New Vaccine Introduction

Key Considerations

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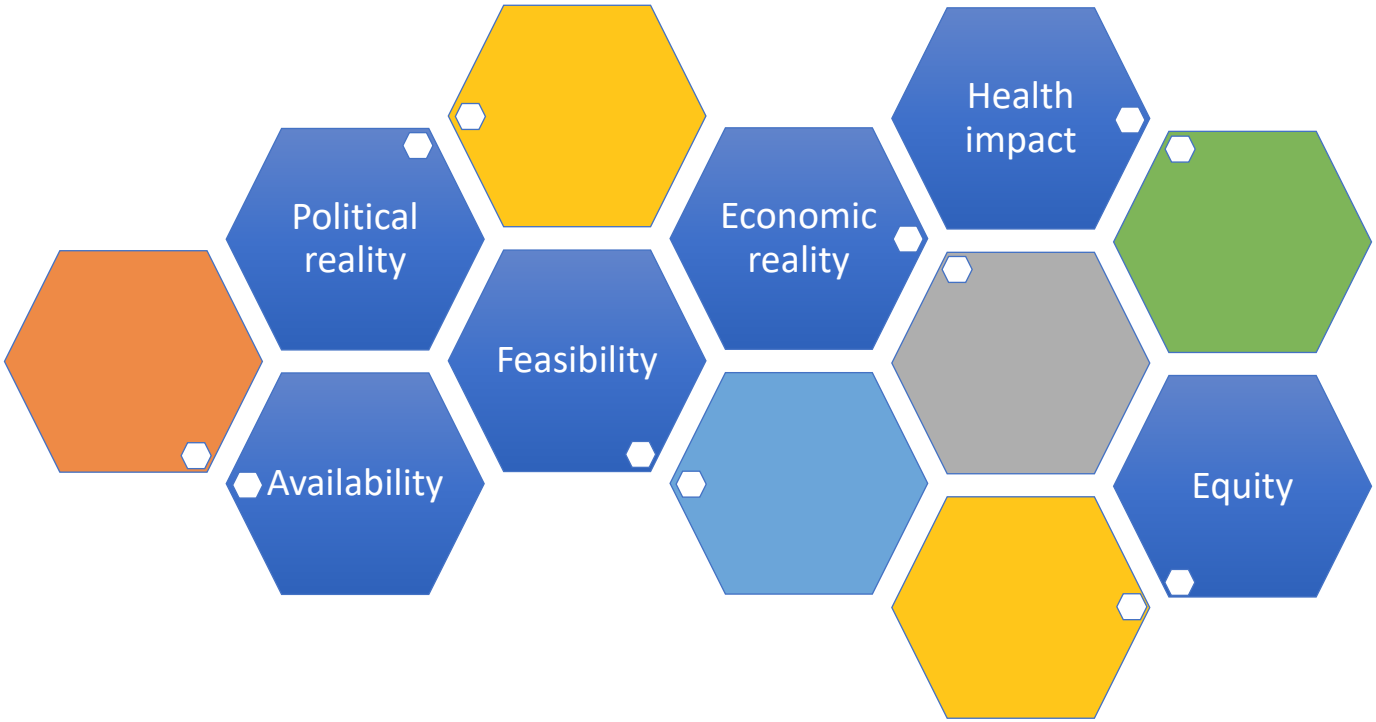
TVEE
TEACHING VACCINE ECONOMICS EVERYWHERE

Outline

- Section A: COVID-19 Vaccine –Why NUVI economics is different
- Section B: Principles of NUVI economics that still apply to COVID
- Section C: Principles of Vaccine Hesitancy—old and new
- Section D: Vaccine Advocacy and Economics for 2021

Section A
COVID-19 Vaccine Why NUVI Economics is Different

Choice of Whether to Invest In Vaccines is always a Complex Dynamic



COVID-19 Vaccine would be different

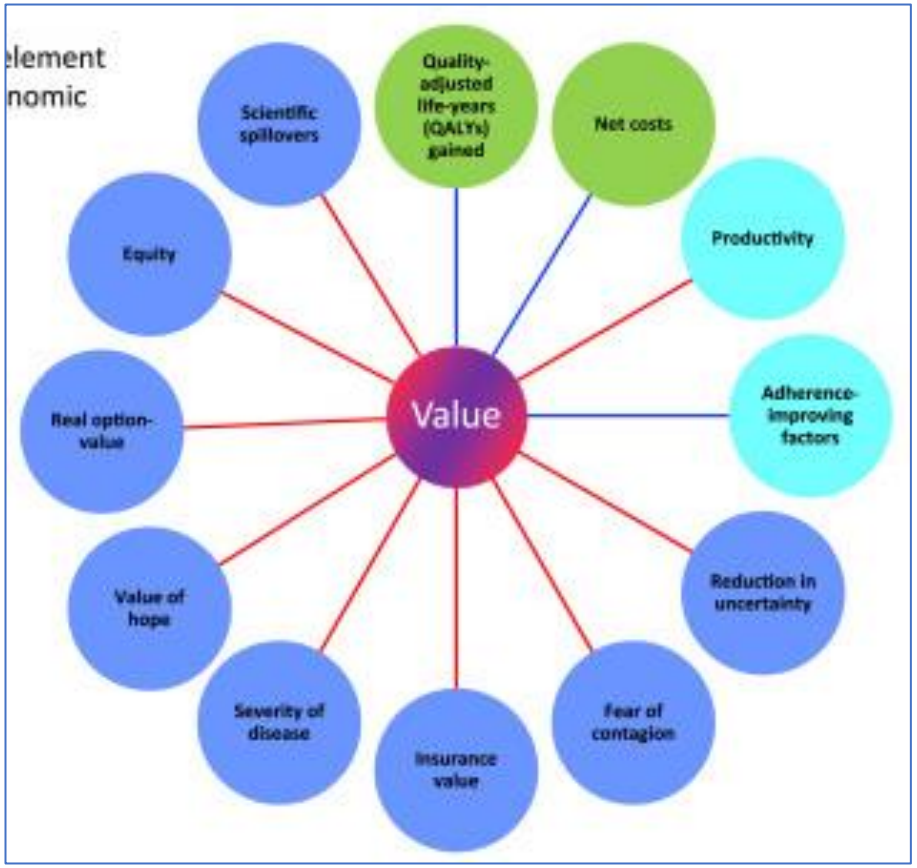
<u>The Value Proposition is Different</u>

