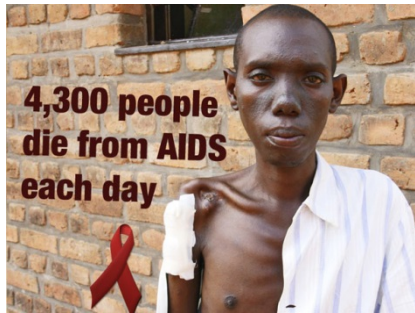


# Response to HIV

## LOGISTICAL AND OTHER PERSPECTIVES



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# Topics

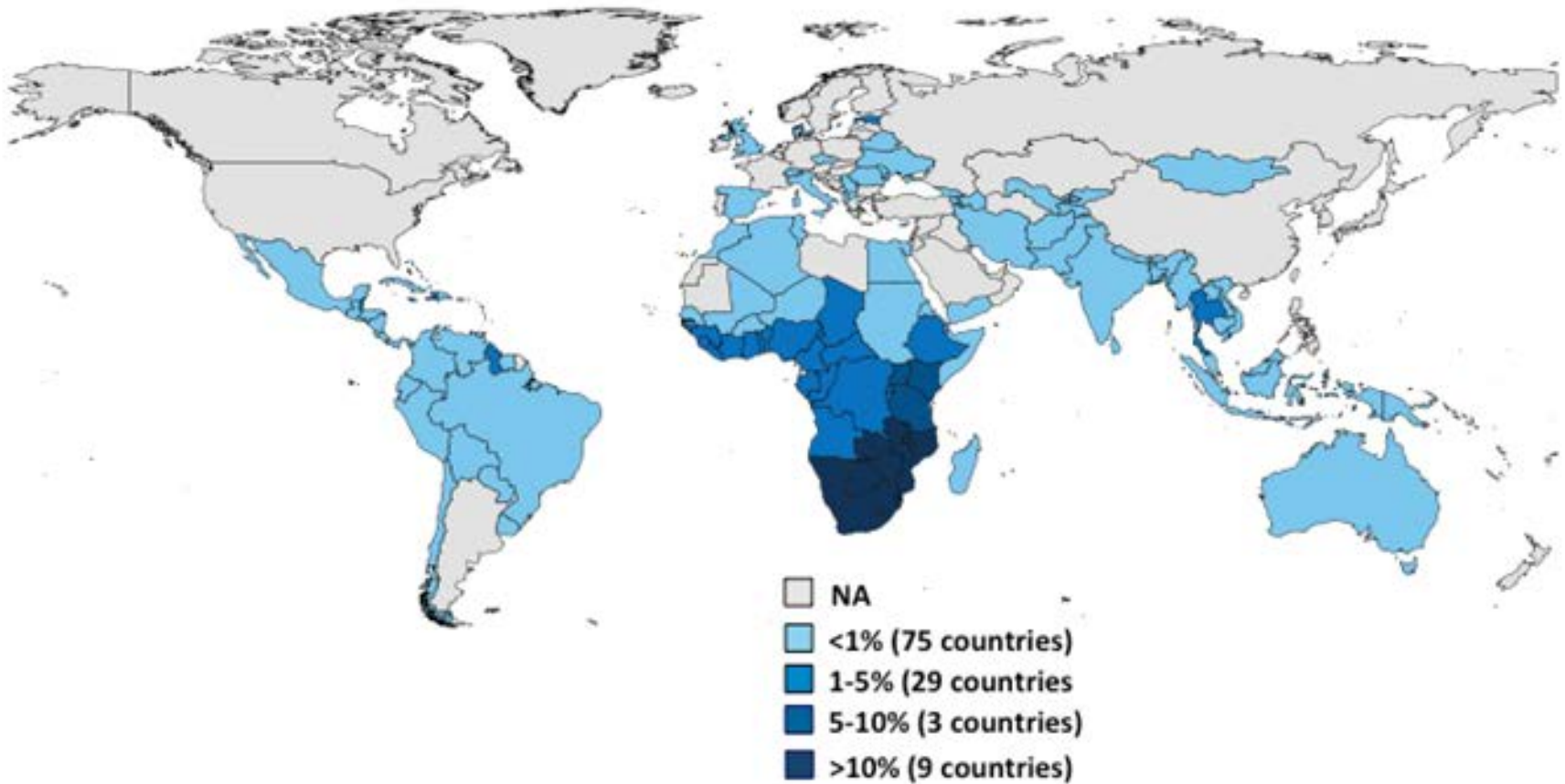
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- HIV: A humanitarian crisis
- Planning for HIV response
- Barriers to program implementation
- Competing HIV priorities
- Health systems integration

# HIV in sub-Saharan Africa

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**Global HIV/AIDS prevalence = 0.8%**





