Cost Benefit Analysis of Healthcare Professional Education on Patient Outcomes

Kieran Walsh, Stephen Maloney, Scott Reeves, Dragan Ilic, George Rivers
Welcome – but what’s it all about?

For every penny spent on medical education

Do we get benefit?

Learner, provider, commissioner, funder
Agenda

Introduction. Explanation of outcomes. KW

Cost analysis: an introduction. KW

Costing an educational programme – how to do it. Participative session where delegates work in small groups to conduct a mocked up costing of an educational programme. KW + all

Costing the benefits. Participative session where delegates work in small groups to brainstorm what benefits would be worthwhile and how they could be costed. KW + all

Linking the programme to the outcome. Interactive session where delegates discuss the challenges in doing this and how best to overcome these challenges. All

Discussion. Developing plans for research. Follow up. All.
Intended outcomes

Cost an educational programme

Choose educational outcomes that can be costed

Link the programme to the outcomes

Conduct simple cost benefit analyses

Follow up with you
Output

Might write this up as a report of a symposium

If anyone would like to join me in co-authoring this, let me know

If anyone has any concerns about this, let me know

Depending on how it all goes ....

Also you are welcome to the slides and papers
Intro
Cost benefit analyses in medical education

• Background
• Case studies – e-learning, simulation
Background
Truth 1

- Medical education is expensive
- Cost of medical education
  - UK?
  - Internationally?
- No one knows how much more
- Getting more expensive > inflation
- Especially expensive in the West - ?
- Most expensive country / least?
- Value??
Truth 2 – medical education of the past is going out to pasture

“A first year medical student recently commented to me that in every lecture he attended he fell asleep after 45 minutes or so. Of course, with my years of experience of medical education I reassured him that with time and some effort he would be able to achieve this in as little as ten minutes or less.”

Eugene Milne
Truth 2 – medical education of the past is going out to pasture

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Eugene Milne

Reassuring you are all still awake ... Early days ...
Truth 2 – progress in working out “what works” in medical education

<table>
<thead>
<tr>
<th>The past</th>
<th>Now</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive</td>
<td>Active</td>
</tr>
<tr>
<td>Different agendas</td>
<td>Evidence based</td>
</tr>
<tr>
<td>Learning things you don’t need to know</td>
<td>Curriculum driven</td>
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<tr>
<td>Not learning things you need to know</td>
<td>Needs based</td>
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<tr>
<td>One size fits all</td>
<td>Learner centric</td>
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<tr>
<td>Points driven</td>
<td>Tailored</td>
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<tr>
<td>Just clinical</td>
<td>Communication, team</td>
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## Truth 2 – progress in working out “what works” in medical education

<table>
<thead>
<tr>
<th>The past</th>
<th>Now</th>
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<tbody>
<tr>
<td>Practise on patients</td>
<td>Simulation</td>
</tr>
<tr>
<td>Using the same formats</td>
<td>Blended learning</td>
</tr>
<tr>
<td>Not knowing</td>
<td>Feedback driven</td>
</tr>
<tr>
<td>Take it or leave it</td>
<td>Evaluated</td>
</tr>
<tr>
<td>Academic</td>
<td>Quality improvement and patient safety</td>
</tr>
</tbody>
</table>
The debate is moving on ...

What works

What works for a given cost
<table>
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<th>High cost</th>
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Remarkable state of affairs

£5 billion
- too much / little
- sufficient benefit / insufficient

“unknown unknown”?
Truth 4 . . . because we don’t really know what the costs are and we don’t have cost analyses tools and we haven’t really tried and we have little experience

Until now
Ground rules ... For my talk

• Cost = financial cost ..... human cost
• Cost = cost . . . not institutional acceptance/ our way of doing things/ feasibility / other such words
• Evidence-based > emotional arguments (education = motherhood and apple pie)
• Not a cost cutting guide OR an argument for investment
  - Ideologically neutral
  - Book – cut or invest ...
Case studies

- E-learning
- Simulation
E-learning – 3 questions

• Does it work?
• What are the costs?
• How can we ensure more value for a given cost?
E-learning – does it work?

- Probably
- Many different forms already – reductionist
- As well as face to face learning – faint praise?

- Real attractiveness is not that it is better than face to face – more later
E-learning - what are the costs?

