Computational Healthcare and Precision Medicine

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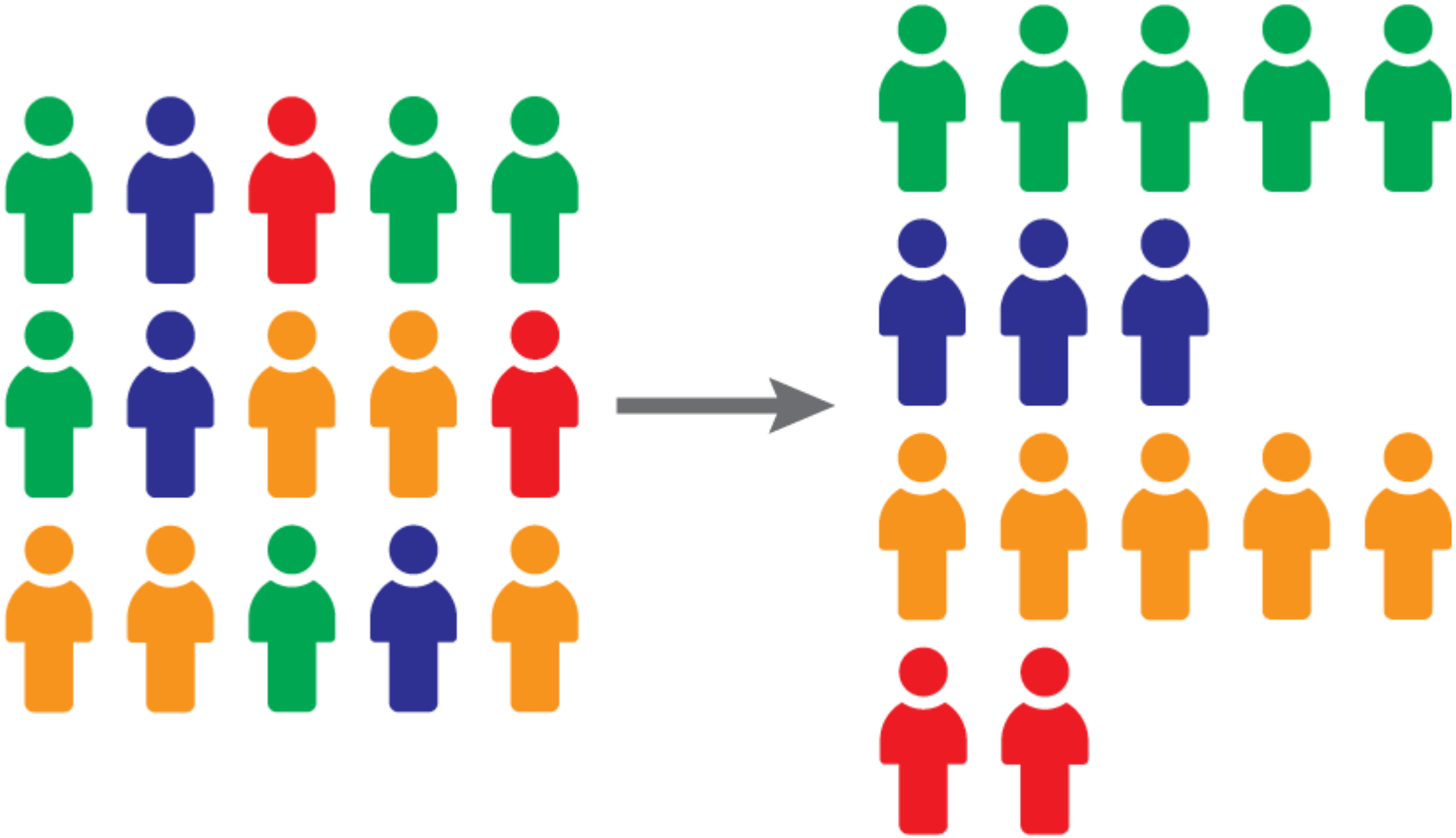
Yale SCHOOL OF MEDICINE

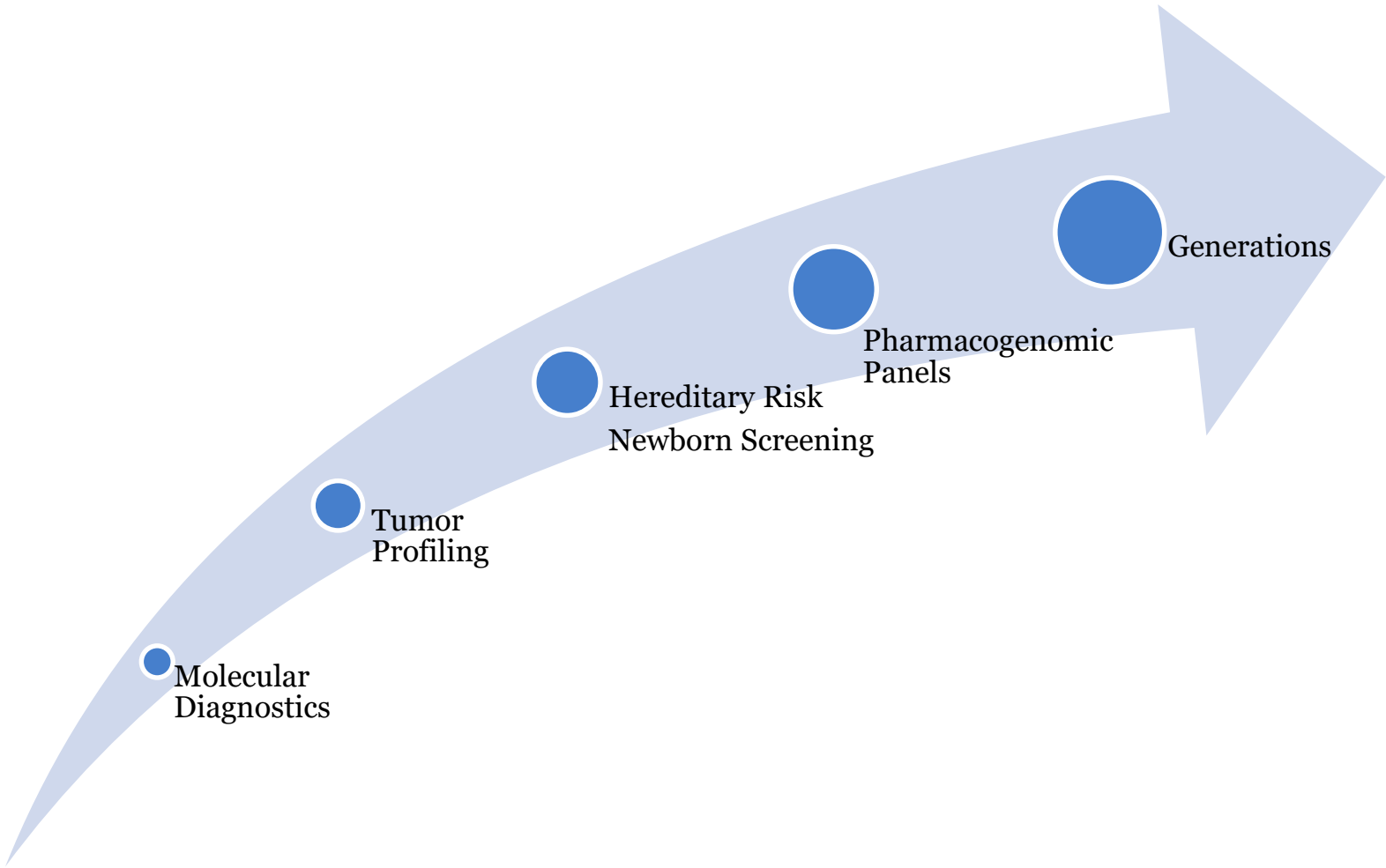
YaleNewHavenHealth

Center for Computational Health

Goal: Precision Diagnostics and Therapy



Precision Medicine at Yale/YNHH



An Example: Pharmacogenomic Screening

After Fatal Toxicity, Questions Over DPD Testing Before Chemo

Pam Harrison
March 13, 2019

Some cancer patients react very badly to commonly used chemotherapies — but there is a test that can identify those patients.

So why isn't this test being used?

This is the question currently being asked in a courtroom, where the families of four patients who died are now suing the health authorities because testing was not carried out before treatment was initiated. The argument is that such testing could have potentially prevented these deaths.

This scenario comes from France and concerns testing for deficiency of the dihydropyrimidine dehydrogenase (DPD) enzyme or for certain polymorphisms of the *DPYD* gene that encodes for that enzyme.

Barriers to Implementation

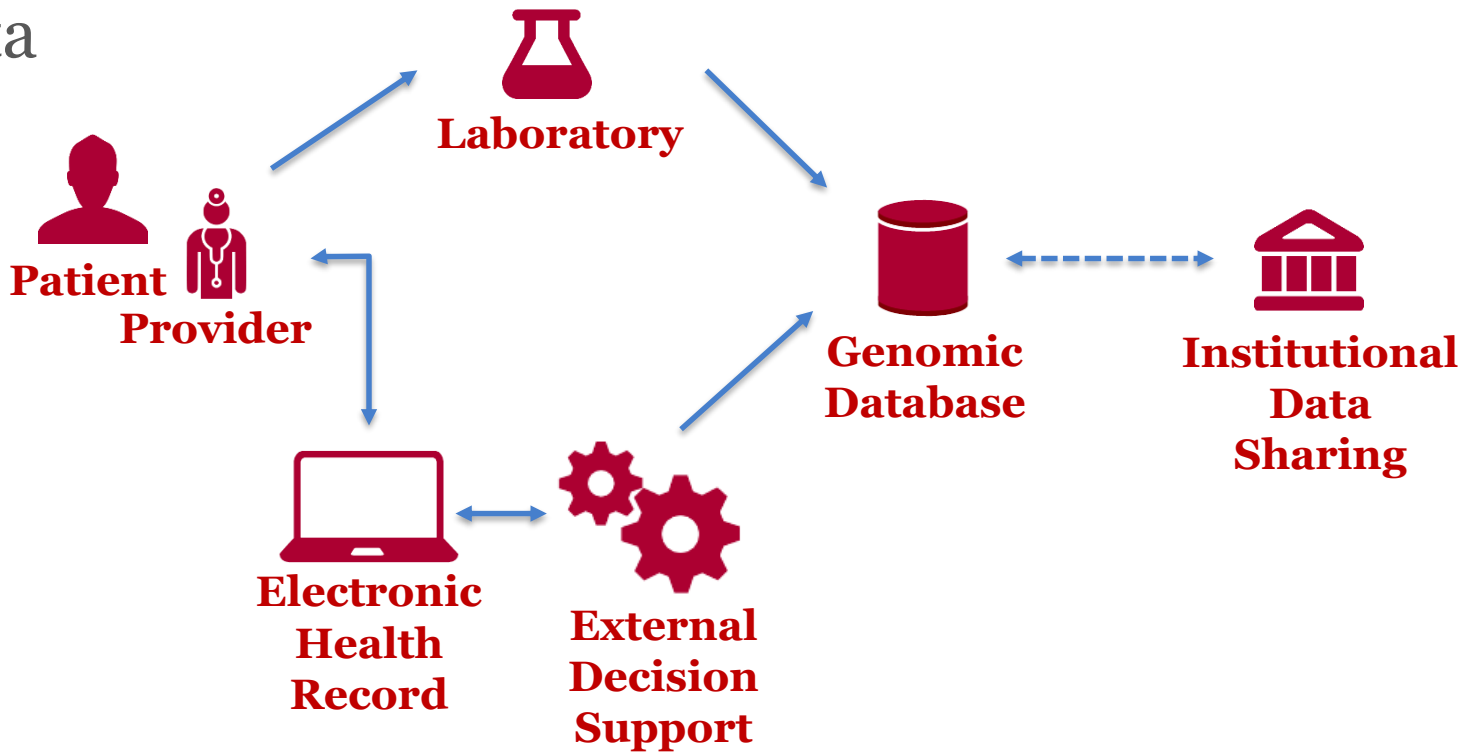
- Access to data to develop clinical evidence and guidelines
- Coverage to support routine or targeted clinical testing
- Ability to share results to increase cost-efficacy of testing
- Mechanism to deliver meaningful results at the point-of-care

Pharmacogenomics at Yale/YNHH

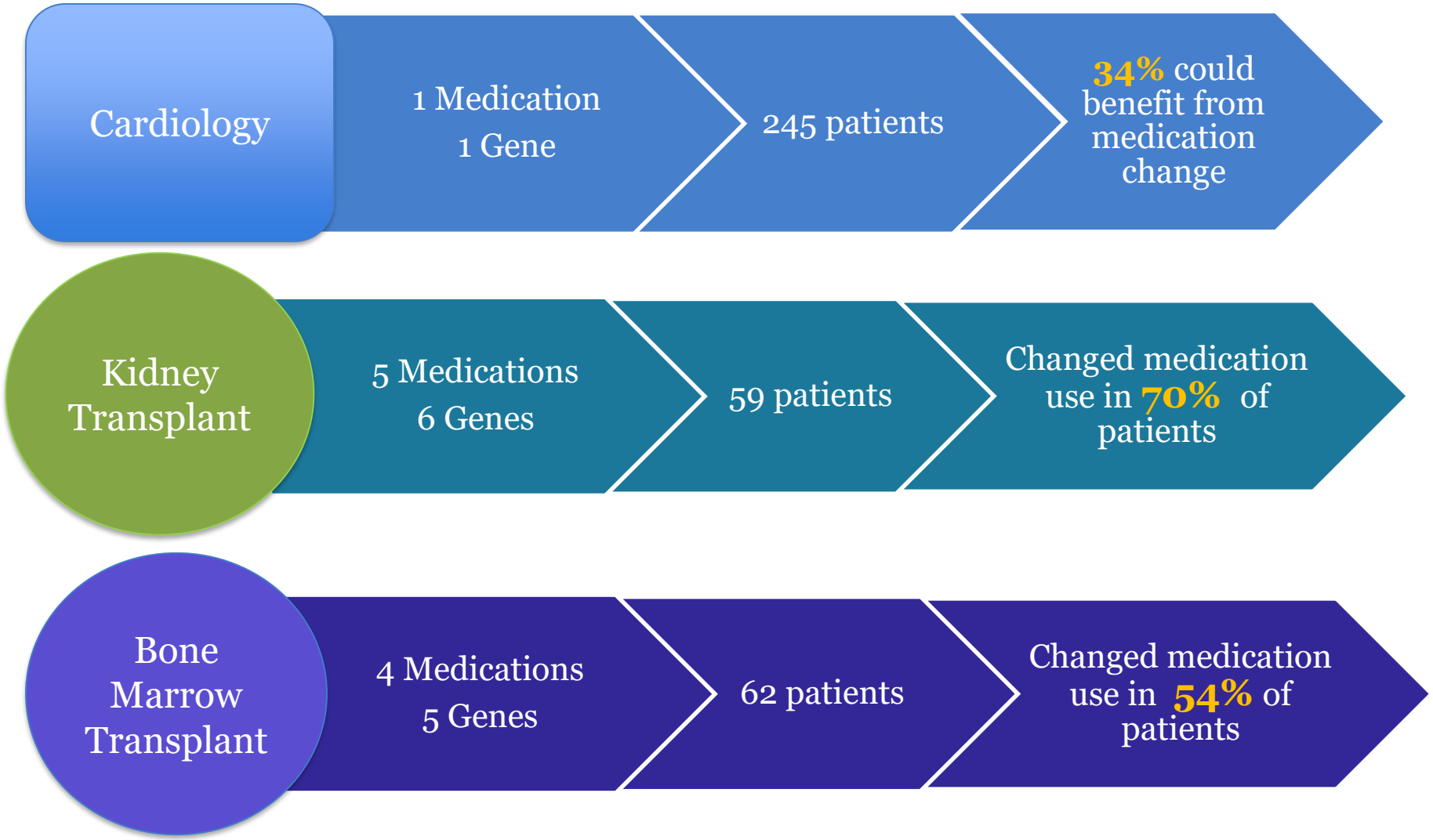
- Project initiated in 2018 with panel-based test in 3 clinical populations
- Multi-disciplinary project (pharmacy, laboratory medicine, specialty-specific providers)

Genomic Data Integration and Clinical Decision Support

- Genomic decision support at the point-of-care
  - Move beyond a text / PDF report
  - Deliver complex interpretations when needed clinically
  - Quickly find historical data



Pilot Results of Testing



Computational Healthcare Strategy

- Part of a larger strategy to develop a comprehensive computational health platform
  - Integrate genetic and phenotypic (clinical, patient-reported) data
  - Capacity to handle large volumes of data generated for precision medicine applications (genomics, radiology, digital pathology)
  - Ability to use advanced decision support and integrate with the EHR, but not be dependent on single vendor
  - Oversight of data generation and analytics to ensure patient safety in a rapidly evolving field

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