



Better health through
laboratory medicine.

AACCC's Congressional Briefing: Improving Patient Care through Harmonized Test Results

Wednesday, October 5, 2016

Lunch Briefing: 11:30 am – 12:30 pm

Room B-369, Rayburn House Office Building

Improving Patient Care through Harmonized Test Results

Wednesday, October 5, 2016

Sponsored By:

- Representative Renee Ellmers (R-NC)

Moderator:

- Dr. David Koch

Speakers:

- Dr. Stephen Master
- Dr. Darius Paduch
- Dr. James Pirkle



*Better health through
laboratory medicine.*

Harmonization of Laboratory Tests

Stephen Master, MD, PhD, FCAP, FACB

Director, Central Laboratory, New York Presbyterian / WCMC

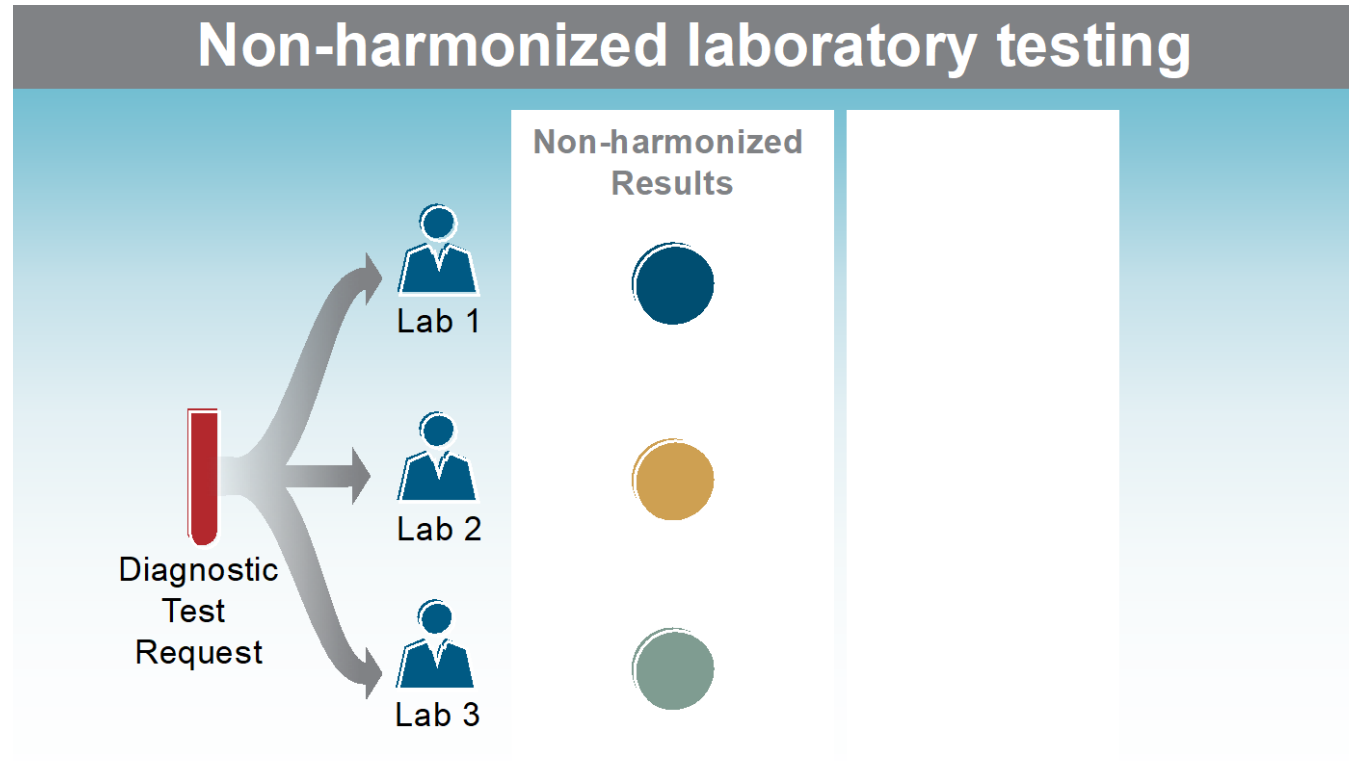
Associate Professor of Pathology and Laboratory Medicine

Weill Cornell Medical College, New York, NY

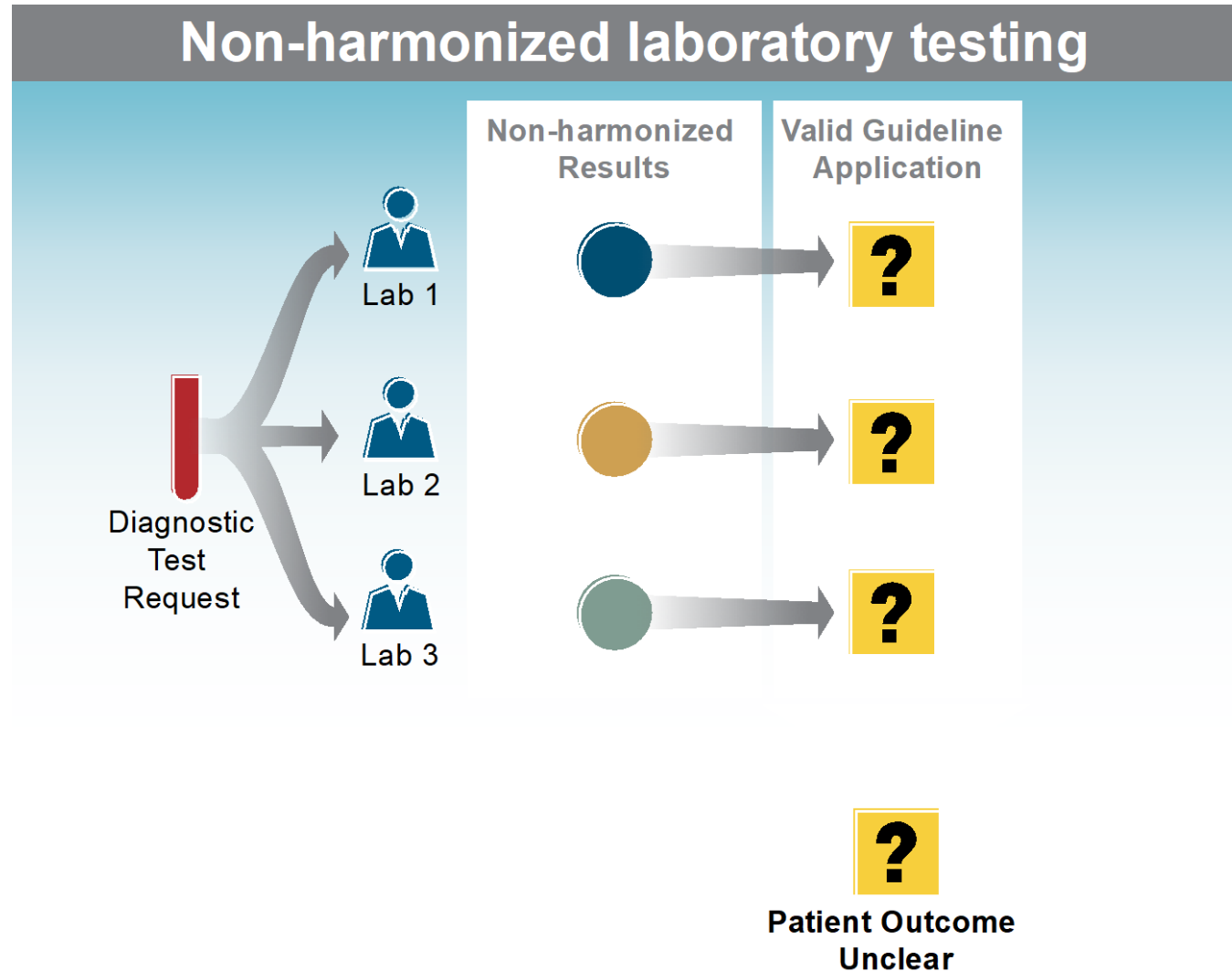
Outline

- What is Harmonization?
- Why does it matter for patients?
- Why does it matter to the healthcare system?
- Examples of important analytes
- AACC Perspective

What is Harmonization?



