Predicting Population Health Risks with AMI Data

September 15, 2021

The Southeast Energy Efficiency Alliance (SEEA) promotes energy efficiency as a catalyst for economic growth, workforce development and energy security across 11 southeastern states including Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and Virginia.

Areas of Work

Energy Efficiency Policy

Built Environment

Energy Efficient Transportation

Regional Investments

Why Energy Efficiency Matters Now

OUR ROLE

SEEA works to move the energy sector forward so that all people in the Southeast can live and work in healthy and resilient buildings, utilize clean and affordable transportation, and thrive in a robust and equitable economy.

Energy-Efficient Policy

Supports decision-makers at the state, local, and utility levels by identifying energy-efficient solutions to fit stakeholder needs

Built Environment

Empowers partners to strengthen energy and building codes to increase access to healthy and resilient housing

Energy-Efficient Transportation

Advances policies and programs that expand efficient transportation options, drive innovation, and improve air quality

Diversity & Equity

Pursues equitable energy solutions and works to leverage the collective knowledge and strength of the Southeast

SEEA
SOUTHEAST ENERGY EFFICIENCY ALLIANCE

Our Values

Take Initiative
We take responsibility for realizing a better quality of life in the Southeast.

Earn Trust
We pursue our work with benevolence, competence, and reliability.

Value Others
We seek, respect, and promote diverse perspectives.

Pursue Equitable Solutions
We recognize, acknowledge, and account for a history of prejudice and inequality in Southeastern communities and the role it plays in the issues we address.

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Jeff Keller, Ph.D

Phase Health

Jeff Keller is the CEO and Founder of Phase Health, a company dedicated to leveraging non-clinical data sources to pinpoint individuals at risk of poor health outcomes and enabling intervention. Jeff founded Phase Health when he was previously the Chief Innovation and Strategy Officer of the University of Virginia Health System. Jeff's career has spanned finance, technology, and healthcare. He has started two companies previously in the healthcare space, and spent several years at General Electric, where he helped to establish corporate venture capital funds in both the energy and healthcare sectors. Jeff holds an MBA from the Johnson Graduate School of Management at Cornell University, a doctorate in Cell Biology from Vanderbilt University, and a BA in Biology from the University of Virginia. Jeff lives in Charlottesville, Virginia with his wife and two sons and enjoys spending time outdoors with his family as well as cooking and drystack stonemasonry.

The Challenge: U.S. Healthcare Industry Snapshot

- **The U.S. healthcare industry:**
  - ~$3.5 Trillion or $10,700 per person/year
  - ~18% of GDP
  - Growing at 4-5% annually
- **Driven by broad, secular trends:**
  - Ageing of U.S. population: 10,000 new Medicare-eligible lives every day
  - 1965: 4.6 workers for every Medicare beneficiary; 2030: 2.3 workers for every Medicare beneficiary
  - Unmitigated growth in cost of care and prescription drugs

"When American business talks about taxes strangling our competitiveness, they're talking about something that, as a percent of GDP, has gone down from 4% to 2% of GDP, while medical costs, which are borne to a great extent by business, have gone from 5% to 17% … So medical costs are the tapeworm of American economic competitiveness." -- Warren Buffett

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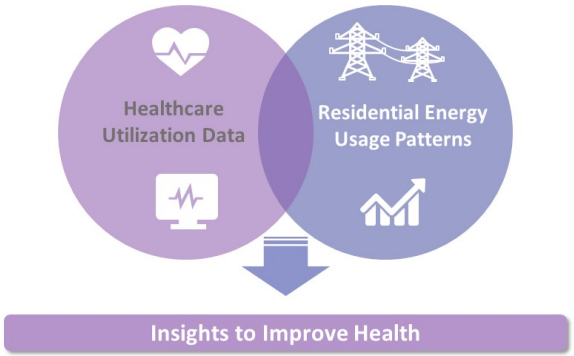
Overview: Phase Health

