

# Payback: Achieving Health Impact from Investments in Public Health Research

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# Overview

- Context
- Why the need for payback?
- The payback model
- Examples: Payback in action
- Utility of the model
- Summary

# Context



# Relevance

Director's Corner

Our Science Makes Your Life Better



- CDC Health Protection Goals
  - Alignment with Agency Mission
  - Improve Health and Quality of Life
- Excellence in Science
  - Translate Knowledge into Action
  - Achieve Health Impact

# Why the Need for Payback?



# What if CDC Could Improve How It ...

- Measures the impact of its research investments?
- Gains greater insight into the research investment process?
- Objectively assesses when to terminate investments?
- Reinforces research and public health practice for health impact?



# Then CDC Could...

- Improve research investment business decisions with:
  - Forethought
  - Real time data
  - The bottom-line in mind: Improving health

**Hence the VALUE of  
PAYBACK**

# The Payback Model





# Buxton and Hanney Payback Model\*

- Payback concept encompasses 5 main categories of benefit from research:
  - Knowledge benefits
  - Benefits to future research and research use
  - Political and administrative benefits
  - Health sector benefits
  - Broader economic benefits
- Different measures may be appropriate for each category
- Model used: Input-output applied to case studies

\*Buxton, M., & Hanney, S. (1996). How can payback from health services research be assessed? *Journal of Health Services Research*, 1(1), 35-43.



# Payback Is..

- Health outcomes (HO) realized within a planned time frame, accounting for cost

$$\text{Payback} = \text{HO Benefits} - \text{HO Costs}$$

Monetary values transformed into health benefits lost (opportunity costs) in order to finance potentially beneficial research investment activities

# Health Outcome

- The amount of health-related quality of life sacrificed or obtained from applications of research discoveries or findings

..covers both costs and rewards of public health investments

..cash-flow is related to profit in private sector, health outcome flow is related to Payback in public health!

# Opportunity Costs

- “The true cost of investing in one kind of medical care [or a public health intervention] is not money, nor even the resources the money represents.
  - It is the health benefits- longer life, better functioning, and freedom from pain- that could have been achieved if the dollars had been spent on something else.”\*

\*Russell, L. B. (1992). Opportunity costs in modern medicine. *Health Aff (Millwood)*, 11(2), 162-169.



# Cost-Effectiveness

- Cost-effectiveness (CE) studies show the opportunity costs of [public health] medical choices\*
- Restatement of CE ratios in terms of life-years per dollar spent brings out the opportunity costs involved
  - by focusing on the amount of health that could [have been] “purchased” if the same money was used for different interventions

\*Russell, L. B. (1992). Opportunity costs in modern medicine. *Health Aff (Millwood)*, 11(2), 162-169.



# Transforming Dollars to Health Outcomes

Description of Variable	Variable	Numerical Example
<b>Cost-effectiveness ratio: Influenza vaccination [Infant 6 - 23 months*]</b>	\$ / Health Outcomes Saved (HS)	\$12,000 / Quality-adjusted Life Year (QALY)
<b>Investment for research venture</b>	\$	\$1.2 Million
<b>Calculation of Outcome</b>	$\$ \div [\$ / \text{HS}]$	$\$1.2\text{M} \div [\$12,000 / \text{QALY}]$
<b>Outcome: Opportunity - cost of the research venture</b>	HS	100 QALYs given up

\*Prosser, L. A., Bridges, C. B., Uyeki, T. M., Hinrichsen, V. L., Meltzer, M. I., Molinari, N. A., et al. (2006). Health benefits, risks, and cost-effectiveness of influenza vaccination of children. *Emerg Infect Dis*, 12(10), 1548-1558.