Benefits exceed "health" and "lives saved"

- **Equity**
- **Value of Hope**
- **Fear of contagion**
- **Reductions in uncertainty**
- **Reductions in dread**
- **Family spillovers**

Cost Offsets

- **Value of "no pandemic" is $trillions**
- **Avoiding a 5-10% recession**
- **On scale of whole health sector**



Lakdawalla *Value Health 2018*

What is Real Option Value?

- Real option value is the market price of the right to make a product. It can be worth more than the direct sales are worth
- Real option value of safe effective COVID-19 vaccine is what the license would be worth if sold to highest bidder in an auction
  - Possibly worth more than the expected net revenue
- Why?
  - Glory from saving the planet
  - Power from access to all the presidents and prime ministers on earth
  - Strategic opportunities
    - Play bidders against each other
    - Quid pro quo deals

Value of COVID-19 Vaccine

- Global GDP
  - $142 trillion ($18,685 per human)
- COVID one year economic impact is approximately a 10% recession
  - $14 trillion ($1,865 per human) +/- 50%
- So if a COVID-19 Vaccine can eradicate a $14 trillion problem…. What is its market value?

By Comparison: All health spending on earth in 1 year is just $9 trillion

New Vaccine Introduction (NUVI) Economics

- Traditionally concerned with
  - Should we introduce Vaccine X?
  - Moot point for a proven safe and effective COVID-19 vaccine

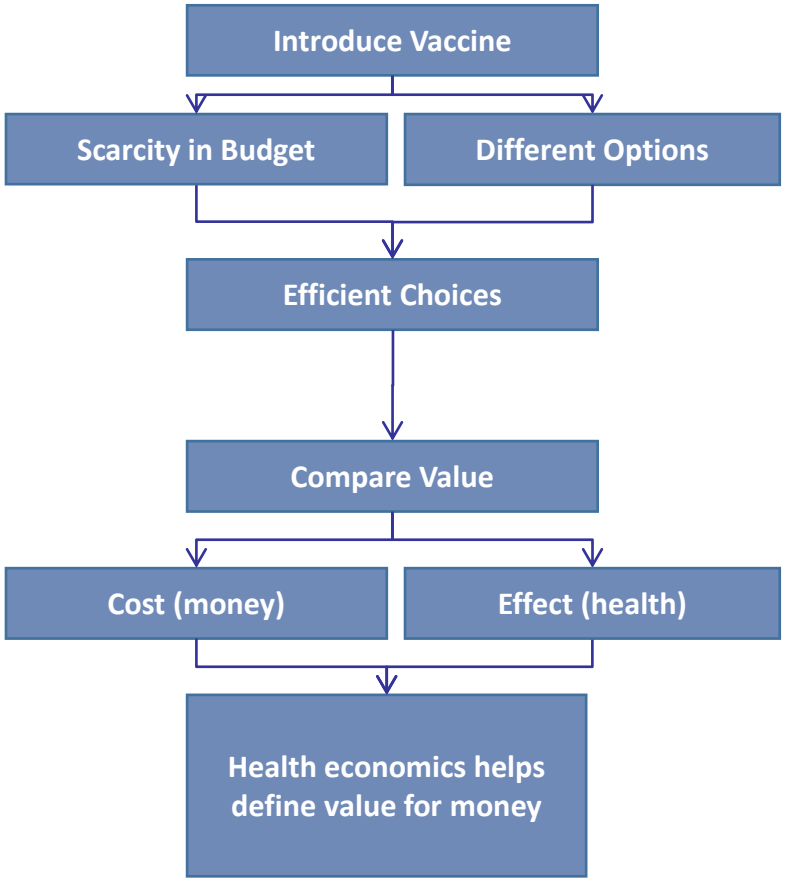
- Also concerned with
  - How do we minimize costs and disruptions when we introduce Vaccine X
  - How do we maximize the benefits of introducing Vaccine X

Four Components of COVID-19 NUVI

- Production capacity of vaccine (Supply-side issues)
  - Will global production output of the vaccine be enough to sustain demand?
- Price of vaccine and cost of immunization (Financing issues)
  - With shrinking economies, how will funds be reallocated towards COVID-19 immunization and vaccine procurement from – other vaccine/immunization efforts? From other public health interventions? From other social programs?
- Storage of vaccine (Logistic and Operational issues)
  - If the vaccine requires specialized cold-chain equipment, are EPI programs able to reallocate funding towards acquiring the equipment?
  - Decrease inventory of other vaccines to make space for COVID-19 vaccine?
- Uptake of the vaccine (Demand-side issues)
  - How to obtain high coverage despite recent rumors and false information in media about COVID-19 vaccine?
  - At what cost will mass immunization campaigns affect the risk of being infected?
  - If supply of vaccine is low, which population sub-group to target?

