



YEARS/ANS CERN

ENLIGHT ANNUAL MEETING

CERN

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# ***THE STATUS OF PARTICLE THERAPY IN THE USA AND THE AMERICAS***



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# The Americas

## NORTH AMERICA



## CENTRAL AMERICA, MEXICO & CARIBBEAN

## SOUTH AMERICA



North America – 346 M  
 Central America, Mexico  
 & the Caribbean – 200 M  
 South America – 396 M

**TOTAL Population – 942 M**

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# ***PROTON THERAPY IN CANADA***



Total population—35 M

**Vancouver**

(TRIUMF)-Treated

175 pts

(closed Dec 2013)

**Toronto**—planning  
protons

**Edmonton**-planning  
protons



# Proton Facilities in the United States

## PROTON THERAPY CENTERS

★ = In Operation   ★ = Under Construction   ★ = In Development

Seattle  
California  
Loma Linda  
San Diego  
Arizona

Oklahoma  
Texas  
Houston  
Dallas  
Irving  
Louisiana

Massachusetts  
Pennsylvania  
New Jersey  
Maryland  
Virginia  
Tennessee  
Minnesota  
Michigan  
Illinois  
Indiana  
Missouri  
Georgia  
Florida  
Jacksonville  
Jacksonville  
Orlando



About Our Members

National Association of Proton Therapy

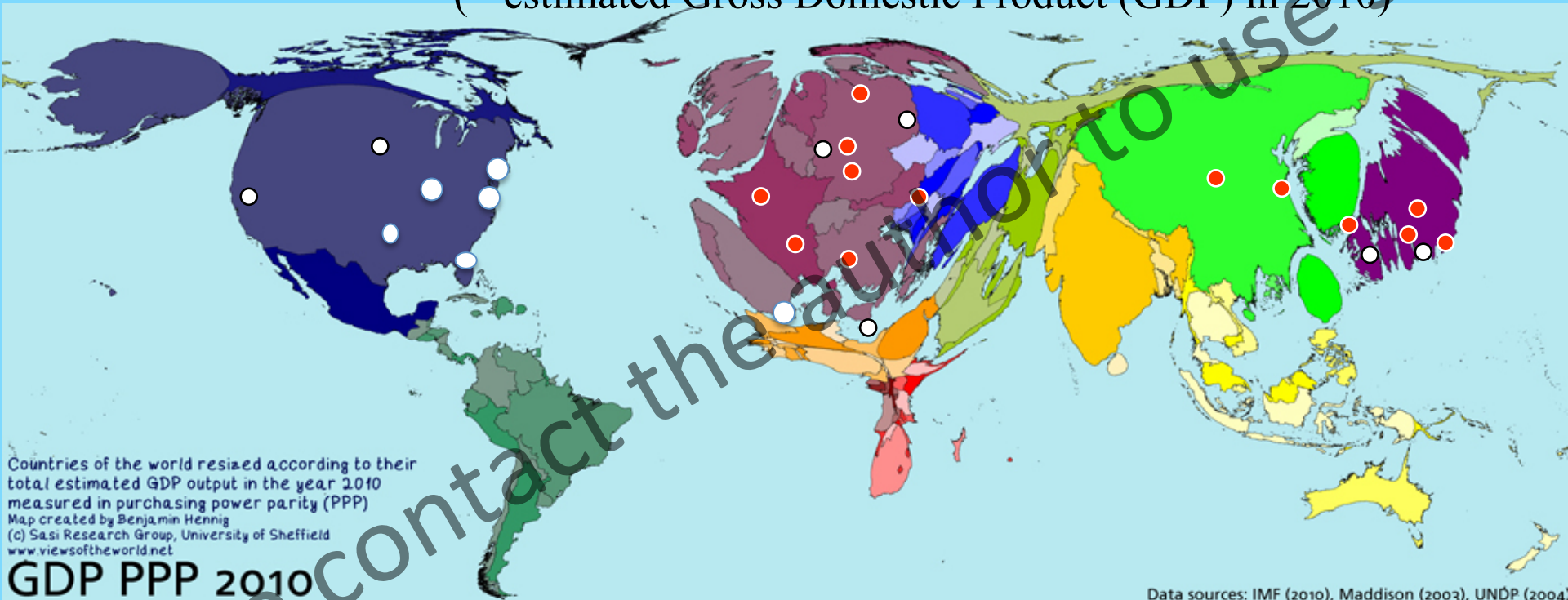
# *Proton and Neutron Therapy Pioneers in the US*



# Heavy Ion Therapy Facilities Around the World

Area resized according to the nation's wealth

(= estimated Gross Domestic Product (GDP) in 2010)



- In operation or under construction
- Planned

# ***PATIENTS TREATED IN THE US WITH PROTONS & He***

Berkeley H	30	1957
Berkeley He	2,054	1992
Boston NPTC	7,345	2013
Loma Linda	17,829	2013
Bloomington, IN	34	2013
Houston, TX	4,746	2013
Jacksonville, FL	5,085	2013
Oklahoma City, OK	1,364	2013
Pennsylvania, PA	1,750	2013
Warrenville, IL	1,329	2013
Hampton, VA	767	2013
Somerset, NJ	512	2013
Seattle, WA	86	2013
St. Louis, MO	1	2013
<b>TOTAL PROTON</b>	<b>40,848</b>	