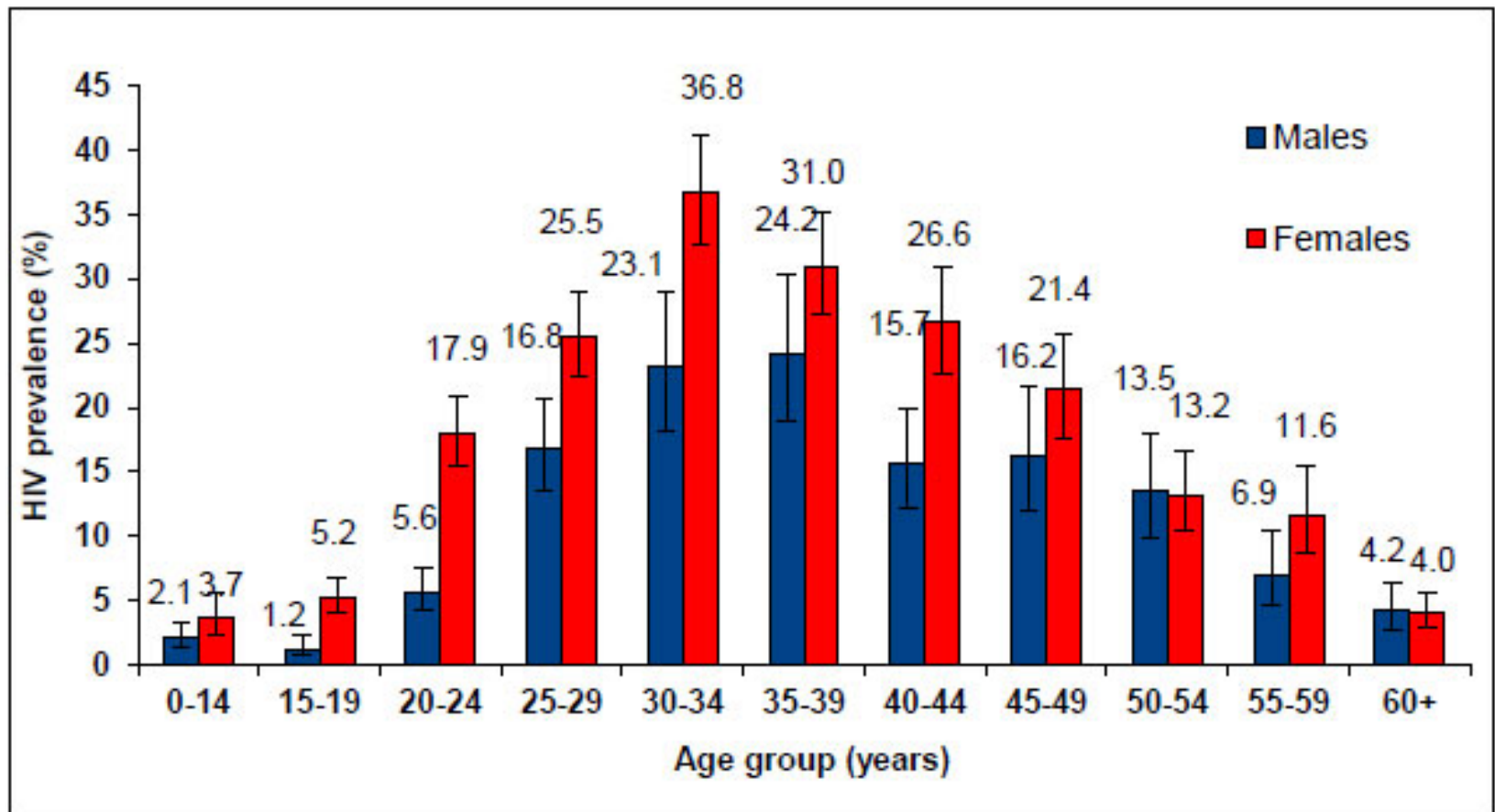
# HIV in South Africa

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- 0.7% of world population; 17% of HIV cases
- 1 in 8 persons is infected (12% prevalence)
  - Blacks: 13% prevalence
  - Coloreds: 3% prevalence
  - Whites: 1% prevalence
- 1 in 6 adults aged 15-49 is infected (17% prevalence)
- 2.7 million people receiving antiretroviral therapy (ART)
- 900 new cases per day, 500 deaths per day
- **This is a humanitarian crisis!**

# HIV prevalence in SA by age and sex

Figure 1: HIV prevalence by age and sex, South Africa, 2012



# Key issues in responding to HIV

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- Getting infected individuals on ART is critical
  - Longer life, economic productivity, fewer orphans, ...
  - Reduced infectivity → prevents HIV spread
- HIV prevention programs are also critical
  - For every person newly enrolled in treatment, two more people become HIV infected!
- How to scale up HIV prevention and treatment?
  - Logistical and operational issues
  - Barriers to implementation

# Topics

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- HIV: A humanitarian crisis
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# HIV Response

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- “The right program in the right place at the right time”
- HIV treatment for all eligible individuals
  - Screening → linkage to care → retention in treatment → viral load suppression
- HIV prevention programs
  - Different risk groups (age, gender, risk behaviors)
  - Different geographic settings (urban, rural, ...)



