CISNET –Planning for the Future
Possible Future Priorities
Spring 2018

CISNET Goals for Future :
Balancing Prior Formula for Success with New Opportunities

- Continue success of structure of multiple modeling groups each focused on single cancer sites using rigorous comparative modeling approach
  - Rapid response funds
  - Affiliate member program (join for collaborative opportunities, but no funding)
  - Junior investigators group (webinars and events at meetings)
  - Computer programmers interest group
  - Rigorous model documentation at different technical levels

- Enhance opportunities for:
  - Cross-cancer site collaborations
  - Training of junior investigators and their opportunities for funding
  - Outside investigators to work with CISNET
    - Modelers
    - Those wishing to work with CISNET on model applications
  - Constructive critique of CISNET models and modeling approaches
  - Setting standards for model sharing
  - Developing modeling for new cancer sites
  - Methods development

Possible Priority Areas for the Future

1) Precision Screening
   a. Risk-based screening — polygenic risk, family history, behavioral risk factors, etc. Who to screen and how often? Tradeoffs of optimal regimens vs. regimen complexity
   b. Subsequent screening regimen dependent on earlier events – e.g. prior screens, co-morbidities, etc.
   c. Impact of new technologies

2) Precision Treatment
   a. Big Data - taking advantage of availability of enhanced registry and other data between first course of therapy and death (detailed regimens, dose, recurrence), genomic characterization of disease
   b. Value/threshold pricing of expensive regimens
   c. Trial design and evaluation – e.g. impact of precision treatment de-escalation (non-inferiority trials)
   d. Population impact of advances (especially in recurrent setting)

Possible Priority Areas (cont.)

3) Overdiagnosis and Active Surveillance
    a. Screening regimens to minimize the chance of overdiagnosis
    b. Decision to select active surveillance, regimens of active surveillance, decision to terminate active surveillance and initiate treatment

4) Decision aids – using models as engines to develop decision aids (policy and individual)

5) Evidence-based implementation of screening and/or treatment processes — understanding what works in real-world settings

6) Meta-Synthesis – model-based meta-analysis when trials are too different to combine under usual meta-analysis methods

Possible Priority Areas (cont.)

7) **State, local, and international cancer control planning**

8) **Suggesting optimal routes to reduce health disparities** — race/ethnicity, income/education, insurance status, geography (e.g., rural/urban), access to health care

9) **Methods Development**
   a. **Computing and algorithmic infrastructure development** – high-speed computing and enhanced algorithms to solve problems such as high-dimensional model calibration and probabilistic sensitivity analysis
   b. **Integration of statistical and simulation modeling** – support of development of statistical modeling which will inform and/or can be inserted into simulation models (e.g. statistical modeling of recurrence)

10) **Other cancer-specific opportunities**

Possible Enhancement #1:
Introduce New Cancer Sites

To Support:

- Development of "CISNET" type models for a new cancer sites not currently included in CISNET

- "Scaled down" version of full CISNET group

- Reduce the barriers to entry

- Would not provide a list of possible cancer sites

  - Modeling of issues related to cancer types other than those currently included—applicant would need to make the case that a cancer site is amenable to this type of modeling and that significant opportunities exist for model applications that would have impactful public health benefits

- Proposed cancer sites must meet the following criteria:

  - Cancer site must have existing, new, and/or evolving cancer control opportunities that are mature enough that they have been or could be shortly deployed
  - There are perceived inefficiencies in the way these cancer control strategies have been or might be deployed (which could be explored through modeling)

Possible Enhancement #1 (continued): Introduce New Cancer Sites

- Multiple PI application from two (or possibly 2-3) modeling groups to maintain comparative modeling perspective
  - 2-3 modeling groups represents a scaled down version of the full CISNET sites, but still represents a big advantage over a single group
  - Designate a lead modeling group to acquire data sources, lead model comparisons, field inquires
- Can include models developed from scratch or nascent efforts (unlike CISNET main award)
- Emphasis can include model development, extensions, and applications
  - Most models should include a natural history component (and show that data are available to support it) unless the applicant could indicate why it is not necessary
- More difficult to maintain independence of modeling efforts if they are developed from scratch (probably most models will be at least nascent efforts and will already have a basic structure formulated)
- Smaller budget than main CISNET site partly to lower financial barriers to entry for NCI (esp. given that most of these cancer sites have a smaller population "footprint")

Possible Enhancement #1 (continued): Introduce New Cancer Sites

- Can possibly leverage current CISNET work (e.g. smoking history generator, HPV transmission models, co-morbidity adjusted lifetables)

- Measuring success for a new cancer site
  - Demonstrating that available evidence synthesized in simulation models can produce credible extrapolations
    - For example, models results can be validated against independent evidence not used in model development
  - Finding reasonable consistency between independently developed models
  - Developing opportunities across the cancer control spectrum where modeling can assist in optimizing choices that will have significant public health benefit

Possible Enhancement #2:
Overall CISNET Coordination

As CISNET has grown in size and influence this seems necessary

- Enhanced training program for junior investigators (details to follow)

- Facilitating discussion & debates about modeling approaches, including forums for external critiques (participating in publications in this area)

  - As CISNET's impact has grown, so has criticism (want to be welcoming of constructive critique)

- Facilitating cross-cancer site collaborations

- Integrating funded incubator cancer sites into CISNET community

- Outreach and fielding external inquiries

- Developing model release standards

- Continuing to develop model documentation standards, publication support, and members only website, and overall meeting support

Enhanced Junior Investigators Program (possible ideas)

- Goal: Support junior investigators (both pre and post doc) throughout CISNET to foster a career in decision modeling (both model development and model applications)

- As usual, work at one main site, but encourage visits to other sites
  - Develop catalog of short and medium term visiting opportunities at other sites

- Coordinated curriculum of webinars by senior members of CISNET to bring the breadth and richness of modeling approaches and applications

- Series of webinars by Junior Investigators, opportunities for junior investigators to discuss ongoing work, annual meeting for junior investigators

- Annual competitive small awards program to allow junior investigators to pursue independent ideas and possibly to support visits to other sites

Possible Enhancement #3: Competitive Supplements for CISNET Grants

To Support:

- Cross-cancer site collaborations in areas of common interest (e.g. overdiagnosis and active surveillance, risk-based screening, cancer recurrence modeling)

- Modeling cancer by genomic instead of anatomic characterization

- Opportunities for those outside CISNET to collaborate with CISNET

  - Those wishing to work with CISNET on specific model applications

  - Collaborate to enhance an existing model (e.g. improved modeling of DCIS for breast cancer)

  - Add a new model for existing cancer site (would need to provide strong scientific justification as to what this new model adds)

Possible Enhancement #3: Supplements to CISNET Grants (continued)

- Support modeling as extension of existing NCI consortia (e.g. Population-based Research to Optimize the Screening Process [PROSPR], Early Detection Research Network [EDRN])

- Opportunities for junior investigators (although the formal application would be through a coordinating center PI, a junior investigator could take a major role in much of the work)

- Model related methods development