A Multi Criteria Decision Analytic (MCDA) approach to combining evidence and patient preferences for cancer prevention and treatment:

an application to prostate cancer screening

Glenn Salkeld
School of Public Health
“Efficient health care requires informed doctors and patients. The health care system inherited from the 20th century falls short on both counts”

"(We have an)… inefficient system that wastes taxpayer's money on unnecessary or even potentially harmful tests and treatments as well as on medical research that is of limited relevance to the patient"

Raise taxes? Ration resources?
"The 21st century should become the century of the patient. …Promote health literacy and better care is possible for less money"

"(What’s needed)…. is honest and transparent information to enable better doctors, better patients and ultimately better health care"

Take for example, PSA screening for prostate cancer

**THE BENEFIT**

- ERSPC study found that the risk of dying from prostate cancer from 3.65 deaths per 1000 men over 9 years to 2.94 deaths per 1000 men over 9 years.

**POTENTIAL HARMs**

- Control group – 48/1000 men affected by prostate cancer diagnosis and treatment
- Screened group – 82/1000 men

SNAPSHOT BENEFIT TO HARM RATIO

- 34 additional men diagnosed with prostate cancer and treated for LESS than one death per 1000 men

- 1410 men would need to be screened and 48 additional cases of prostate cancer would need to be treated to prevent a single death from prostate cancer.
Take for example, PSA screening for prostate cancer

The elephant in the room

- Put those 48 men in one room.

- "Each would be convinced that the detection and treatment of their prostate cancer had saved their life. And 47 of the 48 would be wrong"

What is the possible response to this?

- Information support
  - Yes, but written information is often presented in a bias way
  - *(insert ref to review)*

- Decision support
  - For patients, for doctors, - to achieve informed consent
  - Growing recognition for more formal decision support
SEC. 1236. DEMONSTRATION PROGRAM ON USE OF PATIENT DECISIONS AIDS.

(a) IN GENERAL.—The Secretary of Health and Human Services, acting through the Center for Medicare and Medicaid Innovation established under section 1115A of the Social Security Act (as added by section 1907) and consistent with the applicable provisions of such section, shall establish a shared decision making demonstration program (in this subsection referred to as the “program”)

...
(2) **Patient decision aid.**—The term “patient decision aid” means an educational tool (such as the Internet, a video, or a pamphlet) that helps patients (or, if appropriate, the family caregiver of the patient) understand and communicate their beliefs and preferences related to their treatment options, and to decide with their health care provider what treatments are best for them based on their treatment options, scientific evidence, circumstances, beliefs, and preferences.
(3) **Shared Decision Making.**—The term “shared decision making” means a collaborative process between patient and clinician that engages the patient in decision making, provides patients with information about trade-offs among treatment options, and facilitates the incorporation of patient preferences and values into the medical plan.
Key requirements in this legislation

- It's for 'patients' ....and clinicians

- Options
- Scientific evidence
- Beliefs, preferences and values
- Trade-offs
- Educational tool
My talk today

› How to implement decision support using Multi Criteria Decision Analysis (MCDA) via an interactive aid - Annalisa

Dr Michelle Cunich
A/Prof Kirsten Howard

Prof Jack Dowie
MCDA collaborations using ‘Annalisa’ in London, Sydney and Odense
Declarations

› Jack Dowie, London School of Hygiene and Tropical Medicine, is a part owner of the IP of Annalisa ©

› MyDecisionSuite and MyDecisionQuality are © 2011 Mette Kjer Kaltoft and Jack Dowie

› The Prostate Cancer Screening Annalisa was designed by
› Glenn Salkeld and Michelle Cunich, University of Sydney
› and Jack Dowie.

› The School of Public Health, University of Sydney has no pecuniary interest in the software or licensing but does have a strong interest in research collaboration and open access to interactive decision support aids that have been evaluated. AND.................
I’m a BIG fan of BC!
What is MCDA?

Multi criteria methods to designed to help people make better choices when faced with complex decisions

Facilitates combination of ‘evidence’ and ‘subjective preferences’

- Decompose the decision problem
- Describe the attributes or characteristics of option (or the criteria used to determine whether a decision goal is met)

Value-based methods use quantitative approaches to determine how well the options fulfill the criteria and decision priorities of the criteria in achieving the goal of the decision

Reference: Dolan JG. Patient 2010 3(4)229-248
"I feel fine but I'm hearing suggestions that men of my age should have a test to see whether they might have prostate cancer"

Professor Glenn Salkeld: It all depends... why don't you use this new interactive decision aid to see whether having this test would be the best thing for you?

