Policy Evaluation in Public Health

CDC's Office on Smoking and Health Surveillance and Evaluation Webinar
January 29, 2015

Office of the Associate Director for Policy
Centers for Disease Control and Prevention
http://www.cdc.gov/policy/

Disclaimer

- The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Overview of the CDC Policy Process

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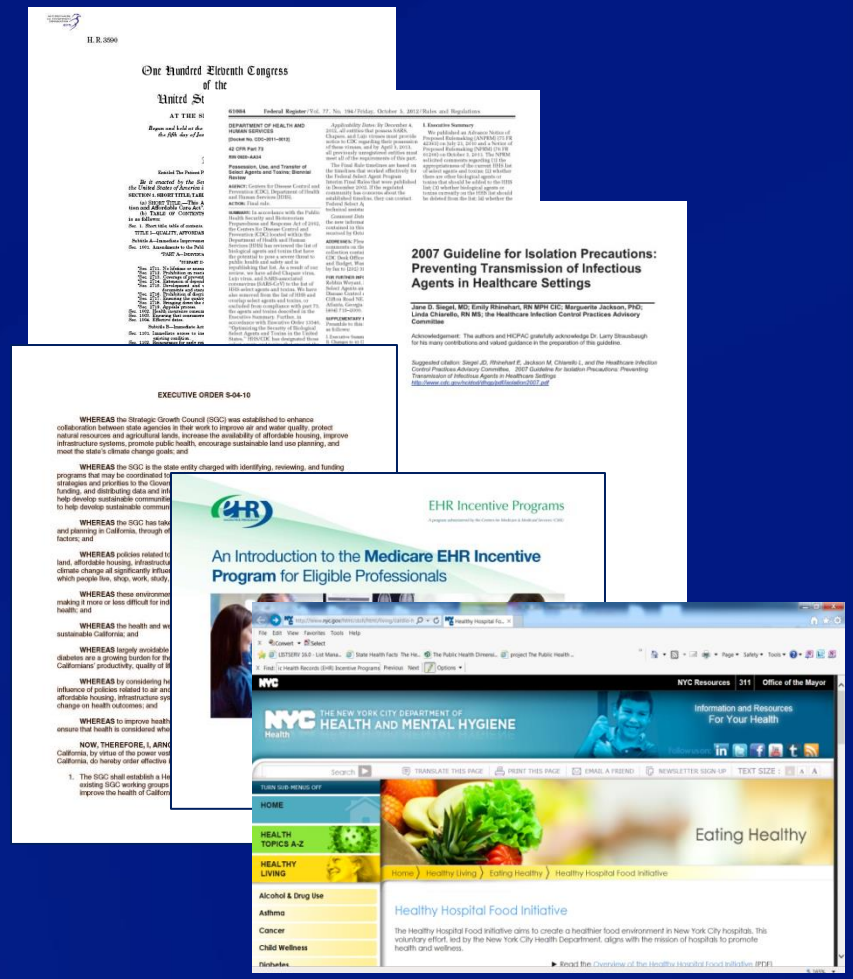
Poll:

How would you describe your policy experience?

Experience Level	
Policy newbie: Unfamiliar territory. (Subtitled: “Uh... How do you spell ‘policy’?”)	
Policy dabbler: Familiar with basic concepts; could impress during cocktail conversation	
Policy proficient: Have put concepts into action. People come to me for advice.	
Policy wonk: “I live, eat and breath policy.”	

What is "Policy"?

- Law, regulation, procedure, administrative action, incentive, or voluntary practice
- Implemented by governments and other institutions
- Frequently reflected in resource allocations



Why Policy?

- Policy is a major driver and facilitator of change in population health
  - Policy development is an essential public health function[1,2]

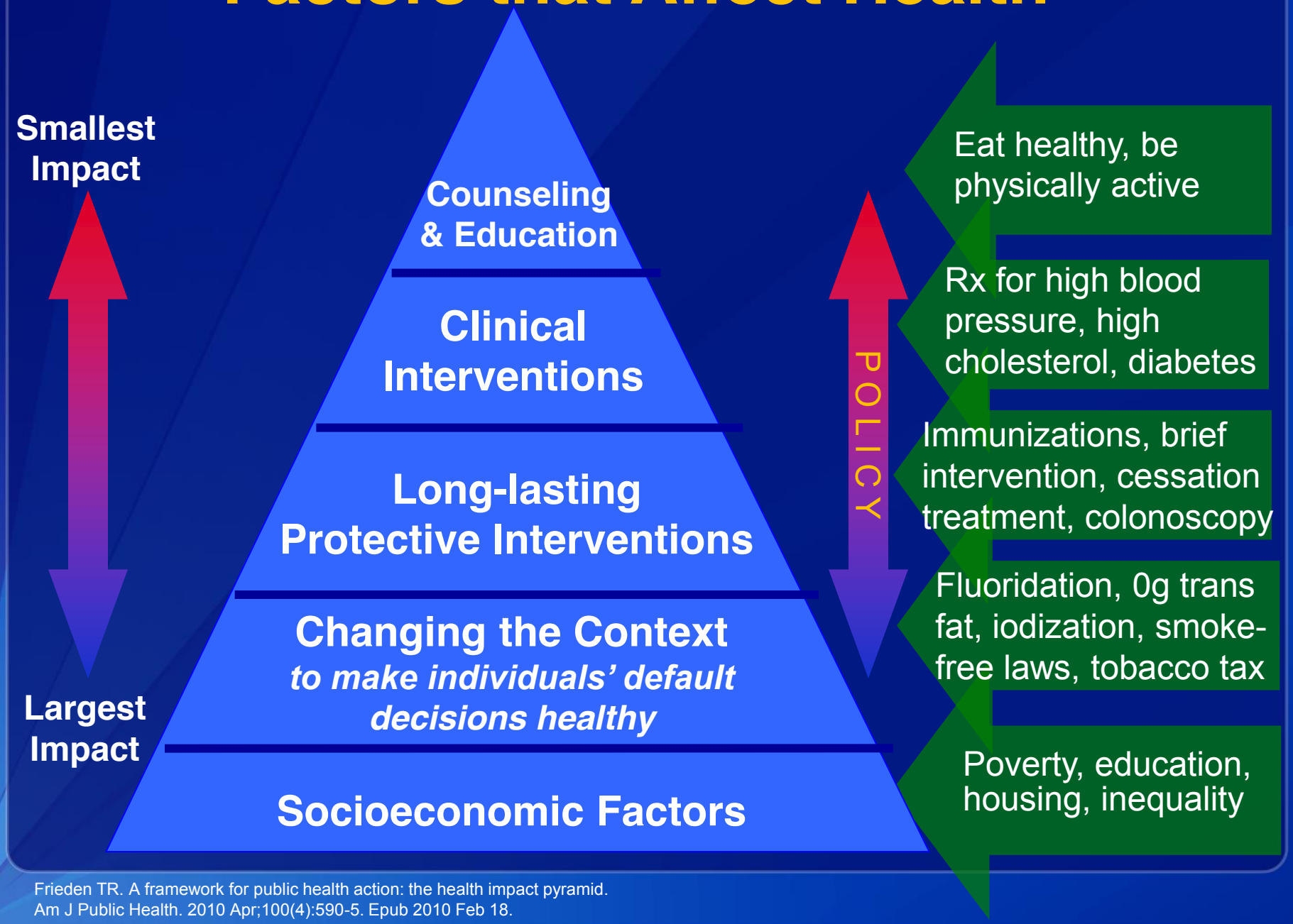
- Policies can be standardized, measured, evaluated, and replicated

[1]Institute of Medicine (U.S.). The Future of Public Health. Washington, D.C.: National Academy Press; 1988.
[2]Public Health Functions Steering Committee, The Ten Essential Public Health Services http://www.health.gov/phfunctions/public.htm

CDC Policy Vision

- Policy is understood, valued and utilized as an essential component of public health.
- Achieve the vision through:
  - Providing the evidence base for policy interventions to improve population health
  - Translating science to make it accessible to policy makers.

Factors that Affect Health



Frieden TR. A framework for public health action: the health impact pyramid.
Am J Public Health. 2010 Apr;100(4):590-5. Epub 2010 Feb 18.

CDC's Policy Process

- The goal of CDC's Policy Process is to foster a common understanding of what policy is and the process by which it is conceptualized, developed, adopted, and evaluated.

- In the ideal scenario, a problem is defined, potential policy solutions are identified, analyzed, and prioritized, and the best solution is adopted and evaluated.

http://www.cdc.gov/policy/process/index.html

Choose Policies with Significant Impact and High Likelihood of Adoption

CDC's Policy Process

Domains:

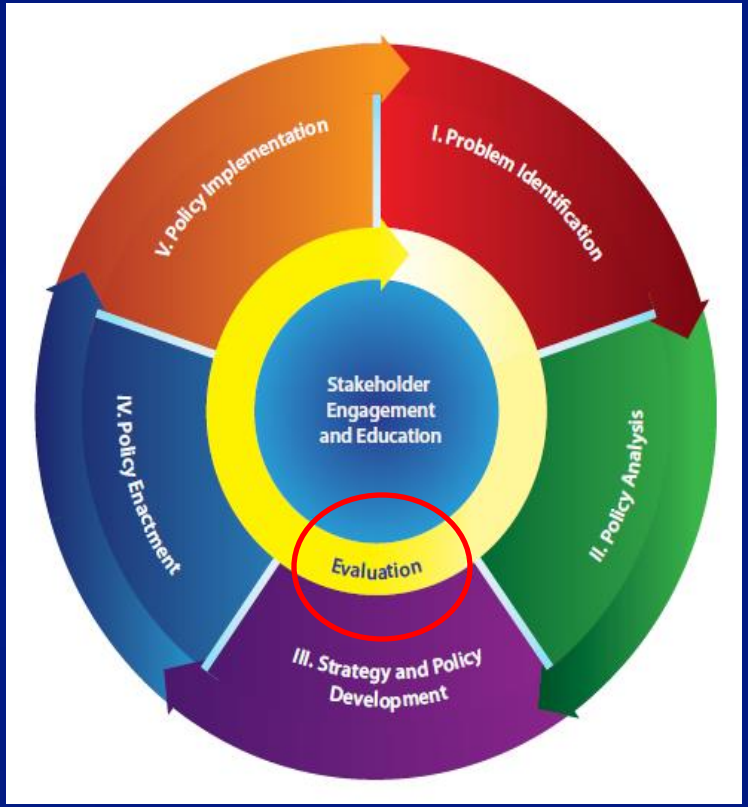
I. Problem Identification

II. Policy Analysis

III. Strategy & Policy Development

IV. Policy Enactment

V. Policy Implementation



Cross-cutting domains:

Stakeholder Engagement & Education

Evaluation

http://www.cdc.gov/policy/process/index.html

Applying the CDC Evaluation Framework to Policy Interventions

Jennifer L. Matjasko, PhD
Behavioral Scientist

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Overview

- Evaluation and the Policy Process
- Distinct Aspects of Policy Evaluation
- The CDC Evaluation Framework and Policy: Unique Considerations
- The Policy Process and Smoking and Health: A Few Examples
- Conclusions

