

The Institute for Clinical and Economic Review (ICER)

Appraisal of IMRT vs. 3D-CRT

Purpose of the Day

- What is the structure and role of the Evidence Review Group?
 - Independent
 - Constitution
 - Review of Draft Assessment
 - Confirm/comment on ratings of comparative clinical effectiveness and value

Structure of the Day

- Policy and political background
- Introduction to ICER and purpose of today
- Introduction to IMRT
- Lunch
- Clinical Effectiveness
- Comparative Value
- Tying it all together

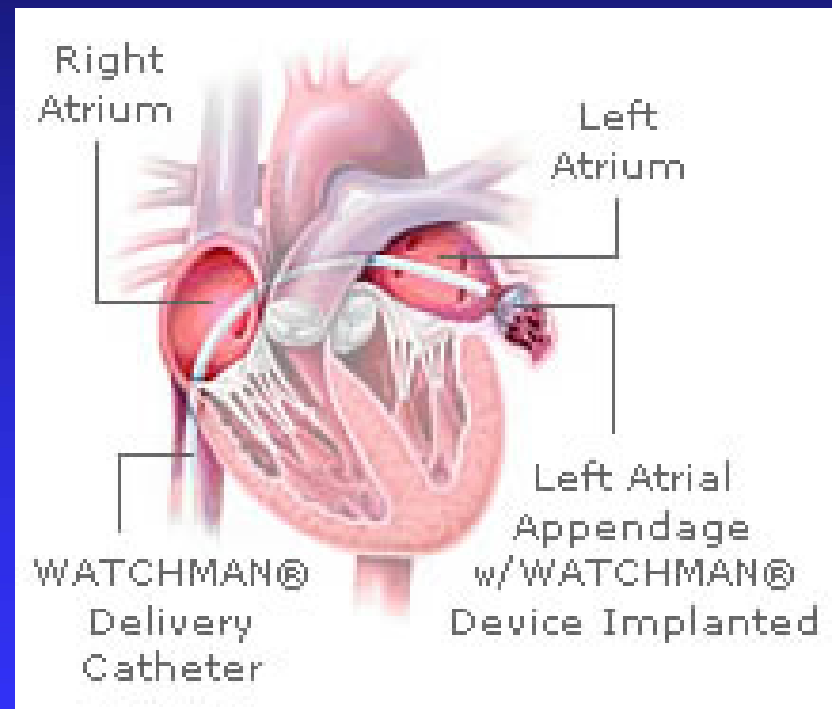
PLEASE HANG UP.

Pratt's HEALING OINTMENT FOR MAN AND BEAST



WE BOTH USE IT!