- Policy, advocacy and stakeholder mobilization



- Community mobilization



- Service delivery design



- Supply and management of commodities



- Capacity-building and training



- Management and coordination



- Determining costs and obtaining financing

# Policy, advocacy, stakeholder mobilization

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- Build and maintain political commitment
- Involve and coordinate a range of stakeholders
- Ensure involvement of persons living with HIV
- Work to influence health sector policies
- Promote a rights-based approach to HIV prevention and treatment
- Understand the regulatory environment for medicines and medical supplies

# Community mobilization

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- Engage community members in HIV prevention and treatment efforts
- Provide information about HIV prevention and treatment efforts
- Address perceptions about the benefits (or lack of benefits) of proposed efforts

# Service delivery design

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- Determine what services are to be offered, to which individuals and by which providers
  - Standardized protocols and quality standards, avoidance of stigma and discrimination
- Determine the setting (e.g., mobile intervention, community-based, hospital-based)
- Plan the service delivery
  - Number of individuals potentially reached, infrastructure needs, space needs, human resource needs, training needs, need for medicines and medical supplies, plan for monitoring and evaluation

# Supply, management of commodities

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## 1. Estimate needed supplies

- HIV test kits, specimen collection kits, HIV medications, refrigeration units, condoms, educational materials, equipment for training providers (e.g., videos), ...

## 2. Procure supplies

- Purchased: determine sources and acceptable prices, product quality, expiration dates, and delivery timelines
- Donated: inform donors of how much is needed and quality standards, assess reliability of delivery times and quantities, beware of hidden costs (e.g., storage and distribution fees)

# Supply, management of commodities

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## 3. Distribute supplies

- Acquire needed facilities/equipment for storage and transport, manage the supply chain (e.g., inventory control, storage, transport), monitor and evaluate the supply chain

## 4. Use supplies

- Adhere to program guidelines, obtain feedback about amount of items used and acceptability of supplies to patients and providers

# Capacity-building and training

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- Build capacity in a coordinated way
  - Range of providers (public, private, NGO)
  - Range of geographic areas and population groups
  - Potential new settings for service delivery
- Develop human resources
  - Recruitment, training and retention of appropriate numbers and types of program personnel



# Management and coordination

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- Develop an appropriate management system
  - Advisory functions, day-to-day management, monitoring and evaluation
- Coordinate HIV prevention and treatment activities
  - National, regional, local levels
- Coordinate activities with other relevant services and stakeholders
  - Maternal and child health services, mental health services, other health services, ...

# Determining costs, obtaining financing

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- Develop accurate cost estimates
  - Number of people potentially reached, startup and ongoing costs for facilities, staff and supplies
- Obtain financing
  - Variety of funding sources (local and central government, private sector, national and international donors, NGOs, local fundraising)

# Topics

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- HIV: A humanitarian crisis
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# The HIV care cascade

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Low testing rates.  
10% tested annually in SA.  
75% have ever been tested.

Difficulties in retaining  
infected individuals in care.  
In SA, 33% loss to followup.

Untested  
individuals

HIV testing  
and  
counseling

HIV care  
and  
treatment

Viral load  
suppression

Difficulties in linking infected  
individuals to treatment sites.  
In SA, 33% do not link to care.

Difficulties in achieving viral  
load suppression.  
In SA, 27% on ART do not  
achieve viral load  
suppression.

# Challenges in HIV treatment scale up

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- Community acceptability and protection of human rights
- Equity concerns
- Safe and acceptable first-line ART regimen
- Programmatic challenges
  - Scale up of HIV testing
  - Linkage into HIV care programs
  - ART delivery systems
  - Monitoring and reporting systems
  - Financing

# Challenges in HIV prevention

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- VOICE trial (Vaginal and Oral Interventions to Control the Epidemic)
  - NIH-funded clinical trial
  - Vaginal gel; oral pre-exposure prophylaxis
  - 5029 women in Uganda, Zimbabwe, and South Africa
- Reported adherence: 90%
- Fraction of women with the drug in their blood: 25-30%
- Trial was halted prematurely due to high infection rate in intervention arm

# Why did the VOICE trial fail?

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- Difficulty in taking a pill every day
- Misaligned incentives
  - Large stipends for participating
  - Free contraception, HIV tests, gynecological exams
- Mistrust and lack of information
  - “HIV won’t happen to me”
  - The drugs “cause liver cancer,” “rot the uterus”
  - The investigators “are secretly spreading HIV”
- Cultural barriers

# Topics

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- HIV: A humanitarian crisis
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# Competing HIV priorities

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## HIV TREATMENT

- Testing
- Linkage to care
- Social support programs
- Retention in care
- Viral load monitoring
- Viral suppression

## HIV PREVENTION

- Testing and counseling
- Condom promotion
- Voluntary male circumcision
- Prevention of mother-to-child transmission
- Programs targeted to other at-risk populations

# How to evaluate interventions?

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- Quantifiable outcomes
  - Costs
  - Health benefits
- Non-quantifiable outcomes
  - Equity, equality, fairness, justice
  - Social and political considerations (e.g., individual freedom, privacy, security, social norms)
  - Ethical and moral considerations
  - Robustness and implementability

# Topics

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- HIV: A humanitarian crisis
- Planning for HIV response
- Barriers to program implementation
- Competing HIV priorities
- Health systems integration

# Competing health priorities

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- HIV treatment and prevention
- Tuberculosis, malaria
- Other infectious diseases
  - Diarrheal diseases, respiratory diseases, typhoid, hepatitis, ...
- Non-communicable diseases
  - Diabetes, heart disease, hypertension, cancer, ...
- Maternal and child health
- Mental health
- ...

