Economic evaluations of next-generation precision oncology: a critical review

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Disclosures of Interest

• The authors have no actual or potential conflicts of interest in relation to this topic or presentation.
Background

• Precision oncology

• Next-generation sequencing (NGS)

• Sustainability

• Study aims: explore availability and scope of economic evaluations
Methods

Search terms related to:
- economics, genomics, and oncology

Databases:
- Medline (PubMed)
- Embase (Ovid)
- Web of Science

Study period: 2000 - 2016
Flow Chart

Databases: 1,350

779 after duplicates

541 screened

95 full-text articles assessed

55 included in qualitative synthesis

Other sources: 6

238 – conference abstracts

446 – not NGS or evaluation incomplete

5 – not accessible or not in English

10 – incomplete

24 – not NGS

1 – duplicate results
Publications Over Time

Number of Articles Published

Year

Study Characteristics

• **Single cancer sites** (100%)
  – Breast cancer (55%)
  – Colorectal cancer and Lynch syndrome (15%)

• **Panel sequencing** (86%)

• **Prognosis** (67%) or **diagnosis** (25%)

• **Usual care comparator** (80%)

• **Few clinical trials** (24%)
Sensitivity Analysis

• **Deterministic SA** (91%)
  – Health outcomes, costs, Pr(treatment change)

• **Probabilistic SA** (75%)
  – 1 in 4 reported < 60% ICERs cost-effective

• Scenario or subgroup analysis (38%, 28%)

• Value of information (11%)
Study Heterogeneity

Is precision oncology cost-effective?

- Perspective
- Funding Source
- Target Population (e.g. cancer type)
- Modeling Assumptions (e.g. time horizon)
- NGS Technology
- Comparator
- Primary Strategy
Current Guidelines

• CADTH recommends:
  – Probabilistic SA
  – Value of information
  – Scenario analysis

• Our findings:
  – Deterministic SA most common
  – Reporting deficiencies
Conclusions

• We require evidence for:
  – Comprehensive NGS
  – Identifying targeted treatments
  – Multiple tumor sites

• Sustainable implementation requires that all evidence be based on:
  – Policy-relevant assumptions
  – Extensive SA
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