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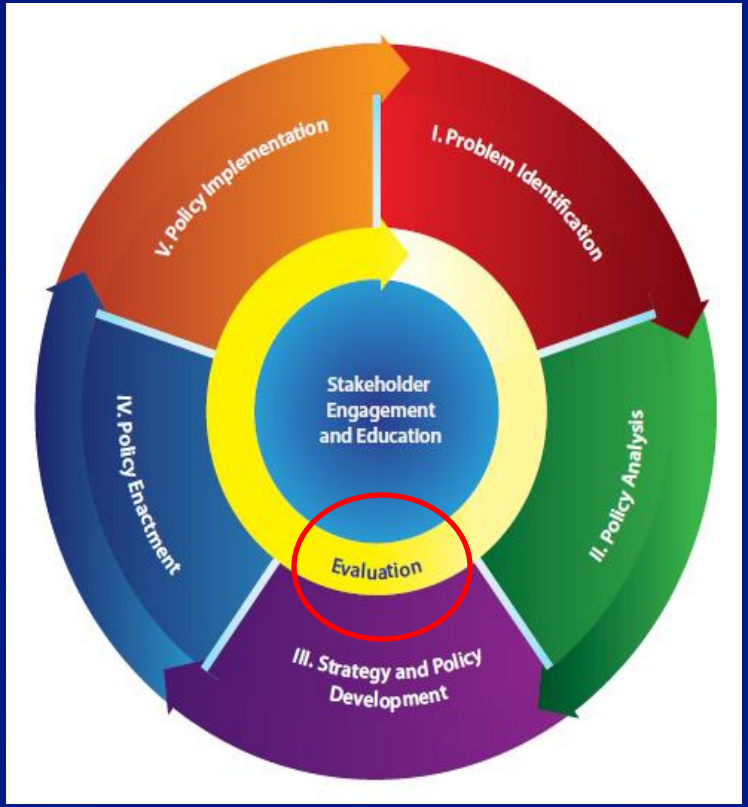
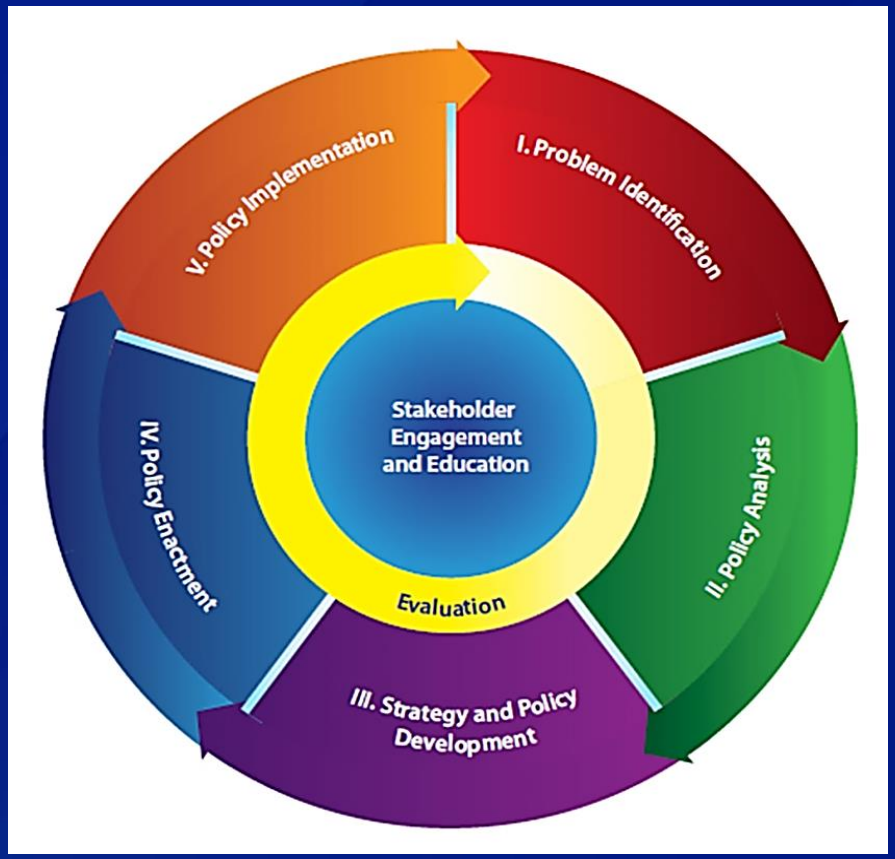


http://www.cdc.gov/policy/process/index.html

What is Policy Evaluation?

Policy evaluation is the systematic collection and analysis of information to make judgments about contexts, activities, characteristics, or outcomes of one or more domains of the policy process.

Purpose of Evaluation by Policy Process Domains



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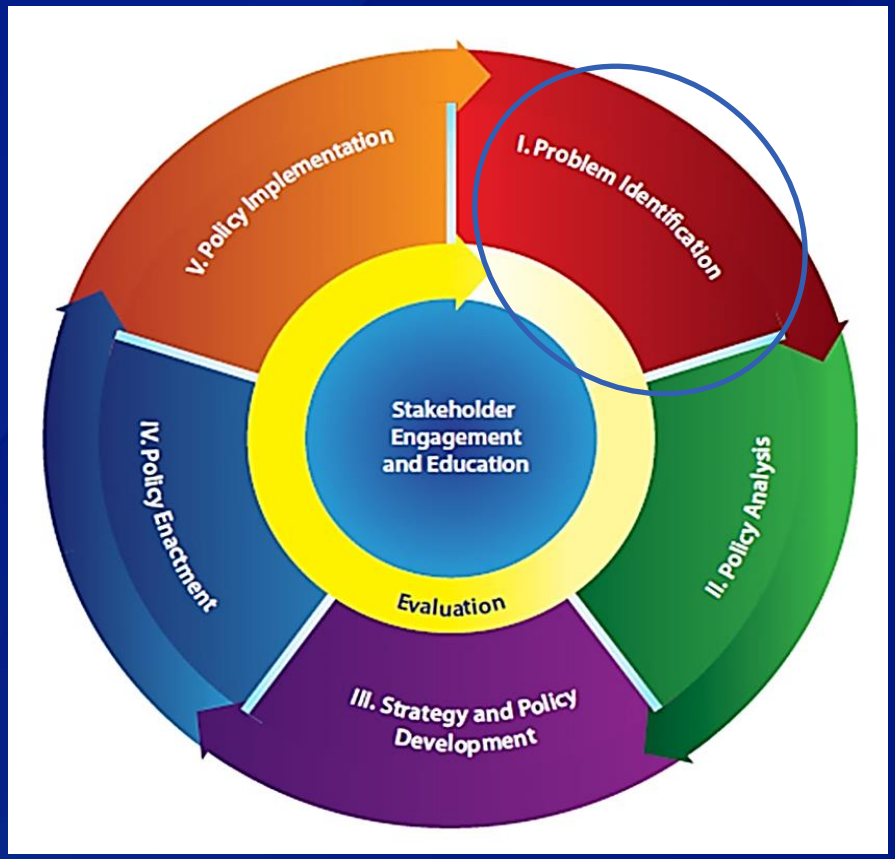

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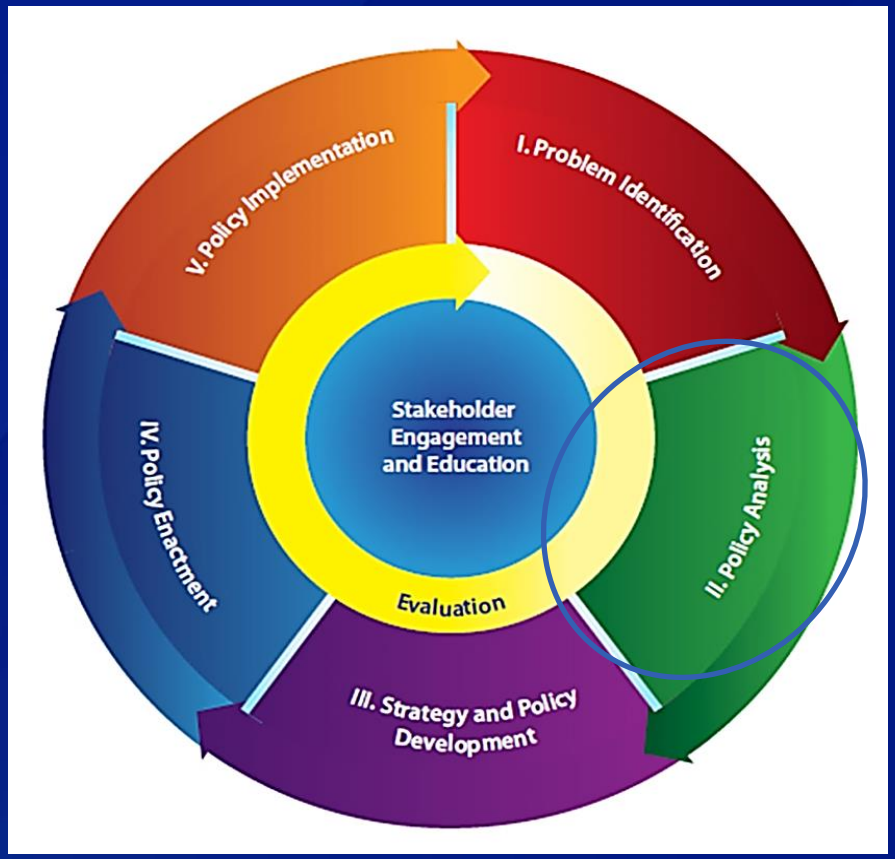

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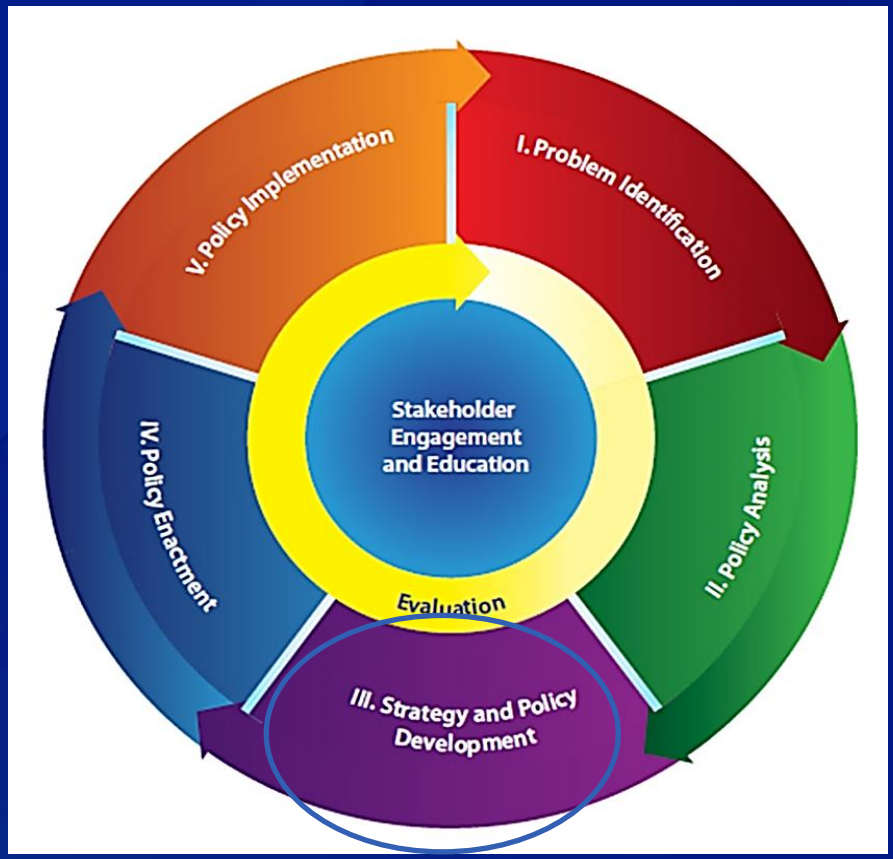