# Health systems integration

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- How to integrate HIV care into new and existing health systems?
- How to integrate NGOs into new and existing health systems?

A wide-angle photograph of the Stanford University Main Quad at dusk. The central building, the Main Quad, is illuminated with warm lights, highlighting its architectural details and the large mural above the entrance. The building is flanked by two long, two-story wings with red-tiled roofs and arched windows. The foreground is a large, well-maintained green lawn with a central path leading towards the building. The sky is a mix of soft pinks, oranges, and blues, suggesting the time is either dawn or dusk. A few palm trees are visible in the background, and some people can be seen walking on the path in front of the building.

Thank You

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# Investing in an HIV education program

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Suppose an HIV education program reduces risky behavior by 80% and costs \$10,000.

Should we invest in it?

What if the reduction is 50%? 25%? 10%? 5%?

# Health policy: Quantifiable factors

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- Monetary costs and savings
  - Cost of an intervention
  - Savings in health care costs
- Health outcomes
  - Reduction in number of inpatient days
  - Number of infections prevented
  - Number of years of life gained
  - Number of quality-adjusted life years (QALYs) gained
  - Number of disability-adjusted life years (DALYs) averted



# What is cost-effectiveness analysis?

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- Cost-effectiveness analysis (CEA) is a formal method for comparing the costs of a medical intervention with its benefits to determine whether the intervention is worth doing
- Ultimate goal of CEA is to inform resource allocation decisions

# Cost-effectiveness ratio

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$$\text{Cost effectiveness ratio} = \frac{\text{(incremental costs of an intervention)}}{\text{(incremental benefits of the intervention)}}$$

For example: the incremental CE ratio of screening compared to no screening is

$$\frac{(\text{Costs}_{\text{Screened}} - \text{Costs}_{\text{Unscreened}})}{(\text{Benefits}_{\text{Screened}} - \text{Benefits}_{\text{Unscreened}})}$$

“Screened” refers to cohort of patients who were screened

“Unscreened” refers to cohort of patients who were not screened

# Costs and benefits: Societal perspective

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- Measure all costs and benefits, regardless of source or beneficiary
- E.g., for costs: patient costs, health care provider costs, employer costs, costs of the criminal justice and welfare systems
- E.g., for benefits: health outcomes for patients, their contacts and offspring

# Measurement of costs/savings

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- Costs/savings = Changes in resource use associated with an intervention (i.e., incremental resources consumed)
- Must consider all costs/savings, regardless of source or beneficiary
- Must express all costs/savings in \$ of same year

# Categories of costs/savings

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- Costs of health care services
- Costs of patient time
- Costs associated with care giving (paid or unpaid)
- Other costs associated with illness (e.g., childcare)
- Costs incurred by employers
- Costs associated with non-health impacts of intervention (e.g., welfare costs, criminal justice costs, environmental costs)

# Measurement of benefits

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- Health benefits = improvement in health associated with an intervention
- Can measure in natural units for the intervention
  - E.g., reduction in hospital patient days, disease progression, years of sight saved, infections averted, life years gained, ...
- But ... to be able to compare with other interventions, must use a common measure
  - QALYs (quality-adjusted life years)
  - DALYs (disability-adjusted life years)

# Quality adjustment (QALYs)

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- Time spent in each health state is weighted by a quality multiplier that is intended to reflect relative quality of life in that health state
- “Perfect health” has quality multiplier 1.0
- Death has quality multiplier 0
- For other health states, quality multipliers reflect diminution of health (e.g., pain/suffering, vision, hearing, speech, cognition, emotion, mobility, dexterity, ...)