# Payback Model

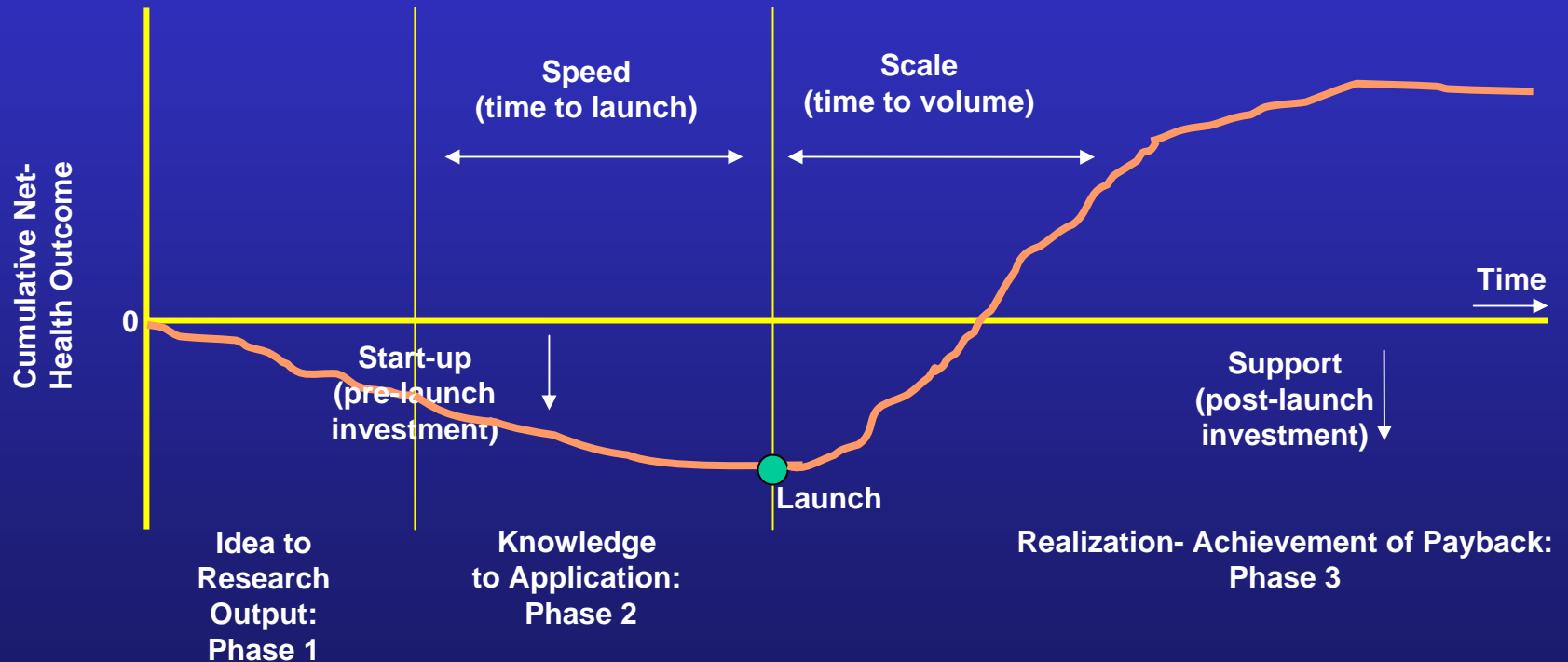
- 3 Phases
  - Idea to research knowledge output: Phase 1
  - Knowledge to application: Phase 2
  - Realization- Achievement of payback: Phase 3
- 4 Factors Affect Payback
  - Start-up costs, or pre-launch investment
  - Speed, or time to launch
  - Scale, or time to volume
  - Support costs, or post-launch investment

# Health Outcome Curve

- Plots cumulative health outcome flow over time
  - To assess total investment commitment and bottom-line impact at any point in time



# The Health Outcome Curve



# Achieving Impact

- “When assessing the outcomes of research it is necessary to identify the impact the research has had on policy and practice even before attempting to assess the benefits in terms of improvements in [population health] the service provided.”\*

\*Buxton, M., Hanney, S., Packwood, T., Roberts, S., & Youll, P. (2000). Assessing benefits from Department of Health and National Health Service Research & Development. *Public Money & Management*, 29-34.