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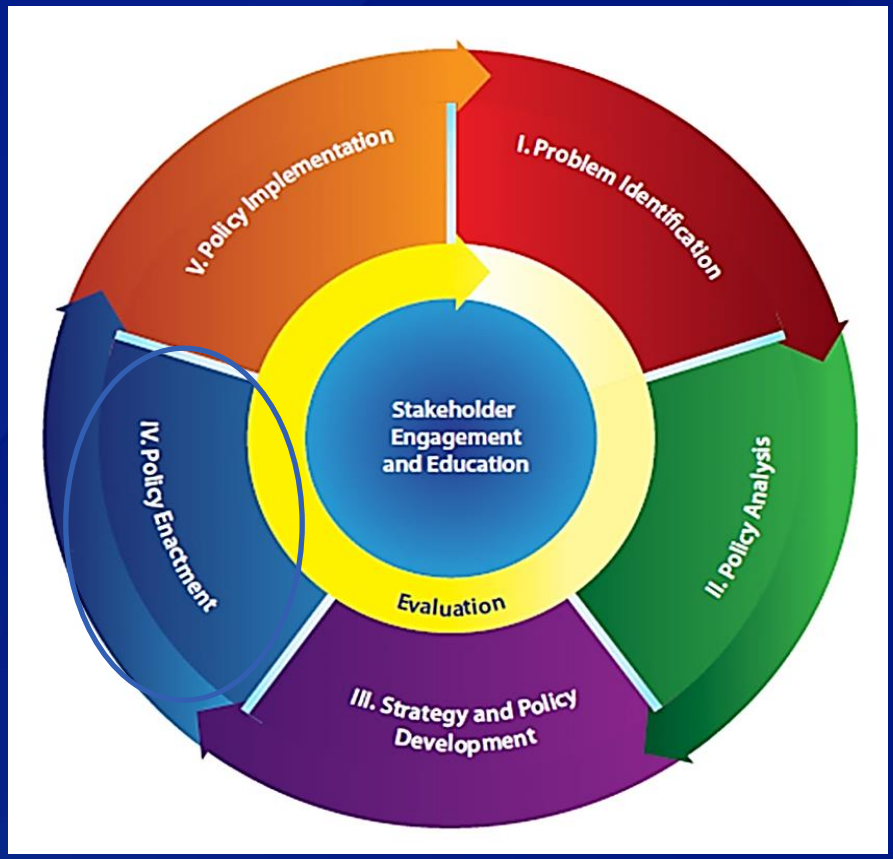

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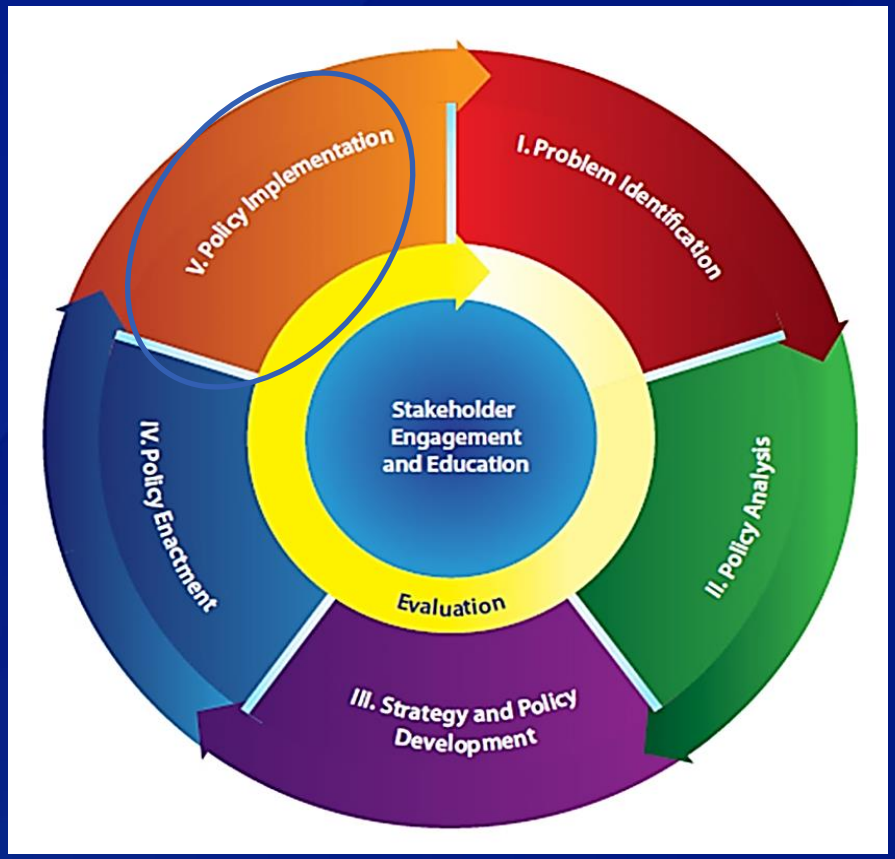
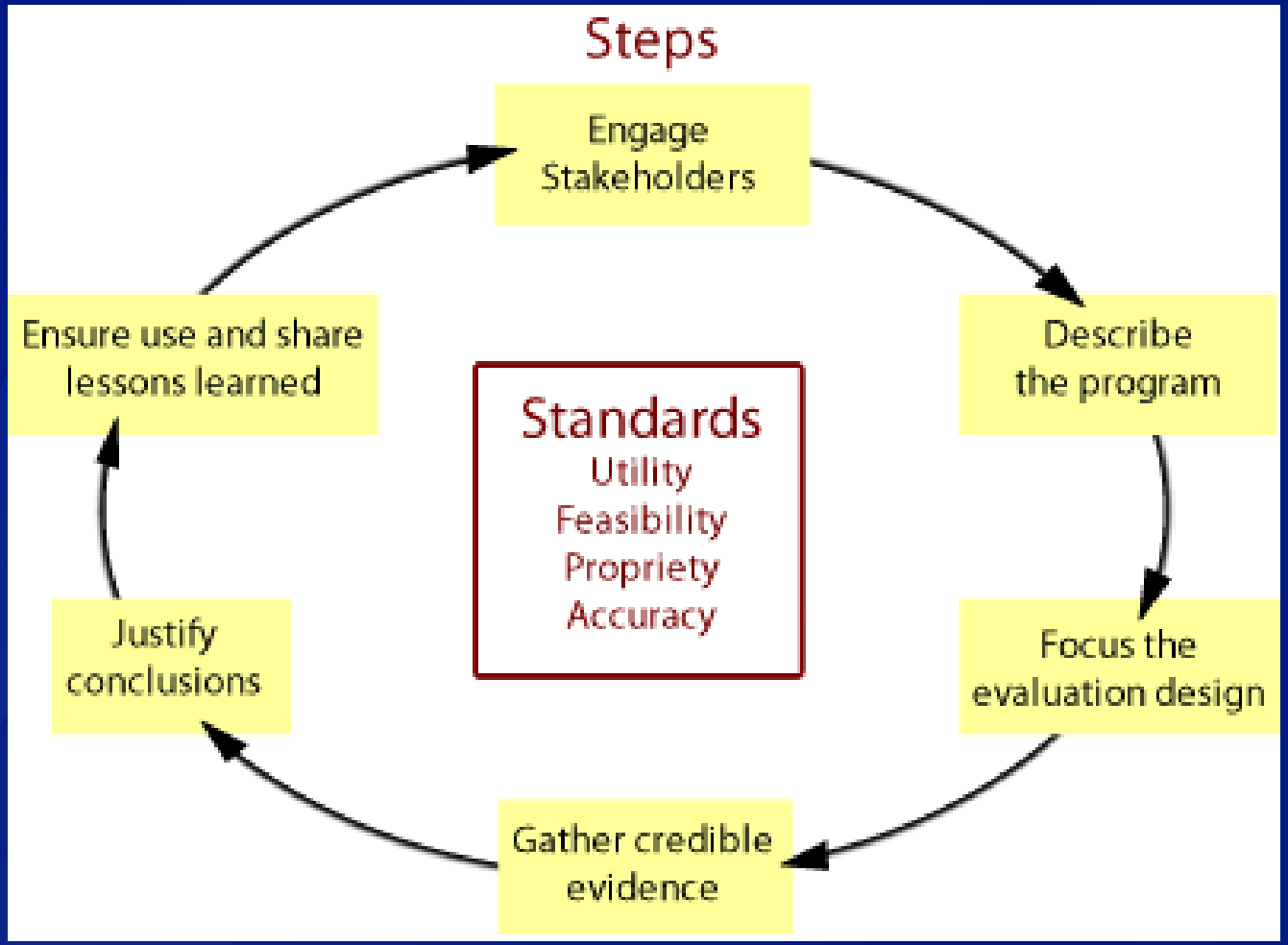


Why Evaluate Policy?

- Document and inform the policy development, adoption, and implementation process
- Determine policy effectiveness
- Gauge support
- Assess compliance
- Build evidence base
- Inform future policy efforts

Policy Evaluation and The CDC Evaluation Framework



http://www.cdc.gov/eval/framework/

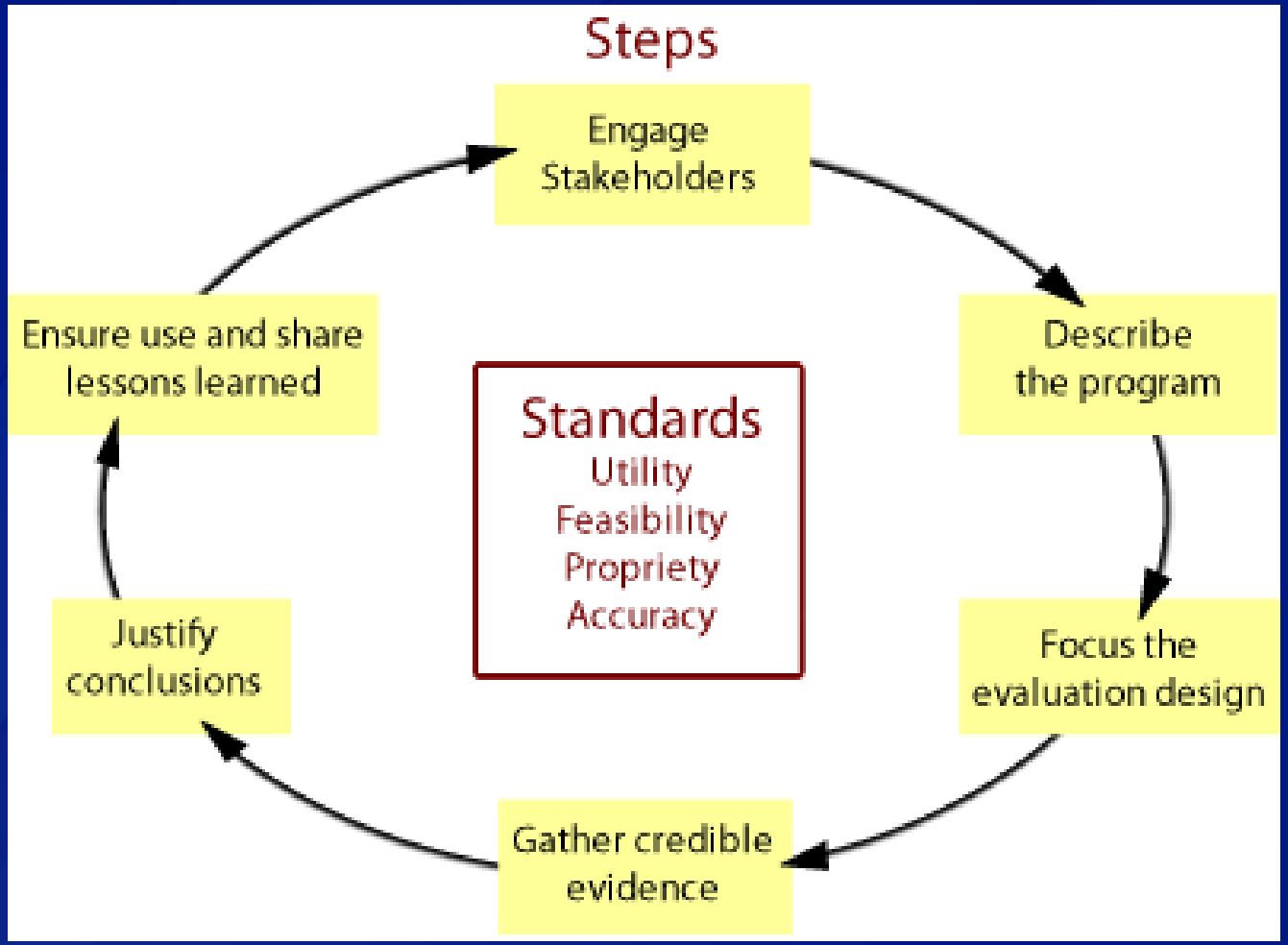
Quiz: What are the distinctions between program and policy evaluation?

