Leveraging Data for HIV Response

$100 Bills on the Ground?

Eran Bendavid

September 28, 2018

Stanford University

Conflicts and Acknowledgements

No conflicts to declare

Conflicts and Acknowledgements

No conflicts to declare

National Institute
of Allergy and
Infectious Diseases

Conflicts and Acknowledgements

No conflicts to declare

National Institute of Allergy and Infectious Diseases

Many thanks to collaborators and gracious hosts

Conflicts and Acknowledgements

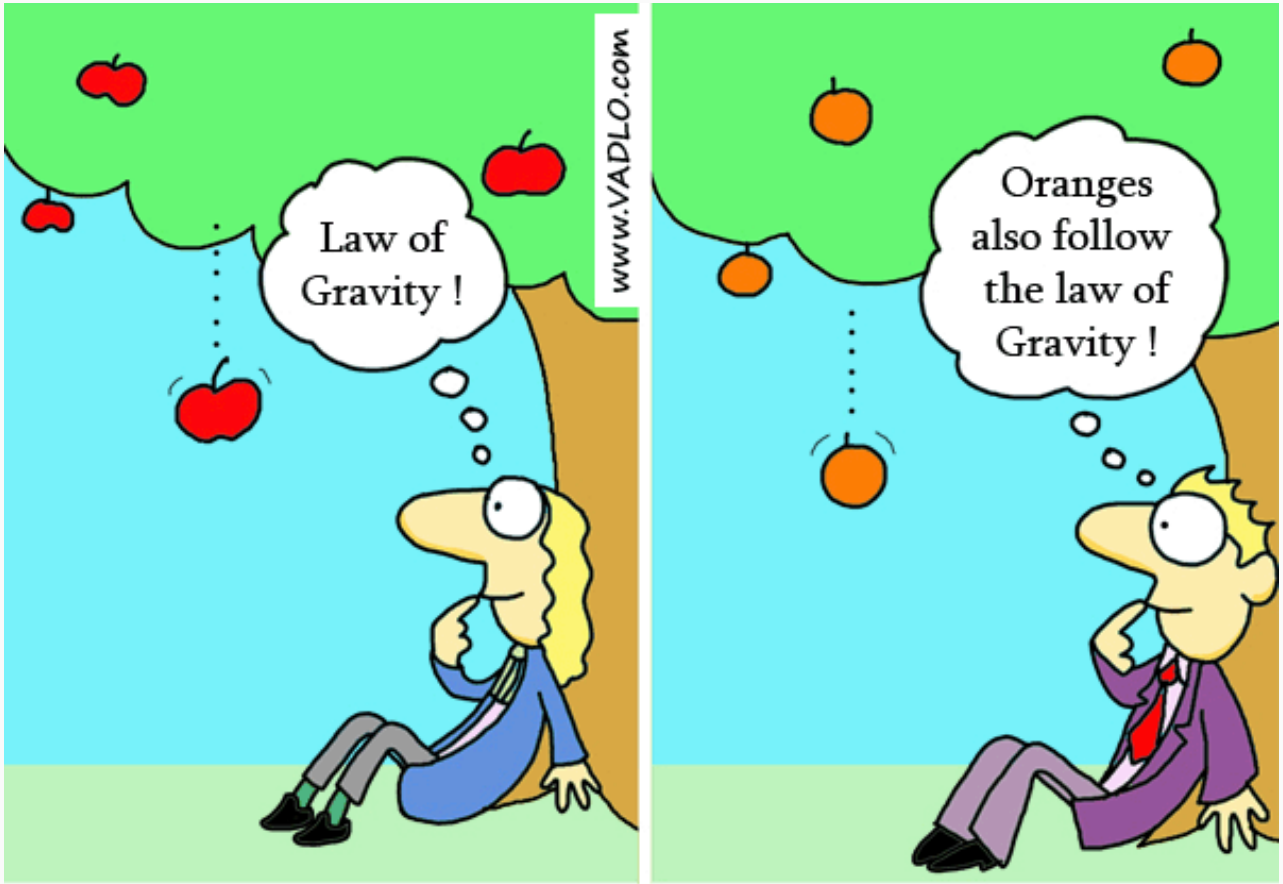
No conflicts to declare

National Institute of Allergy and Infectious Diseases

Many thanks to collaborators and gracious hosts

And all the individuals whose experience contribute to our work

Making Progress



High Impact Paper

Low Impact Paper

Ways of Doing Implementation Science

Ways of Doing Implementation Science

- An intervention is identified from a (relatively small) RCT

Ways of Doing Implementation Science

- An intervention is identified from a (relatively small) RCT
- Several potential approaches for scaling or implementing the intervention are identified

Ways of Doing Implementation Science

- An intervention is identified from a (relatively small) RCT
- Several potential approaches for scaling or implementing the intervention are identified
- Essential components of the approaches are implemented

Ways of Doing Implementation Science

- An intervention is identified from a (relatively small) RCT
- Several potential approaches for scaling or implementing the intervention are identified
- Essential components of the approaches are implemented
- Outcomes of the intervention are measured

