Osteopathic Science
From Theory to Practice to Best Practice

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OMED® 18
october 5–9 | san diego

Dedication

William S. Bickel, Ph.D

Philip E. Greenman, D.O.

Acknowledgements: "we never work alone in a vacuum!"

THANK YOU ALL!

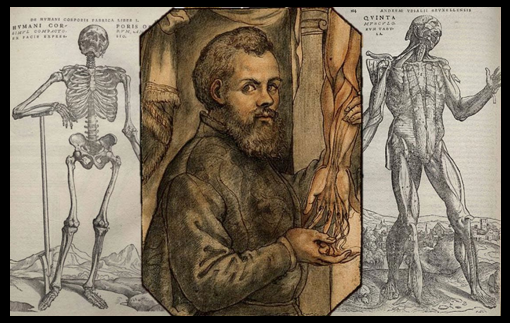
Chris Yacuk, OMS II
Jenny Ha, OMS II
Aurel Apple, OMS II

Eng Huu, D.O.
Eva Shay, D.O.
Tiffany Worthington, D.O.
Ethan Worthington, D.O.

We've Got This!*

*= summary point

Now stay tuned……

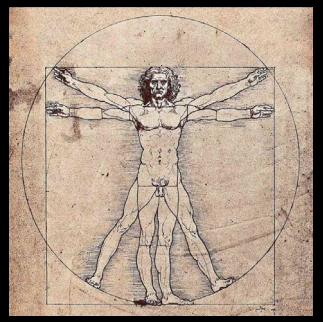


Vesalius
De Fabrica
Corporis Humani

Jenner
1st vaccine

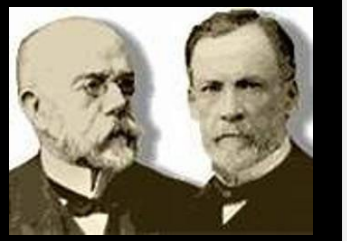
A.T. Still
Osteopathy

Evidence Based Medicine



da Vinci
Dissects
corpses

Descartes



Koch & Pasteur
Germ theory

Mixter & Barr
HNP
radiculopathy
series

1489 1543 1596-1650 1796 1870 1874 1934 1990's

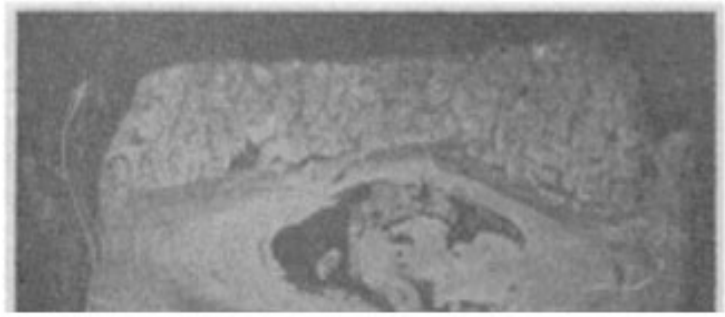
NEW ENGLAND SURGICAL SOCIETY

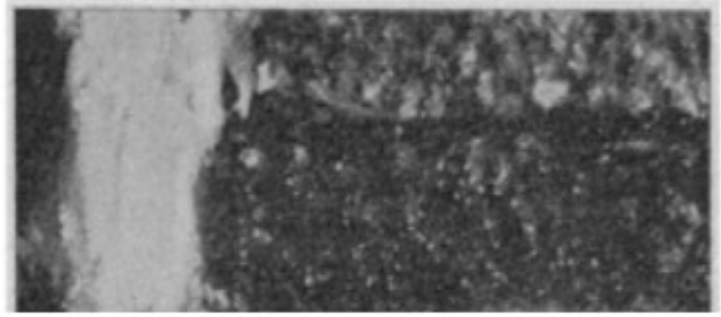
