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@PersonalizedMed

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A National Network for Implementing GeNomics In pracTicE: IGNITE

IGNITE
www.ignite-genomics.org

The Duke Center for Applied Genomics & Precision Medicine
precisionmedicine.duke.edu

Global Genomic Medicine Collaborative

Vision Without Implementation is Hallucination

--Thomas Edison--

Early Precision Medicine: 1961 "Factors of Risk"

Factors of Risk in the Development of Coronary Heart Disease—Six-Year Follow-up Experience

Kannel WB et al.

November 1961

- High blood pressure
- Increased cholesterol
- HDL cholesterol
- Smoking
- Diabetes
- Family history
- Male sex

Source: Kannel WB et al. *Ann Intern Med* 1961;55:33−50.

> 50 Years Later:
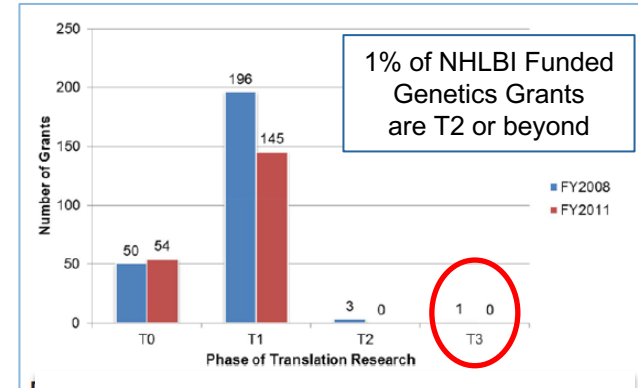# Failure of Implementation of CVD Risk Calculators
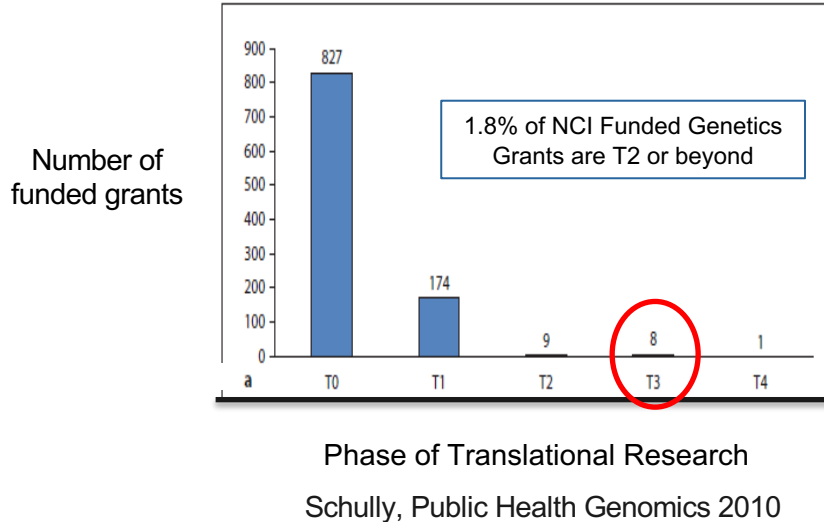
- Primary Care Physicians
  - only **13%** had read guidelines carefully
  - only **17%** used a CHD risk calculator

  "a large variability in knowledge, beliefs, and practice patterns among practicing family physicians"

- Barriers
  - Lack of knowledge
  - Distrust in validity
  - Time consuming

Eaton CB, *J Am Board Fam Med* 2006; 19:46–53.
Eichler K, *BMC Fam Pract* 2007; 8:1.