- **Problem Statement:** The US Healthcare industry is unsustainable in its current form and is undergoing structural changes as a result:
  - Shifting Models: from reactive "sick care" to proactive maintenance of health and promotion of wellness; the healthcare system needs to move "upstream" to target interventions to the highest risk patients to controls costs and improve outcomes
  - Expanded Use of Data: to understand the health risks of individuals and populations
- **What We Know:** There is a strong link between utility insecurity, energy poverty, and adverse (and expensive) healthcare outcomes
- **Thesis 1:** AMI data is a determining feature of healthcare outcomes, and can be leveraged to improve health and control costs
- **Thesis 2:** Utilities can play a significant role in reducing healthcare spending by utilizing AMI data to help providers identify the highest risk patients and target interventions



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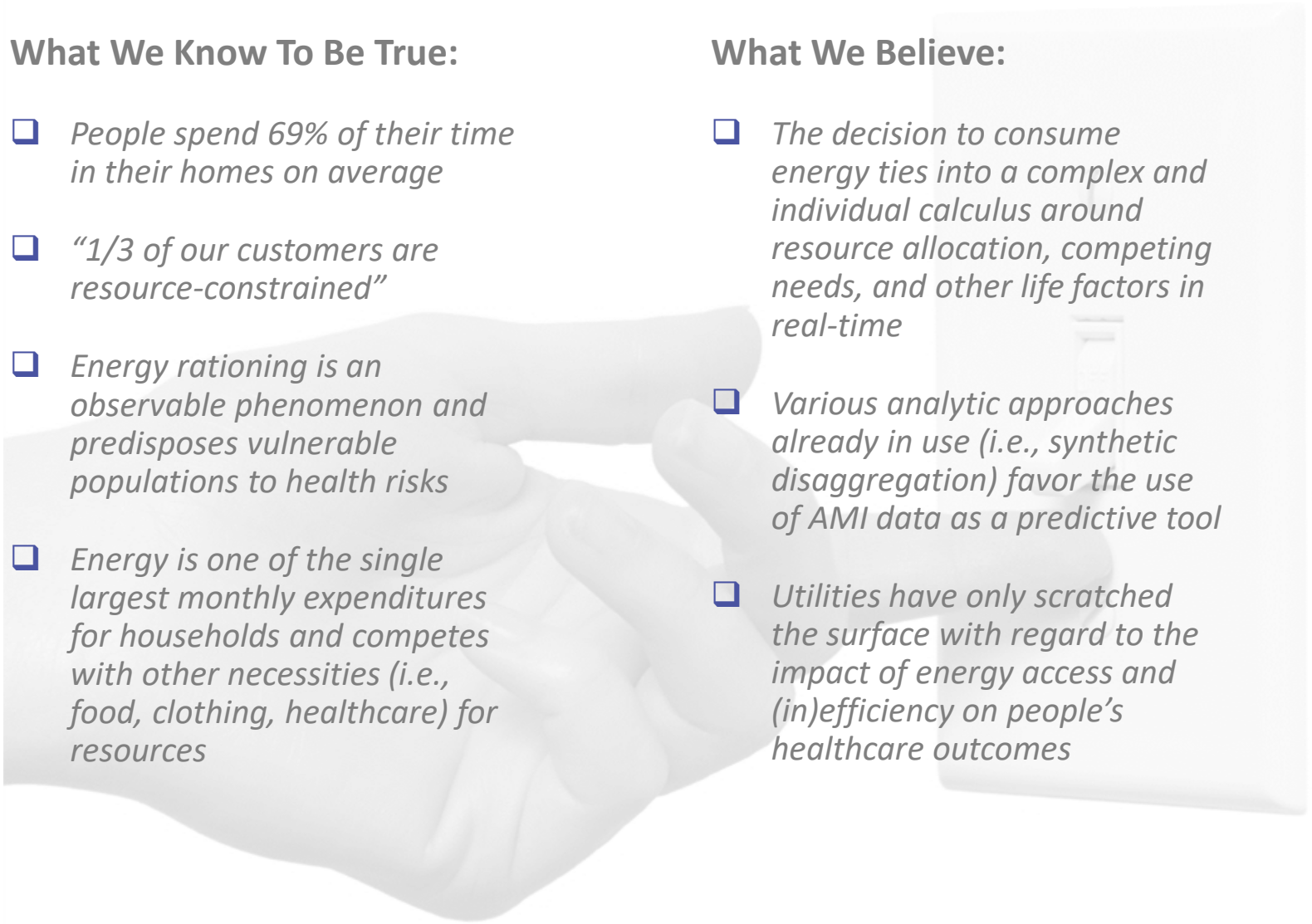
The Opportunity: Residential Energy Usage and Health