RUPTURE OF THE INTERVERTEBRAL DISC WITH INVOLVEMENT OF THE SPINAL CANAL*

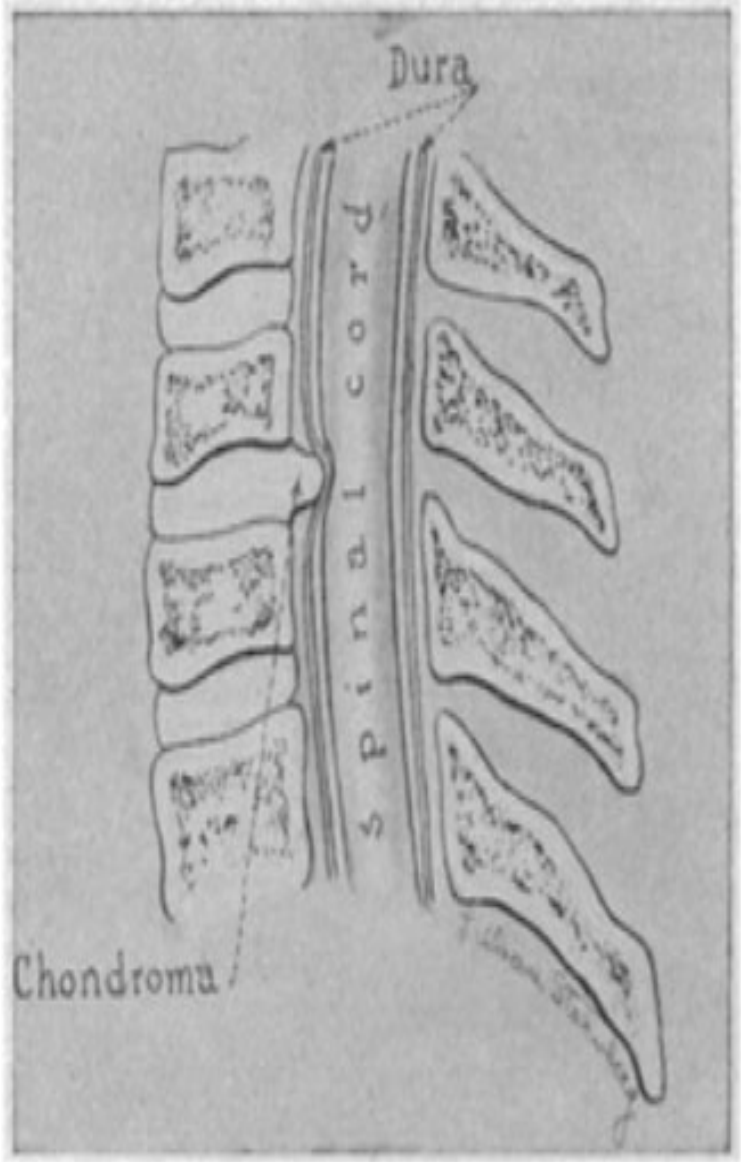
BY WILLIAM JASON MIXTER, M.D.,† AND JOSEPH S. BARR, M.D.†

DURING the last few years there has been a good deal written and a large amount of clinical work done stimulated by Schmorl's[1] investigation of the condition of the intervertebral disc as found at autopsy. His work will stand

In 1911 Goldthwait[2] reported a case of sciatica and paraplegia which he attributed to a posterior displacement of the intervertebral disc at the lumbosacral junction and suggested that such displacements might be the cause of many







(FIG. 17. Showing the usual location of a ventral vertebral disc chondroma. [Legend in *Surgery, Gynecology and Obstetrics*].)

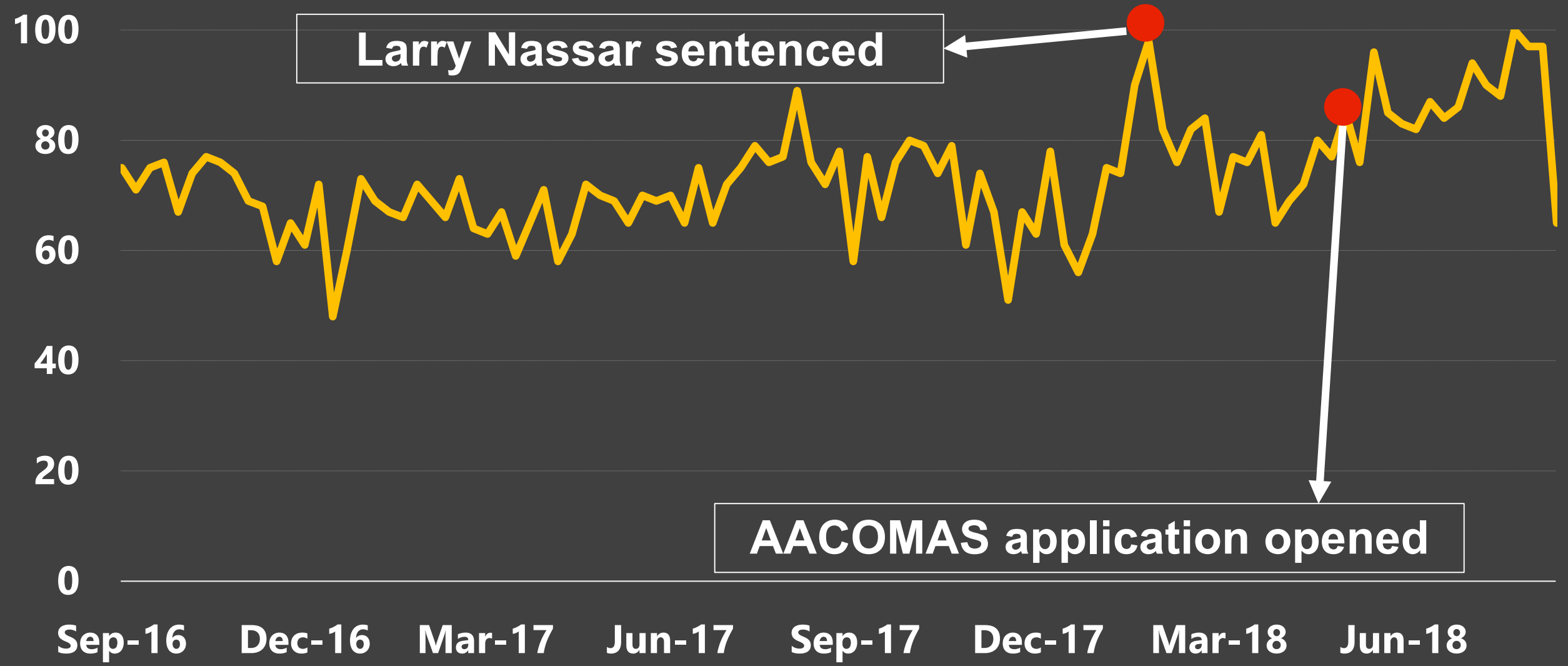
FIG. 3. Illustration taken from article by Elsberg, show chondroma" arising from intervertebral disc. (Elsberg: S O.; 46: 10; 1928.

