The CANCER MOONSHOT INITIATIVE

Duke Urologic Assembly, 2017
Goals of the Cancer Moonshot

• Accelerate progress in cancer, including prevention & screening
  – From cutting edge basic research to wider uptake of standard of care

• Encourage greater cooperation and collaboration
  – Within and between academia, government, and private sector

• Enhance data sharing

(Presidential Memo 2016)
Vice President’s “Original” Cancer Moonshot Workflow

Vice President’s Office

Cancer Moonshot Federal Task Force

NCI/NIH

National Cancer Advisory Board

“Blue Ribbon Panel”

Working Groups
Federal Task Force Goals

- Accelerate our understanding of cancer, its prevention, early detection, treatment and cure;

- Support greater access to new research, data, and computational capabilities;

- Improve patient access and care;

- Identify and address any unnecessary regulatory barriers and consider ways to expedite administrative reforms;

- Identify opportunities to develop public-private partnerships and increase coordination of the Federal Government’s efforts with the private sector, as appropriate.

(Presidential Memo 2016)
Blue Ribbon Panel

• “The Blue Ribbon Panel ... will provide expert advice on the vision, proposed scientific goals, and implementation of the National Cancer Moonshot. ..The panel may also recommend other cancer research activities to enhance this effort.

• “The Panel will provide an intensive examination of the opportunities and impediments in cancer research... Findings and recommendations of the Panel will be reported to the NCAB.

• “The NCAB will use the Panel’s findings and recommendations to provide final recommendations to the NCI Director.”
# Blue Ribbon Panel

## Co-Chairs

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Tyler Jacks*</td>
<td>MIT</td>
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<tr>
<td>Elizabeth Jaffee*</td>
<td>Johns Hopkins</td>
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<td>Dinah Singer</td>
<td>NCI</td>
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<tr>
<td>Peter C. Adamson, M.D.*</td>
<td>Children's Hospital of Philadelphia</td>
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<td>James Allison</td>
<td>MD Anderson</td>
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<td>David Arons</td>
<td>National Brain Tumor Society</td>
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<td>Mary Beckerle</td>
<td>Univ. of Utah</td>
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<td>Mitchel Berger*</td>
<td>UCSF</td>
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<td>Jeffrey Bluestone</td>
<td>Parker Institute</td>
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<td>Chi Dang*</td>
<td>U. Penn</td>
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<td>Mikael Dolsten</td>
<td>Pfizer</td>
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<td>James Downing</td>
<td>St. Jude Hospital</td>
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<td>Levi Garraway</td>
<td>Harvard Medical School</td>
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<td>Gad Getz</td>
<td>Broad Institute</td>
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<td>Laurie Glimcher</td>
<td>Weill Cornell</td>
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<td>Lifang Hou</td>
<td>Northwestern</td>
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<td>Neal Kassell</td>
<td>Univ. Va.</td>
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<td>Elena Martinez*</td>
<td>UCSD</td>
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<td>Deborah Mayer</td>
<td>UNC</td>
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<td>Edith Mitchell</td>
<td>Thomas Jefferson Univ.</td>
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<td>Augusto Ochoa</td>
<td>Louisiana State Univ.</td>
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<td>Jennifer Pietenpol</td>
<td>Vanderbilt Univ.</td>
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<td>Angel Pizzaro</td>
<td>Amazon Web Services</td>
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<td>Barbara Rimer</td>
<td>UNC</td>
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<td>Charles Sawyers*</td>
<td>MSK</td>
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<td>Ellen Sigal</td>
<td>Friends of Cancer Research</td>
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<td>Patrick Soon-Shiong</td>
<td>NantWorks</td>
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<td>Wai-Kwan Alfred Yung</td>
<td>MD Anderson</td>
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*NCAB/BSA member
Charge to Blue Ribbon Panel

• “The Blue Ribbon Panel … will provide expert advice on the vision, proposed scientific goals, and implementation of the National Cancer Moonshot. ..The panel may also recommend other cancer research activities to enhance this effort.

• “The Panel will provide an intensive examination of the opportunities and impediments in cancer research… the Panel may call upon special consultants, assemble ad hoc work groups … Findings and recommendations of the Panel will be reported to the NCAB.

• “The NCAB will use the Panel’s findings and recommendations to provide final recommendations to the NCI Director.”

(Presidential Memo 2016)
## BRP Working Groups

<table>
<thead>
<tr>
<th>Working Group</th>
<th>Co-Chair</th>
<th>NCI Staff</th>
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<tbody>
<tr>
<td><strong>Cancer Immunology</strong></td>
<td>Liz Jaffee, Jim Allison</td>
<td>Toby Hecht, Kevin Howcroft</td>
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<tr>
<td><strong>Precision Prevention and Early Detection</strong></td>
<td>Mary Beckerle, Jennifer Pietenpol</td>
<td>Elisa Woodhouse, Tracy Lively</td>
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<td><strong>Tumor Evolution</strong></td>
<td>Chi Dang, Levi Garraway</td>
<td>Joanna Watson, Suresh Mohla, Tony Dickherber</td>
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<td><strong>Clinical Trials</strong></td>
<td>Charles Sawyers, Mitch Berger</td>
<td>Jeff Hildesheim, Meg Mooney</td>
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<td><strong>Implementation Sciences</strong></td>
<td>Elena Martinez, Augusto Ochoa</td>
<td>Bob Croyle, Worta McCaskill-Stevens</td>
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<td><strong>Pediatric Cancer</strong></td>
<td>Peter Adamson, Jim Downing</td>
<td>Judy Mietz, Malcolm Smith</td>
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<td><strong>Enhanced Data Sharing</strong></td>
<td>Angel Pizarro, Gaddy Getz</td>
<td>Juli Klemm, Betsy Hsu, Jennifer Couch</td>
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Blue Ribbon Panel Working Groups

• Each Working Group had 12-15 members.

