The Life Course Visual Toolkit

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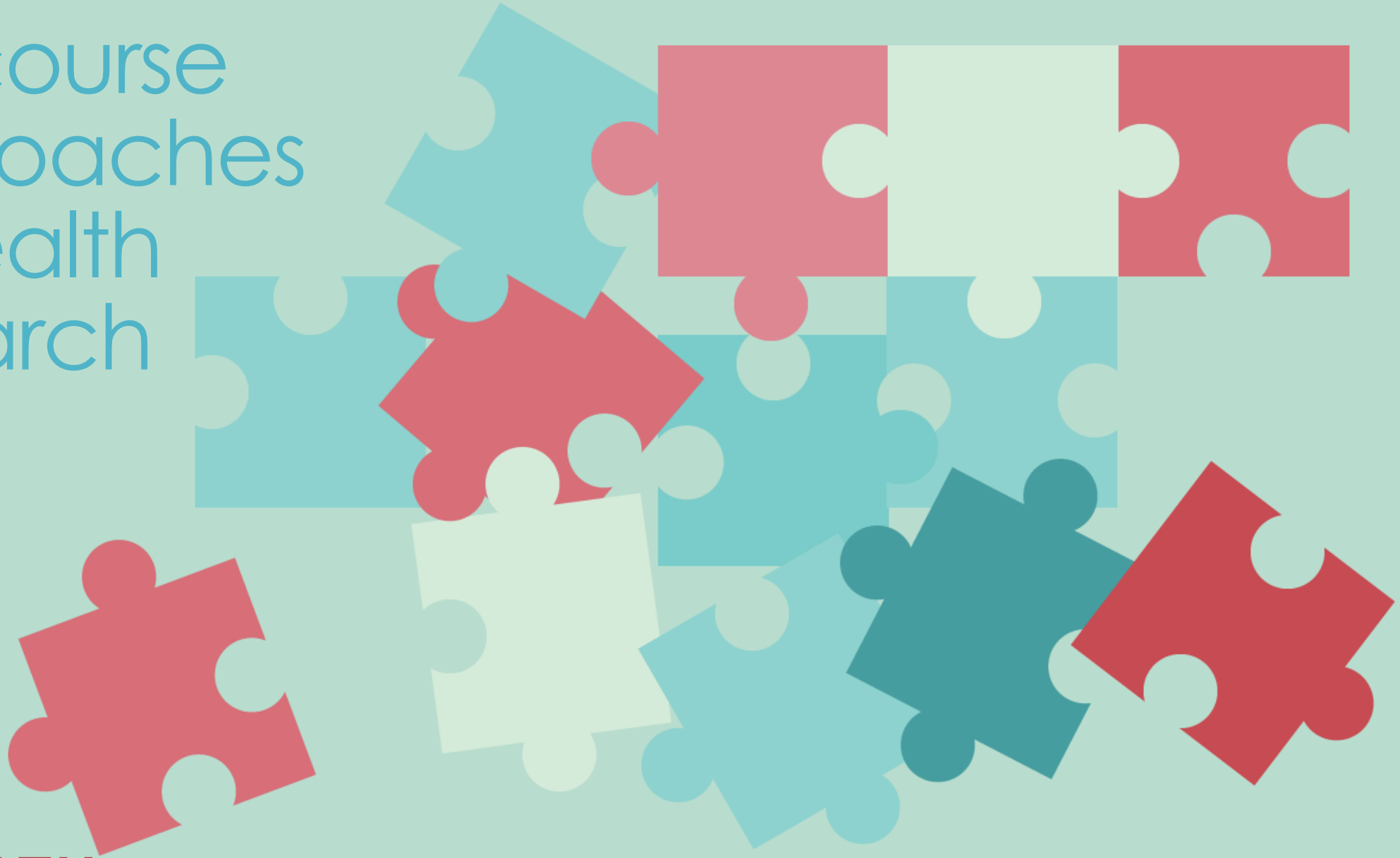
@hahanson11