Evidence-Based Medicine

25 years young

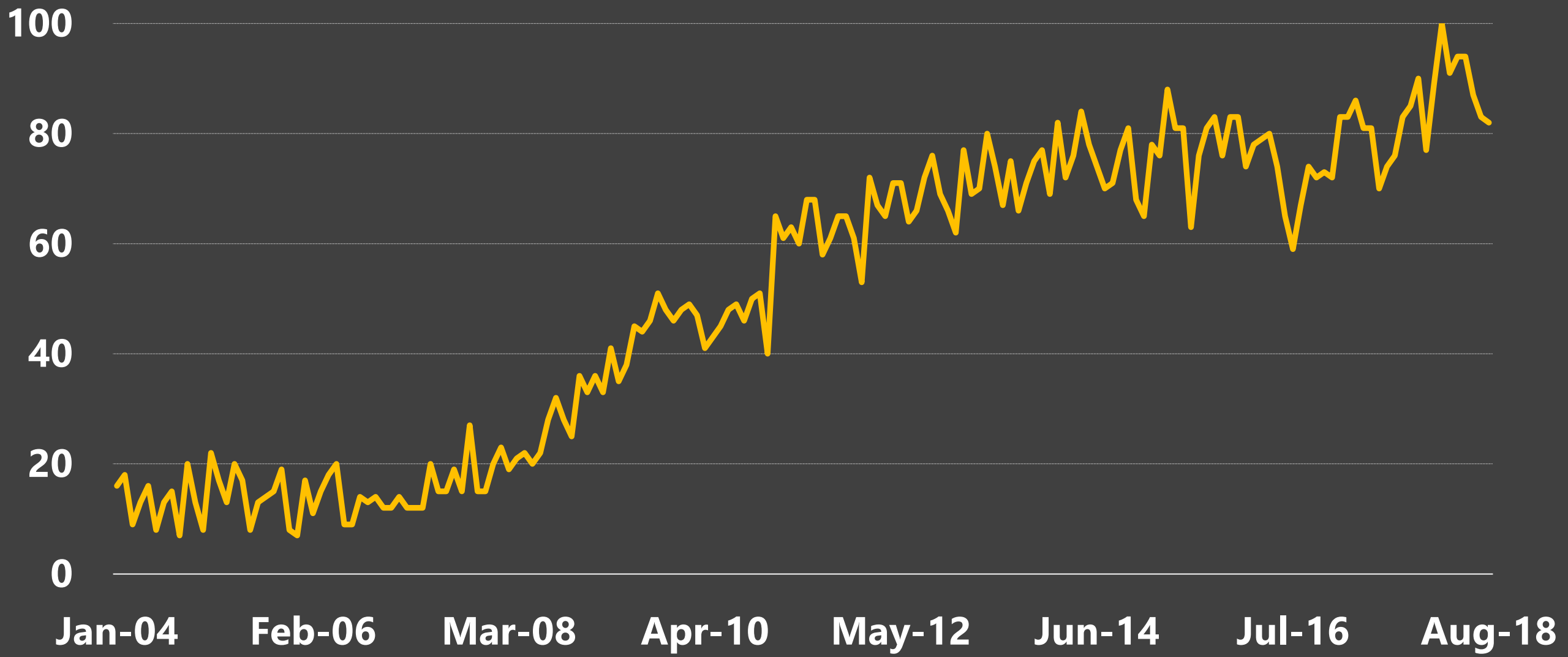
“Osteopathic Medicine” Search Interest

