

Aging and immunity III

Foundation Merieux

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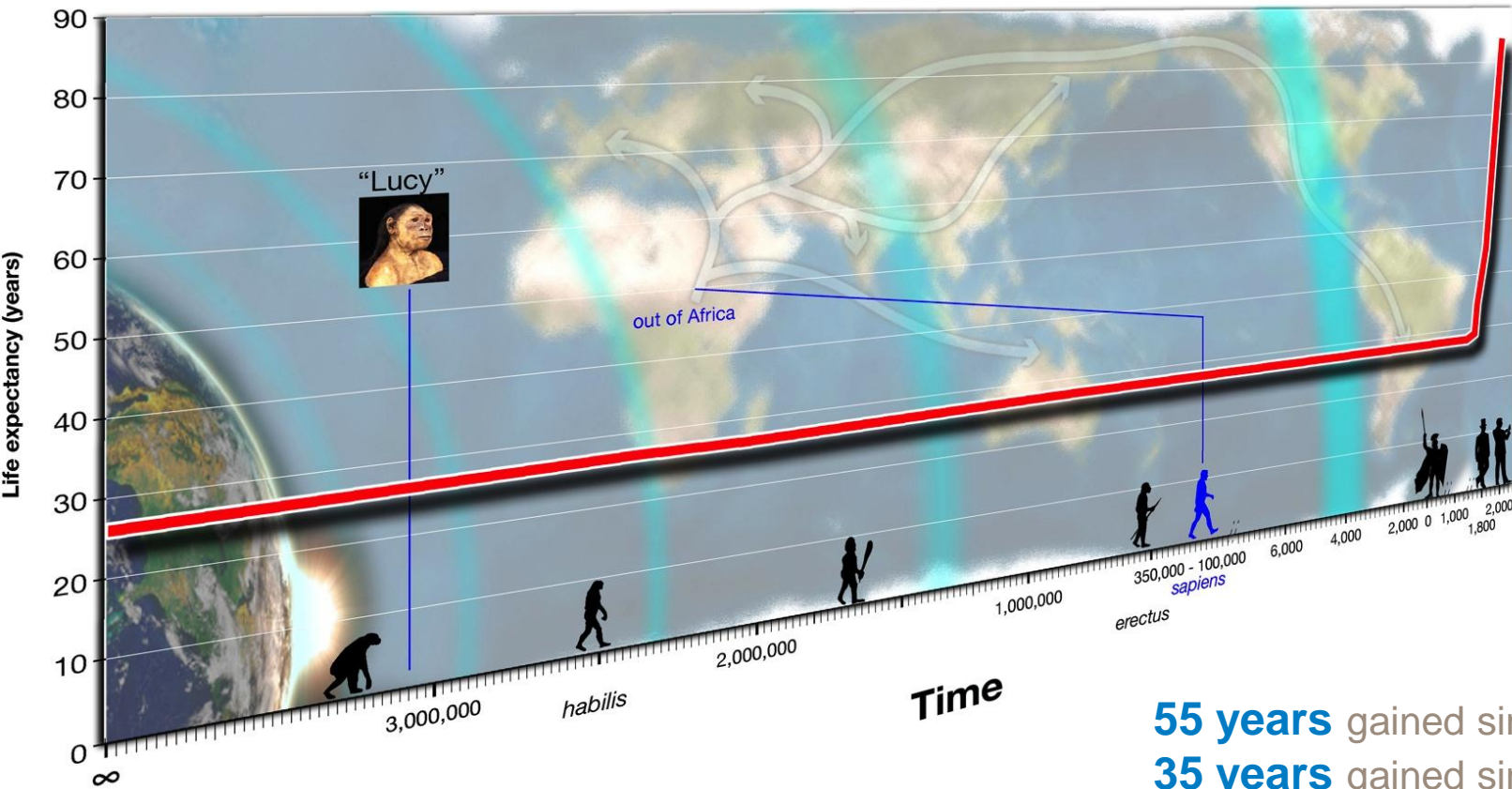
Siena January 11th 2016