What We Know To Be True:

- *People spend 69% of their time in their homes on average*
- *"1/3 of our customers are resource-constrained"*
- *Energy rationing is an observable phenomenon and predisposes vulnerable populations to health risks*
- *Energy is one of the single largest monthly expenditures for households and competes with other necessities (i.e., food, clothing, healthcare) for resources*

What We Believe:

- *The decision to consume energy ties into a complex and individual calculus around resource allocation, competing needs, and other life factors in real-time*
- *Various analytic approaches already in use (i.e., synthetic disaggregation) favor the use of AMI data as a predictive tool*
- *Utilities have only scratched the surface with regard to the impact of energy access and (in)efficiency on people's healthcare outcomes*

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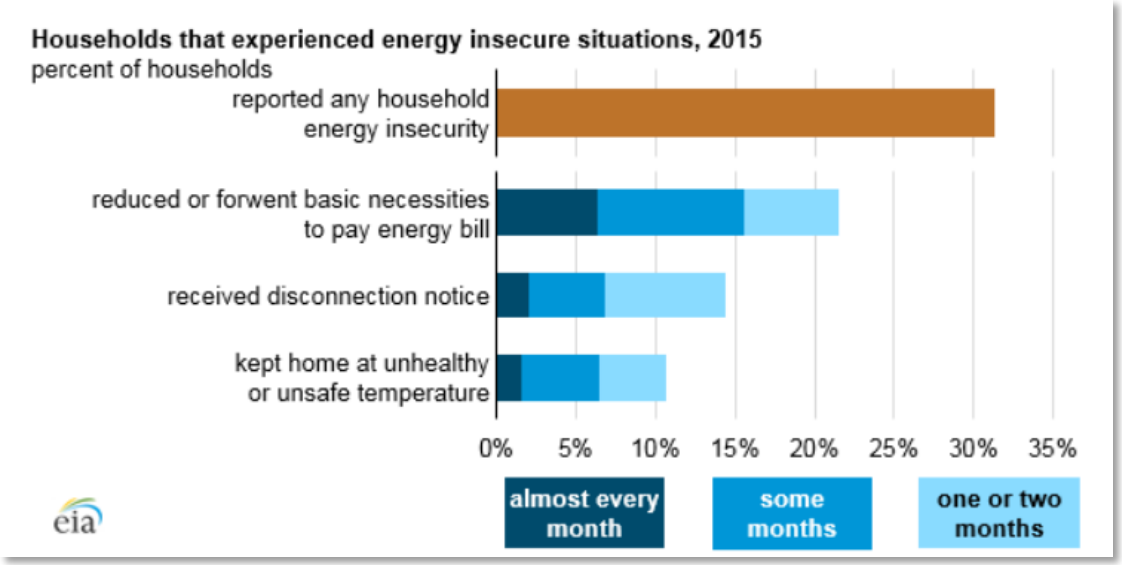
Energy and Healthcare Are Linked

- "Energy poverty" describes a condition faced by many Americans in which the personal cost of consumption needed to maintain a healthy lifestyle creates a significant or unnecessary economic burden



Source: U.S. Energy Information Administration, *Residential Energy Consumption Survey 2015*

- Aberrant energy usage patterns, understood through AMI data, may identify those individuals at greatest risk of adverse health outcomes and therefore most in need of support and intervention

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Tradeoffs: Healthcare vs. Utilities

"I've not paid my water bill yet. I just keep thinking, please don't come turn it off right now. That sort of thing. And then I've got a payment arrangement with the electric, because I got a disconnect notice." – Amanda Sturgill

"So you've been putting off your electric and water…" – Interviewer

The New York Times

The Daily

"Yeah."– Amanda Sturgill

"…to pay the health bills?" – Interviewer

"Yeah, yeah. Because I don't want to be taken to jail, if that's what they would do or whatever." – Amanda Sturgill