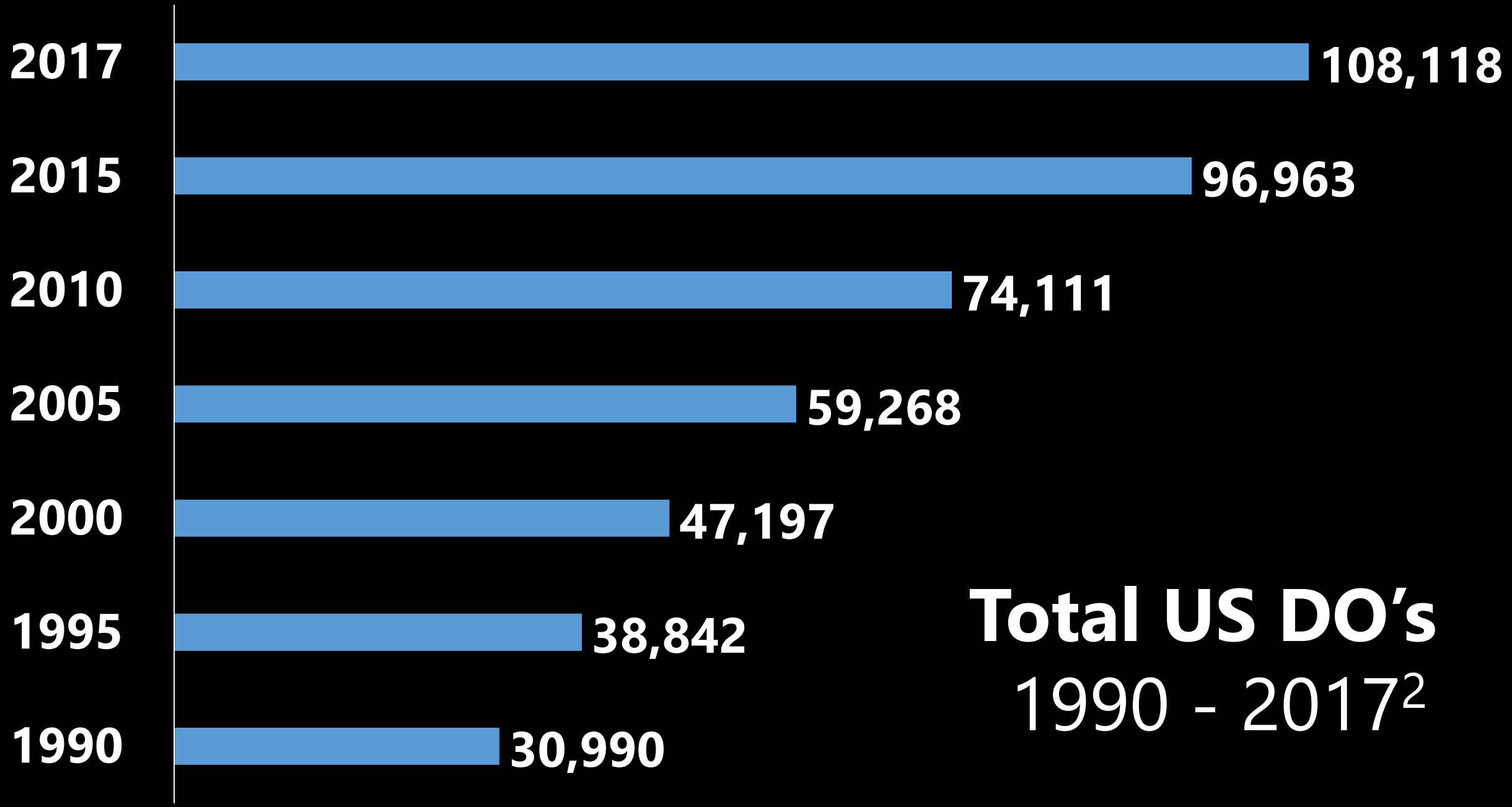
2016 - Present



“Is a DO a doctor?” Search Interest

2004 - Present

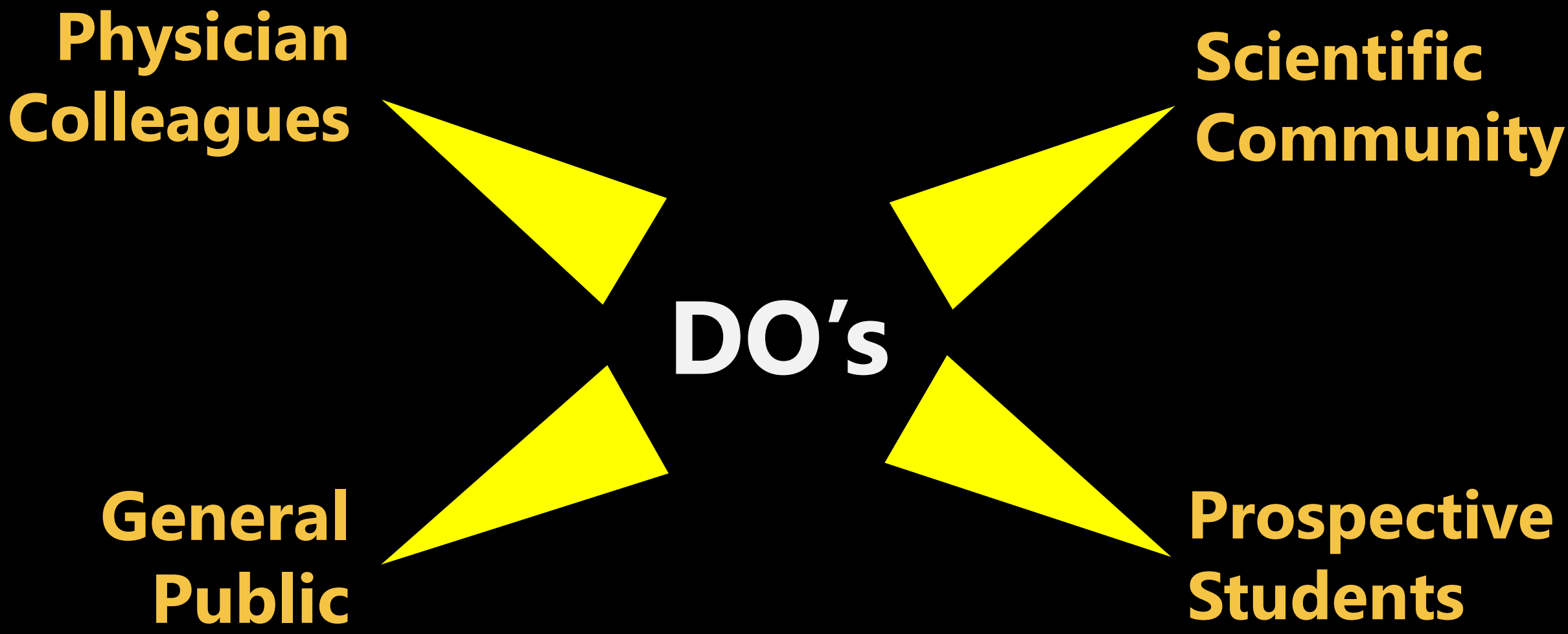