Some history of human evolution

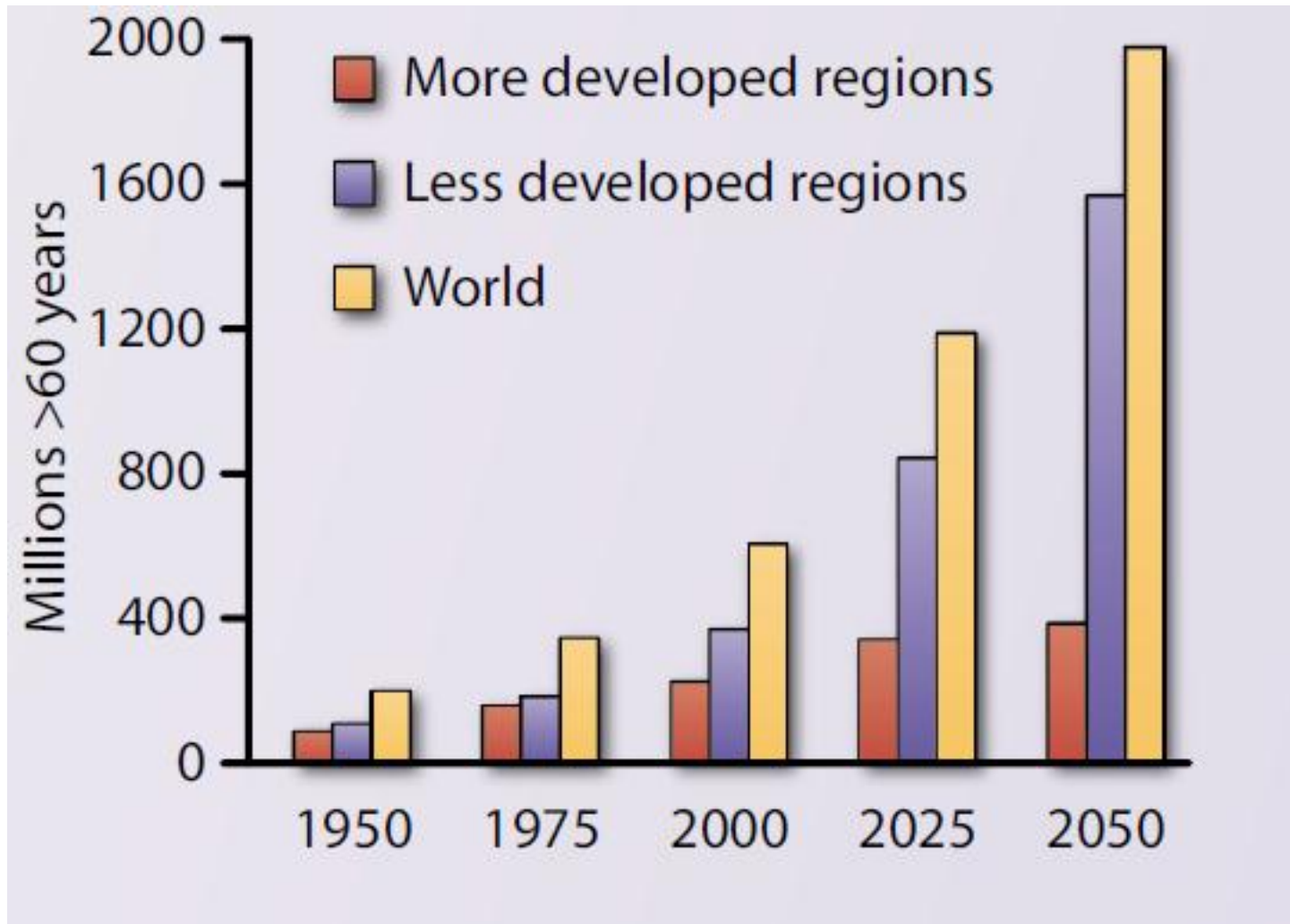


For 99.99 % of the history of mankind, life-expectancy has been < 30 years

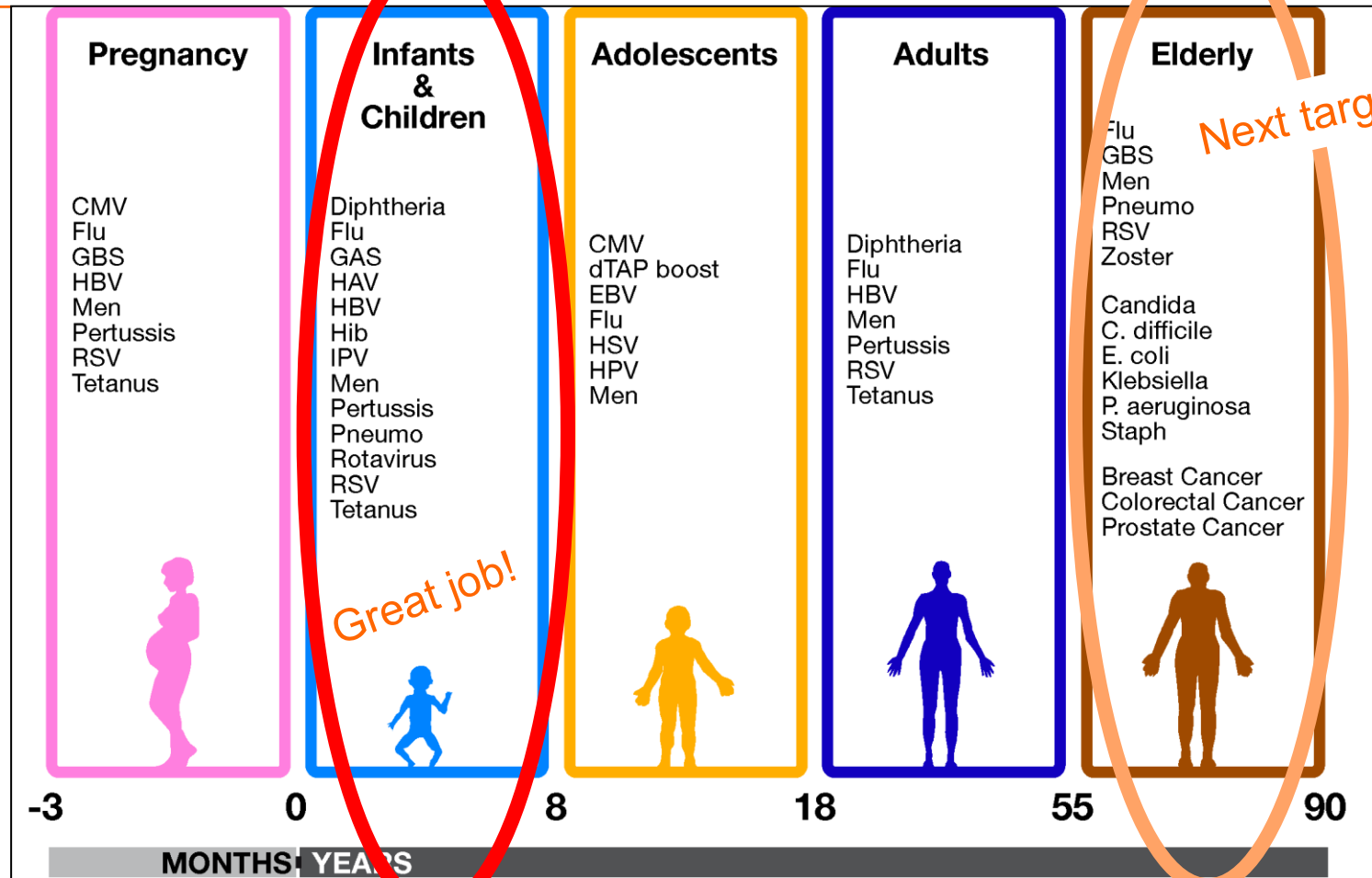


55 years gained since 1700