Ways of Doing Implementation Science

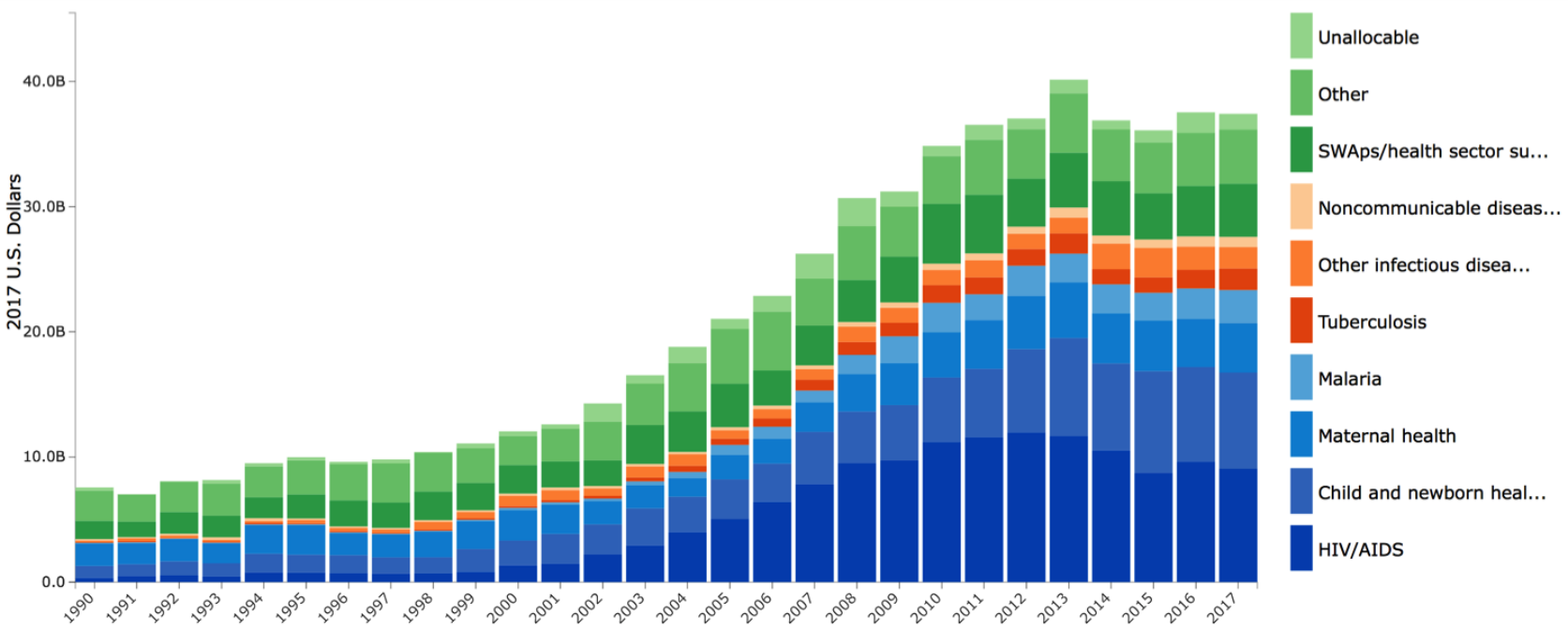
- An intervention is identified from a (relatively small) RCT
- Several potential approaches for scaling or implementing the intervention are identified
- Essential components of the approaches are implemented
- Outcomes of the intervention are measured

Ways of Doing Implementation Science

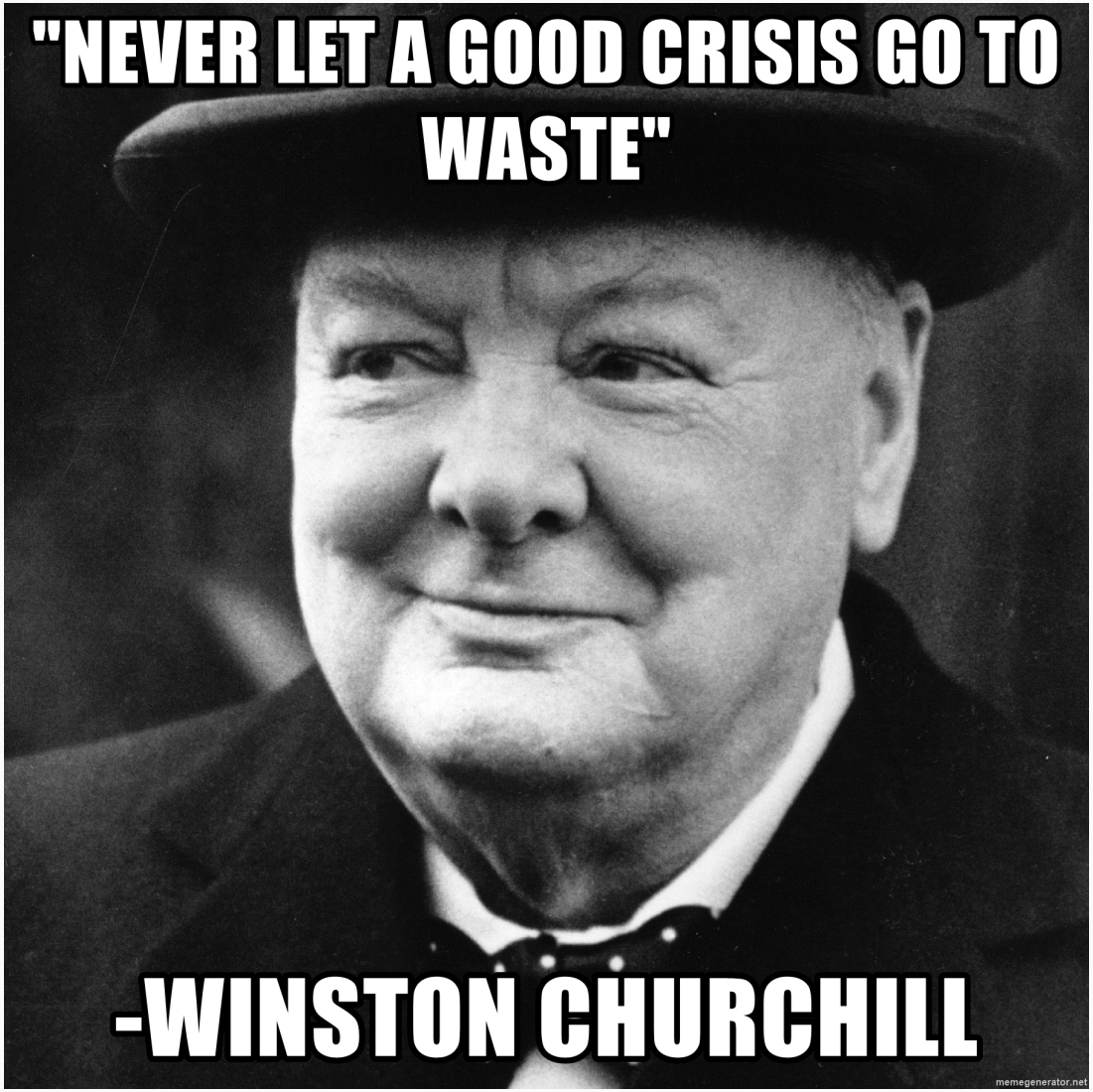
- An intervention is identified from a (relatively small) RCT
- Several potential approaches for scaling or implementing the intervention are identified
- Essential components of the approaches are implemented
- Outcomes of the intervention are measured

- (Estimated budget for measuring outcomes: $6 million)

Why is innovation in doing IS important?



Why is innovation in doing IS important?