# Disability adjustment (DALYs)

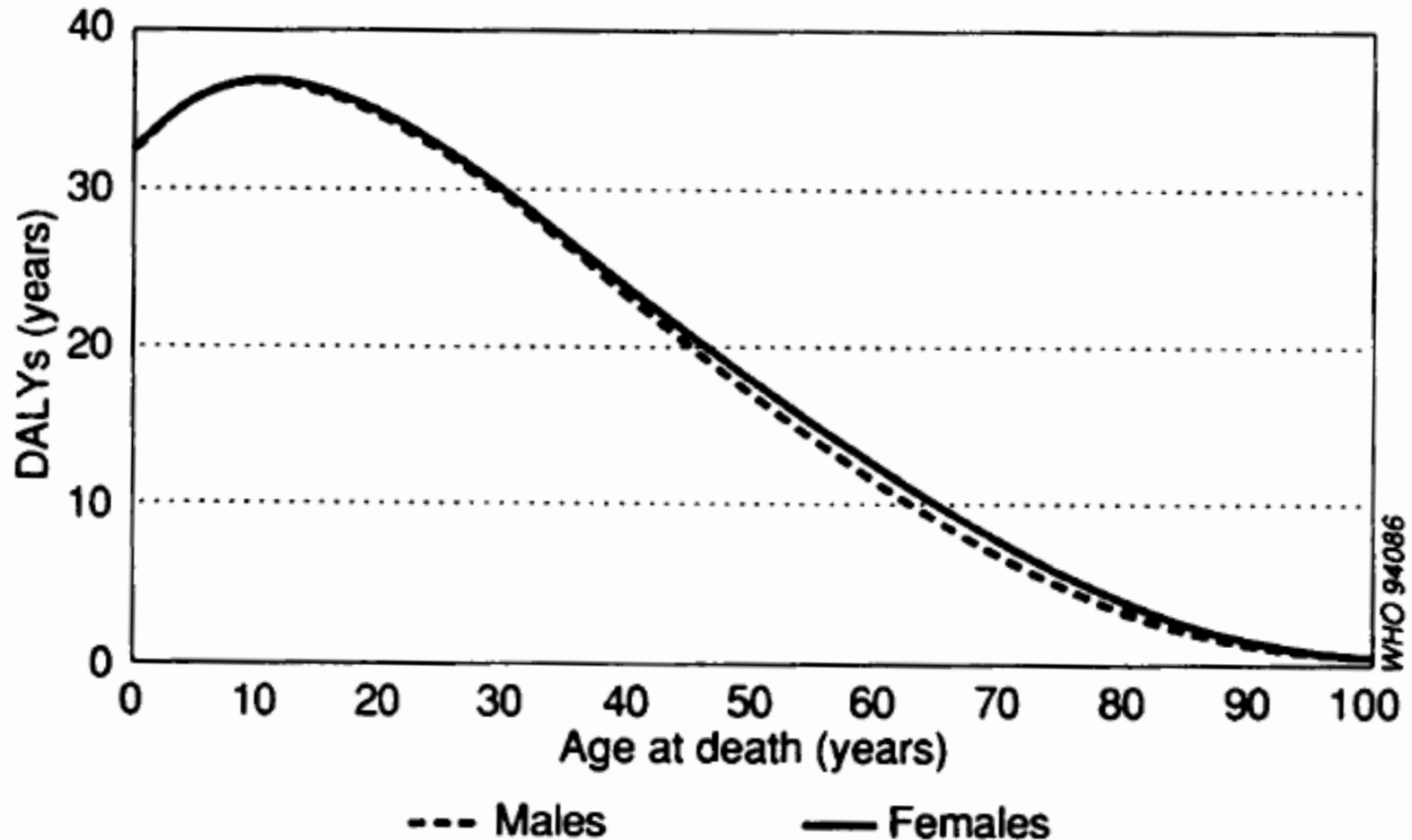
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- Time spent in each health state is weighted by a disability multiplier (ranging from 0 to 1) that is intended to reflect losses in an individual's potential contribution to society
- Weights based on
  - Time lost due to premature death
  - Social value of time lived at different ages
  - Disability
  - Discounting (time preference)



