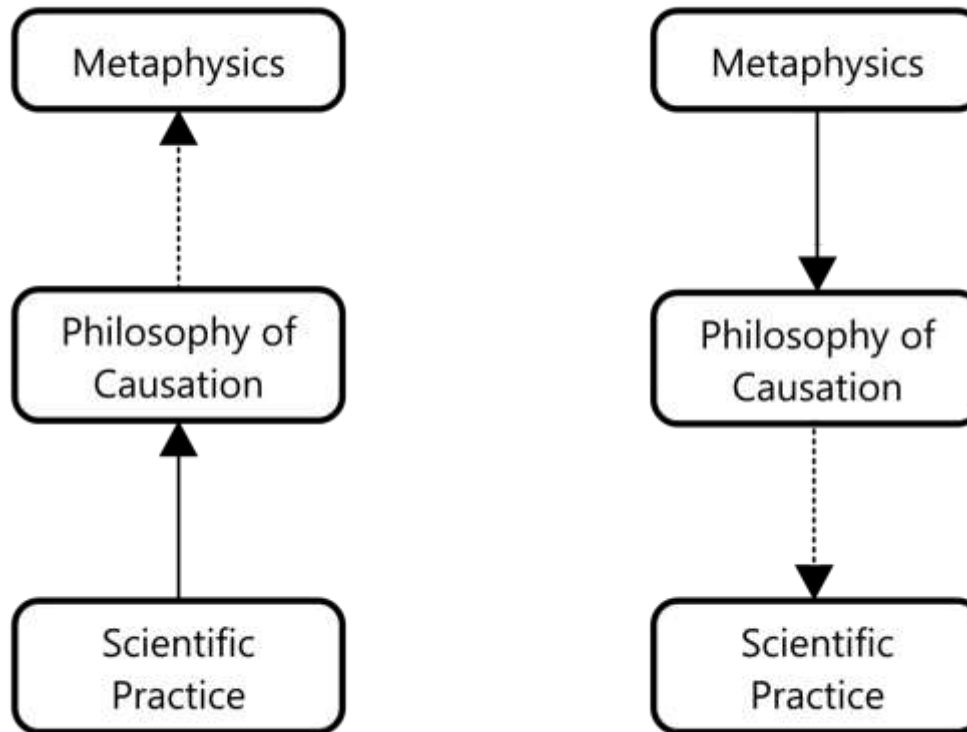
March 2009

Brendan Clarke

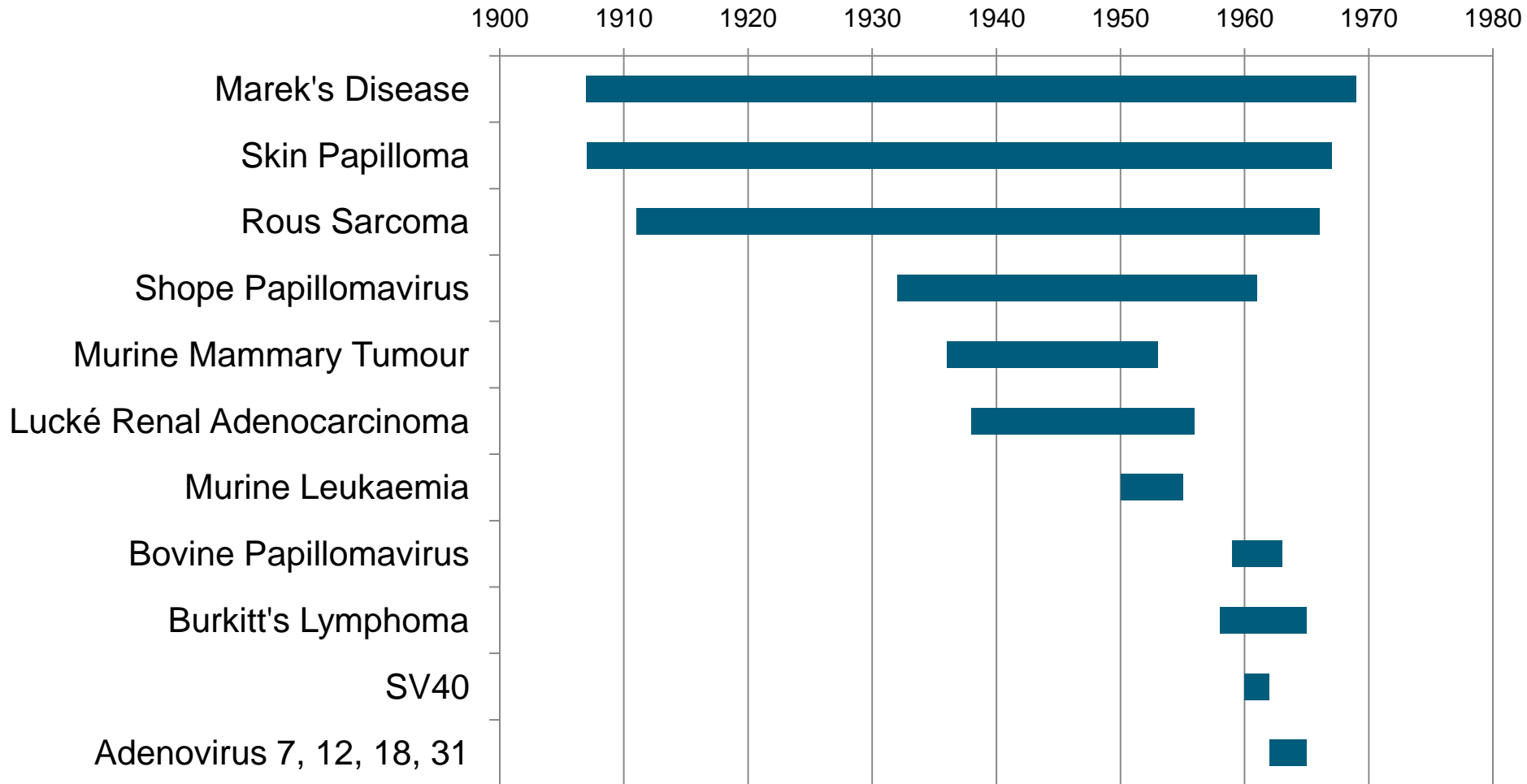
Department of Science and Technology Studies