• In total almost 150 individuals were engaged in the Working Groups, including academic researchers, clinicians, industry representatives and advocates.

• Charge was to generate 2-3 recommendations of major scientific opportunities that are poised for acceleration.

• The Working Groups met almost weekly to discuss and formulate their recommendations.
Scientific and Community Outreach Activities

Goal:
- Provide opportunities for the public and experts ways to submit ideas
- Increase the public’s participation in the Cancer Moonshot

Approaches:
- Online public idea repository – over 1600 ideas submitted
- One-on-one public input: email
- BRP Listening sessions
- Professional conferences

Response:
- Over 1600 ideas received
Overview of Blue Ribbon Panel Report

• The 7 Working Groups submitted a total of 14 recommendations

• All 14 were discussed at the July 20 meeting of the Blue Ribbon Panel
  – Thirteen were approved as “Moonshot recommendations”
  – One recommendation was converted to a demonstration project
For the report, some recommendations were combined:

- Pediatrics Cancer and Tumor Evolution Working Groups both recommended efforts to identify new therapeutic targets to overcome cancer resistance.

- Tumor Evolution, Cancer Immunology and Precision Prevention Working Groups proposed generation of human atlases of cancer.

- Both the Precision Prevention and Implementation Science Working Groups focused on the importance of screening.

- Development of technologies cited throughout the recommendations was combined into a single recommendation.
Overview of Blue Ribbon Panel Report

- The Report summarizes these recommendations of exceptional research opportunities that could lead to powerful advances in our understanding of cancer.

- Three sidebars highlight proposed demonstration projects.

- The online Report will include all recommendations in their entirety at www.cancer.gov.br.
Cross-Cutting Themes

• National network of patient biological and clinical data

• Prevention

• Health disparities research

• Development of biomarkers, technology and preclinical models

• Data sharing, analytics and predictive computational modeling

• Collaboration; public-private partnerships
Summary of the Recommendations

A. Network for direct patient engagement:
   • Enlist patients in federated network that includes patient tumor profiling data and “pre-registers” patients for clinical trials.

B. Cancer immunotherapy network.
   • Organize networks to discover and evaluate novel immune-based approaches for pediatric and adult cancers, and eventually develop vaccines.

C. Therapeutic target identification to overcome drug resistance.
   • Launch interdisciplinary studies to delineate mechanisms that lead cancer cells to become resistant to previously effective treatments.

D. Creation of a national cancer data ecosystem.
   • Create an ecosystem to collect, share, and interconnect datasets.
Summary of the Recommendations

E. Fusion oncoproteins in pediatric cancer.
   • Improve understanding of the abnormal fusion proteins that result from chromosomal translocations and drive many pediatric cancers.

F. Symptom management research.
   • Support research to accelerate development of guidelines for management of patient-reported symptoms to improve quality of life and adherence to treatment regimens.

G. Precision prevention and early detection:
   • Implementation of evidence-based approaches. Conduct implementation science research to encourage broader adoption of HPV vaccination, colorectal cancer screening, and tobacco cessation.
Summary of the Recommendations

H. Retrospective analysis of biospecimens from patients treated with standard of care.
  • Analyze biopsies to learn which features predict outcome to better plan treatment for future patients.

I. Creation of human tumor atlas.
  • Catalog the evolution of genetic lesions and cellular interactions in tumor/immune/other cells in tumor microenvironment from the earliest detected lesions to metastasis

J. Development of new enabling technologies.
  • Support development of technologies to accelerate testing of therapies and tumor characterization.
Summary of the Recommendations

Prevention: Lynch Syndrome Demonstration Project
• A national effort to systematically screen all CRC and endometrial cancer patients for Lynch syndrome (LS)
• First degree relatives of patients with LS would be given the option to be screened and provided with genetic counseling

Therapy: Pediatric Cancer Immunotherapy Network Demonstration Project
• A national pediatric immunotherapy clinical trials network to facilitate the testing of new immunotherapy approaches in childhood cancer
• Establish a robust research pipeline to advance pediatric immunotherapy

Emergent Technologies: Tumor Pharmacotyping Demonstration Project
• Develop intra- and extra-tumoral technologies for determining the most effective therapeutic agents for individual patients
Next Steps

- The Report will advise NCI on future directions and programs that relate to the Cancer Moonshot

- Director, NCI, will forward the Report to the Vice President’s Cancer Moonshot Task Force

- Policy issues identified by the BRP as barriers (e.g. coverage and reimbursement; uniform informed consent) have been forwarded to the Task Force for consideration.
  
  - Implementation will depend on the extent to which these barriers are addressed.
Next Steps (continued)

- NCI will consider approaches for implementation of the recommendations
  - Identify those recommendations that are most feasible to implement in FY17
  - NCI will look to its advisory boards and the Blue Ribbon Panel for advice in the implementation
- Establish public-private partnerships and partnerships with other agencies
- Extent and rate of implementation will depend on Congressional appropriations
- Continued investment in investigator-initiated research and research areas beyond the scope of the Blue Ribbon Panel remains a high priority
Next Steps; Fate of Moonshot Under Trump?

• The 21st Centuries Cures Act passed with a 94-5 vote in the Senate. Fate is uncertain under Trump.

• Funding is uncertain

• The White House Task Force exited with Obama on January 20

• Moonshot Executive President Greg Simon will continue as its director, under Joe Biden’s leadership, as a new non-profit that has been renamed the: Biden Cancer Initiative

• FDA involved but no new leadership at FDA appointed yet

• Commercial ventures developing as well

• Incoming Secretary for Veterans Affairs is supportive
Questions?

www.cancer.gov/brp