# DALYs lost due to death at each age

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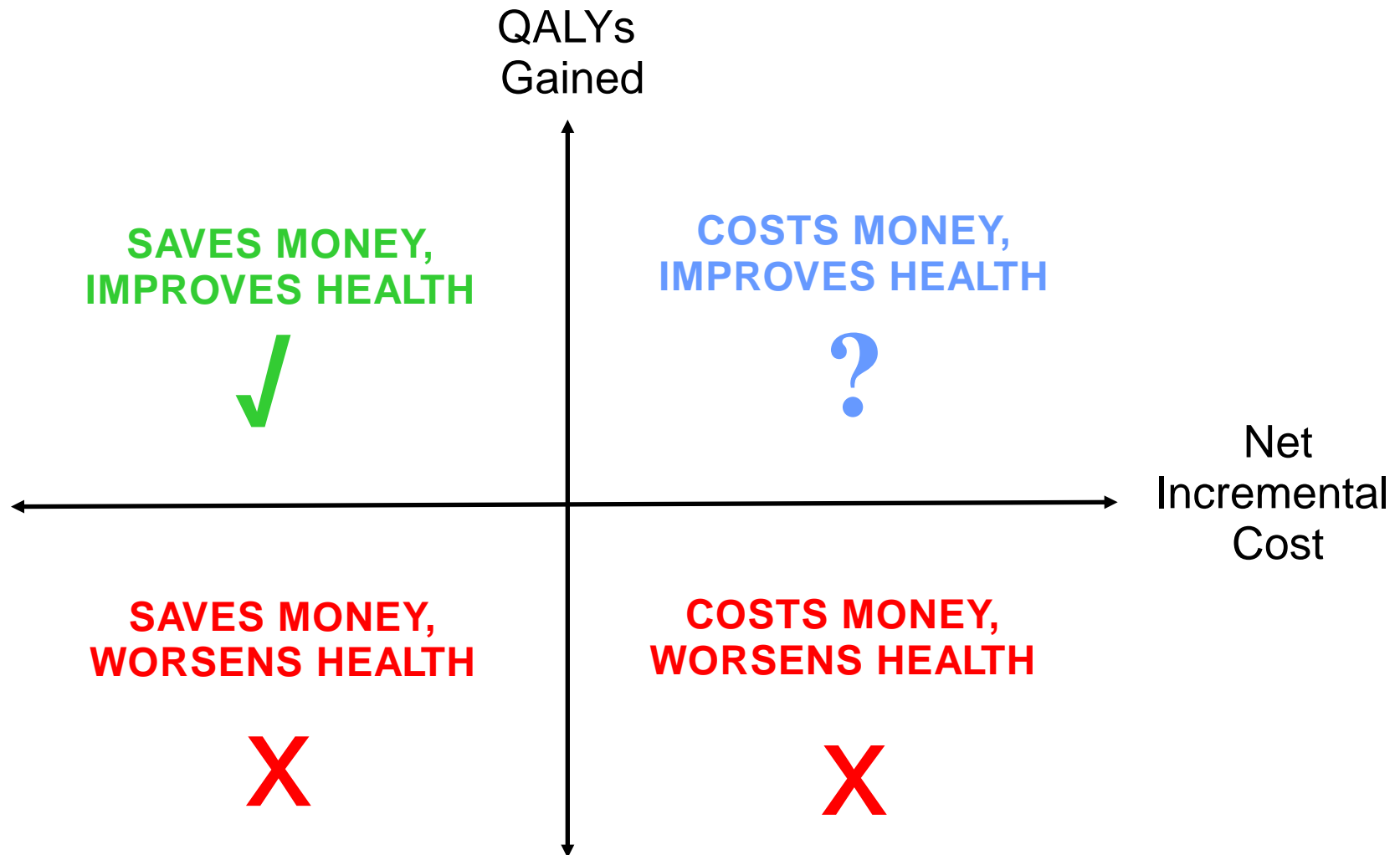
# Spending a budget

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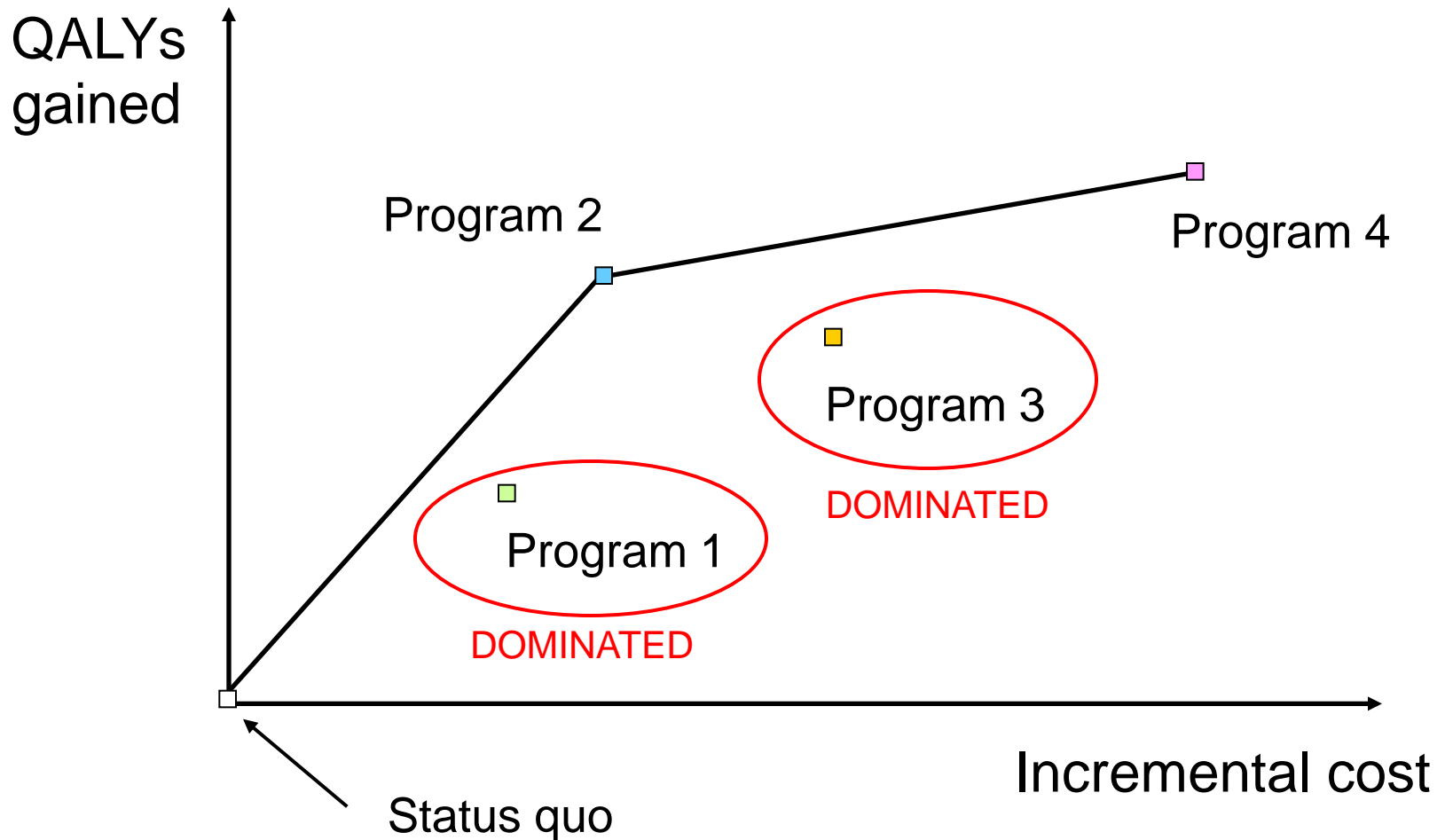
<b>Program</b>	<b>Cost</b>	<b>QALYs Gained</b>	<b>CE Ratio</b>
A	\$3.0 m	1000	\$3,000
B	\$3.2 m	500	\$6,400
C	\$2.0 m	100	\$10,000
D	\$1.8 m	100	\$18,000
E	\$2.2 m	100	\$22,000