Genomics Translation: Funding Has Not Been A Priority for Implementation (USA)

Number of funded grants

1.8% of NCI Funded Genetics Grants are T2 or beyond

Phase of Translational Research

Schully, Public Health Genomics 2010

1% of NHLBI Funded Genetics Grants are T2 or beyond

Puggal, Circ Cardiovasc Genet. 2013

Not All Payers are Alike
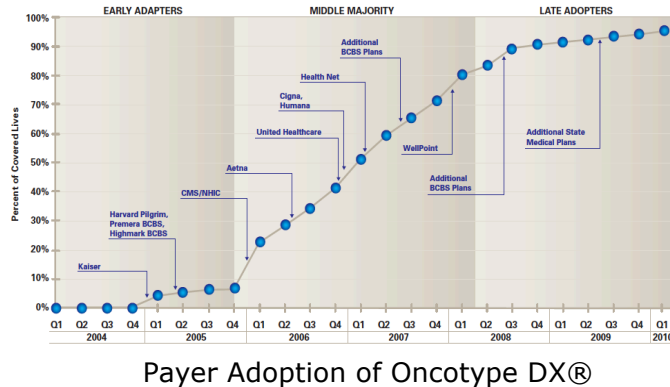
Payer Adoption of Oncotype DX®

COVERAGE INCONSISTENCIES FOR SAMPLE DIAGNOSTICS (2010)*

Innovative Test Examples	FDA Cleared?	Positive Coverage Policies			
		Aetna	Regional CMS	Cigna	Regional BCBS
AlloMap	Yes		✓		
Oncotype DX (breast Cancer)	No	✓	✓	✓	✓
MammaPrint	Yes		✓		
Pathwork Tissue of Origin	Yes				
BRACAnalysis	No	✓	✓	✓	✓
OVA1	Yes		✓		
KRAS (colorectal cancer)	No	✓	✓	✓	✓

*Note: All of these tests are offered as LDTs. The information in this table was current as of the publication of the source report in 2010, and has not been updated to reflect the most current information.

Source: BIO and Health Advances Report: The Reimbursement Landscape for Novel Diagnostics: Current Limitations, Real-World Impact, and Proposed Solutions. 2010.

Journal of **Personalized Medicine**

MDPI

Article

Insurance Coverage Policies for Pharmacogenomic and Multi-Gene Testing for Cancer

Christine Y. Lu [1,*], Stephanie Loomer [1], Rachel Ceccarelli [1], Kathleen M. Mazor [2], James Sabin [3], Ellen Wright Clayton [4], Geoffrey S. Ginsburg [5] and Ann Chen Wu [1]

The IGNITE Network (NHGRI)

