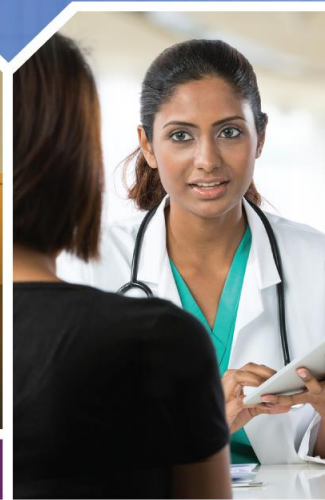
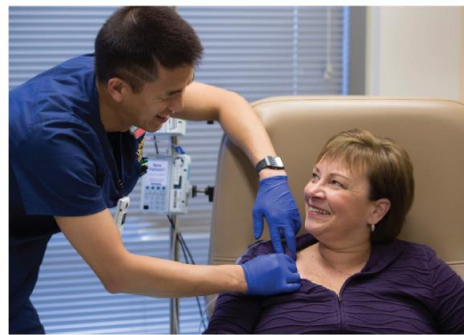




**UC DAVIS
HEALTH**



UC Davis Collaborative for Diagnostic Innovation

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Overview

- Why do we care about diagnostic tests?
- What are the problems and opportunities associated with diagnostic tests?
- How could a Collaborative address these problems?
- What unique assets and strengths could be leveraged and linked?
- What is the value? How do we get people to join to launch?
- What is the risk?

Why do we care about diagnostic tests?

- Pivotal role in health care:
 - Identifies and accurately characterizes disease.
 - Guides the most appropriate course of treatment.
 - Monitors disease during treatment.
 - Prevents disease development or by detecting early warning signs so that interventions can occur.

**70% of all medical decisions are based on laboratory tests.
Imaging tests are common and increasing in frequency.**

Why do we care about diagnostic tests, con't?



- Diagnostic tests can create create **cost-effective high value** healthcare – if used correctly!
- **Leadership in diagnostic testing can:**
 - Improve health and lives of patients and populations.
 - Distinguish UC Davis Health from other medical schools or health systems.

But ... diagnostic test process is imperfect.

There are important problems to be solved and opportunities to be explored.

- Problems:
 - Diagnostic errors.
 - Misuse and over-use, particularly re: expensive tests, inflating healthcare expense and creating potential harm.
 - Lack of accuracy or stratification of findings to customize management – complications occur from generic management decisions that adversely impact many patients.

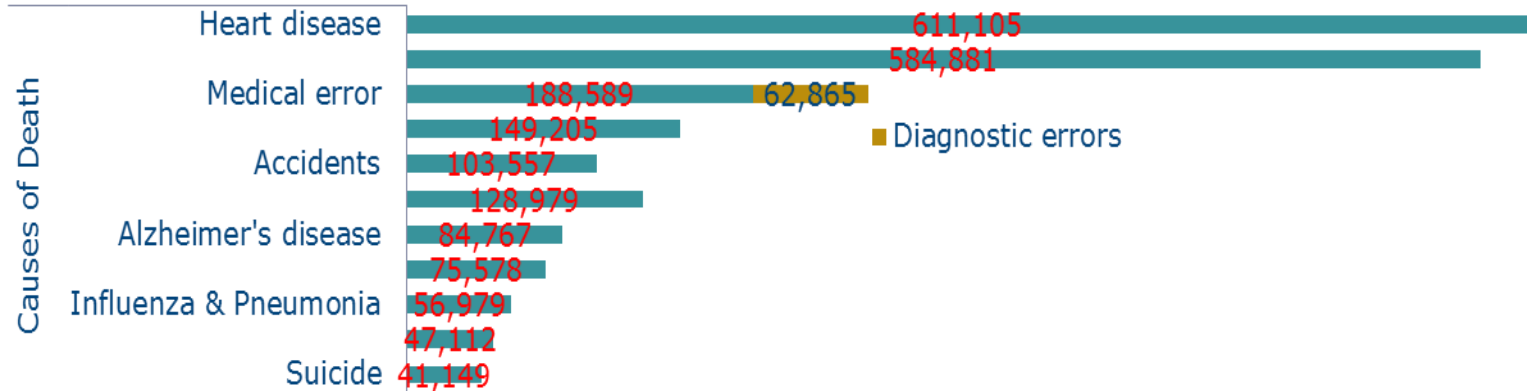
- Opportunities:
 - New discoveries offering solutions to problems we didn't know we had.
 - Biomarkers, genomic info, imaging methods, and more.