Life course approaches to health research



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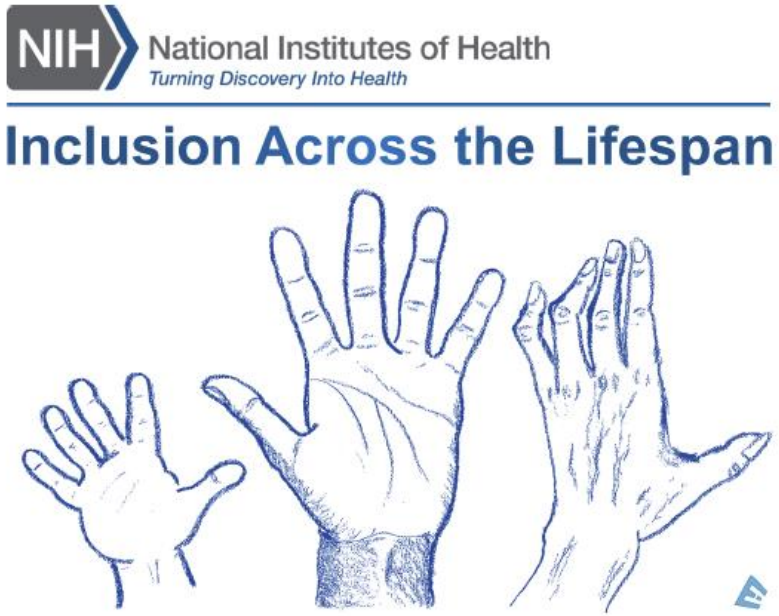
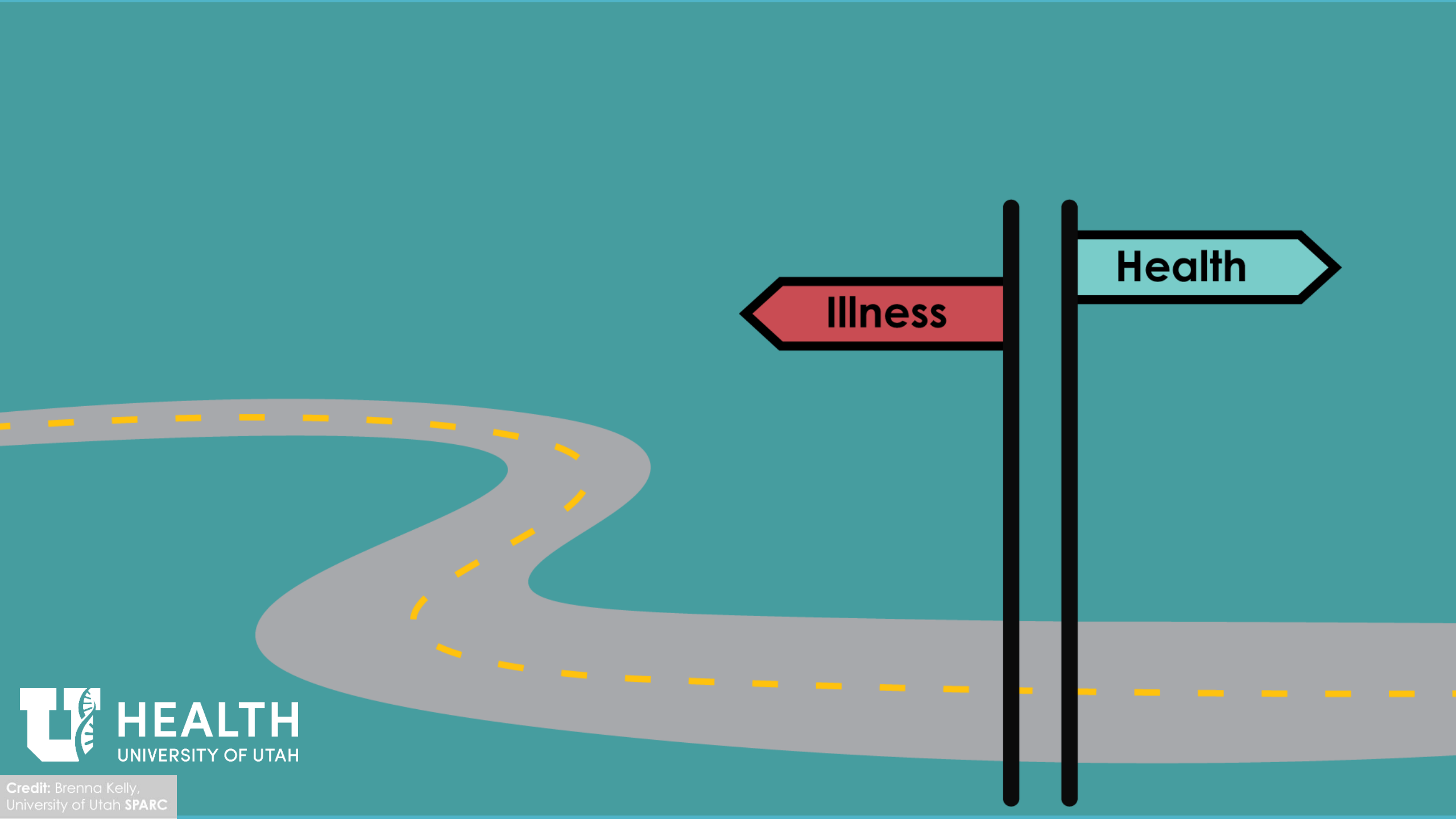