Alternatives

Demographic and Health Surveys

- Nationally representative surveys conducted in most Sub-Saharan African counties

Demographic and Health Surveys

- Nationally representative surveys conducted in most Sub-Saharan African counties
- Since 2003, over 60 surveys that include HIV testing (over 1,000,000 HIV tests) conducted among women *and men*

Demographic and Health Surveys

- Nationally representative surveys conducted in most Sub-Saharan African counties
- Since 2003, over 60 surveys that include HIV testing (over 1,000,000 HIV tests) conducted among women *and men*
- Surveys also contain an enormous amount of additional information

Demographic and Health Surveys

- Nationally representative surveys conducted in most Sub-Saharan African counties
- Since 2003, over 60 surveys that include HIV testing (over 1,000,000 HIV tests) conducted among women *and men*
- Surveys also contain an enormous amount of additional information
- Information is collected in (largely) the same way across countries and surveys

Demographic and Health Surveys

- Nationally representative surveys conducted in most Sub-Saharan African counties
- Since 2003, over 60 surveys that include HIV testing (over 1,000,000 HIV tests) conducted among women *and men*
- Surveys also contain an enormous amount of additional information
- Information is collected in (largely) the same way across countries and surveys
    1. Geospatial information

Demographic and Health Surveys

- Nationally representative surveys conducted in most Sub-Saharan African counties
- Since 2003, over 60 surveys that include HIV testing (over 1,000,000 HIV tests) conducted among women *and men*
- Surveys also contain an enormous amount of additional information
- Information is collected in (largely) the same way across countries and surveys
    1. Geospatial information
    2. Personal and demographic information

Demographic and Health Surveys

- Nationally representative surveys conducted in most Sub-Saharan African counties
- Since 2003, over 60 surveys that include HIV testing (over 1,000,000 HIV tests) conducted among women *and men*
- Surveys also contain an enormous amount of additional information
- Information is collected in (largely) the same way across countries and surveys
    1. Geospatial information
    2. Personal and demographic information
    3. Socioeconomic information

Demographic and Health Surveys

- Nationally representative surveys conducted in most Sub-Saharan African counties
- Since 2003, over 60 surveys that include HIV testing (over 1,000,000 HIV tests) conducted among women *and men*
- Surveys also contain an enormous amount of additional information
- Information is collected in (largely) the same way across countries and surveys
    1. Geospatial information
    2. Personal and demographic information
    3. Socioeconomic information
    4. (Self-reported) sexual behavior

Demographic and Health Surveys

5. Anemia

Demographic and Health Surveys

5. Anemia
6. Anthropometrics

Demographic and Health Surveys

5. Anemia
6. Anthropometrics
7. Intimate partner violence

Demographic and Health Surveys

5. Anemia
6. Anthropometrics
7. Intimate partner violence
8. Reproductive health

Demographic and Health Surveys

5. Anemia
6. Anthropometrics
7. Intimate partner violence
8. Reproductive health
9. Abortions

Demographic and Health Surveys

5. Anemia
6. Anthropometrics
7. Intimate partner violence
8. Reproductive health
9. Abortions
10. HIV knowledge and attitudes

Demographic and Health Surveys

5. Anemia
6. Anthropometrics
7. Intimate partner violence
8. Reproductive health
9. Abortions
10. HIV knowledge and attitudes
11. Child health and mortality

Demographic and Health Surveys

5. Anemia
6. Anthropometrics
7. Intimate partner violence
8. Reproductive health
9. Abortions
10. HIV knowledge and attitudes
11. Child health and mortality
12. Maternal health and mortality

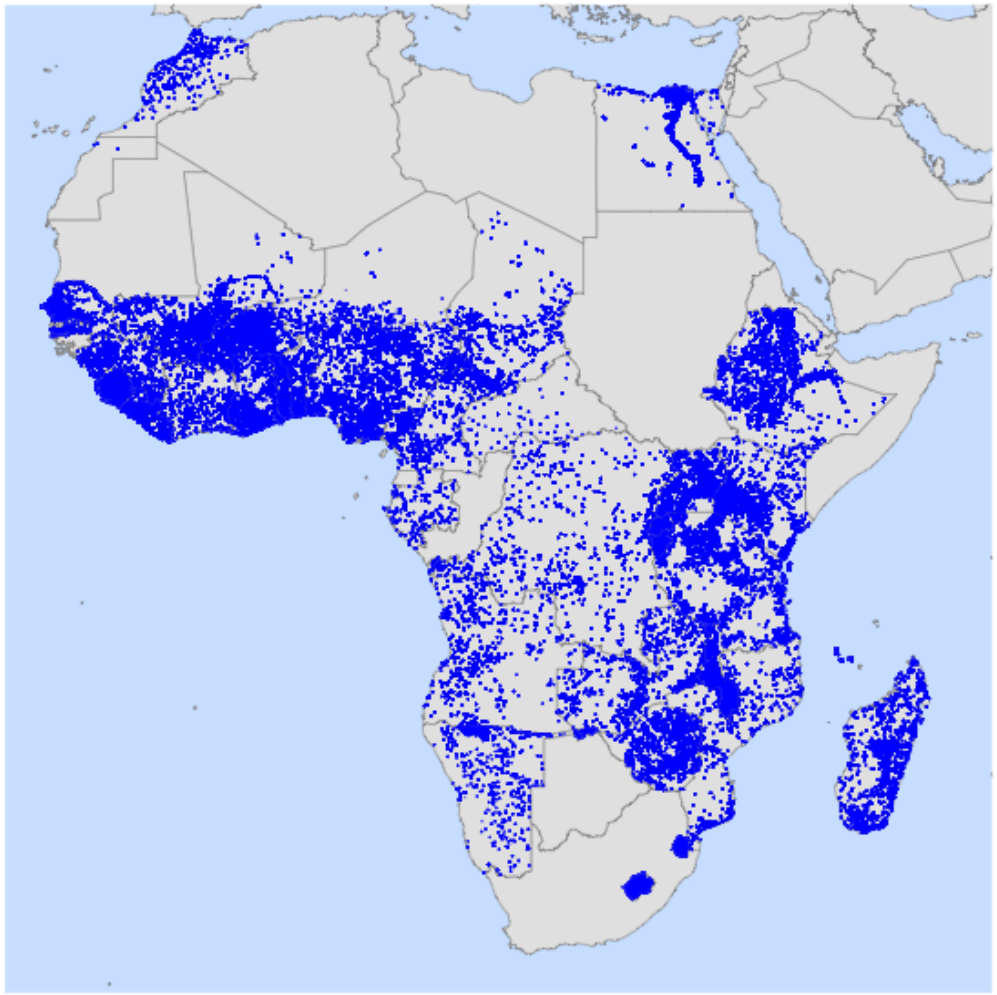
Demographic and Health Surveys

5. Anemia
6. Anthropometrics
7. Intimate partner violence
8. Reproductive health
9. Abortions
10. HIV knowledge and attitudes
11. Child health and mortality
12. Maternal health and mortality
13. Tobacco use