UCL

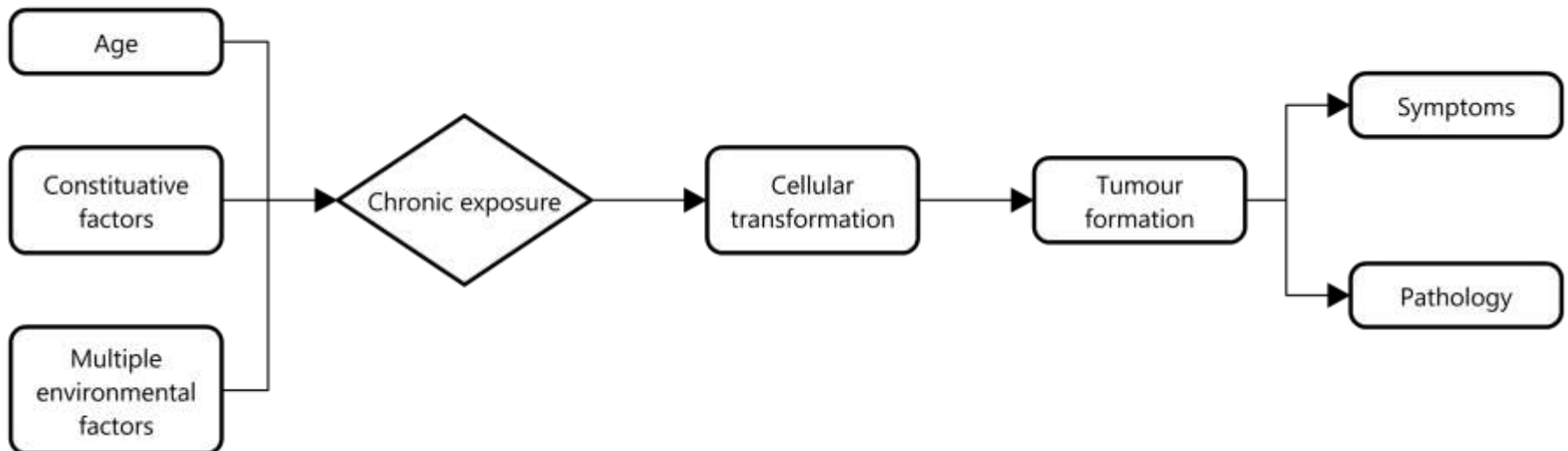
# Two approaches to causation



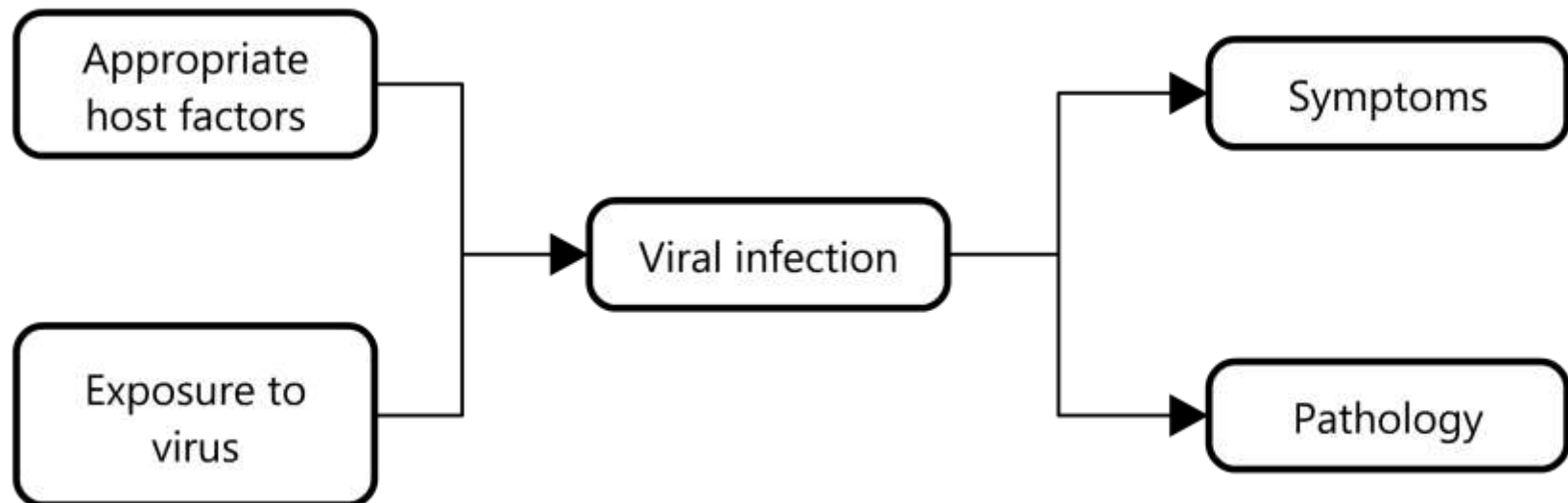
# Milestones: Viral oncogenesis



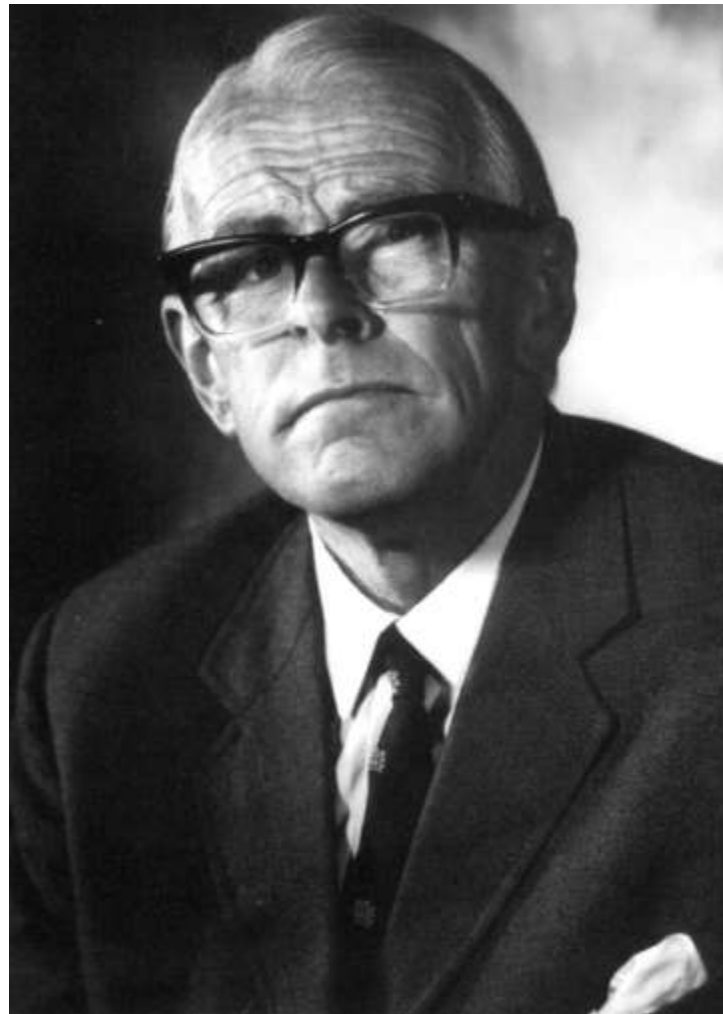
# Mechanism schema for cancer causation