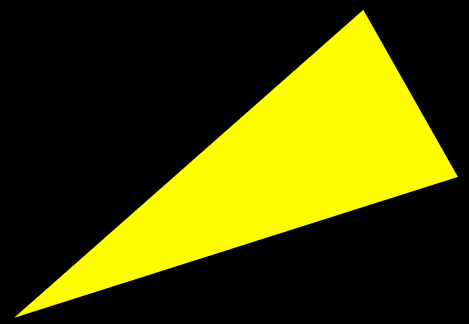
Total US DO's

1990 - 2017[2]

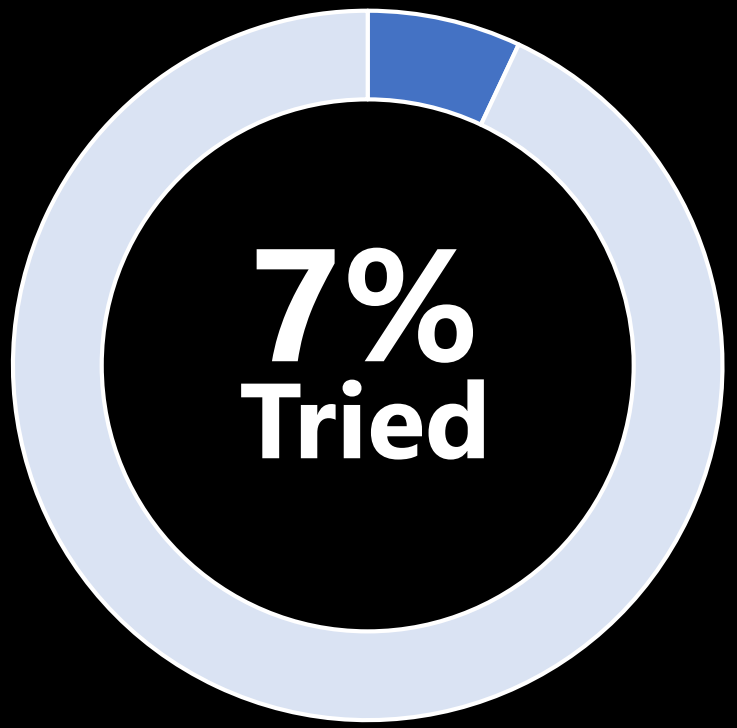
Who is looking at us?