Innovation: The Challenges



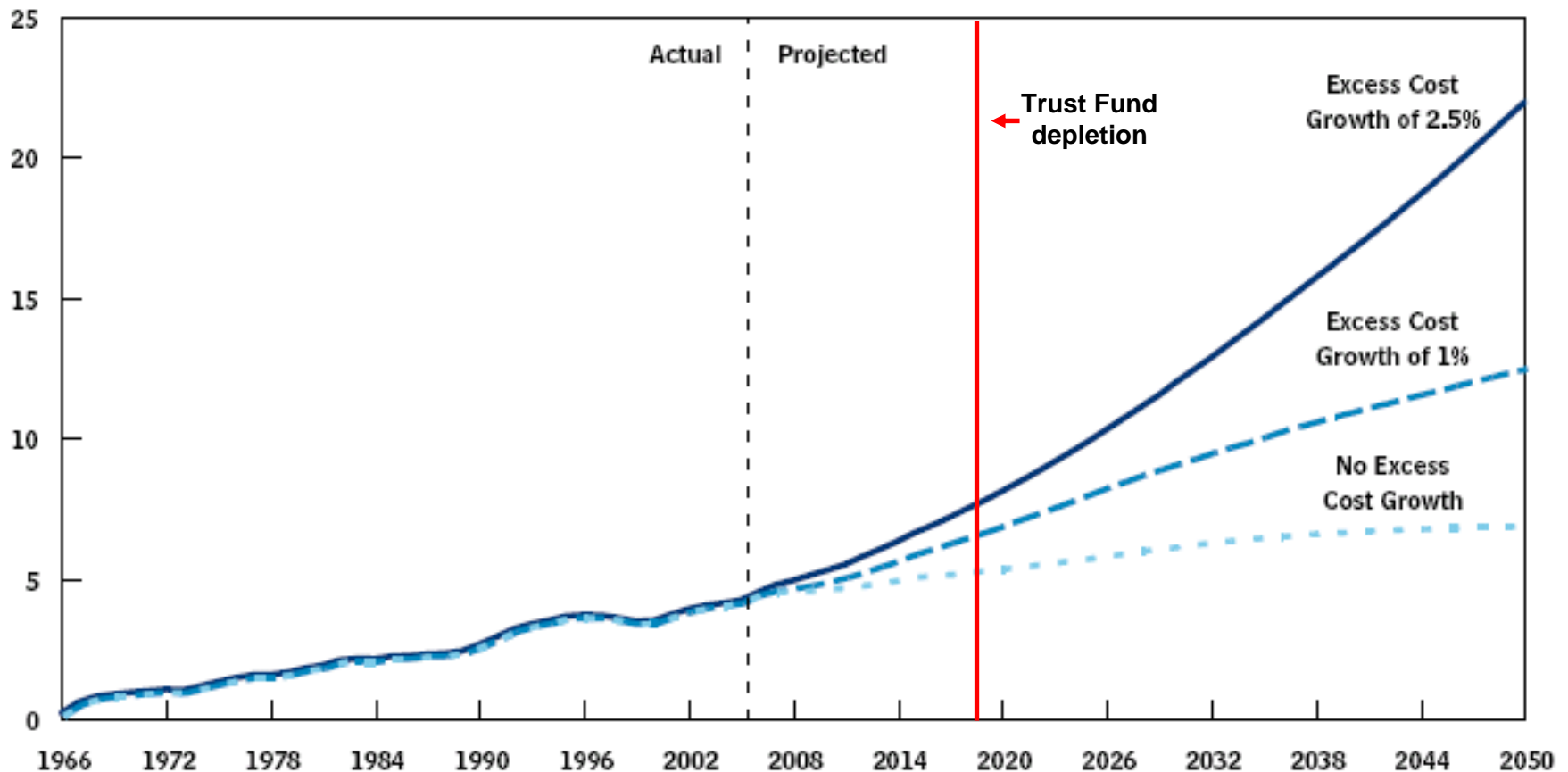
Health Care Costs

- Today the US spends on health care
 $\$2,100,000,000,000$
- 16% of GDP, \$1 of every \$7 spent
- If nothing changes, by 2030 health care will consumer \$1 out of every \$3 of GDP

Figure 1-7.

Total Federal Spending for Medicare and Medicaid Under Different Assumptions About Excess Cost Growth, 1966 to 2050

(Percentage of gross domestic product)



Source: Congressional Budget Office.

US Health Technology Assessment

- Poor coordination
- Weak legitimacy
- Limited usefulness
- Incomplete integration

Proposed Agency

- A new Comparative Effectiveness Research agency has been proposed in Congress
- The agency would provide information on the relative clinical (and cost) effectiveness of alternative health care interventions
 - Drugs, devices, diagnostics, procedures
- Funding at the level of \$5 billion dollars

Goals of ICER

- Stimulate broader national policy to integrate value considerations into comparative effectiveness initiatives
- Test new methods for making technology assessments more accessible and actionable
- Integrate assessment of comparative clinical effectiveness with “comparative value”