Determine which statements apply to program evaluation and which apply to policy evaluation. Choose the appropriate options now:

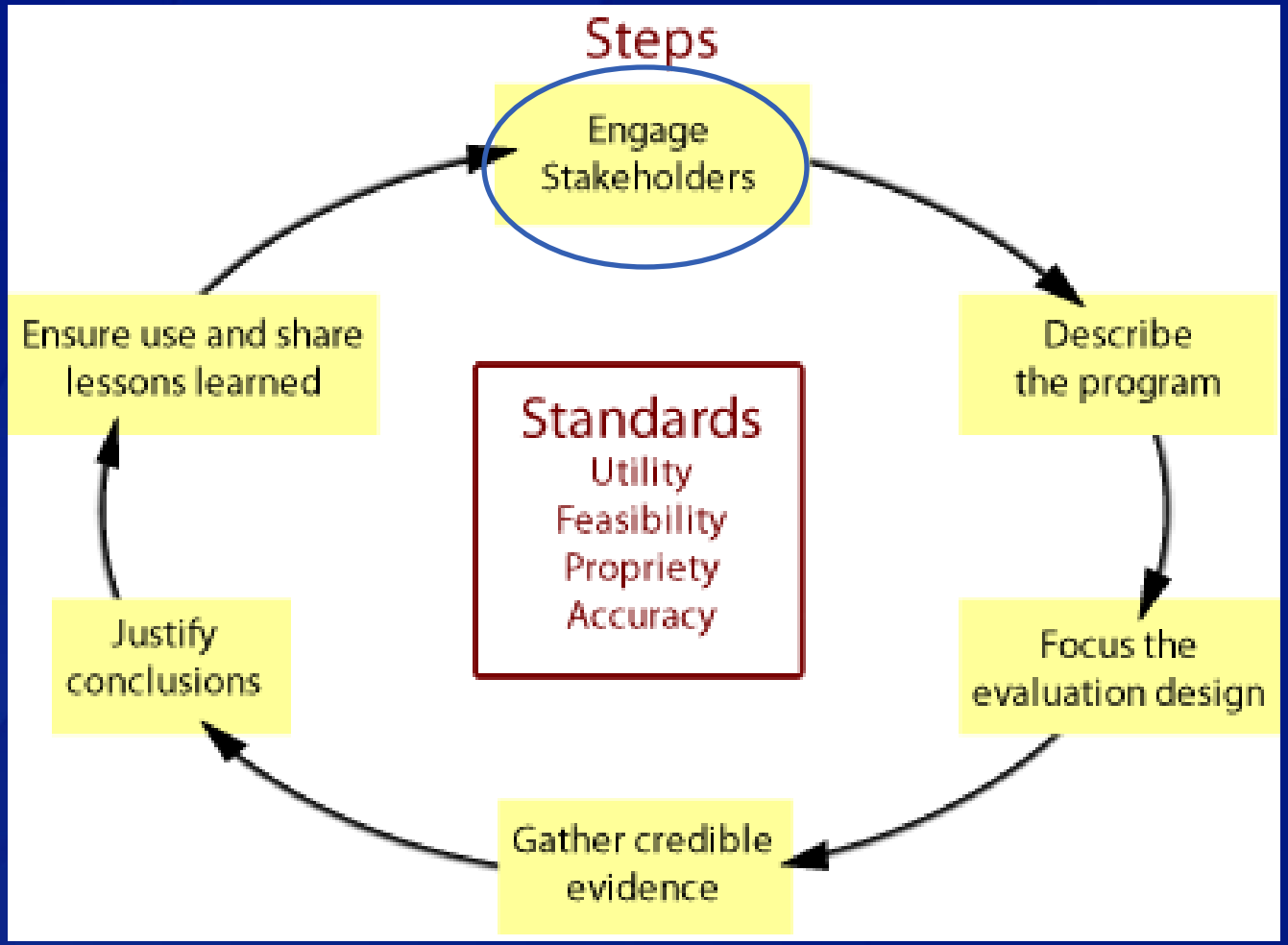
Domain	Program	Policy
People often choose to participate or receive services.	☐	☐
Data collection generally occurs at the system and community levels.	☐	☐
The timeframe is likely to be known and defined by a specific funding period.	☐	☐

Considerations for Policy Evaluation

The CDC Evaluation Framework



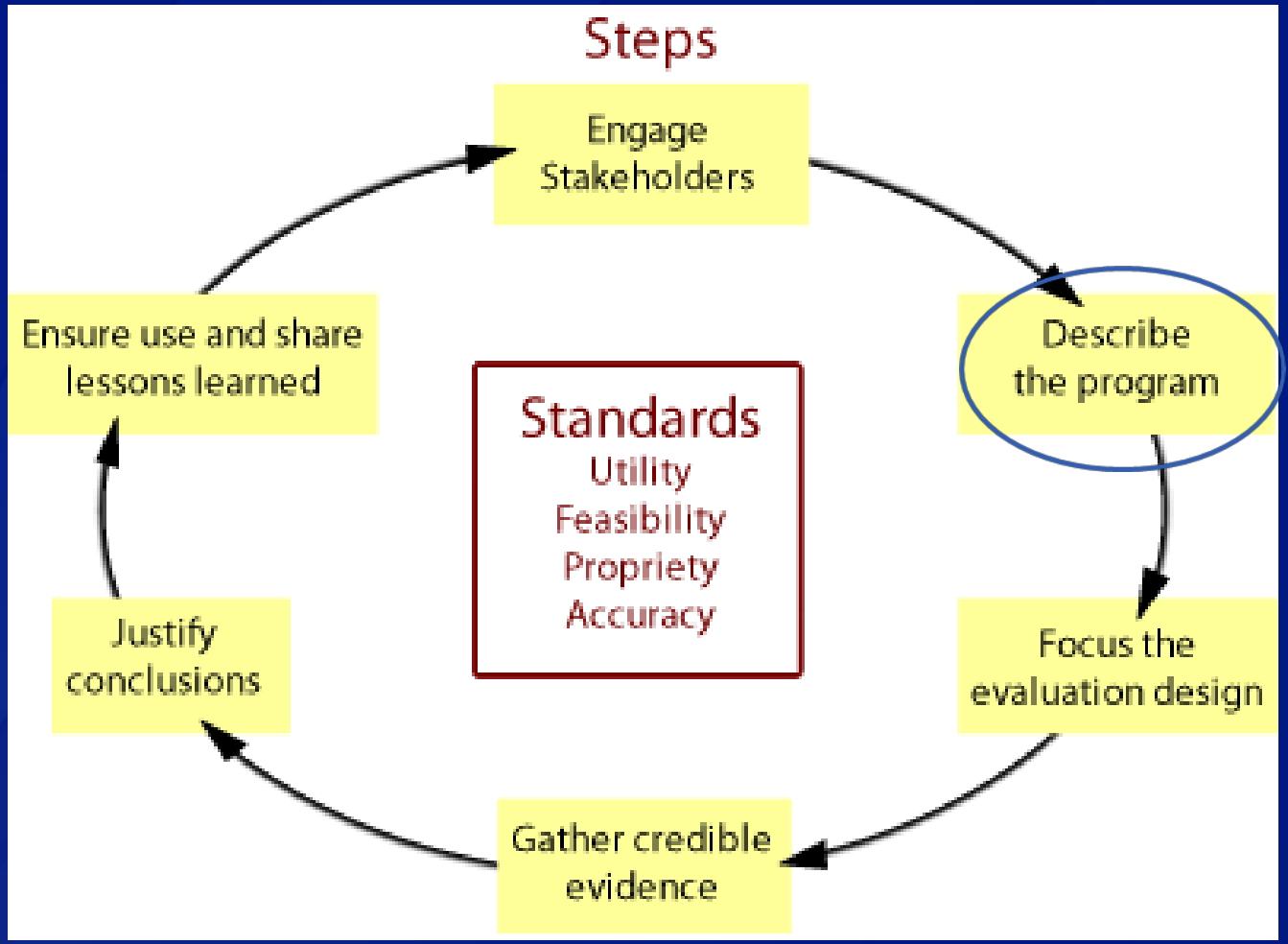
The CDC Evaluation Framework



The CDC Evaluation Framework: Engaging Stakeholders

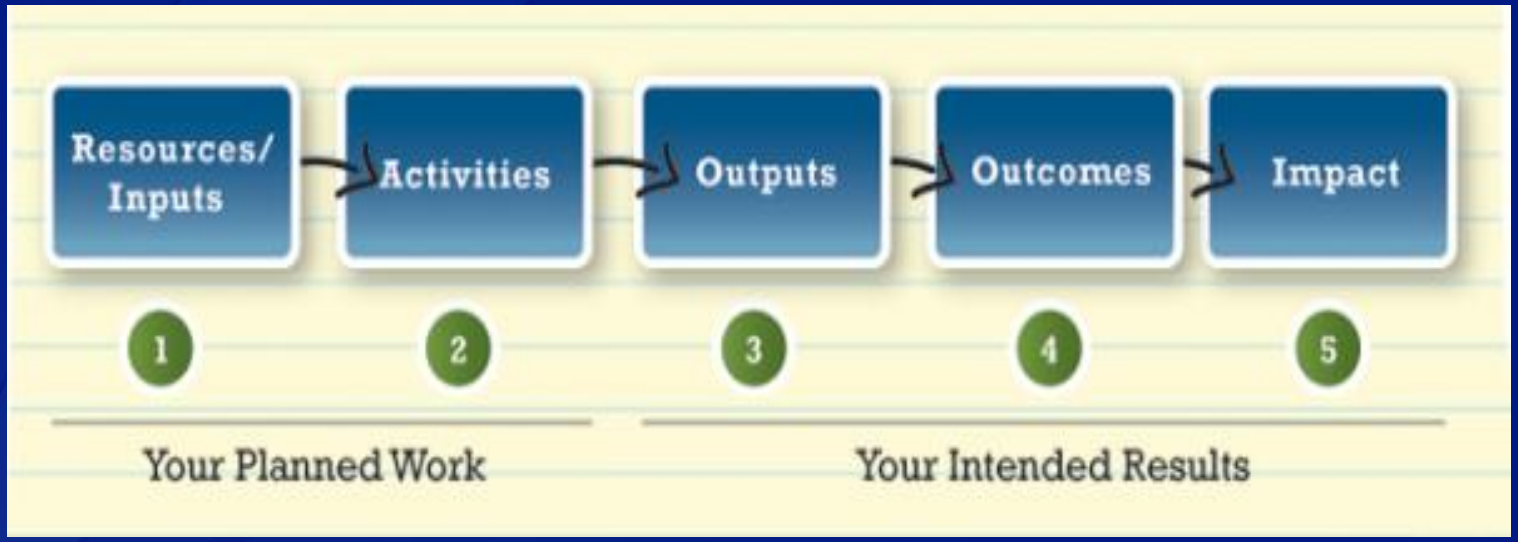
Type of Stakeholder	Key Skills/Expertise	Key Roles
Policy Experts	▪ ***Expertise in policy process*** ▪ ***Understanding of critical policy content and implementation factors***	▪ ***Describing the policy*** ▪ ***Focusing the evaluation design*** ▪ ***Justifying results*** ▪ ***Ensuring use and lessons learned***
Evaluation Experts	▪ Evaluation design and methodology ▪ Statistical expertise	▪ Focusing the evaluation ▪ Gathering credible evidence ▪ Justify conclusions
Subject Matter Experts	▪ Subject matter expertise ▪ Contextual knowledge	▪ Engaging stakeholders ▪ Describing the policy ▪ Justifying conclusions ▪ Ensuring use and lessons learned
Those Impacted by Policy	▪ ***Contextual knowledge*** ▪ ***Knowledge of barriers and facilitators to implementation and evaluation*** ▪ ***Familiarity with data sources*** ▪ ***Alternative perspective on meaning of results***	▪ ***Engaging stakeholders*** ▪ ***Describing the policy*** ▪ ***Gathering credible evidence*** ▪ ***Justifying conclusions*** ▪ ***Ensuring use and lessons learned***
Decision makers and those responsible for adopting, implementing and enforcing the policy	▪ ***Contextual knowledge*** ▪ ***Understanding of critical policy content and implementation factors*** ▪ ***Knowledge of barriers and facilitators to implementation and evaluation*** ▪ ***Alternative perspective on meaning of results***	▪ ***Engaging stakeholders*** ▪ ***Focusing the evaluation design*** ▪ ***Describing the policy*** ▪ ***Gathering credible evidence*** ▪ ***Justifying conclusions*** ▪ ***Ensuring use and lessons learned***

