KNIGHT
CANCER
Institute

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A Population-Based Screening Program versus Opportunistic Screening and Early Detection

Sancy Leachman, MD, PhD

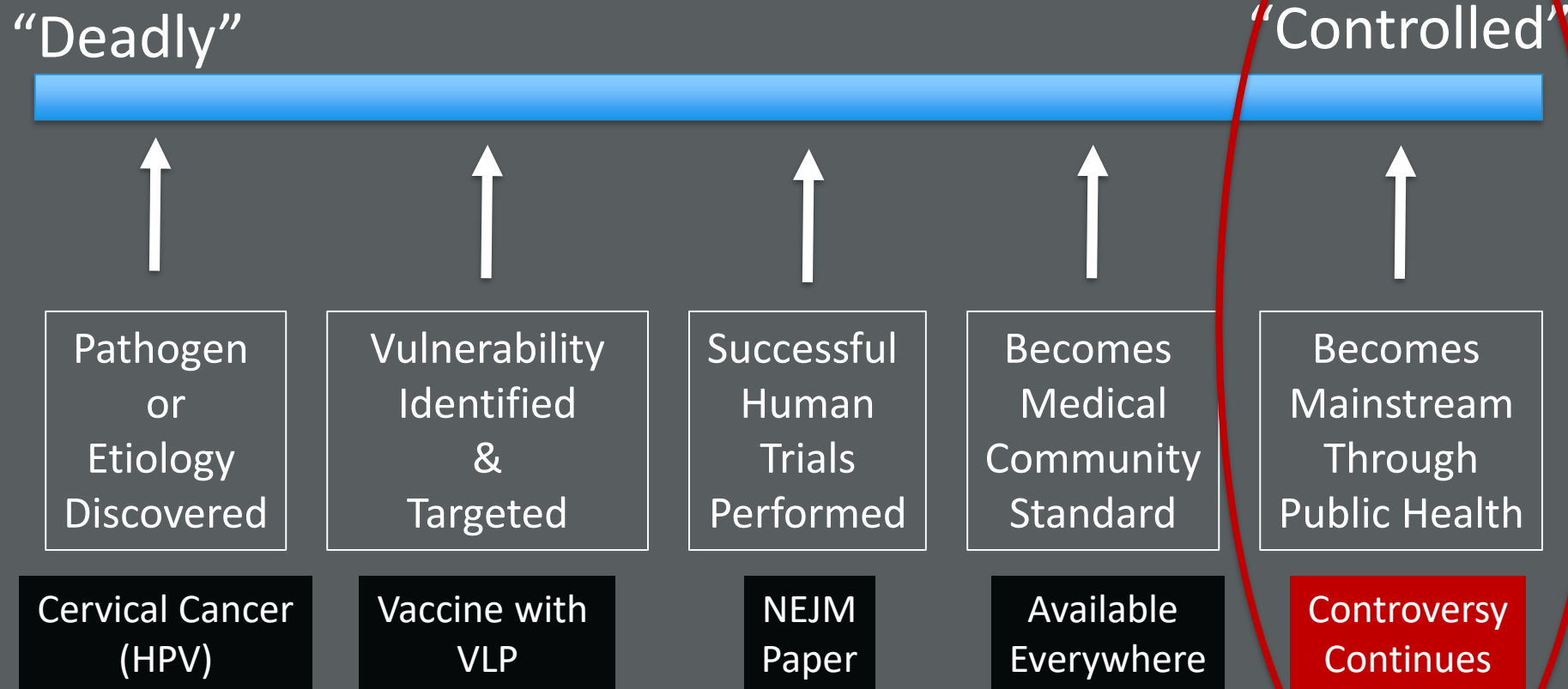Australian Skin and Skin Cancer Research Center

Melanoma Screening Summit

Monday, March 25, 2019

Disclosures

- Potentially Discussed in Q&A:
    - DermDetect (Mobile Dermoscopy)
    - MoleMapper – Free & Open Source Research Kit
- Not Discussed:
    - Myriad Genetics Laboratory
    - Castle Biosciences
    - Orlucent, Inc.
    - VeriSkin, Inc.
    - Merck

A Control Strategy That Works

"Deadly"   "Controlled"

| Pathogen or Etiology Discovered | Vulnerability Identified & Targeted | Successful Human Trials Performed | Becomes Medical Community Standard | Becomes Mainstream Through Public Health |

| Cervical Cancer (HPV) | Vaccine with VLP | NEJM Paper | Available Everywhere | Controversy Continues |

Melanoma Can Be A Model for Applied Early Detection

"Deadly"   "Controlled"

| Mechanism and Targets Discovered | Effective Treatment Identified | Patients Needing Treatment Identified | Treatment Applied To Patients | Treatments Broadly Applied to Community |

Identification Of Early Detection Method or Device → Identification and Treatment In Appropriate Populations
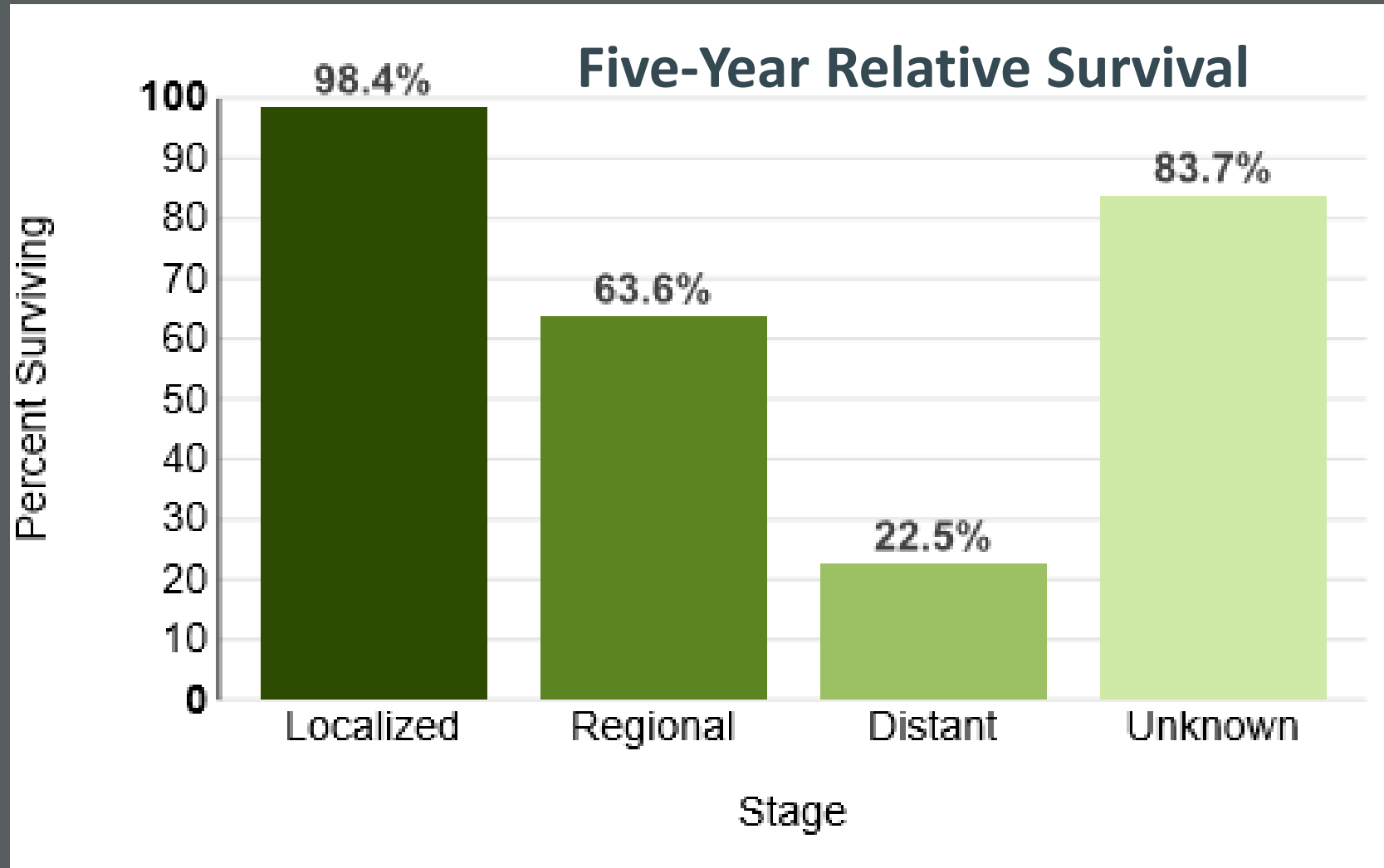
Most Cancers

Melanoma (our eyes)

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The Vision (AKA BHAG): Seek Out & Destroy Every Lethal Melanoma

Early Detection Works for Melanoma

SEER 18 2008-2014, All Races, Both Sexes by SEER Summary Stage 2000

Skin awareness is inversely associated with lesion thickness and death.

Table 2. Independent predictors of death from melanoma in a multivariable model*

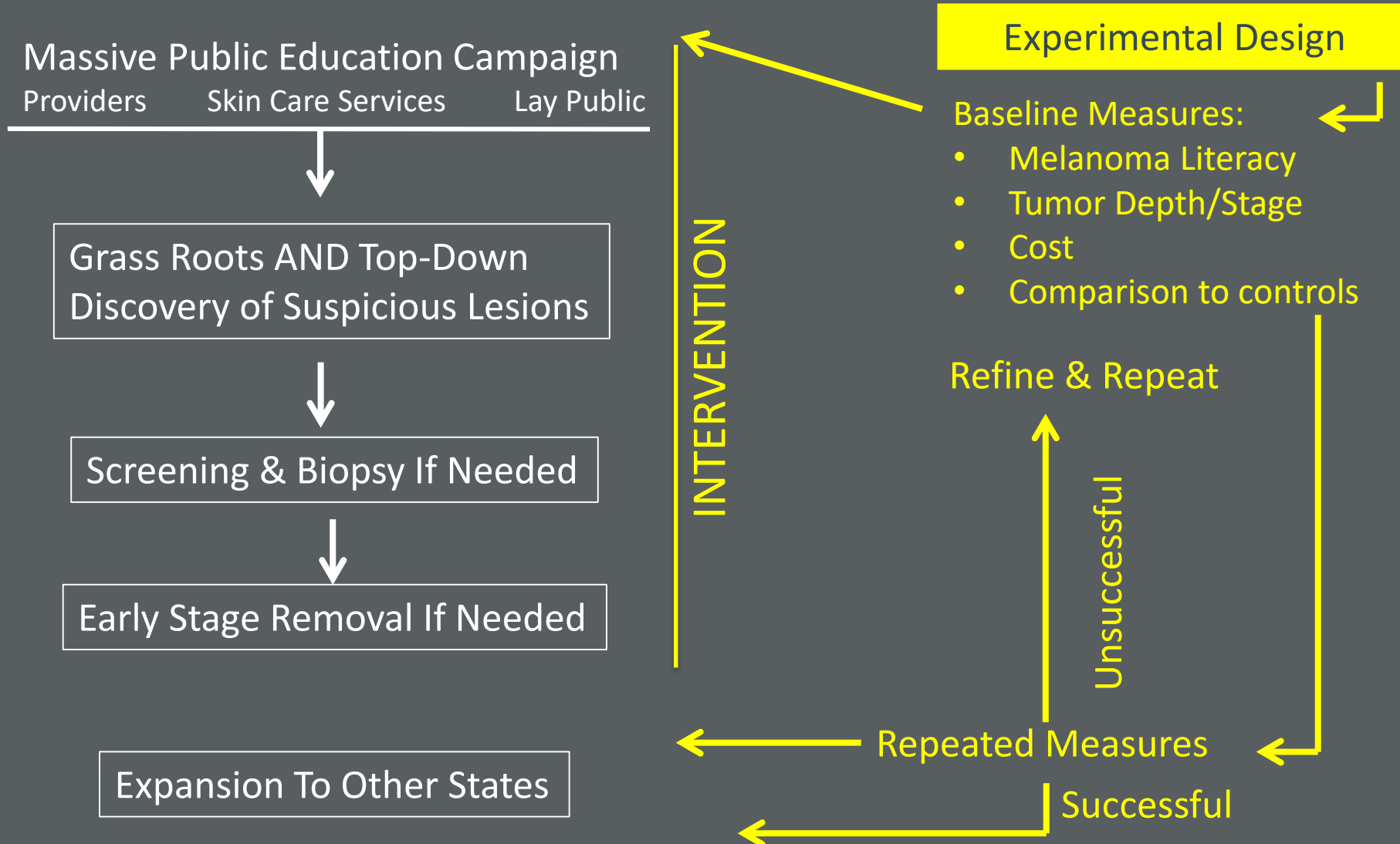| Variable	Hazard ratio (95% confidence interval)	P value
Solar elastosis		.009
Absent	1.0 (referent)	
Present	0.4 (0.2 to 0.8)	
Skin awareness		.022
No	1.0 (referent)	
Yes	0.5 (0.3 to 0.9)	
Breslow thickness		<.001
1 mm increase	1.3 (1.2 to 1.4)	
Anatomic site		.001
Other	1.0 (referent)	
Head/Neck	3.0 (1.5 to 6.0)	
Mitoses		<.001
None	1.0 (referent)	
Any	7.6 (2.5 to 23.1)	

*This model was run with all the variables in Table 1. Only these variables remained statistically significant at a level <0.10 are shown.

Berwick M, et al. JNCI Vol 97(3):195-199; 2005

The Concept: Oregon's Version of Schleswig-Holstein

Testing the hypothesis that melanoma mortality can be decreased by almost half through early detection/education.

The War Plan: A Statewide Population Sciences Experiment Overview!

Massive Public Education Campaign

Providers   Skin Care Services   Lay Public

Grass Roots AND Top-Down Discovery of Suspicious Lesions

Screening & Biopsy If Needed

Early Stage Removal If Needed

Expansion To Other States

INTERVENTION

Experimental Design

Baseline Measures:
- Melanoma Literacy
- Tumor Depth/Stage
- Cost
- Comparison to controls

Refine & Repeat

Unsuccessful

Repeated Measures

Successful

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War on Melanoma™: Major Outcomes

Professional Public Health Campaign For Those that Don't Care

Interrelated Hypotheses

Improved Melanoma Literacy

Knowledge & Behavior Survey OR, WA, UT

Reduced Cost for Care

All Payers All Claims Database

Lives Saved

Cancer Registry
- Depth
- Stage
- Incidence
- Mortality

Baseline and Post-Campaign

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Communications Methodology
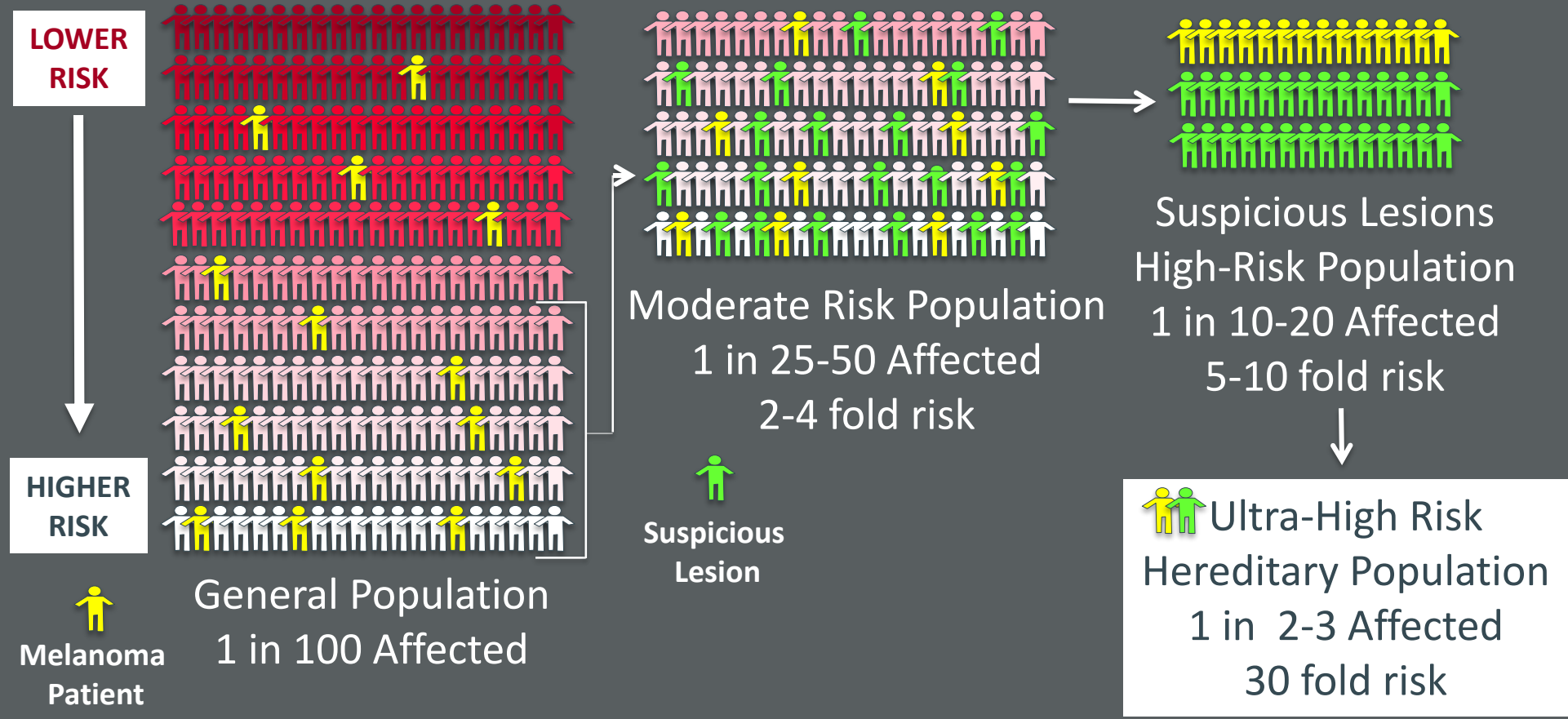
| Just Look & Act Campaign | Social Media
Billboards
Regular Updates |

↓

| Solutions for All | Web Page |

Education: Lay to Expert
Referrals: Derm & PCPs
Mole Mapper Tracking App
DermDetect Screening Exams
Telederm E-Visits
Registry Participation
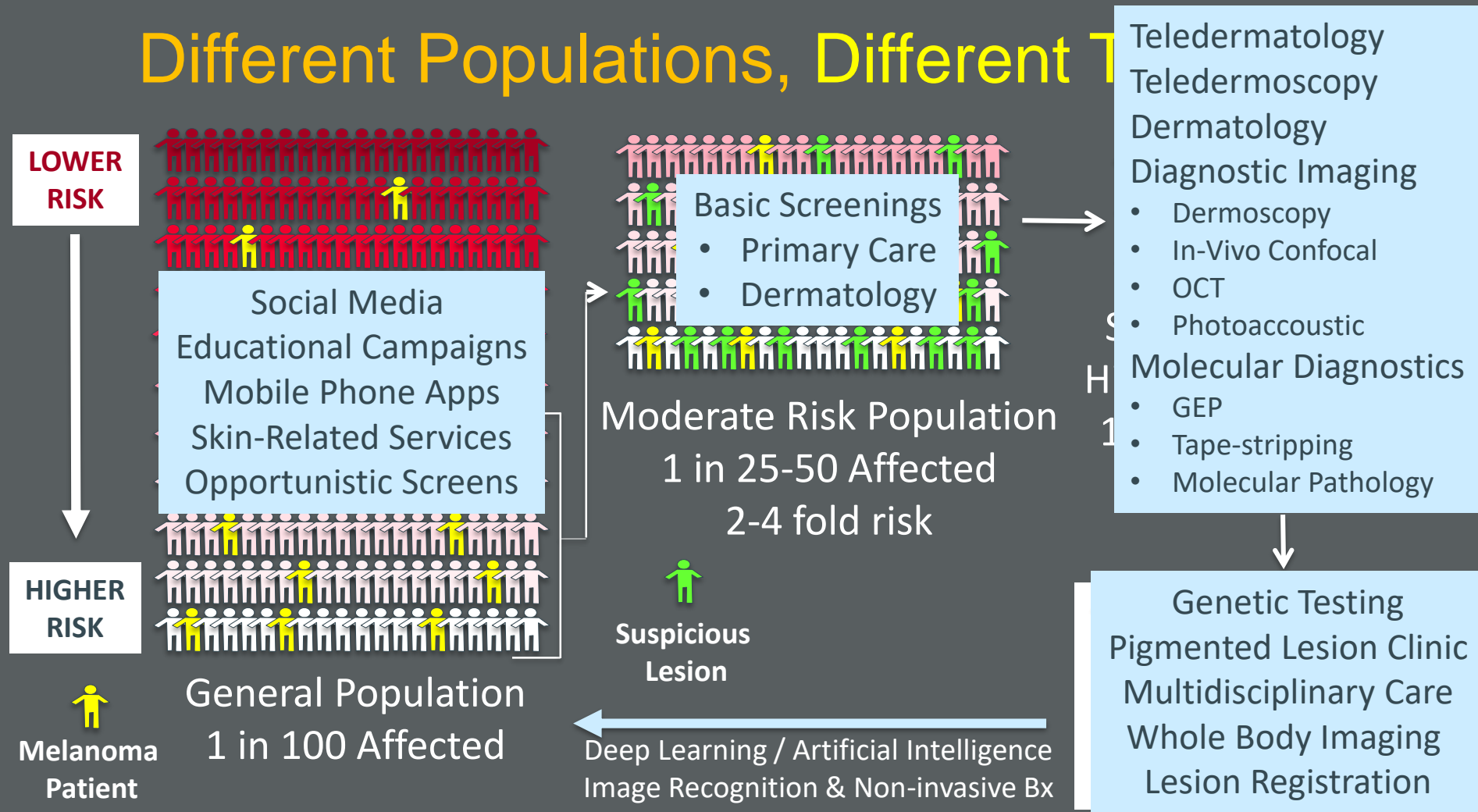Collaboration: Derm & PCP

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Strategic Screening Methodology
Different Populations

LOWER RISK

HIGHER RISK

Melanoma Patient

General Population
1 in 100 Affected

Moderate Risk Population
1 in 25-50 Affected
2-4 fold risk

Suspicious Lesion

Suspicious Lesions
High-Risk Population
1 in 10-20 Affected
5-10 fold risk

Ultra-High Risk
Hereditary Population
1 in 2-3 Affected
30 fold risk

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Strategic Screening Methodology

Different Populations, Different T[ ]

LOWER RISK

HIGHER RISK

Melanoma Patient

Social Media
Educational Campaigns
Mobile Phone Apps
Skin-Related Services
Opportunistic Screens

General Population
1 in 100 Affected

Basic Screenings
• Primary Care
• Dermatology

Moderate Risk Population
1 in 25-50 Affected
2-4 fold risk

Suspicious Lesion

Teledermatology
Teledermoscopy
Dermatology
Diagnostic Imaging
• Dermoscopy
• In-Vivo Confocal
• OCT
• Photoaccoustic
Molecular Diagnostics
• GEP
• Tape-stripping
• Molecular Pathology

Genetic Testing
Pigmented Lesion Clinic
Multidisciplinary Care
Whole Body Imaging
Lesion Registration

Deep Learning / Artificial Intelligence
Image Recognition & Non-invasive Bx

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Summary: The Full-Spectrum Operations Pyramid

Population	Outreach Method	Screening Technique
Ultra-High-Risk (1:3-1:10) Genetic Predisposition	Dermatology & Multi-disciplinary Melanoma Clinics	CODE, specialty clinics, advanced skin imaging
High-Risk Population (1:10-1:20) Personal Hx; Atypical Moles	Oregon Dermatologic Society	Telederm, in-person clinics, referrals, dermoscopy, biopsies
Moderate Risk (1:25-1:50) Red hair, Light skin, UVR damage	State Medical Boards & Societies, PCPs	E-visits, e-consults, in-person clinics Modified INFORMED Curriculum
General Population (1:100)	Melanoma Community Registry Oregon Health Authority	MoleMapper, Mobile Screening

