

Vision for Precision and Personalized Medicine (PPM) by the Minnesota Precision Medicine Collaborative (MPMC)

Authored by the MPMC co-PIs: Pamala Jacobson, PharmD, Susan Wolf, JD, Constantin Aliferis, MD, PhD,
Douglas Yee, MD, Catherine McCarty, PhD, Kingshuk Sinha, PhD

March 12, 2018

1. Guiding Principles:

- a. Precision and personalized medicine (PPM) is major paradigm shift and development in health sciences and healthcare. Precision medicine now guides the diagnosis and treatment of diseases and responds to the urgent need for better informed care decisions, superior outcomes and equitable delivery of patient-centered care.
- b. The clinical benefits from PPM are already being realized for specific diseases/patient groups (e.g., cancers), yet the future benefits and potential of PPM are almost limitless. There are many areas that remain unstudied and thus PPM is an area where UMN can make major discoveries.
- c. PPM requires a coordinated clinical, laboratory, informatics, counseling, ethics and supply chain centric framework.
- d. PPM also requires both classical/established tools (e.g., risk modeling, genetic counseling, pharmacogenomics, informatics, clinical decision support, deployment) and emerging workflows/paradigms/frameworks (e.g., sequencing, molecular profiling, precision trials).
- e. In order for the UMN to be competitive in research, clinical care, and in training clinicians, scientists, and leaders we must develop substantial and relevant PPM capacities across collegiate units. Without PPM we will not recruit the best faculty, provide the best possible patient care equitably, compete for federal PPM funding or attract top students.
- f. A small number of other universities are currently leading the field of PPM (e.g., Vanderbilt, University of Washington, Baylor, Broad Institute) and still others are making major PPM investments (e.g., Indiana University, Columbia University, State of California, MD Anderson, U of Oregon). The UMN is thus far in neither category. This is placing us at a substantial disadvantage in securing NIH grants and offering cutting-edge medical care and training. There is a wealth of talent at UMN in AHC and other collegiate units, and with proper vision, focus, coordinated effort, and investment we can become leaders in selected areas of focus.
- g. Teamwork is of the essence: PPM is extremely interdisciplinary. It also requires “systems” level supply chain-centric thinking – from design to delivery. It requires health economics analysis of sustainability and value. It furthermore incorporates integrated analysis of the ethical, legal, management and social issues.
- h. Our efforts must have urgency: this is a highly competitive field and without investment in PPM, we are falling further and further behind.
- i. The UMN needs a bold vision and a plan to jump-start our University-wide efforts and position us as a leading precision health enterprise.

2. Goals & Expected Outcomes

- a. Make the UMN an academic leader in PPM within a 10-year horizon by advancing all of sciences and disciplines using PPM methods, approaches, data, and discoveries.
- b. Advance the interdisciplinary science of PPM.
- c. Advance the integrated practice of PPM that is sustainable and scalable.
- d. Advance analysis of the ethical, legal, management, and social issues and development of PPM solutions.
- e. Advance health economics, cost-benefit, sustainability, and supply chain-centric analysis of PPM related diagnostic tests and therapies.

- f. Lead the nation in education programs that train health professionals, scientists and leaders in PPM.
- g. Participate in major national and international PPM initiatives (those currently include the federal “All of Us” Initiative, and prestigious consortia funded by NIH including CSER2, IGNITE, PGRN, NSIGHT, TOPMed).
- h. Ensure that the PPM efforts at the UMN are sustainable and scalable.

3. Strategy and Tactics

- a. Create a stable PPM home with a distributed but well-coordinated leadership structure with broad representation in the form of a University-wide Center to connect scientists, clinicians, and scholars working on all aspects of PPM and coordinate the vision and implementation of PPM. This coordinating entity should be accountable to the VPHS, VPR, and Provost.
- b. Ensure that our patients and residents of the state benefit from PPM. Establish and deploy all major PPM tools at UMN and affiliated clinical practices by importing the best-of-breed approaches developed by others (i.e., do not re-invent the wheel when validated solutions exist, but make sure such solutions are deployed).
- c. Create partnerships across the state, US and world to build PPM capacity, deliver better health and make new discoveries. Partner with the (i) State, (ii) MN Health Systems, payers and providers, (iii) NIH consortia and CTSA network, (iii) Other institutions and funded centers doing precision medicine, (iv) Clinico-genomic data consortia, (v) Omics assaying companies, (vi) Clinical genomics companies, (vii) PGx companies, (x) Medical Alley and other biotech investors, and (xi) International collaborators.
- d. Build capacity for increased and interdisciplinary research excellence in PPM to foster high-impact research, securing NIH grants and philanthropic support, and building collaborations with other institutions doing precision medicine.
- e. Pursue a diversity of revenue streams from federal agencies, private foundations, industry, and state. Build the foundations of PPM at UMN while building 3-4 focal areas of PPM in which the UMN can attain leadership status within the 10-year horizon. These areas must leverage our strengths. Examples of potential areas of focus:
 - i. Learning Health System that drives powerful discoveries as a natural extension of patient care
 - ii. Development of molecular profiles by piggy-backing on clinical trials and/or clinico-molecular data.
 - iii. Pre-emptive pharmacogenomics
 - iv. PPM for reducing health disparities
 - v. Reliable, responsive, resilient and responsible design of PPM supply chains
 - vi. Novel educational programs and courses for PPM
 - vii. Ethical, legal, and social issues in precision medicine
 - viii. Diagnostics and biomarkers for individualized therapies
 - ix. Gene editing and gene transfer for disease treatment
- f. Build on prior success and PPM development work of which there are several important examples (e.g. Grand Challenge precision medicine projects).

4. Supplemental information/references and addenda are under development and available on request.

(i) Institute of Medicine 2011 Report on Precision Medicine, (ii) Paradigms of PPM, (iii) Examples of national institutional leaders in PPM & brief explanation of areas of strength/focus, (iv) Large-scale national and international initiatives in PPM, (v) UMN faculty with strength in PPM, (vi) Vision for pharmacogenomics (PGx), (vii) Efforts for state-sponsored PGx, (viii) MPMC successful projects; Native American cancer, Ovarian Cancer, Computational Psychiatry, 10,000 Families project, (ix) Ethics, legal, social issues and PPM supply chain management projects, and (x) Current and envisioned educational PPM programs and courses.