The CDC Evaluation Framework



The CDC Evaluation Framework: Describing the Policy Effort

- **Logic Models and Considerations for Policy Evaluation**



The CDC Evaluation Framework: Describing the Policy Effort

Term	Definition	Examples
Inputs	Information or resources required for developing/implementing policy	Funding Staff Evidence/research base Stakeholder support
Activities	Actions that comprise the program, in this case identifying the problem and developing and implementing the policy effort.	
Outputs	Direct products or deliverables that result from the activities.	Changes in product design Regulations Enforcement of laws Incentives Reach of policy Changes in systems that support or facilitate a policy
Outcomes	Short-term and intermediate changes in target audience behaviors, awareness of risk factors, attitudes, and knowledge.	Increased rates of physical activity Use of seat belts Attitudes toward domestic violence Bullying among adolescents Change in community norms
Impacts	Long-term change in indicators	Decrease in injury rates Decrease in obesity Decrease in healthcare associated infections Decrease in morbidity Decrease in mortality Costs saved

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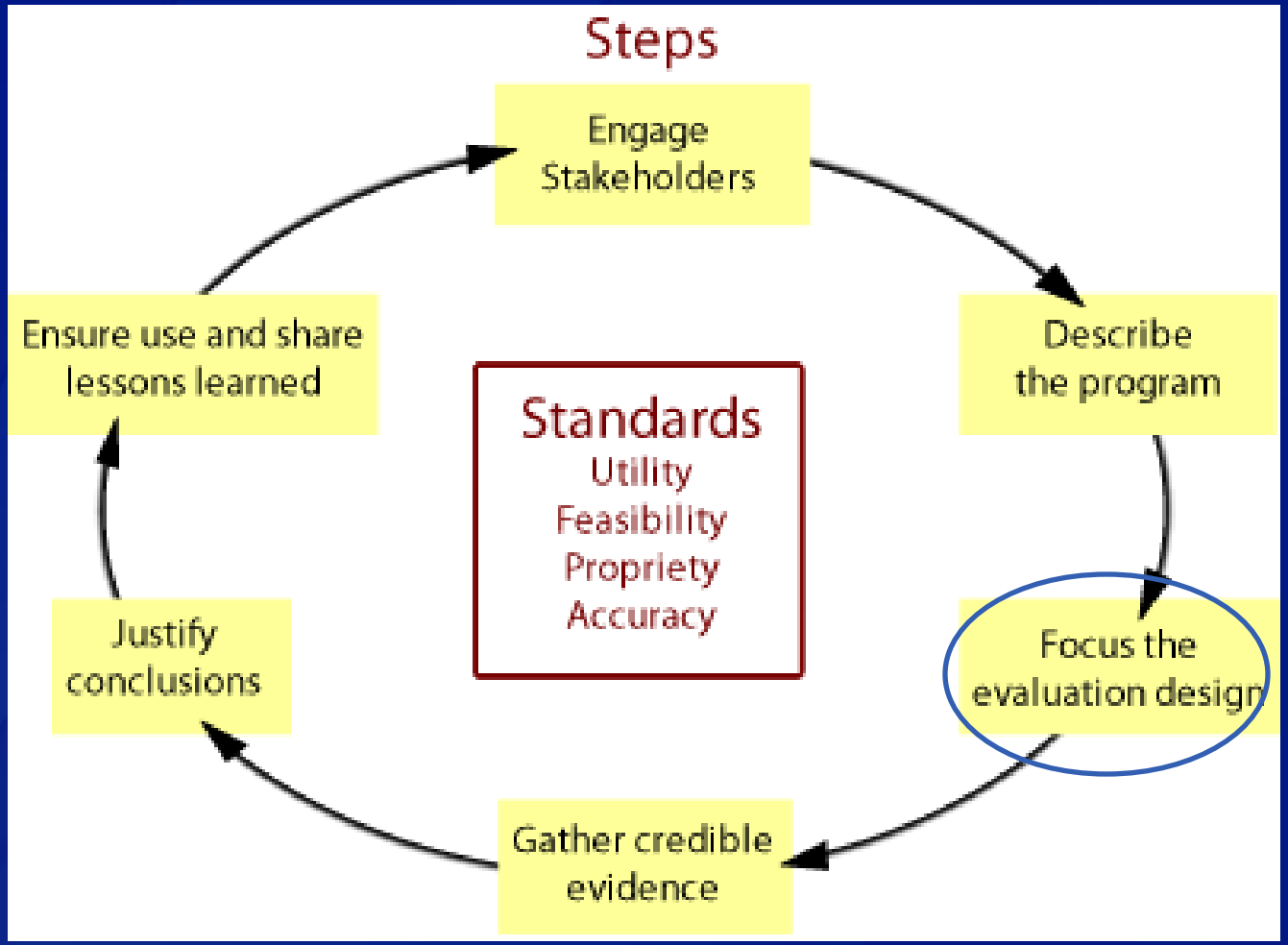
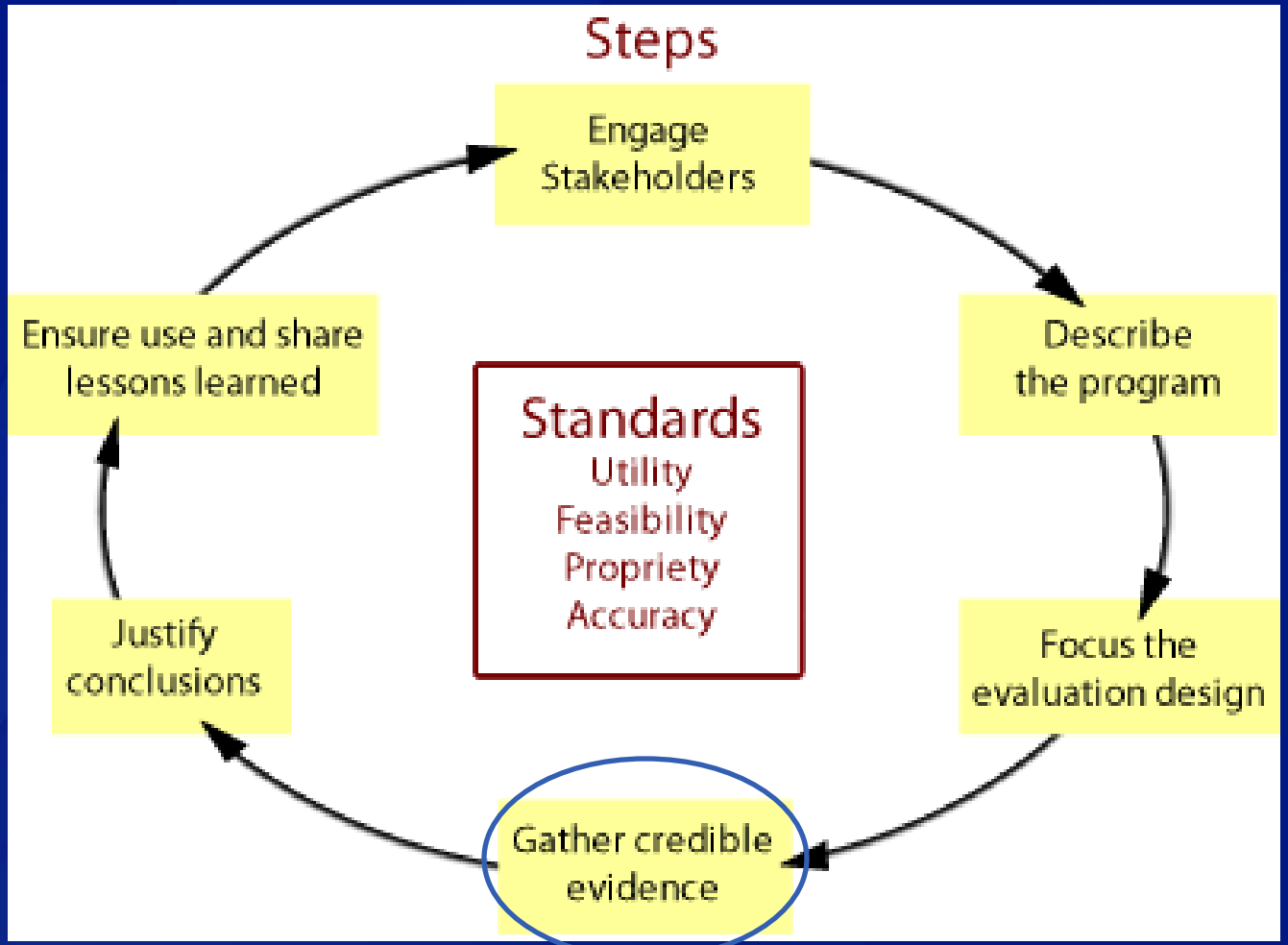


The CDC Evaluation Framework: Focusing the Evaluation Design

- **Depends on which domain(s) of the policy process are being examined**

- **Key considerations here are the same as program evaluation:**
  - Purpose: Why is the evaluation being conducted?
  - User: Who will use the information and what is their focus?
  - Use: How will the information gained from the evaluation be used?
  - Evaluation Designs: Experimental, Quasi-experimental, non-experimental/observational, mixed methods