- **National spotlight on these issues in 2015 National Academy of Medicine report.**



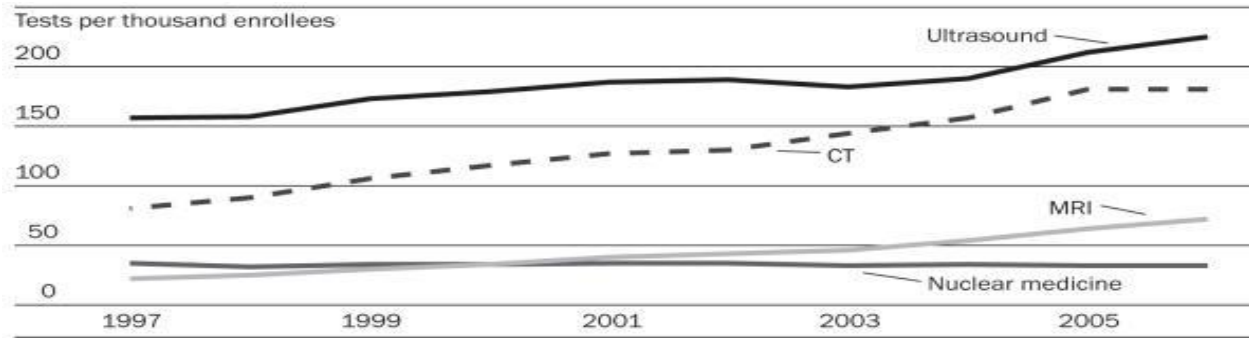
Problem #1: Diagnostic errors are a substantial cause of deaths from medical error.

Deaths in the United States, 2013



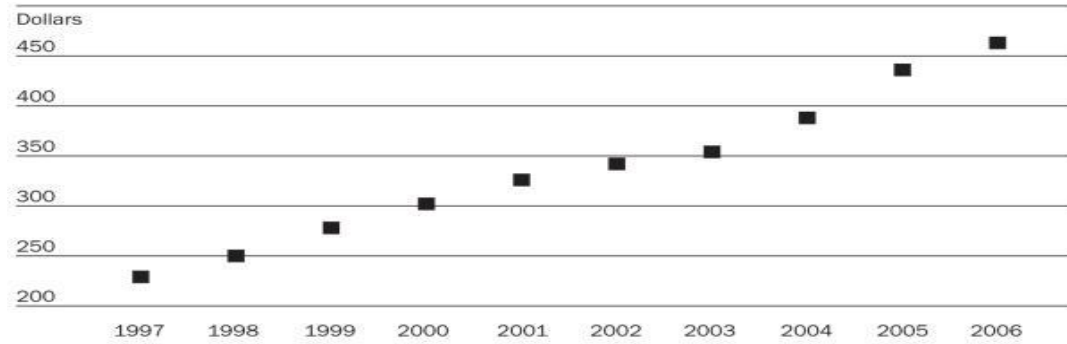
- # of deaths from diagnostic errors similar to diabetes or flu/pneumonia.
- Diagnostic errors affect 1 in 20 Americans.
- Errors cause other complications, as well as unnecessary expense.
 - » US Institute of Medicine; 2015
 - » BMJ Quality & Safety 25-Year Summary of US Malpractice Claims, 2013.

Problem #2: Misuse and over-use of expensive tests contributes to rise in healthcare costs



Cross-sectional imaging tests per 1000 enrollees/year

Millwood. Health
Aff 2008; 27: 1491-1502.

