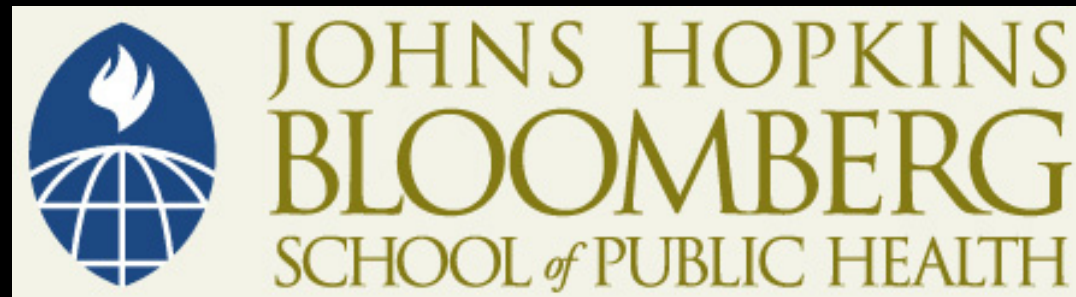


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DECISION RULES

Lecture 11

Kevin Frick

3 Types of Differences Between Alternatives

- Costs only—which costs less?
- Effects only—which is more effective?
- One is more effective and less expensive
 - More effective and less expensive is preferred
 - “Dominating” or “it dominates the other”
- One is more effective and more expensive
 - Ask whether getting the extra result for the extra expenditure is worthwhile
 - Implicit answer to “is one better than the other”