Source: "The Daily" news podcast, December 2, 2019

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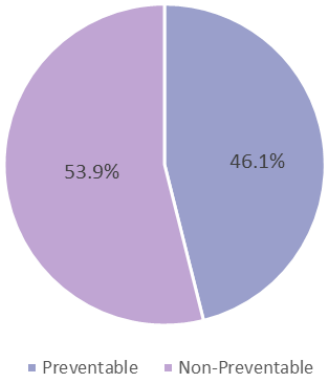
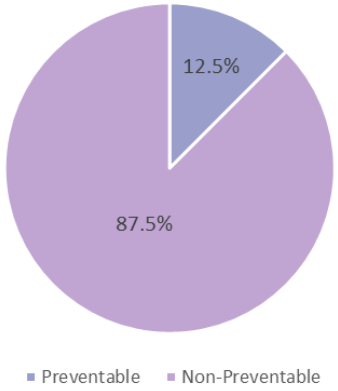
The Solution: Providing More Proactive Care

- **The healthcare system must begin to intervene "upstream" of dangerous and expensive encounters with the healthcare system**
- **Mismanagement of "Ambulatory-Sensitive" conditions drive avoidable costs**
  - Chronic diseases (Type 2 diabetes, COPD, Congestive Heart Failure, Asthma, Behavioral Health, Musculoskeletal/Chronic Pain, etc.) are