Demographic and Health Surveys

5. Anemia
6. Anthropometrics
7. Intimate partner violence
8. Reproductive health
9. Abortions
10. HIV knowledge and attitudes
11. Child health and mortality
12. Maternal health and mortality
13. Tobacco use
14. Nutrition

DHS Locations



DHS - geospatial opportunities

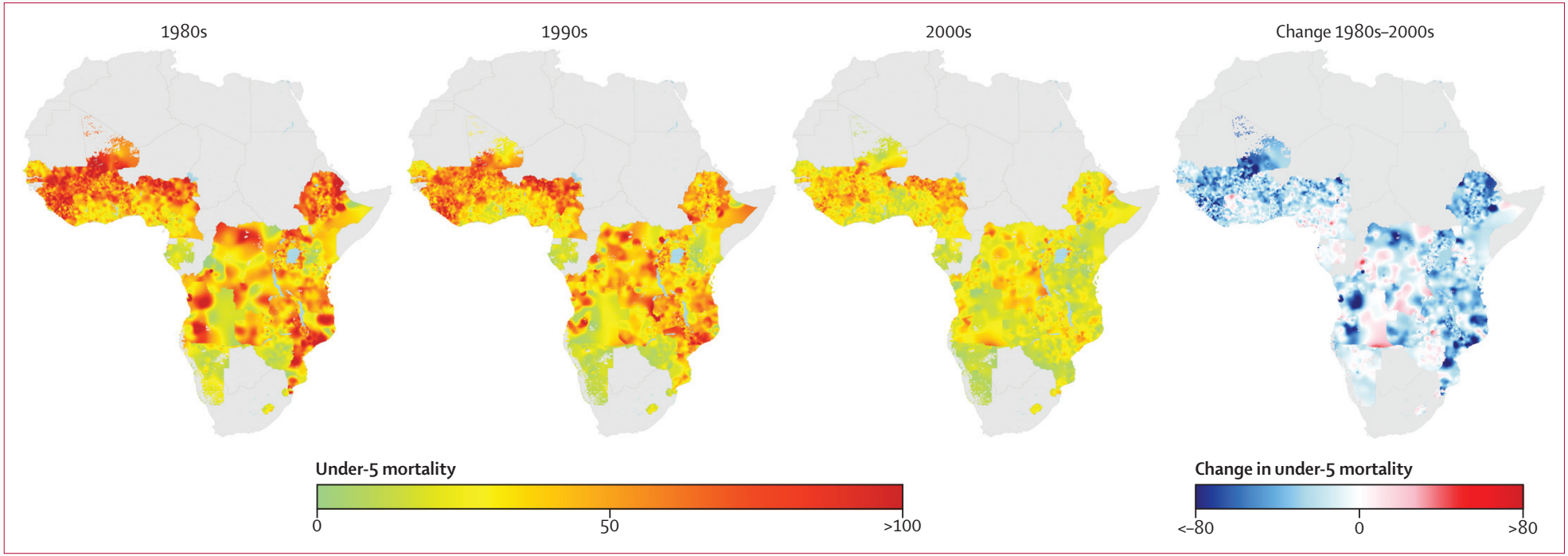


Figure 1: **Variation in under-5 mortality**
Maps show variation across sample countries in three decades, and the difference in cell-level mortality between the 1980s and 2000s. Mortality (and change in mortality) is represented as 5m0 (deaths per 1000 under-5 life-years).