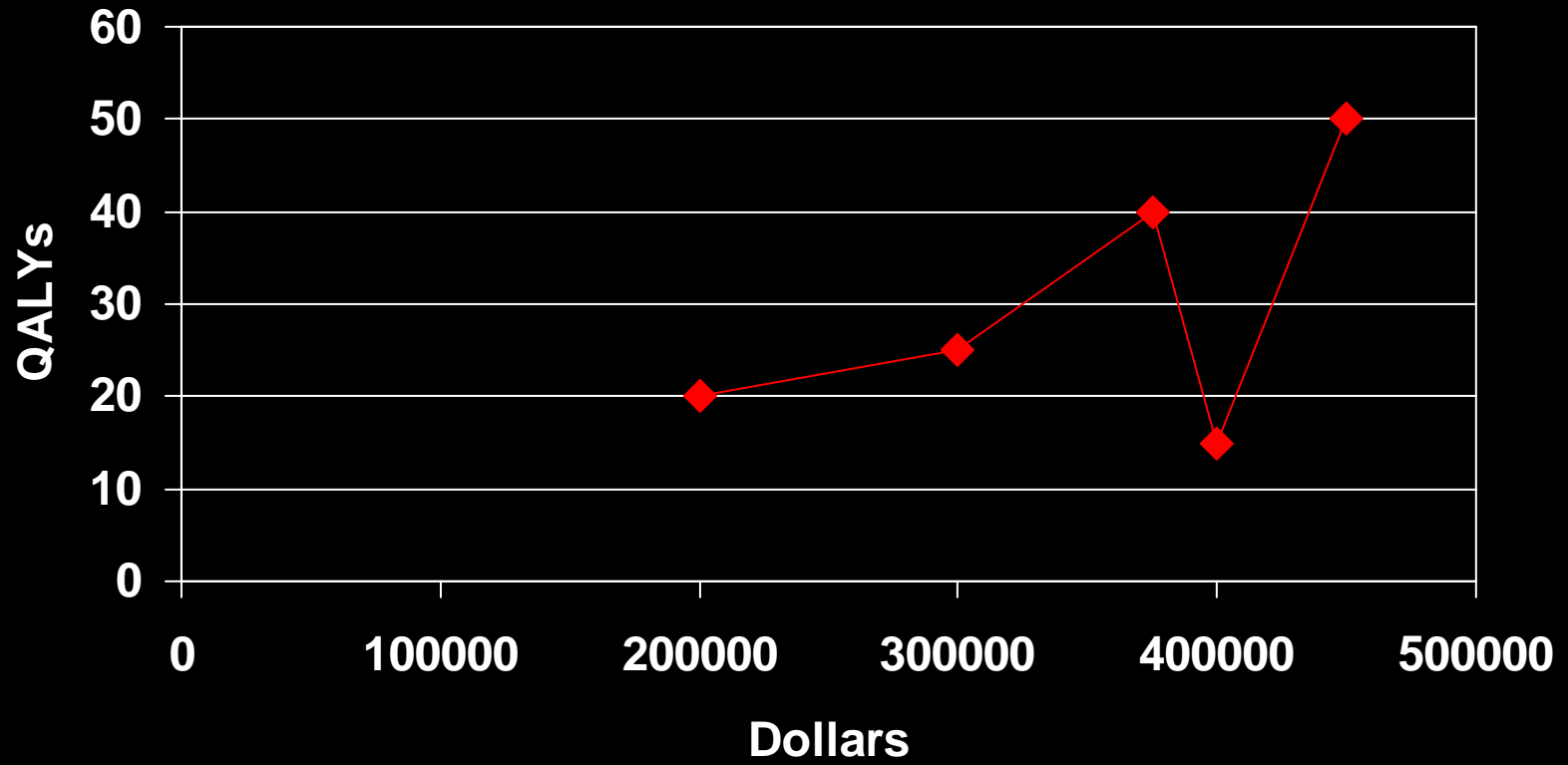
Eliminating Dominated Alternatives

- Domination
 - An alternative or combination of alternatives yields more of the outcome at the same or lower cost
- Strong domination
 - A single alternative yields more of the outcome at the same or lower cost
- Weak dominance
 - A combination of outcomes yields more of the outcome at the same or lower cost

Incremental Cost-Effectiveness Table - 1

Option	Cost	Effect	Incr. C	Incr. E	ICER
1	300000	25			
2	200000	20			
3	450000	50			
4	375000	40			
5	400000	15			

