Framing an Economic Evaluation

Bloomberg Philanthropies | DATA FOR HEALTH INITIATIVE | D2P Data to Policy | CDC Foundation Together our impact is greater | Vital Strategies

Learning objectives

At the end of this module, you will be able to:

- Define economic evaluation
- Describe how to frame an economic evaluation

Storyline of a policy brief

Here is **the PROBLEM**

↓

This is / These are **the ROOT CAUSES**

↓

These **INTERVENTIONS / POLICIES** will affect the root causes

↓

Each policy will **COST THIS MUCH** to implement, and **be THIS EFFECTIVE**

↓

Therefore, we **RECOMMEND POLICY X**

ECONOMIC EVALUATION

*"The dissemination of **accurate information** on **costs** and **benefits** may be the best way to **reduce** opposition and implement **effective** public health actions."*

- Dr. Thomas Frieden, NEJM, 2013

Economic Evaluation

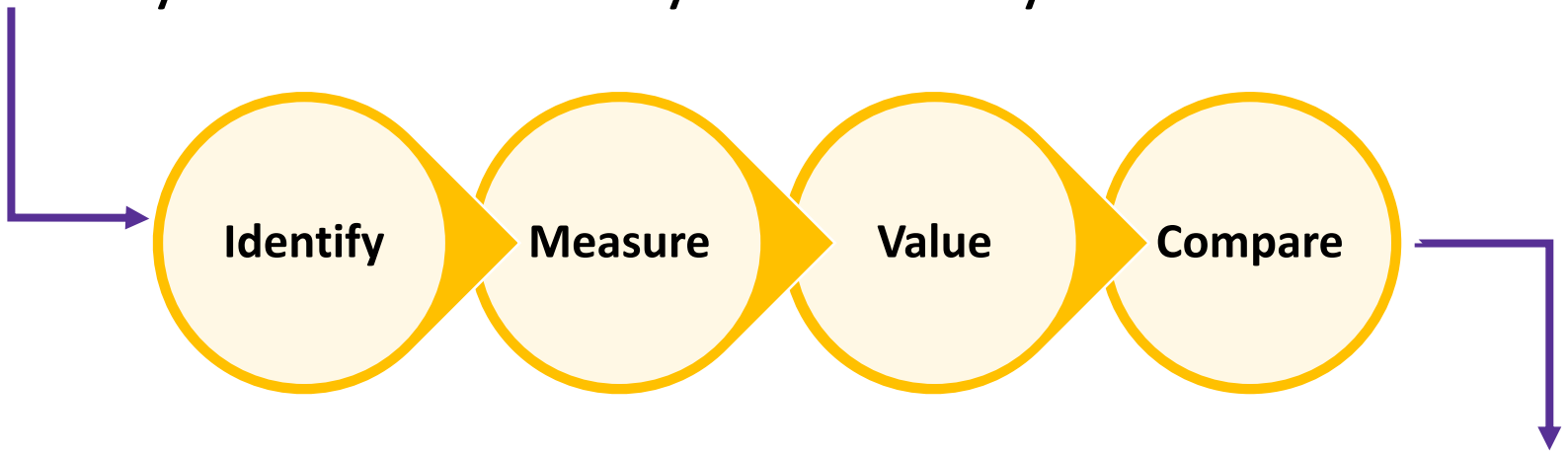
Systematic appraisal of costs and outcomes of an intervention

Economic evaluation provides answers to:

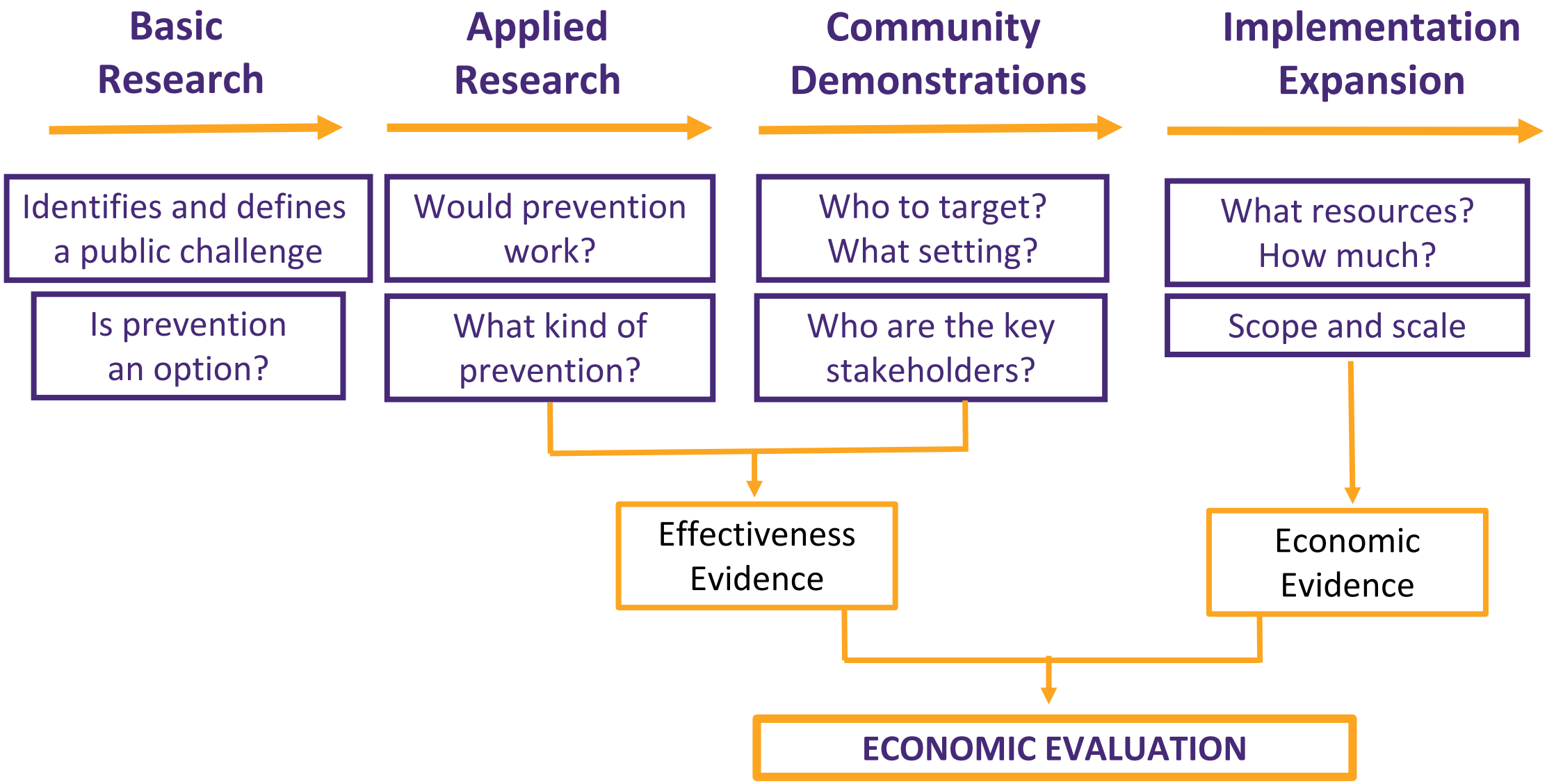
- What if questions
- Policy option questions
- Service production, distribution and consumption questions
- What interventions?
- Who pays?
- Who benefits?
- What outcomes?

