

Cost Effectiveness of Screening in the National Lung Screening Trial

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- NLST CEA in progress
- Preliminary CEA
- Sources of uncertainty

Cost Effectiveness Analysis



- Comparison: LDCT vs CXR, None
- Effectiveness: LYs and QALYs
- Costs: \$US (reference 2009)
- Perspective: Societal
- Time horizon: Within-trial and lifetime
- Discount rate: 3%

Effectiveness (LYs)

- Aggregate LYs from entry to death
- Observed survival before 2009
- Projected survival after 2009
 - age, sex, smoking, lung ca stage

Effectiveness (QALYs)

- Adjust LYs for QOL (0-1.0)
- SF-6D utility scoring
- Estimate missing scores
 - age, sex, scr, lung ca

- Direct medical (screening, dx, rx)
- Non-medical (travel, lodging)
- Opportunity (lost wages)
- Projected beyond 2009
 - age, sex, and lung ca stage

Direct Medical Costs

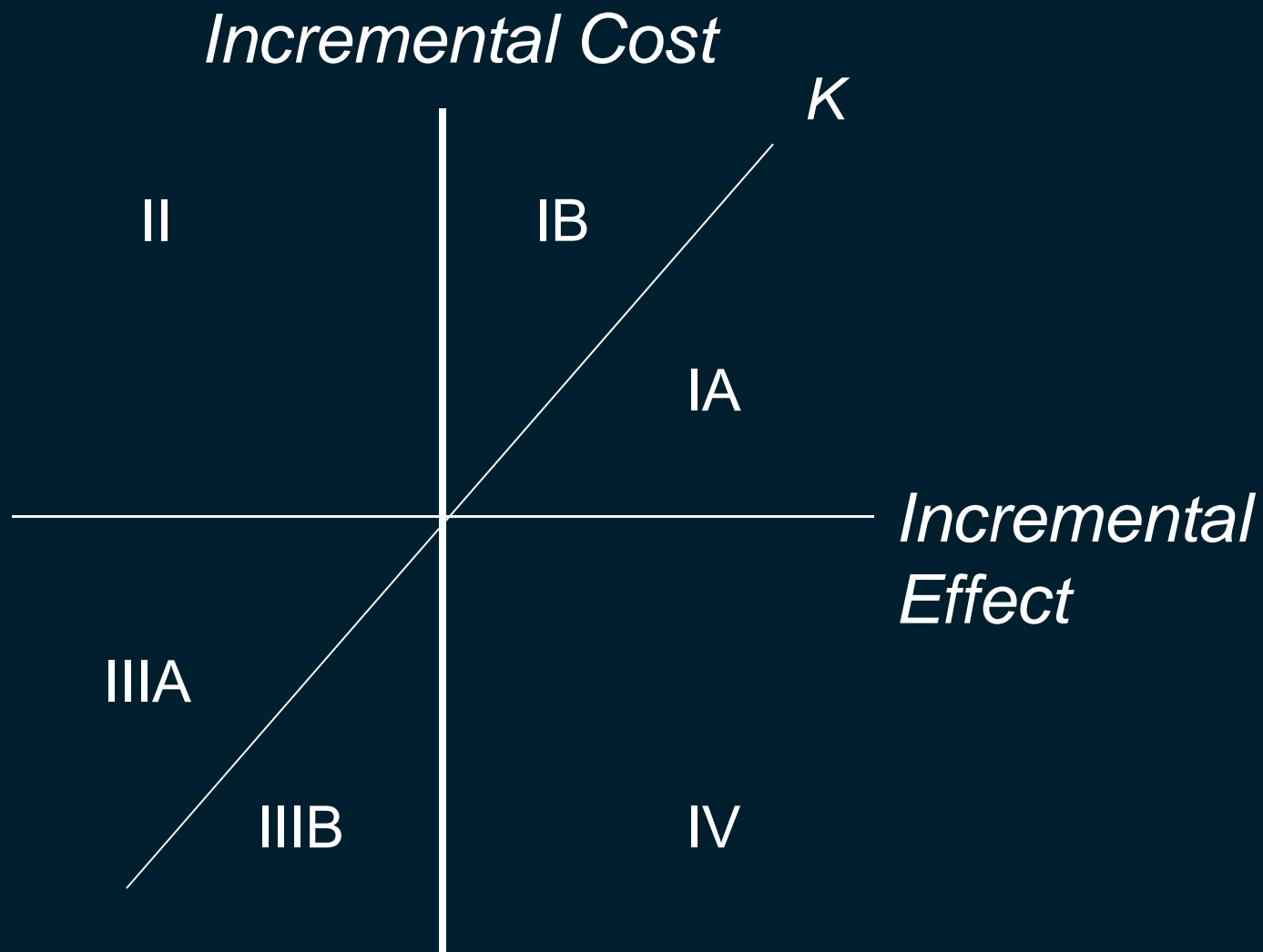
- Utilization based on medical abstraction
- Costs from utilization & Medicare prices
- Impute missing costs

Baseline Results

- LYs, QALYs & Costs
- ICER ($\Delta C/\Delta E$)
- Subset analyses
 - age, sex, smoke, co-morb

uncertainty

- Sensitivity analysis
- Scatterplot of ICE
- CE acceptability curves



Preliminary CEA

- Comparison: LDCT vs No Scr
- Effectiveness: Life-Years
- Costs: \$US (reference 2008)
- Perspective: Societal
- Time horizon: Lifetime
- Discount rate: 3%

Additional Assumptions

- 3 annual LDCT screens
- Cum positivity rate 40%
- 2 additional CTs/ positive LDCT
- Treatment costs cancel out

Years Per Screennee

Variable	Baseline
Risk ¹	0.017
RRR ¹	0.200
ARR	0.003
YLL ^{2,3}	12.000
LYGs	0.040

1. <http://www.cancer.gov/images/DSMB-NLST.pdf>
2. Brown et al. Annu Rev Public Health 2001;22:91-113
3. With adjustment for 3% discount rate

Cost Per Screen



Variable	Baseline
LDCT ¹	\$300
Non-med ²	\$100
Per screen	\$400
Per 3 screens	\$1200
Follow-up CT	\$320
Total	\$1520

1. <http://www.cms.gov/apps/physician-fee-schedule/>

2. Heitman et al. J Am Coll Radiol 2010;7:943-8

eliminary ICER

Variable	Baseline
Cost	\$1,520
LYG	0.040
ICER	\$38,000

CT Screening Costs

Perspective	Cost
Societal	\$1,520
Screennee	\$0-2500
Provider	\$???

Extrapolation from NLST

Variable

ICER

Risk ↓

↑

Screen intensity ↑

↑

Surgical effectiveness ↓

↑

Surgical mortality ↑

↑

Smoking cessation ↑

↓

Year LDCT Screening Costs



Population	Size^{1,2}	Cost³
Age 55-74, \geq 30 pkyrs	8 million	\$4 billion
Age 45-64, ever smoker	32 million	\$18 billion
Age \geq 45, ever smoker	47 million	\$26 billion
Age \geq 18, ever smoker	94 million	\$53 billion

1. <http://riskfactor.cancer.gov/studies/tus-cps/info.html>
2. MMWR Morb Mortal Wkly Rep 2009;58:1227-32
3. \$560 first year of screening (\$400 + \$160)

- “Deep” model of natural history
- Extensive sensitivity analyses
- Collaboration with NLST

SUMMARY

- LDCT screening potentially CE
- Dependent on several variables
- Costs vary by perspective
- NLST/ CISNET collaboration
- Future guidelines development