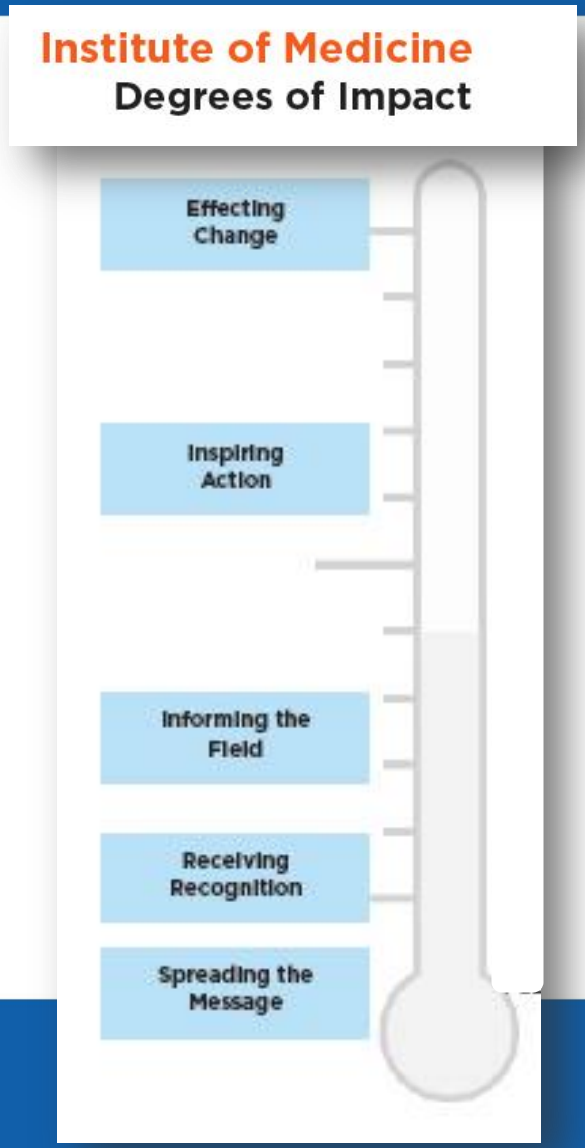
What Difference Are You Making?

"Discover the impact our work has on the health of the nation and the world"

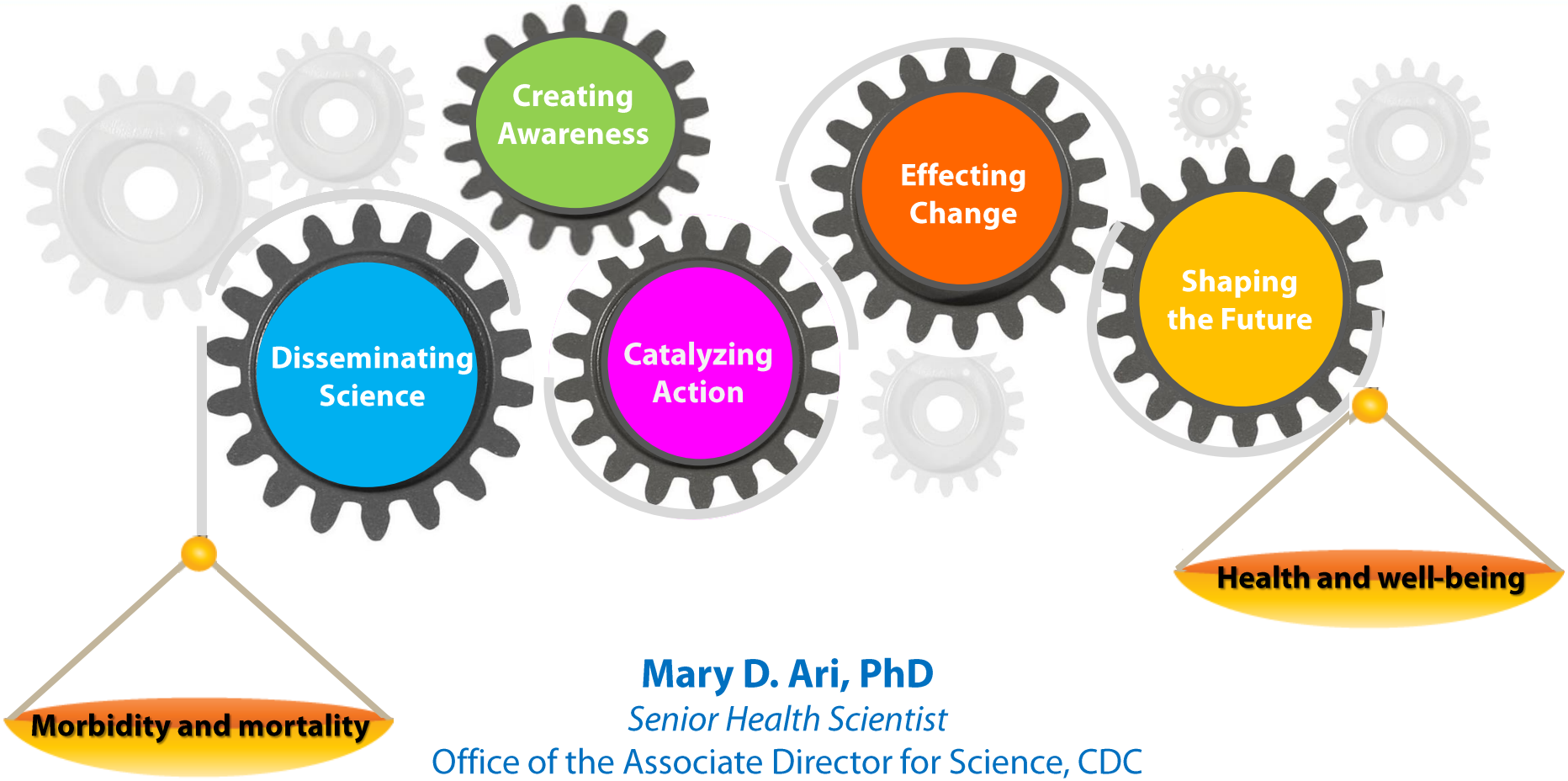
IOM home page



Harvey Fineberg, MD, PhD
President, Institute of Medicine

Accessible Version: https://youtu.be/EDxBT7ll8Oc

How CDC is Making a Difference
Science Impact Framework



Mary D. Ari, PhD
Senior Health Scientist
Office of the Associate Director for Science, CDC

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Why We Do What We Do

Health–a fundamental resource for unencumbered and joyful living

By protecting health, CDC's ultimate *raison d'etre* is to enable people to achieve their full potential in

both their personal and professional lives

What Is the Impact of Our Work?

State of the Art in Measuring Impact of Research

- **Relying solely on bibliometrics is a dated approach**
- **Broader societal, environmental, cultural, and economic value must be taken into consideration**
- **Best practice combines**
  - Narrative
  - Quantitative indicators
  - Qualitative Indicators

Donovan, Research Evaluation 2011;20(3):175-9

What IS the Idea ?
It Is a Framework

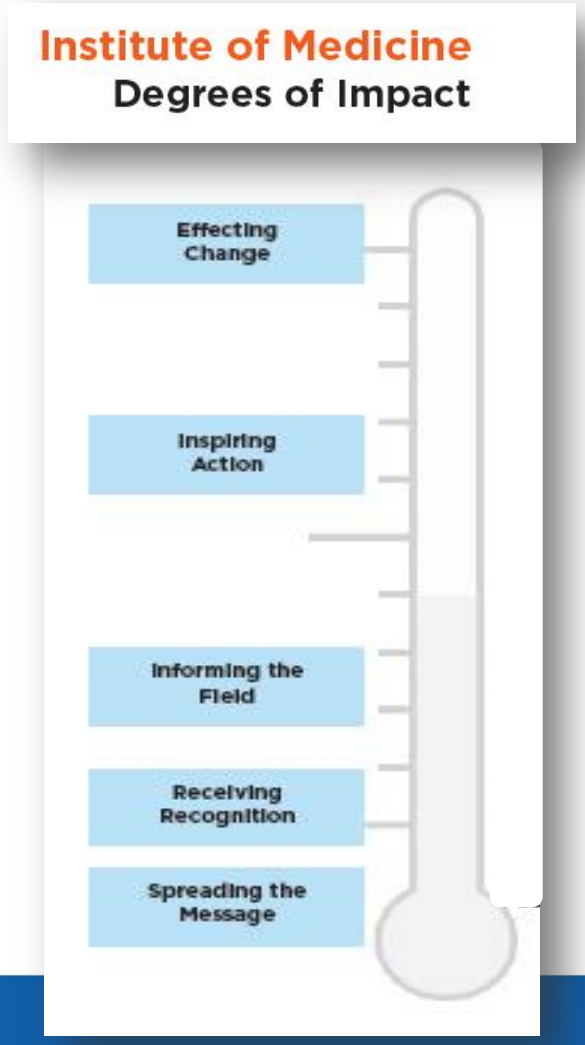
- **A framework for tracking CDC science and linking its influence or impact on subsequent events and actions that ultimately lead to improving health**
  - Based on (with permission) the Institute of Medicine (IOM) Degrees of Impact Framework
  - Other frameworks considered
- **Developed in January–June 2012 by a small OADS-led workgroup**

Donovan et al. Research Evaluation 2011;20(3):175-9
Bollen et al. PloS One 2009;4(6):e6022
Rukmani, R. Current Science 2008;95(12):1694-8

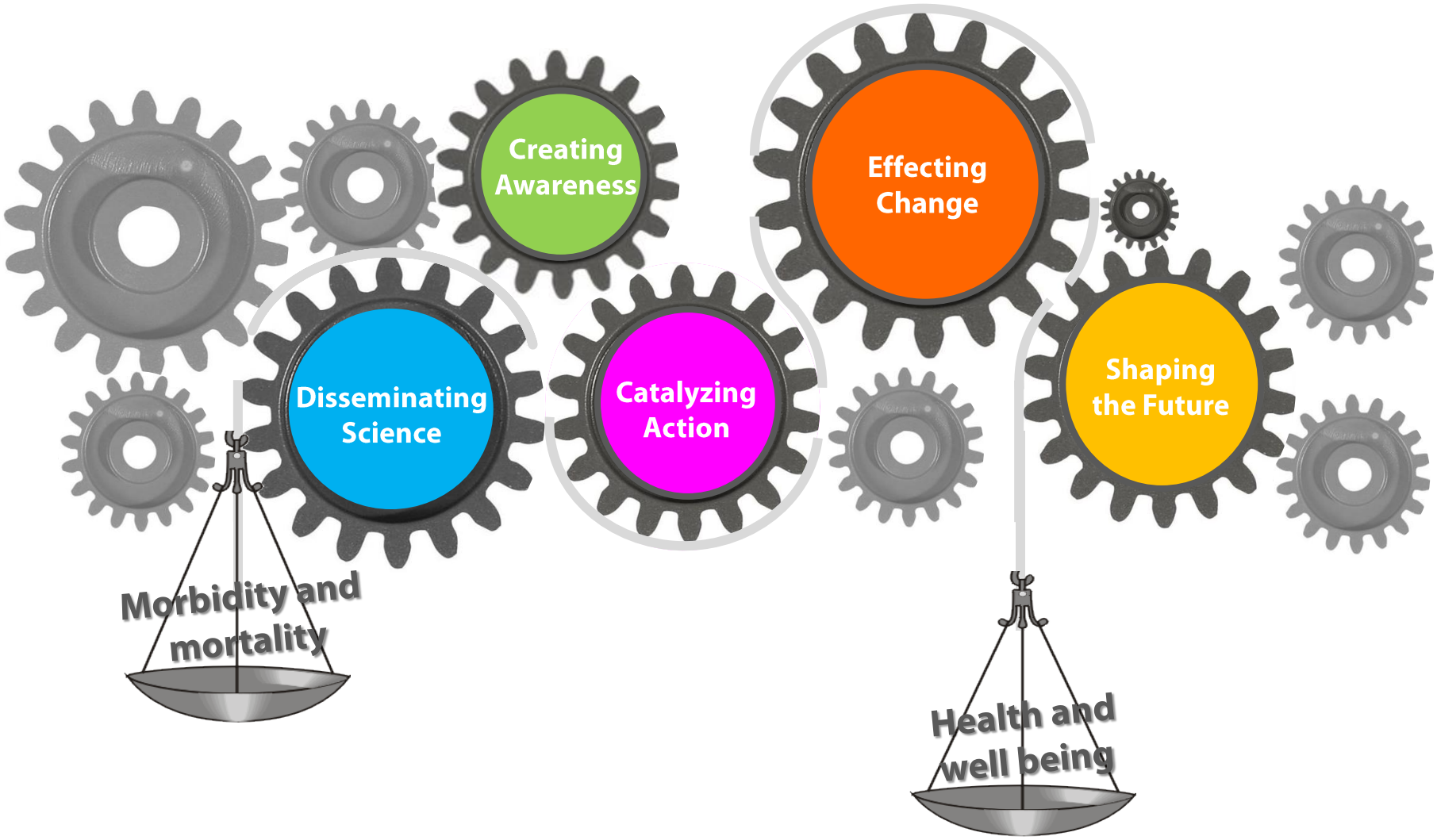
Institute of Medicine Degrees of Impact

"Discover the <u>impact</u> our work has on the health of the nation and the world"