DHS - HIV prevalence

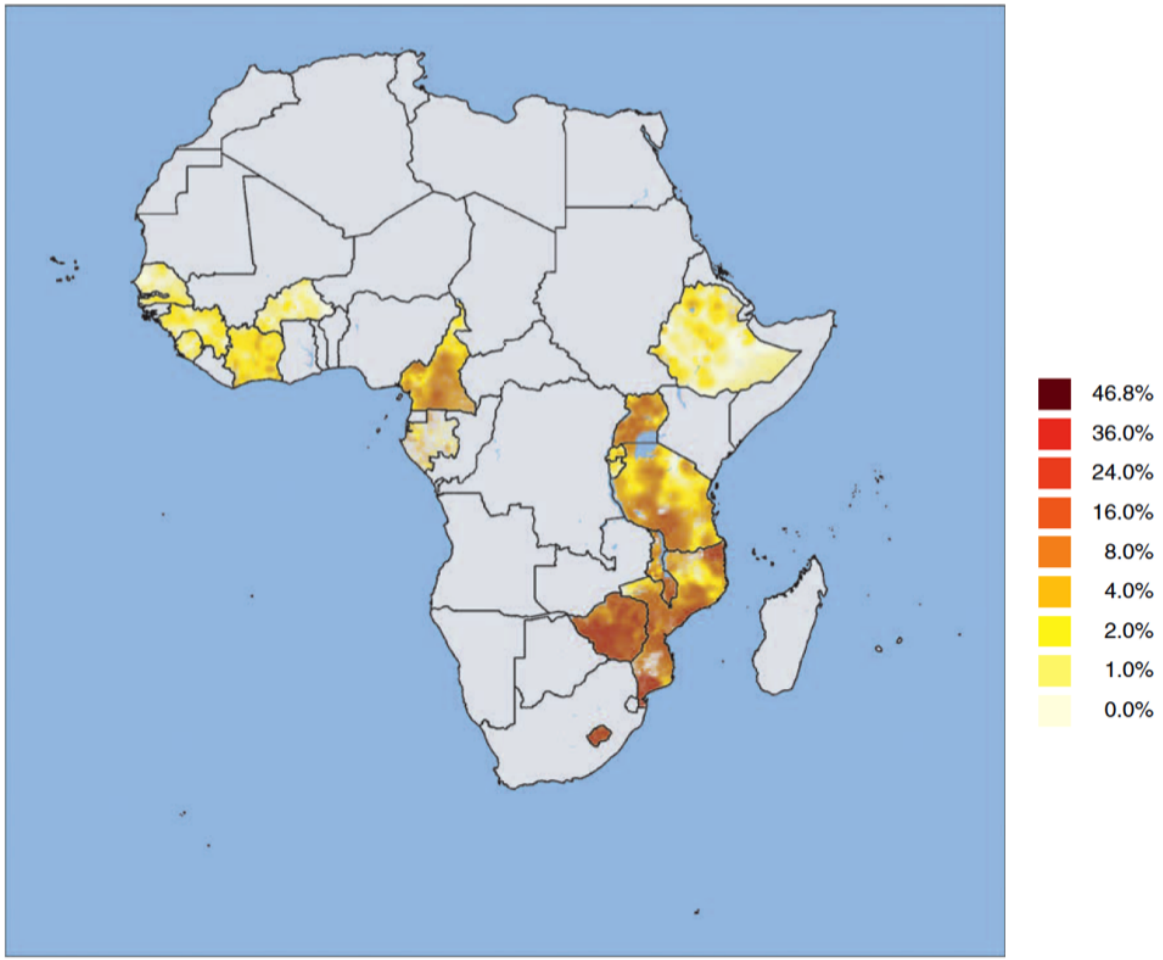
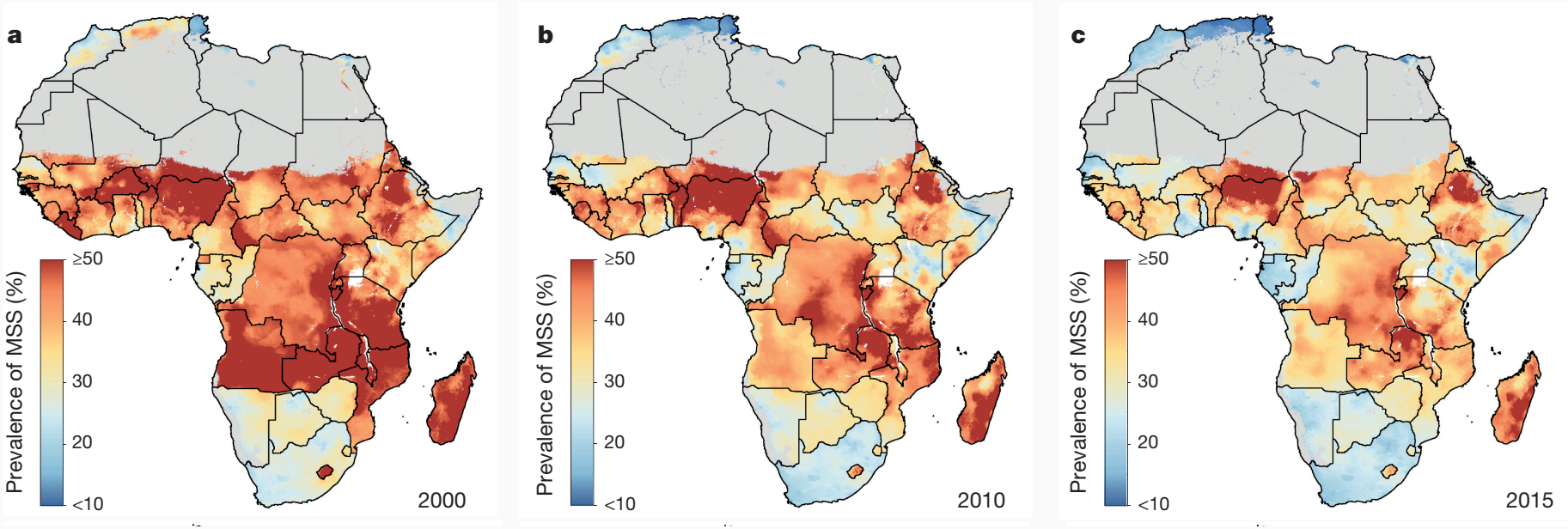


Fig. 2. HIV prevalence (in %, 15–49 year-olds) surface for the 16 selected sub-Saharan countries. Surfaces were generated independently for each country. Surveys used were conducted between 2008 and 2012.

Larmarange et al, *AIDS* 2014

DHS - malnutrition (stunting)