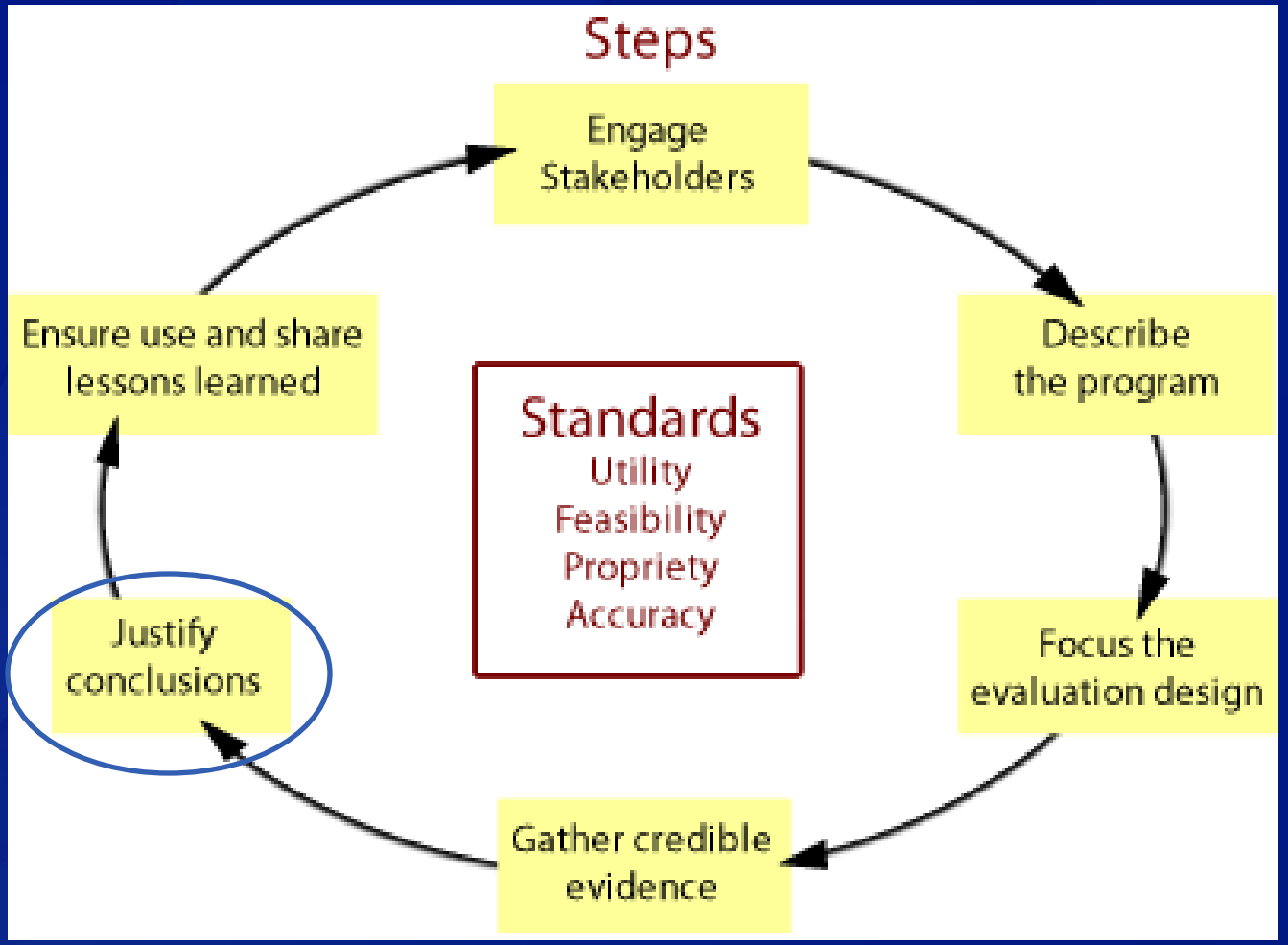
The CDC Evaluation Framework



The CDC Evaluation Framework: Gathering Credible Evidence

	Primary Data	*Secondary Data*
Quantitative Data	▪ Questionnaires/surveys ▪ Media tracking	▪ ***Existing research*** ▪ ***Existing surveillance systems (e.g., Behavioral Risk Factor Surveillance System (BRFSS), Youth Risk Behavior Survey (YRBS), Pregnancy Risk Assessment Monitoring System (PRAMS), National Health Interview Survey (NHIS)*** ▪ ***Geographic Information Systems (GIS) research***
Qualitative Data	▪ ***Content analysis of the policy itself, any revisions to the policy, amendments, revised regulations, court rulings, or other formal changes to the policy*** ▪ Key informant interviews ▪ Focus groups ▪ Case studies ▪ Meeting observations	▪ ***Secondary analysis of primary qualitative data sets (e.g., secondary analysis of interview transcripts)—the use of existing data to find answers to research questions that differ from the questions asked in the original research*** ▪ ***Retrospective review of charts/case notes***

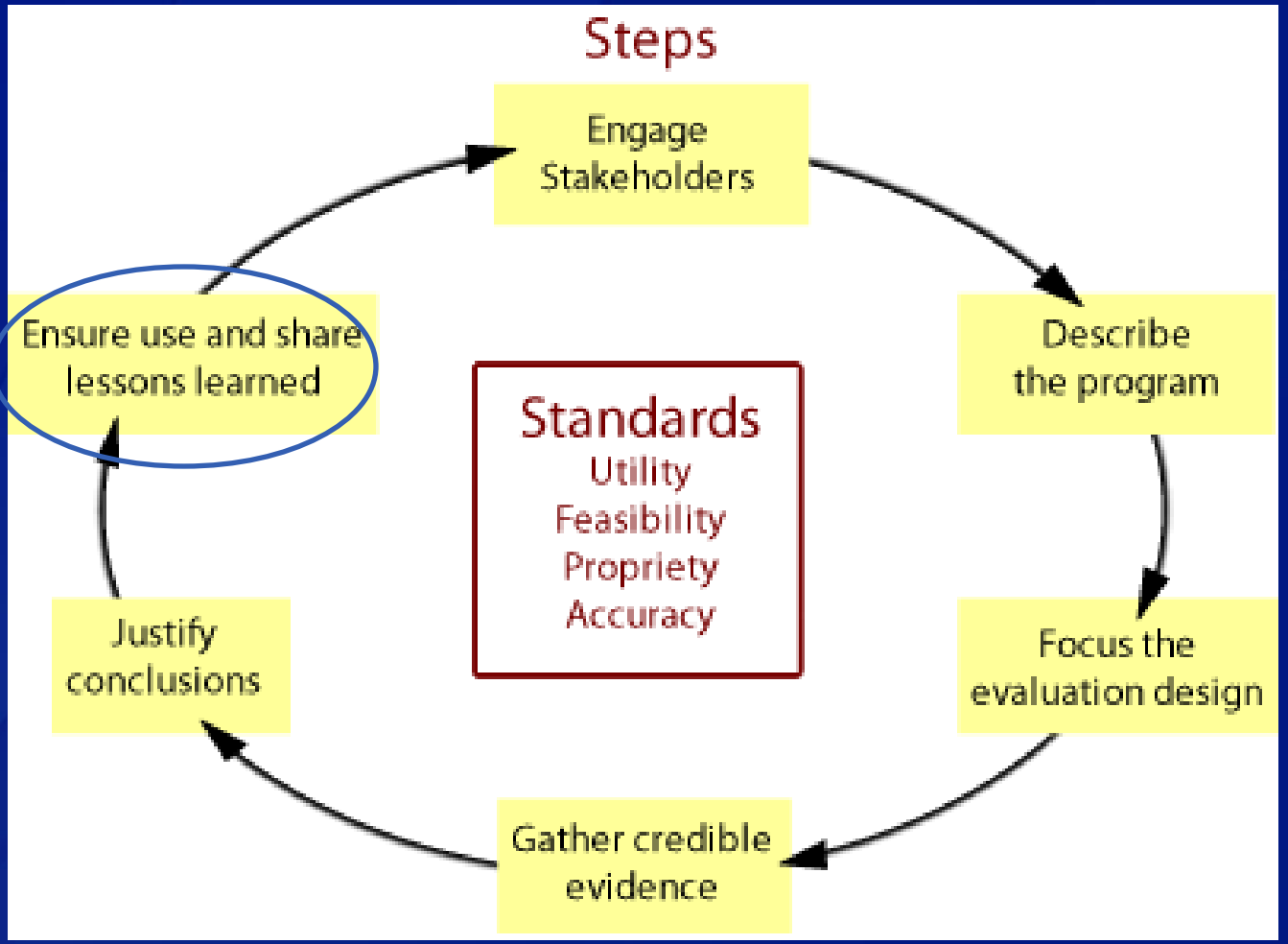
The CDC Evaluation Framework



The CDC Evaluation Framework: Justifying Conclusions

- Present analysis results in a way that is meaningful and understandable to stakeholders
- Compare results and reconcile inconsistencies from different data, methods, and analyses
- Interpret results within the context of the evaluation questions, policy goals, and the policy logic model
- Consider the influence of external factors (e.g., environmental changes or changes in related policies)

The CDC Evaluation Framework



The CDC Evaluation Framework:
Ensuring Use of Findings and Lessons Learned

- **Tips for communicating with policymakers**
  - Frame data in relation to local context
  - Provide real-life illustrations
  - Illustrate statistical data clearly
  - Present complicated results accurately while striving for clarity and brevity
  - Consider cost-benefit analyses
  - Base information on evaluation findings

Examples: Policy Evaluation and Smoking and Health

- **Policy Analysis Domain: Comprehensive Smoke-Free Air Laws (Local vs. Statewide)**
- **Policy Enactment Domain: State Tobacco Activities Tracking and Evaluation (STATE) System**
- **Across Policy Domains: Community Guide Evidence-Based Tobacco Policies**
  - Increasing the unit price of tobacco products
  - Reducing out-of-pocket costs for cessation treatments
  - Smoke-free policies

Knowledge Review: What are the distinctions between program and policy evaluation?

Determine which statements apply to program evaluation and which apply to policy evaluation. Choose the appropriate options now:

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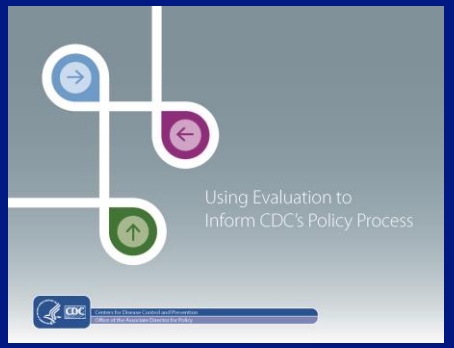
Conclusions

- Policy evaluation is critical
- Plan evaluation before the implementation of policy (when possible)
- Demonstrating impact can be challenging when multiple interventions have been implemented
- CDC and others are available to provide technical assistance

Resources

- Definition of “policy”
- “Overview of the CDC Policy Process”
- CDC Policy Analytical Framework
- “Using Evaluation to Inform CDC’s Policy Process”



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Thank You!

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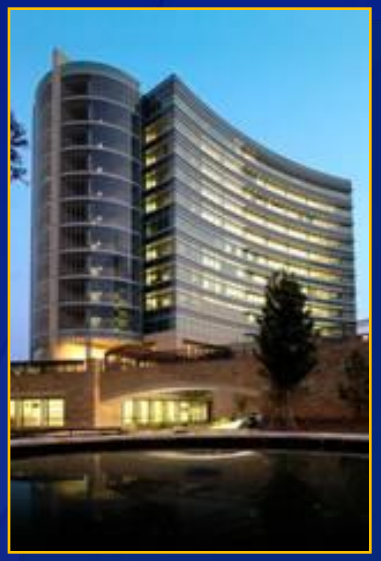

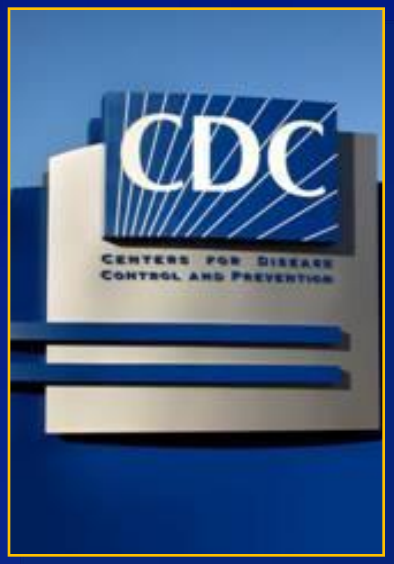





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Practical Application of Policy Evaluation Methods

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Economic Evaluation as One Approach for Evaluating Policies

Applied analytic methods to:

Identify,
Measure,
Value, and
Compare

the costs and consequences of treatment and prevention strategies.