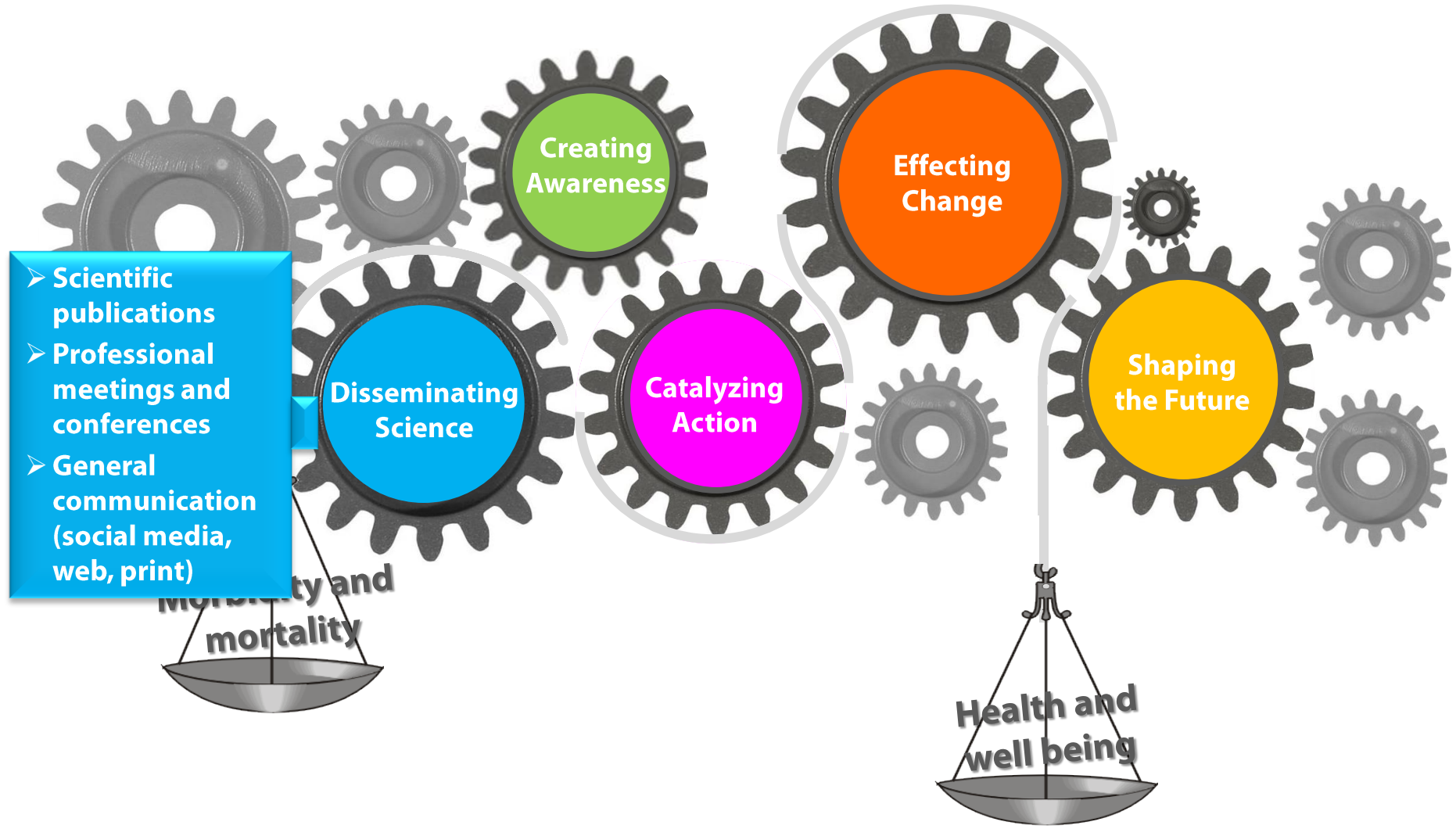
IOM home page



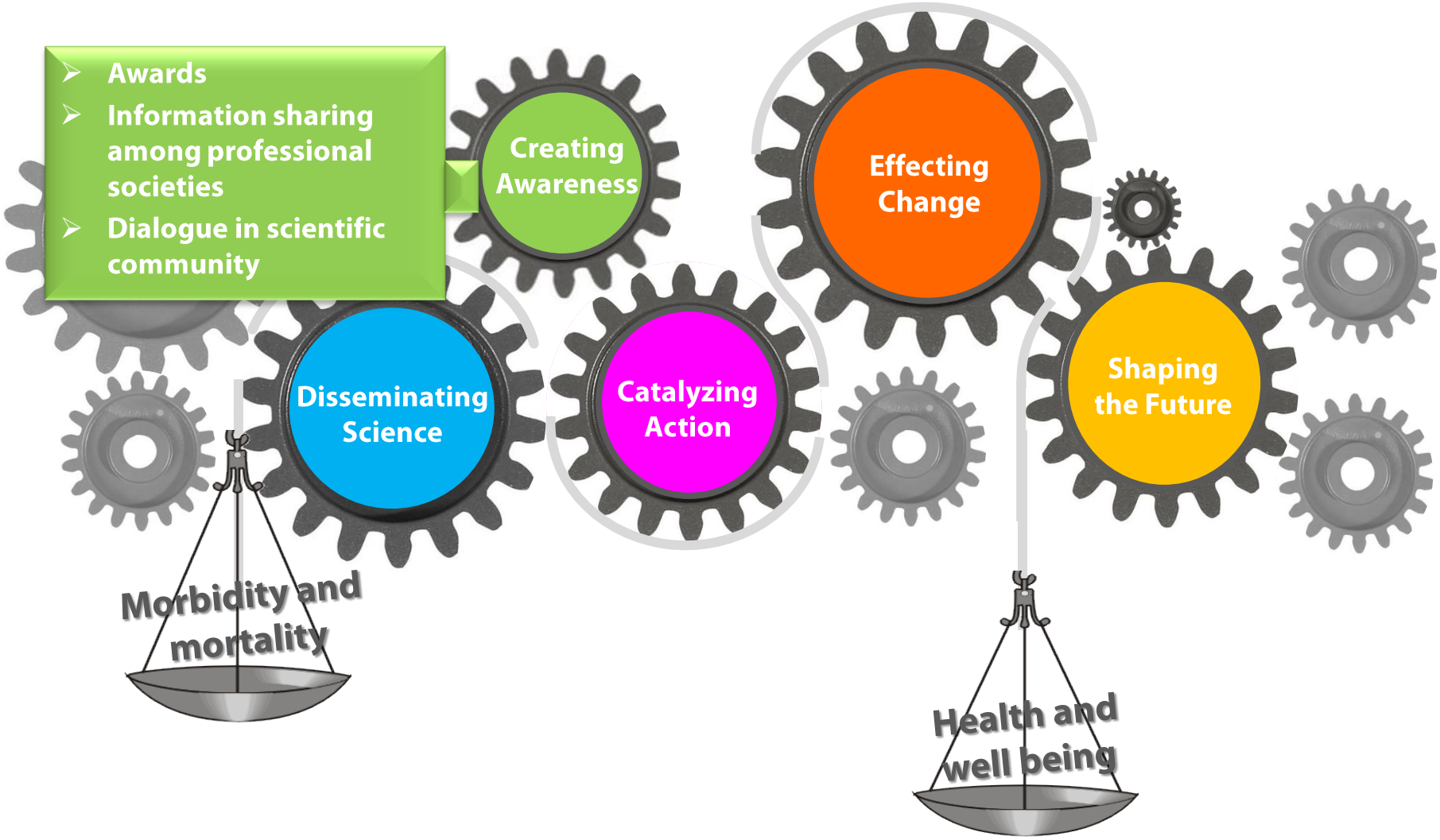
CDC Science Impact Framework
5 Levels of Scientific Influence