BMC Medical Genomics

RESEARCH ARTICLE — **Open Access** — CrossMark

The IGNITE network: a model for genomic medicine implementation and research

Kristin Wiisanen Weitzel[1], Madeline Alexander[2], Barbara A. Bernhardt[3], Neil Calman[4], David J. Carey[5], Larisa H. Cavallari[1], Julie R. Field[6], Diane Hauser[4], Heather A. Junkins[7], Phillip A. Levin[8], Kenneth Levy[9], Ebony B. Madden[7], Teri A. Manolio[7], Jacqueline Odgis[7], Lori A. Orlando[10,19], Reed Pyeritz[3], R. Ryanne Wu[10,19], Alan R. Shuldiner[11,12], Erwin P. Bottinger[13], Joshua C. Denny[14,15], Paul R. Dexter[9], David A. Flockhart[9*], Carol R. Horowitz[16], Julie A. Johnson[1], Stephen E. Kimmel[2,17], Mia A. Levy[18], Toni I. Pollin[11], Geoffrey S. Ginsburg[19*] and on behalf of the IGNITE Network
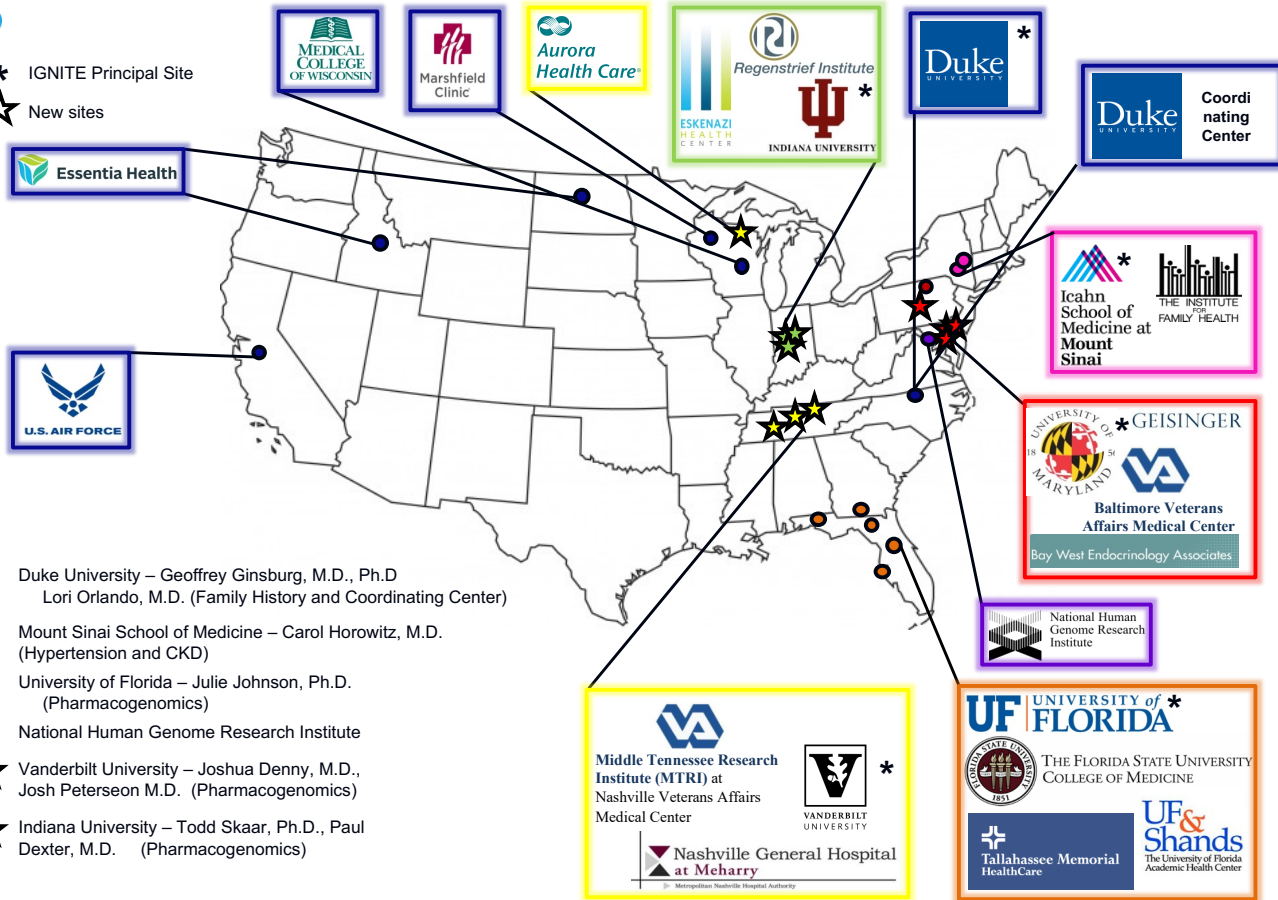
- Expand and link existing genomic medicine efforts
- Develop implementation methods, in diverse settings and populations
- Contribute to evidence base regarding outcomes of incorporating genomic information into clinical care
- Disseminate best practices for genomic medicine implementation, diffusion, and sustainability

www.gmkb.org

IGNITE
Implementing GeNomics In pracTicE

* IGNITE Principal Site
⭐ New sites

MEDICAL COLLEGE OF WISCONSIN

Marshfield Clinic

Aurora Health Care

Regenstrief Institute
ESKENAZI HEALTH CENTER
IU * INDIANA UNIVERSITY

Duke UNIVERSITY *

Duke UNIVERSITY Coordinating Center

Essentia Health

Icahn School of Medicine at Mount Sinai *
THE INSTITUTE FOR FAMILY HEALTH

U.S. AIR FORCE

* GEISINGER
UNIVERSITY OF MARYLAND 1851
VA Baltimore Veterans Affairs Medical Center
Bay West Endocrinology Associates

National Human Genome Research Institute

● Duke University – Geoffrey Ginsburg, M.D., Ph.D
   Lori Orlando, M.D. (Family History and Coordinating Center)

● Mount Sinai School of Medicine – Carol Horowitz, M.D.
   (Hypertension and CKD)