Osgood-Zimmerman et al, *Nature* 2018

DHS - diarrhea

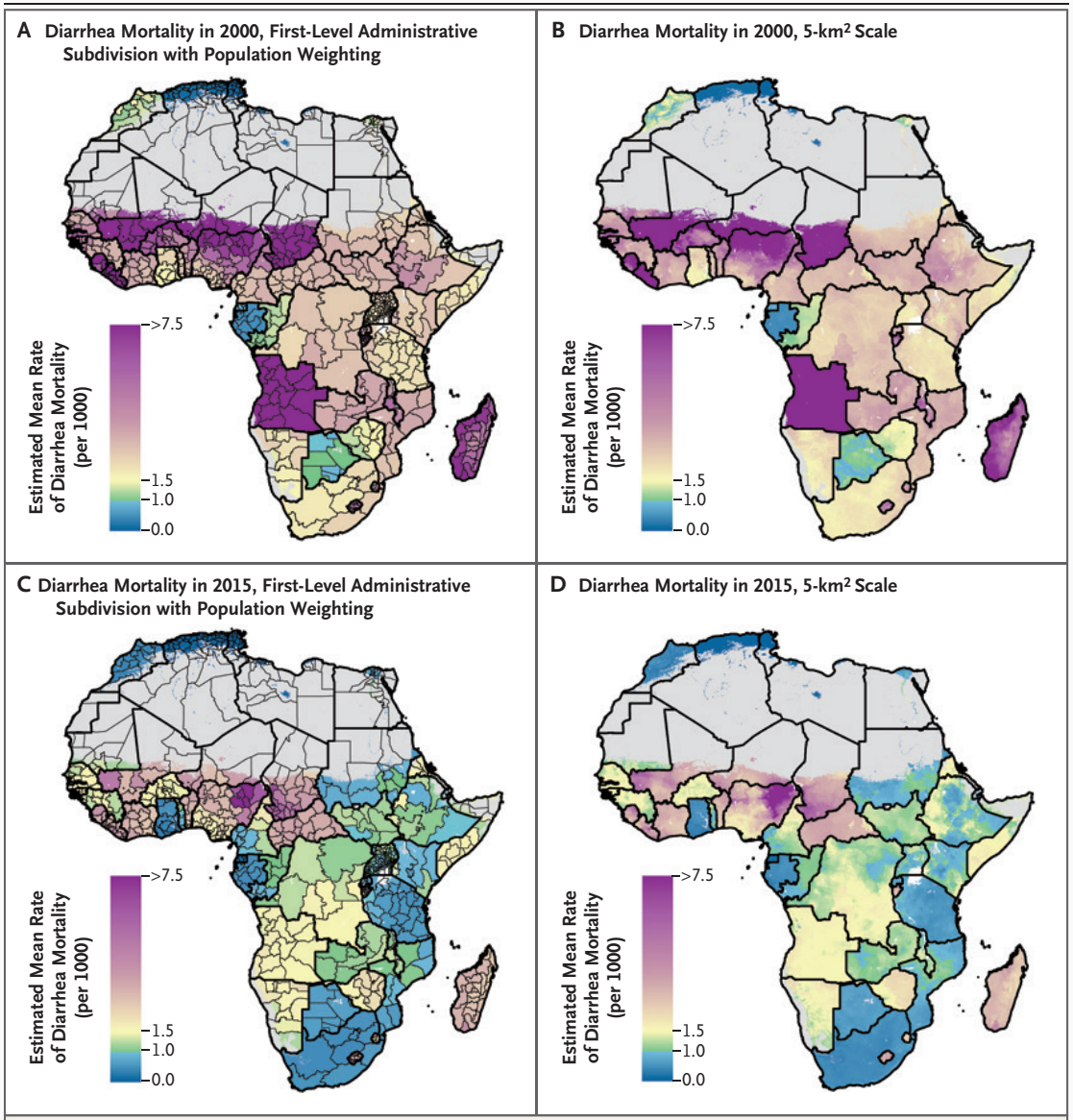


Figure 1. Diarrhea-Related Mortality Rates among Children Younger than 5 Years of Age in 2000 and 2015.

DHS - HIV incidence

Household survey of HIV incidence in Rwanda: a national observational cohort study

Sabin Nsanzimana, Eric Remera, Steve Kanters, Augustin Mulindabigwi, Amitabh B Suthar, Jean Paul Uwizihiwe, Mutagoma Mwumvaneza, Edward J Mills, Heiner C Bucher

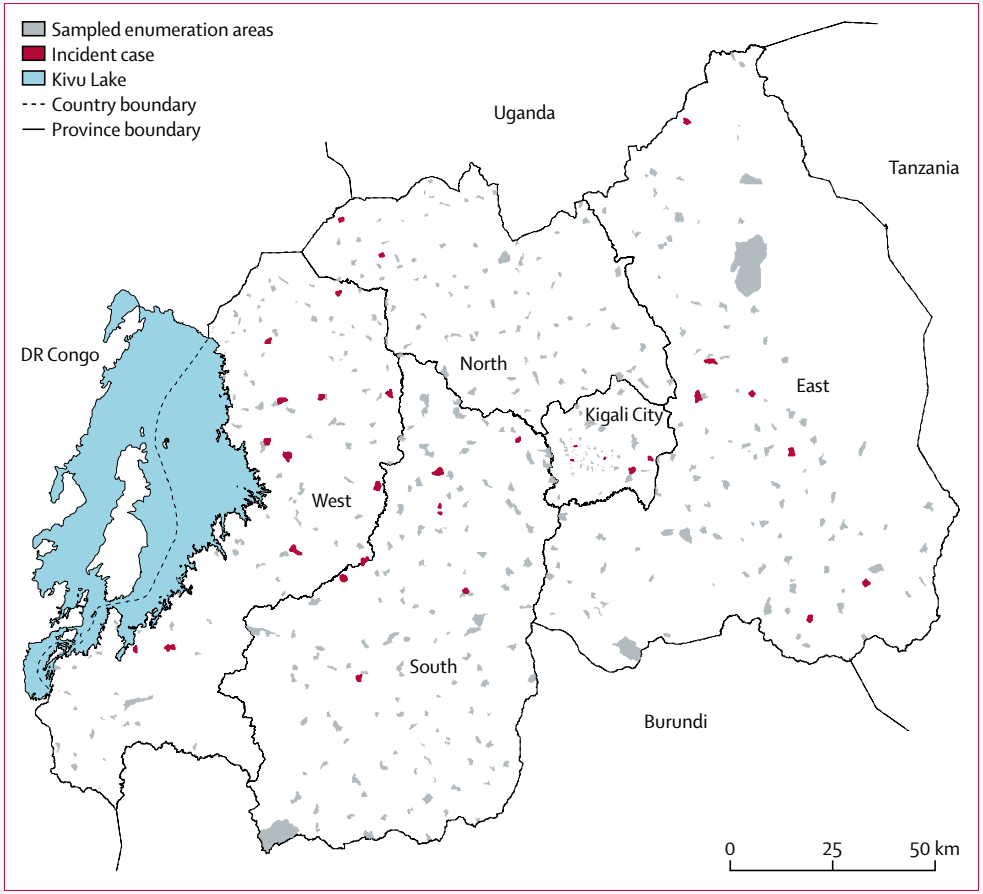


Figure: **Distribution of new infections across the provinces of Rwanda**

DHS - leveraging opportunities

- Additional surveys available for (at least) Kenya, Zambia, DRC, Lesotho, Benin, Togo, Liberia, Angola, and South Africa

DHS - leveraging opportunities

- Additional surveys available for (at least) Kenya, Zambia, DRC, Lesotho, Benin, Togo, Liberia, Angola, and South Africa
- Information is available to create...

DHS - leveraging opportunities

- Additional surveys available for (at least) Kenya, Zambia, DRC, Lesotho, Benin, Togo, Liberia, Angola, and South Africa
- Information is available to create...
    1. HIV testing prevalence

DHS - leveraging opportunities

- Additional surveys available for (at least) Kenya, Zambia, DRC, Lesotho, Benin, Togo, Liberia, Angola, and South Africa
- Information is available to create...
    1. HIV testing prevalence
    2. HIV prevalence among those untested

DHS - leveraging opportunities

- Additional surveys available for (at least) Kenya, Zambia, DRC, Lesotho, Benin, Togo, Liberia, Angola, and South Africa
- Information is available to create...
  1. HIV testing prevalence
  2. HIV prevalence among those untested
  3. prevalence of some co-morbidities (undernutrition, anemia)

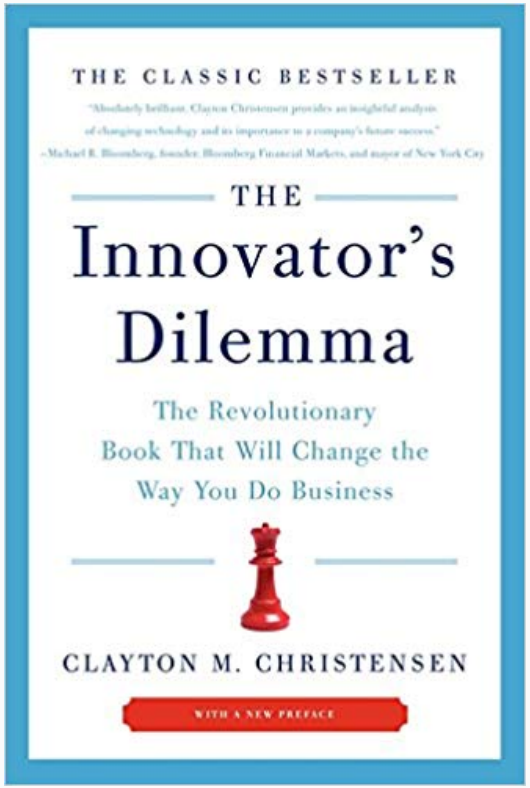
DHS - leveraging opportunities

- Additional surveys available for (at least) Kenya, Zambia, DRC, Lesotho, Benin, Togo, Liberia, Angola, and South Africa
- Information is available to create...
  1. HIV testing prevalence
  2. HIV prevalence among those untested
  3. prevalence of some co-morbidities (undernutrition, anemia)
  4. HIV risk factor distribution (circumcision, marital status, IPV)