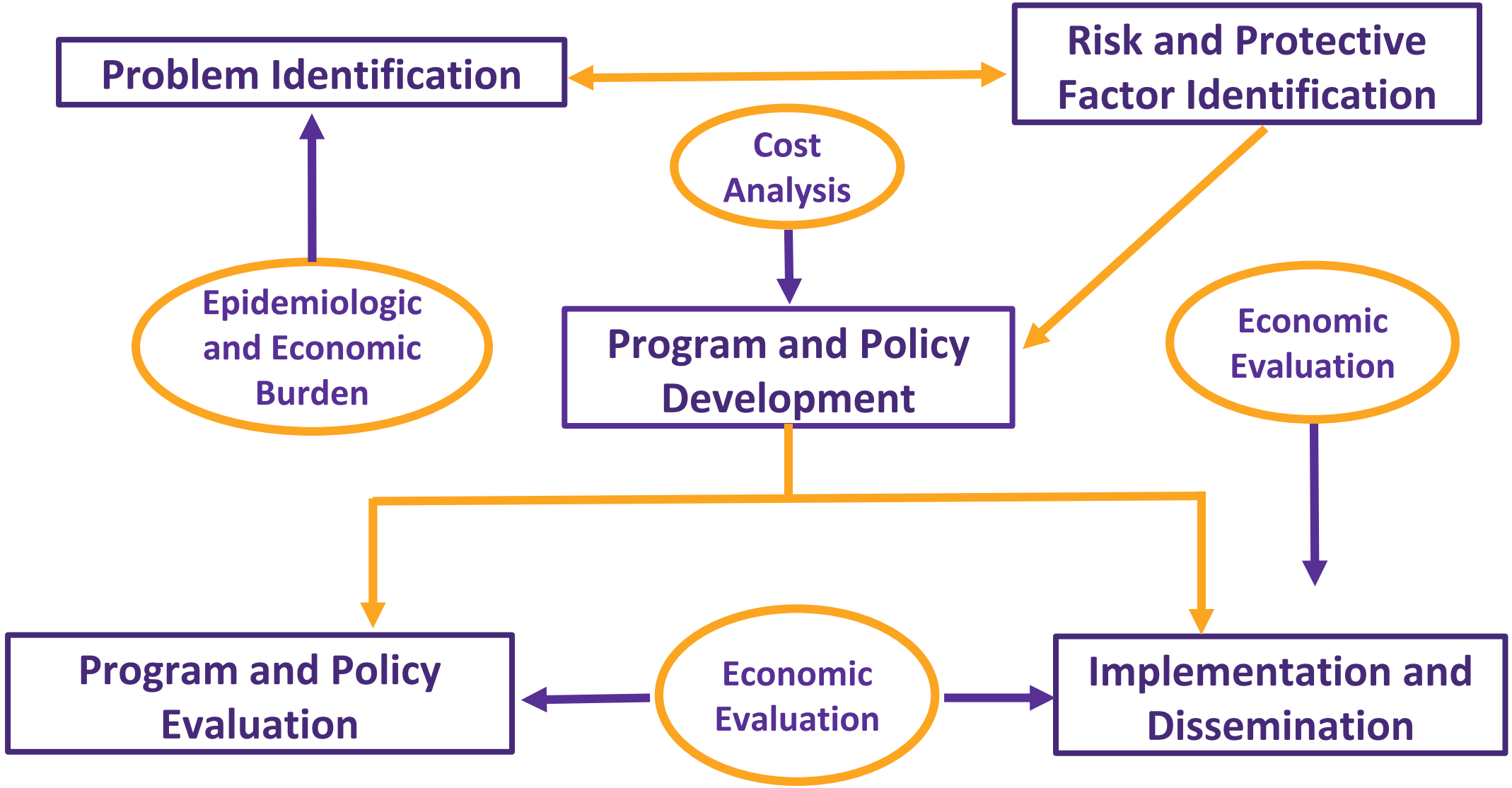
Economic evaluation methods

Applied analytic methods to systematically:



The **costs and consequences** of public health interventions, programs, etc.


Basic Research
Applied Research
Community Demonstrations
Implementation Expansion
Identifies and defines a public challenge
Is prevention an option?
Would prevention work?
What kind of prevention?
Who to target? What setting?
Who are the key stakeholders?
What resources? How much?
Scope and scale
Effectiveness Evidence
Economic Evidence
ECONOMIC EVALUATION


Problem Identification
Risk and Protective Factor Identification
Cost Analysis
Epidemiologic and Economic Burden
Program and Policy Development
Economic Evaluation
Program and Policy Evaluation
Economic Evaluation
Implementation and Dissemination

What are costs and outcomes?