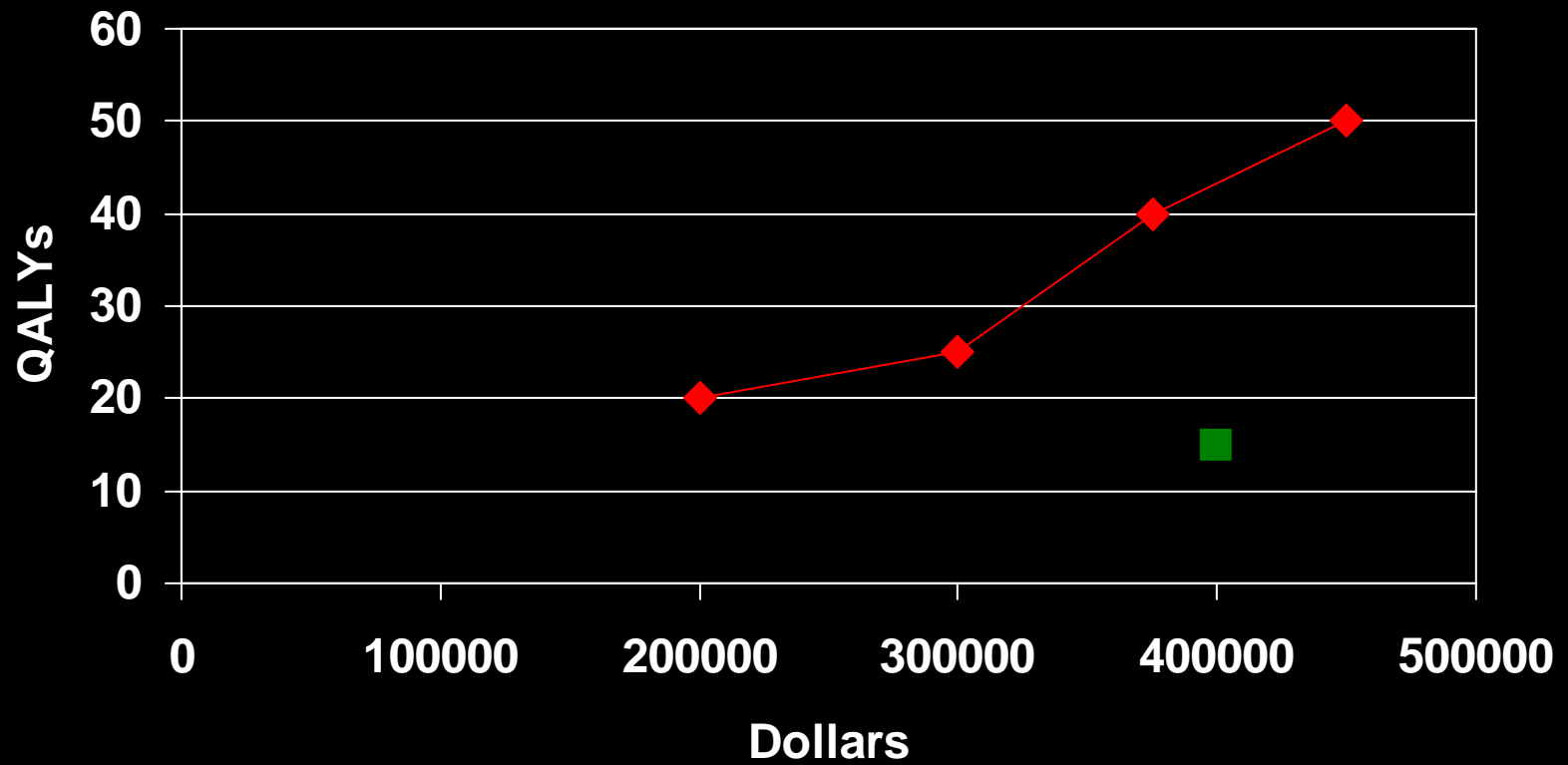
Graph - 1



Incremental Cost-Effectiveness Table - 2

Opt.	Cost	Effect	Incr. C	Incr. E	ICER
2	200000	20			
1	300000	25			
4	375000	40			
3	450000	50			

Graph - 2



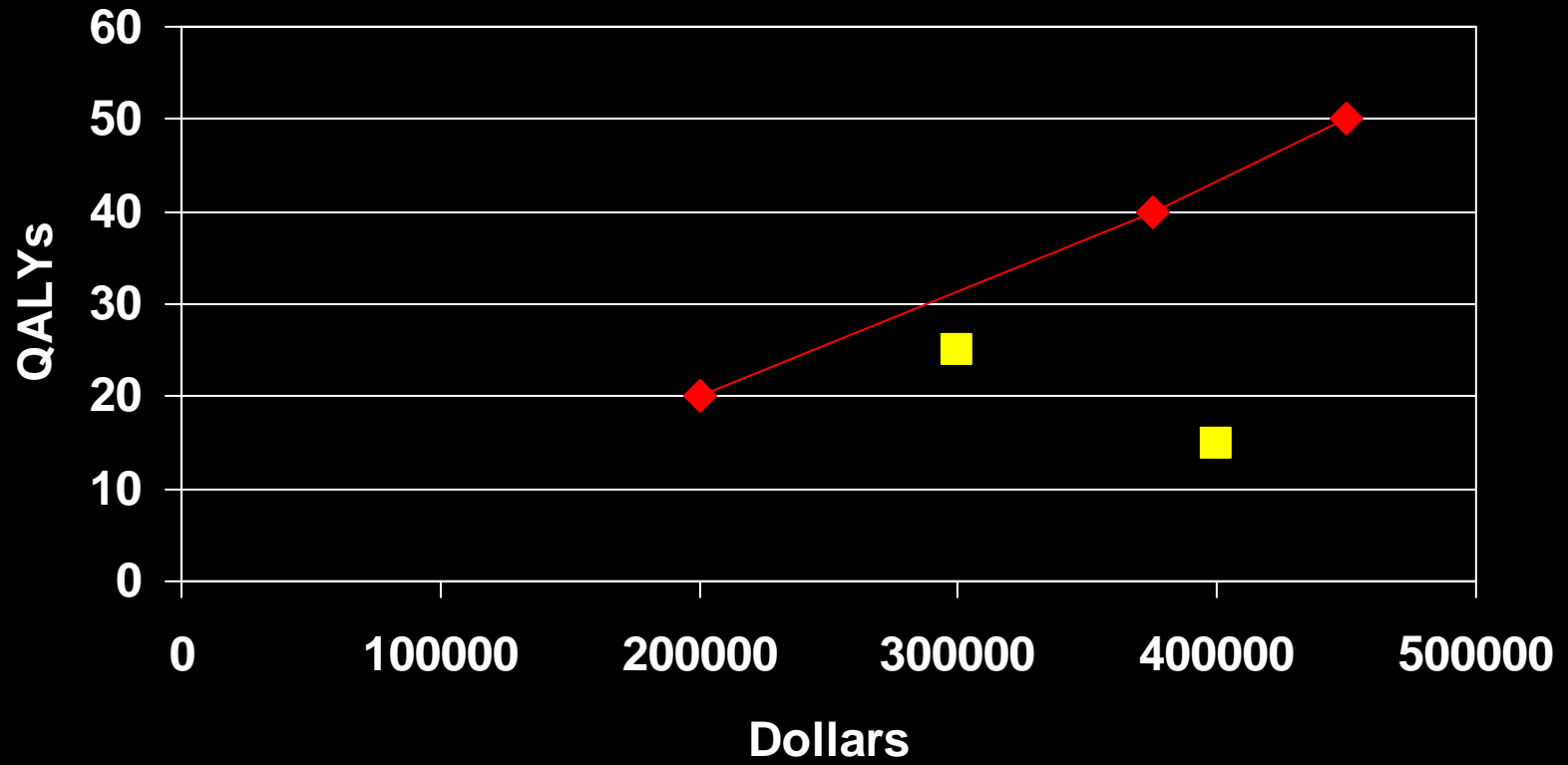
Incremental Cost-Effectiveness Table - 3