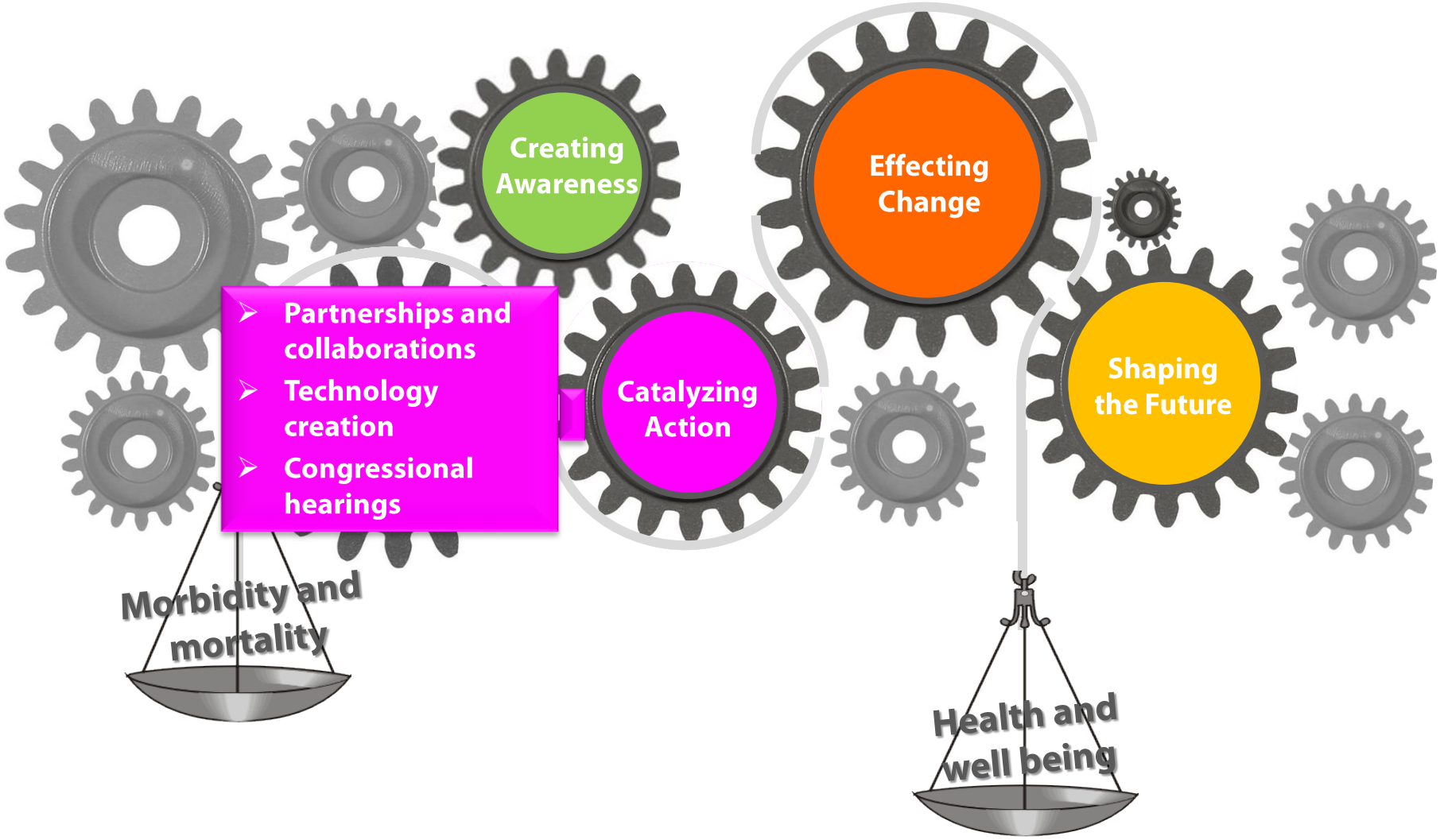
CDC Science Impact Framework



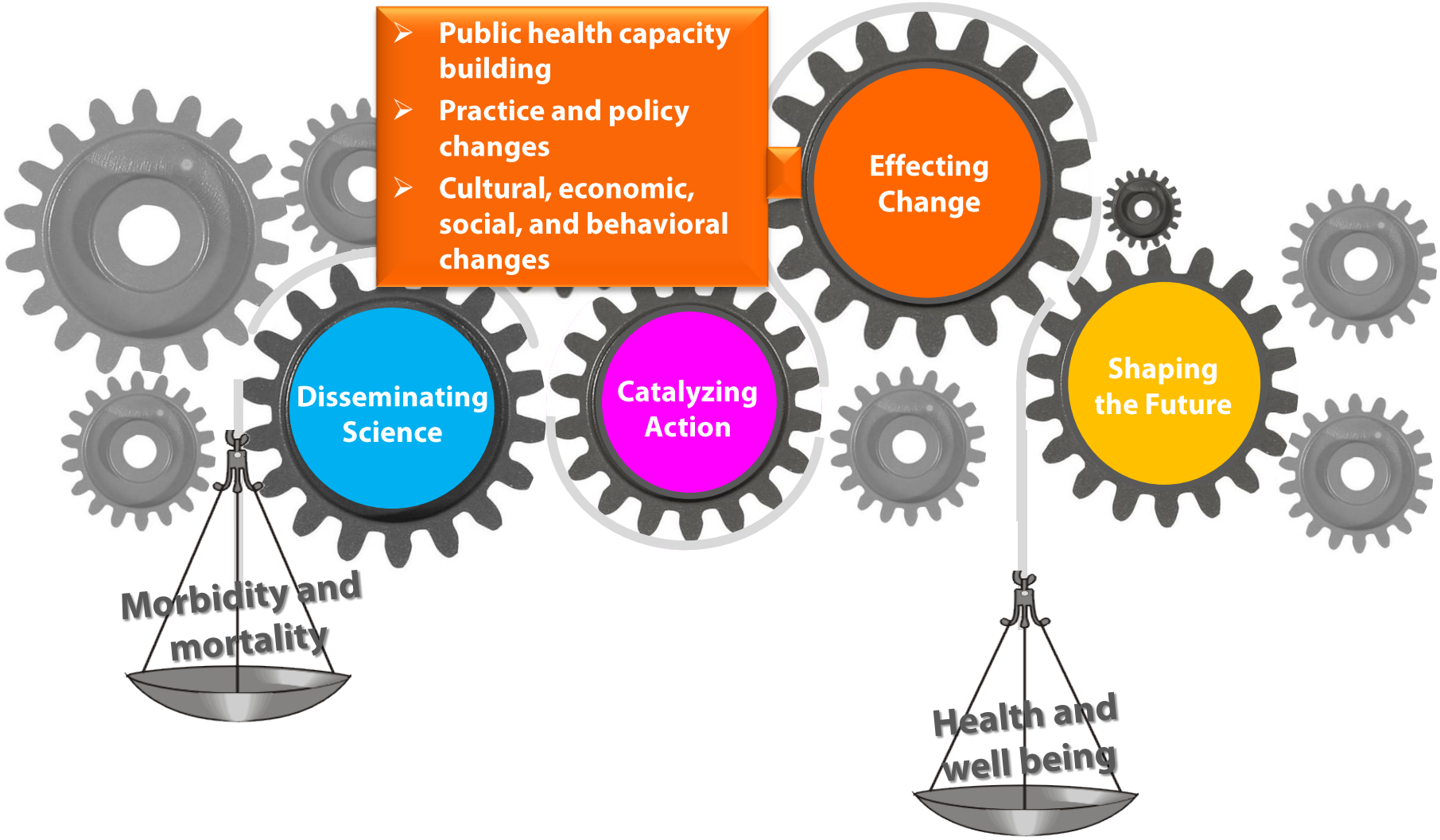
CDC Science Impact Framework



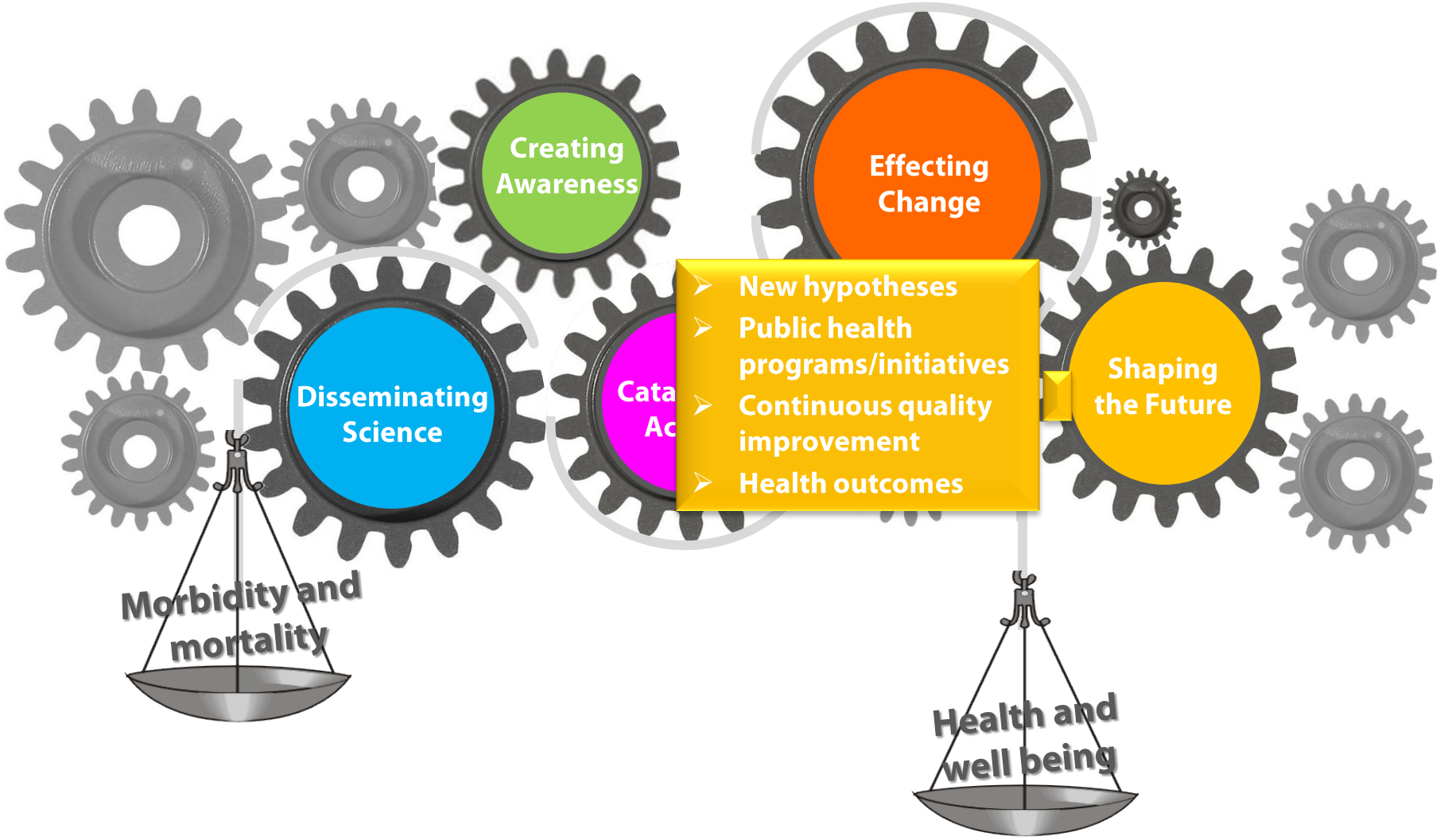
CDC Science Impact Framework



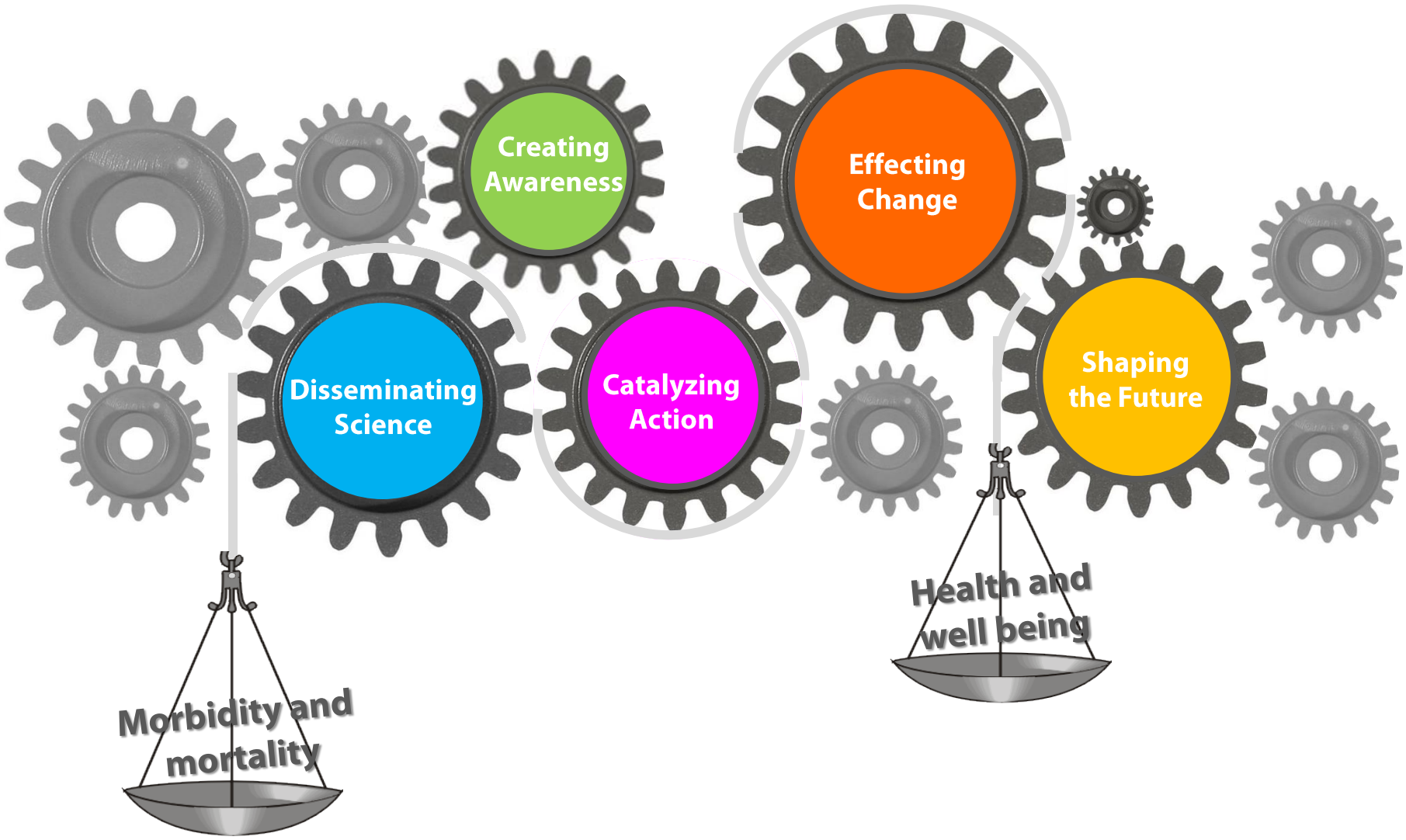
CDC Science Impact Framework



CDC Science Impact Framework

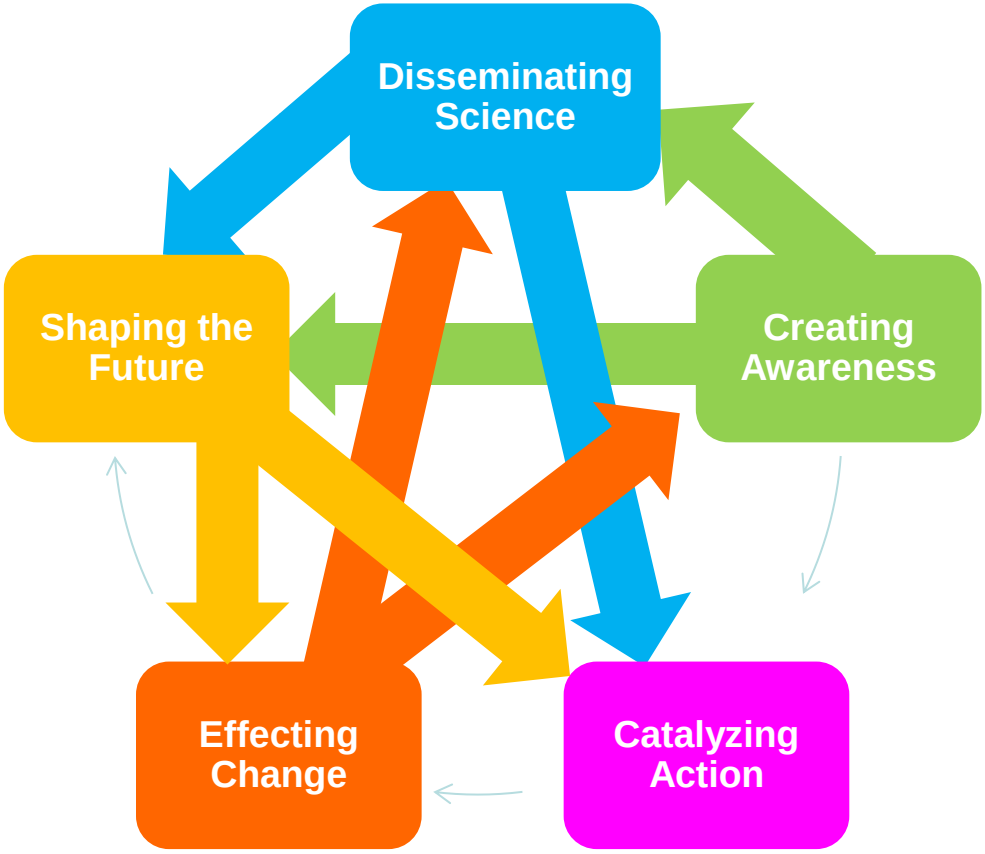


CDC Science Impact Framework



Proposed Framework with 5 Levels of Influence

- Disseminating Science
- Creating Awareness
- Catalyzing Action
- Effecting Change
- Shaping the Future