• Provider costs
• Learner costs
• Out of the frame
• Lets take them one by one
• Perspective is important! Whose cost?
E-learning - provider costs

- Website build
- Content – from text to virtual worlds .. populate
- Hosting .. small
E-learning - learner costs
E-learning - learner costs

“Free e-learning resources”!? No such thing
E-learning - learner costs

- Hardware
- Software
- Depreciation ... and maintenance
- Internet connection .. BB
- Electricity, lighting . . .
- Wages .. if learning at work

- Should you worry about this?
- Could you say – “that’s your problem”?
E-learning - out of the frame

- Trainer accommodation
- Trainer travel and subsistence
- Learner accommodation
- Learner travel and subsistence
- Classrooms
- Equipment
- Off-the-job time
- Print costs

Happy slide – convenience and cost – but some spin
E-learning - how can we ensure more value for a given cost?

- Scale up content - populate
- Enable usage – 10/100/1000
- Map the content format to the outcome
- Interactive cases
- Just in time - ak
- Podcast
- Multimedia - behaviours
- Don’t be seduced by technology - Princeton
- Share – institutions / teams
- Needs assessment
- Make it interprofessional
Simulation – new case study – same 3 questions

• Does it work?
• What are the costs?
• How can we ensure more value for a given cost?
Simulation - does it work?

1901 -
1909 -

BMJ
Simulation - does it work?

• Integrated skills – clinical and communication .. integrate
• Practise and rehearse – as often as you like
• Safe for patient and learner – environment
• Patient expectations – training
• Patient safety
• Interprofessional
• Rare but important events – cardiac arrest in young
• Assessment
Simulation - what are the costs?
Simulation - what are the costs?

- Hardware
- Software
- Trainers
- Learners
- Patients

- TCO ??

- Car .... Simulation centre
Simulation – how can we ensure more value for a given cost?

• Don’t be seduced by fidelity – commercial jet simulators
• Don’t be seduced by technology
• Don’t confuse fidelity with technology - GP
• Use the correct simulation for the task - part task / assessment
• Use the simulation to max capability neurosurgery
• Mobile simulation
• Share
• Ensure / enable usage – gym??
Task

Costing an educational programme – conduct a mocked up costing of an educational programme.

Costing the benefits - brainstorm what benefits would be worthwhile and how they could be costed.

Linking the programme to the outcome - Discuss the challenges in doing this and how best to overcome these challenges.

Discussion. Developing plans for research. Follow up.
Costing an educational programme – conduct a mocked up costing of an educational programme
Costs

• Is not price \((\text{cost} + \text{profit})\)
• Is not expenditure

• Is opportunity cost

• What is opportunity cost?
Costs

• Is not price \((\text{cost} + \text{profit})\)
• Is not expenditure

• Is opportunity cost

• What is opportunity cost?
• Not money – the cost of not doing something else
Gathering costs – ingredients approach

First step

Like cooking
Gathering costs – ingredients approach

- Must be comprehensive and exhaustive
- If anything is missed out, everything else will be wrong
- This is the denominator in your sum
Gathering costs – ingredients approach

• Identify all ingredients
• Even if they are free to you

• WHY?
Gathering costs – ingredients approach

• Identify all ingredients
• Even if they are free to you

• Because they may not be free to everyone … who wants to replicate your programme
Gathering costs – ingredients approach

- **Personnel**
- Facilities
- Equipment and consumables
- Learner inputs?
- Others

- Personnel – 70%
- Hi cost – hi value
Gathering costs – ingredients approach

- Personnel
  - Pay closest attention to the biggest cost (personnel)
  - A small error here will have a big effect overall
How to identify ingredients

Become intimately familiar with the educational programme
• Programme documentation
• Interviewing the participants
• Observing the programme in action (planned, delivered, received curriculum)
Assign a cost to each ingredient

and add them up
Reporting costs

• In monetary terms
But
• Currency
• Inflation
• Education and cost practices
Reporting costs

In educational terms

• 100 hours of a senior lecturer’s time
• 10 hours in a 50 seat lecture hall
Reporting costs

- Monetary terms
- Educational terms
- Be transparent
Conduct a mocked up costing of an educational programme
Conduct a mocked up costing of an educational programme - summary

• Personnel
  • Facilities
  • Equipment and consumables
  • Learner inputs?
  • Others

• Personnel – 70%
• Hi cost – hi value
Conduct a mocked up costing of an educational programme

• Personnel
  • Think about a programme that you plan to do or have done
• Cost it
• Small groups
• 10 minutes
• Barriers
• Report back
Cost analysis tools: Cost-

- Effectiveness
- Utility
- Feasibility
- Benefit
Cost effectiveness

• The evaluation of two or more alternative approaches or interventions according to their costs and their effects in producing a certain outcome
• Imply a comparison
• Easy to understand
• Guide decision making
• Cannot be used to compare interventions with different intended outcomes
• Cannot be used to compare interventions that do not have a “common measure of effectiveness that can be used to assess them”
• Causality – non-equivalence of groups, attrition, maturation, the effects of testing, and regression to the mean
Cost utility