Please click HERE to listen to a brief message from Professor Salkeld

When you click 'Next' you will be asked to consent to participate in this survey and after that the interactive decision aid will appear on your screen
My Decision Suite

My Prostate Cancer Screening Aid

We invite you to consult our new online interactive aid for men making a decision about whether to be screened for Prostate Cancer.

You may wish to consult your doctor before making a final decision. Only a doctor can order a PSA test.

This survey consists of six sections. Each section is represented by the colour coded boxes below.

It may take you as little as 16 minutes to complete all of the sections. But allow half an hour if you want explore the aid a bit more and extract the full benefit from our interactive decision aid.

Click the 'Next' button in the bottom LEFT hand corner to move onto the next section.
Preparing for the decision

My Decision Navigator

Being screened for possible Prostate Cancer is a serious decision which is ultimately up to you to make.
Your response to the following questions will take you to the parts of the interactive decision aid and survey that are relevant to your needs.

My Decision Preparation

If you are seeking to make a high quality decision it is useful to have a clear idea of what you see as the ingredients of a good decision before you start.
In this section we do three things:

Provide information about your prostate, prostate cancer and PSA testing at a level of detail selected by you - with links to more information as required
Remind you of what is required for you to give your informed consent to any future decision that you may take in relation to screening and treatment
Present a list of things that are commonly regarded as criteria for a high quality decision.

Because different people weight these criteria differently, we also ask you to indicate how important each criterion is to YOU.
<table>
<thead>
<tr>
<th>OPTIONS</th>
<th>None</th>
<th>Some</th>
<th>Moderate</th>
<th>High</th>
<th>Very high</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of being clear about the possible OPTIONS for me and what they involve</td>
<td></td>
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<tr>
<td>EFFECTS</td>
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<tr>
<td>Importance of being clear about the possible EFFECTS and outcomes of each of the options for me</td>
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<tr>
<td>IMPORTANCE</td>
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<tr>
<td>Importance of being clear about the relative IMPORTANCE of the different effects and outcomes for me</td>
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<tr>
<td>CHANCES</td>
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<tr>
<td>Importance of being clear about the CHANCES of the different effects and outcomes happening to me, including the uncertainties surrounding the best estimates</td>
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<tr>
<td>TRUST</td>
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<tr>
<td>Importance of being able to TRUST the information I am given is the best possible</td>
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<td>SUPPORT</td>
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<td>Importance of feeling I received the level of SUPPORT and consideration I wanted throughout the decision process, especially in regard to communicating at my level</td>
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<tr>
<td>CONTROL</td>
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</tr>
<tr>
<td>Importance of feeling in CONTROL of the decision to the extent I wished</td>
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<tr>
<td>COMMITMENT</td>
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</tr>
<tr>
<td>Importance of feeling COMMITTED to acting on the decision taken</td>
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</tbody>
</table>
Decision Technologies

Not Decision-Aided

Decision-Aided

Not MCDA-based

MCDA-based

AHP, HiView, Visa

Annalisa 2+

Integrated in MDS
Options

Attributes

Option Scores

Preference Base

Evidence Base
Annalisa for PSA Testing

Scores

- PSA Test: 0.944
- NO PSA Test: 1.000

Values

- LOSS OF LIFETIME: 0.200
- NEEDLESS BIOPSY: 0.200
- URINARY PROBLEMS: 0.200
- BOWEL PROBLEMS: 0.200
- SEXUAL PROBLEMS: 0.200

Evidence

- PSA Test:
  - 0.996
  - 0.776
  - 0.976
  - 0.946
  - 0.579

- NO PSA Test:
  - 0.995
  - 1.000
  - 0.982
  - 0.947
  - 0.609
PSA Annalisa – Demonstration Video

http://www.screencast.com/t/MlNAbfcl

Camtasia Studio\PSA Test SHort Demo V3\PSA Test SHort Demo V3.avi
Low Numeracy
Keep it simple

### Annalisa for PSA Testing

**Scores**

<table>
<thead>
<tr>
<th>Values</th>
<th>Loss of Lifetime</th>
<th>Needless Biopsy</th>
<th>Urinary Problems</th>
<th>Bowel Problems</th>
<th>Sexual Problems</th>
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<tbody>
<tr>
<td>Evidence</td>
<td>0.200</td>
<td>0.200</td>
<td>0.200</td>
<td>0.200</td>
<td>0.200</td>
</tr>
</tbody>
</table>
Keep it simple

Annalisa for PSA Testing

Scores

PSA Test: 0.944

NO PSA Test: 1.000

Values

- LOSS OF LIFETIME: 0.200
- NEEDLESS BIOPSY: 0.200
- URINARY PROBLEMS: 0.200
- BOWEL PROBLEMS: 0.200
- SEXUAL PROBLEMS: 0.200

Evidence
Would you like to see the evidence?