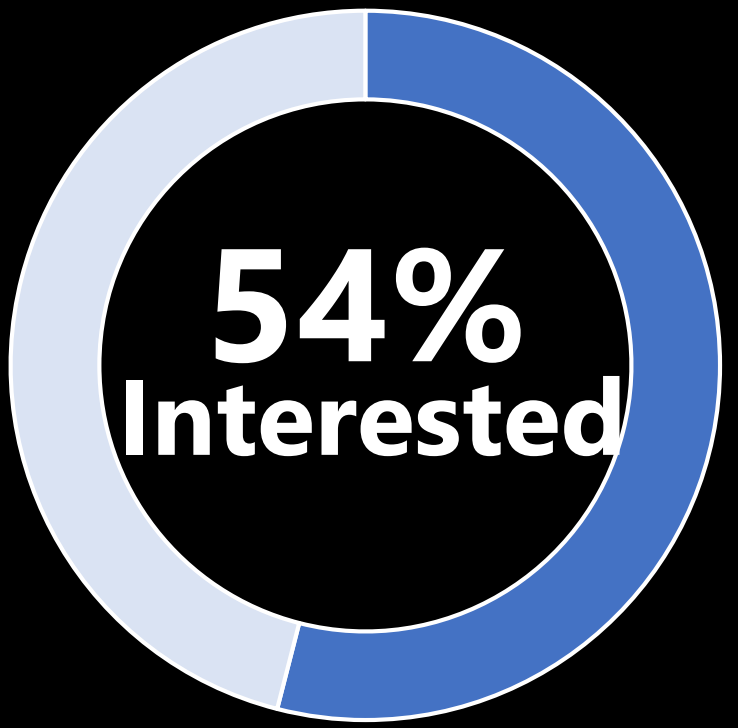


DO’s



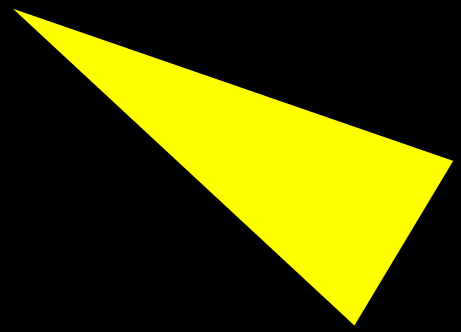
General Public



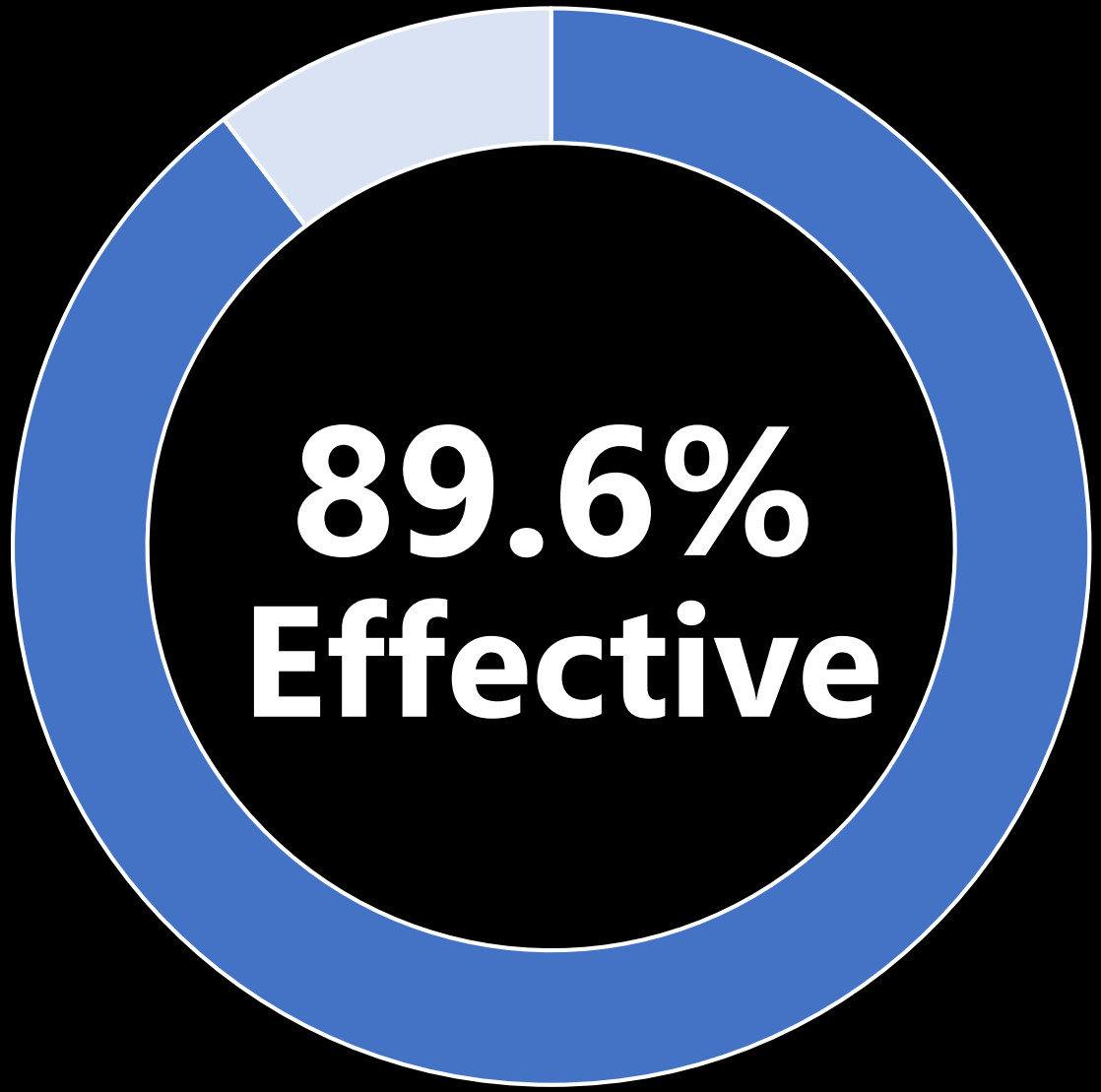


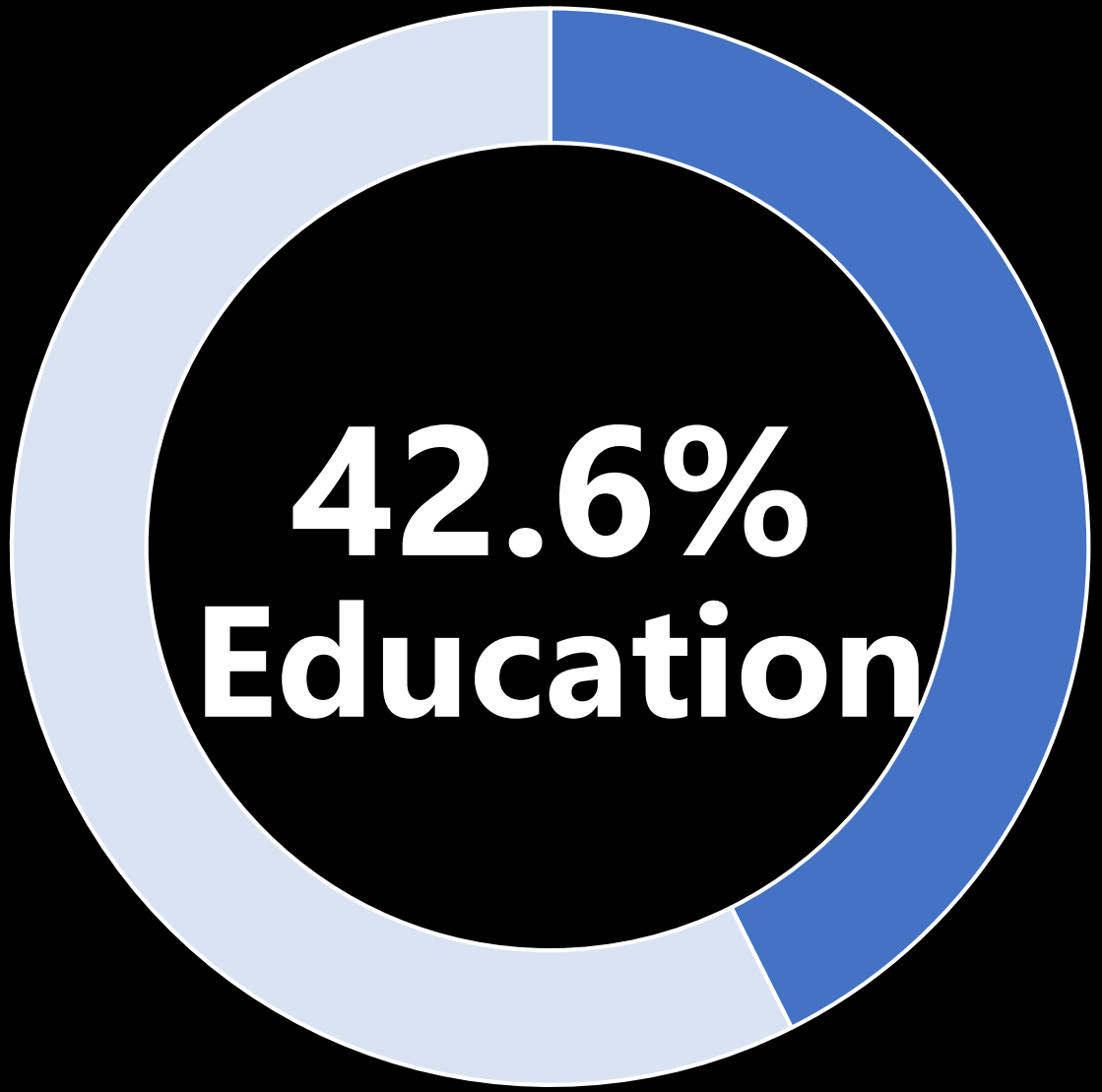
Statista. Percentage of U.S. adults who ever tried osteopathy as of 2

Physician Colleagues



DO’s





2005 Resident survey in JAOA[4]

2002: 3,079
2017: 8,088

DO's

Prospective Students

AAMC Medical School Enrollment Survey[5]

Scientific Community

DO's

Structure and Distribution of an Unrecognized Interstitium in Human Tissues

Petros C. Benias[1,2], Rebecca G. Wells[3,4], Bridget Sackey-Aboagye[3], Heather Klavan[1], Jason Reidy[5], Darren Buonocore[5], Markus Miranda[1], Susan Kornacki[6], Michael Wayne[7], David L. Carr-Locke[1,8] & Neil D. Theise[1,5,6]

Confocal laser endomicroscopy (pCLE) provides real-time histologic imaging of human tissues at a depth of 60–70 μm during endoscopy. pCLE of the extrahepatic bile duct after fluorescein injection demonstrated a reticular pattern within fluorescein-filled sinuses that had no known anatomical correlate. Freezing biopsy tissue before fixation preserved the anatomy of this structure, demonstrating that it is part of the submucosa and a previously unappreciated fluid-filled interstitial space, draining to lymph nodes and supported by a complex network of thick collagen bundles. These bundles are intermittently lined on one side by fibroblast-like cells that stain with endothelial markers and vimentin, although there is a highly unusual and extensive unlined interface between the matrix proteins of the bundles and the surrounding fluid. We observed similar structures in numerous tissues that are subject to intermittent or rhythmic compression, including the submucosae of the entire gastrointestinal tract and urinary bladder, the dermis, the peri-bronchial and peri-arterial soft tissues, and fascia. These anatomic structures may be important in cancer metastasis, edema, fibrosis, and mechanical functioning of many or all tissues and organs. In sum, we describe the anatomy and histology of a previously unrecognized, though widespread, macroscopic, fluid-filled space within and between tissues, a novel expansion and specification of the concept of the human interstitium.