# Choosing from alternative interventions

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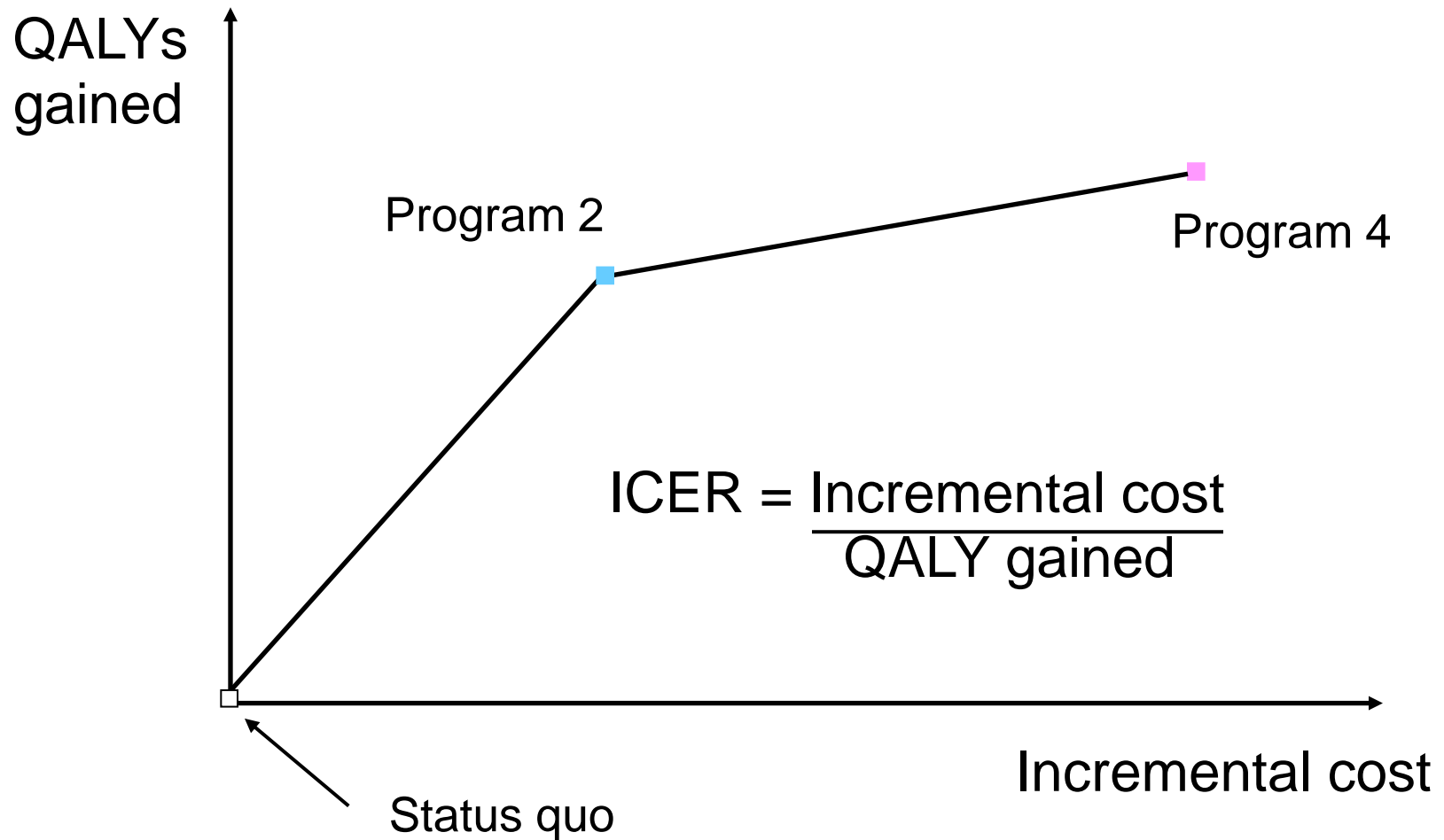