How We Tested the Framework
9 Case Studies

- **Case studies were selected from**
  - CDC Public Health Grand Rounds (4)
  - Shepard Science Award-winning manuscripts (4)
  - MMWR articles (1)
- **Case studies covered broad areas of epidemiology and laboratory research**
- **For each case study, workgroup members**
  - Identified events related to the original manuscripts
  - Placed manuscripts within 1 of the 5 levels of influence
  - Researched in more detail the influence in these events
  - Validated the events and the links with the program subject-matter expert

Principles

- **Linking of events prospectively or retrospectively**
  - Contributors
  - Contributions
  - Correct assignment of credit
  - Focus on re-use
- **Short-term indicators that predict long-term impact**
  - Indicators
  - System for tracking these indicators

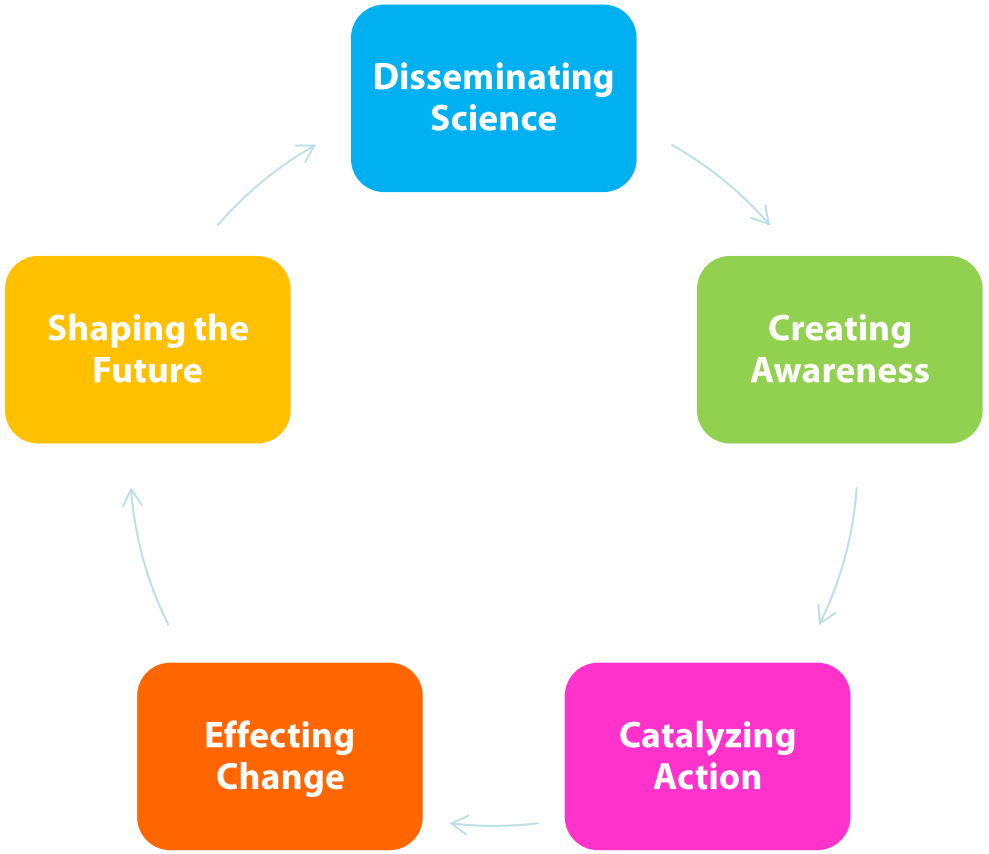
Ruegg, R. & Jordan, G. (2007). *Overview of evaluation methods for R&D programs: A directory of evaluation methods relevant to technology development programs*

Implementation Options
Data Sources for Links and Associations

Influence	Data Sources*	Example
Disseminating Science	Investigators, MEDLINE, WoS, Google	CDC-authored scientific publications
Creating Awareness	Investigators, Lexis/Nexis, Web	FDA petition
Catalyzing Action	Investigators, registries (patents, trademarks), marketing, legislation	Safer labeling and marketing practices
Effecting Change	Investigators, surveillance systems, G&R	ED visits reduced 50%
Shaping the Future	Investigators, surveillance systems, marketing, G&R	"harm elimination"

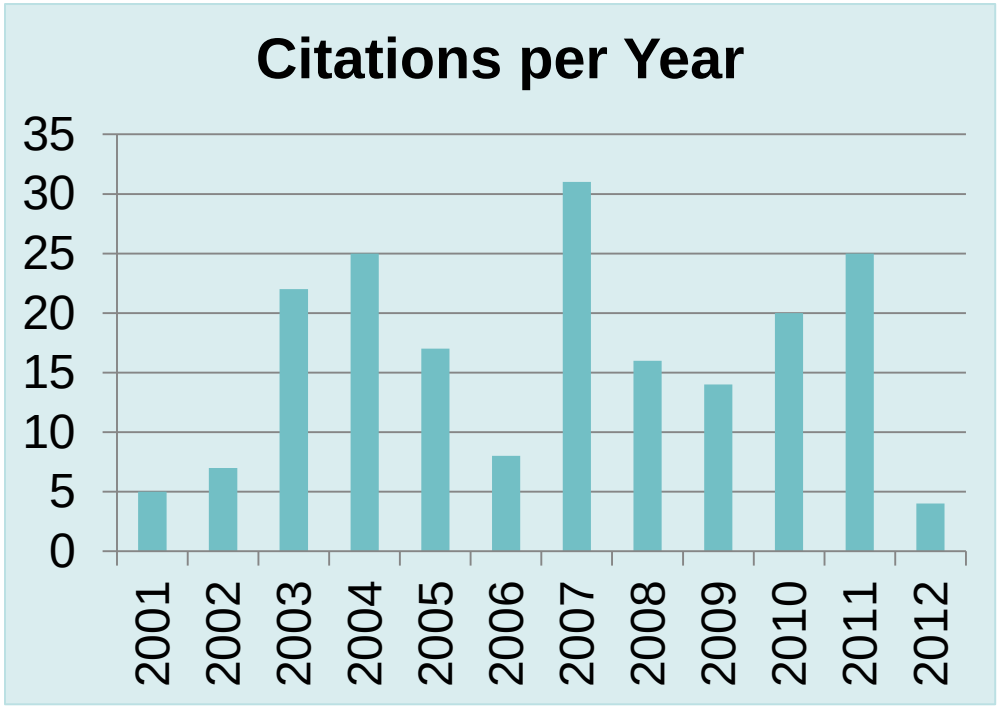
*Data Sources are a mixture of stakeholders (who would be experts for identifying the data sources), systems (that can provide the data), and actual measures G&R, guidelines and recommendations

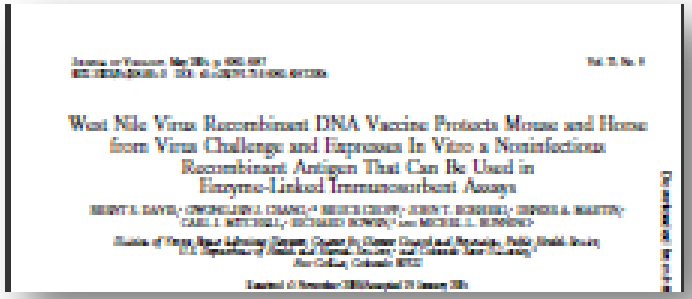
Case Study
West Nile Virus (WNV)



- In 2001, CDC published an article in the *Journal of Virology* showing that a single dose of a DNA vaccine could prevent WNV infection in mice and horses

Case Study
WNV Paper Metrics

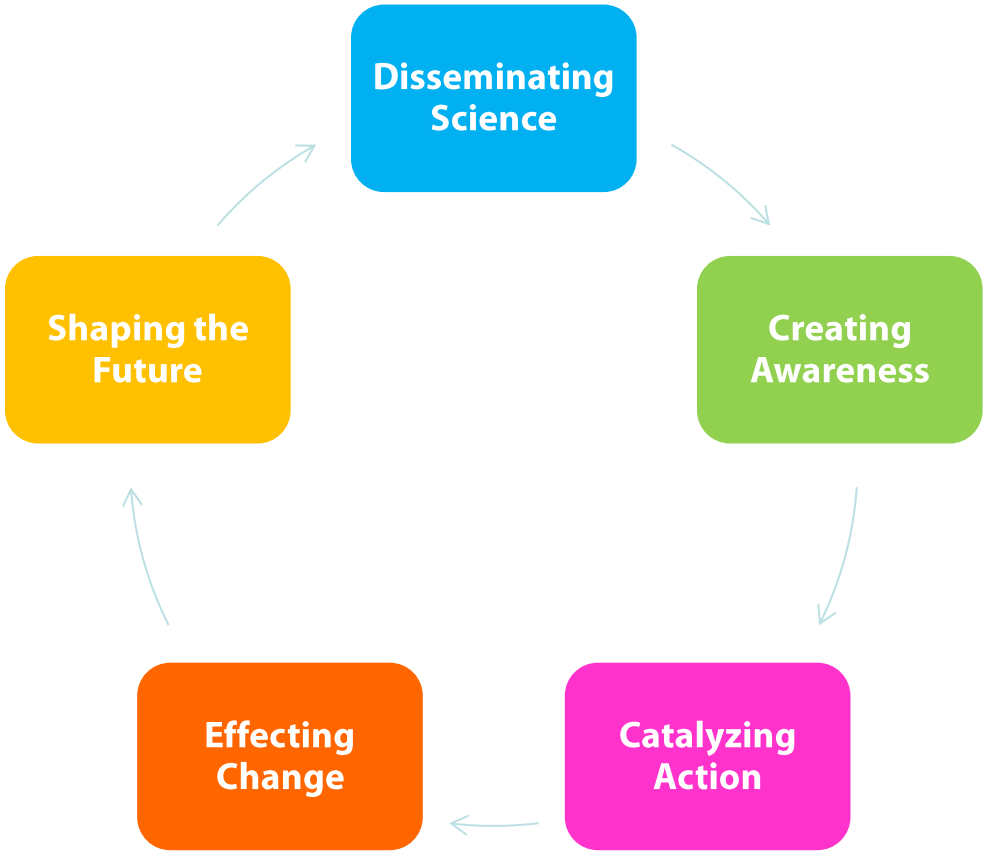




West Nile Virus Recombinant DNA Vaccine Protects Mouse and Horse from Virus Challenge and Expresses In Vitro a Noninfectious Recombinant Antigen That Can Be Used in Enzyme-Linked Immunosorbent Assays

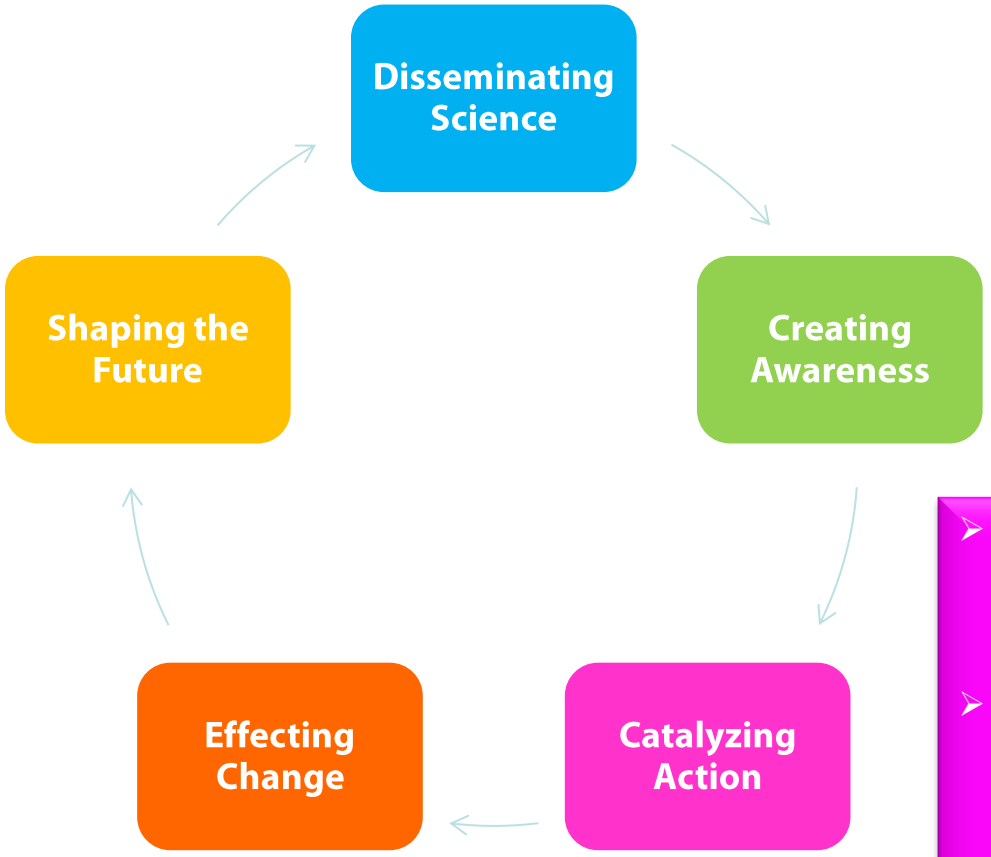
Quick Stats	
Total citations	193
Second-generation citations	4,210
5-year impact factor	5.257
Average cites per year	16.17