optimally managed in the outpatient setting but too often hit highest-cost care access points

Emergency Room Encounters:



Inpatient Admissions:



Shift the healthcare model from treating illness to preserving wellness by understanding and engaging our populations before they become acutely ill

To do this, we must access the best data available that describes risk within our populations

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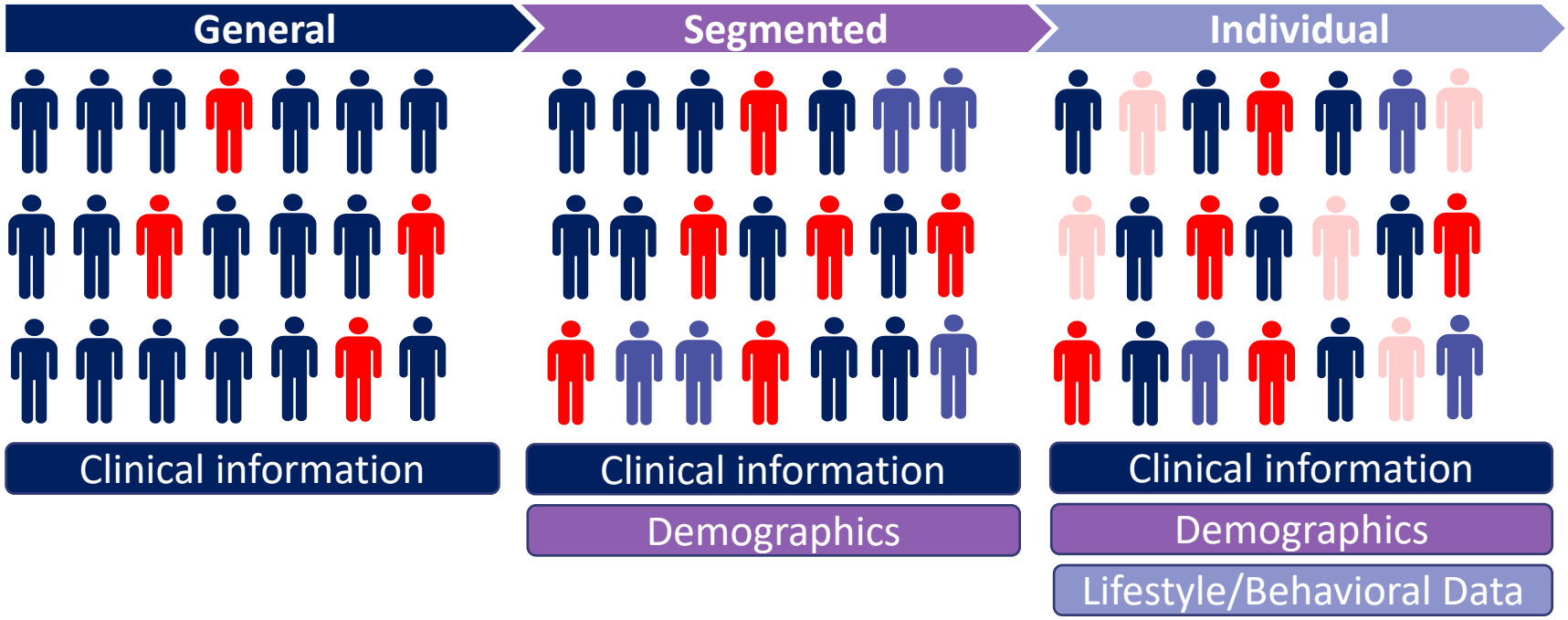
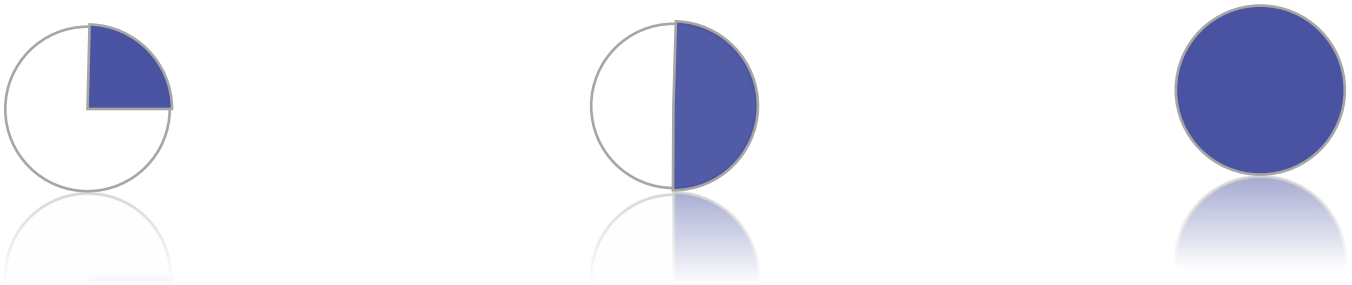
(1) Joynt et al. JAMA, June 2013 Vol. 309 No. 24.