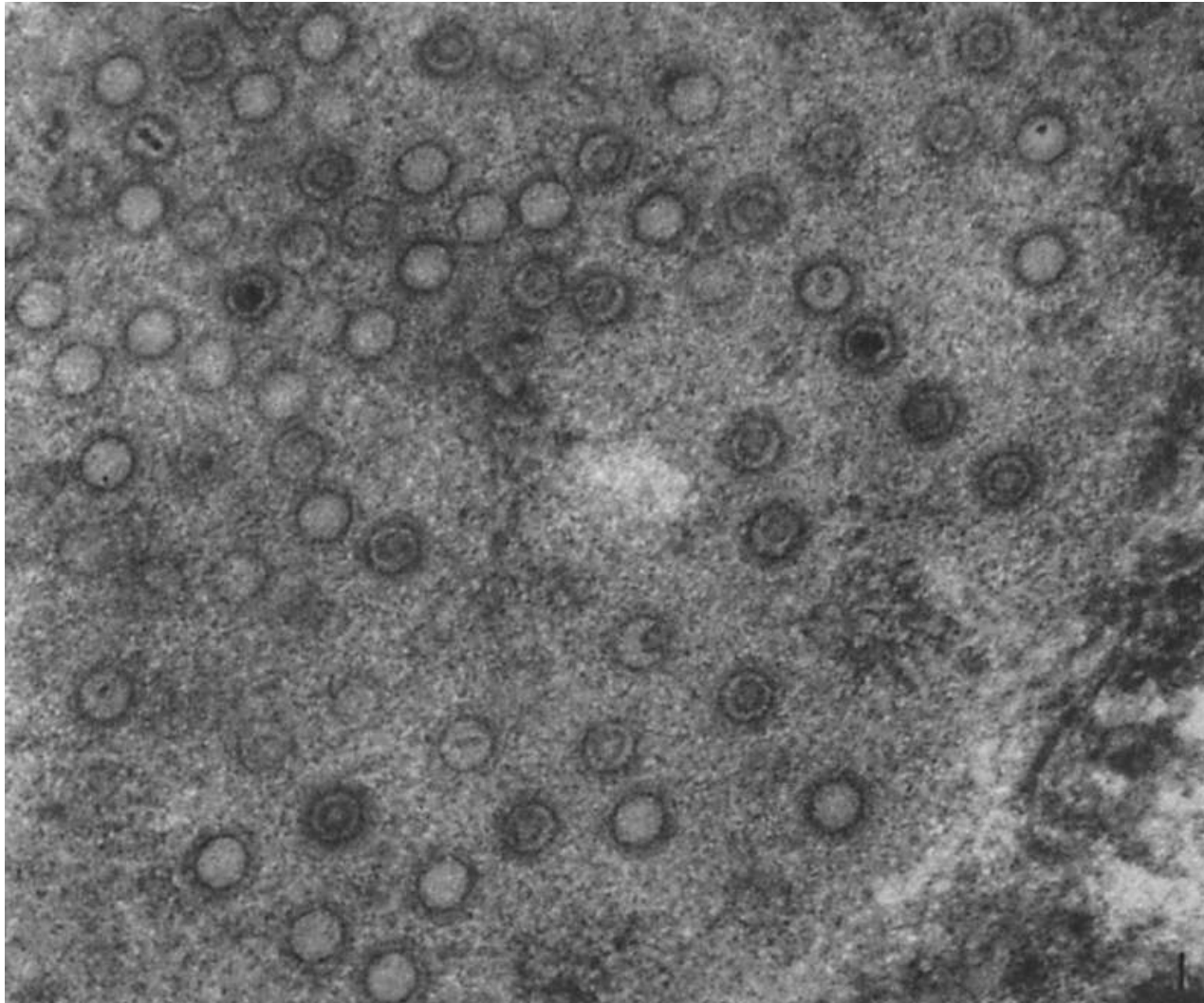
# Mechanism schema for viral infections



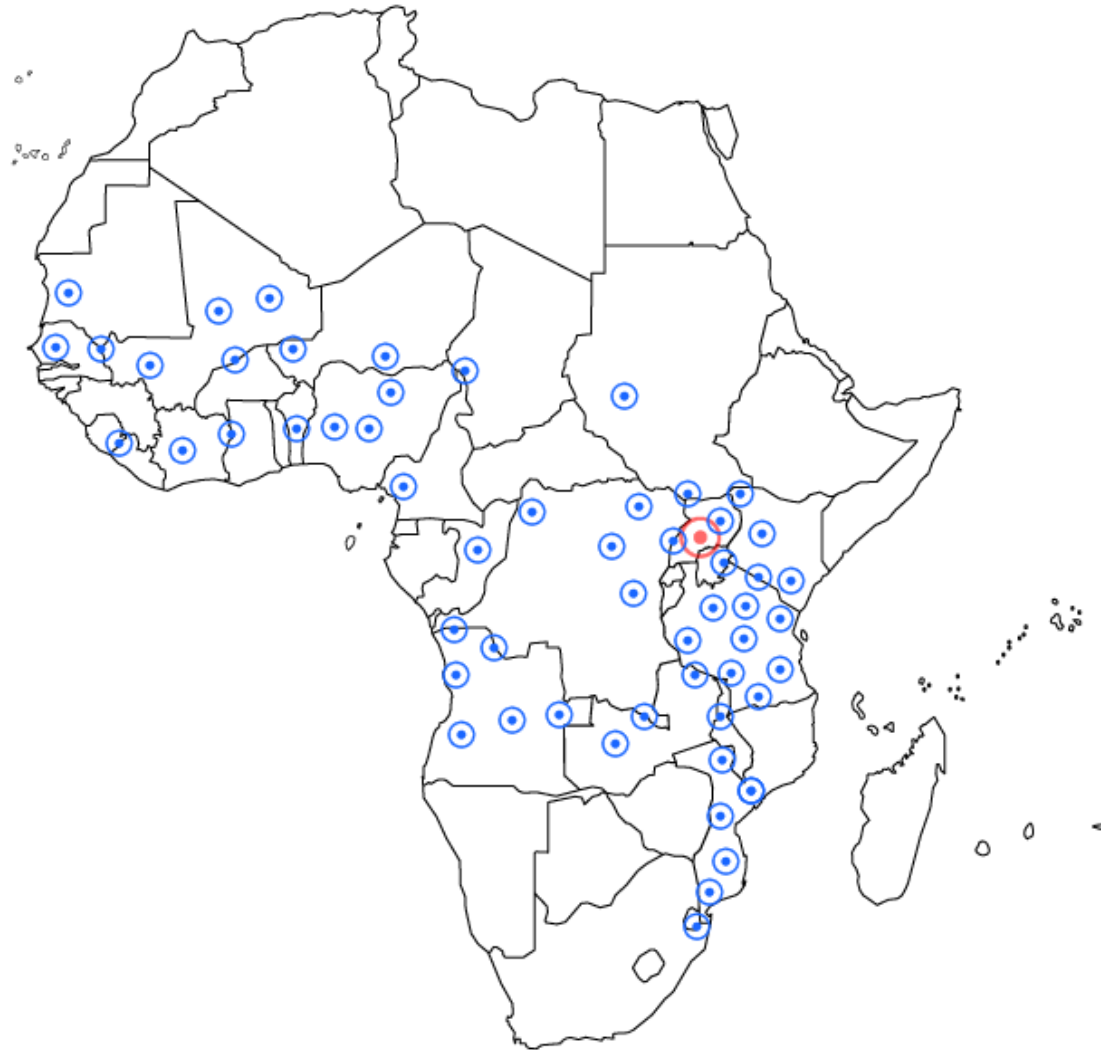
# Burkitt's lymphoma



# Burkitt's lymphoma and Epstein-Barr virus



# Burkitt's lymphoma distribution





# Burkitt's lymphoma



# Cervical cancer risk factors

[Elliott, 1964]

- **Risk factors**

- Low socioeconomic status
- Marriage
- Sexual intercourse with multiple sexual partners
- Employment as prostitutes
- Infection with syphilis

- **Protective factors**

- Jewish or Muslim faith
- Sexual abstinence
- Circumcision of male partner
- Cleanliness of male partner
- Use of barrier contraception

# Evidence for herpes simplex virus as cause of cervical cancer

[Alexander, 1973: 1486]