35 years gained since 1900

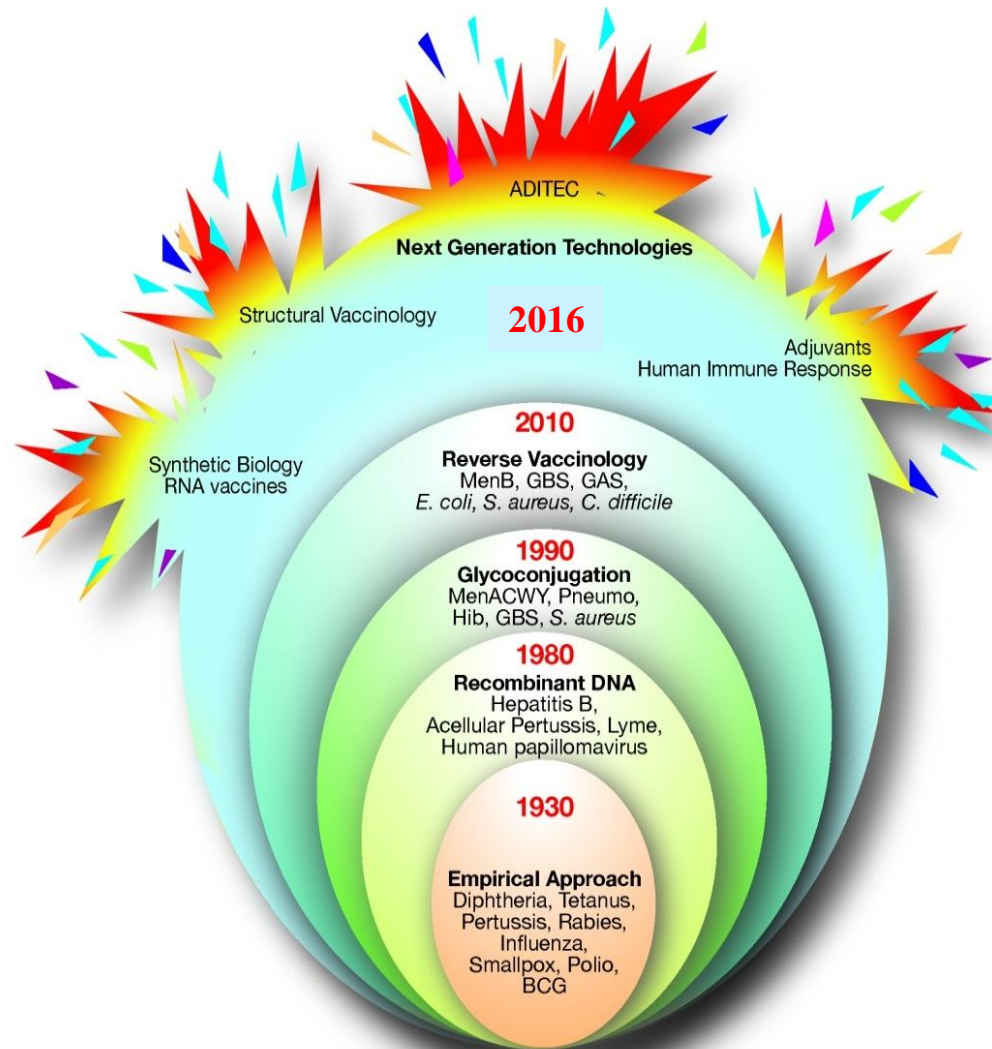
Aging population



Vaccines for every age



We have an explosion of new technologies to target new diseases



Three breakthrough vaccines in 2015

Vaccines continue to serve our society



First Malaria vaccine licensed

Efficacy and safety of RTS,S/AS01 malaria vaccine with or without a booster dose in infants and children in Africa: final results of a phase 3, individually randomised, controlled trial