Section B
Economics of New Vaccine Introductions

NUVI Economics?
A tool for decision makers



Scarcity (limitations) in ***resources*** (budget)

Different options exist for vaccine introduction

Choices have to be made between options because of budget limitations

- Chose ***efficiently*** ?
- ***Compare!***

- ***Value*** of (new) interventions:

Value ***cost*** (money) and ***effect*** (health)

Look at ***incremental*** differences!

Make the selection ***explicit***

Also helpful for ***equity distribution*** of health care resources in the population

Economics and New Vaccine Introductions

- Program managers need to know what investments would be needed for introducing a vaccine to get the most health at the least cost

- Common tools
  - Cost effectiveness analysis: ”value for money” of a program relative to a feasible alternative
  - Budget impact: change in flow of funds when an organization substitutes a new program for the alternative (current) program

Evidence Base – Vaccine Introduction

Clinical

- Burden of disease
- Vaccine efficacy
- Vaccine safety
- Clinical resources
- Immunization program strategy

Political

- Demand
- Acceptability
- Political benefit
- Legal issues
- Equity issues
- Ethical issues
- Conformity to similar programs in other regions

Economic

- Program cost
- Health care budget
- External funding
- Competing priorities
- ***Cost-effectiveness***

Vaccine Value For Money: *Consumer Decision*

What do I get out of Vaccines? What do I give up?

Benefits

- Why do I want a Vaccine?
- How will it prevent the spread of infectious disease?

Alternatives

- Other Vaccines?
- Prevention?
- Education?
- Infrastructure?
- Doing Nothing?

Costs

- What expenses?
- To Whom?
- Who pays?
- Unintended Consequences?

Paying the costs

- Savings?
- Return on Investment?
- Prevention compared to Treatment
- Reduce spending on other items?

Value For Money: *Healthcare Sector*

Benefits

Child

Family

Community

Nation

What metrics?

Vaccine Program

Costs

Vaccine

Personnel

Supply chain

Cost to patient & family

Alternatives

Status quo (no new program)

Masks

Quarantines

Treatment

Paying the costs

Available funds

Shift budget

Fee for service

New taxes

NGO

Who are the Stakeholders?

- General Public
  - Population sub-groups based on socio-economic categories
- Patient-advocacy groups
- Payers
- Government entities
- Corporations
- International organizations

The benefits and costs of COVID-19 immunizations are large and very unequally distributed. Thus different groups could prefer different policies and immunization strategy.

Section C
Vaccine Hesitancy

The Free-rider Problem

- Free riding is an attempt to benefit from a public good without sharing in the cost
    - Examples

Free Riding and Vaccines

- What happens when someone free rides on the vaccine system?
  - Do they receive private protection?
    - Consider measles
    - Consider tetanus
    - Consider HPV
  - Do they receive herd immunity?

But why do people opt-out?

- Level of benefit from one injection
  - Goes down (to zero) as coverage goes up (to 99.9%)

- Not all risks are perceived the same
  - Risks imposed by someone else worry us more
  - Human-made risks worry us more than natural risks
  - Risks we cannot control worry us more
  - Risks that come from untrusted sources worry us more