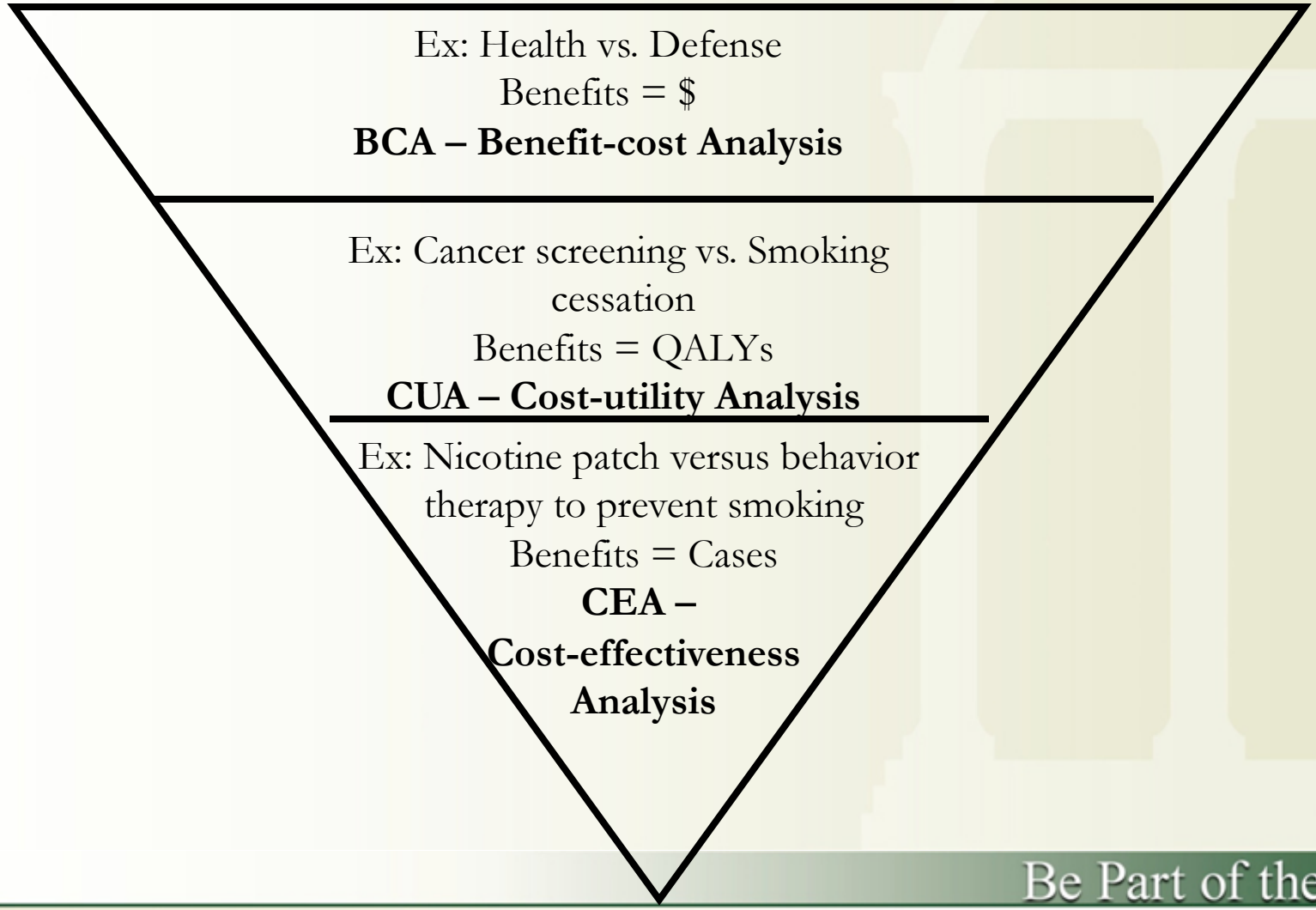
Why Care About EE?

- Maximizing outcomes is important.
- Minimizing costs is important too.
- Resources are limited, so hard (resource allocation) decisions must be made.
- Demonstrates the value provided from the resources expended (return on investment).

EE Methods

- MACRO-level of policy making
  - Benefit-cost analysis (BCA)
- MICRO-level of policy making
  - Cost-effectiveness analysis (CEA)

What EE Method to Use?



Benefit-cost Analysis (BCA)

- A method used to compare costs and benefits of an intervention
  - where all the costs and benefits are standardized or valued in ***monetary terms***.

- Provides a single value:
  - Net Benefits: NB (Benefits – Costs)

Quantify Benefits - BCA

- Human Capital or Cost-of-Illness (COI) approach
  - Typically includes medical costs and productivity losses averted
  - Productivity losses based on wages
- Willingness-to-Pay (WTP) or Contingent-valuation surveys
  - e.g., how much is society ***willing to pay* to** reduce the annual mortality risk associated with secondary smoke

Example

- Mudharri, US EPA, 1994
  - BCA of a national smoke-free law for all public building with 10+ persons entering per week
  - Costs
    - Implementation of the restriction, construction and maintenance of smoking lounges, and enforcement.
  - Benefits - HUMAN CAPITAL APPROACH
    - Savings on medical expenditures by averting heart disease, the value of lives saved, costs averted by reduced smoking-related fires, and productivity improvements.
  - The net present benefit to society was between $42 and $78 billion, and this range was based on high and low estimates of costs and benefits.

Cost-effectiveness Analysis (CEA)

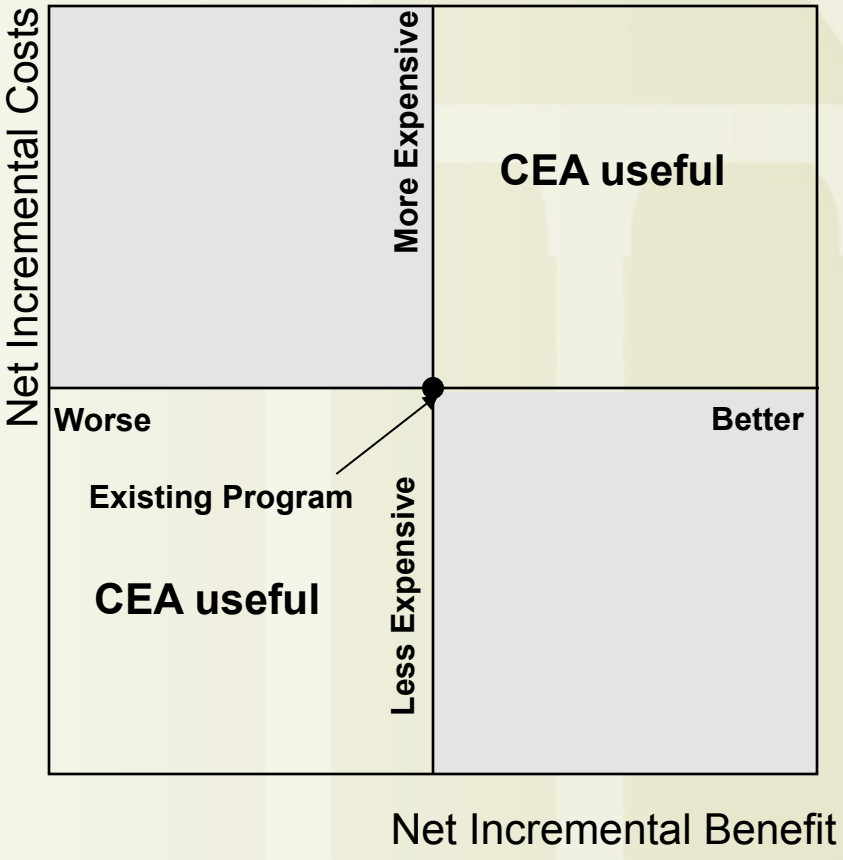
- Measures both the costs and outcomes, but assures that all of the outcomes are measured in the same metric across all alternatives.
  - The outcome of interest is the only relevant outcome for both strategies
    - cost per quit
    - cost per smoking days prevented
    - cost/life saved
    - Cost per life-year saved

CE Never in Isolation

- Compared to what?
  - A single option can never be "cost effective"; the term ***requires*** a comparison to another specific alternative
    - another intervention or policy
    - do nothing (which has its own stream of costs and outcomes)
    - Status quo (which may be doing nothing)
- Choice of comparator
  - always use best available alternative policy
  - always include most widely used policy

Cost-Consequence Space

- Different actions are indicated in the different quadrants
- CEA analysis is only useful when there is a ***TRADEOFF*** between cost and outcomes



Quantify Outcomes — CEA

- Intermediate outcomes:
  - Reduced cigarette smoking
  - Decreased hypertension
- Final outcomes:
  - Increased disability-free days
  - Increased # of life years (LYs) or life expectancy
  - Increased health-related quality of life (HRQoL)

CEA Caveat

- Outcomes cannot be combined; they must be considered separately. Consider one or two of the most important measures.
- Number of summary measures depends on number of outcomes chosen.
  - If A and B are the most important, then:
    - Cost/outcome A (cost per 1% increase in smoking days).
    - Cost/outcome B (cost per 1% reduction in hypertension).
    - **Translation for policy-makers can be difficult.**

Hollis, McAfee, Fellos, et al
Tobacco Control
2007; 16(S1): i53-i59

THE EFFECTIVENESS AND COST-EFFECTIVENESS OF TELEPHONE COUNSELING AND THE NICOTINE PATCH IN A STATE TOBACCO QUITLINE

Tobacco Quitlines Overview

- Quitlines are telephone-based tobacco cessation services that help tobacco users quit
- In this particular intervention, counselors, with motivational interviewing training, follow computer driven scripts providing
  - Caring
  - Motivation
  - Quitting strategies
- Participants offered referrals, mailed “quit kits”, and given information on pharmacotherapy options

Study Overview

- Comparison of the cost-effectiveness of three protocols
  - Intensive: multiple and longer calls
  - Moderate: multiple calls
  - Single brief call
- Three protocols further divided into 2 groups each
  - Offered free nicotine patches (NRT)
- Part of an RCT
- Outcome:
  - 30 days of abstinence at 12-month follow-up

Study Overview

- Perspective: State program
- 5 methods compared to the brief, no NRT option provided
- Costs:
  - Training
  - Counselors time
  - Administrative and technical support
  - Facility space
  - Supplies

Results

Table 3 Smoking cessation and cost effectiveness

Characteristics	No NRT offer			NRT offer			
	Brief (n=872)	Moderate (n=718)	Intensive (n=720)	Brief (n=868)	Moderate (n=715)	Intensive (n=721)	p Value
Abstinence* 6 months (%)	10.2	10.7	13.1	16.8	21.3	24.3	<0.0001
Abstinence* 12 months (%)	11.7	13.8	14.3	17.1	20.1	21.2	<0.0001
Cost/participant (SD), 2004$	$67 ($20)	$107 ($33)	$132 ($57)	$193 ($79)	$242 ($92)	$268 ($99)	<0.0001
Incremental cost/quit† (range), 2004$	NA	$1912 ($2551–$1273)	$2640 ($4120–$1161)	$2467 ($3622–$1311)	$2109 ($2980–$1239)	$2112 ($2946–$1278)	NA

*Abstinent from all forms of tobacco for 30 days or more at follow-up.
†Incremental cost per additional quit relative to brief/no NRT arm. Ranges calculated using standard deviations and 12-month abstinence.

- Example of how CE Ratios calculated:
  - Comparing No NRT/Moderate to No NRT/Brief
    - ($107 - $67) / (.138 - .117) = **$1905 (table shows $1912)**
  - Comparing NRT/Intensive to No NRT/Brief
    - ($2112 - $67) / (.212 - .117) = **$2138 (table shows $2112)**

Cost-Utility Analysis — CUA

- Compares costs and benefits, where benefits = # of life years saved *adjusted* for loss of quality.
- Combines length of life (survival rates) and health-related quality of life.
- Compares disparate outcomes in terms of utility.
  - Quality-adjusted life years (QALYs).
  - Disability-adjusted life years (DALYs).
- Derives a ratio of cost per health outcome.
  - $/QALY or $/DALY.

