Implementing Genomic Medicine in the Clinic: Perspectives of an Integrated Health System

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Geisinger Health System

- **Mission**

  Enhance the quality of life through an integrated health service organization based on a balanced program of patient care, education, research, and community service.

- **Geisinger Brand**
  - Quality
  - Value
  - Partnerships
  - Advocacy

The Vision

- Quality
- Innovation
- Market Leadership
  - ➢ Growth
  - ➢ Scale and Generalize Innovation
- The Geisinger Family
  - ➢ Legacy
  - ➢ Personal and Professional Well-being

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Geisinger Health System
An Integrated Health Service Organization

Provider Facilities

Physician Practice Group

Managed Care Companies

- **Geisinger Medical Center**
  - Hospital for Advanced Medicine, Janet Weis Children's Hospital, Women's Health Pavilion, Level I Trauma Center Ambulatory Surgery Center
- **Geisinger Northeast (2 campuses)**
  - Geisinger Wyoming Valley Medical Center with Heart Hospital, Henry Cancer Center, Level II Trauma Center
  - South Wilkes-Barre Adult & Pediatric Urgent Care, Ambulatory Surgery Center, inpatient rehabilitation, pain mgmt, sleep disorders
- **Marworth Alcohol & Chemical Dependency Treatment Center**
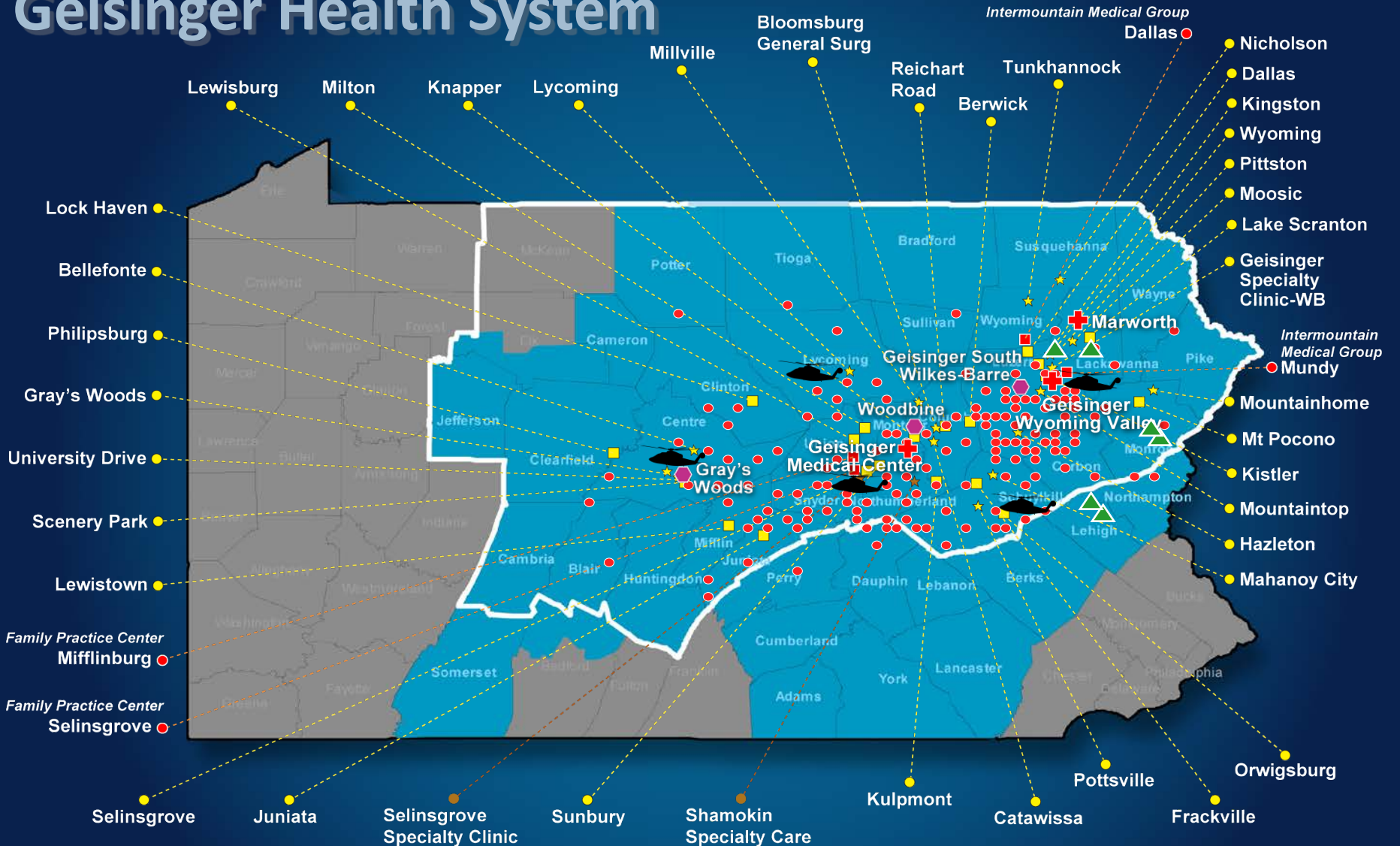- >53K admissions/OBS & SORU
- ~820 licensed in-patient beds