1. HSV is a commensal organism
2. HSV is transmitted venerally
3. HSV is compatible with known risk factors, including:
  1. First coitus at early age
  2. Multiple sexual partners or promiscuity
  3. Low socioeconomic status
4. Herpes viruses are implicated in similar disease states
5. HSV is recoverable from some tumour cells

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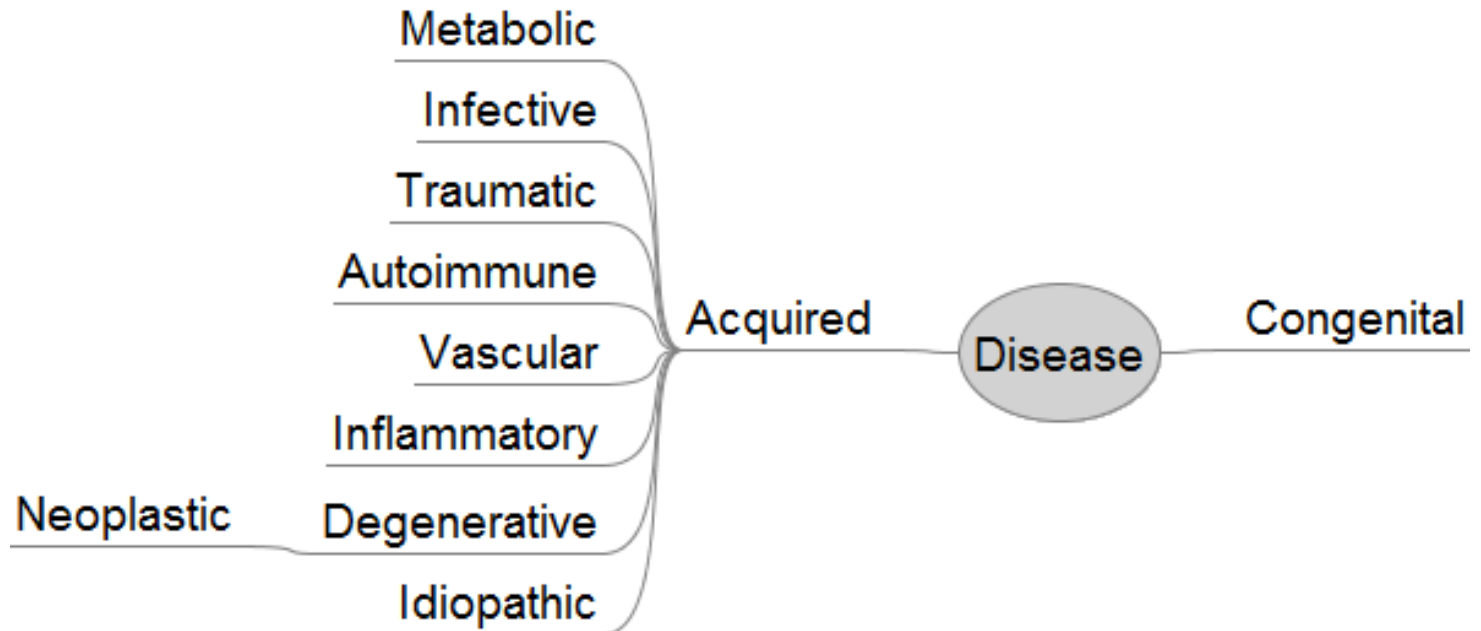
- Development of a conjoint research programme
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- Integration of laboratory and epidemiological investigation
- Recursive process:
  - laboratory work guides epidemiology
  - epidemiology guides laboratory work