ICER

- Blue Shield of California Foundation
- Collaborative academic model
- Pilot appraisals
 - IMRT for localized prostate cancer
 - Virtual colonoscopy
 - Pegfilgrastim

ICER Appraisal Process

- Topic selection
- Scoping committee
- Technology assessment
 - Clinical effectiveness
 - Comparative value
- Presentation to Evidence Review Group (ERG)
- Final Report with Integrated Evidence Rating

Integrated Evidence Rating

Comparative Clinical Effectiveness

Superior A

Incremental B

Comparable C

Pot/Unprov P/U

Inadequate I

Comparative Value

a
High

b
Reasonable/
Comparable

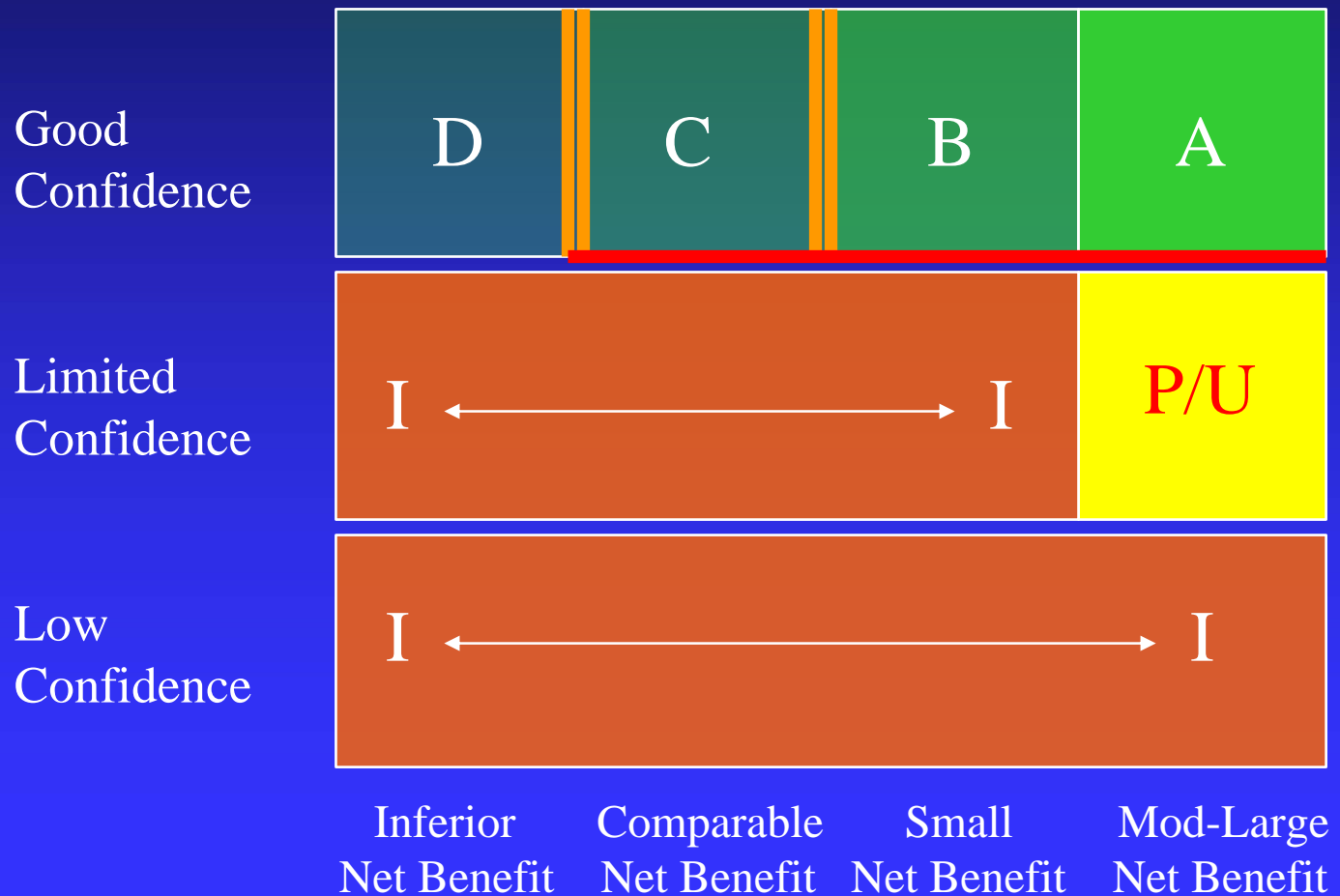
c
Low



Comparative Clinical Effectiveness

Comparative Clinical Effectiveness

Comparing tech ____ vs. ____



Integrated Evidence Rating

Comparative Clinical Effectiveness

Superior A

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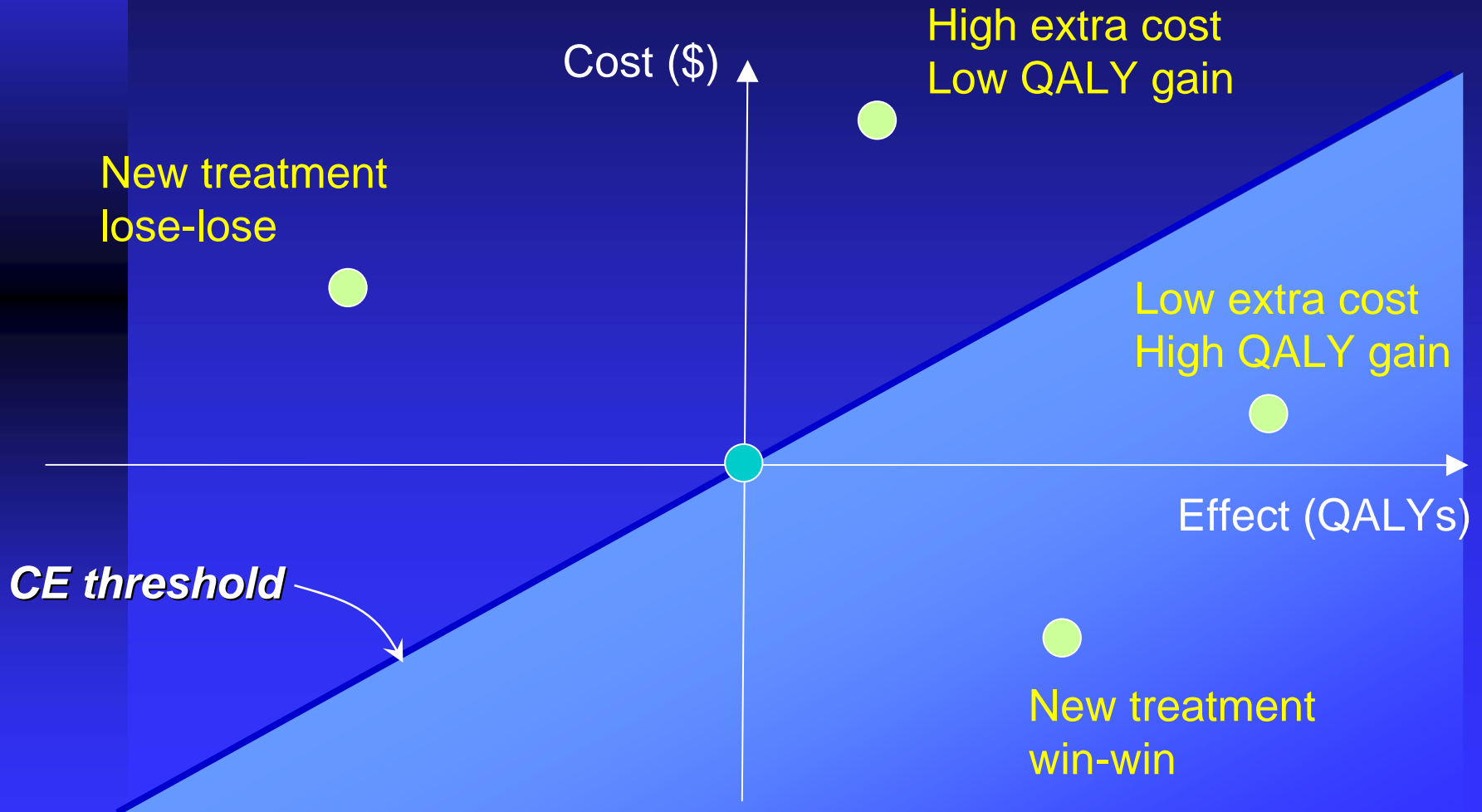