• Examination of two or more alternatives according to their cost and their utility
• Utility means the satisfaction among individuals as a result of one or more outcomes or the perceived value of the expected outcomes to a particular constituency
• Cost utility analysis is closely related to cost effectiveness analysis – however, cost effectiveness analysis must use a single measure of effectiveness whereas cost utility analysis enables researchers to amalgamate many different measures of effectiveness into a single measure of utility
Cost utility

• Educators and learners may value one outcome above another
• One way to capture this is to assign different weights to different outcomes
• Allow multiple outcomes to be taken account of in the evaluation
• Force the stakeholders to reflect on the relative merits of different outcomes and to articulate the results of their reflections and record them
• A number of different methods may be used to assign “weightings”
• Subjective assessment
• Causality
Cost feasibility

• Measuring the cost of a proposed intervention in order to decide whether it is feasible (that is, whether it can or cannot be considered)
• Simple and quick to implement
• A concrete method to estimate costs
• Cannot help us decide between alternative approaches
• Nor can it help us decide if an approach is worthwhile as it doesn’t look at the effectiveness or utility of an intervention or the benefits that may be associated with it

• Example – sim centre
Cost benefit

• “The evaluation of alternatives according to their costs and benefits when each is measured in monetary terms”
• Enable us to discover if any particular intervention on its own has benefits that exceed its costs
• Enable us to compare the costs and benefits of interventions with different outcomes
• Enable us to compare the costs and benefits of widely differing types of interventions in completely different areas
• Rely entirely on our ability to measure costs and benefits in monetary terms
• Causality
<table>
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<tr>
<th></th>
<th>Costs</th>
<th>Outcome</th>
<th>Benefit</th>
<th>Total benefits</th>
<th>Net benefit (total benefits – costs)</th>
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<tbody>
<tr>
<td>Simulation-based education</td>
<td>£20 000</td>
<td>8 complaints prevented</td>
<td>Benefit per complaint prevented = £1000</td>
<td>£8000</td>
<td>−£12 000</td>
</tr>
<tr>
<td>Communication skills teaching</td>
<td>£10 000</td>
<td>12 complaints prevented</td>
<td>Benefit per complaint prevented = £1000</td>
<td>£12 000</td>
<td>+£2000</td>
</tr>
<tr>
<td>Team-based learning</td>
<td>£25 000</td>
<td>5 medical accidents prevented</td>
<td>Benefit per medical accident prevented = £10 000</td>
<td>£50 000</td>
<td>+£25 000</td>
</tr>
<tr>
<td>Quality improvement education</td>
<td>£50 000</td>
<td>7 medical accidents prevented</td>
<td>Benefit per medical accident prevented = £10 000</td>
<td>£70 000</td>
<td>+£20 000</td>
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Task

Costing the benefits - brainstorm what benefits would be worthwhile and how they could be costed.

Linking the programme to the outcome - Discuss the challenges in doing this and how best to overcome these challenges.
Task

Discussion. Developing plans for research. Follow up.
Cost analyses can guide decision making but they should not necessarily make the decisions for us.

You can have the most expensive option if you wish.
Common errors
Common errors

- Omitting hidden costs – clinical/educational budgets
- Paying too little attention to the main costs
- Paying insufficient attention to opportunity costs - 10K fee + 20K lost earnings
- Mistiming costs
- Misunderstanding transfer of payments (doubling up)
- Failing to account for development costs
- Conducting the wrong analysis
Why is this important?
Why is this important?

- Payer
- Individual
- Institution
- Government
Or maybe it’s not important at all

- Spend your budget ... or it will be taken away
- “Complexity payments” – fuzziness
- Primary purpose of a medical school: learning, research – blur
- Primary purpose of postgraduate training: learning, clinical care – blur
- The cost disease
More dilemmas ....

- Economies of scale ... Or maybe not ..
  Not a factory
- Capacity utilisation – until fall over
- Human capital theory – a German unword
- Labour economics > health economics
- The cost of an OSCE – but what of its value
A new problem?

- 1893 paper
- Person studying medicine
- Young person studying medicine
- Young man studying medicine
- Young gentleman studying medicine
- Young gentleman from rich family studying medicine
- Young gentleman from rich family studying medicine in London
- Young gentleman from rich family studying medicine to pass exams and save money and get a high paying job in London
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Truth 3 - we don’t know what constitutes value for a given cost
Strategy – this is what we must do

• Individual studies - modest - realistic and achievable - tactical

• A series of systematic reviews

• Programmes to further the methodology

• Centres of excellence of cost and value in medical education

• Research programmes involving collaborations


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