Case Study
West Nile Virus (WNV)



- In 2002, the California Condor Recovery Team learned that an experimental CDC DNA WNV vaccine protected against WNV infection in several bird species

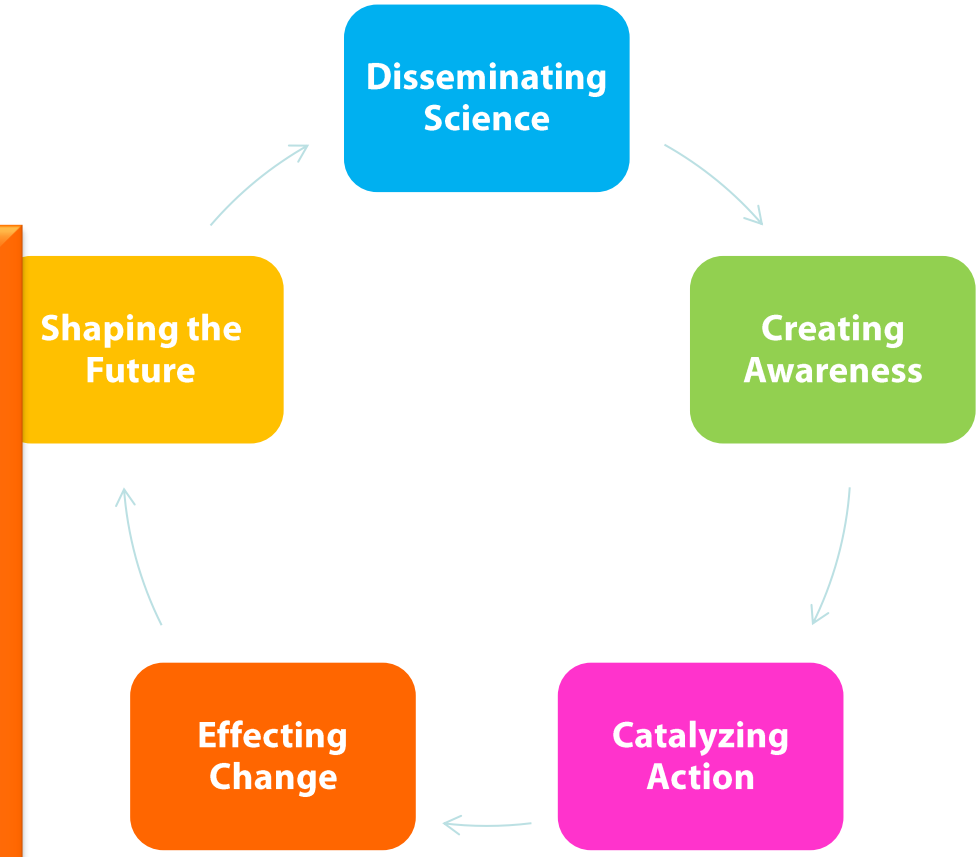
Case Study
West Nile Virus (WNV)



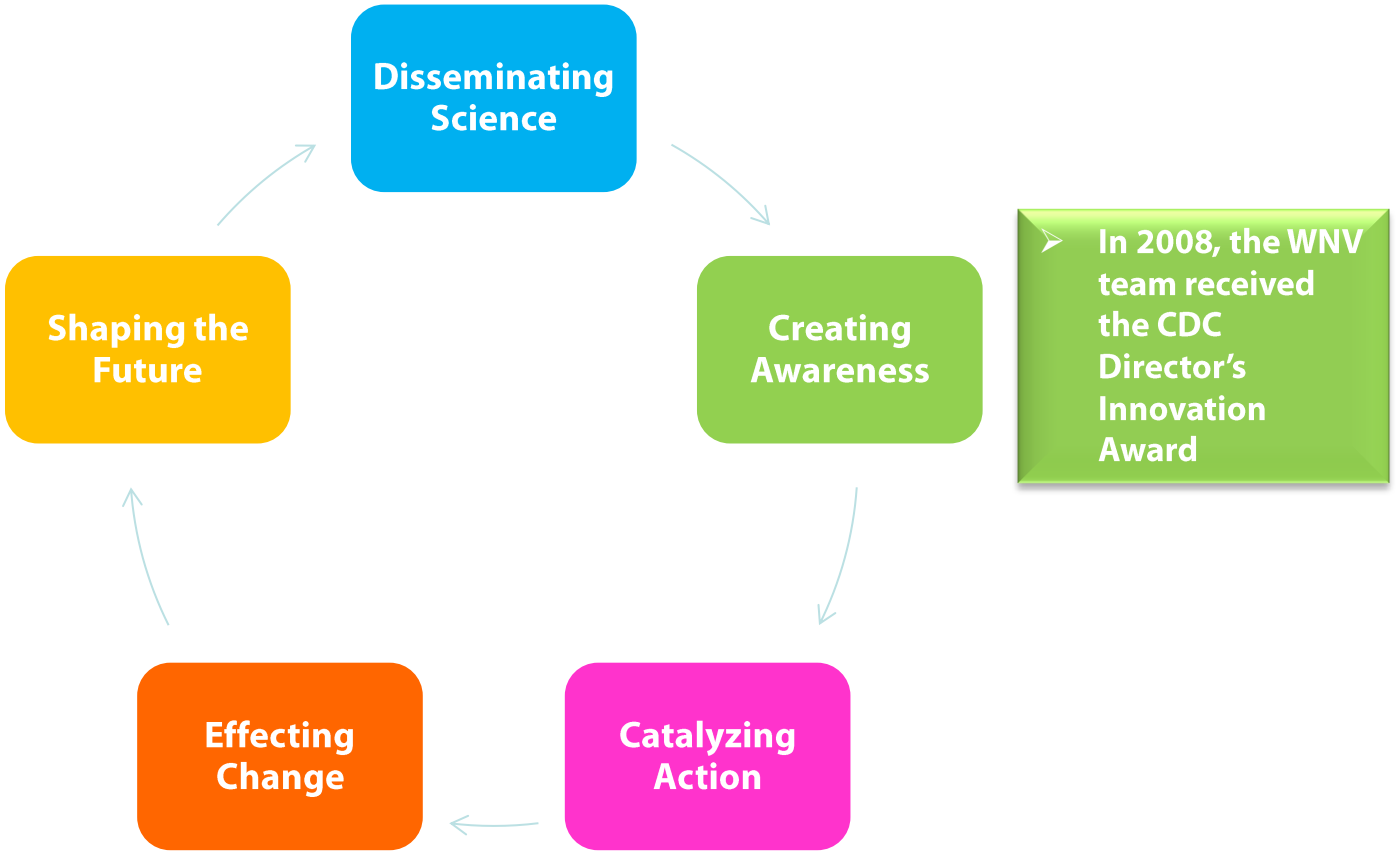
- CDC expedited the delivery of the equine WNV vaccine
- In 2004, the vaccine was found to be safe and effective in protecting captive condors from naturally circulating WNV

Case Study
West Nile Virus (WNV)

- In 2005, the CDC equine DNA vaccine was licensed by the USDA
- This led to a Phase 1 human clinical trial of a similar DNA vaccine
- The vaccine was shown to induce T-cell and antibody responses at levels shown to be protective in studies of horses



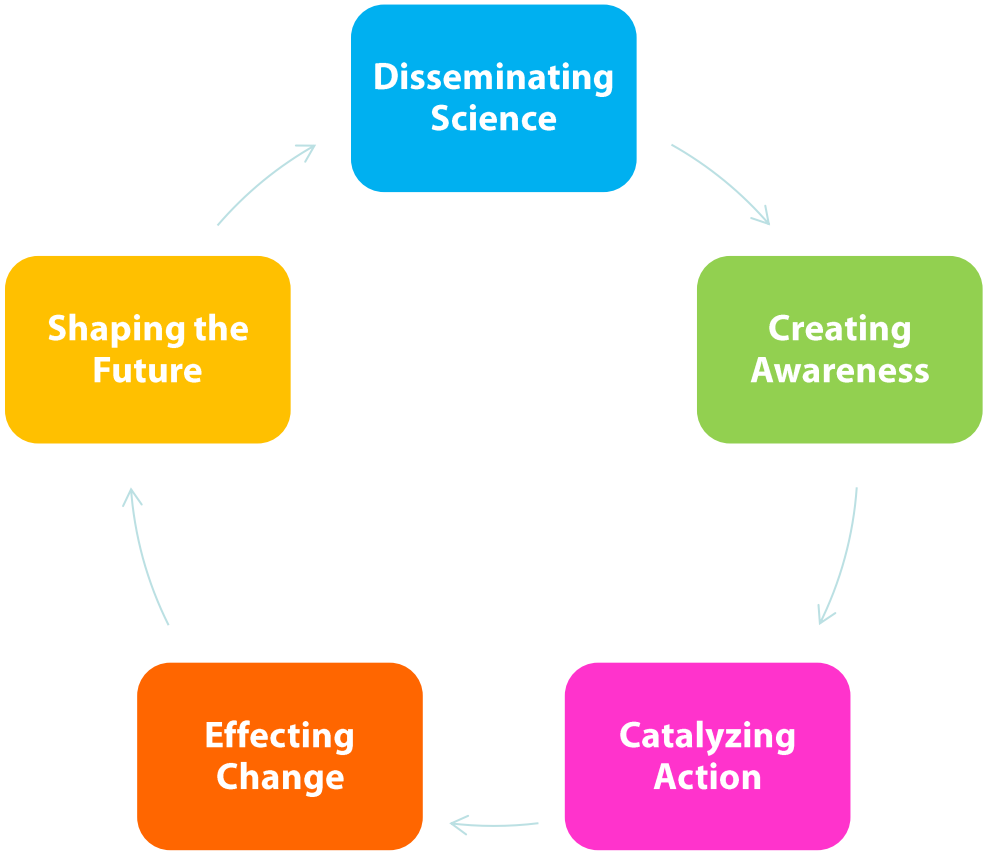
Case Study
West Nile Virus (WNV)



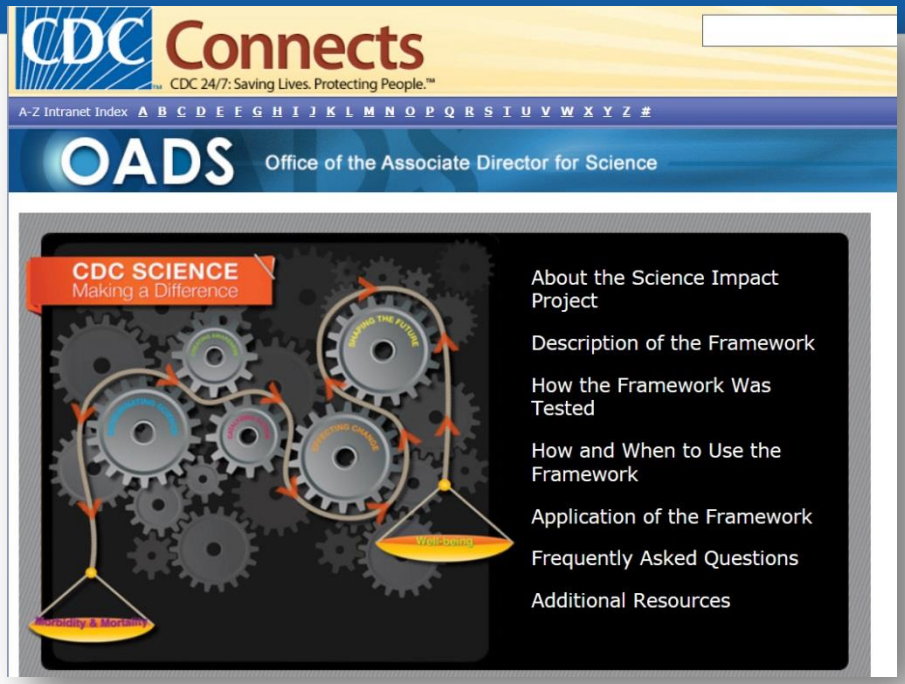
- In 2008, the WNV team received the CDC Director's Innovation Award