- **Costs**
  - Value of resources used to produce goods or services
  - Comprehensive cost inventory is necessary to successfully conduct any economic evaluation
- **Outcomes**
  - Effectiveness of a program or an intervention
  - Natural units (ex: number of case averted)
  - Utility measures (ex: quality-adjusted health outcomes)

Types of economic evaluation

- **Partial – costs only**
  - Cost of illness analysis
  - Program cost analysis
- **Full – costs & outcomes**
  - Cost-effectiveness analysis (CEA)
  - Cost-utility analysis (CUA)
  - Cost-benefit analysis (CBA)

Type	Description	Measures	Decision level
PARTIAL ECONOMIC EVALUATION			
Cost of illness analysis	Disease economic burden	Net cost ($)	Public health decision-makers at the local, state, and national levels
Program cost analysis	Net program cost	Net cost ($)	Public health decision-makers at the local, state, and national levels First step to CEA, CUA, and CBA
FULL ECONOMIC EVALUATION			
Cost-benefit analysis (CBA)	Compares different programs with different outcomes (e.g., health vs. other area)	Benefit-cost ratio ($benefit: $cost)	National level and broader perspective, such as the President and Congress (e.g.,: Congress needs to decide between investments in health or investments for another program)
Cost-effectiveness analysis (CEA)	Compares interventions with the same outcomes (ex: between two cervical cancer interventions)	Cost-effectiveness ratio ($per case averted)	Program level (ex: a cancer program director decides to fund one of two possible cervical cancer prevention interventions)
Cost utility analysis (CUA)	Compares interventions with different health outcomes (ex: cervical cancer vs. Alzheimer's disease)	Cost-utility ratio ($per QALY saved)	Agency level (ex: the CDC or a local health agency director decides between funding cervical cancer or Alzheimer's disease interventions)

Source: Rabarison KM, Bish CL, Massoudi MS and Giles WH. Economic evaluation enhances public health decision-making. Front. Public Health 3:164. doi: 10.3389/fpubh.2015.00164

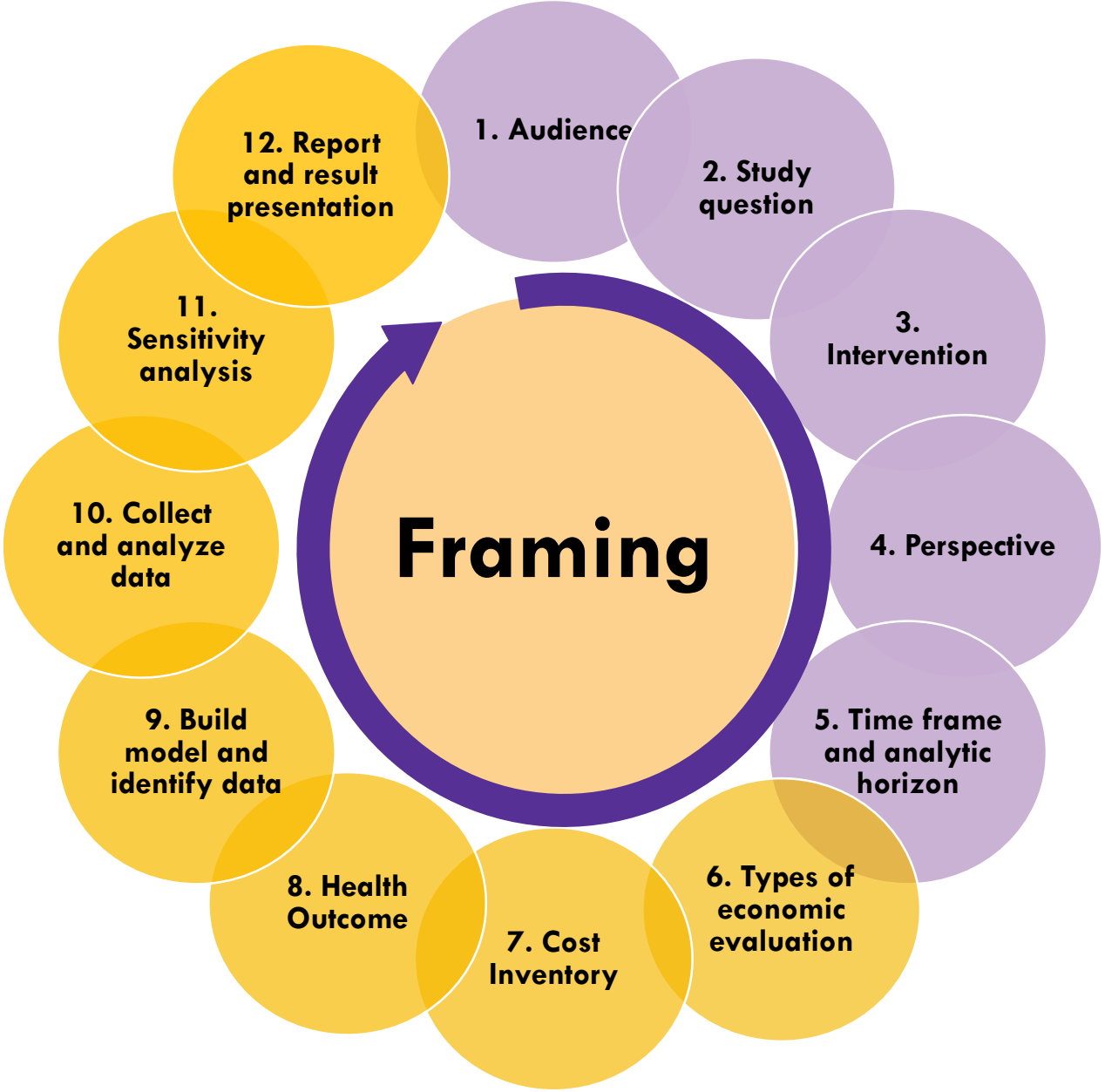
Why “frame” an economic evaluation?

Narrow and objectively define evaluation question of interest

Ensure analysis and results answer the evaluation question

Help think strategically about *who will use results and how*

What?
Who?
For Who?
Which?
How?



1. Audience

Policy Decision Makers

Elected officials, agency leaders, gov. public health officials

Program Decision Makers

Ministry of Health, hospital administrator, program director

Other interested parties

Patients, target population members, family, media, public

2. Study question

- **Addresses policy issues driving analysis**
- **Clearly defines the identified target audience**
- **Reflects needs of the target audience**
- **Well-constructed and clearly articulated**

What is the cost-effectiveness of an expanded vaccination program versus current program?