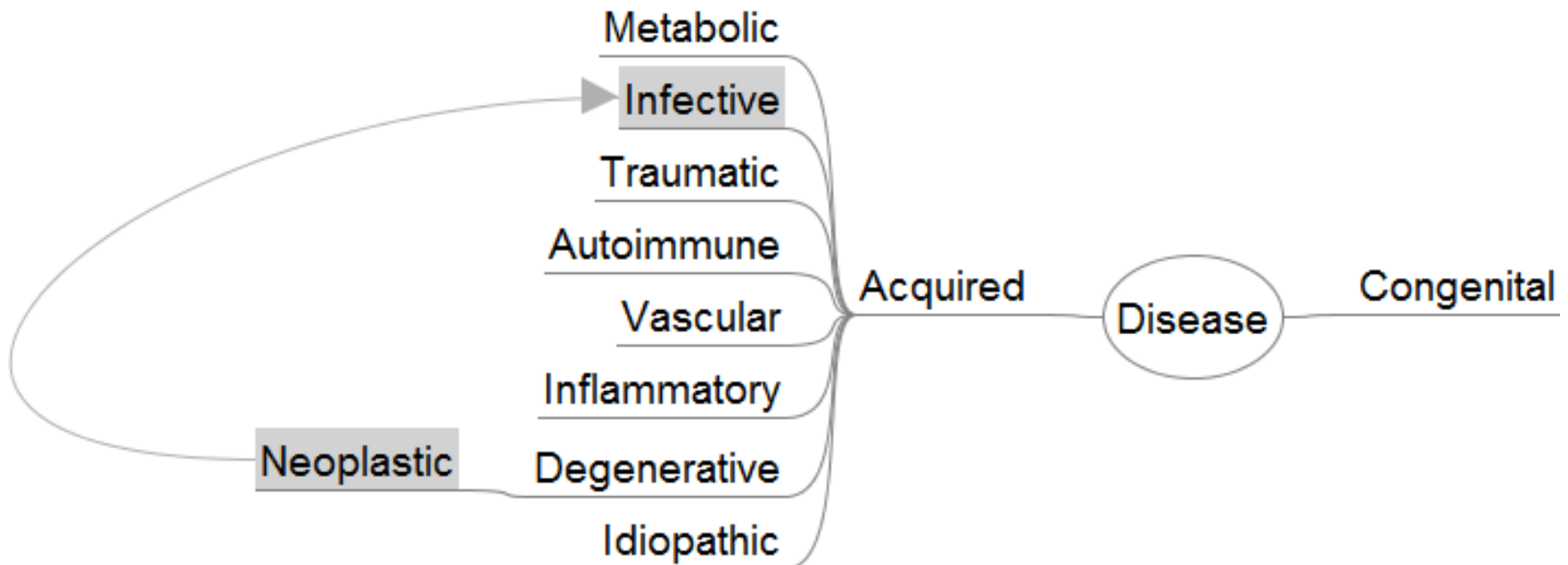
## Getting to causation...

- Development of a conjoint research programme
- Trigger: search for a specific aetiology and consequent interpretive framework
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  - epidemiology guides laboratory work
- Production of interdependent mechanistic and statistical evidence
  - Russo and Williamson [2007]