- Multispecialty group
- ~900 physicians
- ~520 advanced practitioners
- ~65 primary and specialty clinic sites (37 community practice sites)
- 1 Outpatient surgery center
- >2.1 million outpatient visits
- ~360 residents and fellows

- ~298,000 members (including ~63,000 Medicare Advantage members)
- Diversified products
- >30,000 contracted physicians/facilities
- 43 PA counties

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Geisinger Health System

Map of Pennsylvania showing Geisinger Health System facility locations.

Labels on map:
- Lewisburg
- Milton
- Knapper
- Lycoming
- Millville
- Bloomsburg General Surg
- Reichart Road
- Berwick
- Tunkhannock
- *Intermountain Medical Group* Dallas
- Nicholson
- Dallas
- Kingston
- Wyoming
- Pittston
- Moosic
- Lake Scranton
- Geisinger Specialty Clinic-WB
- *Intermountain Medical Group* Mundy
- Mountainhome
- Mt Pocono
- Kistler
- Mountaintop
- Hazleton
- Mahanoy City
- Lock Haven
- Bellefonte
- Philipsburg
- Gray's Woods
- University Drive
- Scenery Park
- Lewistown
- *Family Practice Center* Mifflinburg
- *Family Practice Center* Selinsgrove
- Marworth
- Geisinger South Wilkes Barre
- Woodbine
- Geisinger Wyoming Valley
- Geisinger Medical Center
- Gray's Woods
- Selinsgrove
- Juniata
- Selinsgrove Specialty Clinic
- Sunbury
- Shamokin Specialty Care
- Kulpmont
- Catawissa
- Pottsville
- Frackville
- Orwigsburg

Last updated 12/16/10

Legend:
- 🟨 Geisinger ProvenHealth Navigator Sites
- 🟥 Contracted ProvenHealth Navigator Sites
- ⭐ Geisinger Medical Groups
- ⭐ Geisinger Specialty Clinics
- ✚ Geisinger Inpatient Facilities
- ⬡ Ambulatory Care Facility
- ⬜ Geisinger Health System Hub and Spoke Market Area
- 🟦 Geisinger Health Plan Service Area
- 🔺 Careworks Convenient Healthcare
- 🔴 Non-Geisinger Physicians With EHR
- LifeFlight Base

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Regional Demographics

- 2.6 million people in 31 county service area
- Older and poorer relative to national averages
- Most counties officially designated as rural and underserved
- Non-transient: <1% annual out-migration rate in most counties
- 96% White European descent

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Electronic Health Record (EHR)

- **>$135M invested** (hardware, software, manpower, training)
- **Running costs:** ~4.4% of annual revenue of >$3B
- **Fully-integrated EHR:** 37 community practice sites; 2 hospitals; 2 EDs; 6 Careworks retail-based and worksite clinics
  - Acute and chronic care management
  - Optimized transitions of care
- **Networked PHR** - ~178,000 active users (34% of ongoing patients)
  - Patient self-service (self-scheduling, kiosks)
  - Home monitoring integrated with Medical Home
- **"Outreach Health IT"** – 3,159 users in 612 non-Geisinger practices
  - Remote support for regional ICUs
  - Telestroke services to regional EDs
- **Active Regional Health-Information Exchange (KeyHIE)**
  - 18 hospitals, 100+ practices, 500,000 patients consented
- **e-health (eICU®) Programs**
- **Keystone Beacon Community - $16M Grant from ONCHIT over 3 years**
  - HIT-enabled, Community-wide care coordination in 5 rural counties
- **Geisinger MyCode®** - biobanking blood samples