# Achieving Health Impact via Research

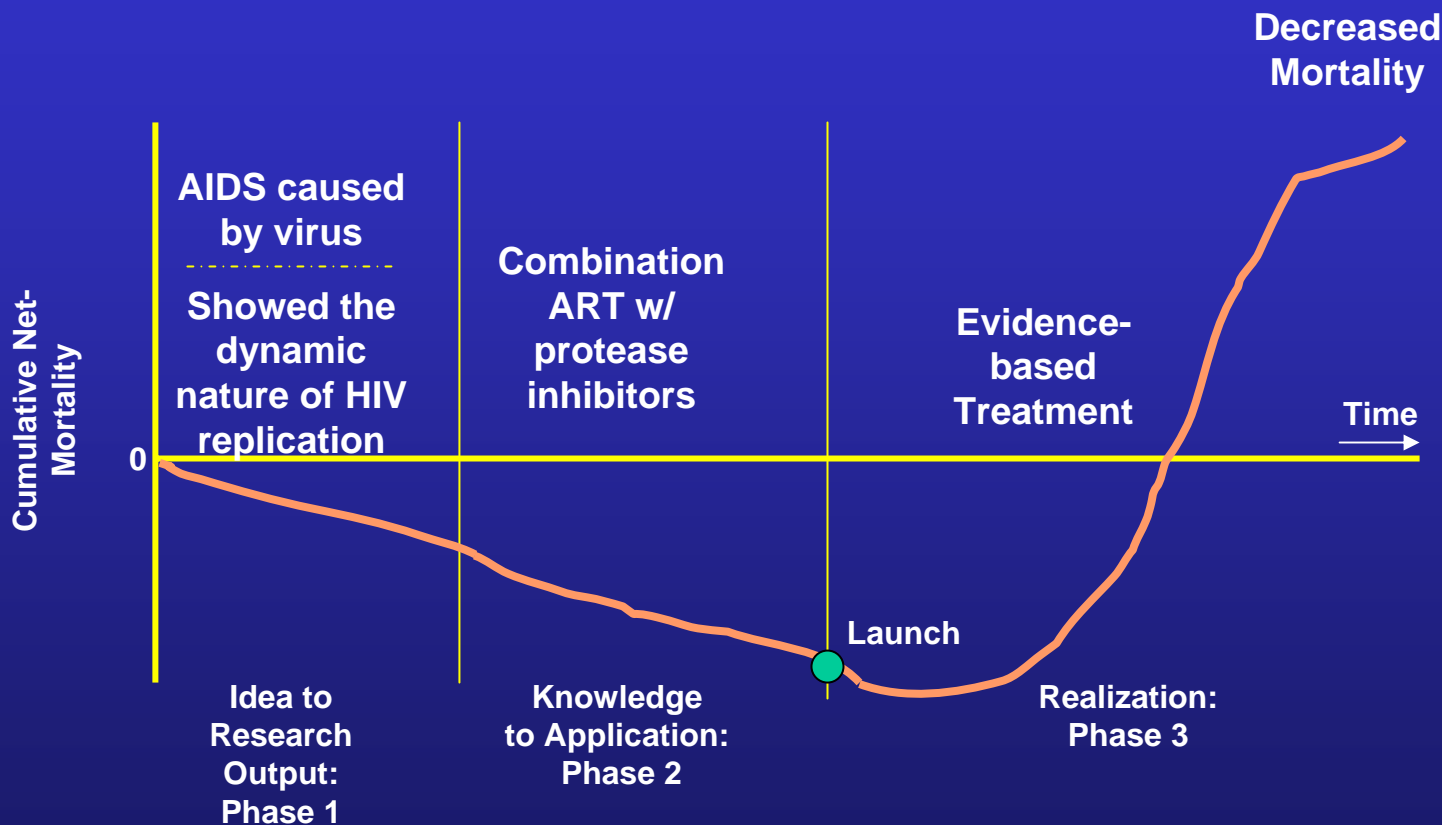
- Streams / Channels for Health Impact
  - Health Policy
    - Legislation
    - Regulation
  - Public Health Programs
  - Public Health Practice
  - Direct use of CDC research findings by consumers
- CDC's research outputs are only as effective as their overall influence on relevant distribution channels