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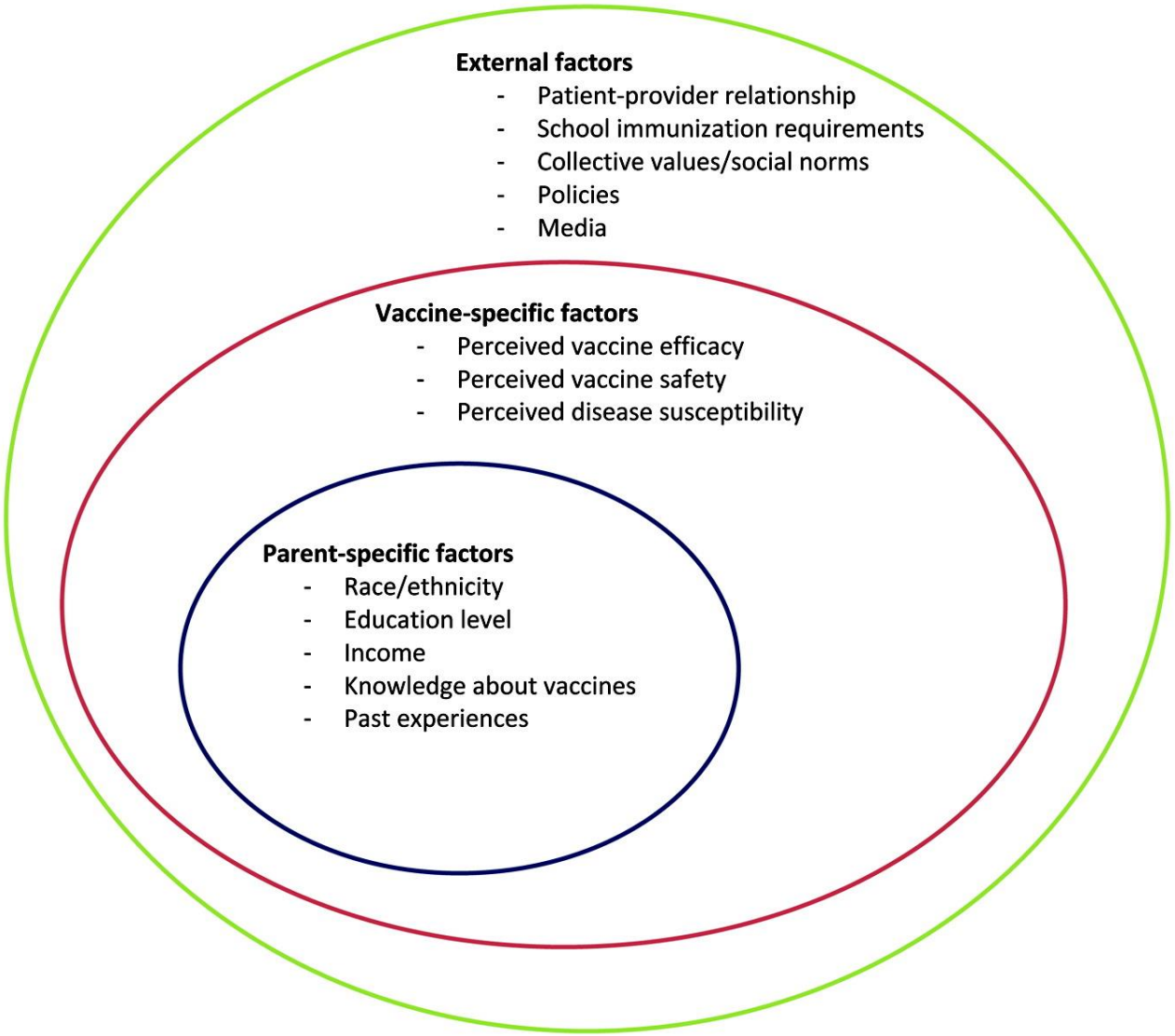
Vaccine Hesitancy (Gowda & Dempsey, 2013)



How can we address free – riding?

- Providing incentives to vaccination
  - Conditional cash transfers
  - This create a price that is below zero
- Mandatory (forced) vaccinations
  - Fines or punishments or denied school entry if not vaccinated
  - Requires trust and low perceived risk
- Reshaping social norms to encourage prosocial behavior – social nudge
- Persuasion based on “Good citizenship”
- TRUST

Trust

- Trust is the credibility we give to information and information sources
- Trust foundations
  - Past experience with the source
  - Personal relationship with source
    - Family and friends
    - Long time health provider
  - Tribality
    - Is the source a member of “my people”?
  - Reputation
    - What other people say about the source
  - Coherence with other beliefs and epistemology
- The power of narrative
  - One story can outweigh 100 randomized trials