Economic Evaluation

“... the comparative analysis of alternative courses of action in terms of both their costs and consequences.”

Drummond, Stoddart & Torrance, 1987

Weighing up costs and effects



Comparative Value Rating



Other considerations:

- Cost per key outcome(s)
- Relative cost to similar treatments/situations

Integrated Evidence Rating

Comparative Clinical Effectiveness

Superior	A	Aa	Ab	Ac
Incremental	B	Ba	Bb	Bc
Comparable	C	Ca	Cb	Cc
Pot/Unprov P/U		Pa	Pb	Pc
Inadequate	I	I	I	I

Comparative Value

a
High

b
Reasonable/
Comparable

c
Low

Applications of ICER ratings

- Coverage decisions
- Value-based insurance design
- Reimbursement platforms
- Physician compensation
- Patient-clinician decision support tools

Purpose of the Day

- Review of Draft Assessment
- Comment on ratings of comparative clinical effectiveness and value
- NOT an NIH consensus committee
- NOT to make coverage recommendations
- Help us improve the ICER process

Appraisal of IMRT vs. 3D-CRT

Appraisal of IMRT

■ Scope

- Patient population(s)
- Comparator(s)
- Key questions
 - ◆ Differences in disease-free and overall survival
 - ◆ Differences in side effects → quality of life
 - ◆ Patient characteristics that most influence clinical and cost-effectiveness of IMRT

Background

- Localized prostate cancer
 - Classification
 - Treatment options
 - Importance of side effects

IMRT and 3D-CRT

- Origins
- Potential advantages of IMRT
 - Decrease in toxicity
 - Ability to deliver “ultra high” doses >81 with acceptably low toxicity
- Potential disadvantages of IMRT
 - “Cold spots” within the field
 - Increased risk of secondary malignancy
 - Inadequate quality assurance of methods of delivery

Clinical Guidelines

- NCCN
 - Low risk → 70-75 Gy
 - Intermediate risk → 75-80 Gy
- NCI
- ASTRO
 - IMRT is “preferred method” for Rx

Ongoing Research

- Dose escalation with IMRT and/or 3D-CRT
- Hypofractionation
- No randomized trials in US of 3D-CRT vs. IMRT
- Canadian phase III RTC begun 2005, completed in 2014

Coverage, Reimbursement, Use

- Medicare
- Private insurers
- Reimbursement: 4 x 3D-CRT = IMRT
- 2002-2004: 32%-73% penetration
 - 61% academic and 93% community clinicians using for GU cancer
 - 91% of non-users planned to adopt in near future

The Evidence

- Previous tech assessments
 - AHRQ, 2007
 - CTAF, 2005-2006
 - NCCHTA, 2003
 - TEC, NICE, CADTH: no review
- Systematic literature review
 - 62 IMRT articles
 - 283 3D-CRT articles

Key Findings

- Disease-free survival
 - Benefits to escalation to 75-81 Gy
 - No data yet on >81 Gy vs. 75-81 Gy
- Potential harms
 - No data on secondary malignancy
- Differential risk of toxicity