Annalisa for PSA Testing

Scores

Values

LOSS OF LIFETIME
0.200

NEEDLESS BIOPSY
0.200

URINARY PROBLEMS
0.200

BOWEL PROBLEMS
0.200

SEXUAL PROBLEMS
0.200

Evidence

PSA Test

0.996
0.776
0.976
0.946
0.579

NO PSA Test

0.995
1.000
0.982
0.947
0.609
Reveal the scores

### Annalisa for PSA Testing

<table>
<thead>
<tr>
<th>Scores</th>
<th>PSA Test</th>
<th>NO PSA Test</th>
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<td>1.000</td>
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<table>
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<tr>
<th>Values</th>
<th>LOSS OF LIFETIME</th>
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<th>URINARY PROBLEMS</th>
<th>BOWEL PROBLEMS</th>
<th>SEXUAL PROBLEMS</th>
</tr>
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<tr>
<td></td>
<td>0.579</td>
<td>0.609</td>
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</tbody>
</table>
Change the settings in Annalisa

Annalisa for PSA Testing

Scores
- PSA Test: 0.944
- No PSA Test

Values
<table>
<thead>
<tr>
<th>Loss of Lifetime</th>
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Evidence
- PSA Test
  - 0.996
  - 0.776
  - 0.976
- No PSA Test
  - 0.995
  - 1.000
  - 0.982
  - 0.947
  - 0.609

Settings:
- Locking Mode: Off
- Locks Active: On
- Attribute Orientation: +
- Text Size: A
- Number Format: 0.0%
- Display Precision: 0.111
- Show Weight Normalisation: On
- Show Score Breakdown: Off
- Score Type: Idealised
- Language: EVS
- Credits: 2008 Maldaba Ltd. www.annalisa.org.uk
Show the breakdown of the score

**Annalisa for PSA Testing**

**Scores**
- PSA Test: 0.975
- NO PSA Test: 0.999

**Values**
- LOSS OF LIFETIME: 0.570
- NEEDLESS BIOPSY: 0.088
- URINARY PROBLEMS: 0.088
- BOWEL PROBLEMS: 0.167
- SEXUAL PROBLEMS: 0.088

**Evidence**
- PSA Test:
  - 0.996
  - 0.776
  - 0.976
  - 0.946
  - 0.579
- NO PSA Test:
  - 0.995
  - 1.000
  - 0.982
  - 0.947
  - 0.609
**My Decision Quality**

My Decision Quality is a tool for YOU to assess - from YOUR perspective - the quality of a decision that has just been taken.

Please rate the decision you have just taken on each of these criteria.

<table>
<thead>
<tr>
<th>Options</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree/disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am clear about the possible OPTIONS for me and what they involve</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Effects</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree/disagree</th>
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<th>Strongly disagree</th>
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<tr>
<td>I am clear about the possible EFFECTS and outcomes of each of the options for me</td>
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<td>0</td>
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<table>
<thead>
<tr>
<th>Importance</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree/disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
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<td>I am clear about the relative IMPORTANCE of the different effects and outcomes for me</td>
<td>0</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Chances</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree/disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
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<tr>
<td>I am clear about the CHANCES of the different effects and outcomes happening to me, including the uncertainties surrounding the best estimates</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Trust</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree/disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I TRUST the information I have been given is the best possible</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
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<table>
<thead>
<tr>
<th>Support</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree/disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
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<td>I am satisfied with the level of SUPPORT and consideration I received throughout the decision process, especially in regard to communicating at my level</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree/disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
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<td>I feel in CONTROL of my decision to the extent I wish</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commitment</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree/disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am COMMITTED to acting on my decision</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
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</table>
My Score for Decision Quality

On the next screen you will see your 8 criteria Ratings in the bottom panel. In the middle panel you will find the Weightings for these criteria that you provided earlier in My Decision Preparation. In the top panel you will find the Decision Quality Score that combines your Ratings and Weightings.

We suggest a score below 50% is not satisfactory, 50-70% is satisfactory to good, and above 70% very good to excellent.
Making health decisions – it’s a complex and imperfect world

MY SOURCES ARE UNRELIABLE,

BUT THEIR INFORMATION IS FASCINATING.