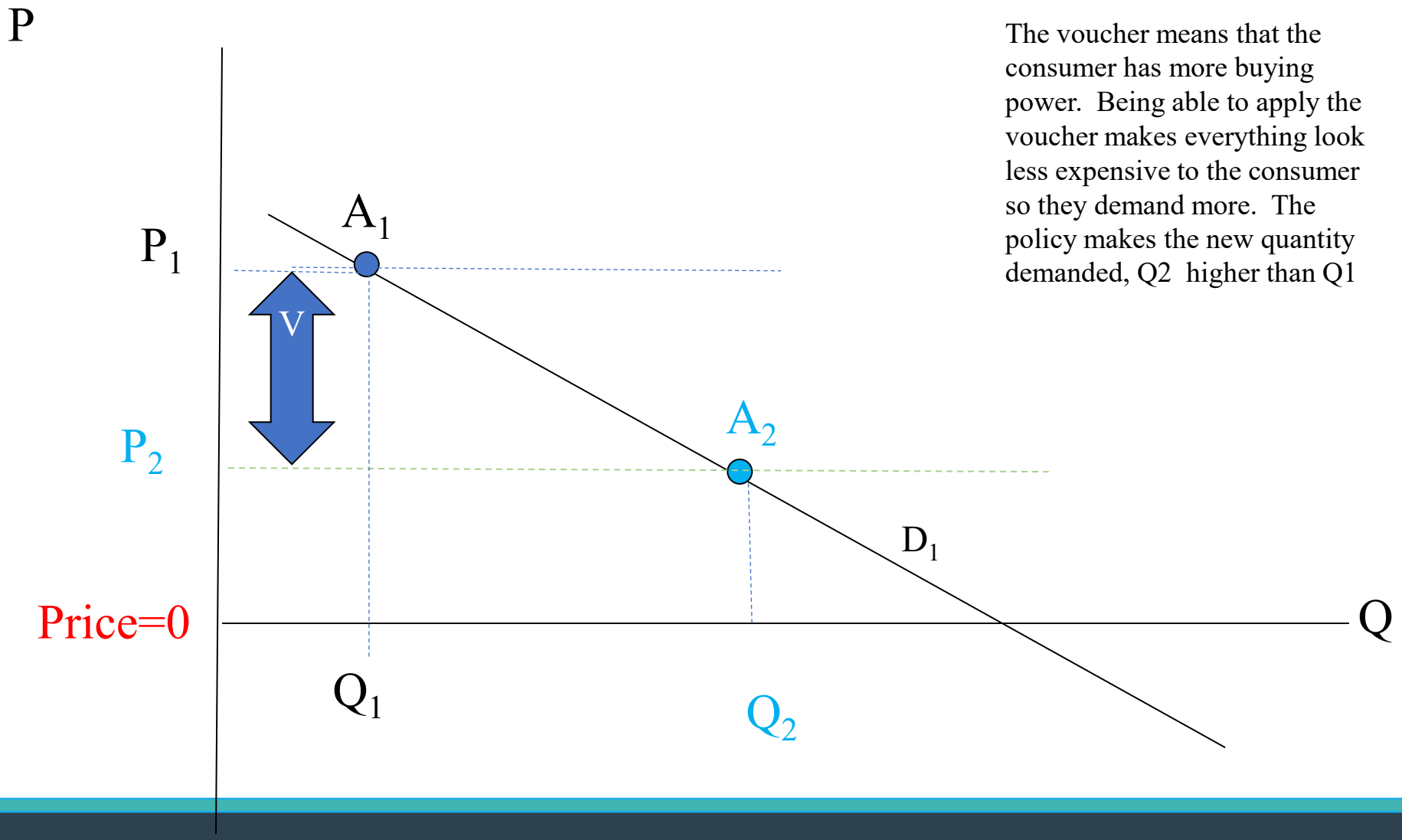
Economic Tools

- Subsidies
  - Getting fee to zero
  - Getting access costs to zero
  - Getting sub-zero costs
- Mandates

What is the Vaccine “price”

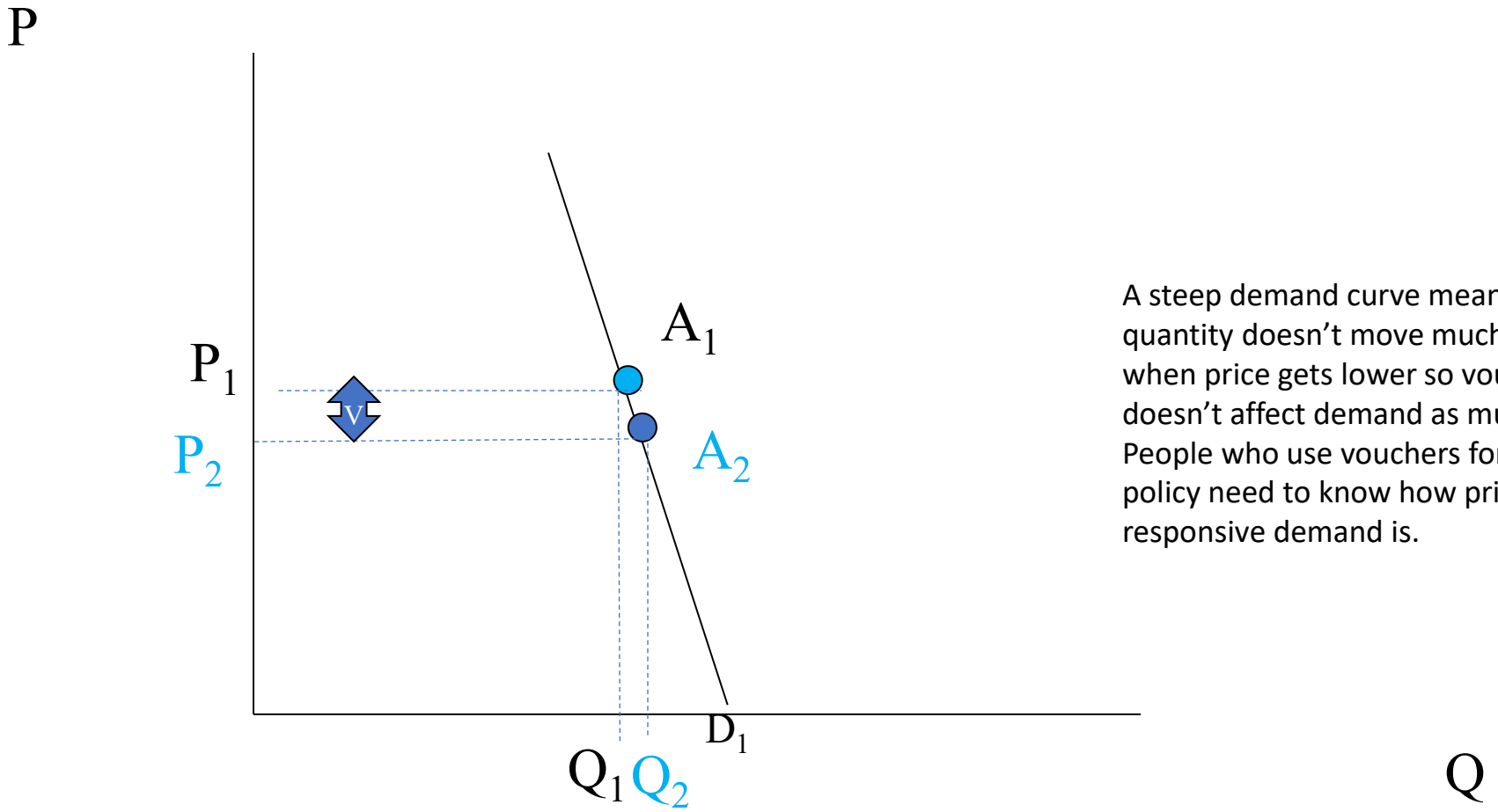
- Price involves all opportunity costs paid by the household to get vaccinated.
- It includes
  - Time spent traveling and waiting
  - Lost economic productivity from missing work or school or housework
  - Losses if there are side effects from the vaccine
  - Fees paid if vaccinated in private sector
- Following slides show “P” and refer to these lost household resources