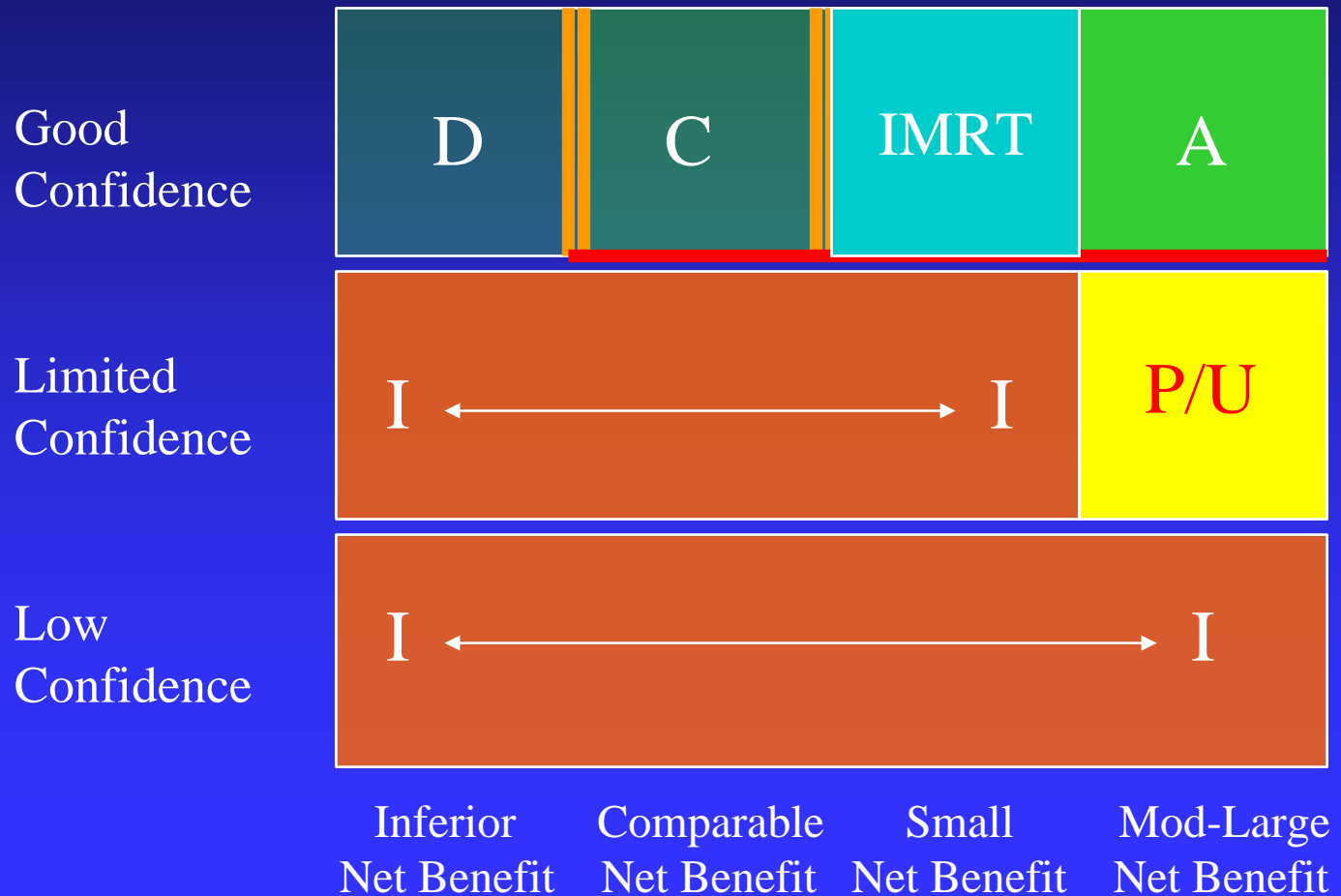
3D-CRT	<i>Late GI toxicity ≥ 2</i>	<i>Late GU toxicity ≥ 2</i>	<i>Impotence</i>
75-80 Gy	21% (Michalski, 2005) 19% (Shippy, 2007) 16% (Zelefsky, 1999) 16% (Skwarchuk, 2000) 14% (Zelefsky, 2001) 13% (Schultheiss, 1997) 12% (Jani, 2007) 11% (Peeters, 2005) 10% (Zelefsky, 2000) 10% (Kirichenko, 2007) 0% (D'Amico, 2006)	23% (Jani, 2007) 13% (Zelefsky, 2001) 13% (Shippy, 2007) 8% (Kirichenko, 2007)	39% (NCCHTA, 2003) 28% (D'Amico, 2004)
IMRT	<i>Late GI toxicity ≥ 2</i>	<i>Late GU toxicity ≥ 2</i>	<i>Impotence</i>
75-81 Gy	6% (Kirichenko, 2007) 6% (Jani, 2007) 4% (Zelefsky, 2002) 3% (Shippy, 2007) 2% (Zelefsky, 2006)	23% (Jani, 2007) 19% (Shippy, 2007) 15% (Zelefsky, 2002) 6% (Kirichenko, 2007)	49% (Zelefsky, 2006) 48% (Zelefsky, 2002)

GI toxicity: proctitis

- 14% for 3D-CRT and 4% for IMRT
- Treat 100 patients with IMRT will have 10 fewer cases of proctitis
- NNT = 10 patients

Comparative Clinical Effectiveness

IMRT vs. 3D-CRT for Rx 75-80 Gy



Draft Integrated Evidence Rating

Key Findings

- Cost per case of proctitis avoided = \$313,000
- Cost per QALY = \$706,000
- If risk of proctitis =
 - 25%, cost/QALY = \$400,000
 - 75%, cost/QALY = \$130,000
- Threshold analysis for cost of IMRT
 - Cost/QALY = \$100,000 → \$16,900
 - Cost/QALY = \$150,000 → \$19,100

Integrated Evidence Rating

IMRT vs. 3D-CRT Rx 75-80 Gy

Comparative Clinical Effectiveness

Superior	A	Aa	Ab	Ac
Incremental	B	Ba	Bb	IMRT
Comparable	C	C	C	C
Pot/Unprov P/U		Pa	Pb	Pc
Inadequate	I	I	I	I

Comparative Value

a
High

b
Reasonable/
Comparable

c
Low

Potential Application of ICER Ratings to Medical Policy

Radiation for low-risk prostate CA

Comparative Clinical Effectiveness

Superior	A	Aa	Ab	Ac
Incremental	B	Brachytherapy	Bb	IMRT
Comparable	C	C	C	C
Pot/Unprov P/U	P/U	Hypofract Rx	Pb	Pc
Inadequate	I	Proton Beam Therapy		

Comparative Value

a	b	c
High	Reasonable/ Comparable	Low

From Tech Assessment to Medical Policy

Brachytherapy
Ba

No prior auth
0% co-pay
Premium price

Prior auth
20% co-pay
Lower reimbursed price

Hypofract Rx
Pa

Proton Beam
I

Prior auth/CED

Non-covered

Outstanding elements

- Budget impact
- Ethical considerations
- Research considerations

ERG Feedback

- ICER format: useful?
- What information would you have liked?
 - Draft ratings before the meeting?
- What information did you not find useful?
- Process: a vote, consensus, or some blend for rating determination?
- Best role for patients, clinical experts, and manufacturers?
- Other?

Conclusion and Next Steps

- IMRT vs. 3D-CRT
 - Potential for technology assessment with integrated assessment of comparative value to support innovative medical policy
- Next steps
 - Pegfilgrastim, virtual colonoscopy
 - Complete appraisals of the “family” of EBRT
 - Establish sustainable funding and strategic models

Thank you!