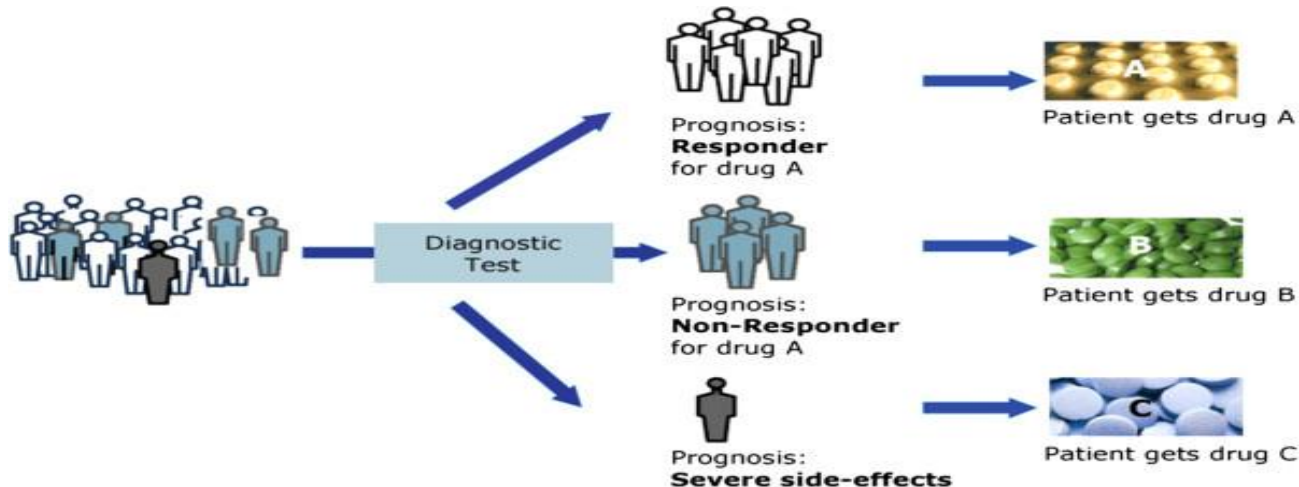


Annual imaging costs per health plan enrollee

Problem #3: Lack of accuracy/stratification of test results to “customize” management

- Need for better tests to:

- Subclassify patients.
- Customize decisions among many existing management or treatment strategies – or help create new strategies!
- Improve outcomes, minimize complications.



Each of these problems provides an opportunity for innovation – but there is more!

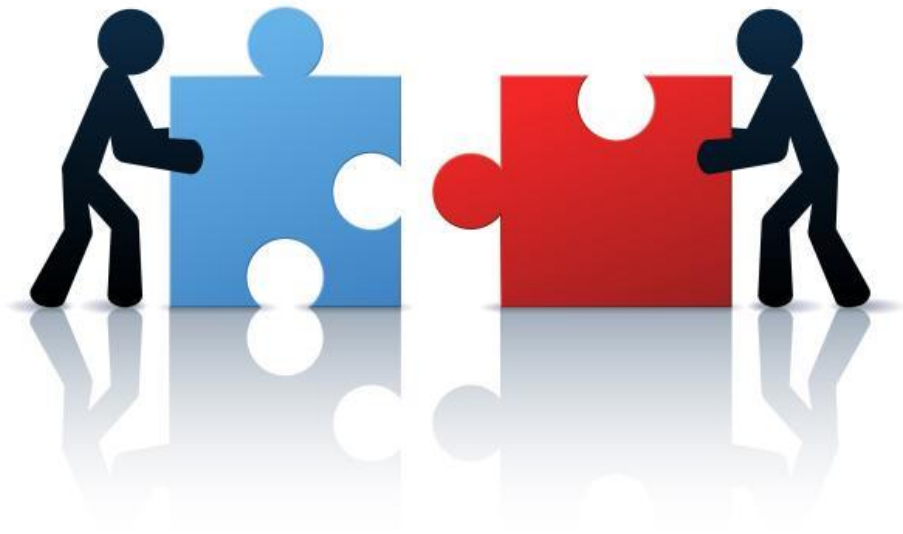
More opportunity: Innovation → solutions to problems that we don't even recognize now!

New knowledge, discoveries, and inventions continually emerge:

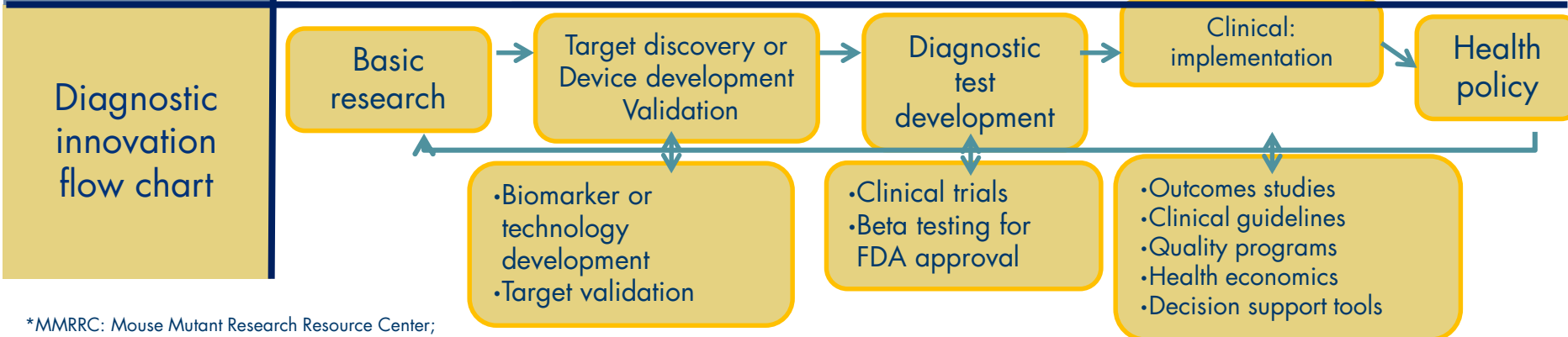
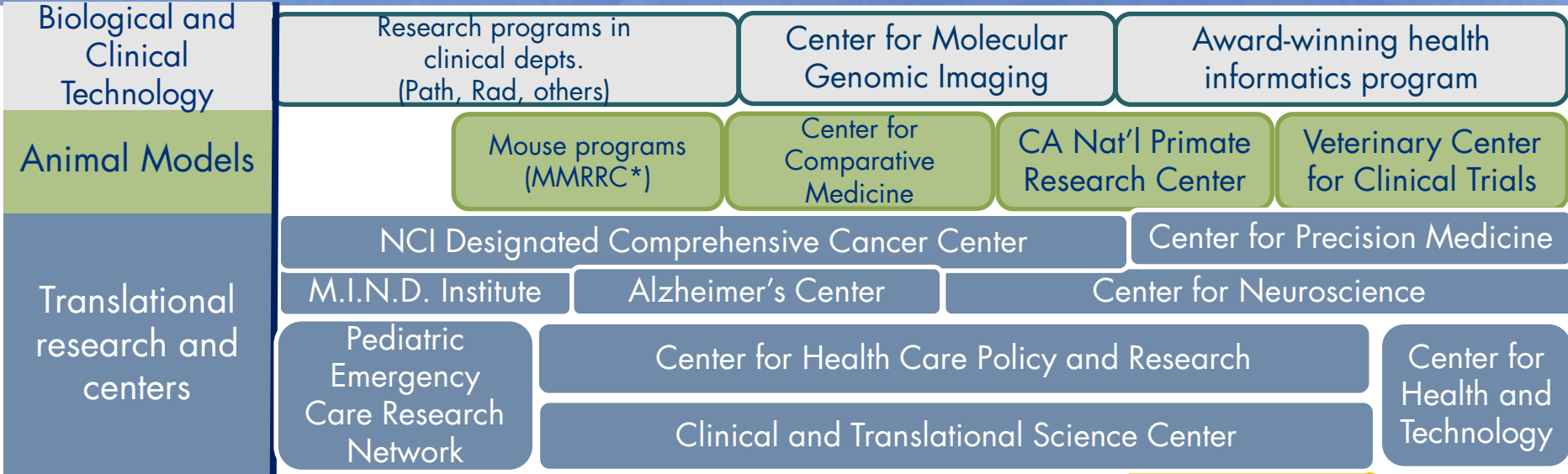
- Opportunities to improve lives in ways that we could never imagine.
- Example: The iPhone – who ever imagined that we couldn't live without one?? Who knew we had problems that needed to be solved??



A Collaborative could link and leverage existing assets to solve problems → greater impact



Links: UCD Assets for Diagnostic Innovation – Selected examples



*MMRRC: Mouse Mutant Research Resource Center;

Foundation: Strong existing record in diagnostic innovation at UCD

- **Diagnostic error reduction:**
 - Polage: Award-winning publication re: inaccuracy of molecular tests for C. diff; Moore Foundation-funded STOP C. diff project
 - Tran: Demonstrated inaccuracy of hand-held glucose meters in critically-ill patients, leading to FDA recall.

- **Misuse/overuse, cost-effectiveness**
 - Kupperman: NIH grant to create unique decision-support tools guiding imaging orders in the emergency department.

- **Accuracy/Customization:** Many research groups identifying unique biomarkers of disease.