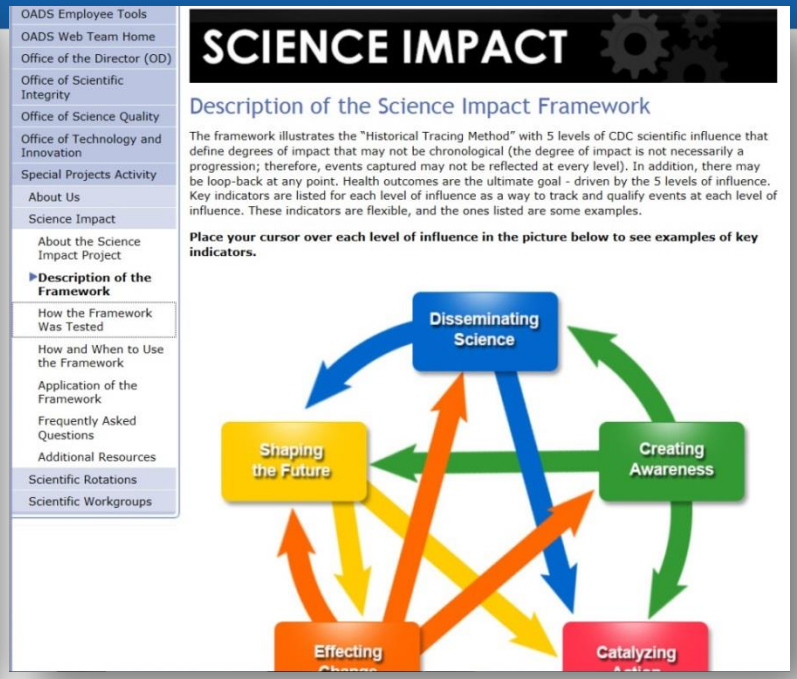
Case Study
West Nile Virus (WNV)

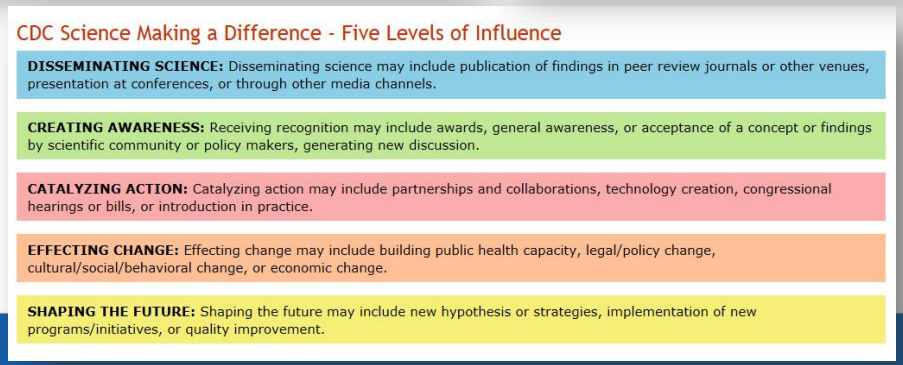
- In 2011, the NIH DNA vaccine was further modified
- It demonstrated an enhanced T-cell response in Phase 1 clinical trials



Science Impact Framework Webpage





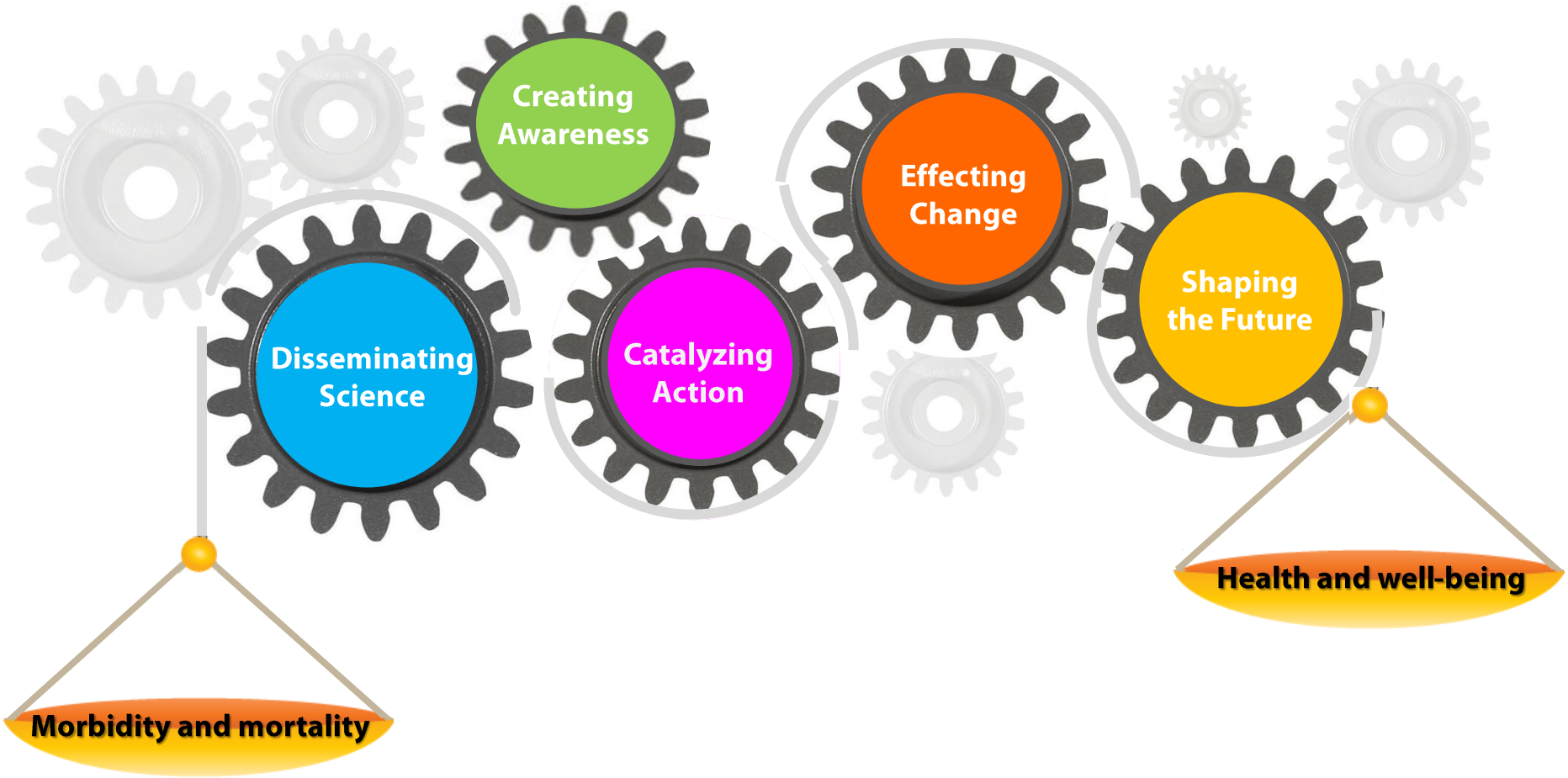


http://www.cdc.gov/od/science/impact

CDC Discussion Panel

- **Tom Chapel,** MA, MBA
  Chief Evaluation Officer, Office of the Associate Director for Program
- **Christine Casey,** MD, CAPT, USPHS
  Deputy Editor, MMWR Serials
  Centers for Surveillance, Epidemiology and Laboratory Services
- **Rex Astles,** PhD
  Senior Health Scientist, Division of Laboratory Programs, Standards and Services, Centers for Surveillance, Epidemiology and Laboratory Services
- **Mehran Massoudi,** PhD, MPH, CAPT, USPHS
  Chief, Applied Research and Translation Branch
  Director, Prevention Research Centers Program
  National Center for Chronic Disease Prevention and Health Promotion
- **Lee Warner,** PhD, MPH
  Associate Director for Science, Division of Reproductive Health
  National Center for Chronic Disease Prevention and Health Promotion

Measuring Science Impact

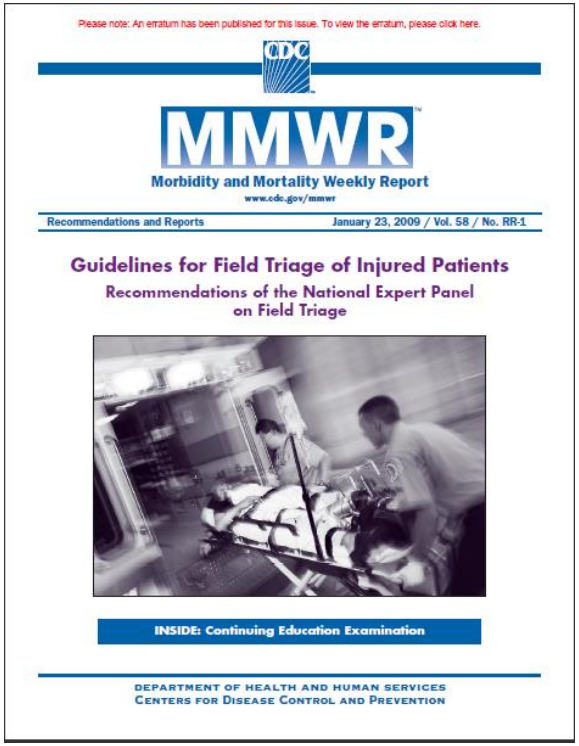


http://www.cdc.gov/od/science/impact

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Field Triage Guidelines and Science Impact: Perspective of a Journal Editor

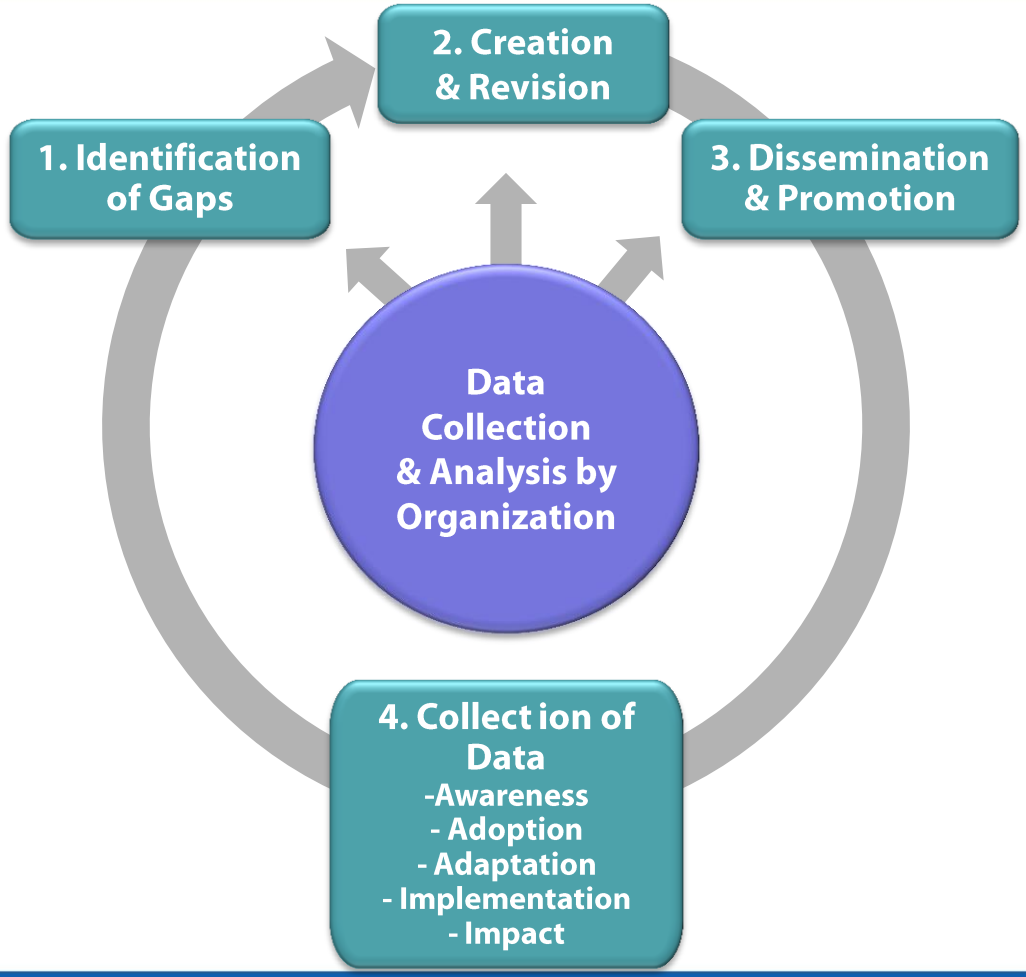
- **June 2011 collaboration**
  - Office of the Associate Director for Science
  - National Center for Injury Prevention and Control
  - *Morbidity and Mortality Weekly Report (MMWR)*
- **Story-based framework**
- **Alternative to journal metrics**
  - Biblio-, Sciento-, Webo-, Alt-, Entity-
- **Lessons learned**
- **Next steps**
  - Explicit and intentional
  - Educate and incorporate
  - Evaluate and revise



http://www.cdc.gov/mmwr/pdf/rr/rr5801.pdf

Christine Casey, MD
CAPT, US Public Health Service
Deputy Editor, *MMWR* Serials
Center for Surveillance, Epidemiology, and Laboratory Services, CDC