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Timeline: WoM Early Detection Campaign

2013   2014   2015   2016   2017   2018   2019

Knight
Early Detection
Challenge

WoM
Registry

MoleMapper
Tracking App

E-Consults
E-Visits

Oregon
Derm
Society

Oregon
Health
Authority

OSCaR
SEER
Registry

PCP
Council
CME Events

Outreach
Roadshow

Cost
Analysis

Federated
States

Curriculum
Development

Broad
Public
Campaign

Literacy
Survey
Development
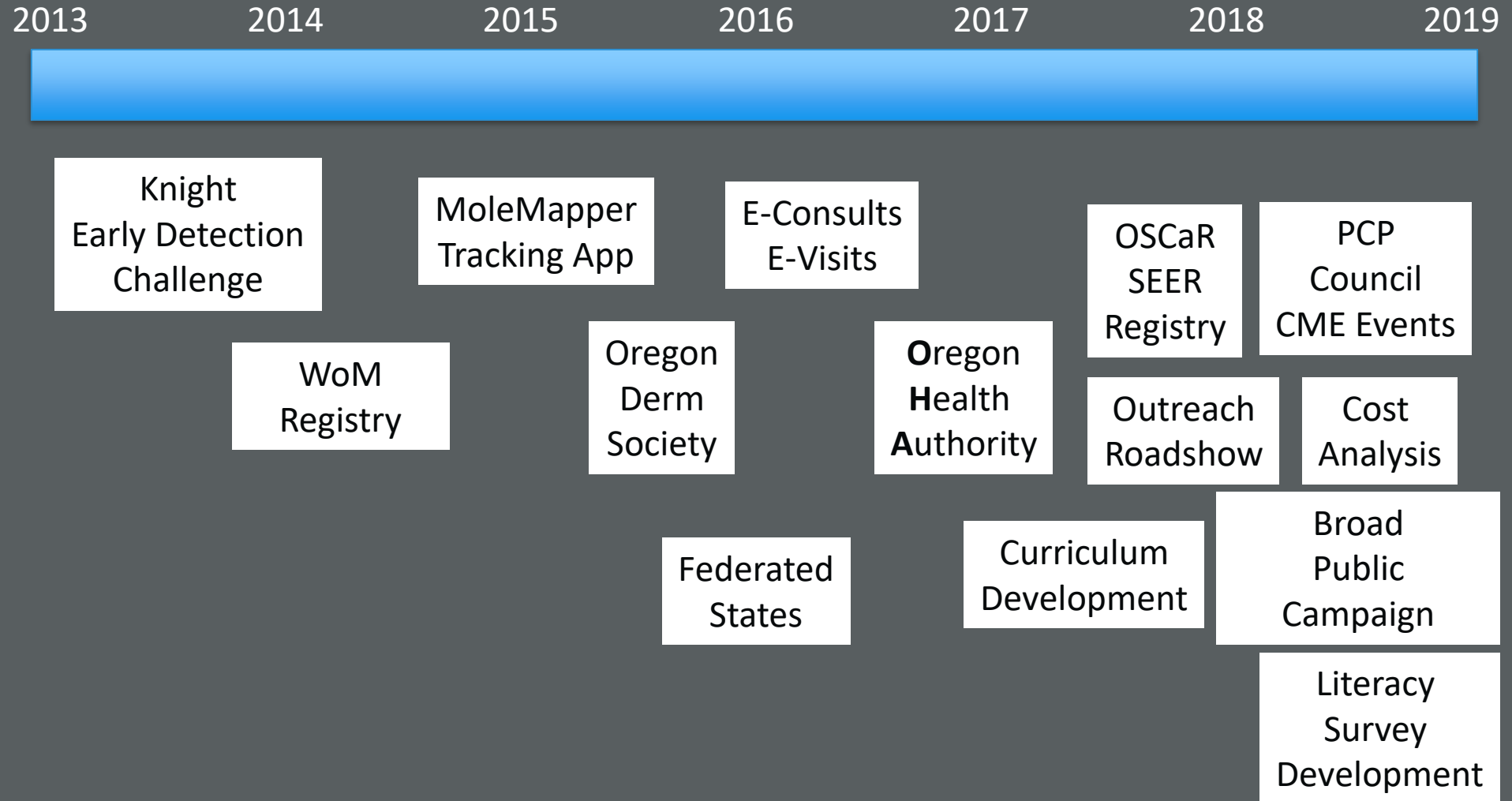
WoM Early Detection Campaign