What is Harmonization?



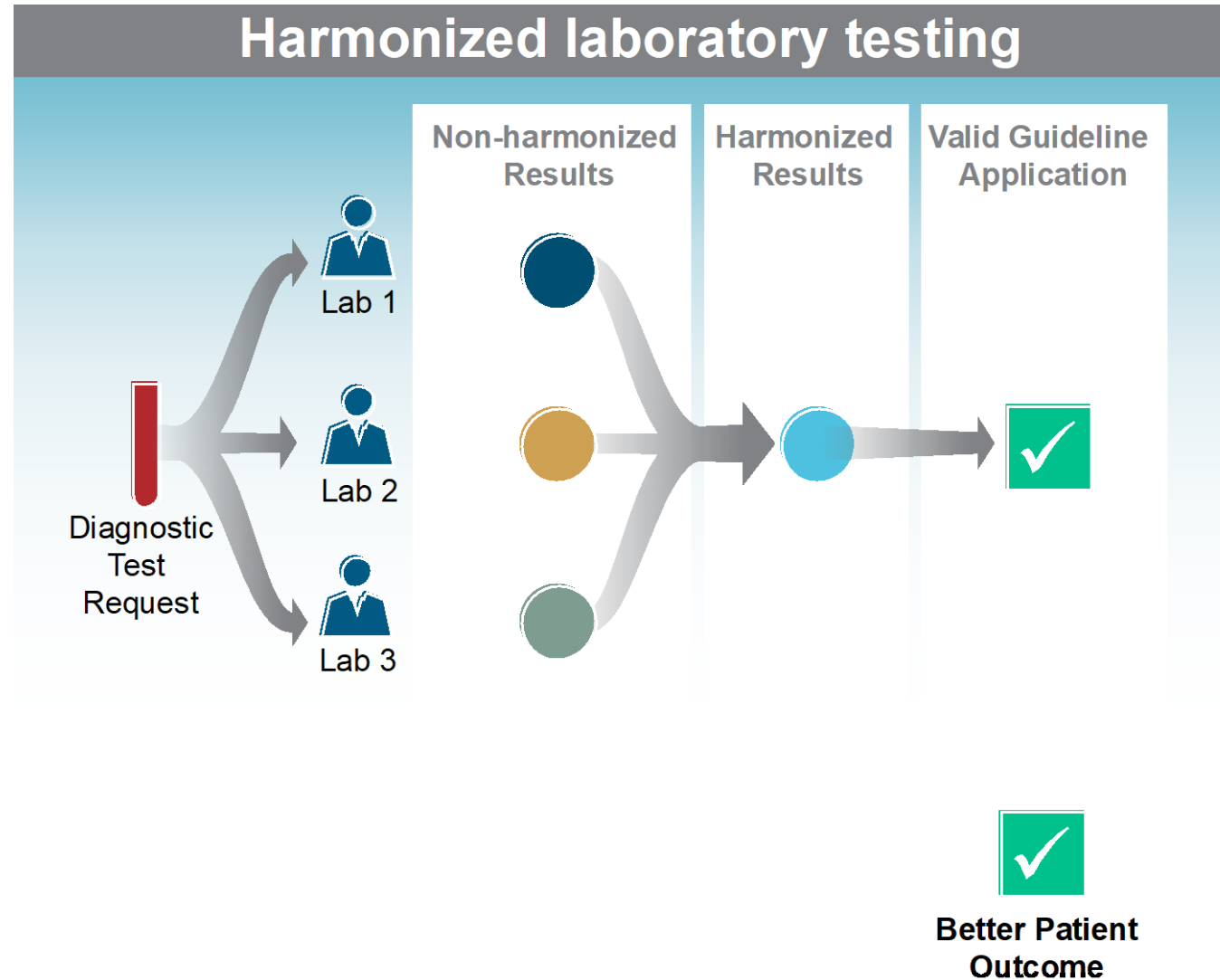
Why Does it Matter for Patients?

- Difficulty in comparing results from different providers
 - “I’m using a new laboratory, and my results changed; is something wrong?”
- May lead to retesting
 - Example: tumor markers require establishment of new baseline test results when the method changes
- Makes it confusing to investigate the medical implications of test results
 - Possible unnecessary visits to healthcare provider

Why Does it Matter for the Healthcare System?

- Problems for the portable medical record
- Outcomes-based reimbursement
 - If we can't compare lab values, how can we tell who is doing a good job with their patients?
- Makes it more difficult to assess health trends
- Complicates longitudinal testing
- Inhibits the development of accurate national guidelines for treatment
 - Also, implications for federally-funded research