Lifespan vs. Life course

Lifespan: Measure of longevity reflecting underlying biologic aging of an individual

Life Course: Encompasses lifespan and is influenced by the interaction of contextual factors over time that affect health and develop and vary among individuals.



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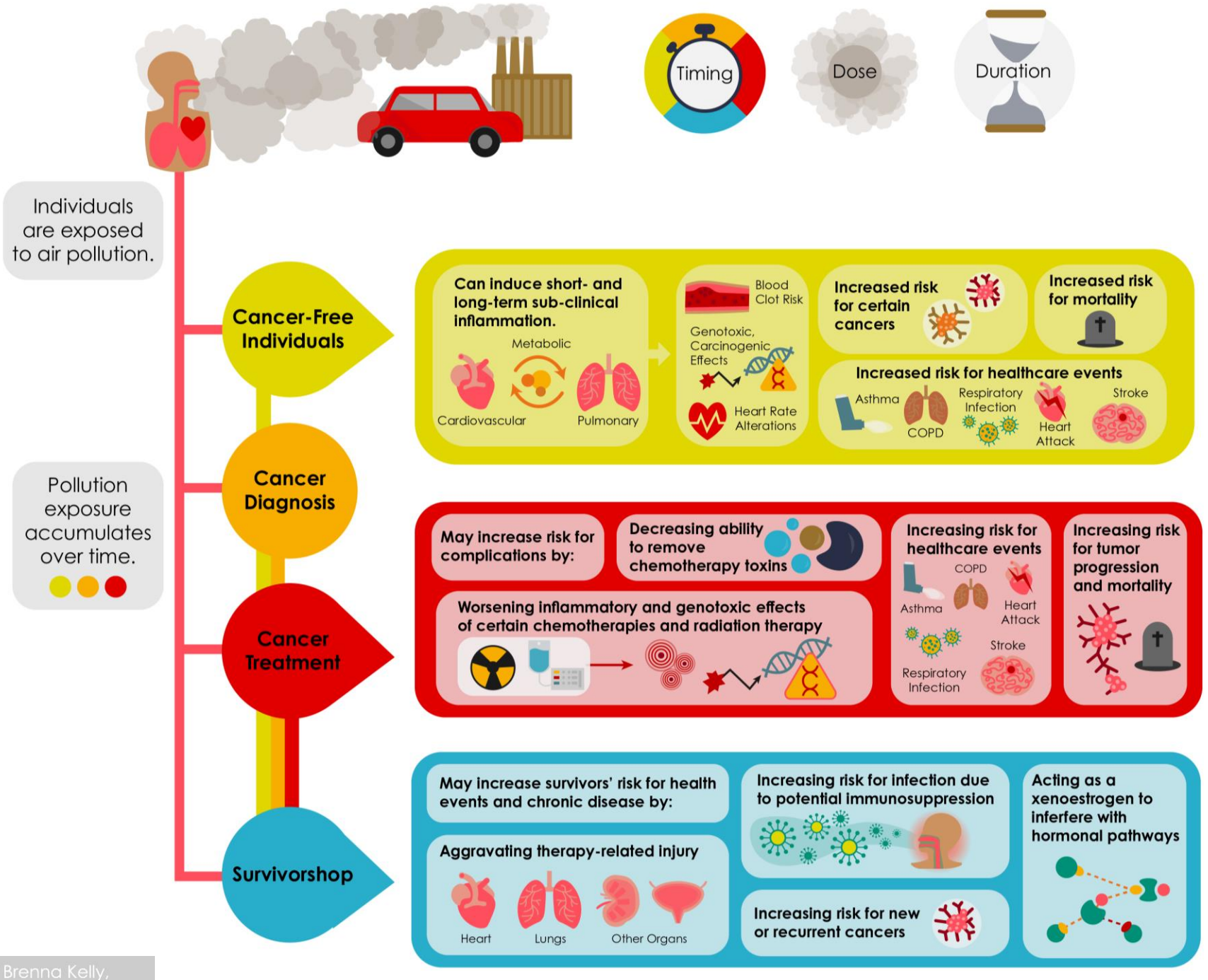
Credit: Brenna Kelly, University of Utah **SPARC**