*RTS,S Clinical Trials Partnership**

www.thelancet.com Vol 386 July 4, 2015

Zoster vaccine 97% efficacy in the elderly

Efficacy of an Adjuvanted Herpes Zoster Subunit Vaccine in Older Adults

N ENGL J MED 372;22 NEJM.ORG MAY 28, 2015

Ebola vaccine 100% efficacy

Efficacy and effectiveness of an rVSV-vectored vaccine expressing Ebola surface glycoprotein: interim results from the Guinea ring vaccination cluster-randomised trial

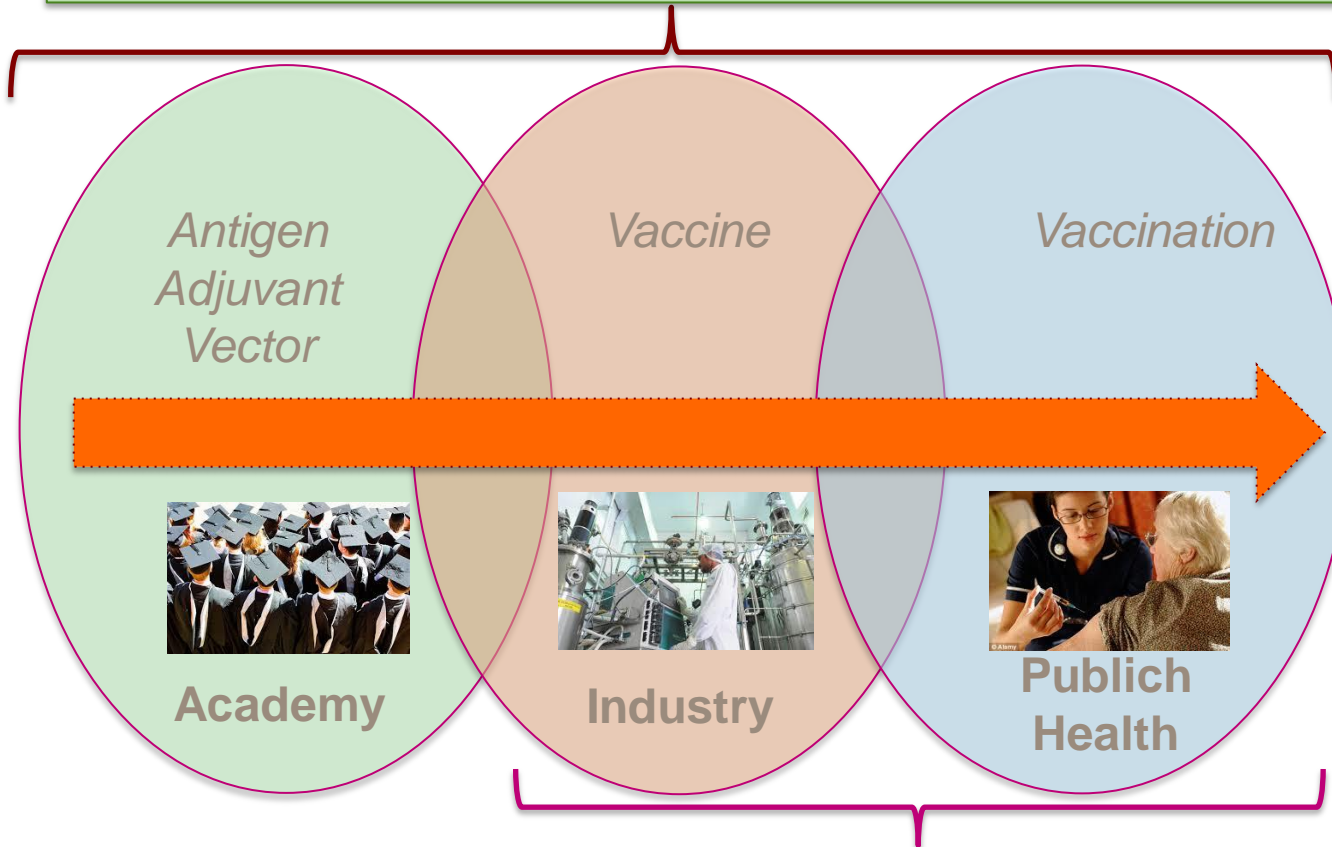
Vaccines are ready to play a major role in healthy aging