Benefits of Harmonization

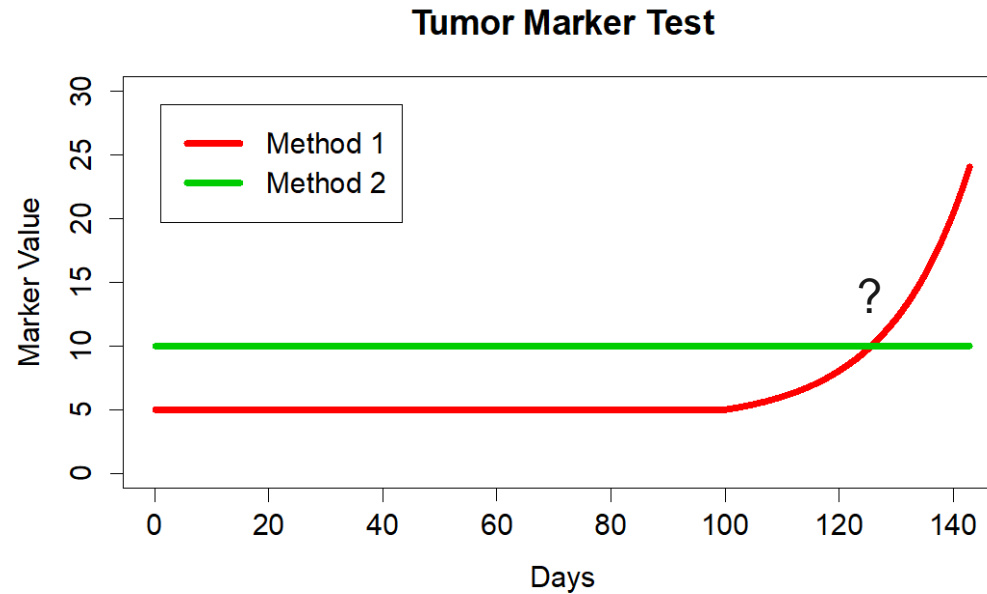


Examples of tests requiring harmonization

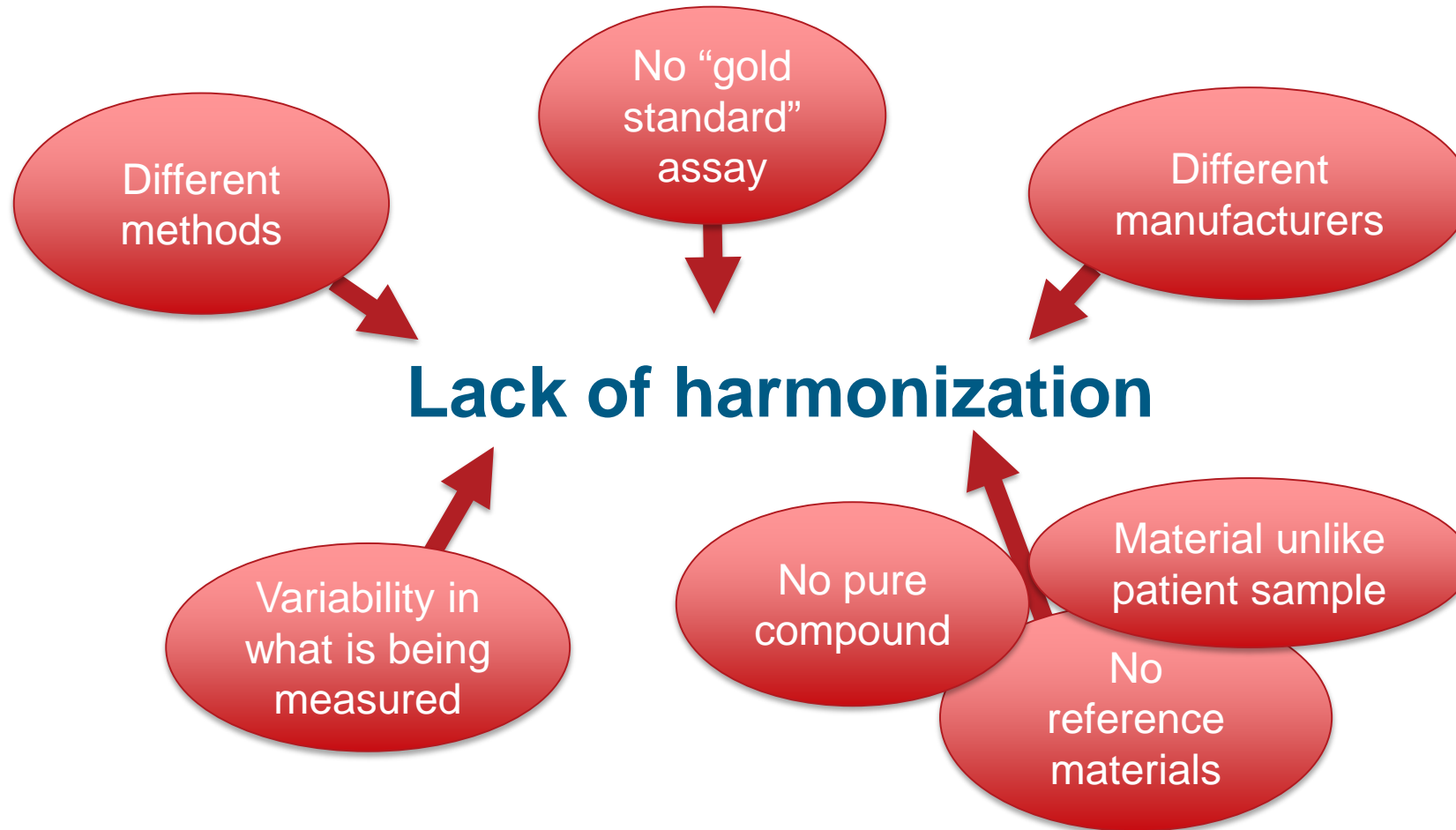
- Human growth hormone (growth abnormalities)
- Thyroid stimulating hormone (thyroid disorders)
- Prostate-specific antigen and other “tumor markers”
- Thyroglobulin (cancer)

Example: Cancer Recurrence

- Patient diagnosed with cancer and treated by removal of their tumor
- “Tumor marker” used to detect presence of the cancer



Why is this a hard problem?



Solutions: AACC Recommendations

- Coordinated action among many groups will be required to address harmonization issues:
 - Education on the scope of variability in laboratory test results
 - Base clinical practice guidelines on harmonized testing procedures
 - Streamlined/standardized regulatory processes to expedite the recalibration of medical tests
 - Funding from government and private sector sources to harmonize high-priority laboratory tests

