Practical cost-benefit considerations in developing countries

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Disclosures

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  - Advanced Bionics Corporation
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Objectives

- Principles and examples of Cost-Benefit Analysis
- Context of Developing Countries
  - Challenges of Cost-Benefit Analysis
  - Practical Considerations
Incremental Utility Gain

- Utility: True value of a good or service
- Health Utility Gain x Life-Years = Quality-adjusted life year (QALY)
- 1 QALY
  - 1 yr increased length of life
  - Increase in health utility from 0.5 to 0.7 for 5 years
78 children with unilateral CIs

Proxy evaluation of utility
- Currently
- Immediately pre-CI
- 1 yr pre-CI
Utility Gained with CI

Cheng et al. JAMA. 2000;284(7):850-856
Cost Analysis

• Direct clinical and rehabilitation costs
• Costs of complications, replacement
• Maintenance, processor upgrades, warranties
• Indirect costs: travel, education costs, lost wages
Cost-Utility Analysis

• Costs and Utility gains discounted 3% per annum (future costs in today’s $)
• Cost/QALYs
Cost-Utility Ratios

Cheng et al. JAMA. 2000;284(7):850-856

$8,809/QALY  $10,131/QALY  $5,957/QALY
Cost-Utility Assessment
NICE Guideline (UK), 2009

- Unilateral at 1 yo: £13,400/QALY ($21,000/QALY)
- Bilateral: £40,400-54,100/QALY ($63,251-84,700/QALY)
  - Second device discounted 30%: £22,700-27,886/QALY ($35,500-43,600)
Cost - Utility of Selected Medical Interventions

Neonatal Intensive Care (1 to 1.5 kg)
CABG (3-vessel disease)
Coronary Angioplasty (severe angina)
Cochlear Implant
Elective Intracranial Aneurysm Repair
Estrogen-Progestin Replacement
Implantable Defibrillator
Cardiac Transplant
Propranolol (hypertension)
Tuberculin Screening
Knee Replacement
CABG (1-vessel disease)
Peritoneal Dialysis
Hemodialysis

(QALY per $1,000)
Global Context: Competing Health Priorities

http://ucatlas.ucsc.edu/spend.php
What gets funded?

• **Criteria for funding**
  • **Threshold** (arbitrary)
  • **Gross National Income** (multiple of)
  • **Preference-elicitation** (trade-off)
    » Willingness to pay
    » Willingness to accept increased risk

Shillcutt et al, Pharmacoeconomics 27(11):903-917, 2009
Barriers to CI in Developing Counties

Consumer

• Competing expenses, children's needs
• Affordability
  – Intervention
  – Maintenance
  – No guaranteed ROI
• Limited or no infrastructure
  – Screening
  – Diagnosis
  – Rehabilitation & Education
  – Otological services
• Stigma, no legal recourse
“To some extent, less wealthy individuals are less willing and able to afford health services, and several studies exist to support this. However, other evidence suggests that poverty has less of an impact on “Willingness to Pay” for health interventions than might be expected, especially for characteristics of high-quality care that people view as essential. Extensive evidence demonstrates that people will pay catastrophic amounts for the healthcare of loved ones, and a family may be willing to pay more than their annual income if they anticipate future income or are willing to liquidate resources”

Barriers to CI in Developing Counties

Providers

- Overhead costs
- Training costs
- ROI: number of paying customers
- Complementary infrastructure
  - Screening
  - Diagnosis
  - Rehabilitation & Education
  - Otological services
Cost-Benefit Considerations in Developing Countries

• **Additional Investments**
  - Human capital development
  - Early diagnosis and intervention systems
  - Mainstream special education options
  - Prevention

• **Additional Benefits**
  - Improved services for adults and children with all types of hearing deficits
A Practical Approach

• Identify local/regional champions
• Provide professional development and mentorship
• Promote patient advocacy
• Cultivate political interest and investment
• Establish proof of principle and sustainable pilots
Thank you