Opt.	Cost	Effect	Incr. C	Incr. E	ICER
2	200000	20			
1	300000	25	100000	5	20000
4	375000	40	75000	15	5000
3	450000	50	75000	10	75000

Incremental Cost-Effectiveness Table - 4

Opt.	Cost	Effect	Incr. C	Incr. E	ICER
2	200000	20			
4	375000	40	175000	15	11667
3	450000	50	75000	10	7500

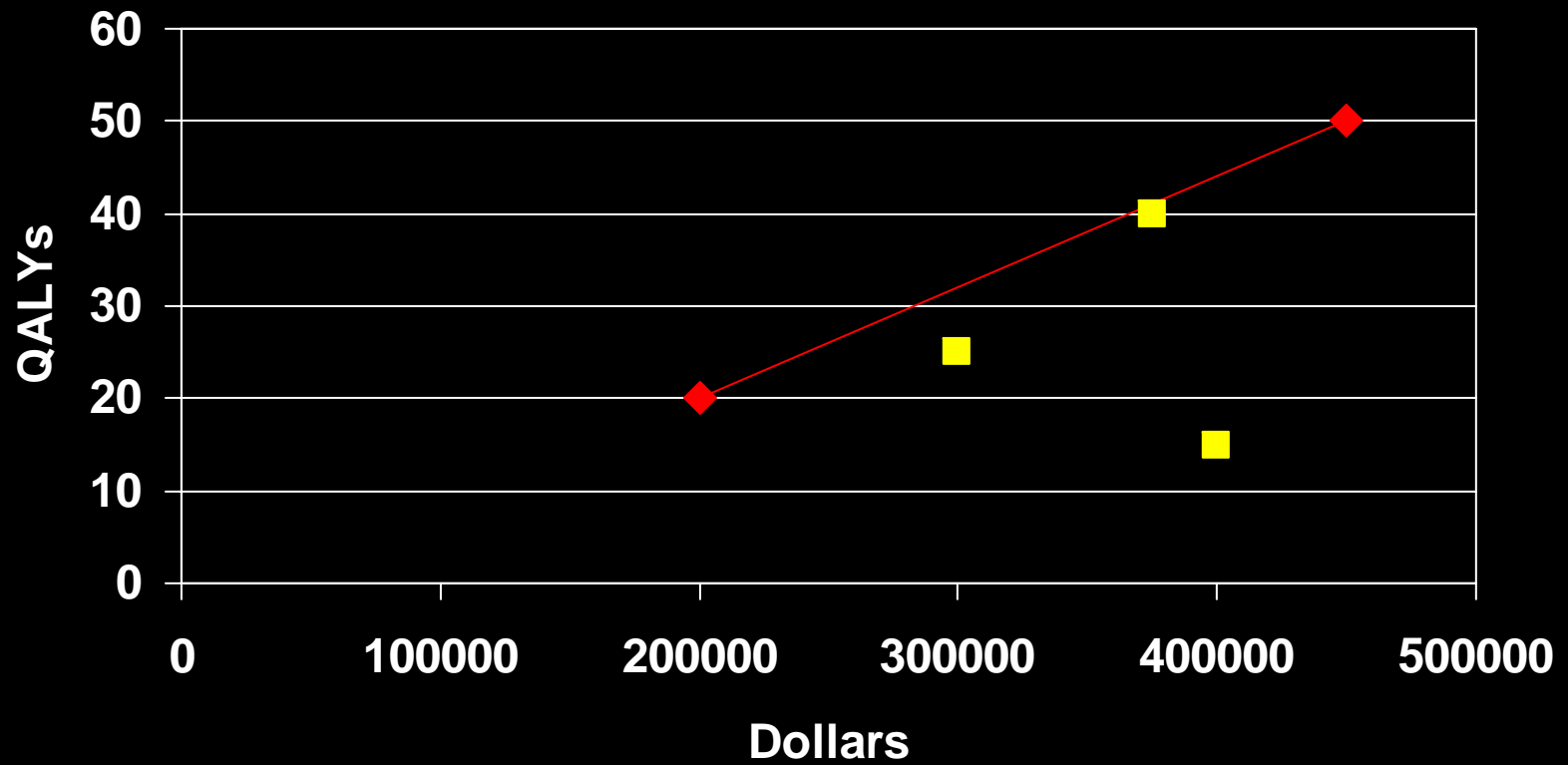
Graph - 3



Incremental Cost-Effectiveness Table - 4

Opt.	Cost	Effect	Incr. C	Incr. E	ICER
2	200000	20			
3	450000	50	250000	30	8333

Graph - 4



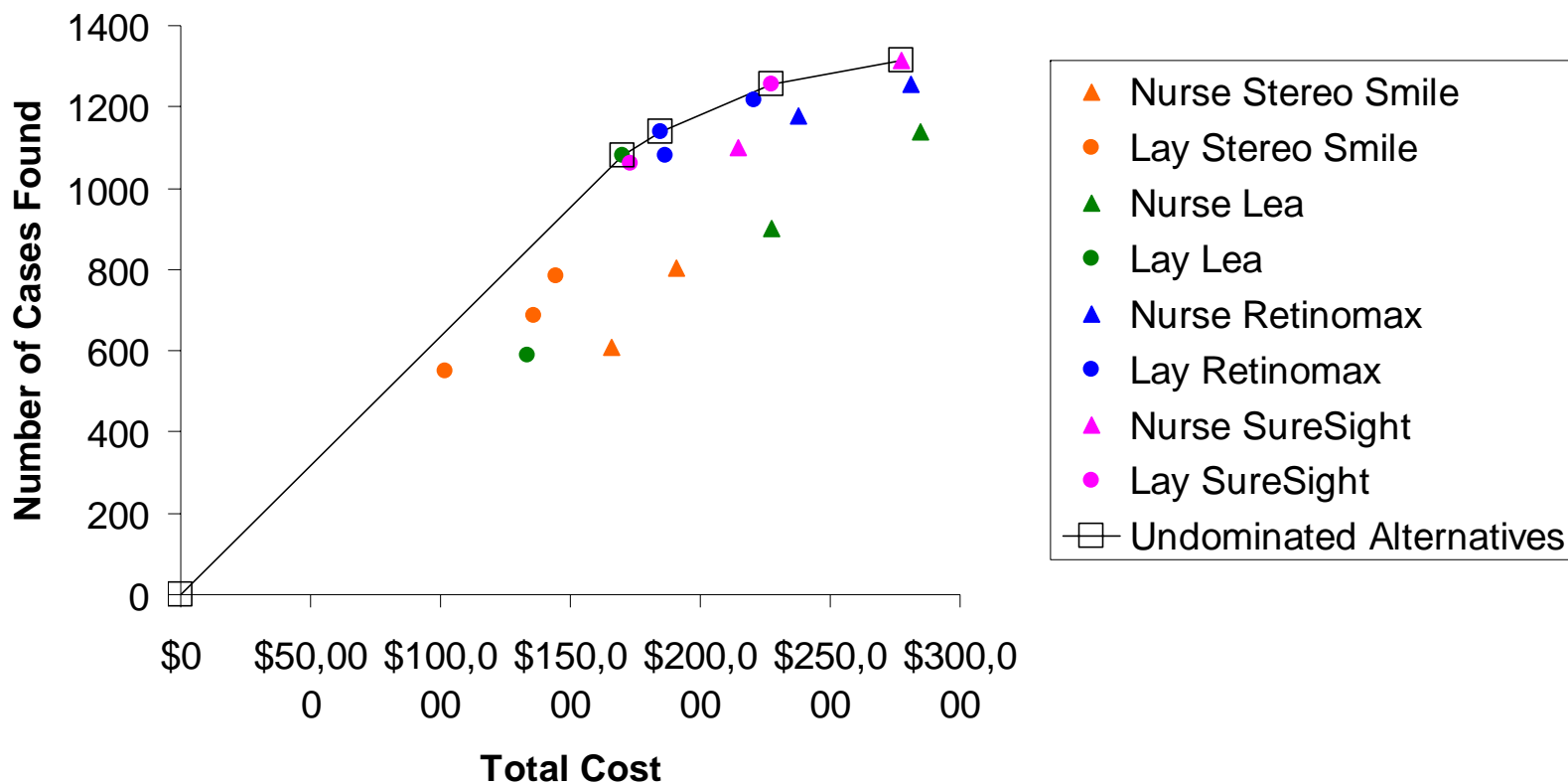
End Result of Eliminating Undominated Alternatives