Improving the Impact of Laboratory Practice Guidelines with Metrics



Rex Astles, PhD

Senior Health Scientist, Division of Laboratory Programs, Standards, and Services
Center for Surveillance, Epidemiology, and Laboratory Services, CDC

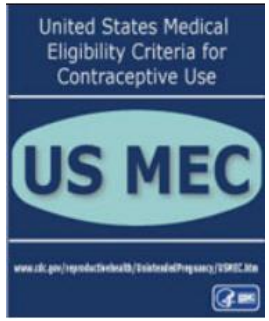
Measuring Public Health Impact in the Prevention Research Centers Program

- Established in 1984; unique network of academic research centers partnering with public health agencies
- Conducts applied public health research, health risk assessment, and other health promotion and disease prevention programs
- Applying research into practice: Innovation, translation, dissemination, and implementation science
- Reach nearly 30 million people in 103 partner communities

Mehran Massoudi, PhD, MPH
CAPT, US Public Health Service
Chief, Applied Research and Translation Branch and *Director,* Prevention Research Centers Program
National Center for Chronic Disease Prevention and Health Promotion, CDC

Plans to Measure the Impact of Contraceptive Guidelines for Healthcare Providers and Pregnancy Risk Assessment Monitoring System

- **Metrics to systematically monitor use in real-time**
- **Evidence-based clinical guidance**
  - U.S. Medical Eligibility Criteria for Contraceptive Use
    - Recommendations about contraception for >60 medical conditions and characteristics



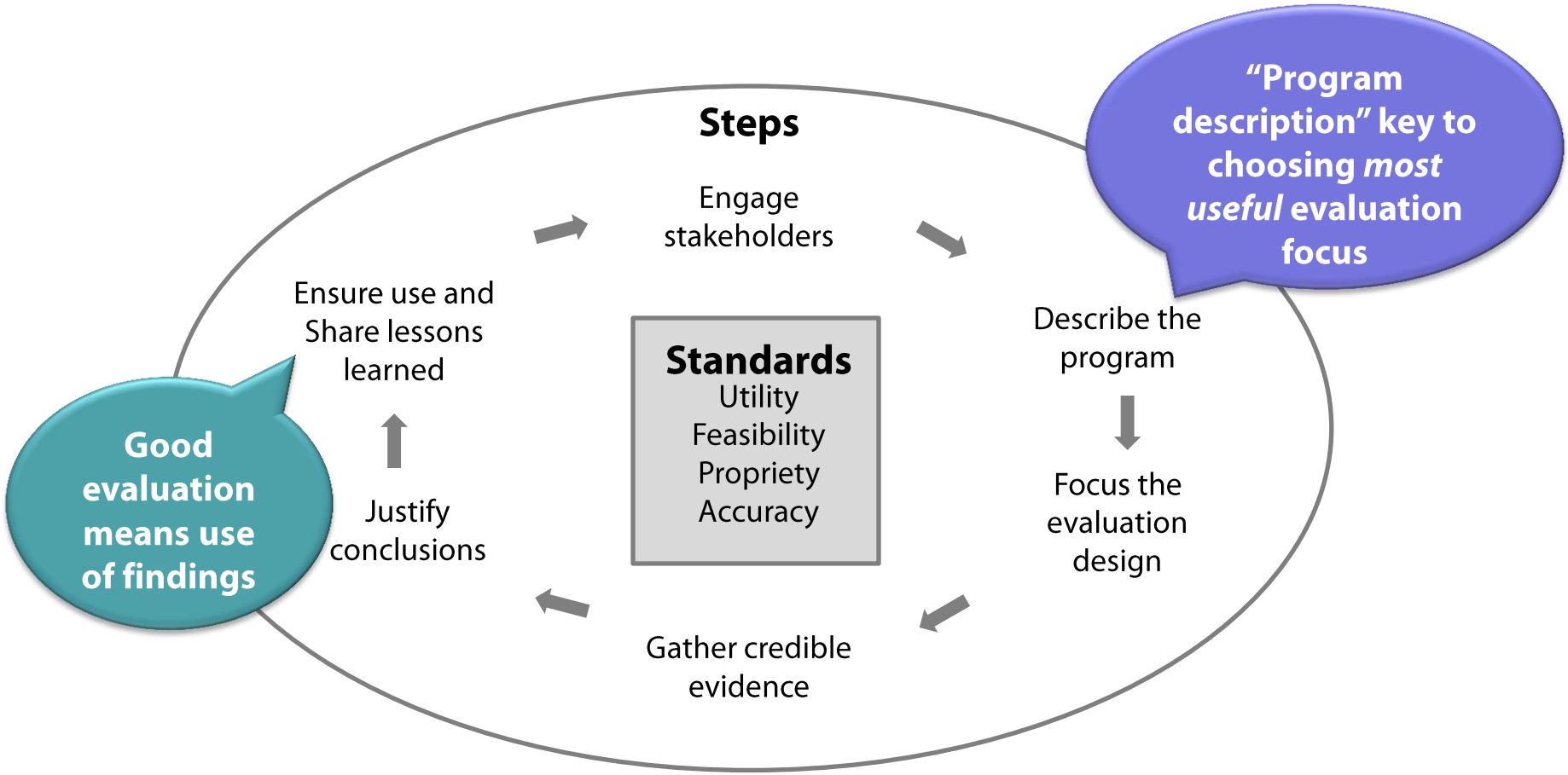
www.cdc.gov/reproductivehealth/DRH/index.htm

- **Surveillance systems**
  - Pregnancy Risk Assessment Monitoring System (PRAMS)
    - Collects population-based data on maternal experiences before, during, and shortly after pregnancy

www.cdc.gov/PRAMS

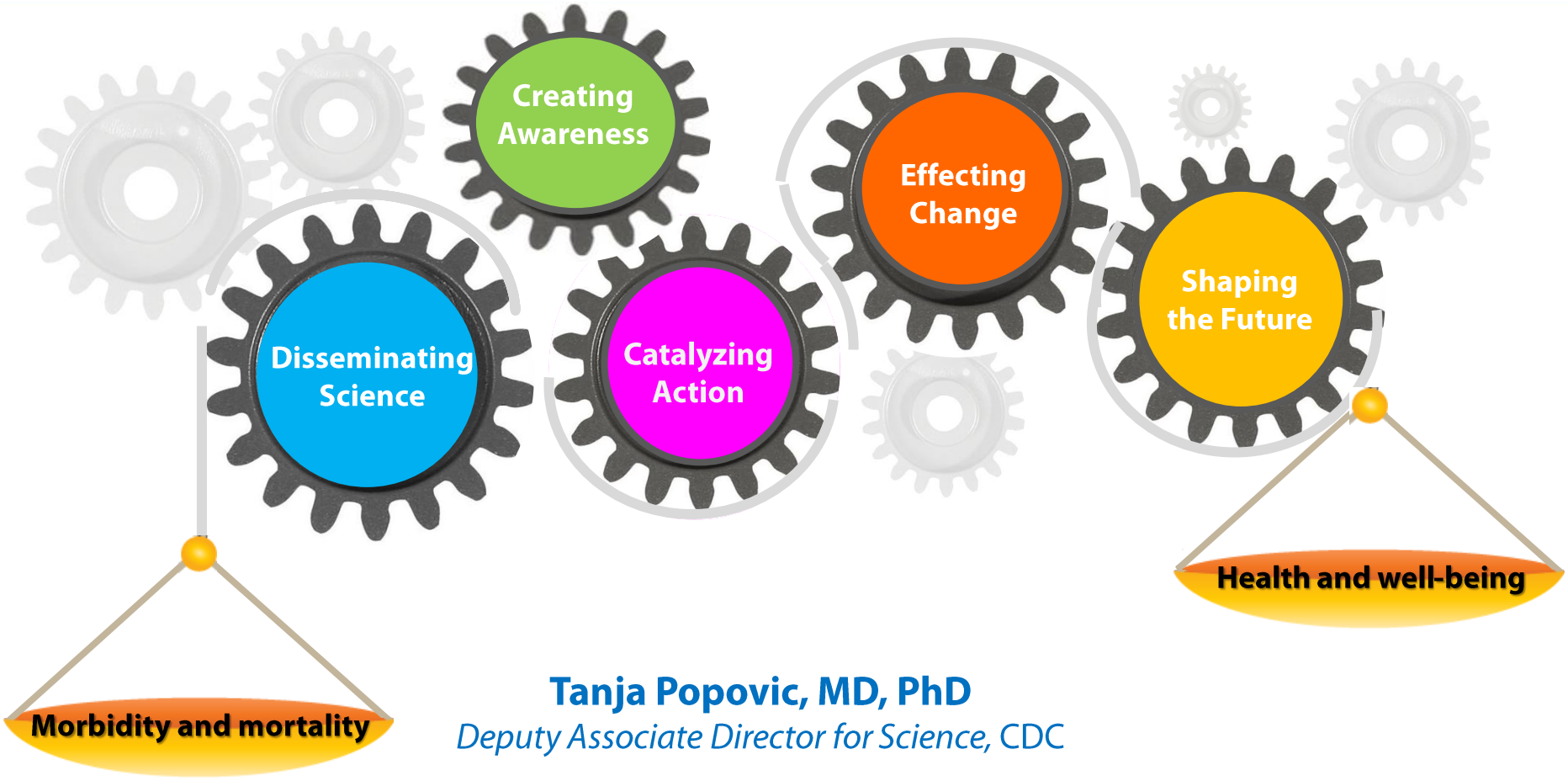
Lee Warner, PhD, MPH
Associate Director for Science, Division of Reproductive Health
National Center for Chronic Disease Prevention and Health Promotion, CDC

How CDC Evaluates its Public Health Programs



Tom Chapel, MA, MBA
Chief Evaluation Officer
Office of the Associate Director for Program, CDC

What Difference You Can Make Using the Science Impact Framework?

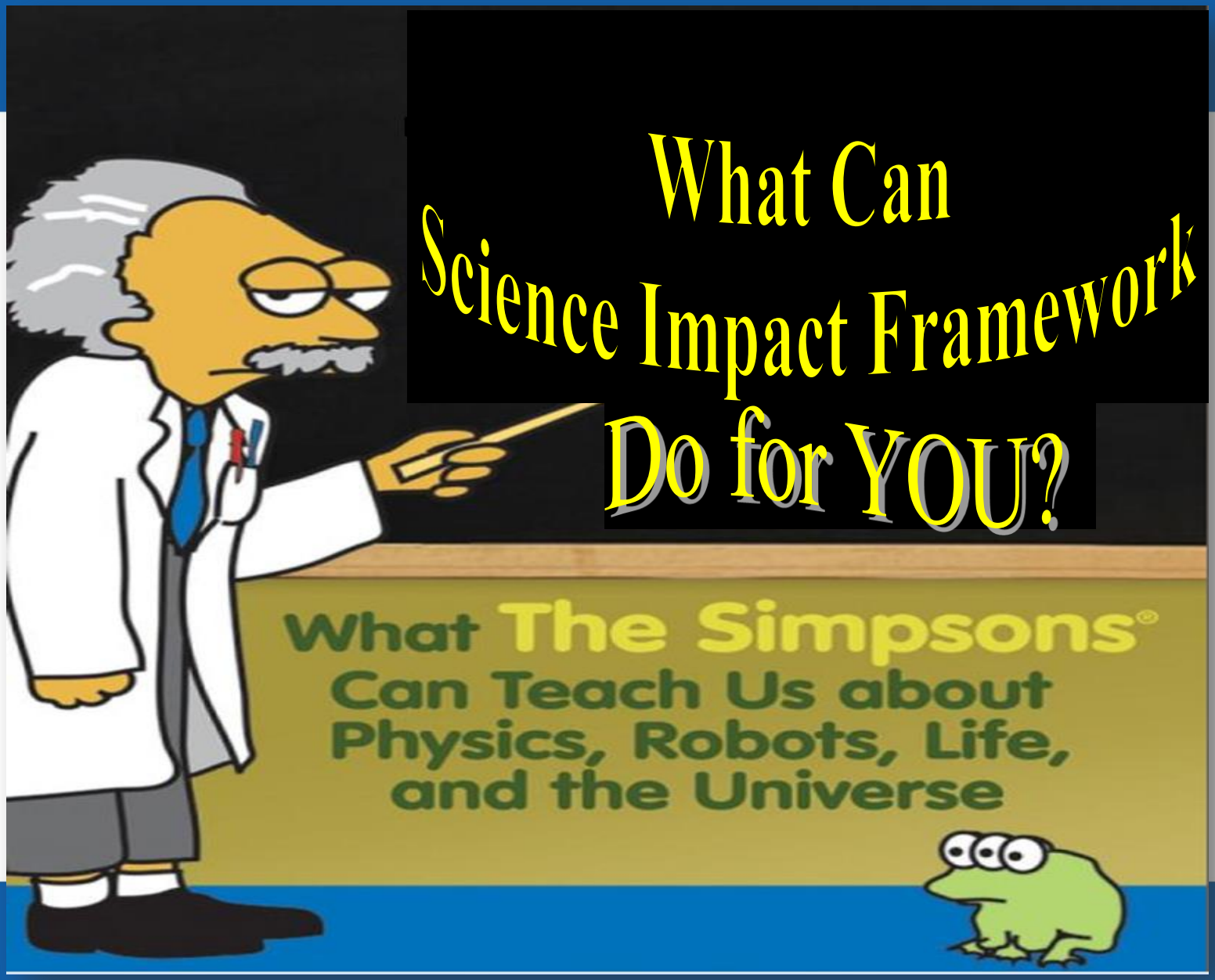


Tanja Popovic, MD, PhD
Deputy Associate Director for Science, CDC

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

What We Heard Today

- **Shift from sole reliance on traditional bibliometrics**
  - Helps understand how widely the research is disseminated
  - Does not tell us how scientific findings are used toward significant improvements in public health practice or policy
- **What is unique about the Science Impact Framework?**
  - Health outcomes
    - Makes us focus on impact of what we do
    - Applies to a broad range of public health activities
    - Allows monitoring of progress of our work in real time
  - Additional benefits
    - Supports better decision-making, prioritizing, collaborating and communicating