Better Risk Models Enable Better Management

- Clinical resources that drive prevention are minuscule relative to the populations they serve and must be targeted accurately
- Non-clinical data sets fill out the picture



Health Risk of the Covered Population: Actual vs. Understood



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Residential Energy Usage as an Additive Data Set

Data Features	Demographics	Consumer Behavior	Clinical	SDH	Residential Energy Usage
Correlated with Outcomes					TBD
Objective					
Granular (Individual Level)					
Available at Scale					
Quantitative					
Longitudinal & Real Time					
Standardized (pop. to pop.; mkt to mkt)					
Actionable	TBD	TBD	TBD	TBD	TBD

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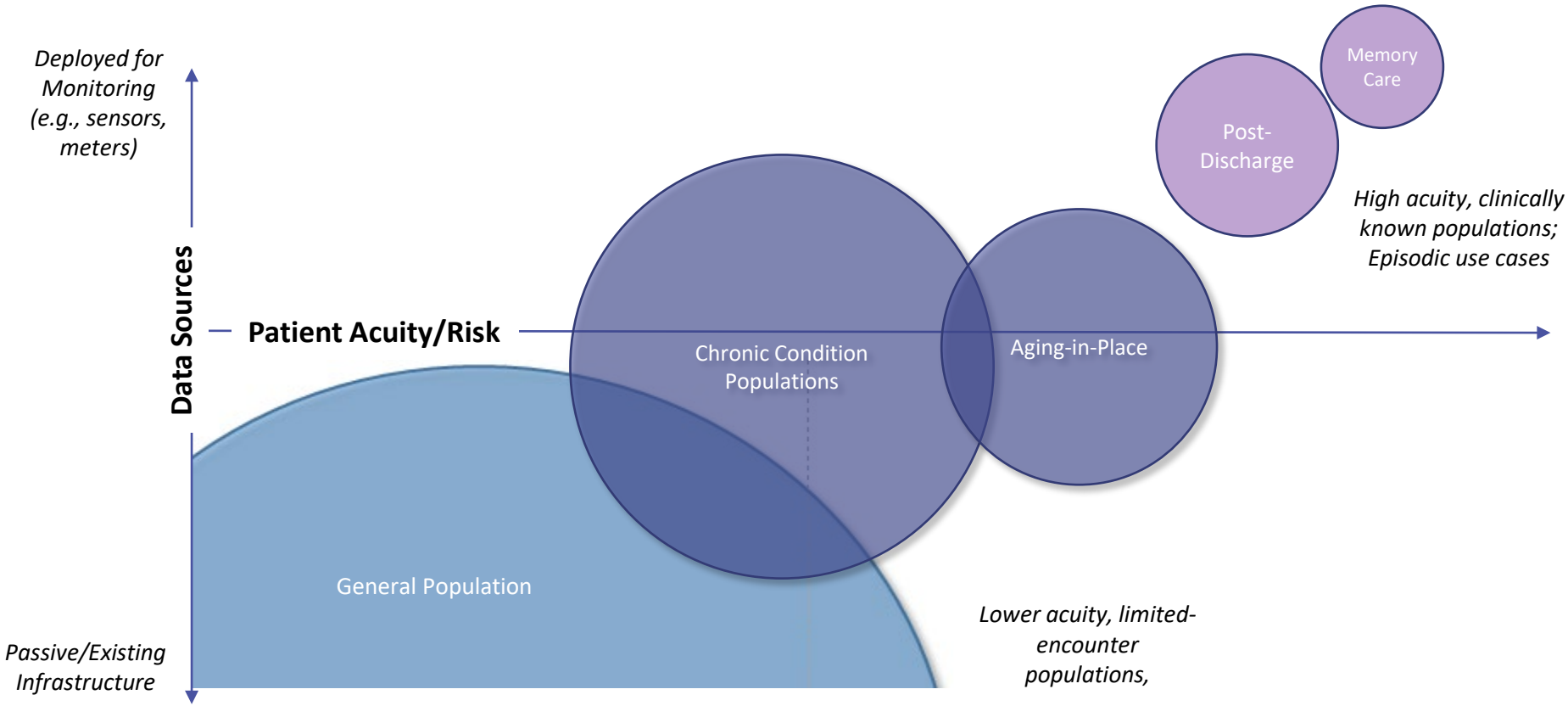
Collecting Data in the Home

- *When collecting and using ex-clinical data, need to find the right balance:*
  - *Data volume – what does it mean? How do we interpret?*
  - *Cost to acquire – what's it worth and who pays?*
  - *Target patient population/use case – who receives it and what's involved?*
  - *Actionability – what is the corresponding intervention and who delivers?*



COVID19 Is a Catalyst

- The links between health outcomes and energy will become abundantly clear
  - Utility shutoff moratoria ended/-ing; deferred payment programs in process
- COVID19 offers alignment to stakeholders and resources to address most acute cases
  - CARES Act funding
  - State and government healthcare payers facing costs of resulting healthcare utilization

"West Atlanta resident Harriet Feggins has a 13-year-old daughter who relies on a machine to help with her asthma. Feggins has been out of work since March because of the pandemic. She has managed to pay her electric bill by dipping into her 401(k) and scraping together odd jobs — watching the kids of essential workers and cleaning homes. She has shut off the power in parts of her home and has hung blackout curtains to try to keep the house cool and her electric bill low."

npr

Source: https://www.npr.org/2020/07/28/892995058/tidal-wave-of-power-shut-offs-looms-as-nation-grapples-with-heat