How often to recommend cervical cancer screening: every 5 years, 3 years, or annually?

3. Identify the intervention

- **Clearly defined components**
  - Intervention
  - Intervention target population
  - Intervention delivery system
- **Carefully selected options and a baseline comparator**
  - Includes appropriate options needed for decision-making
  - Prevents analysis from being too cumbersome

Intervention (continued)

- **What is the baseline situation or status quo?**
  - What scenario will the intervention be compared to?
  - Is there another intervention in place or not?
- **Proposed policy option descriptions**
  - Who is doing what, to whom, where, how, and for how long?
  - Are any relevant alternative options omitted?
  - Should a “do-nothing” option be considered?

4. Perspective definition

- **Viewpoint from which an economic evaluation is conducted**
  - What costs are paid and what benefits are received
  - Example: A donor may be concerned about the societal perspective of an intervention, but needs the MOH perspective too for budgeting purposes

Buyer: This fruit costs me $3!

Seller: This gives me $3, but only cost me $1!

Select only one perspective, for the policy briefs in this training.

Types of perspectives

- **Society:** broadest perspective, include all costs (no matter who incurs them) and all benefits (regardless of who experiences them)
- **Healthcare system:** cost of diagnosing and treating a patient
- **Payer:** entity or institution responsible of the financial cost of an intervention – ex: the government i.e. the minister of health
- **Provider:** persons and institutions providing health services – ex: physician clinics, hospitals, or health centers
- **Patient:** person targeted by health intervention under consideration – ex: loss of productivity because of missed workdays, medicine costs, clinic fees, or travel costs

Costs included based on perspective

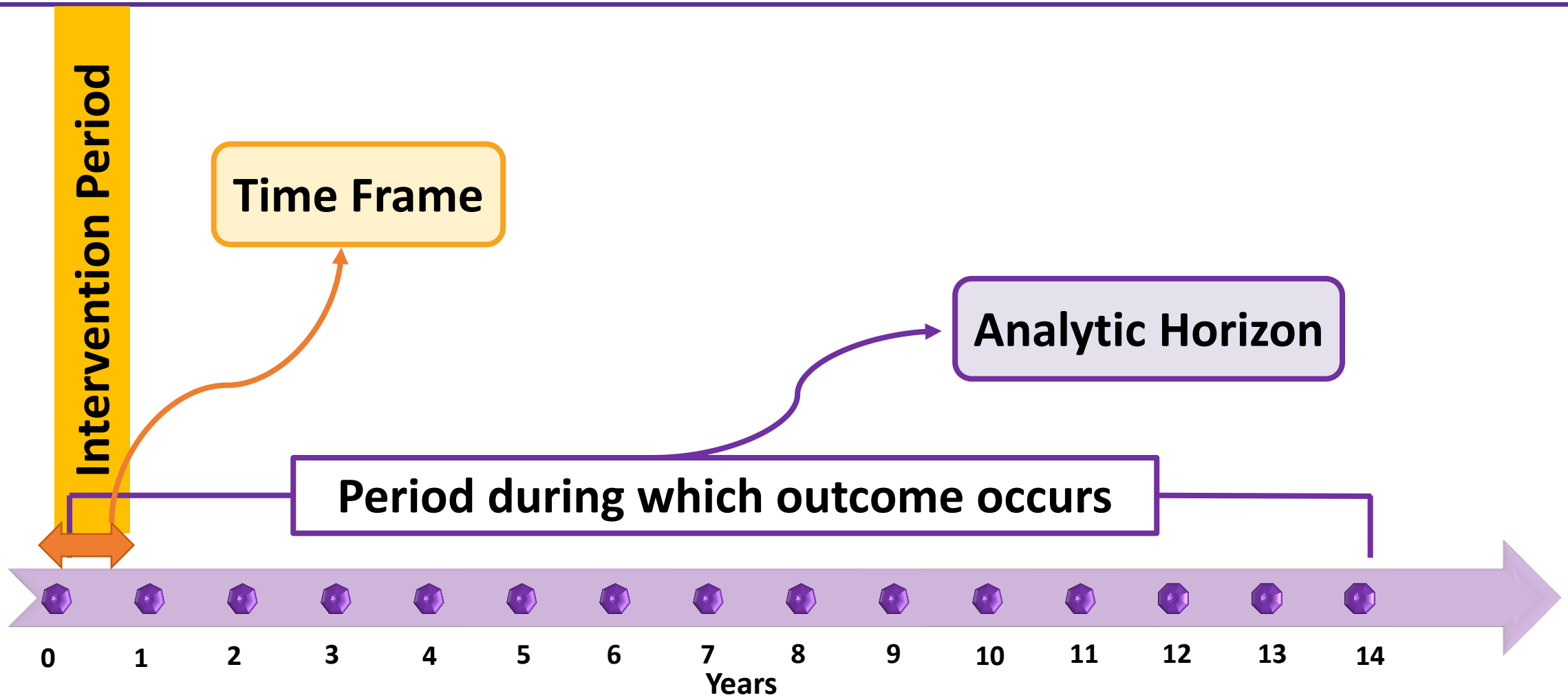
PERSPECTIVES	COSTS					
	Physician time	Drugs	Admin	Productivity Loss	Patient travel	Time off
Society	+	+	+	+	+	+
Healthcare system	+	+	+	-	-	-
Payer, MOH	+	+	+	-	+/-	-
Physician clinic	+	+	+	-	-	-
Patient	+	+/-	-	+	+	+