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Geisinger Clinic Biobank Inventory
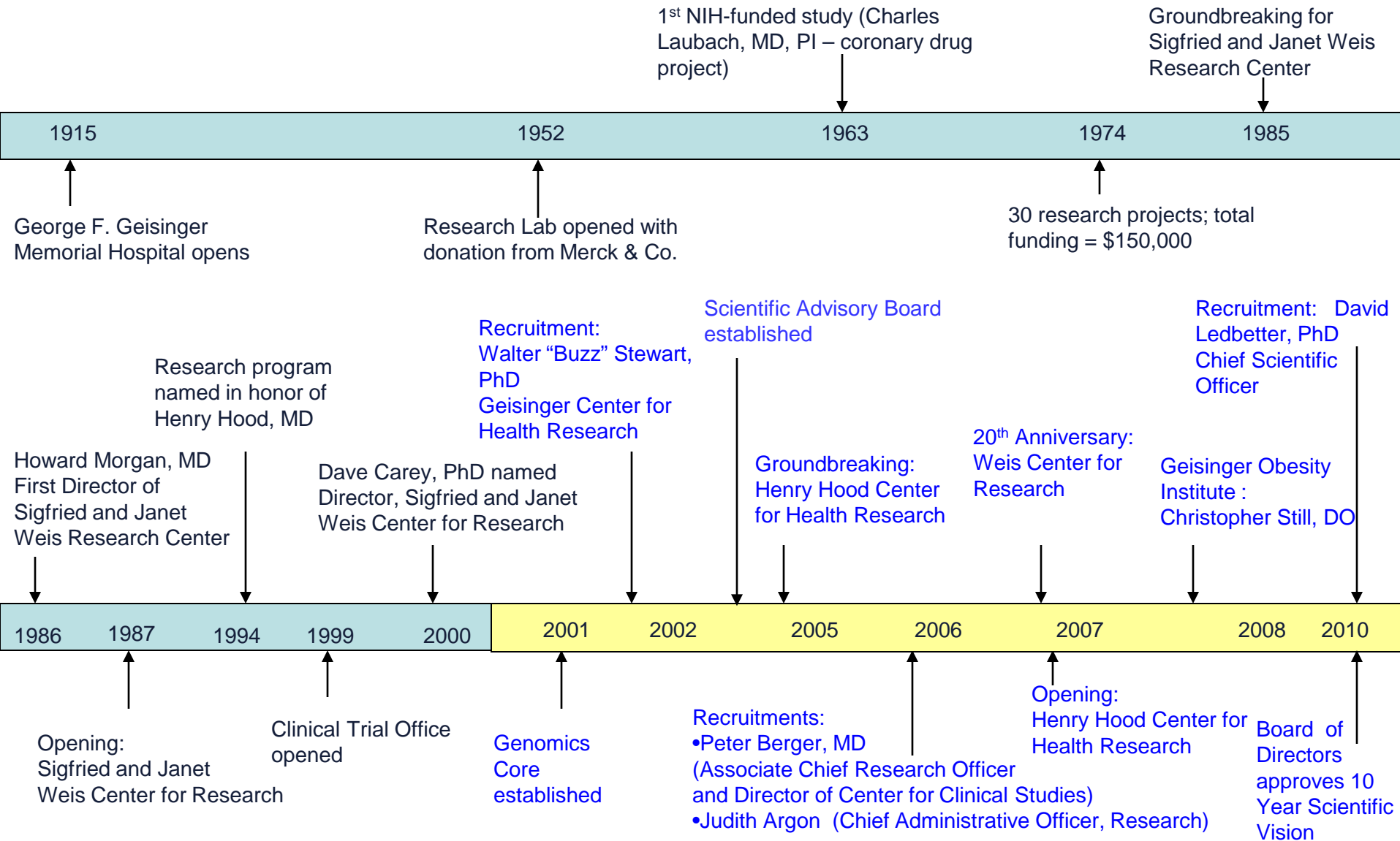
Individual patients   >35,000