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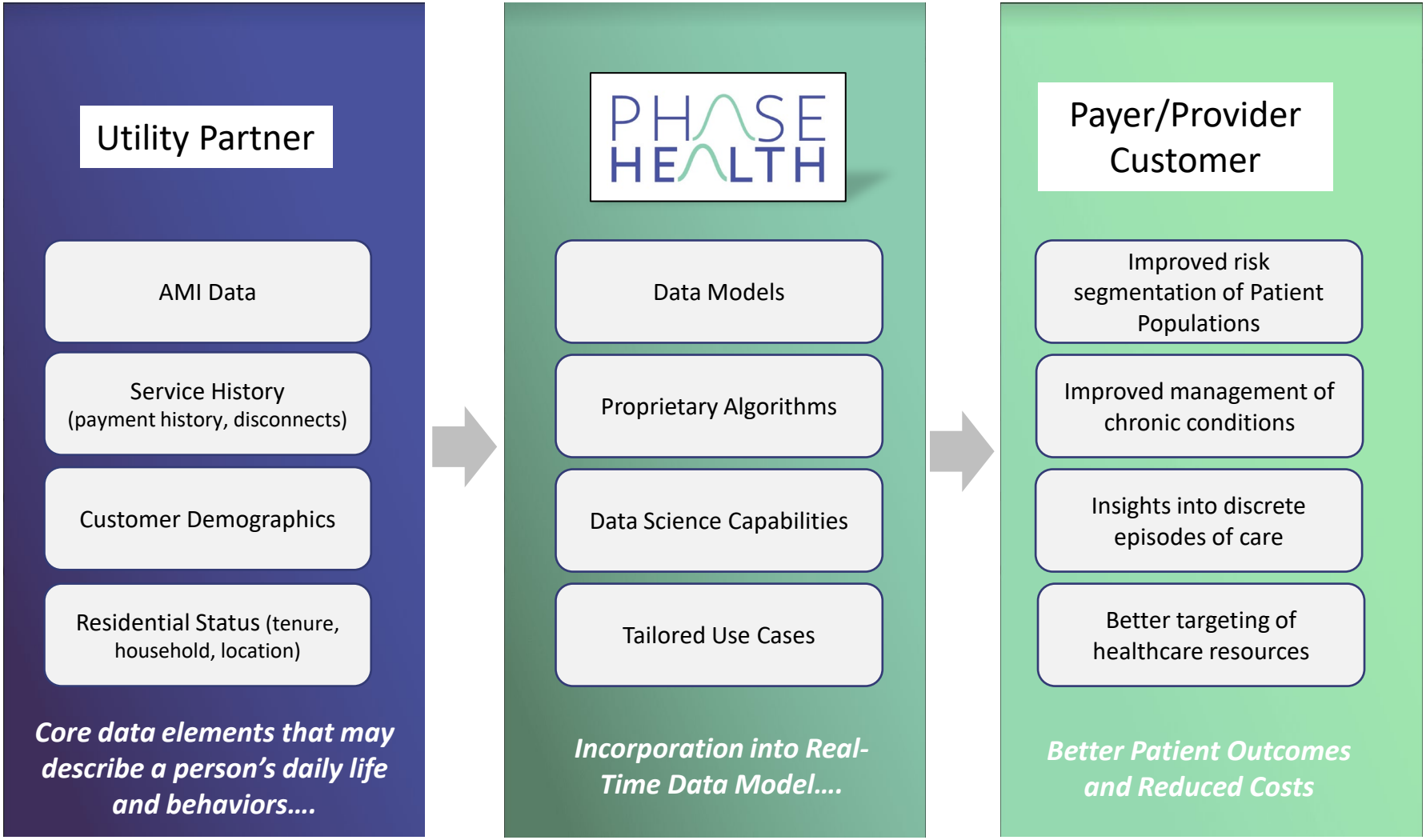
Value Creation Using AMI Data



Utility Partner Economics

- Direct Economic Benefits:
  - 2.5MM residential accounts translates to ~$25MM recurring annual revenue stream utilizing existing assets (assumptions regarding efficacy, penetration, pricing power, margins)
  - No capital investment required; no operating expenses (extremely accretive earnings stream)
  - "Risk-based" pricing models to Healthcare Payers allow Phase Health and Utility Partners to capture greater share of total value created

- Indirect Benefits:
  - Early identification of customers at risk for non-payment or service disconnect:
    - Utility Partner may gain insights into those customers with disproportionate healthcare risk/claims that place them at greater likelihood of non-payment
    - Better targeting of existing customer assistance programs and resources
  - Improved collections
  - Community relations