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# ***BSA Approves Trial of Carbon Ion Therapy***

*The US National Cancer Institute Board of Scientific Advisors (BSA) at a meeting June 22-23, 2014 approved a 5-yr randomized controlled trial at \$2M per year to determine the safety and efficacy of carbon ion therapy for pancreatic cancer to be conducted in Japan.*

*The Cancer Letter, July 3, 2014*

*By conducting the trial outside of the US, where no CIRT centers are in operation, NCI also seeks to head off the problem now observed with proton beam, a technology being rapidly adopted throughout the US ahead of conclusive evidence from randomized trials.*

*The Cancer Letter, June 20, 2014*



## ***BUT.....CONTROVERSIES EXIST.....***

*“Should we consider doing this with photons, protons, and carbon?” said Kevin Cullen, Univ. of MD*

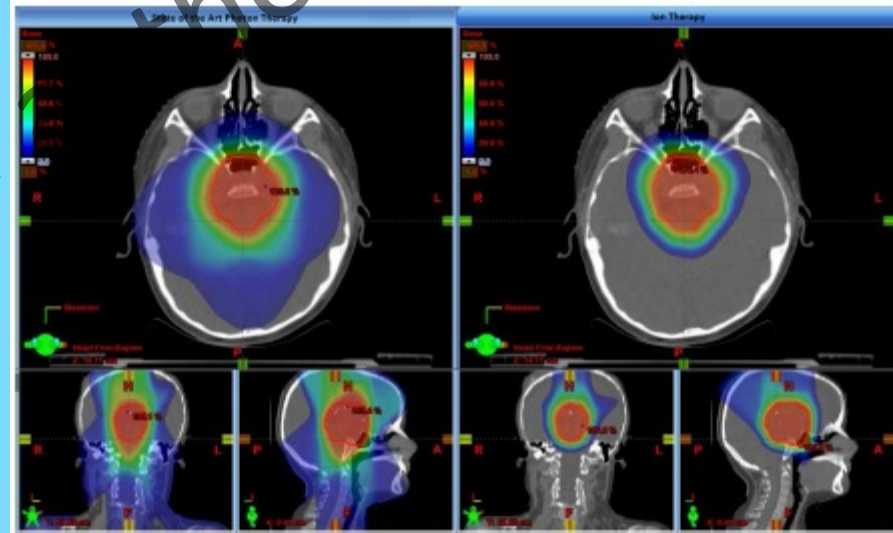
*“Because if you don’t, if the trial is positive, people are going to say, ‘Aha! We should build carbon facilities on every corner of the block.’ And if it is negative, then people will still say, ‘Maybe protons are better.’ So you leave big questions that are going to have seismic implications in terms of how we’re spending our resources building facilities.”*

*The Cancer Letter, July 3, 2014*

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# *Path Forward: DOE-NCI Workshop on Ion Beam Therapy, Bethesda, MD, January 2013*

- *More than 60 participants from medicine, physics, biology & business were charged with addressing 4 topics:*
  - *Charge 1: Identify pertinent clinical applications and radiobiological requirements*
  - *Charge 2: Assess corresponding beam requirements for future treatment facilities*
  - *Charge 3: Assess the corresponding beam delivery system requirements*
  - *Charge 4: Identify R&D activities needed to bridge the gap*



***NIH/NCI----Planning for a National Center for  
Particle Beam Radiation Therapy Research (P20)  
PAR-13-096 (due May 21, 2013) & PAR-13-371 (due Jan 21, 2014)***

*The purpose of this Funding Opportunity Announcement (FOA), issued by the National Cancer Institute (NCI) of the National Institutes of Health (NIH), is to encourage and support planning efforts for establishing a Center for Particle Beam Radiation Therapy (PBRT) Research..... The goal of this FOA is to provide the awardees with funding to enable inclusion of necessary resources (expertise or facilities) to carry out basic, translational, and clinical research complementary to a clinical PBRT facility.....The necessary expertise and efforts would be provided by a multidisciplinary team of basic, translational, and clinical Researchers, including physicists, engineers, biologists, and physicians, while the research facilities may include, by way of example, cell culture laboratories, vivarium, and clinical anesthesia units for pediatric patients..... **It is expected that this effort will result in a national research resource capable of successfully competing for and securing the funding required to operate a specialized research center for clinical PBRT.** This FOA is designed to support solely the planning for a Research Center at a separately funded PBRT facility, and not the PBRT facility itself.*



# *Future Hadron Therapy in the SF Bay Area?*

*SF Bay Area P20 planning application—NAPTA  
(North American Particle Therapy Association)*

*Led by UCSF and colleagues at LBNL, Stanford & SLAC*

*Supported by numerous international and national experts*

*Principal Investigator*

*Dr. Mack Roach, III*

*Chairman, Dept. of Radiation Oncology*

*Pending NCI Decision by October 2014*

## *What happened to your P20?*

*“We got a score in the Excellent range, and we are continuing to explore a number of options including possible collaborations with a group from Japan. We are cautiously optimistic. Only time will tell.”*

*Mack Roach, III, MD*

*Chairman, Radiation Oncology*

*UCSF*