A voucher (subsidy) can shift up demand



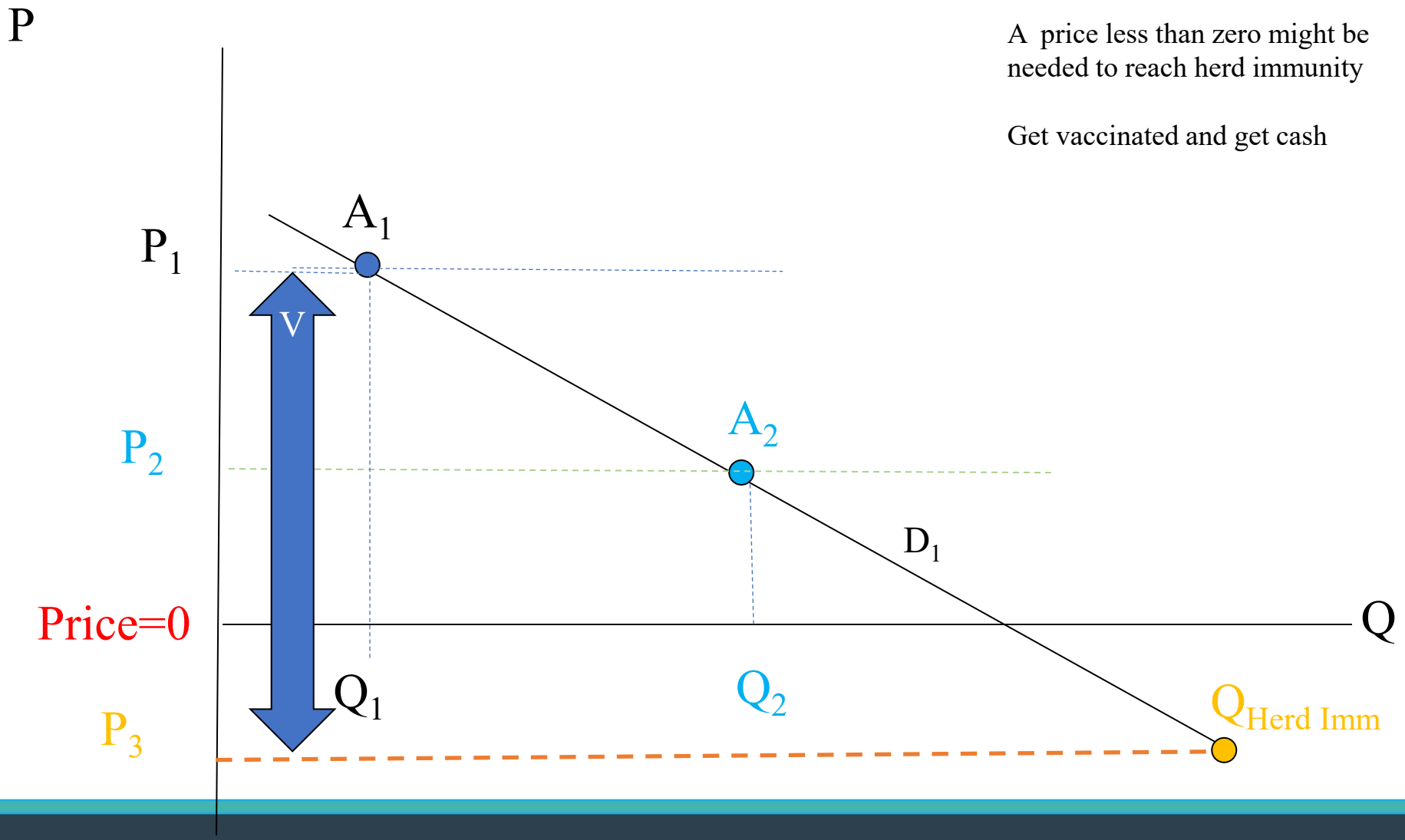
The voucher means that the consumer has more buying power. Being able to apply the voucher makes everything look less expensive to the consumer so they demand more. The policy makes the new quantity demanded, Q2 higher than Q1

Steep demand curves mean vouchers don't work as well.