# Examples: Payback in Action



# Hypothetical Application: Dr. Ho's Breakthrough in AIDS Research and Treatment



# Application: Meeting the Mammography Screening Needs of Underserved Women\*

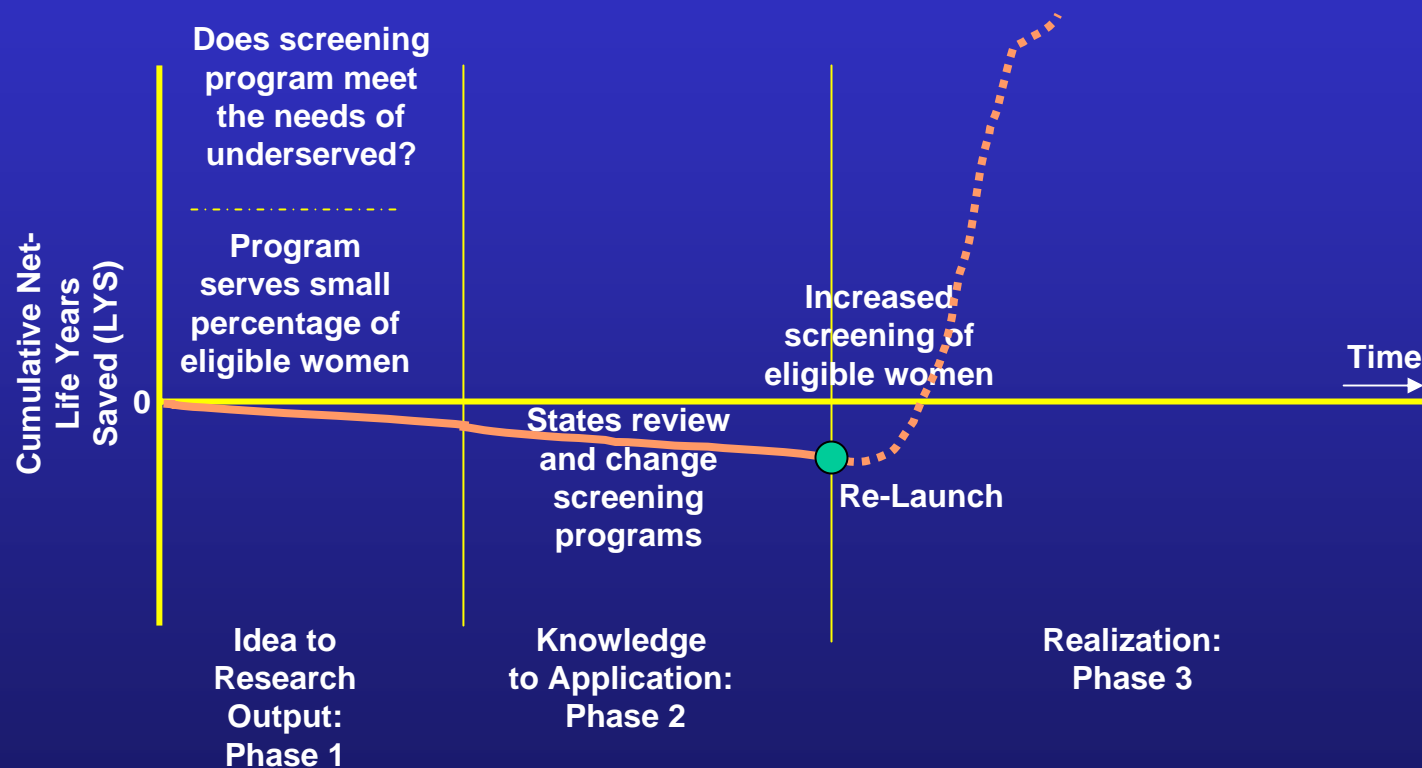
- Examined the extent to which the National Breast and Cervical Cancer Early Detection Program helped meet the mammography screening needs of underserved women
- Calculated the percentage of eligible women who received mammograms through the program
- Results
  - Of eligible women, 14.7% received a Program-funded mammogram
  - The percentage of eligible women screened in each state ranged from 2% to approximately 79%
- Assumptions:
  - First-time, multi-million dollar state allocations to screening programs as a result of the research
  - **Screening rates may increase**

\*Tangka, F. K., Dalaker, J., Chattopadhyay, S. K., Gardner, J. G., Royalty, J., Hall, I. J., et al. (2006). Meeting the mammography screening needs of underserved women: the performance of the National Breast and Cervical Cancer Early Detection Program in 2002-2003 (United States). *Cancer Causes Control*, 17(9), 1145-1154.