● University of Florida – Julie Johnson, Ph.D.
   (Pharmacogenomics)

● National Human Genome Research Institute

⭐ Vanderbilt University – Joshua Denny, M.D.,
   Josh Peterseon M.D. (Pharmacogenomics)

⭐ Indiana University – Todd Skaar, Ph.D., Paul
   Dexter, M.D.   (Pharmacogenomics)

Middle Tennessee Research Institute (MTRI) at Nashville Veterans Affairs Medical Center
VANDERBILT UNIVERSITY *
Nashville General Hospital at Meharry
Metropolitan Nashville Hospital Authority

UF UNIVERSITY of FLORIDA *
FLORIDA STATE UNIVERSITY COLLEGE OF MEDICINE 1851
Tallahassee Memorial HealthCare
UF & Shands The University of Florida Academic Health Center

Risk Recommendations in ~ 2000 Unselected Patients (~ 25,000 Relatives) in 19 Primary Care Clinics

Risk Management Recommendations	N (%)
Monogenic Disorders Related Recommendations	**597 (31.6%)**
Genetic counseling for hereditary cardiac syndromes	107 (5.7%)
Genetic counseling for hereditary cancer syndromes	395 (20.1%)
Genetic counseling for hereditary thrombophilia	165 (8.7%
Familial hypercholesterolemia testing	66 (3.4%)
Hemochromatosis iron studies and genetic testing	3 (0.2%)
Wilson's disease genetic testing	11 (0.6%)
Alpha 1 anti-trypsinase deficiency genetic testing	11 (0.6%)
Familial Cancer Related Recommendations	**508 (26.9%)**
Ovarian cancer screening discussion	32 (1.7%)
Breast MRI screening	58 (3.2%)
Breast cancer chemoprevention	109 (6%)
Colonoscopy screening starting age < 50 and/or more frequently	241 (13.1%)
Common Chronic Disease Related Recommendations	**1059 (56.1%)**
Aspirin for stroke prevention	67 (3.6%)
Diabetes screening	858 (45.4%)
Abdominal Aortic Aneurysm screening	389 (20.6%)
Calcium scoring CT for further cardiovascular risk stratification	11 (0.6%)
Lung cancer screening	45 (2.4%)

A significant percentage of the general primary care population meet criteria for more intensive risk management

Orlando, LA, et al. AJMG 2014; 166:24-33
Orlando, LA, et al. *in review*

# The Power of the Network to Rapidly Implement and Assess Impact: CYP2C19 and Antiplatelet Rx
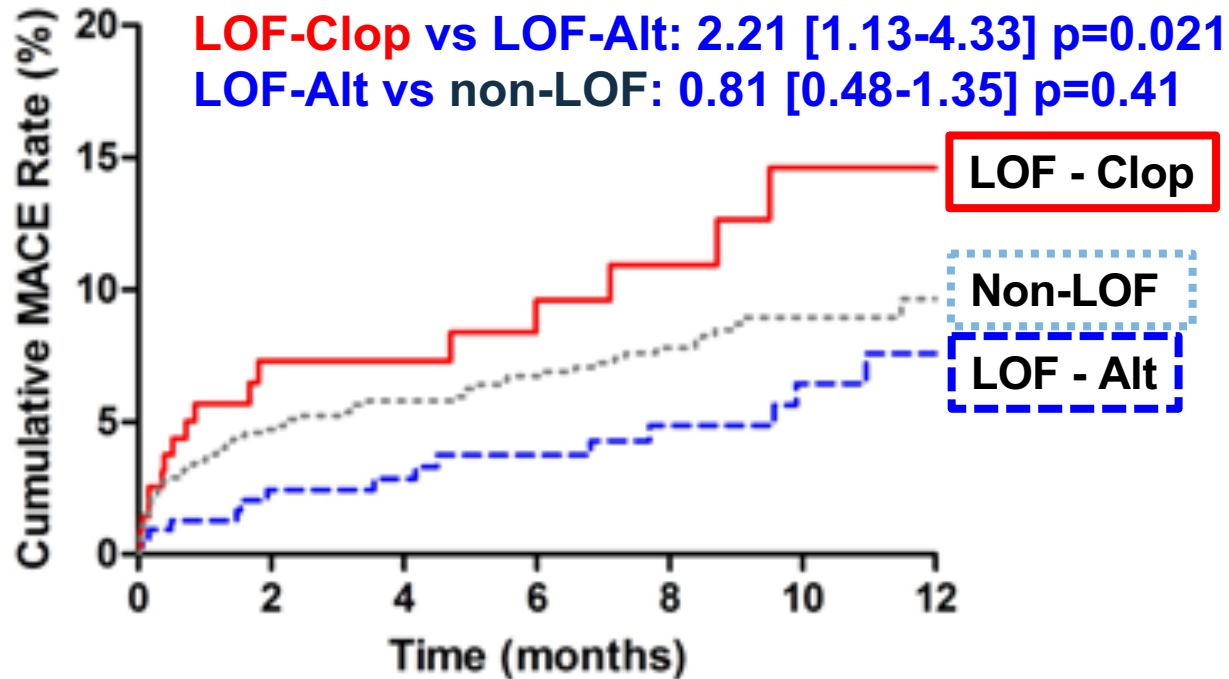
IGNITE I:
The Realities of Genomic Medicine Research

