Waste-Based Model of Population Health, Part 1
Supplementary Materials

1. Bradley, Elizabeth H.; Elkins, Benjamin R.; Hurrin, Jeph; and Elbel, Brian. Health and social services expenditures: Associations with health outcomes. *BMJ Qual Saf* 2011; 20(10):826-31 (Oct).

   Article documenting that, while the amount of money spent per capita in the United States on social services in general compares favorably with other modern first world democracies, there is a profound difference in how those monies are spent. While all other countries spend direct about one-third of all spending to health care delivery services, the United States consumes about two-thirds of all social services spending on health care delivery.

   Link: https://qualitysafety.bmj.com/content/20/10/826

2. Anderson, Gerard F.; Hussey, Peter; and Petrosyan, Varduhi. It's still the prices, stupid: Why the U.S. spends so much on health care, and a tribute to Uwe Reinhardt. *Health Aff* 2019; 38(1):87-95 (Jan).

   This article summarizes the original article that these 3 authors, along with Dr. Uwe Reinhardt, published in Health Affairs in 2003. The title says it all: It is possible to explain health care per capita spending differences between the United States and other modern first-world democracies, purely in terms of unit prices.

   Link: https://www.healthaffairs.org/doi/10.1377/hlthaff.2018.05144

3. Papanicolas, Irene; Woskie, Liana R.; and Jha, Ashish K. Health care spending in the United States and other high-income countries. *JAMA* 2018; 319(10):1024-39 (Mar 13).

   In 2018, Dr. Ashish Jha et al. published a careful study building on the findings first shared in the Anderson, Hussey, Petrosyan, and Reinhardt article. It validates then extends the original findings. Spending differences among modern democracies really does come down to unit prices. There are dramatic differences in the amounts that different countries spend for the same units of care, such as a dose of a drug, a specific laboratory test, or a block of clinician time.

   Link: https://jamanetwork.com/journals/jama/fullarticle/2674671

4. Wallace, C. Jane; and Savitz, Lucy. Estimating waste in frontline health care worker activities. *J Eval Clin Pract* 2008; 14(1):178-80 (Feb).

   In 2007 Wallace and Savitz adapted TPS (Toyota Production System) lean observation tools to a hospital setting. Then then identified a broad list of roles that make up clinical care delivery within a hospital, and directly observed samples of such workers in each role as they performed their work. A trained observation (who was also a very experienced, senior ICU nurse) recorded each task they undertook, then classified it as "value adding" or waste, according to the categories outlined in the TPS lean observation system.

   Waste levels ranged from 20 percent of all work to 70 percent of all work, depending on role. Wallace and Savitz estimated that, overall, about 35 percent of all clinical work time was non-value adding waste.

   Link: https://onlinelibrary.wiley.com/doi/10.1111/j.1365-2753.2007.00828.x

5. RN Observation Video (8-16-11 – Paul O'Neill)

   Paul O'Neill was CEO Emeritus at Alcoa Aluminum, then the U.S. Secretary of the Treasury in the George W. Bush Administration. He led Alcoa Aluminum to outstanding success using Lean quality principles, including formal methods to find and eliminate quality-associated waste. He also led groups in Pittsburgh (the location of Alcoa Aluminum's headquarters, at the time) seeking to improve quality and efficiency in health care (the Pittsburgh Working Together Consortium).

   In conjunction with that work, O'Neill obtained a video of 15 typical minutes in the life of a nurse working a shift in the medical ICU, in a major academic medical center located in the southeastern United States.

   Watch the video with your "waste" glasses on. For each thing that consumes the nurses time, judge whether it directly added value to her patient's care, or was waste (e.g., recovering from systems failures, tracking down information that should have been readily available, correcting potentially life-threatening mistakes in support systems, and the like).

   The makes the findings in Wallace's and Savitz's paper intuitive and real. If anything, Wallace and Savitz were conservative – at least, in this ICU setting. As any experienced clinician will share, though, the content of the video is typical for most health care delivery settings.

   Link: Included with source materials