- Alternatives should be ordered by
 - Cost
 - Effect
 - Incremental cost-effectiveness
- Never report a negative ICER
 - Nearly impossible to interpret

Reminders about Eliminating Dominated Alternatives - 1

- We are not always seeking to get down to just two alternatives
- We are seeking to eliminate dominated alternatives no matter how many that leaves
- Weak dominance only occurs when a combination of alternatives dominate a third
- Strong dominance means that one alternative dominates another although there could be more than one alternative that dominates one other

#1 - Incremental Cost-Effectiveness--High Volume, Lay Volunteers, Average Wage Nurses, Total Retail Cost of Devices, Ophthalmologist Follow-Up, Health Care System Perspective



Reminders about Eliminating Dominated Alternatives - 2

- Weak dominance doesn't literally mean a combination of two alternatives
 - Although this is one interpretation
 - Think about the economic concept of diminishing marginal returns
 - Dollars are the input
 - QALYs or other effect are the output

Reminders about Eliminating Dominated Alternatives - 3

- Once have eliminated dominated alternatives then ask starting from the least expensive alternative is it “worthwhile” to go to the next most expensive alternative
 - May not have sufficient resources for next alternative
 - May have some other use (often aimed at a different condition and not in the same set of alternatives) that is a “better buy”

Determining What is a Good Buy

- Reason for cost utility analysis as all outcomes can be summarized in QALYs
- Suggestion of less than \$50K per QALY in the United States
 - At present, the origins of this figure are under debate
 - More than \$100K/QALY is considered definitely too expensive, although this is also under debate

Example of a Bad Cost-Effectiveness Analysis - 1

Alternative	Cost	6 Min. Walking Distance (ft)
Education	343.98	1349
Aerobic	323.55	1507
Resistance	325.20	1406

Sevick et al., *Medicine & Science in Sports & Exercise*, 2000, 1534-1540.