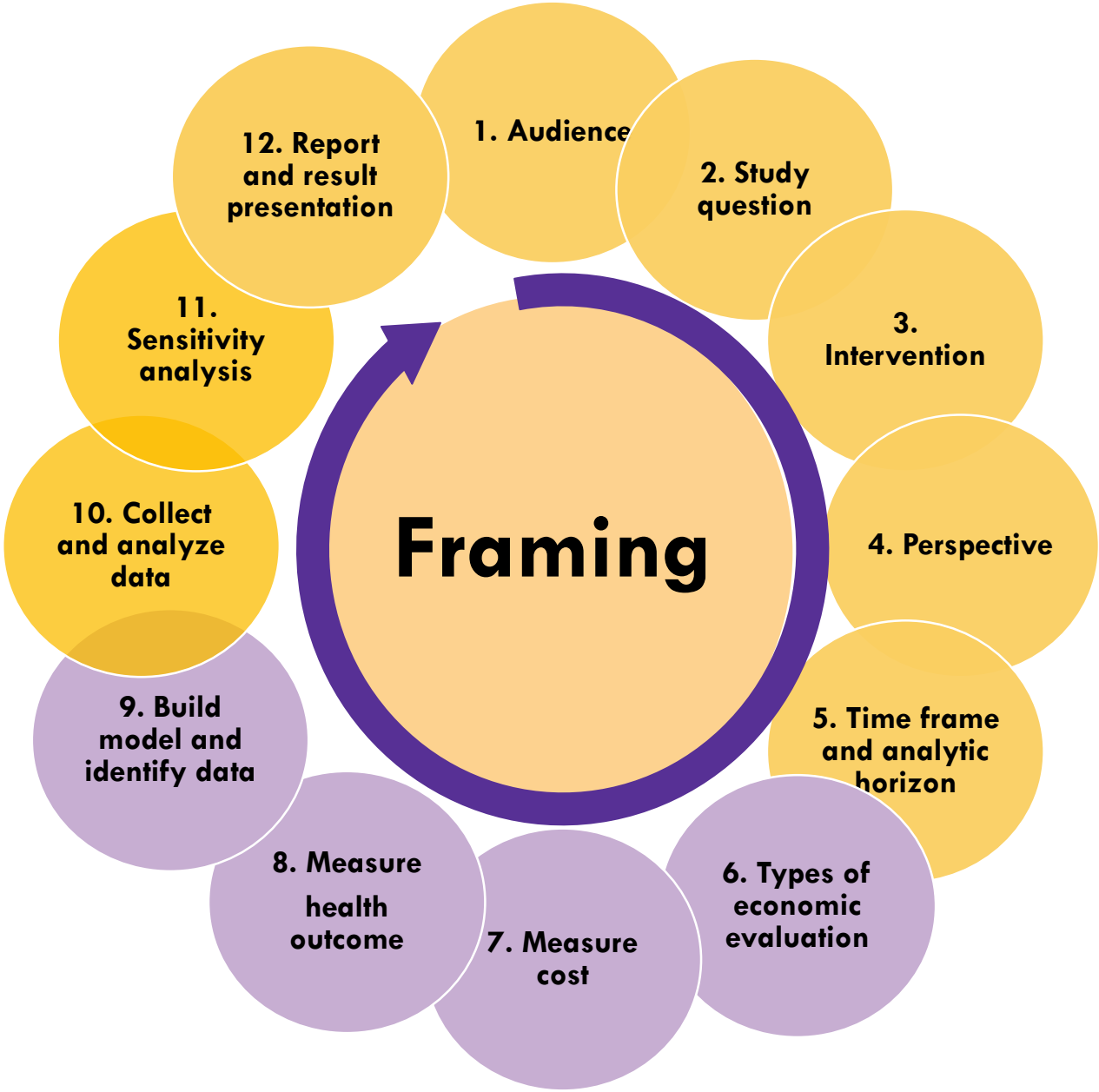
5. Time frame and analytic horizon

- **Time frame:** period during which an intervention is delivered
  - **Seasonal variation** in intervention activities, ex: flu vaccine delivery fluctuation during flu and non-flu seasons
  - **Intervention lifecycle:** costs and outcomes might change based on how long an intervention runs; they might stabilize after a while
  - **Advances in technology:** might make an intervention obsolete, ex: HPV vaccine improvement might change recommendation from 2 to 3 doses

- **Analytic horizon:** entire period during which costs and benefits related to intervention impacts are measured
  - Usually longer than time frame
  - Intervention benefits can be realized after intervention ended

Timeframe vs. Analytic Horizon




Framing
1. Audience
2. Study question
3. Intervention
4. Perspective
5. Time frame and analytic horizon
6. Types of economic evaluation
7. Measure cost
8. Measure health outcome
9. Build model and identify data
10. Collect and analyze data
11. Sensitivity analysis
12. Report and result presentation

6. Types of economic evaluation

- **Cost analysis**
  - Cost of illness (COI) analysis
  - Program cost analysis

PARTIAL

- **Cost effectiveness analysis (CEA)**
  - Costs vs. health outcomes of interventions
- **Cost utility analysis (CUA)**
  - A form of CEA using utility measures for health outcomes, ex: QALYs
- **Cost benefit analysis (CBA)**
  - Costs vs. health outcomes converted to monetary terms

FULL

We will discuss each of them in detail later!

7. Measure costs

- **Cost analysis**
  - 1st step of any full economic evaluation, such as CEA
  - Foundation: cost inventory
  - Identify, collect, categorize, and analyze costs associated with intervention and its outcomes
  - Informs budget justification, decision making, and forecasting

Perspective informs the INCLUDED and EXCLUDED COSTS!