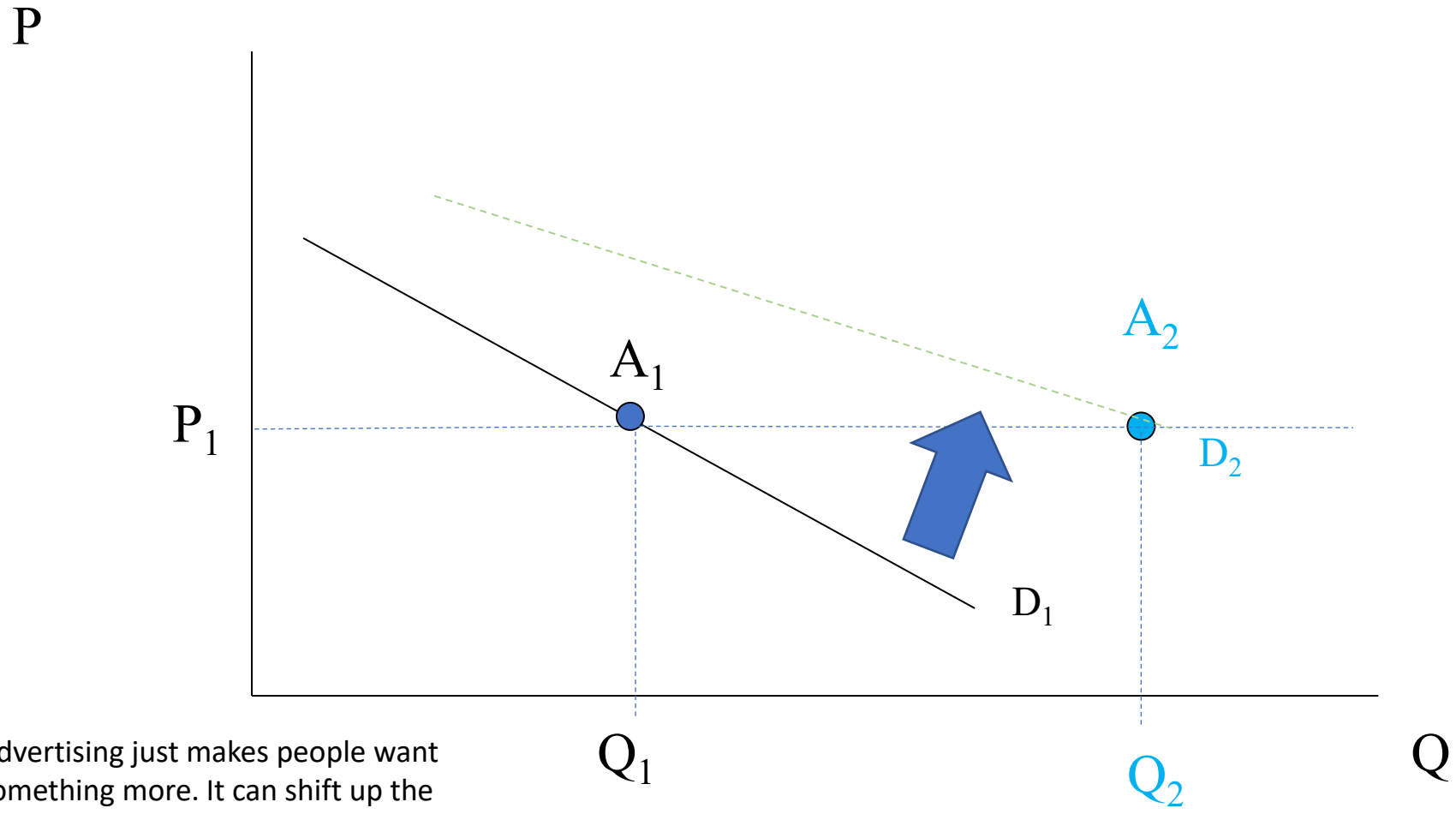


A steep demand curve means that quantity doesn't move much when price gets lower so voucher doesn't affect demand as much. People who use vouchers for policy need to know how price responsive demand is.

Might Need Sub-zero Price



Advertising can shift up demand and make it less price responsive



Advertising just makes people want something more. It can shift up the curve and make people less price responsive.