Innovating for IS

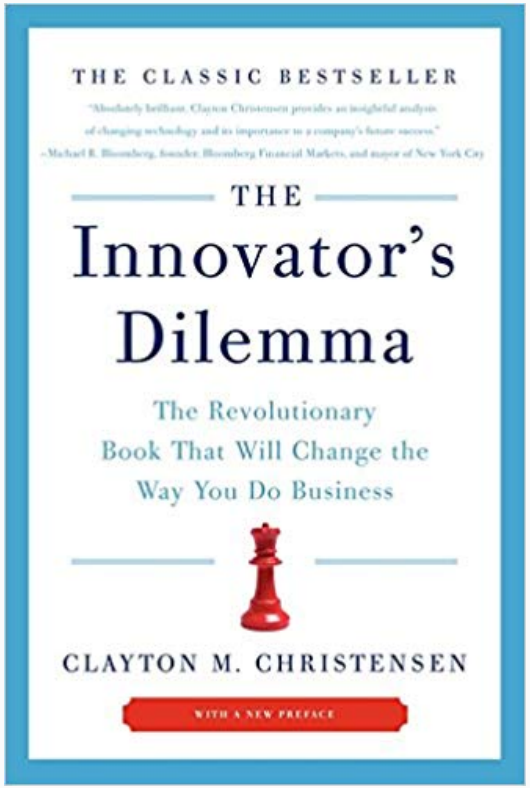
Innovating measurement approaches

- To do more with the finite resources, trial should use LEVIS...



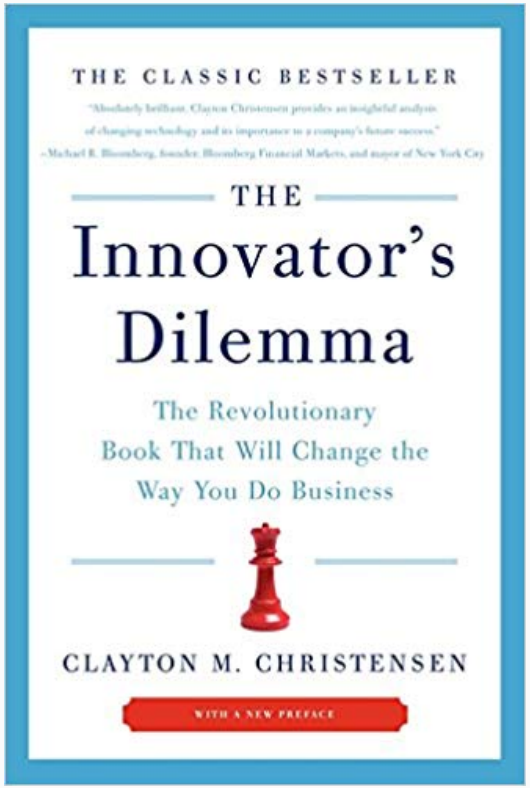
Innovating measurement approaches

- To do more with the finite resources, trial should use LEVIS...
  1. Large



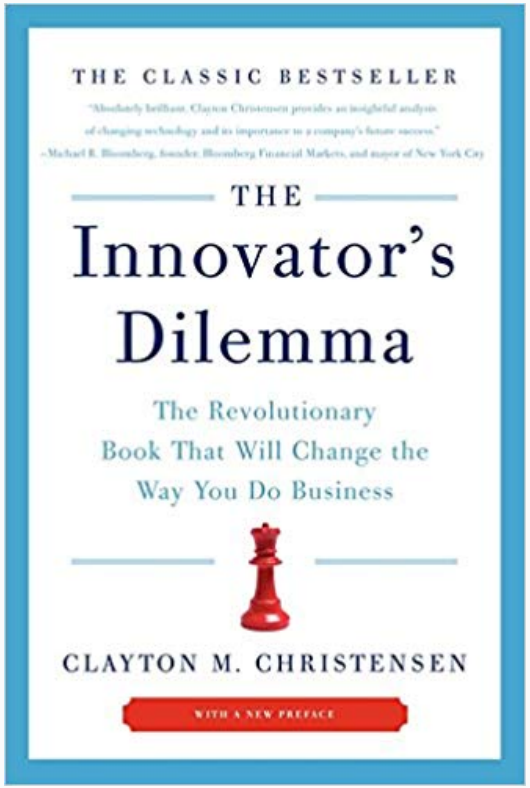
Innovating measurement approaches

- To do more with the finite resources, trial should use LEVIS...
  1. Large
  2. Leveraged



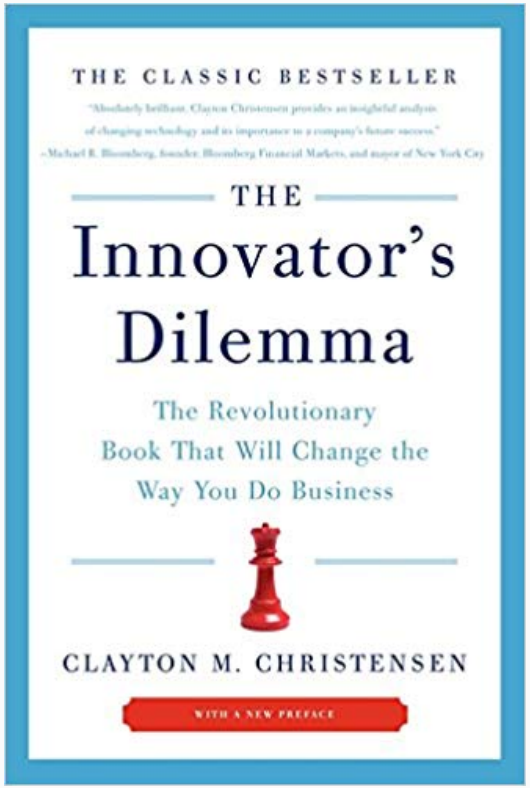
Innovating measurement approaches

- To do more with the finite resources, trial should use LEVIS...
  1. Large
  2. Leveraged
  3. Embedded