- Implementation is a science and it is hard
  - Complex workflows must be understood
  - Process measures can optimize integration into patient/provider workflows
- EMRs are not ready to incorporate genomic data
- Local provider champions are key
- Network wide studies are enormously powerful
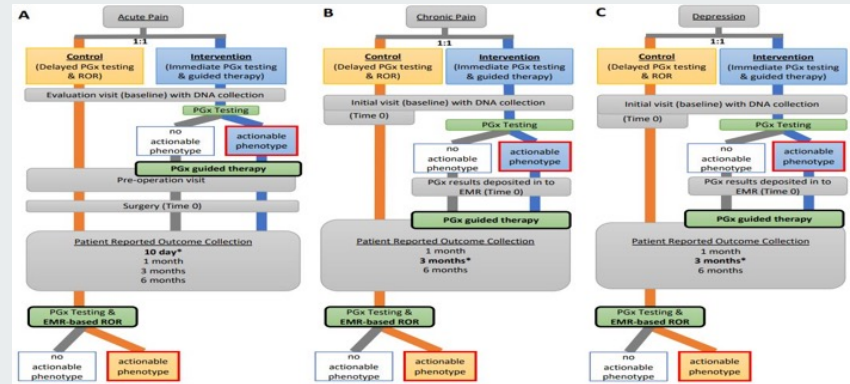 - Genomic medicine research may also help reduce disparities

IGNITE II: Pragmatic Clinical Trials Network
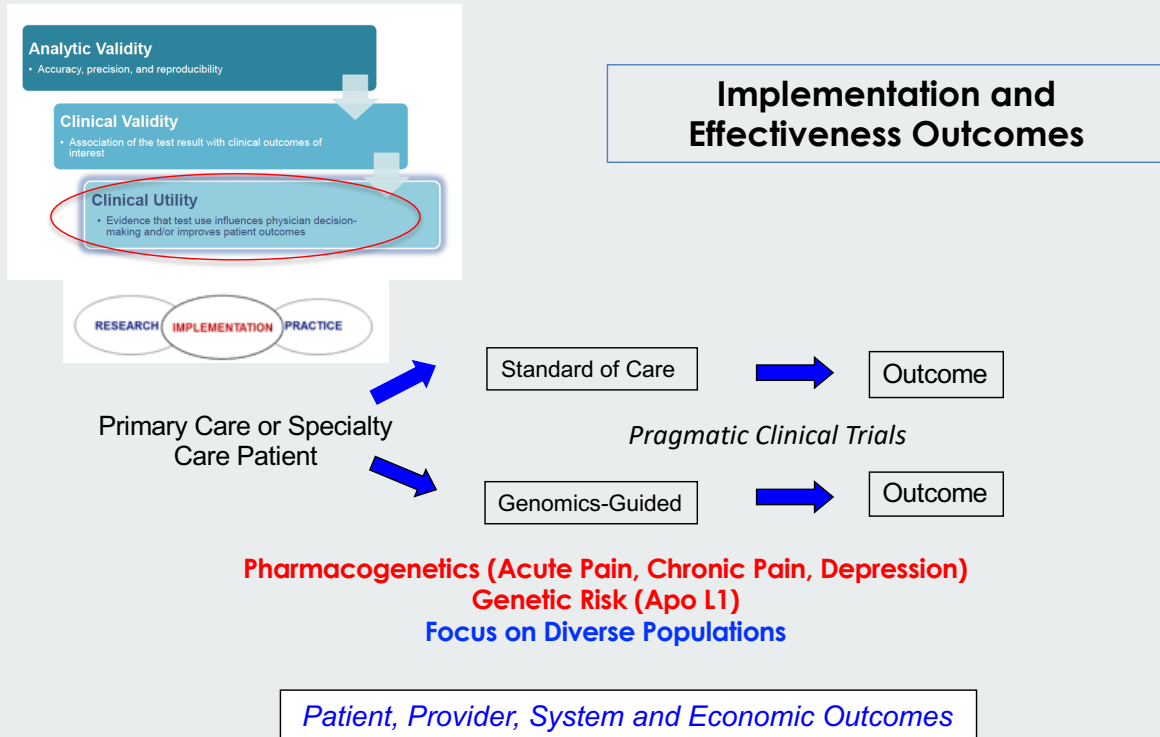
A Depression and Opioid Pragmatic Trial in Pharmacogenetics (ADOPT PGx)