# Efficient frontier in CEA

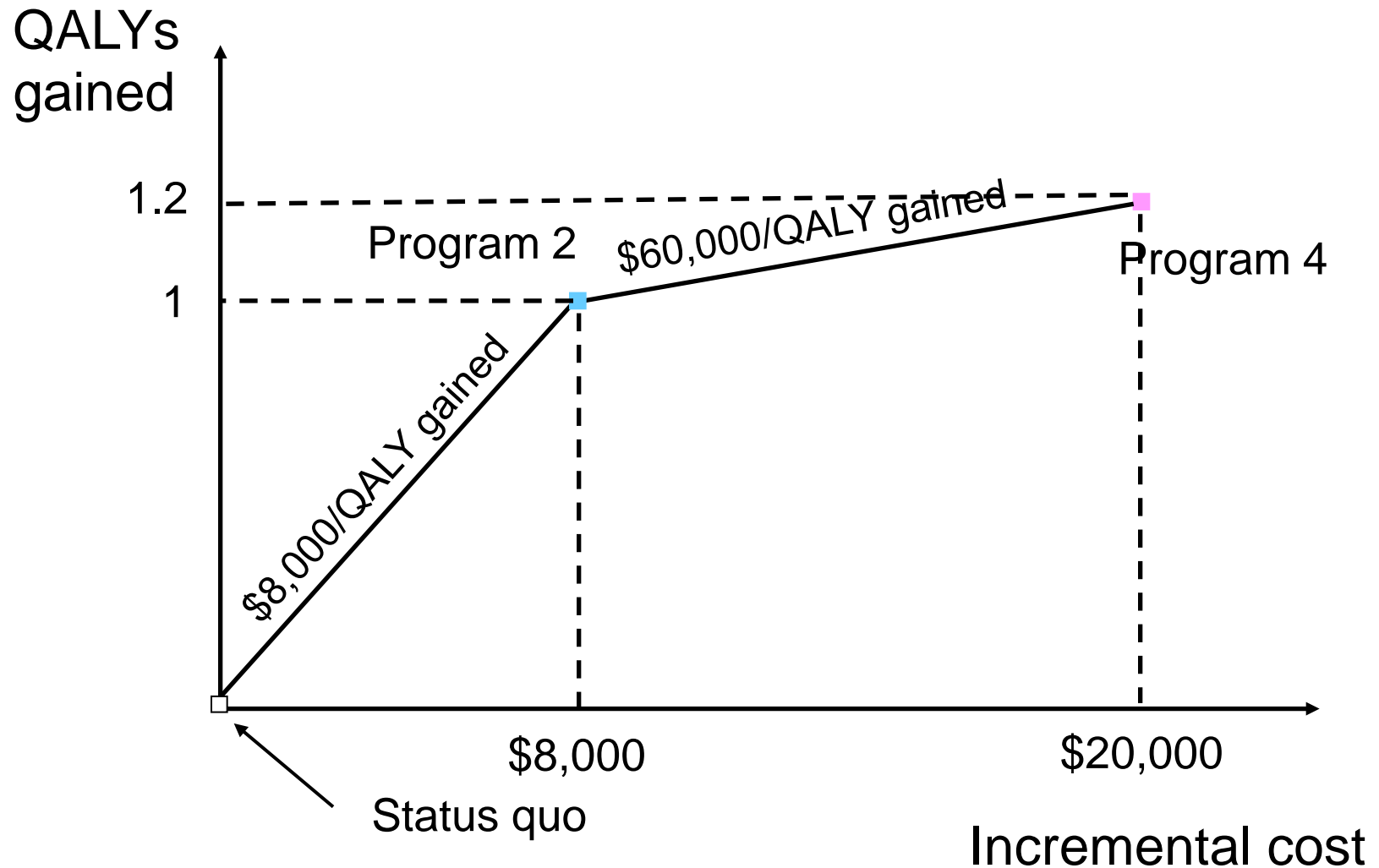


# Incremental cost-effectiveness ratio

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# Incremental CE ratio



# Interpreting the incremental CE ratio

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- WHO guidelines
  - *Very cost-effective* interventions gain each additional QALY (or DALY) at a cost less than GDP per capita
  - *Cost-effective* interventions gain each additional QALY (or DALY) at a cost less than three times the GDP per capita

# GDP per capita for selected countries

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Qatar	\$143,400
Norway	\$66,900
U.S.	\$54,600
U.K.	\$39,500
Russia	\$24,800
China	\$12,900
South Africa	\$12,700
India	\$5,900
Congo	\$700