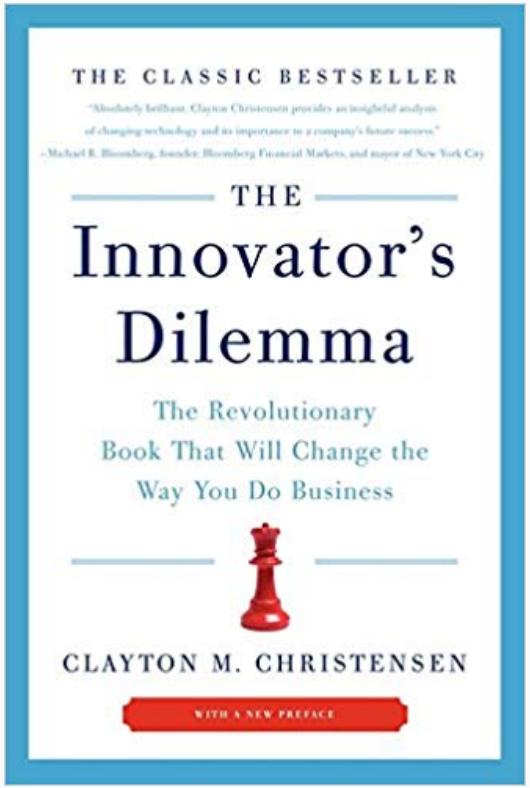
Innovating measurement approaches

- To do more with the finite resources, trial should use LEVIS...
  1. Large
  2. Leveraged
  3. Embedded
  4. Valuable



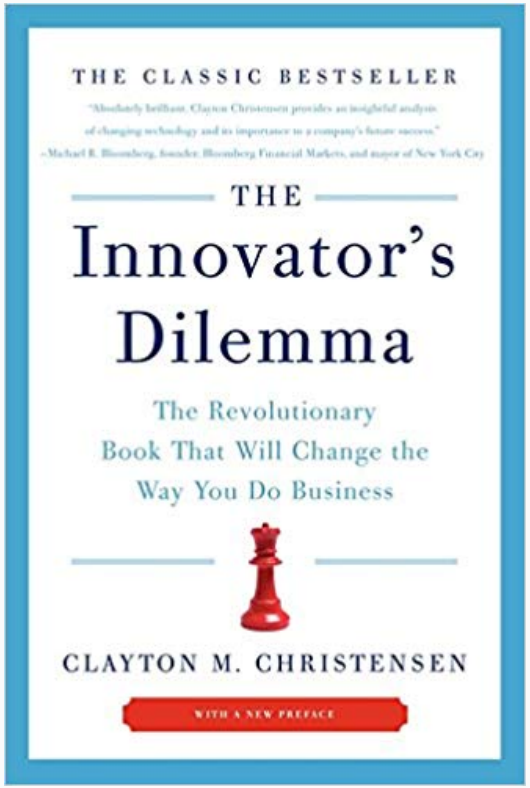
Innovating measurement approaches

- To do more with the finite resources, trial should use LEVIS...
  1. Large
  2. Leveraged
  3. Embedded
  4. Valuable
  5. Innovative



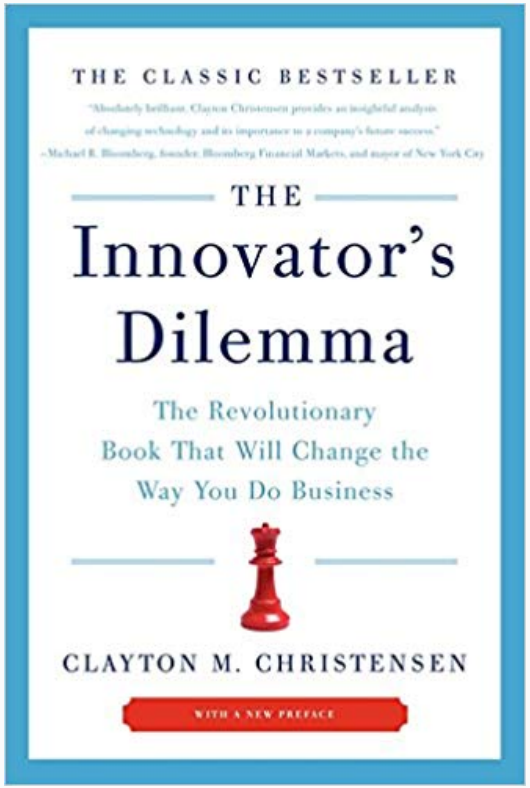
Innovating measurement approaches

- To do more with the finite resources, trial should use LEVIS...
  1. Large
  2. Leveraged
  3. Embedded
  4. Valuable
  5. Innovative
  6. Inexpensive



Innovating measurement approaches

- To do more with the finite resources, trial should use LEVIS...
  1. Large
  2. Leveraged
  3. Embedded
  4. Valuable
  5. Innovative
  6. Inexpensive
  7. Sound



Innovating measurement approaches

NIH National Institutes of Health
Turning Discovery Into Health

Health Information | Grants & Funding | News & Events | Research & Training

Home » News & Events » News Releases

NEWS RELEASES

Tuesday, July 24, 2018

NIH expands program that conducts large-scale clinical trials in real-world settings

Leveraging population trials

- Design large trials with meaningful outcomes

Leveraging population trials

- Design large trials with meaningful outcomes
- Implementation inside existing population samples or registries

Leveraging population trials

- Design large trials with meaningful outcomes
- Implementation inside existing population samples or registries
- Leverage existing data collection efforts

Leveraging population trials

- Design large trials with meaningful outcomes
- Implementation inside existing population samples or registries
- Leverage existing data collection efforts
- Embed data collection of primary outcomes in existing data structures

Leveraging population trials

- Design large trials with meaningful outcomes
- Implementation inside existing population samples or registries
- Leverage existing data collection efforts
- Embed data collection of primary outcomes in existing data structures
- Make any possible parts of the data publicly available

Leveraging population trials

- Design large trials with meaningful outcomes
- Implementation inside existing population samples or registries
- Leverage existing data collection efforts
- Embed data collection of primary outcomes in existing data structures
- Make any possible parts of the data publicly available
- DHS waves cost on average $1-2 million

Thank you for listening

Thank you for listening

Let's work together