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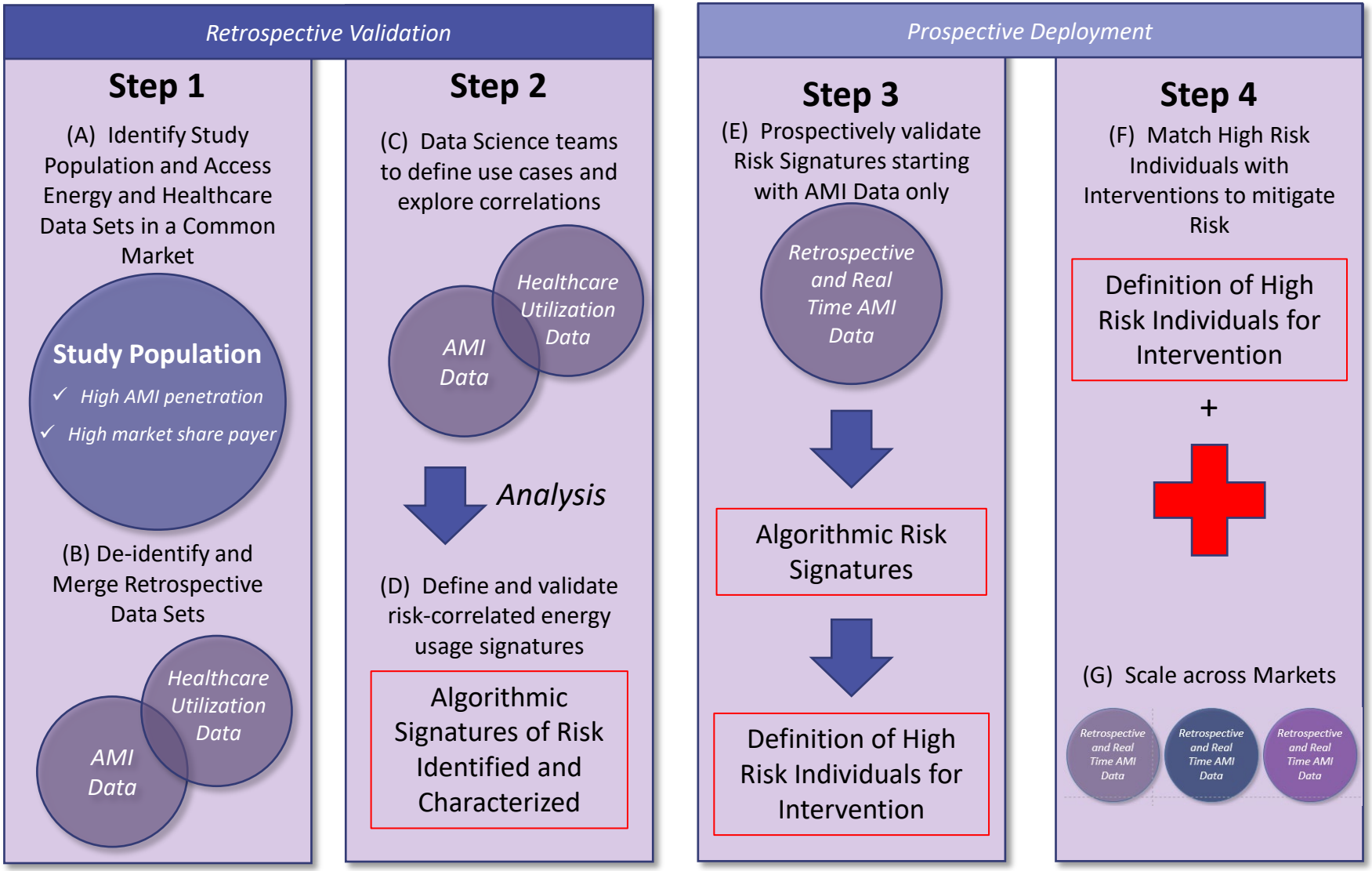
Phase Health: Status and Next Steps



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