8. Measure health outcomes

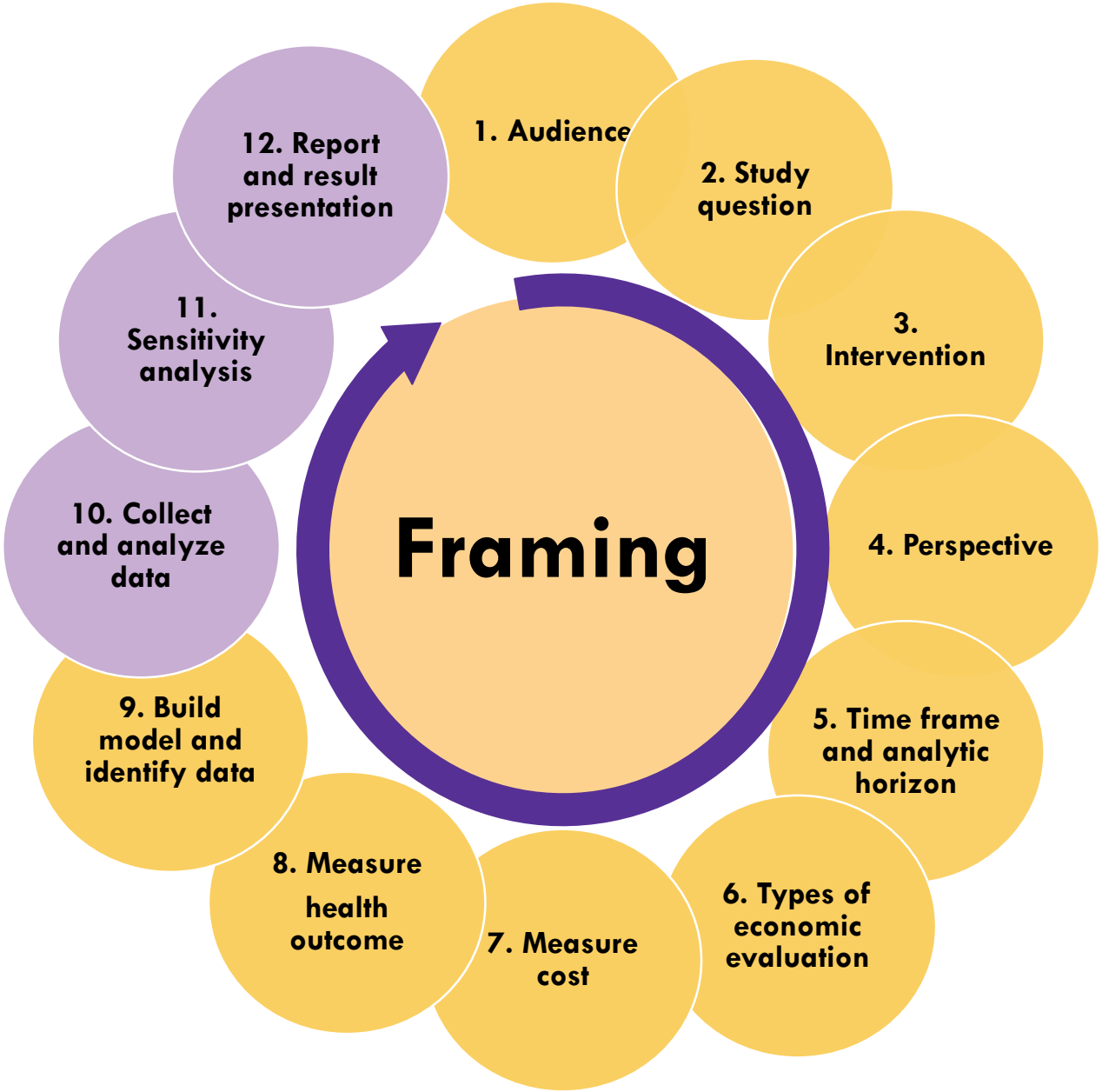
- **What are the health outcomes of interest?**
- **Which outcomes best answer the study question?**
- **How will the outcomes be measured?**
  - What is the measure of quantity?
  - Is it numbers of treatments or improvements in health?
  - How should improvements in health be measured?
  - How are these to be valued?
  - Examples: cases of hospitalizations averted, intensive care unit visits, life expectancy, premature deaths, QALYs

Intermediate vs. final health outcomes

Disease and intervention	Clinical indicator	Intermediate Outcome	Final Outcome
Asthma drugs and interventions	Machine confirmed blocked airway passages	↑ bronchial activity in airway passage	↑ QALYs
MRSA proper sanitation	Culture confirmed infectious skin lesions	MRSA is contained in a particular group	# hospitalizations averted
Depression various drugs	# of suicide avoidance	↓ # of suicide attempts	# deaths averted
HIV/AIDS various interventions	# of newly diagnosed pts.	↓ HIV/AIDS incidence	# years of life saved

9. Building Model and Identifying Data Needs

- **Model type depends on the information you need and desired outcome**
  - Data needs become clear as you build your model
  - Good to have an input list and a cost inventory
- **Building a model is iterative – usually go through several attempts and versions!**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Review Question:

- **What is the purpose of economic evaluation?**
  - ☐ To compare the duration of different interventions
  - ☑ To compare the costs and outcomes of different interventions
  - ☐ To compare the relative risks of different interventions
  - ☐ To compare the burden of different diseases

Framing: Syphilis Example

Economic evaluation example

- **In rural Philippines, syphilis in pregnant women accounts for many adverse pregnancy outcomes**

- **Group of antenatal clinics (ANCs) in a high-burden rural area are trying to decide if they should screen and treat pregnant women for syphilis**
  - Option 1. Not screen or treat pregnant women (status quo)
  - Option 2. To screen and treat and require $3 from patient
  - Option 3. Treat without screening & require $3 from patient

- **Which option to choose?**

Syphilis example:

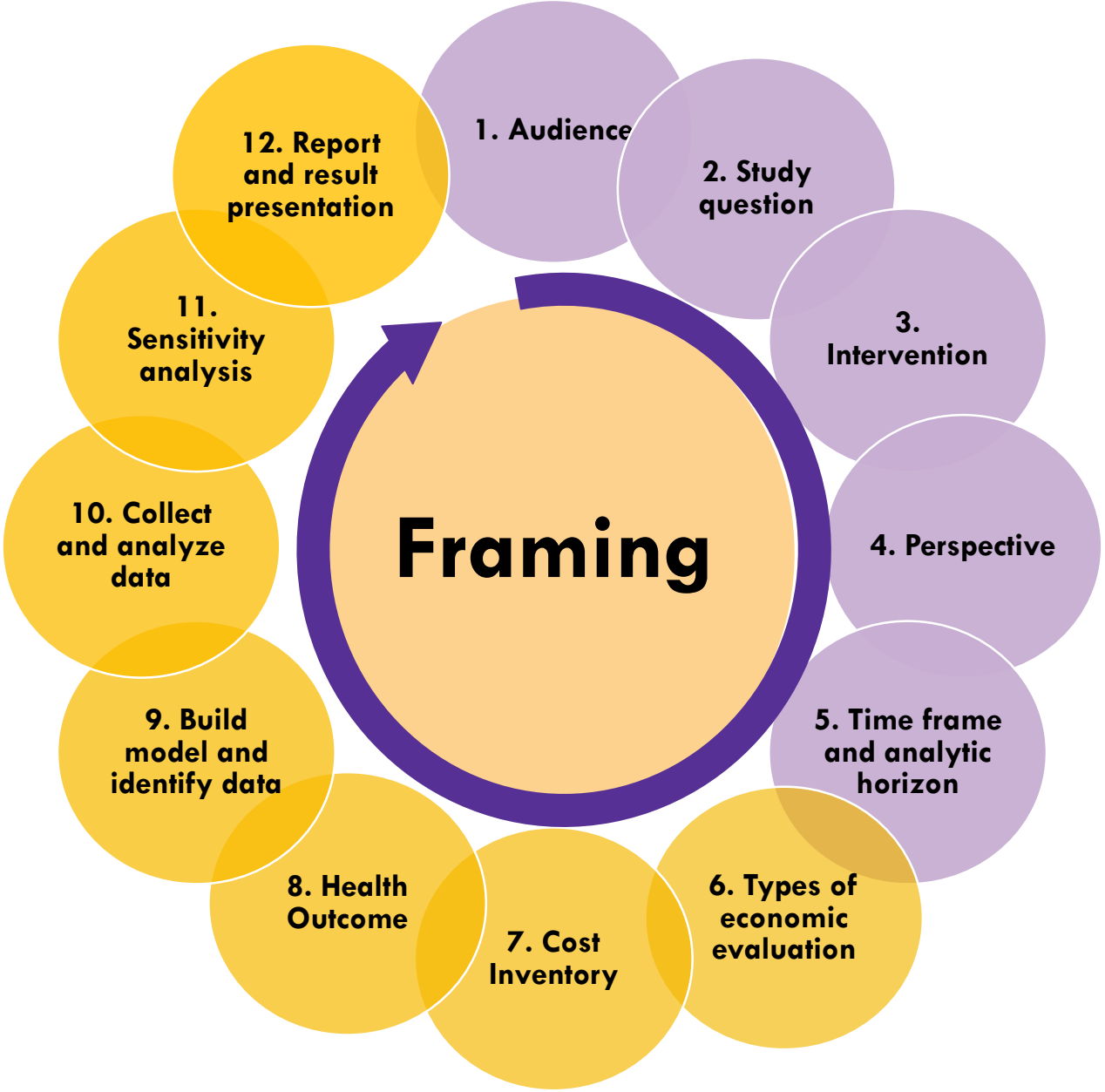
What?

Who?

For Who?

Which?

How?



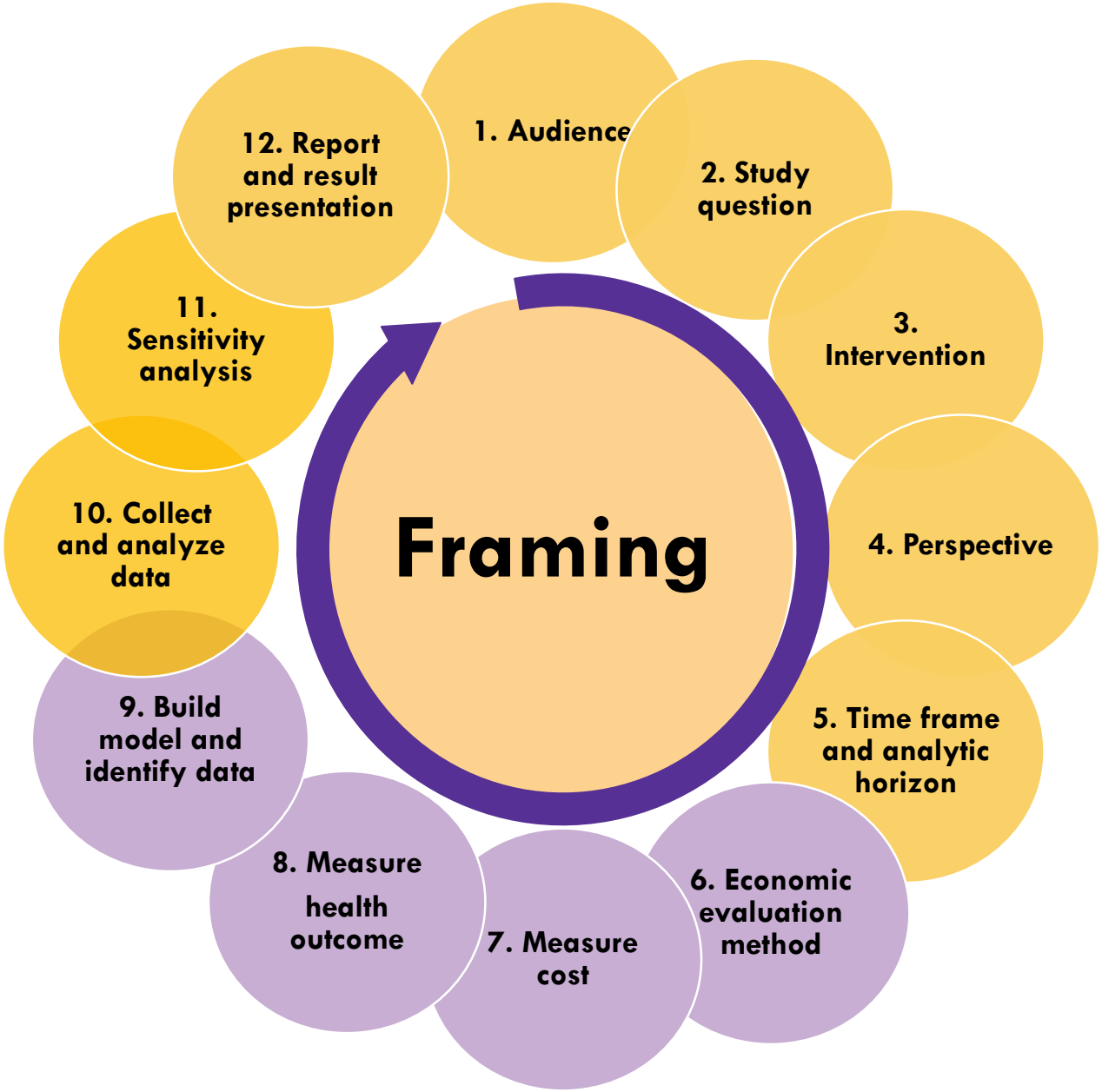
Framing the syphilis program study

1. **Identify the audience(s)**
   - Clinic directors, Ministry of Health, public
2. **Define the study question**
   - Should antenatal clinics start screening & treating pregnant women for syphilis?
3. **Identify the intervention options**
   - No services (status quo)
   - Screen and treat (more than one way to screen and treat)
4. **Define the perspective**
   - Clinic managers? Will need to budget for program
   - Government, MOH?
   - Patient? Patients may be financially burdened by this disease