Developing vaccines is not enough

It is important that vaccines become part of the public health intervention

Define the needs: epidemiology, impact of the disease, etc

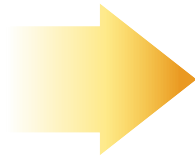


The importance to give the right value to vaccines

How do we make decisions?



Cost effectiveness is a largely used for vaccine decisions



Cost/QALY

- Costs are easy to calculate
- Do QALY capture the real value of vaccines?

Institute of Medicine (IOM) initiative SMART Vaccines

<http://www.nap.edu/smartvaccines>



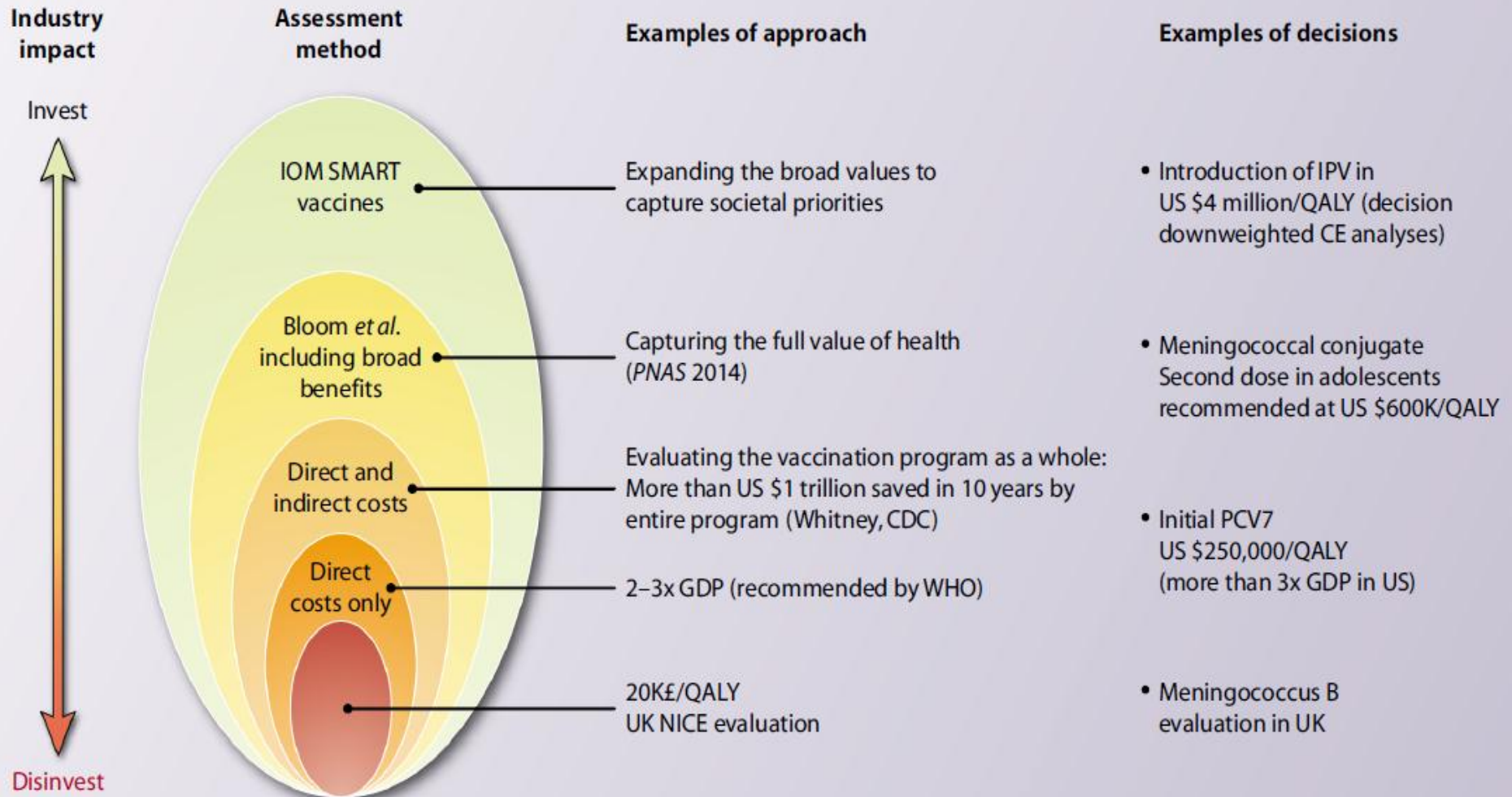
28 attributes 8 categories



Health Considerations	<ul style="list-style-type: none"> • Premature Deaths Averted per Year • Incident Cases Prevented per Year • QALYs Gained or DALYs Averted
Economic Considerations	<ul style="list-style-type: none"> • Net Direct Costs (Savings) of Vaccine Use per Year • Workforce Productivity Gained per Year • One-Time Costs • Cost-Effectiveness (\$/QALY or \$/DALY)
Demographic Considerations	<ul style="list-style-type: none"> • Benefits Infants and Children • Benefits Women • Benefits Socioeconomically Disadvantaged • Benefits Military Personnel • Benefits Other Priority Population
Public Concerns	<ul style="list-style-type: none"> • Availability of Alternative Public Health Measures • Potential Complications Due to Vaccines • Disease Raises Fear and Stigma in the Public • Serious Pandemic Potential
Scientific and Business Considerations	<ul style="list-style-type: none"> • Likelihood of Financial Profitability for the Manufacturer • Demonstrates New Production Platforms • Existing or Adaptable Manufacturing Techniques • Potential Litigation Barriers Beyond Usual • Interests from NGOs and Philanthropic Organizations
Programmatic Considerations	<ul style="list-style-type: none"> • Potential to Improve Delivery Methods • Fits into Existing Immunization Schedules • Reduces Challenges Relating to Cold-Chain Requirements
Intangible Values	<ul style="list-style-type: none"> • Eradication or Elimination of the Disease • Vaccine Raises Public Health Awareness
Policy Considerations	<ul style="list-style-type: none"> • Interest for National Security, Preparedness, and Response • Advances Nation's Foreign Policy Goals
User-Defined Attributes	<ul style="list-style-type: none"> • Up to Seven Attributes

Strategic Multi-Attribute Ranking- Toll (SMART) Vaccines

Methods for evaluating the value of vaccines



Additional attributes to be considered for

DEVELOPED COUNTRIES

- Severe and frequent diseases
- Rare severe diseases
- Frequent non severe illness
- Targets a disease primarily occurring in the elderly
- Interest for national security and response

Additional attributes to be considered for

LOW & MEDIUM INCOME COUNTRIES

- Interest from NGOs
- Lack of availability of alternative measure
- Targets a disease occurring primarily in disadvantaged populations
- Premature deaths averted per year

CORE VALUES

- ◆ **Mortality/Severity of disease**
- ◆ **Vaccine safety considerations**
- ◆ **Economic evaluation capturing the full benefits of vaccination**

Additional attributes to be considered for

MANUFACTURERS

- Feasibility (technical & regulatory)
- Likelihood of licensure < 10 years
- Likelihood of profitability
- Likelihood of a recommendation
- Demonstrates new product platform
- One time cost of development

Additional attributes to be considered for

EMERGING INFECTIONS

- Epidemic and Pandemic potential
- Potential to eradicate the disease
- Targets rare but severe disease with potential for outbreaks/pandemics