Sidney Kimmel Comprehensive Cancer Center
Report 2011

William G. Nelson, M.D., Ph.D.
Director
New Directions for the SKCCC and its Research Programs: Three Examples

(why I am excited to be SKCCC Director)

• Individualized Health/Personalized Cancer Medicine
  - now a University-wide objective

• Initiative to eliminate cancer disparities

• Establishment of a Palliative Care capability for SKCCC and Johns Hopkins Medicine
Whole Exome Sequences of 100 Human Cancers*

11 colorectal cancers
11 breast cancers
24 pancreas cancers
22 gliomas
22 medulloblastomas

2 leukemias
1 breast cancer

1 breast cancer
4 granulosa cell tumors
1 lung cancer Sanger
1 melanoma

3142 mutated genes
286 tumor suppressors
33 oncogenes

*Vogelstein B  AACR Annual Meeting (2010)
Genome-Wide Epigenetic Alterations in Metastases from Men Dying of Prostate Cancer*

Hypermethylation (versus normal tissues)

Hypomethylation (versus normal tissues)

*Yegnasubramian S, Aryee MJ et al. (2011)
### Translational Development of Molecular Biomarkers at SKCCC: What are the Challenges?

#### Regulatory/Systems Considerations
- CLIA, biospecimen collection/archiving, HIPAA, health record information technology

#### Integration into Clinical Practice

<table>
<thead>
<tr>
<th>Test</th>
<th>Marker</th>
<th>Specimen</th>
<th>Company</th>
<th>Disease</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA3</td>
<td>RNA</td>
<td>urine</td>
<td>Dianon</td>
<td>prostate cancer</td>
<td>predicts prostate biopsy outcome</td>
</tr>
<tr>
<td>MGMT methylation</td>
<td>DNA</td>
<td>tissue</td>
<td>MDxHealth</td>
<td>glioblastoma</td>
<td>predicts response to temozolomide</td>
</tr>
<tr>
<td>GSTP1 methylation</td>
<td>DNA</td>
<td>urine, tissue</td>
<td>LabCorp MDxHealth</td>
<td>prostate cancer</td>
<td>predicts prostate biopsy outcome</td>
</tr>
<tr>
<td>AMACR</td>
<td>protein</td>
<td>tissue</td>
<td>many</td>
<td>prostate cancer</td>
<td>diagnosis aid</td>
</tr>
</tbody>
</table>
Detection of Cancer-Specific Mutations in Blood and Body Fluids: Opportunity for Screening and Early Detection*

"BEAMing" for mutant DNA

A

B

Wild-type

Mutant

% mutant DNA in stool

colon cancer stage

Unmet medical needs:
- poor colonoscopy quality
- timing of repeat colonoscopy

Improving Cancer Health at a Population Scale: Covered Lives in the Johns Hopkins Health System

<table>
<thead>
<tr>
<th>Organization (Characteristics)</th>
<th>Population Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johns Hopkins Community Physicians (Primary Care Provider Network)</td>
<td>&gt;260,000</td>
</tr>
<tr>
<td>Johns Hopkins Priority Partners (Medicaid Health Maintenance Organization)</td>
<td>&gt;185,000</td>
</tr>
<tr>
<td>Johns Hopkins Employee Health Program (Health Insurance Plan)</td>
<td>&gt;50,000</td>
</tr>
<tr>
<td>Johns Hopkins US Family Health Plan (Provider to US Government and Military Employees and Families)</td>
<td>Enrolling</td>
</tr>
</tbody>
</table>

Cancer Prevention and Control Program members already working with these entities to establish cancer screening guidelines and improve screening performance - first project focuses on reducing over-screening for prostate cancer among elderly men
Individualized Health/Personalized Medicine at SKCCC and at Johns Hopkins Medicine

What are the Challenges/Opportunities?

- Individualized Health Initiative (IHI) Planning led by Provost, Dean of Engineering, and SKCCC Director
- Envisioned $1.5B project (>0.5B investment in Epic health record/management system - investment in research information technology needed)
- Brings together Schools of Medicine, Public Health, Engineering, Nursing, Arts & Sciences, Business, Applied Physics Laboratory
- $30M Malone gift to Engineering
- $30M Commonwealth Foundation gift to SKCCC for Personalized Cancer Medicine
Race, Ethnicity, and Cancer Mortality in the SKCCC Catchment Area (2010)

<table>
<thead>
<tr>
<th>Race Category</th>
<th>Gender Category</th>
<th>Cancer Incidence %</th>
<th>SKCCC Cancer Registrants %</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>Male</td>
<td>39.4</td>
<td>43.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>38.0</td>
<td>32.3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>77.4</td>
<td>75.6</td>
</tr>
<tr>
<td>Black</td>
<td>Male</td>
<td>9.1</td>
<td>9.6</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>9.0</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>18.1</td>
<td>19.6</td>
</tr>
<tr>
<td>Other</td>
<td>Male</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2.2</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4.5</td>
<td>4.8</td>
</tr>
</tbody>
</table>

- Maryland cancer problem
  - 2nd rank state/district in cancer mortality in 1985
  - Cancer disparities in African-Americans were a major contributor to poor cancer outcomes
  - Disparities were particularly evident in colorectal, prostate, lung, and breast cancers
Working to Eliminate Cancer Health Disparities: Committed Leadership

at SKCCC

CONFERENCE CHAIRPERSON:
William G. Nelson, Johns Hopkins Kimmel Comprehensive Cancer Center, Baltimore, MD

at Johns Hopkins Medicine

Office of Diversity and Cultural Competence

Brian Gibbs, PhD/MPA, Associate Dean for Diversity and Cultural Competence

Johns Hopkins Medicine Diversity and Inclusion Plan 2020

• 20% of 200 Hopkins leaders under-represented minorities
• 75% of community residents view Hopkins as ‘trusted partner’
Working to Eliminate Cancer Health Disparities: **Committed Partners**: State of Maryland Comprehensive Cancer Control Plan

- High cancer mortality in Maryland prompted issuance of Cancer Control Plans; **2004 was first Comprehensive Cancer Control Plan**
- SKCCC and University of Maryland Greenebaum Cancer Center have contributed to the Comprehensive Cancer Control Plans
- Cancer mortality among African-Americans and disparities are falling

New Maryland Comprehensive Cancer Control Plan introduced at SKCCC in summer of 2011
SKCCC Research Helps Eliminate Disparities in Cancer Treatment*

Opportunity: Allogenic bone marrow transplantation (alloBMT) has proven benefit in the treatment of hematological malignancies and inherited bone marrow disorders.

Challenge: HLA-matched bone marrow donors are under-represented among African-American and other minority populations.

Solution: Innovative strategy for establishing immune tolerance in bone marrow allografts reduces graft-versus-host disease (GVHD) and making alloBMT more accessible to minority patients.

Individualizing the Care of Patients with Advanced Cancers:
the Role of Palliative Care*

- SKCCC Director and Administrator led in the establishment of a Palliative Care Program for all of Johns Hopkins Medicine
- $3M investment in new faculty, facilities, research
- National search identified Thomas J. Smith, M.D., as inaugural Director
Planned SKCCC Space Expansion

Bayview Campus: 25,000 ft²

- New Faculty (8 positions)
- Radiation Oncology
- Medical Oncology
- Pulmonary
- Clinical space - 20,000 ft²; Laboratory/support space - 5,000 ft²

Suburban Hospital: 7,000 ft²

Sibley Hospital: 30,000 ft²

All Children’s Hospital: 46,800 ft²
Sidney Kimmel Comprehensive Cancer Center Report 2011

William G. Nelson, M.D., Ph.D.
Director