Air Pollution Exposure Across the Cancer Continuum

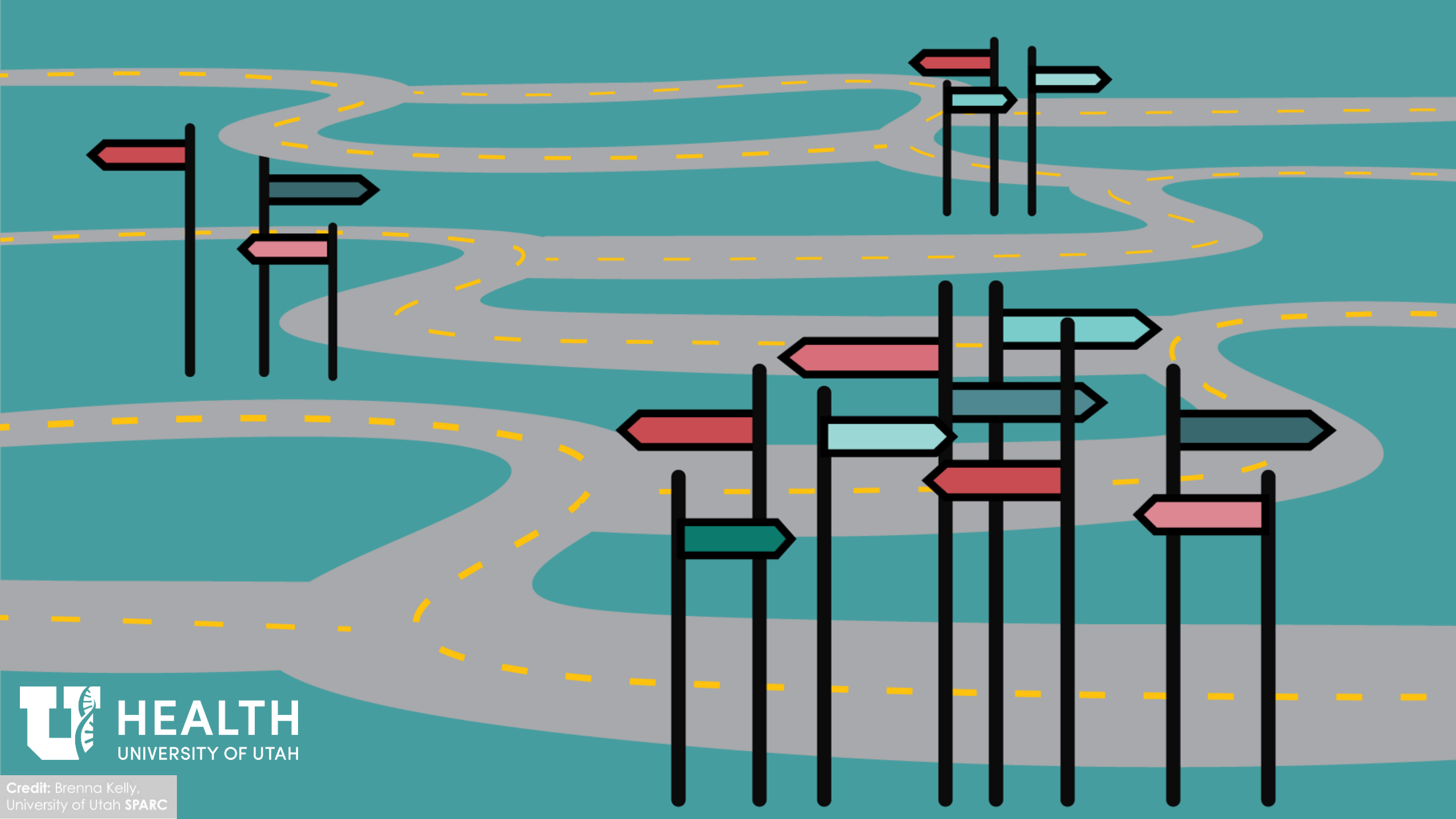


Complexity of time in both exposure and outcomes

Complex diseases

Phenotypic heterogeneity

Credit: Brenna Kelly, University of Utah **SPARC**



Credit: Brenna Kelly, University of Utah **SPARC**

Interdisciplinary blueprint for matching methods to theory: Complexity Science and Life Course Research

Charting the Life Course: An Interdisciplinary Blueprint

5 Pathways Forward

Improving Processes

1. Integrate datasets across the lifespan.
   Use transdisciplinary principles and methods, borrowing from:
   - Engineering
   - Statistics
   - Communication
   - Mathematics
   - Epidemiology
2. Data science cores focus on curation, cleaning, analysis, and modeling of data.
3. New ways to model high-dimensional data.

Improving Application

4. Expand traditional epidemiological methods to include systems and network modeling.

5. Improve reproducibility with standardized measures.

Credit: Brenna Kelly, University of Utah SPARC

Hanson, H., Leiser, C., Bandoli, G., Pollock, B., Karagas, M., Armstrong, D., . . . Barkin, S. (2020). Charting the life course: Emerging opportunities to advance scientific approaches using life course research. *Journal of Clinical and Translational Science,* 1-8. doi:10.1017/cts.2020.492

Life Course Visual Toolkit YouTube Channel

Increase knowledge about life course research methods and innovative approaches

- Widely available that is accessible to researchers across multiple disciplines.
- Synchronous and asynchronous learning opportunities.

An introduction to life course research and complexity

A how to guide for studying the exposome in complex disease with large datasets.

New methods for identifying complex patterns of disease in families and linking them to their etiological roots

Journey into Complexity Science: Promise of the Exposome

Opportunities and Challenges in Growing, Maintaining, and expanding a Longitudinal Life Course Cohort

Policy Perspective in Life Course Research

All of Us Research Program

Mining massive observational data