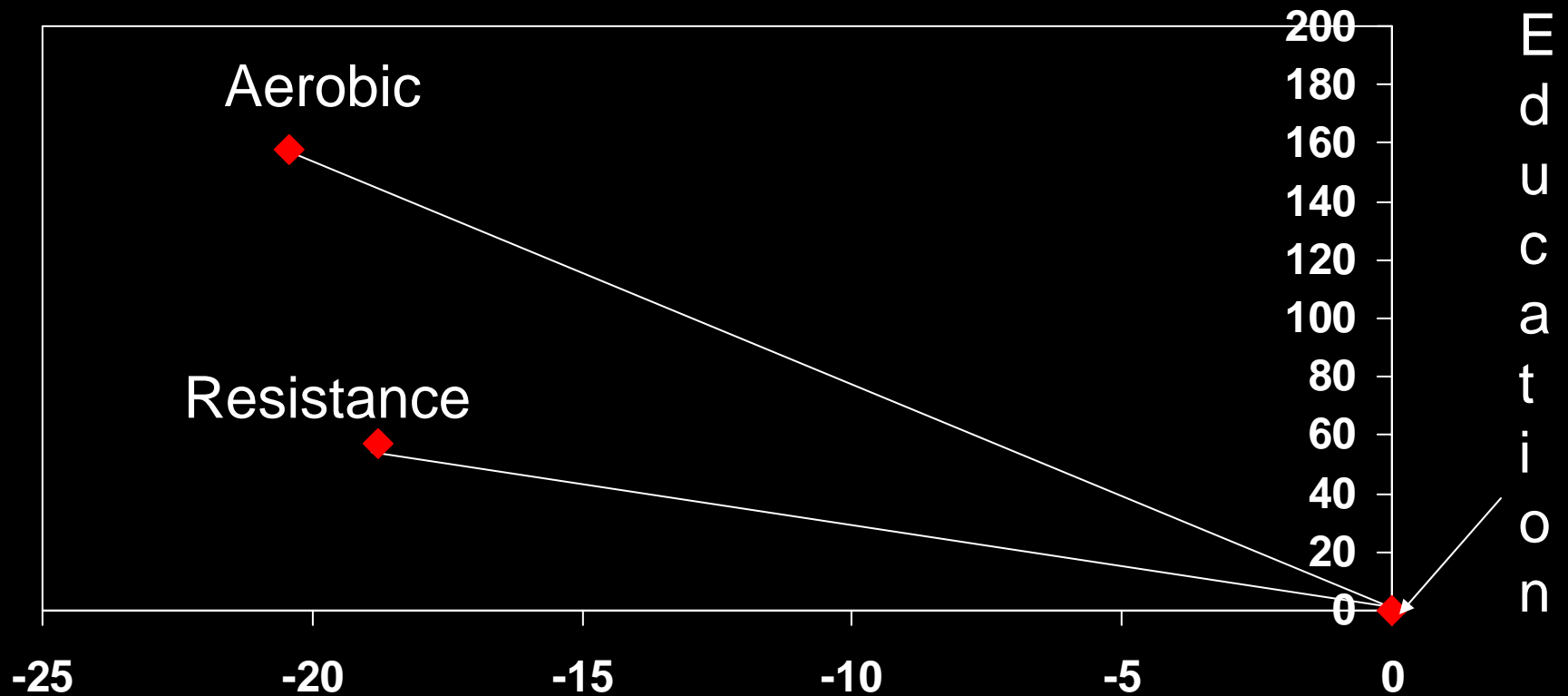
Example of a Bad Cost-Effectiveness Analysis - 2

	Incremental Cost	Incremental Effect (ft)
Aerobic – Education	-\$20.43	158
Resistance - Education	-\$18.78	57

Example of a Bad Cost-Effectiveness Analysis - 3

	Reported ICER
Aerobic – Education	-\$0.13/ft
Resistance - Education	-\$0.33/ft

Example of a Bad Cost-Effectiveness Analysis - 4



Corrected Interpretation of Bad Cost-Effectiveness Analysis

- The authors conclude “The data obtained from this study suggest that, compared with education control, resistance training for seniors with knee OA is more economically efficient than aerobic exercise in improving physical function, when self-reported disability and various measures of physical function are the outcome variables considered.”
- The reanalysis makes it clear that we should conclude that aerobic dominates education and resistance

Details on CBA decision rules

- Alternatives with negative net benefits should not be considered
- With no constraints, maximize net benefits by choosing all alternatives with positive net benefits
- If all are mutually exclusive, choose one with maximum net benefits

More details on CBA decision rules

- Resource constraint, not mutually exclusive
 - Rank alternatives by net benefits to amount of constrained resource (dollars in budgetary case)
 - Choose alternatives in descending order until resources are used up
 - Can get a little complex when the resource is not exactly used up
- Goal is not to choose highest B-C ratio
 - Sometimes order of ratios will be the same

Worked CBA example with resource constraint

- | Alt. | Cost | Net Benefit (1000's) | NB-C Ratio |
|------|---------|----------------------|------------|
| A | 200,000 | 1000 | 5 |
| B | 150,000 | 100 | 2/3 |
| C | 75,000 | 500 | 6 2/3 |
| D | 125,000 | 375 | 3 |
| E | 250,000 | 375 | 1.5 |
| F | 200,000 | 400 | 2 |
| G | 150,000 | 600 | 4 |
| H | 100,000 | 125 | 1.25 |
- With 1,000,000 choose C, A, G, D, F, E
 - With 900,000 choose first five plus H
 - With 950,000 choose same