Psychology Of Advertising

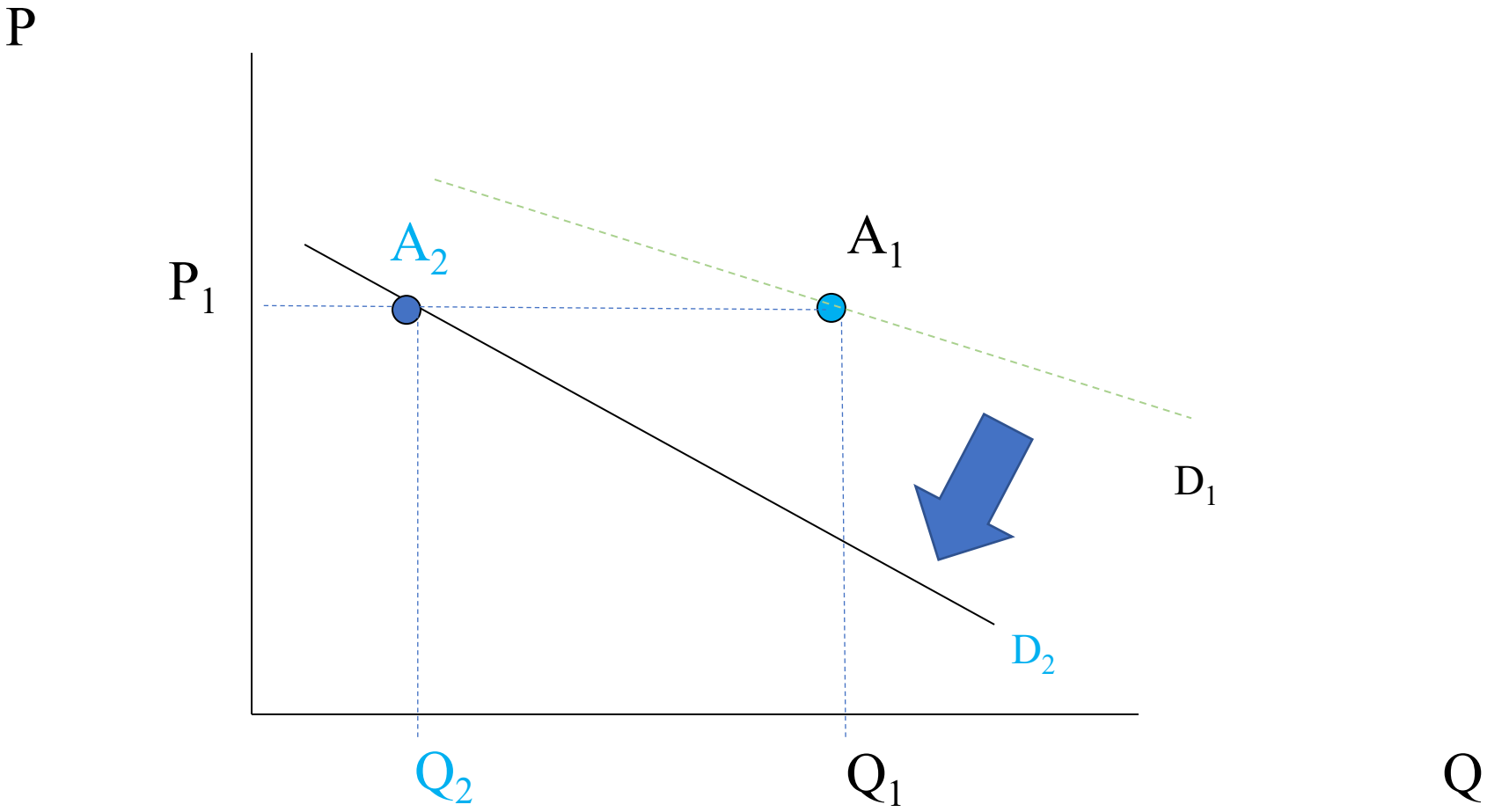
- What is the value proposition of a health product?
- Consider the HPV vaccine.
  - What are the goals of someone making this choice?
  - What determines how responsive they will be to advertising?

- Now consider the COVID-19 vaccine
  - What are the goals of someone making this choice?
  - What determines how responsive they will be to advertising?

Rumors Of Danger Can Shift Down Demand

- Draw what happens if there is a vaccine scare?

Demand scare shifts down demand and makes it less price responsive



Fear shifts demand from D1 to D2.

Successful Vaccine Programs Can Lower Demand

- Philipson Effects
  - Rational consumers have demand in proportion to the risk of infection
    - If a disease becomes more rare, demand should decrease
    - If there is lots of herd immunity it is rational to not pay as much or travel as far to get a vaccine
  - The more vaccine programs succeed the more they need to appeal to social pressure rather than direct health benefits.

Why subsidize or advertise?

- Externalities
  - People might be rational, but without nudging or subsidies they spread too much disease
- Asymmetric information
  - People just don’t know about the value of vaccines
- Uncertainty
  - People fear unknown things about side effects and safety

Is it possible to spend too much to promote vaccines

- The fundamental rule of economic efficiency can help
- MC=MB
- Marginal cost=Marginal benefit

Marginal cost of one more dollar spent to promote vaccines	=	Marginal benefit of disease reduction from preventing vaccine preventable disease

- Don’t spend more than this. Don’t spend less.

Summary

- There are reasons to want to shift demand curves
- Price floors and price ceilings can change what markets do
- Advertising, taxing, and subsidizing can shift demand curves
- The benefits of shifting demand has to be justified by the cost.

Section D: Vaccine Advocacy and Economics for 2021

Vaccine Advocacy - Summary Steps

- Listen to people–citizens, politicians, nurses, CHWs
- Involve people to make a plan based on data
- Create messages and materials and check them with stakeholders
  - Build and sustain strong coalitions
  - Engage policy and decision makers
- Inform and involve the public in designing messages
- Monitor and evaluate your work

Assets in Place for Advocacy

- Co-design approaches are culturally consistent in many settings
  - Urgent to activate this now
- Assemble to listen
- Assemble to answer questions
- Three-way partnerships
  - Citizens
  - Politicians
  - Health experts

CHWs

- Redeploying CHWs for COVID-19 vaccine
- Typical of SIAs
- Advantages of trust
- Record-keeping
- Finding gaps
- Assessing hesitancy and rumors

Vaccines as a public good – Public Role

- Vaccines offer positive externalities
- Most vaccines are low cost and cost-effective
  - Recent analysis shows that investment of $1 in a portfolio of vaccines, would return up to $16 (2011-2020).
- Some childhood vaccines like measles and tetanus protect the poor more than the rich
  - Makes it important that delivery systems reach the poor
- Free riding requires a public solution

Vaccines as a Public Good – Why Public Provision

- Immunization is in public interest because benefits extend beyond those who receive the vaccines
- Even small costs to households can be barrier to access and if they are deterred society cannot achieve benefits of herd immunity.
- As coverage increases the unvaccinated groups may have more vaccine resistance due to free riding

Public/ Private/ Mixed Approach?

- Private Not For Profits (PNFP) and private sector can potentially help public sector vaccinate
  - Helpful if government has limited workforce
  - Helpful if they bring in financing
  - Unhelpful if private sector poaches workers
  - Unhelpful if their quality is poor

- Private sector needs regulation to ensure clients are not taken advantage of

- Private sector won't automatically address free riding

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