What Can
Science Impact Framework
Do for YOU?
What The Simpsons
Can Teach Us about
Physics, Robots, Life,
and the Universe

Track Retrospectively or Monitor Progress and Impact of Your Work

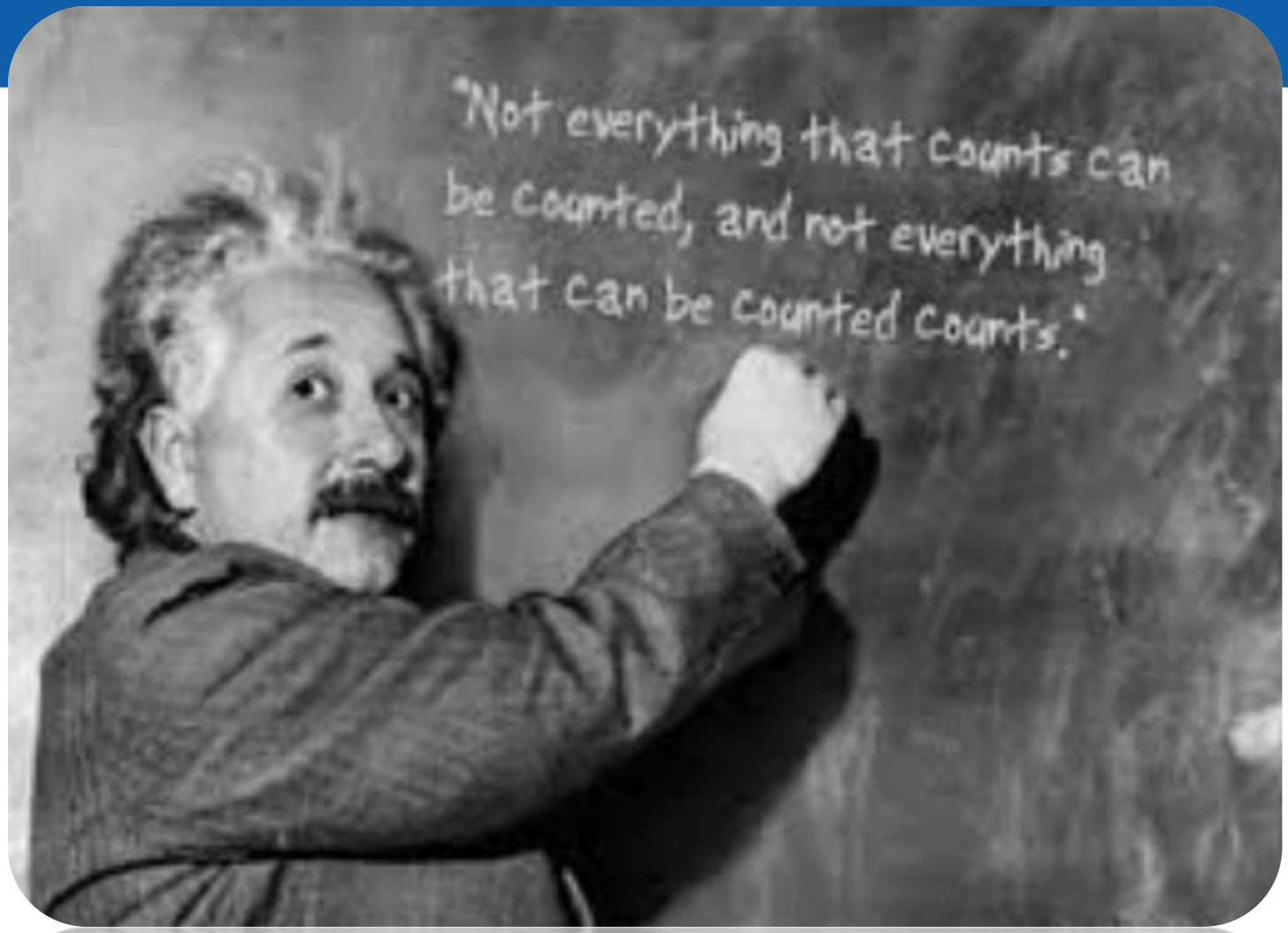
- **Scientific programs and projects**
- **Specific scientific documents**
  - Impact of guidelines and recommendations on practice
  - Major peer-review manuscripts
- **Scientists**
  - Culture change in performance evaluation from current emphasis on number of publications (academic angle) to impact of work (public health angle)

Strengthen Review Process

- **External peer-review**
  - Assess impact of existing extramural science funding
  - Link the funding of new projects and proposals to CDC priorities
- **Science award review**
  - Selection of scientific products and individuals for scientific awards
  - Better understanding of impact on health and well-being of people

Communicate Clearly About Your Work and Its Impact

- **Consistency of narrative and facts, but adjusted for different audiences**
- **Internal communication**
  - Conceptual change from academic to mission-related projects
  - Internal planning and resource allocation
  - Clarity regarding how research impacts people's health
- **External communication**
  - Assist partners with describing their and your contributions to improving people's health


"Not everything that counts can
be counted, and not everything
that can be counted counts."

What You Should Do NOW

From: Howard, John (CDC/NIOSH/OD)
Sent: Monday, January 13, 2014 1:30 PM
To: Ari, Mary D. (CDC/OD/OADS)
Cc: Piacentino, John D. (CDC/NIOSH/OD)
Subject: Terrific Presentation!

Mary:

I just wanted to say how much I enjoyed your presentation today at the Senior Meeting on implementing the research impact framework.
I was wondering if you might consider speaking with Dr. John Piacentino, the NIOSH Associate Director for Science, about making a presentation to his group?

Thanks!

John

Center for Surveillance, Epidemiology, and Laboratory Services

From: Iademarco, Michael (CDC/OPHSS/CSELS)
Sent: Tuesday, January 14, 2014 7:45 AM
To: Ari, Mary D. (CDC/OD/OADS)
Cc: Barkley, Mary M. (CDC/OPHSS/CSELS)
Subject: Assessing the impact of science

Mary, nice presentation yesterday morning.
Can you send me a copy of your slides, I want to share with senior leadership here.
Michael

What You Should Do NOW

National Center on Birth Defects and Developmental Disabilities

From: Shapira, Stuart (CDC/ONDIEH/NCBDDD)
Sent: Sunday, January 12, 2014 12:31 PM
To: Ari, Mary D. (CDC/OD/OADS); Popovic, Tanja (CDC/OD/OADS)
Subject: Science Impact Framework Presentation

Hi Mary and Tanja,

As I mentioned at the last EISC meeting in 2013, our Center has been looking at ways to evaluate the scientific impact of our projects and programs. To that end, I would like to arrange with you to provide a presentation for our Center on the Science Impact Framework … We would very much appreciate a presentation to our Center on this important topic …Thanks, in advance.

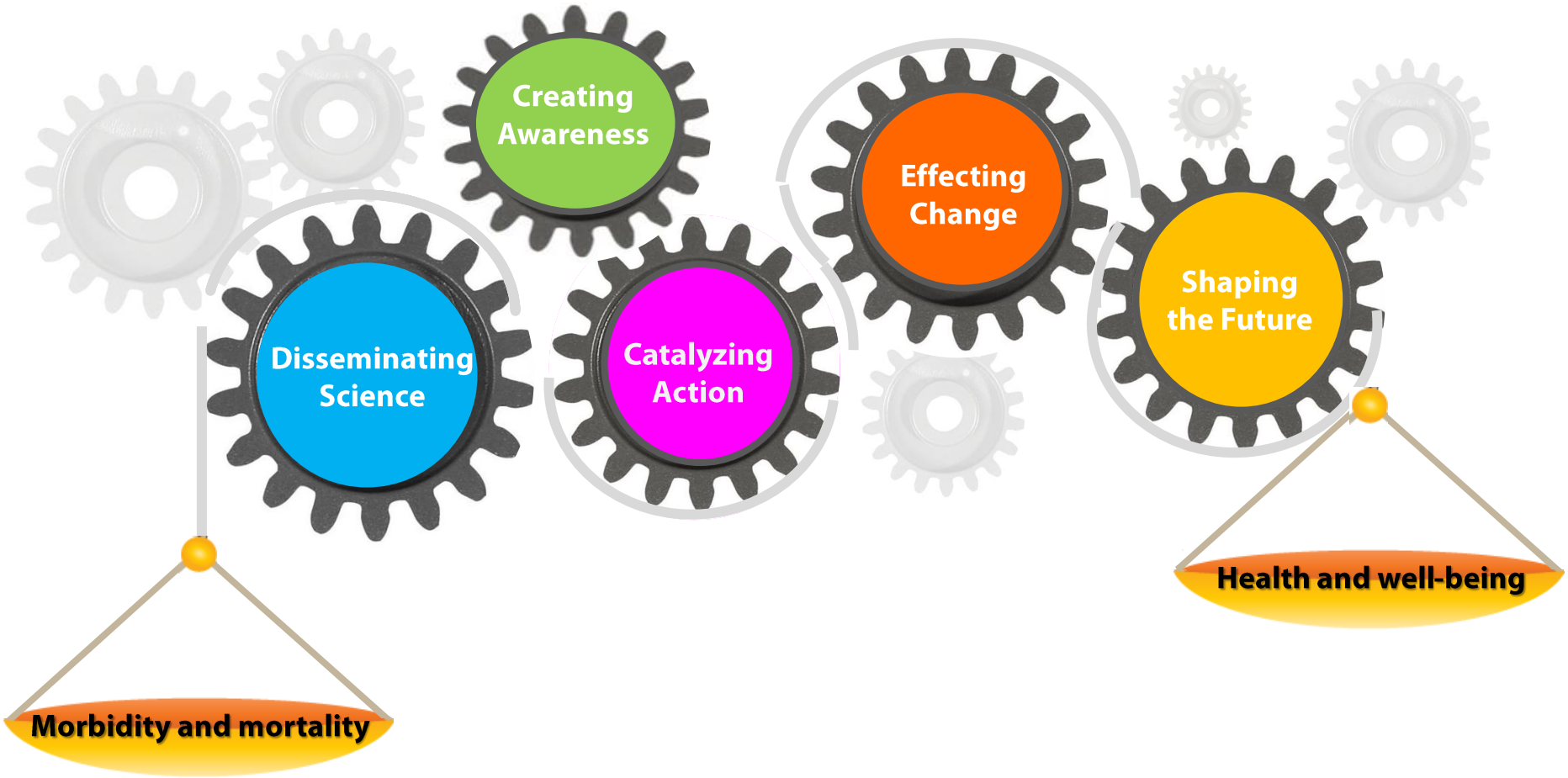
--Stuart

Stuart K. Shapira, M.D., Ph.D.
Chief Medical Officer
Associate Director for Science (ADS)
National Center on Birth Defects and Developmental Disabilities (NCBDDD)
Centers for Disease Control and Prevention
1600 Clifton Road, Mailstop E-87
Atlanta, GA 30333
404-498-3882 [phone]
404-498-3070 [fax]

What You Should Do NOW

"If you only got potential then you ain't got it!"

Knowing the Impact of Our Work Helps Us Shape Our Future



http://www.cdc.gov/od/science/impact

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention