Could Integrative Approaches to Health Help Bend the Cost Curve?

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May 13, 2016
Inaugural Integrative Health Institute Conference

Overview

- Why the hope for integrative approaches?
- Basic orientation to economic evaluation, including what we know now
- How can we take advantage of integrative approaches’ potential to lower healthcare costs?
  - Four strategies/mechanisms to lower cost
  - Cost-related data needed
  - Economic modeling
- Summary

Why the hope for integrative approaches?

- Therapies themselves can be less expensive, e.g., by avoiding high technology
- Less invasive – lower potential for expensive side effects
- Promote self-care – through education and the patient-provider relationship/partnership
- Important for healing
- Important for disease prevention
- Harnesses the body’s natural ability to heal itself

However, cost reductions are not guaranteed

- Little incentive for integrative practitioners to be efficient in the delivery of their care
  - Practitioners often in own practice
  - Mostly practiced outside managed care
  - Much still not covered by insurance
- Often focused on “health optimization” rather than symptom reduction
- Many of the benefits of integrative approaches happen in the future

Basic Orientation

What does economic evaluation add?
Cost-Effectiveness Decision Matrix

<table>
<thead>
<tr>
<th>Increased Costs</th>
<th>Decision: Are benefits worth the costs?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely Reject Alternative (Base Case Dominates)</td>
<td></td>
</tr>
<tr>
<td>No Change</td>
<td>Indifferent</td>
</tr>
<tr>
<td>Cost Savings</td>
<td>Decision: Is health loss worth the savings?</td>
</tr>
<tr>
<td>Definitely Adopt Alternative (Alternative Dominates)</td>
<td></td>
</tr>
<tr>
<td>Worse Health</td>
<td>No Change</td>
</tr>
</tbody>
</table>

What we know now

What we know about the economics of complementary and integrative medicine – systematic review

Comprehensive Systematic Review

- Followed the PRISMA statement
- 34 search terms for CIM
- 16 search terms for economics
- Searched all available years through 2010 in:
  - PubMed
  - CINAHL
  - AMED
- Also searched bibliographies & consulted key researchers
- Applied several measures of quality

Results

- Generated 13,142 references to review after duplicates were removed
- 789 of these were reviewed as full text
- Total of 338 CIM economic evaluations
  - 270 CIM economic evaluations from the search
  - 68 additional from bibliographies and experts
- 204 (60%) published from 2001 thru 2010
  - 114 full and 90 partial
  - 84 US studies (35 full and 49 partial)
- 31 (27%) met the 5 quality criteria

Results (Continued)

- Of the full economic evaluations (n=114), 90% were of single complementary therapies
- Of the 56 comparisons made in the higher-quality studies, 16 (29%) showed cost savings
- Of the 28 CUA comparisons:
  - 5 (18%) cost saving
  - 5 (18%) $0-$10,000/QALY
  - 15 (54%) $10,000-$50,000/QALY
- 22 articles provided at least the minimum information for study transferability

Four strategies/mechanisms to consider
Pattern of Costs

Upfront Intervention Costs

Ongoing Healthcare Costs

Reduce Intervention Costs

Upfront Intervention Costs

Ongoing Healthcare Costs

Group Acupuncture vs TKR

- Patients for whom surgical referral is likely
- Nurses provided acupuncture to groups of patients
  - £20 per treatment (~$44 in 2016 CND)
  - Avg of 16.5 treatments/patient (~$723/patient)
- Cost of uncomplicated TKR £5456 (~$11,957)
- Breakeven if 6% ($723/$11,957) avoid surgery
- At least 31 of 90 referred to acupuncture did not have surgery at 2 years out


Musculoskeletal Physician vs Orthopedic Surgeon-Led Team for Orthopedic Patients

- N=829 patients judged unlikely to require surgery
  - 40% “general,” 30% back, 30% knee
- Randomized to musculoskeletal medicine physician (MMP) vs conventional orthopedic surgeon-led service (COSS)
- Similar health outcomes with MMP slightly better
- MMP had more manual therapy, acupuncture, injections and referral to PT; less surgery & inpt
- Per patient direct costs: MMP = £179 (~$509); COSS = £287 (~$767)

Costs Depend on the Perspective

• Possible perspectives:
  - Individual or Patient
  - Institutional (e.g., third-party payer, hospital, employer)
  - Society

Reduce Adverse Events

- Upfront Intervention Costs
- Cost to Treat Adverse Event
- Ongoing Healthcare Costs

Improve Health

- Upfront Intervention Costs
- Lower Ongoing Costs By Improving Health
- Ongoing Healthcare Costs

Acupuncture for Low Back Pain

- Cost-effectiveness calculated over 3 months
- Treatment – up to 15 sessions over 3 months
- Results €10,526/QALY ($14,120/QALY)

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<thead>
<tr>
<th></th>
<th>First 3 Mos</th>
<th>Second 3 Mos</th>
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</thead>
<tbody>
<tr>
<td>Intervention cost</td>
<td>€367 ($467)</td>
<td>€0 ($0)</td>
</tr>
<tr>
<td>Other HC costs</td>
<td>€87 (-$111)</td>
<td>€87 (-$111)</td>
</tr>
<tr>
<td>Net costs</td>
<td>€280 ($556)</td>
<td>€280 ($556)</td>
</tr>
<tr>
<td>Cumulative net costs</td>
<td>€280 ($556)</td>
<td>€367 ($467)</td>
</tr>
</tbody>
</table>

- 6-Month results would have had lower cost and higher QALY \(\rightarrow\) much lower cost per QALY


Prevent Future Disease

- Avoid the Cost of a Future Event
- Upfront Intervention Costs
- Ongoing Healthcare Costs

The future savings could be large*

- Cost of a heart attack – first 90 days $38,501 plus up to $8,000 out-of-pocket; $1M for severe
- Cost of breast cancer – $128,556 from dx to end of follow up plus $8,500 out-of-pocket per year
- Cost of diabetes - $9,975 per year plus $6,600 out-of-pocket per year

* Estimates from http://www.aflac.com/individuals/realcost/source/
Tai Chi for Fall Prevention in Elderly

- Nursing home residents at average risk for a fall
- Intervention assumed to cost $86.12/year (~$119.50 2016 CN$) per participant
- Assumed cost of a hip fracture $18,881 (~$26,200)
- Assumed 0.5 fall per year avoided per participant, and 0.005 hip fractures avoided/yr
- Savings from avoided hip fractures = 0.005*$26,200 = $131 per participant


Prevent Future Disease

- Avoid the Cost of a Future Event
- Upfront Intervention Costs
- Ongoing Healthcare Costs
- Monthly savings

Number Needed to Treat

<table>
<thead>
<tr>
<th>Category of Patients</th>
<th>Patients Treated</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consented to be screened</td>
<td>1125</td>
<td>100</td>
</tr>
<tr>
<td>Found to be of higher risk</td>
<td>245</td>
<td>22</td>
</tr>
<tr>
<td>Expected to have cardiac event in 10 years</td>
<td>26</td>
<td>2.3</td>
</tr>
<tr>
<td>Avoided cardiac events</td>
<td>8</td>
<td>0.7</td>
</tr>
</tbody>
</table>


Naturopathic Approach for CVD Prevention

- N=245 Canada Post workers with higher risk
- N=176 gave permission to examine their HC costs
- Lifestyle counseling, nutritional and botanical medicine + biometric screening vs screening alone
- Total direct costs in one year $302 ($337 2016 CN$)
  - Intervention cost $344 ($384)
  - Other direct cost savings during the year: $42 ($47)
- Total intervention costs: 245 workers*384=$94,118
- Savings if a heart attack costs more than $11,765
  - ($94,118/8)

Based on Herman et al. JOEM 2014;56(2):171-176.

Discounting

Savings in 20 years of $1,000

<table>
<thead>
<tr>
<th>Years</th>
<th>Value now</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 yrs</td>
<td>$863</td>
</tr>
<tr>
<td>10 yrs</td>
<td>$744</td>
</tr>
<tr>
<td>20 yrs</td>
<td>$550</td>
</tr>
<tr>
<td>40 yrs</td>
<td>$307</td>
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</tbody>
</table>

The Net Effect Across All These Determines the Total Cost Impact

- Avoid the Cost of a Future Event
- Upfront Intervention Costs
- Lower Ongoing Costs By Improving Health
- Avoid the Costs of Adverse Events
- Ongoing Healthcare Costs
- Monthly savings

Other Cost-Related Data Needed

How Much Does What We Are Doing Now Cost?

“essentially, all models are wrong, but some are useful”
George E.P. Box 1919-2013, Statistician

Two General Types of Models
• Estimation models – e.g., regression models
  Raw data \( y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + e \)
• “Simulation” models – use the parameters from estimation models to estimate outcomes

Models “are a way of representing the complexity of the real world in a more simple and comprehensible form. Where true experiments are infeasible or impracticable, models can be used to simulate experiments and to explore alternative scenarios.”

Specifically in health, decision analytic models offer “an explicit approach to synthesizing currently available evidence” and provide answers “where the relevant clinical trials have not been conducted or did not include economic data capture.”

Most recent 100 CEAs published

<table>
<thead>
<tr>
<th>Study Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modeling studies</td>
<td>59</td>
</tr>
<tr>
<td>Markov models</td>
<td>16</td>
</tr>
<tr>
<td>Decision analytic models</td>
<td>8</td>
</tr>
<tr>
<td>Decision tree models</td>
<td>7</td>
</tr>
<tr>
<td>Alongside clinical trials</td>
<td>21</td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
</tr>
<tr>
<td>Retrospective record analysis</td>
<td>14</td>
</tr>
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</table>

**Markov Model for Chronic Low-Back Pain**

- **No Pain**
- **Mild Pain**
- **Moderate Pain**
- **Severe Pain**

For each health state:
- Healthcare cost
- Productivity cost
- Utility value

**Benefits of Economic Models**
- Provides a systematic synthesis of all current appropriate evidence
- Allows comparison of all relevant options
- Provides a way to “fill in the gaps”:
  - Explicitly links intermediate to final outcomes
  - Explicitly allows extrapolation when needed
  - Allows economic outcomes to be included
- Transferability
  - Allows estimation of impact in other settings
- Indicates where more research is needed
  - When uncertainties explicitly modeled

**Summary**
- Integrative approaches have the potential to bend the cost curve
- We know quite a bit about the economics of complementary and integrative medicine, but the information is piecemeal.
- When thinking about practice and effectiveness of interventions need to consider their cost impacts.
- Need to start to build and utilize models:
  - To estimate/capture long-term outcomes
  - To allow transferability of results across settings
  - To better target limited research funding