Determine whether genotype-guided therapy of opioids and SSRIs leads to improved acute and chronic pain control and depressive symptoms


ADOPT-PGx
A Depression and Opioid
Pragmatic Trial in Pharmacogenetics

Genetic testing to UnderstAnd Renal Disease Disparities across the U.S. (GUARDD-US)

To determine the effect of participant and provider knowledge of a positive *APOL1* status on blood pressure management on change in systolic blood pressure (SBP) from baseline to 3 months after randomization among the *APOL1+* participants (African Americans).
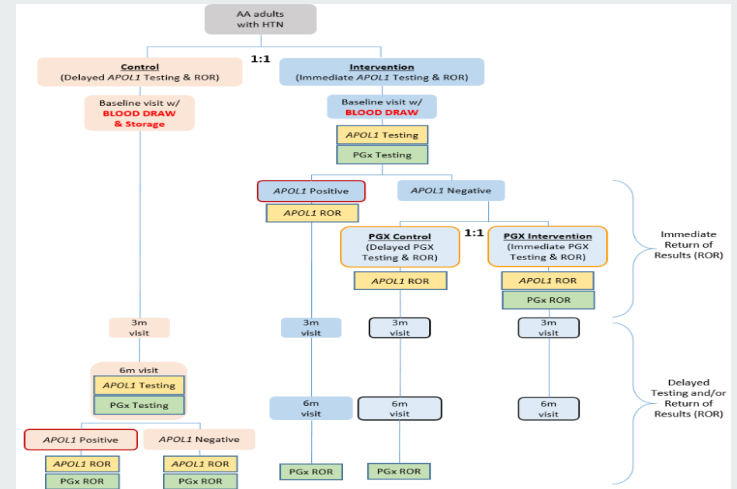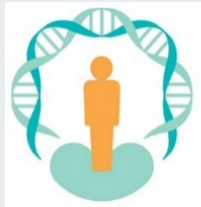
Things change in the real world and impact original study design
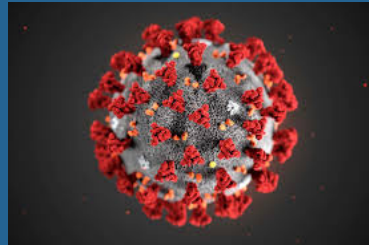
LMIC Opportunities

- Build clinical genomics capacity (clinical labs and workflows)
- Build competencies in genomics knowledge, communication, and decision making to create a vibrant genomics workforce
- Population literacy and numeracy should be a priority
- Diversity of practice across globe require different implementation solutions
- Engage the participants in solving the problems
- Need for collaboration

"G2MC can IGNITE the LMICs"

Teamwork