# Application: Meeting the Mammography Screening Needs of Underserved Women\*

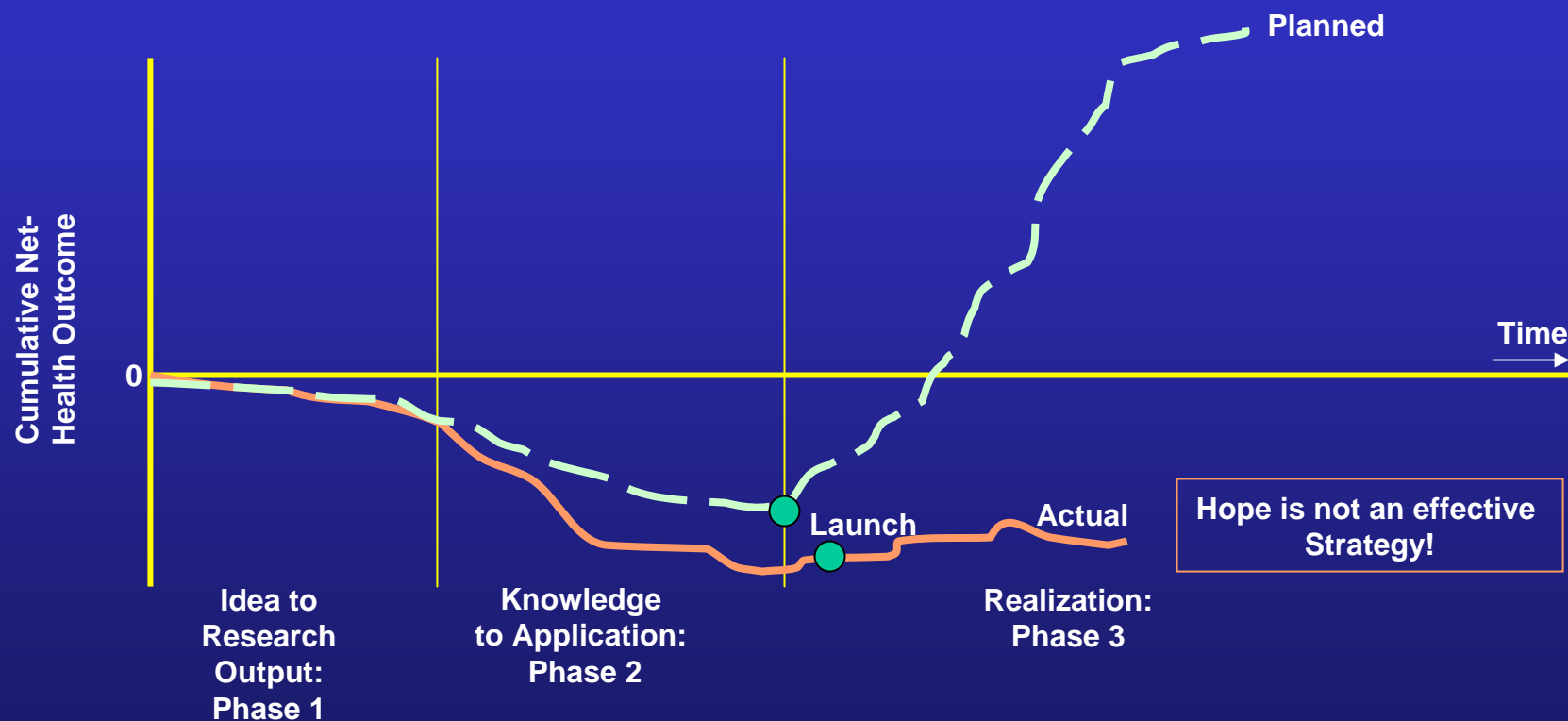
Increased LYS



\*Tangka, F. K., Dalaker, J., Chattopadhyay, S. K., Gardner, J. G., Royalty, J., Hall, I. J., et al. (2006). Meeting the mammography screening needs of underserved women: the performance of the National Breast and Cervical Cancer Early Detection Program in 2002-2003 (United States). *Cancer Causes Control*, 17(9), 1145-1154.



# The Resource Trap





# Utility of the Model



# Potential Value of the Health Outcome Curve

- Effective management for health outcome payback
- Useful tool which may assist:
  - Research investment decision making
  - Research health impact planning
  - Health impact analysis
  - Communication at all levels of the organization
- Evaluate core research investment strategies
- Evaluate strategies to accelerate each phase
- Assist managers' thinking about resource allocation

# Potential Uses of Payback Model

- Research Investment Planning
  - At all levels of the organization
- Prospective integration into research plans
- Track progress and use of CDC research in Phase 2
- Assess how CDC science influences health outcome payback in Phase 3
- Retrospectively assess past research investment decisions



# Summary



# Summary

- Payback model is useful for many public health investment activities:
  - Different health outcomes, innovation, surveillance, technology transfer, laboratory activities, etc.
- Represents investments for health impact visually
- Sharpens focus on health outcomes
  - And other assets that generate health outcomes
- Strengthens the link between research knowledge generation and public health impact through policy, programs, practice and direct consumer use
- Evaluates cost, resource and phase acceleration strategies
- Facilitates communication for effective decision-making
- Promotes accountability
  - translation of research and science into practice
  - could be a useful tool to assess attainment of CDC Health Protection Goals and Organizational Excellence Assessment
- Underscores “What is measured gets achieved”!



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