Thank You



Weill Cornell Medicine

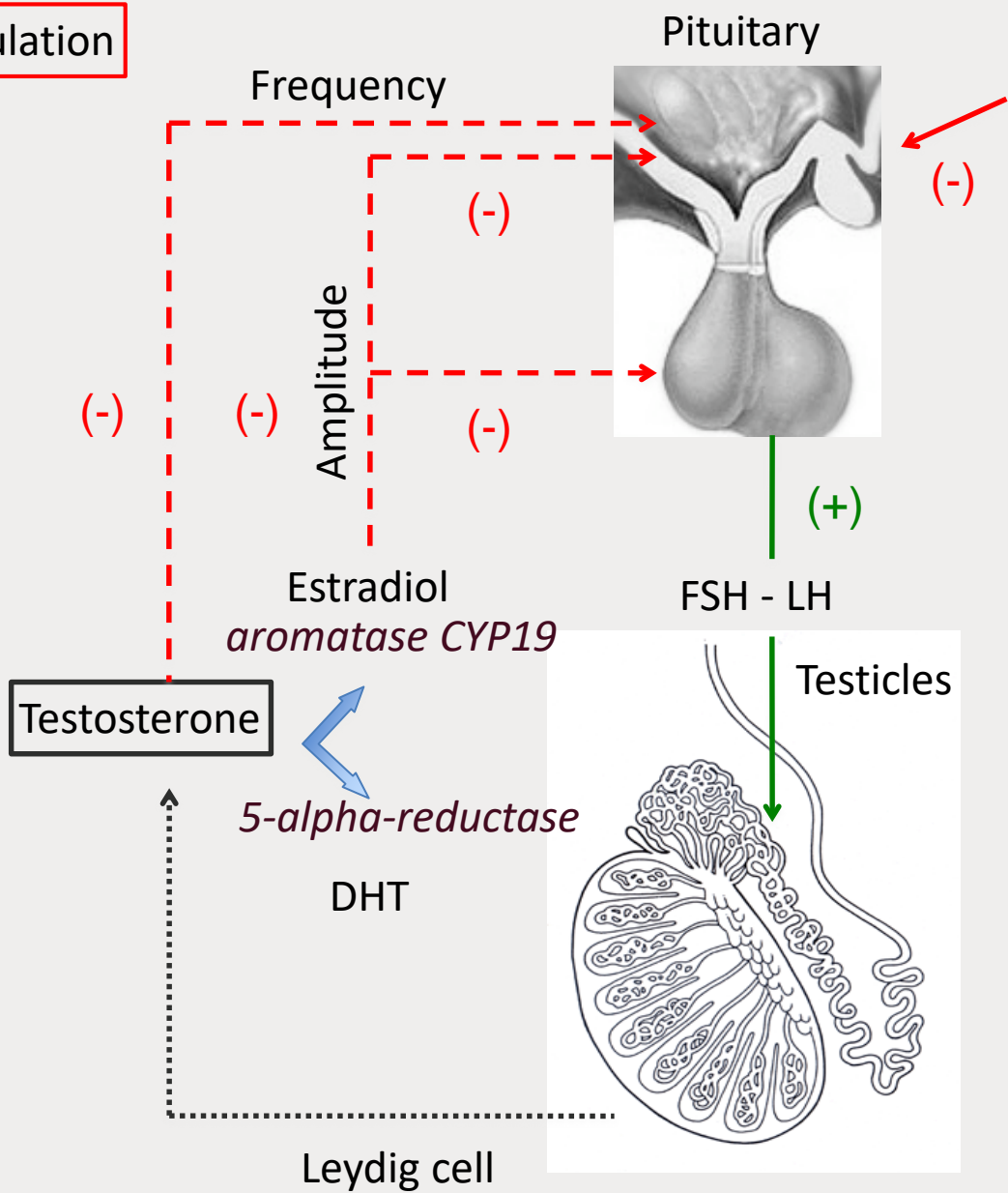
New York-Presbyterian

Improving accuracy in hormonal testing: clinical implications

Darius A Paduch, MD, PhD

Herbert Fisk Johnson Associate Professor of Reproductive Medicine and Urology

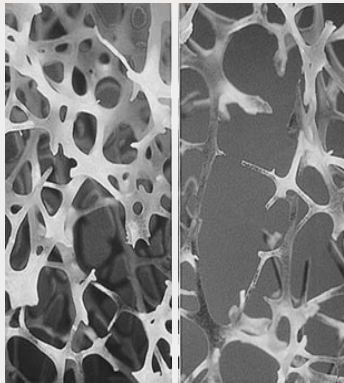
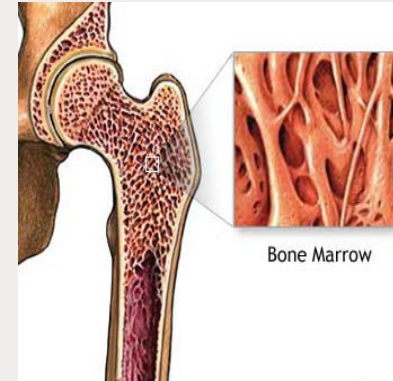
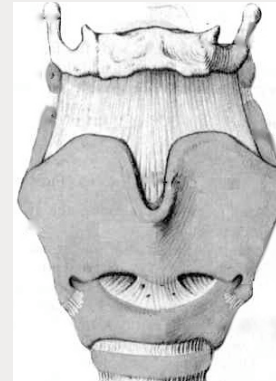
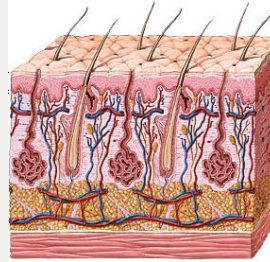
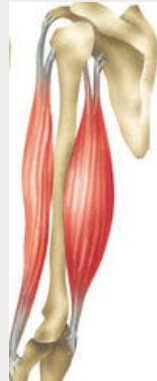
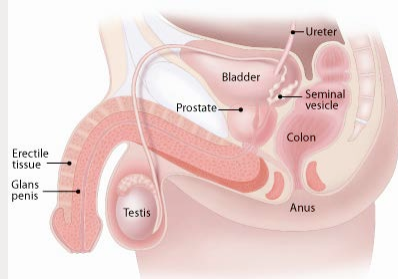
Regulation



- Stress
- Environmental pollution
- Food additives and supplements
- Medications and narcotics
- Brain tumors
- Trauma (concussions)

- Testosterone and estrogens**
1. Normal development
 2. Cognitive function (depression/memory)
 3. Energy
 4. Bone and muscle strength
 5. Reproductive functions
 6. Prostate, adrenal, testicular, breast cancer
 7. Cardiovascular health
 8. Diabetes
 9. Obesity

TESTOSTERONE and ESTRADIOL EFFECTS



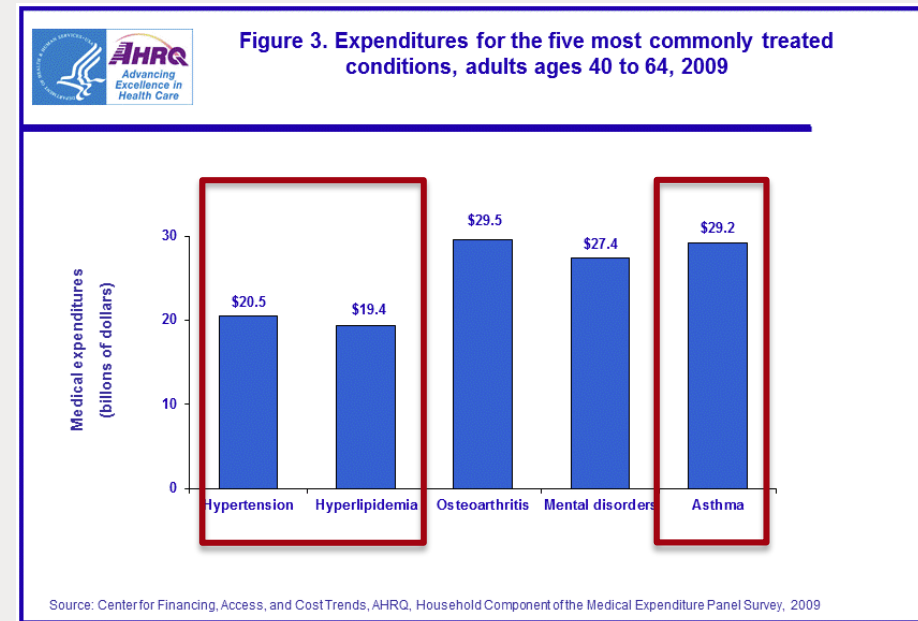
Testosterone: clinical implications for patient and healthcare system

- 1/3rd of men older than 45 years in primary care had undiagnosed low testosterone

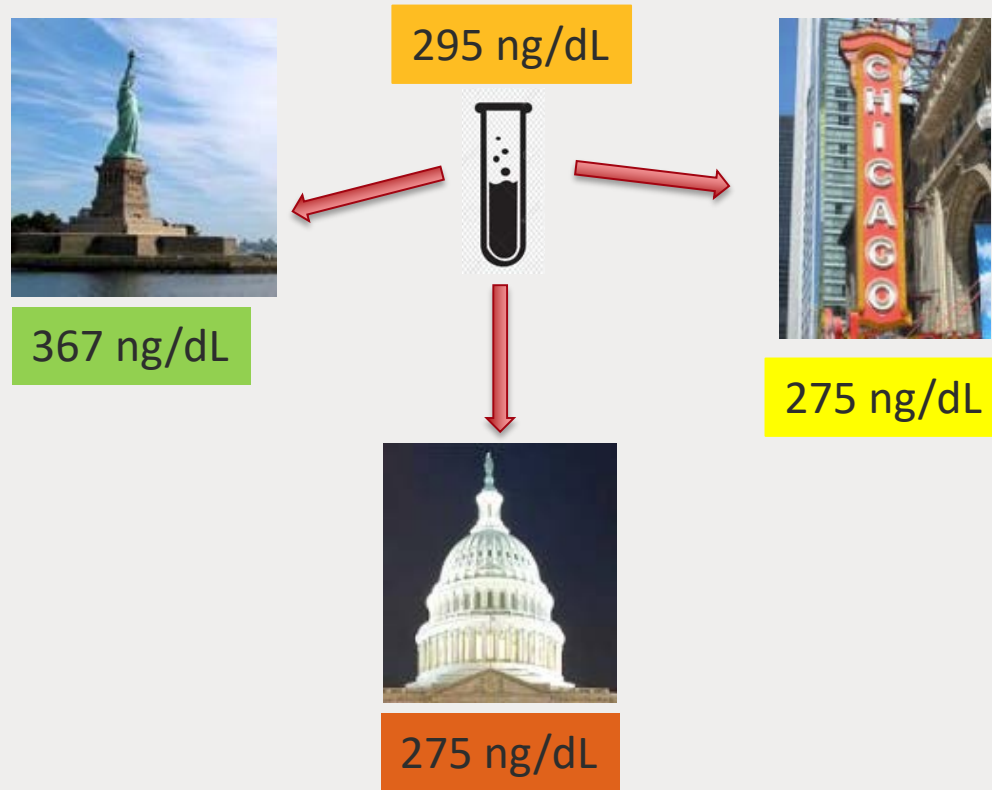
Risks factors associated with low testosterone:

- hypertension (1.84x)
- hyperlipidaemia (1.47x)
- diabetes (2.09x)
- obesity (2.38x)
- prostate disease (1.29x)
- asthma or chronic obstructive pulmonary disease (1.40x)

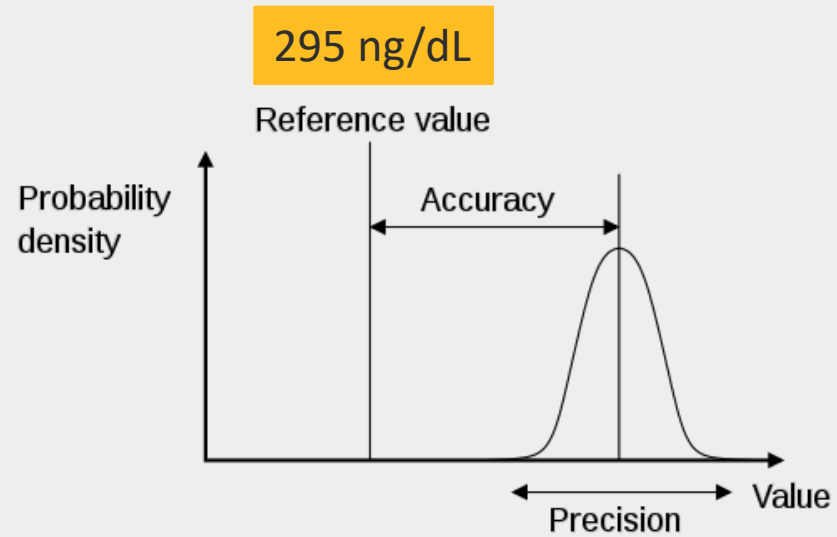
Healthcare expenditure of conditions associated with low testosterone