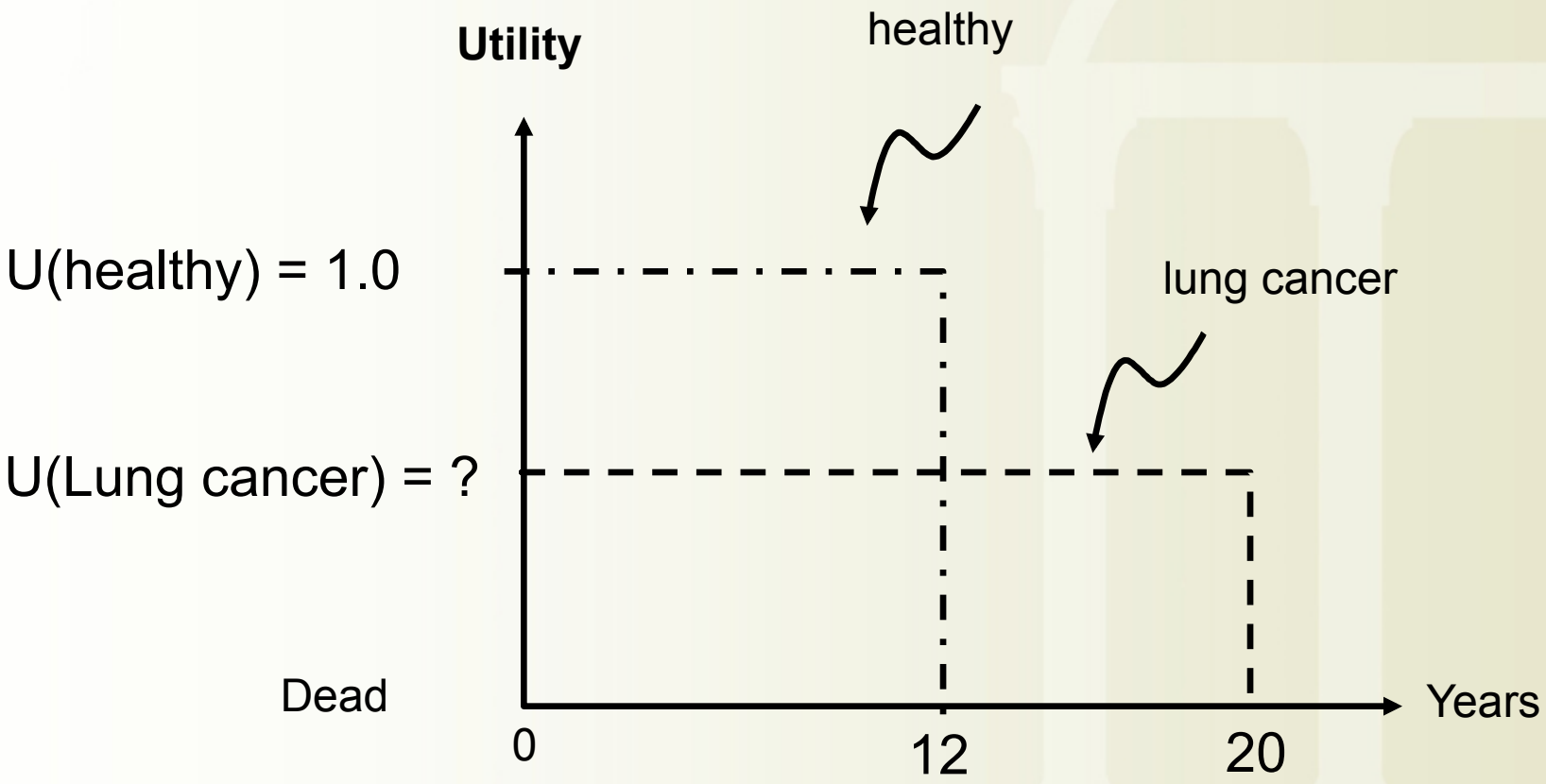
When Is CUA Used?

- When quality of life is ***the*** important outcome.
- When the program affects both morbidity and mortality.
- When programs being compared have a wide range of outcomes.
- When one of the programs being compared has already been evaluated using CUA.

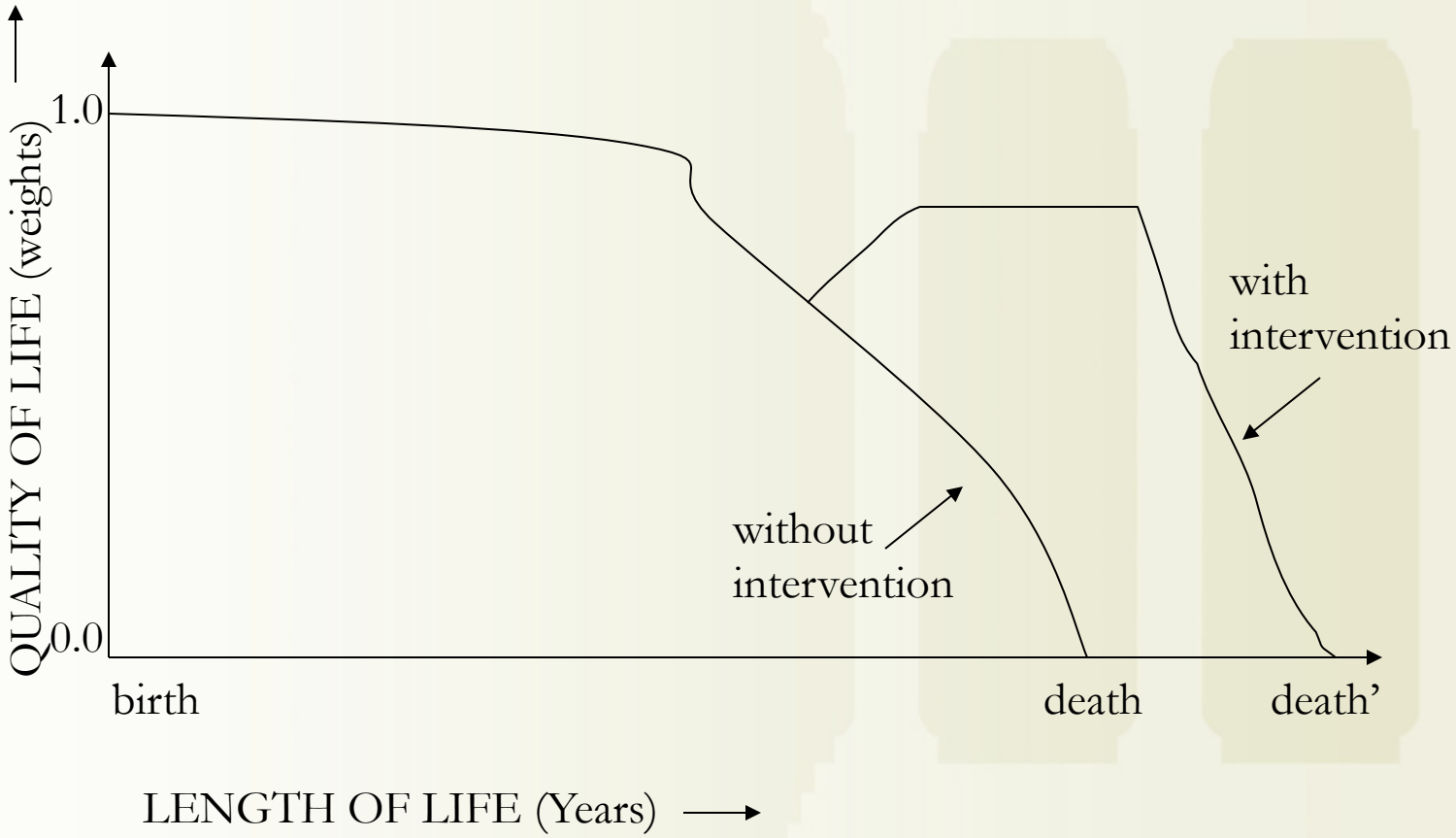
Quantify Benefits — CUA

- Utilities, or preference weights, are:
  - A quantitative approach for describing *preferences* for quality of life.
  - Typically based on a 0 to 1 scale, where:
    - 0 = death.
    - 1 = perfect health.

Time Trade-Off



Valuation of Benefits in a CEA:
Combining Length of Life with Quality of Life



Wang, Crossett, Lowry, Sussman, & Dent
Achives of Pediatric Adolescent Medicine
2001; 155: 1043-1050

COST-EFFECTIVENESS OF A SCHOOL-BASED TOBACCO-USE PREVENTION PROGRAM

Project Toward No Tobacco Use (TNT)

- School-based education program for juniors and seniors
- Teaches refusal skills, awareness of social misperceptions about tobacco use, and misconceptions about physical consequences
- Designated by the CDC as a Program That Works
- Three types of curricula: physical consequences, informational social influence, and normative social influence

Programmatic Costs

- Collected retrospectively
- Only direct costs included at a program perspective

Table 1. Intervention Costs*

Intervention	Cost, $
Training of health educators	
2 Health educators received $10/h for 15 d (120 h) of training	2 × $10/h × 120 h = 2400
2 Health educators received the training at a fee of $56/d for 15 d (120 h) of training	2 × $56/d × 15 d = 1680
Subtotal	4080
Teaching	
2 Health educators taught at 4 schools each for 10 d (80 h) for $10/h	2 × 4 × 80 h × $10/h = 6400
2 Health educators taught 2-d (16-h) booster sessions at 4 schools each for $10/h	2 × 4 × 16 h × $10/h = 1280
Subtotal	7680
Materials	
2 Teacher manuals at $45 per manual	90
1234 Student manuals at $3.69 per manual	4553
Subtotal	4643
Total	**16 403**

*Values provided by the Project Toward No Tobacco Use evaluation study group.

QALYs Saved

- Used published estimates for conversion of LYs to QALYs for smokers
- Example:
  - 1.31 LYs saved per quitter estimated as 2.34 QALYs saved for men aged 25 to 29 years
- From JAMA 1997 (Cromwell et al) - 1.57 QALYs saved is equivalent to 1 LY saved
  - What does this mean?
    - If you don't smoke – for every addl year of life gained, you also gain ½ a year adjusted for quality of life gains.

Results

- Incremental CE Ratios compared to “no smoking” curriculum
- CEA including medical care costs saved (base, worst, and best case at right) is negative due to overall cost savings
- **NOT RECOMMENDED** to report negative CE ratios

Table 4. Results From Base-Case and Multivariate Sensitivity Analyses*

Parameters	Base Case	Worst Case	Best Case
Intervention cost, $	16 403.00	36 563.00	16 403.00
Established smokers prevented, No.	34.9	19.7	51.0
Medical care cost saved, $	327 139.50	160 991.50	478 329.00
Discounted LYs saved	23.3	13.2	34.1
Discounted QALYs saved	36.6	20.7	53.6
Cost per LY saved, $	−13 316.50	−9426.80	−13 538.70
Cost per QALY saved, $	−8481.80	−6004.40	−8623.40
Cost per LY saved (excluding medical care costs saved), $	702.90	2770.10	480.80
Cost per QALY saved (excluding medical care costs saved), $	447.70	1764.40	306.20

*LY indicates life year; and QALY, quality-adjusted life year.

Smoking Related Utilities

Smoking Classification	Age	Male Utility	Female Utility	Source
Never Smoker	40-44	0.90	0.88	Amhad. (2005). The cost-effectiveness of raising the legal smoking age in California. *Med Decis Making*, 25(3): 330-340
Former Smoker	40-44	0.88	0.87	
Current Smoker	40-44	0.82	0.83	
Never Smoker	75-79	0.76	0.66	Kaper, Severens, et al. (2006). Encouraging smokers to quit: the cost effectiveness of reimbursing the costs of smoking cessation treatment. *Pharmacoeconomics*, 24(5): 453-464
Smoker	75-79	0.67	0.61	
Never Smoker	18-19	0.93	0.92	
Smoker	18-19	0.91	0.89	

Another source for utility weights: Tufts CEA Registry

Final Comments

- Economic evaluation (EE) methods are valuable to decision making and for setting policy.

- For practitioners and evaluators, these skills are necessary because the DEMAND for these analyses is growing.





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Thank You!

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