- **New opportunities via newly developed tools:**
 - NSF-funded Center for Biophotonics Sensors & Systems (Chan).
 - R33-funded project for novel MUSE microscopy, beta-test in Cancer Center (Levenson).
 - \$15.5M grant for 1st whole body PET (Radiol, Cherry/Boone)
 - Biobanking of remnant blood samples (Path, Tran) and microbiome samples (Wan)

Unique educational and training programs to be leveraged

- Award-winning Biomed Engineering design course led by Pathology faculty member Nam Tran
 - Challenges undergrads to provide innovative solutions to medical diagnostic challenges.
- Graduate programs in health informatics and public health
- Informatics fellowship
- UCDMC's Quality Certificate Program
- And more!



How are we launching the Collaborative?

▪ Internal seed grants:

- 4 themes/opportunities
 - Creation of new or better tests and test strategies.
 - Optimization of test utilization (particularly reducing underuse, overuse, and misuse of tests and imaging procedures).
 - Reduction of diagnostic errors (particularly reducing delays in diagnosis).
 - Integration of diagnostic data with other data such as clinical information, microbiome and other phenotypes, social determinants of health, behavioral medicine, and others.
- \$340,000 in the seed grant award pool, thanks to:
 - Dept/unit contributions, similar to previous inter-dept/-center grants
 - Practice Management Board contribution
 - Byers gift to Pathology
- Seed grant networking event, 11/6/2017: MIND Auditorium, 5-7 pm.
- **Intent: Support pilot projects that link existing strengths and position teams for extramural funding or commercialization.**

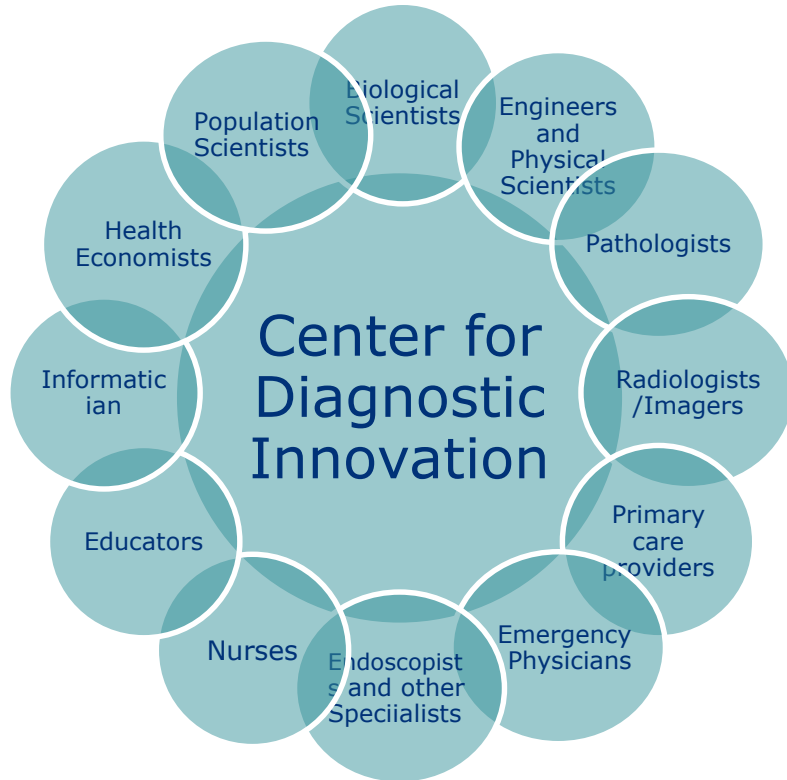


Other potential resources and programs to grow the Collaborative and link participants

- External opportunities for support
 - Cross-center biophotonics cluster application to NSF: Includes supplement for planning conference.
- Networking events
- Services
 - Biobank, informatics expertise, drop-in workshops, equipment, grant or IRB pre-reviews/consults
- Educational activities
 - Biomed engineering design course: Involve Collaborative members
 - Create educational programs re: diagnostic utilization and error reduction into Path-Rad courses for medical students, housestaff education, CME.



Collaborative for Diagnostic Innovation: Multi-disciplinary and inclusive



The Medici Effect:

Innovation that occurs when people of different cultures, backgrounds, disciplines and perspectives come together and interact.

Frans Johanssen

Learn more at:

<http://www.ucdmc.ucdavis.edu/pathology/collaborative-for-diagnostic-innovation/index.html>