Framing the Study

5. **Define study timeframe and analytic horizon**

- **Study timeframe:**
  - Assume we use existing clinics and pay more rent for additional space
  - Pay for staff, supplies, maybe advertising
  - These costs occur throughout the year
- **Analytic horizon:**
  - Costs occur with every patient
  - Benefits are likely to be noticed within a year
  - Evaluate project over a year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4. Perspective
5. Time frame and analytic horizon
6. Economic evaluation method
7. Measure cost
8. Measure health outcome
9. Build model and identify data
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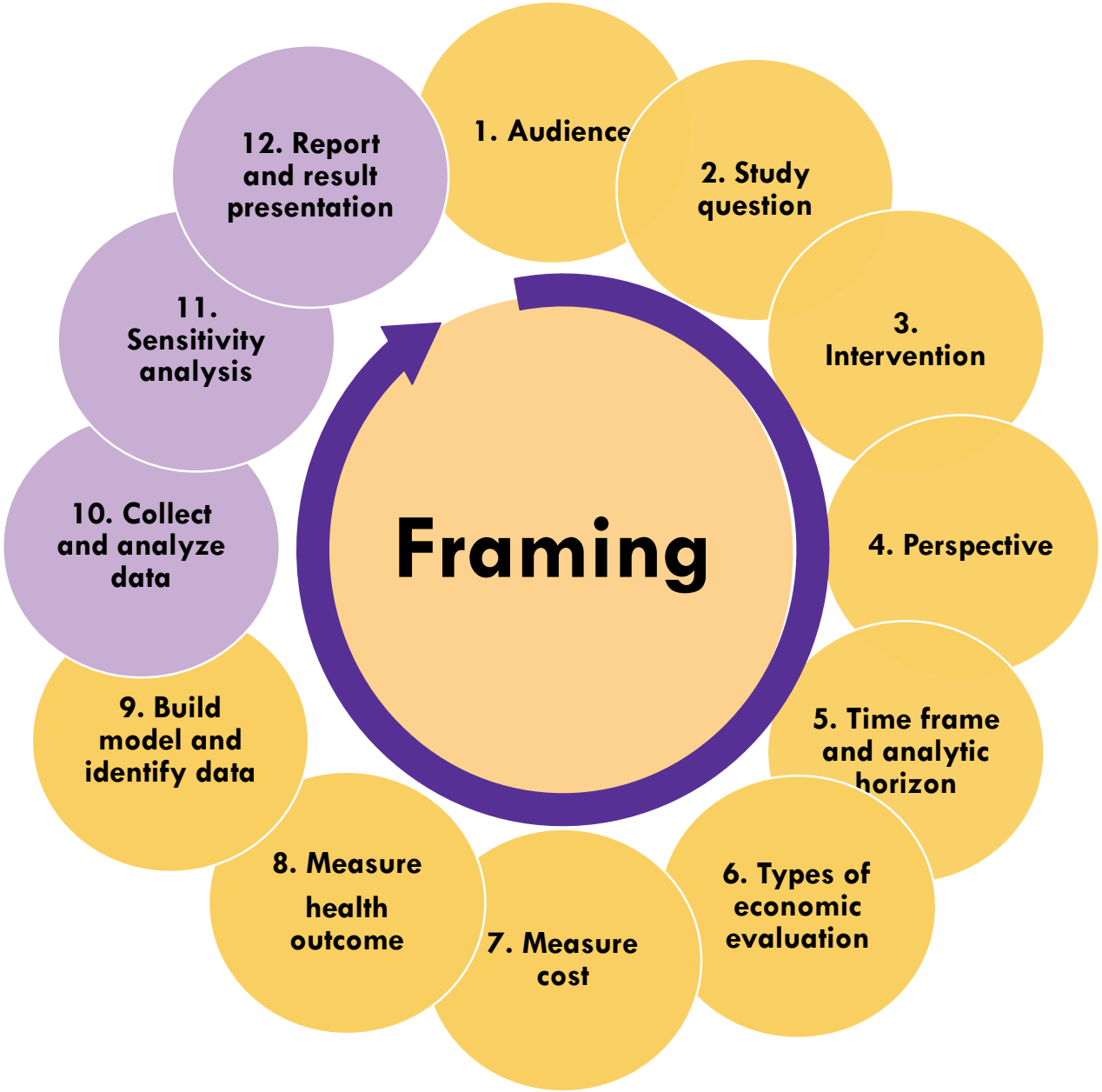
11. Sensitivity analysis
12. Report and result presentation

Next steps:

6. **Choose appropriate type of economic evaluation (Lecture 11)**
   - Cost-Effectiveness Analysis
   - Cost-Utility Analysis
   - Cost-Benefit Analysis
7. **Measure costs (Lecture 10)**
   - Cost analysis
8. **Measure health outcomes:** prevent negative negative health outcomes in infants due to untreated syphilis in mother, which to include?
   - Stillbirths, fetal loss, neonatal/early infant deaths, clinical disease in infants, YLLs, QALYs
   - We'll focus on deaths averted. About 37% of pregnancies in women with active syphilis results in perinatal death (stillbirths, fetal loss, or neonatal/early infant deaths)
9. **Build model and identify data (Lecture 9)**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12. Report and result presentation

Last steps:

10. **Collect and analyze data (Lectures 9 and 10)**
11. **Conduct sensitivity analysis (Lecture 12)**
12. **Write report/policy brief and present results**

END

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