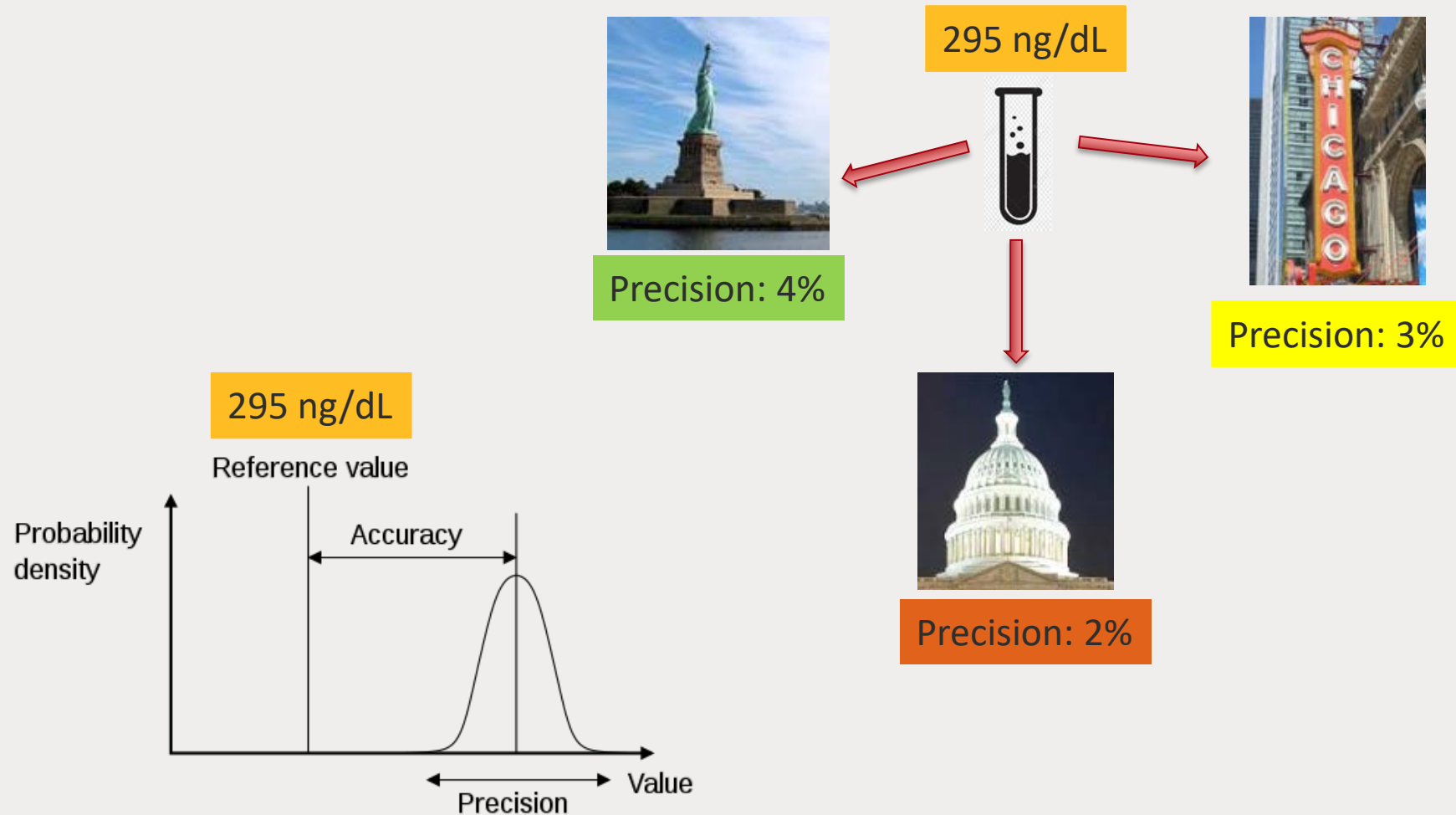
When what you read is not the actual truth.



How do labs tell the “truth?”



“My doctor in DC said my T is normal.”



How does it affect daily practice of physicians and patient care

1. Results make no clinical sense: someone who has no signs of low testosterone will have low testosterone
 - **Need to repeat testosterone measurement to avoid overtreatment, adds cost**
2. Difficulties with assessing response to treatment: patient has been on testosterone and still feels fatigue and low sex drive; decision to increase testosterone depends on accurate laboratory measurement
 - **Frustration with T measurement leads many physician to abandon using it**
3. Lack of portability of the basic laboratory measurement: results obtained from different laboratories during treatment are very difficult to compare, insurance companies dictate where to measure testosterone and such contracts change annually
 - **Problematic monitoring of safety of treatment**



True implications in care

- Lack of harmonization and standardization makes the process of establishing “normal” ranges futile task. If we can’t get same results in three different labs how we can propose universal set of normal ranges.
- Comparing results of research studies (hundreds of millions of dollars spent) is close to impossible because results and conclusions depend on using tool which is precise and reproducible only within specific laboratory where the research was performed.
- Self treatment in younger men common leading to anabolic drug abuse: norms used right now are not age adjusted.
- Overtreatment of older men common because only 20% of internists actually check testosterone before prescribing testosterone: reason: the test result is like tossing a coin.

Do men care more about their cars than about their testosterone?



You ain't got enough testosterone for this estrogen.



someecards
user card

Government regulated accuracy of dispensing gasoline in USA:

Max error of 6 cubic inch per 5 gallons of dispensed gas
= 0.53% of error allowed

Current accuracy of testosterone testing in USA
= 30% of error allowed

Women produce testosterone first and then covert it to estradiol

Hormone assays harmonization and standardization is critical not only for men and boys but also for girls and women; affects us all

Thank You

CDC Harmonization Programs

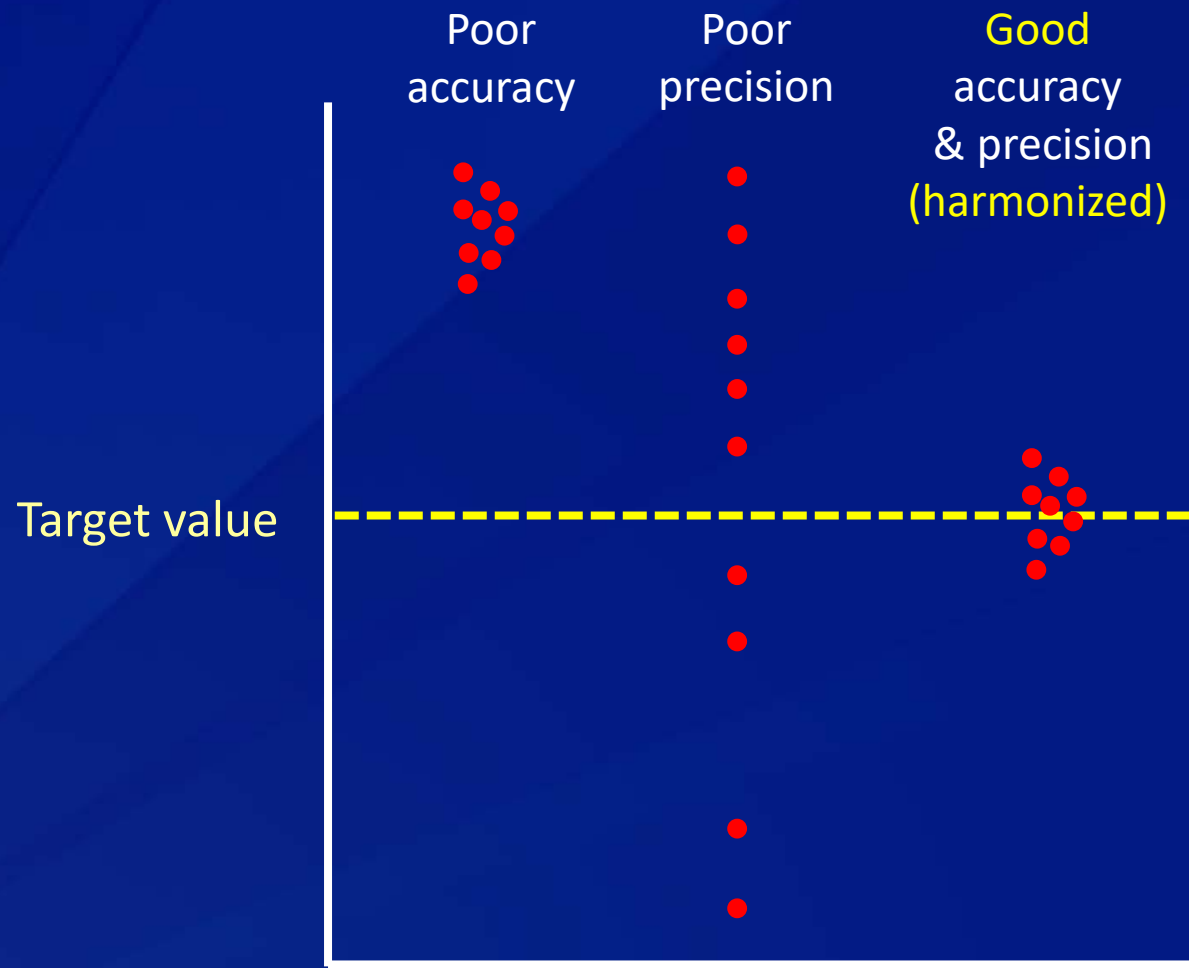
James L. Pirkle MD PhD

Director, Division of Laboratory Sciences
National Center for Environmental Health

Problem:

Important laboratory measurements are **not** sufficiently accurate and precise for:

- effective diagnosis, treatment and prevention of diseases and
- reduction of medical costs



Solution: Harmonization

- assures laboratory measurements are accurate and precise across
 - laboratories
 - analytical methods
 - time
- **can correct** the *inadequate* accuracy and precision of important laboratory measurements

Harmonization steps

Develop and maintain
reference methods

CDC Clinical Reference Laboratory



Calibrate and evaluate
manufacturers

CDC Certificates Program



Monitor accuracy of
clinical laboratories

Accuracy based surveys including
CDC Lipid Testing Monitoring Program

CDC, in collaboration with the private sector,
has a good track record of
harmonizing 8 important lab measurements,
but more are in need.

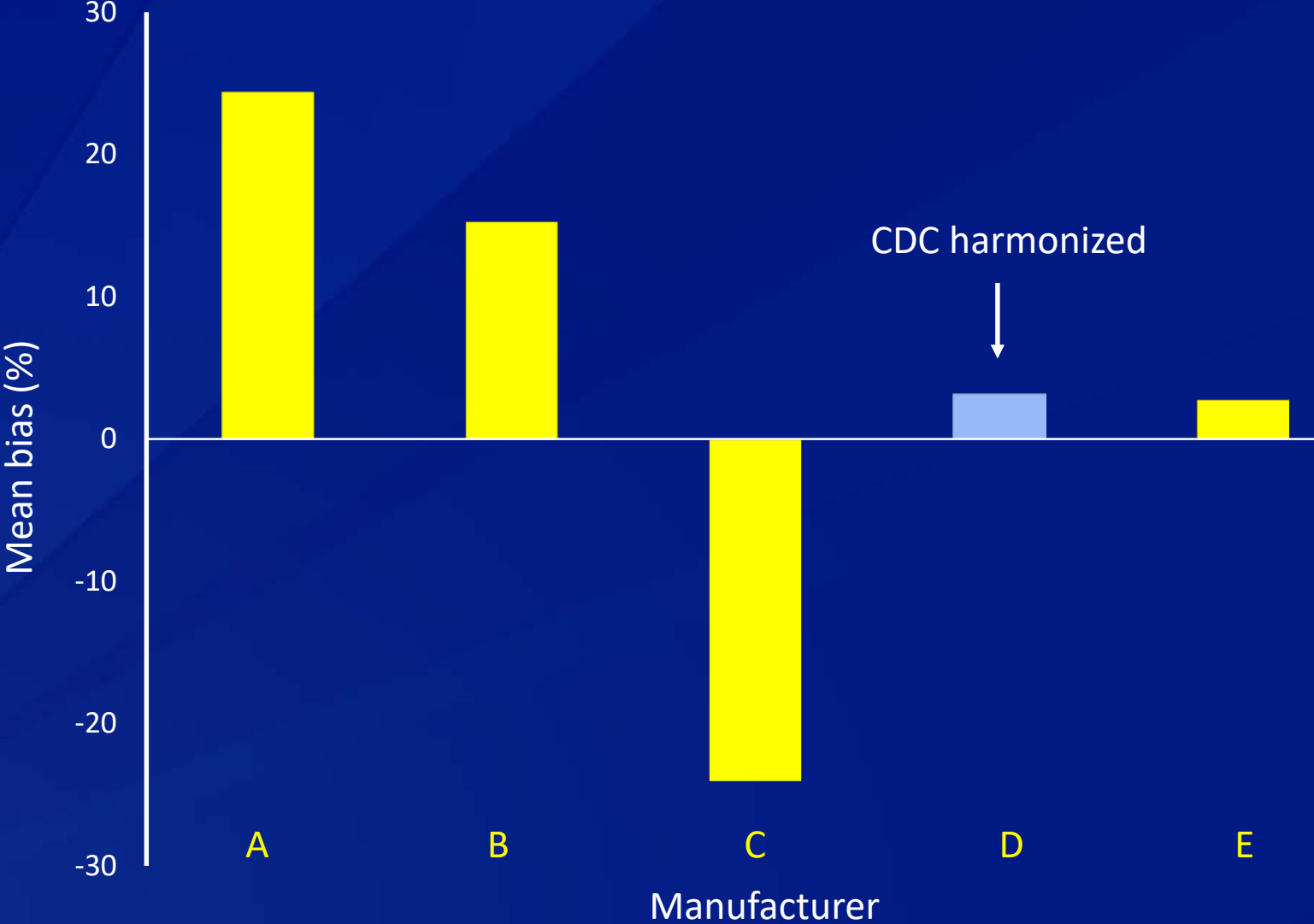
Lab measurements CDC has harmonized

	Accuracy	Precision
Total Cholesterol	$\pm 1.0\%$	$\leq 1\%$
LDL-Cholesterol	$\leq 2\%$	$\leq 1.5\%$
HDL-Cholesterol	≤ 1.0 mg/dL	≤ 1 SD
Triglycerides	$\leq 2.5\%$	$\leq 2.5\%$
25-Hydroxyvitamin D2 25-Hydroxyvitamin D3	$\pm 1.7\%$	$\leq 5.0\%$
Testosterone	$\pm 2.1\%$	$\leq 2.7\%$
Estradiol	$\pm 2.8\%$	$\leq 5.7\%$

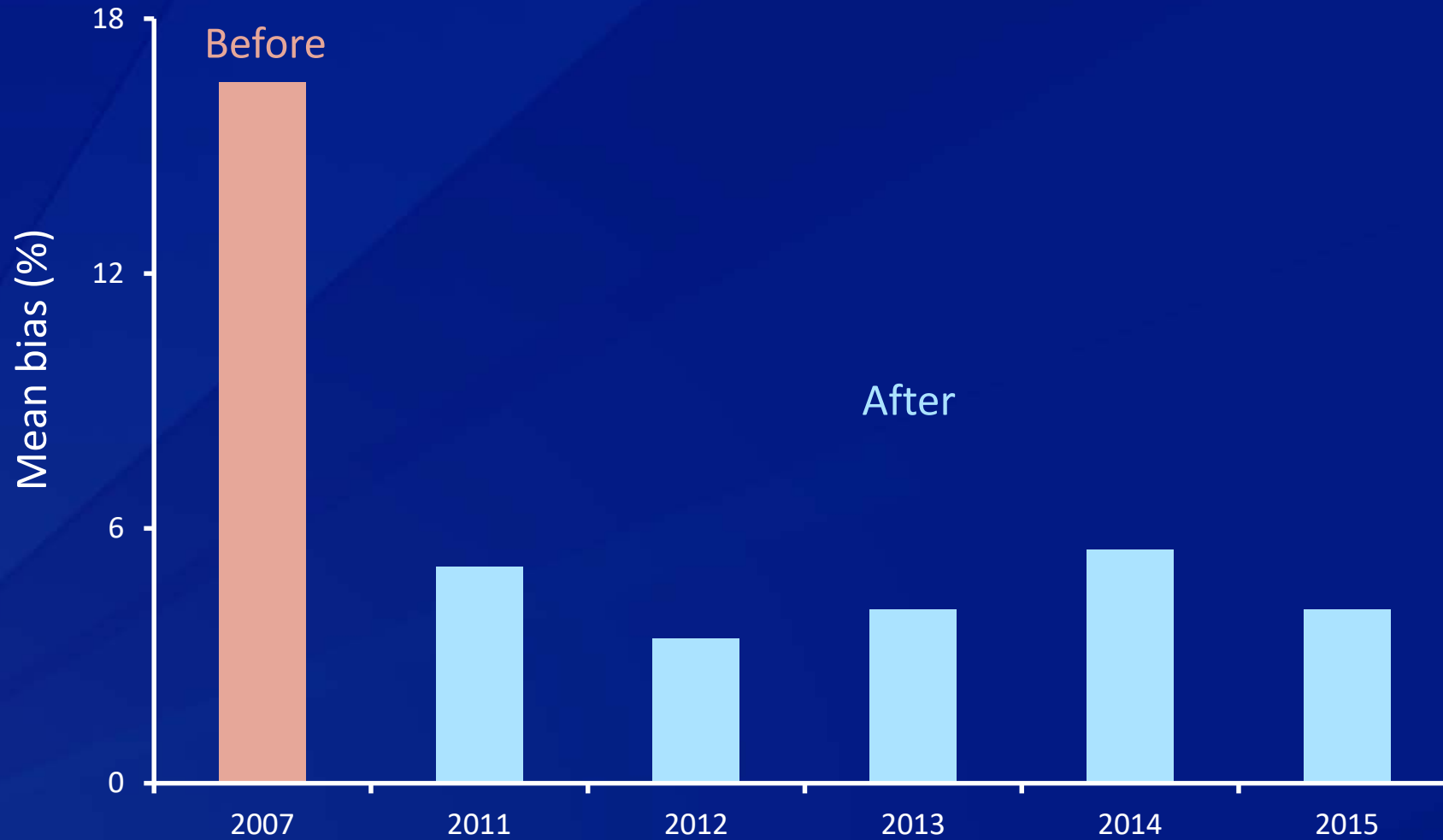
Excellent accuracy of cholesterol measurements from
87 labs in CDC Harmonization Program from 2013-2016
(acceptable is $\pm 3\%$)



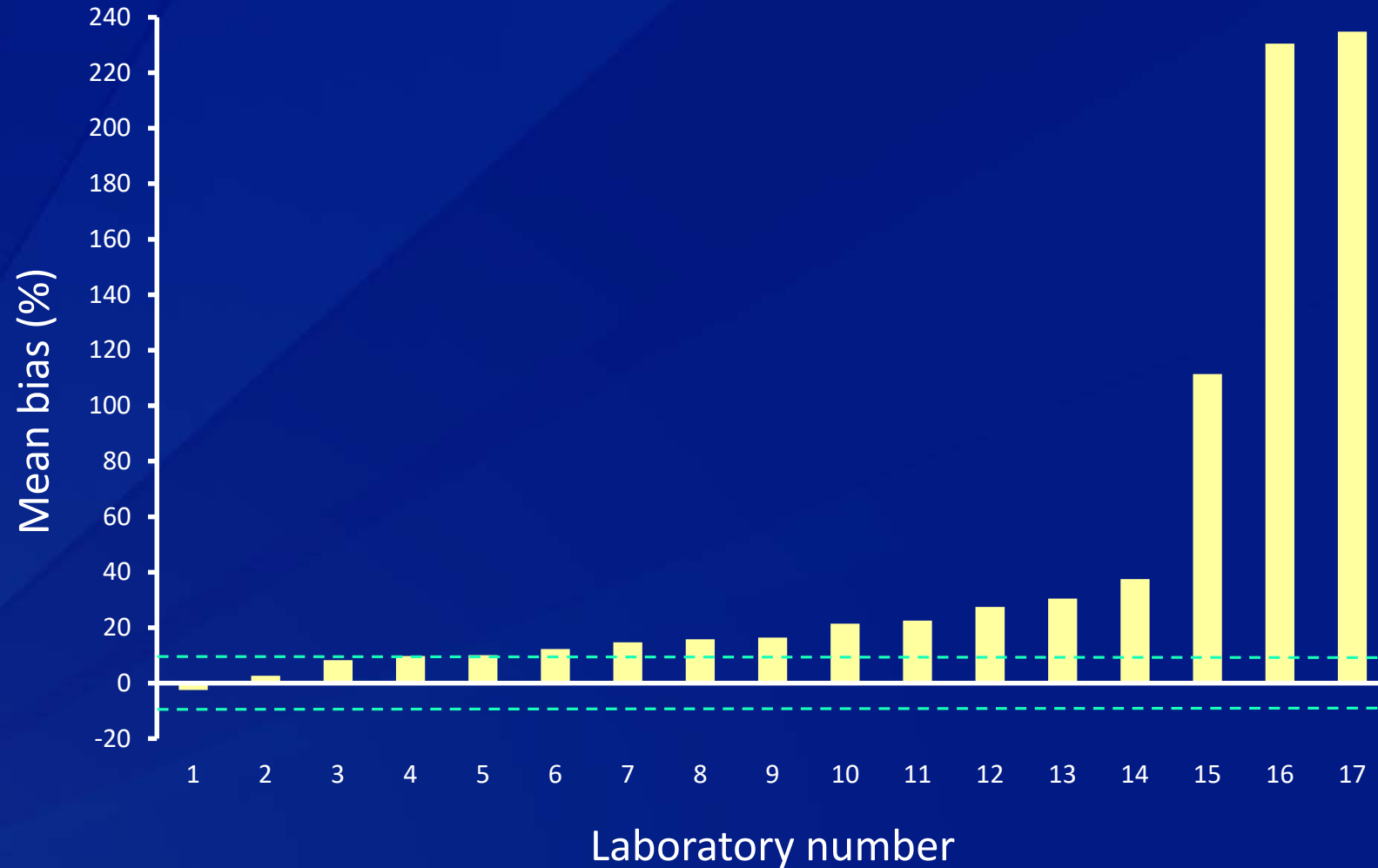
Unacceptable bias in testosterone measurement from different manufacturers



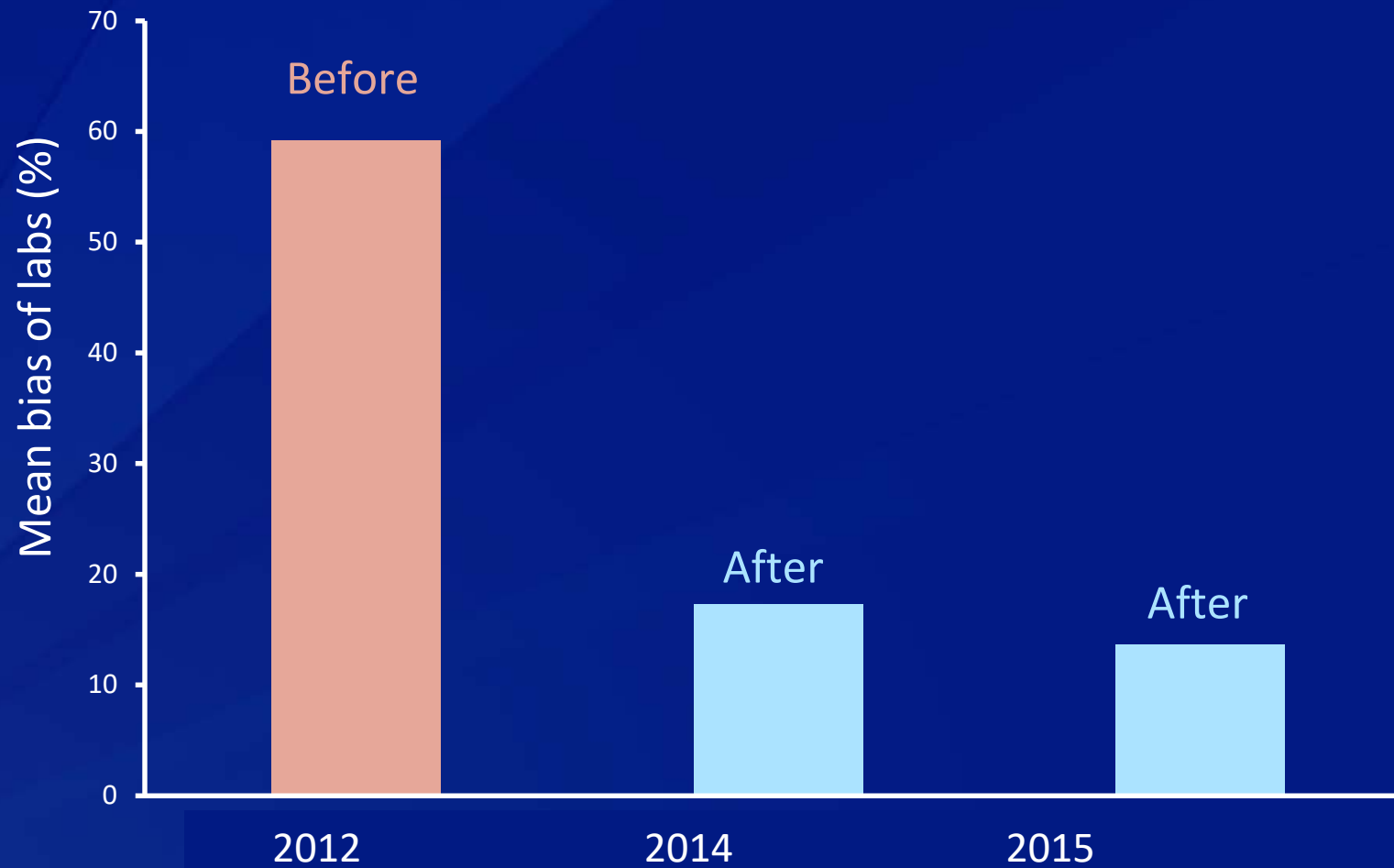
Measurement accuracy of testosterone clearly improved among participants in the CDC Hormones Harmonization Program



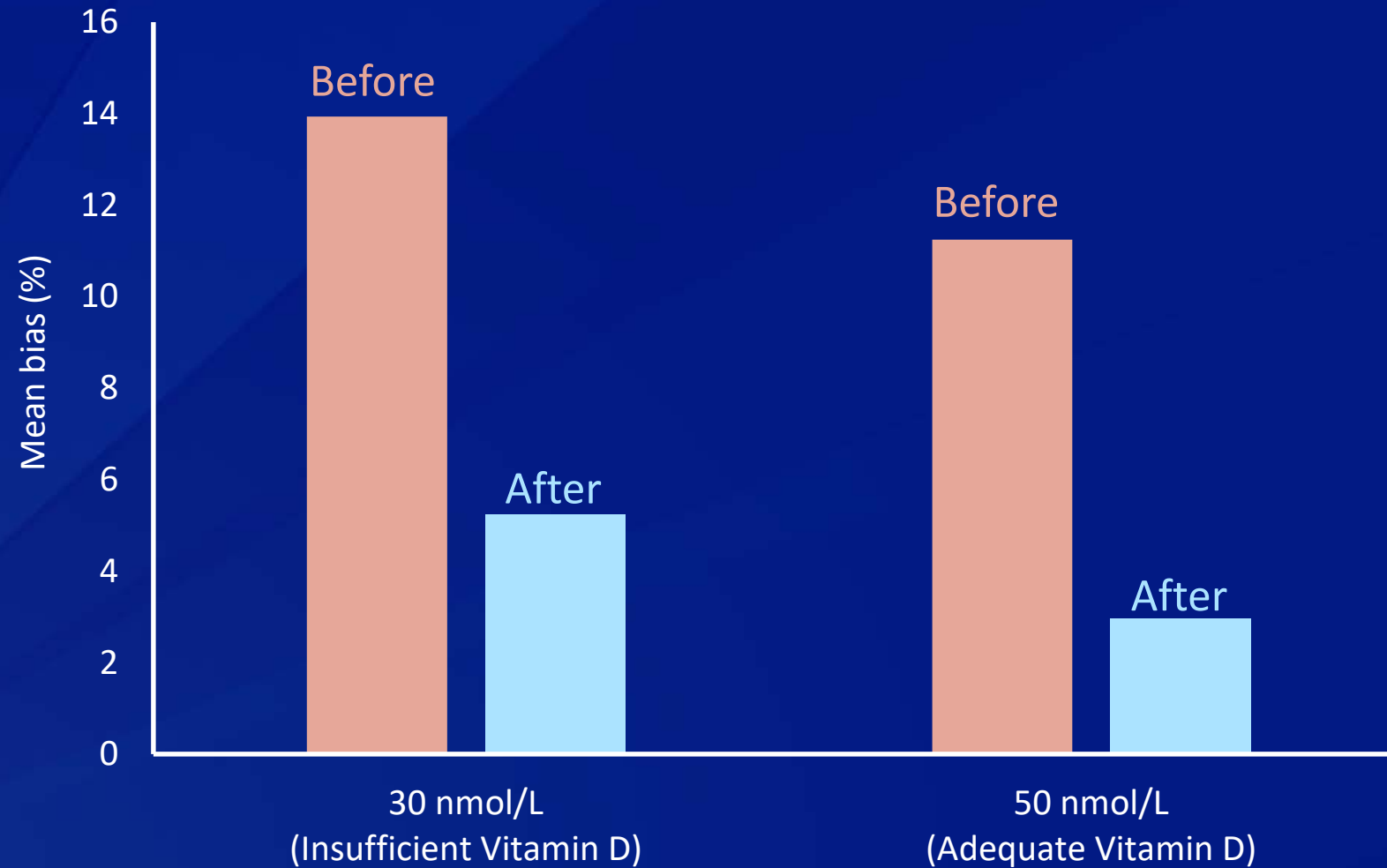
Different laboratories produce markedly different estradiol measurements



Much better estradiol accuracy from participating in the CDC Hormones Harmonization Program



Improved accuracy of 25-hydroxyvitamin D from participation in CDC's Vitamin D Harmonization Program



Study by RTI International found that the
CDC Lipid Harmonization Program resulted
in a **cost benefit** of
\$338 million to \$7.6 billion per year

Thank you.

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333

Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348

Visit: www.cdc.gov | Contact CDC at: 1-800-CDC-INFO or www.cdc.gov/info

The findings and conclusions in this presentation are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

National Center for Environmental Health

Division of Laboratory Sciences



Questions?

Thank you!