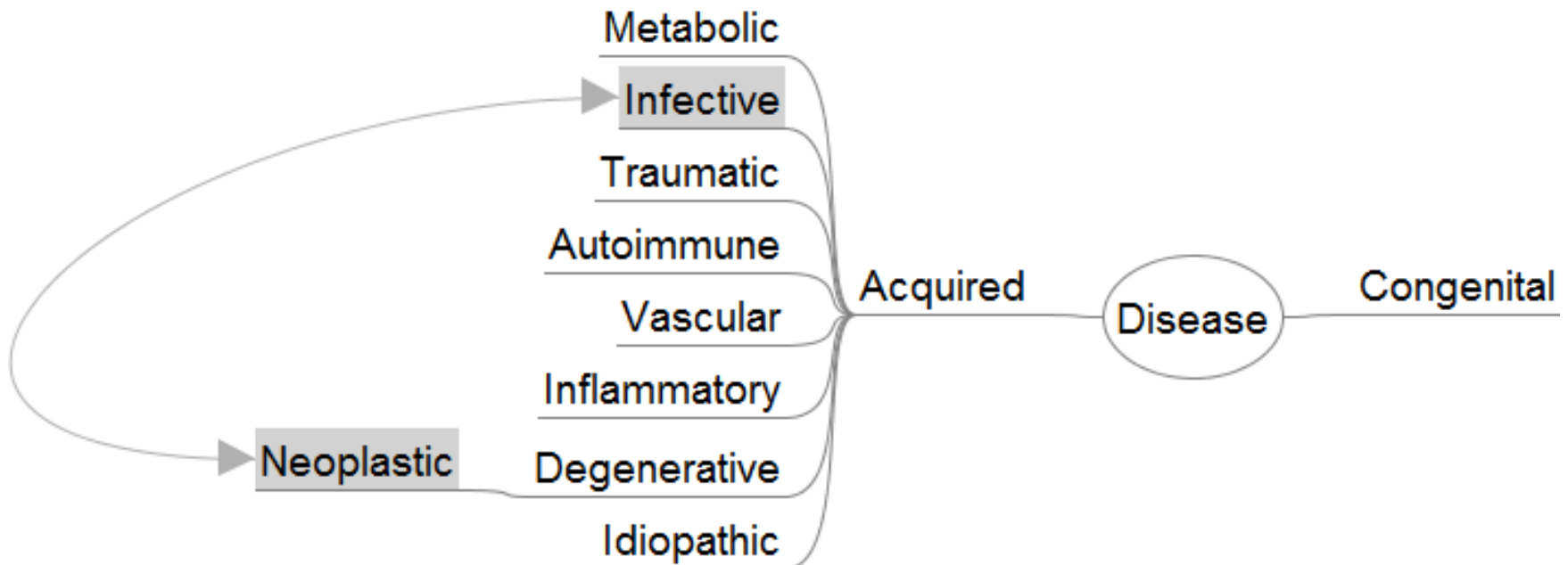
# Branch-jumping and causation



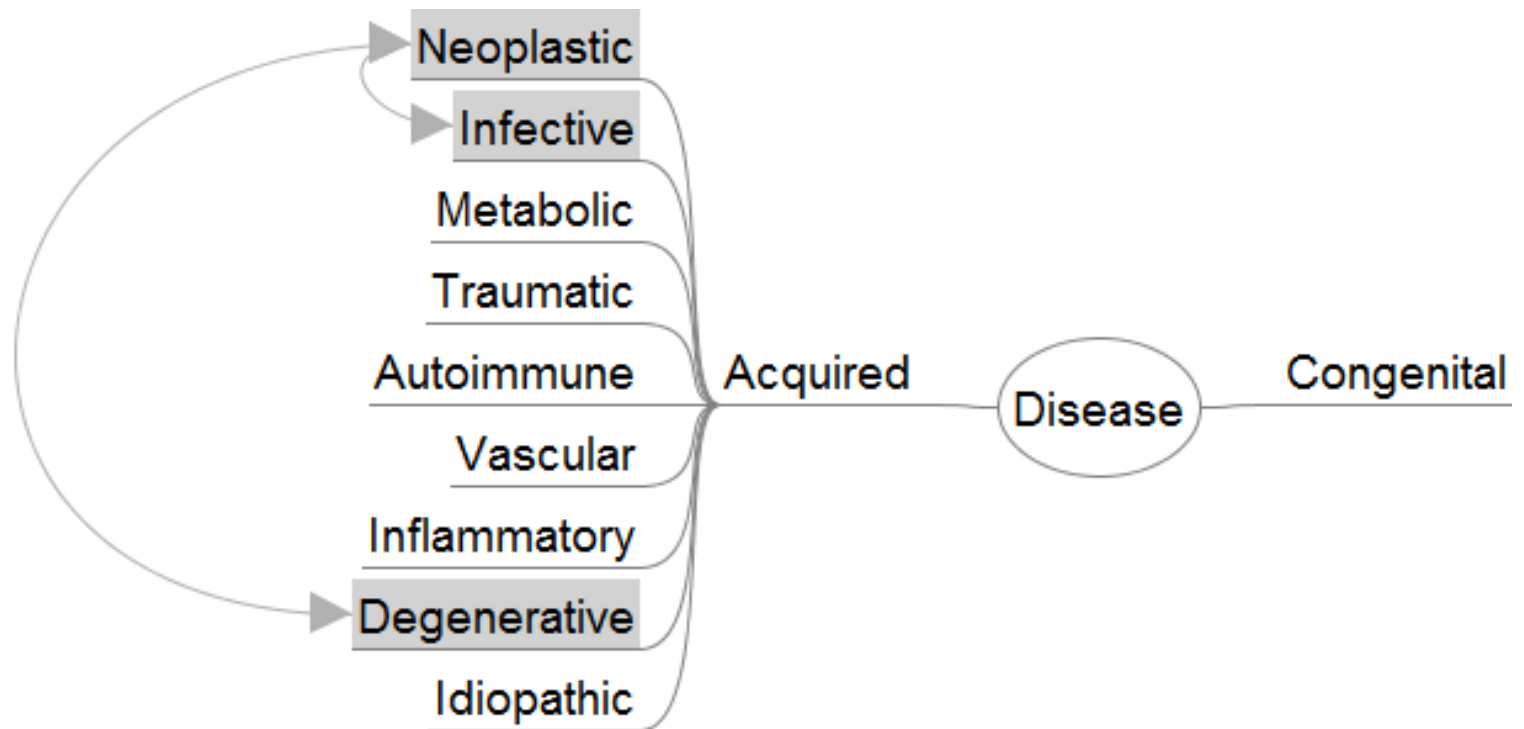
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# Branch-jumping and causation



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