- Primary care   >20,000
- Specialty clinics   >15,000

Blood samples   >24,000

Serum samples   >48,000

DNA samples   >20,000

Tissue samples   >4,000

Total samples   >100,000

Clinical Decision Intelligence System (CDIS) Clinical Data Warehouse

- **Near real-time, system-wide data warehouse**

- **Searchable data format**
  - EHR data (back to 2004)
    - Demographic and lifestyle data (e.g., age, height, weight, smoking)
    - Clinical measures (e.g., blood pressure)
    - Orders (prescriptions, imaging)'
    - Clinical laboratory data
  - Financial data (e.g., billing, payment)
  - Operational data (e.g., events, scheduling)
  - Claims data (e.g., ambulatory, hospital, pharmacy)

- **Data are cleansed, normalized and stored at most granular levels to facilitate data mining and analytics**

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Geisinger Research – Timeline

1st NIH-funded study (Charles Laubach, MD, PI – coronary drug project)

Groundbreaking for Sigfried and Janet Weis Research Center

| 1915 | 1952 | 1963 | 1974 | 1985 |

George F. Geisinger Memorial Hospital opens

Research Lab opened with donation from Merck & Co.

30 research projects; total funding = $150,000

Scientific Advisory Board established

Recruitment: Walter "Buzz" Stewart, PhD Geisinger Center for Health Research

Recruitment: David Ledbetter, PhD Chief Scientific Officer

Research program named in honor of Henry Hood, MD

20th Anniversary: Weis Center for Research

Groundbreaking: Henry Hood Center for Health Research

Geisinger Obesity Institute : Christopher Still, DO

Howard Morgan, MD First Director of Sigfried and Janet Weis Research Center

Dave Carey, PhD named Director, Sigfried and Janet Weis Center for Research

| 1986 | 1987 | 1994 | 1999 | 2000 | 2001 | 2002 | 2005 | 2006 | 2007 | 2008 | 2010 |

Opening: Sigfried and Janet Weis Center for Research

Clinical Trial Office opened

Genomics Core established

Recruitments:
•Peter Berger, MD (Associate Chief Research Officer and Director of Center for Clinical Studies)
•Judith Argon (Chief Administrative Officer, Research)

Opening: Henry Hood Center for Health Research

Board of Directors approves 10 Year Scientific Vision

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Research Strategic Vision

- Vision: Personalized Health Care

- Emphasis on genomics

- Coupled with an innovative clinical provider system and payor

- Both of whom see "value" in potential to change course of disease/improve health outcomes/reduce costs

- Board approved 10 year Vision for Research is affirmation of a year long process by a multidisciplinary committee (inclusive of 3 board members) that translational research is part of, not separate from,Clinical Medicine.

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Key Considerations in Approval Process

- Leadership at multiple levels

- Articulation/communication/debate/refinement of vision

- Formalized and vetted at multiple levels, a five year strategic and financial plan

- Delineation of quality and value (multiple stakeholders)

- Delineation of metrics for success/course correction strategies

- Risk/risk mitigation strategies

- Capacity/history of success in execution

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Progress in GHS Research Vision Implementation: Genomic Medicine

- Appointment of David H. Ledbetter, Ph.D. , inaugural EVP/Chief Scientific Officer – 2010

- Recruitment of W. Andy Faucett, MS (Policy and Education) – 2011

- Receipt of eMERGE Award – 2011

- Recruitment of Ann Moon, MD, Ph.D.;Marc Williams, MD, and Janet Williams, MS – 2011

- Development of Genomic Medicine Program
  - Undiagnosed patients
  - Whole genome/whole exome triad sequencing

- Development of Bioinformatics Core – Gregory Moore, MD, Ph.D. - 2011

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Summary

- Patient focus – clinical medicine/research partnered to improve health of population

- Leadership/commitment at multiple levels to drive vision

- Leadership/commitment at multiple levels to ensure operational execution across multiple constituencies

- Commitment to demonstrating improved patient quality outcomes and improved value to patient providers, payors is key

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