Integration and Harmonization of Diverse Data Resources

Lifespan Enterprise Committee

Webinar 4

CTSA Visual Toolkit: Developing and Validating Ways to Model High-Dimensional Data

Special Focus: Addressing Social Determinants of Health

Sept. 17, 2020 @ 11:00 EST

Zoom Meeting ID: 993-2789-3900

Call-in numbers: +1 646 876 9923, +1 669 900 6833

Sandro Galea, MD, MPH, DrPH
Dean, Professor
Boston University School of Public Health

Milena Gianfrancesco, PhD, MPH
Assistant Professor
UCSF School of Medicine

Understanding Health across the Life Course

Integrating Genetic and EHR Data and Potential Biases

Lifespan Enterprise Committee

Webinar 5

Building the Life Course Toolkit: From Microsimulations to Complexity Science-Informed Interventions

Oct 15, 2020 @ 11:00 EST

Zoom Meeting ID: 993-2789-3900
Call-in numbers: +1 646 876 9923, +1 669 900 6833

Roch A. Nianogo, MD, MPH PhD
Assistant Professor, Epidemiology
UCLA School of Public Health

Laurence Moore, PhD
Director, MRC/CSO Social & Public Health Sciences Unit
University of Glasgow

Causal Modeling and Microsimulations for Population Level Interventions

Moving Towards a Complex Systems Approach to Health Intervention Research

Lifespan Enterprise Committee

Final Webinar

Nov. 19, 2020 @ 11 EST

Applying analytical methods that can capture the multiple dimensions of time

Understanding how health develops over time is central to life course research. Analytical methods that capture the evolution of health over a long period of time can be used to describe heterogeneous patterns of health development and help to inform intervention and outcomes research.

Incorporating time (**timing, dose, and duration**) into our models is an important step in understanding the complex factors that shape health across the life course.

Gretchen Bandoli, PhD
UC San Diego

Kristin Palmsten, ScD
HealthPartners Institute

Click to Register
https://tinyurl.com/LCWebinar6

Special Thanks:

Lifespan Enterprise Committee

Executive Team:
Shari Barkin
Heidi Hanson
Frederick Kaskel

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