2019	2020	2021	2022	2023	2024	2025

SURVEY

Campaign Launched May 18

Baseline Metrics:
- Literacy
- Tumor
- Cost
- Controls

"Just Look" **Campaign**
"If you see something, solve it!"

FEDERATED STATES

ODS: Board Certified Dermatologists

PCP: CME, E-Consults

OHA: Skin Service Professionals

Lay: Curriculum (melanoma, self-exams, empowerment); E-visit

Technology: MoleMapper; Mobile Imaging, Imaging Center

Americans Reached

Literacy Improved

Melanoma Detected Earlier

Costs Reduced

Lives Saved

Repeated Measures: Literacy, Tumor Data, Cost, #Participants, Social Media

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Institutional Partners/Collborators

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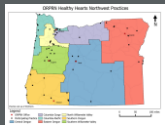
ORPRN

Oregon State Cancer Registry & Oregon Health Authority

Oregon Dermatologic Society

OCHIN

Lewis & Clark College

Community Outreach Programs

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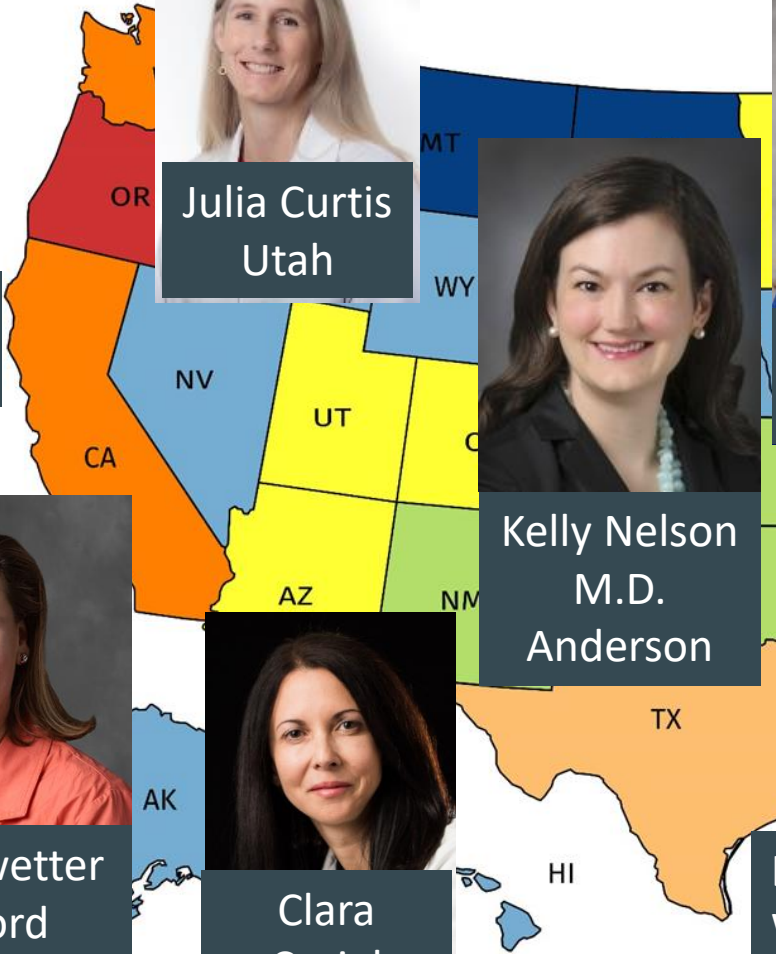

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na Community Registry Members by State
(as of 1/31/18)

We have 8 members of o... ...e United States.

Location missing for approx. 200 members.

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- SolSurvivors

Melanoma Prevention Working Group

- ECOG
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- CALGB
- Pigmented Lesion Subcommittee

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Thank you!