Nature 2018

NIH U.S. National Library of Medicine

ClinicalTrials.gov

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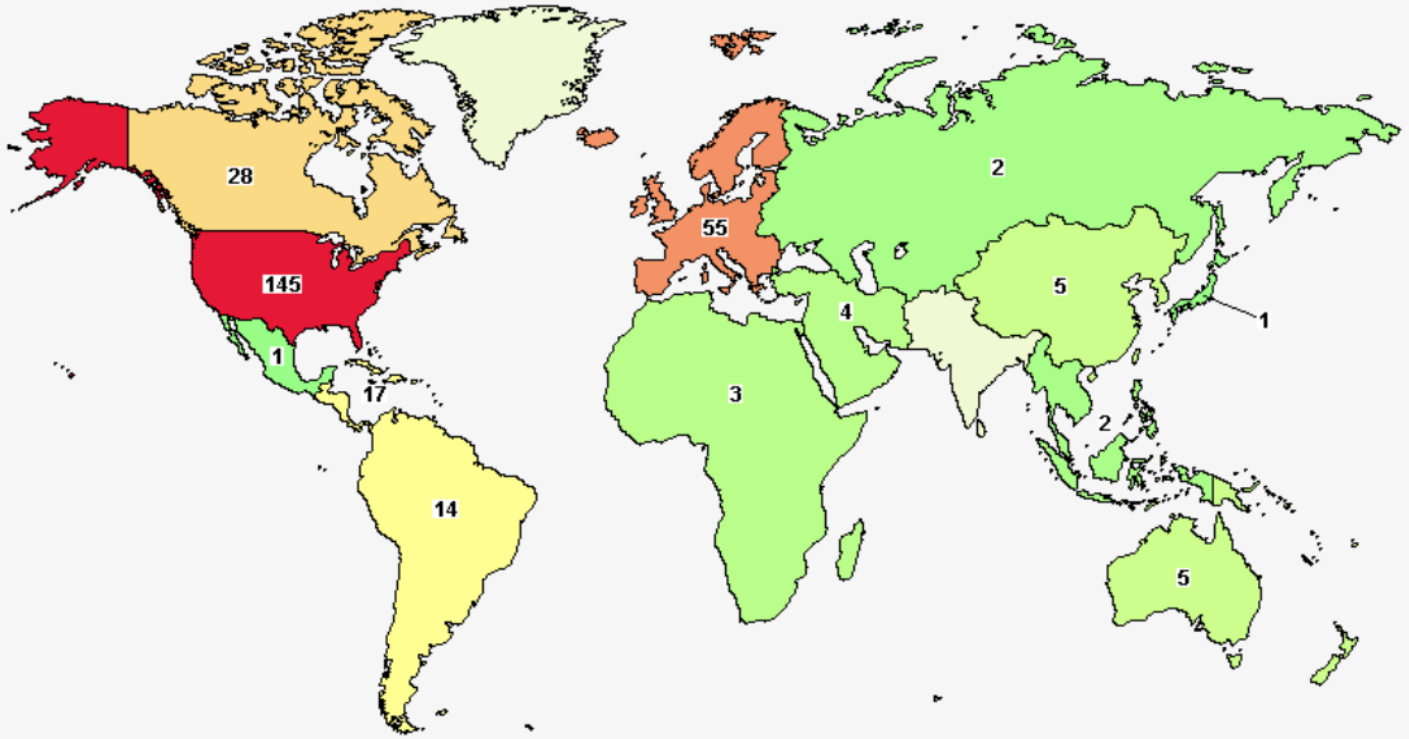
Home > Search Results

Modify Search | Start Over

233 Studies found for: **osteopathic**

A similar map is available for all studies in ClinicalTrials.gov

Click on the map below to show a more detailed map (when available) or search for studies (when map not available).



Spinal manipulation in the treatment of musculoskeletal pain

Authors: Paul Shekelle, MD, Howard Vernon, DC, FCCS (Hons), PhD
Section Editor: Steven J Atlas, MD, MPH
Deputy Editor: Lisa Kunins, MD

Contributor Disclosures

All topics are updated as new evidence becomes available and our peer review process is complete.
Literature review current through: Aug 2018. | **This topic last updated:** May 04, 2018.

INTRODUCTION — Spinal manipulation is a technique used by chiropractors, physical therapists, and osteopathic clinicians, primarily to provide relief for musculoskeletal pain related to the back and neck. It has also been used for other conditions, which are discussed briefly below.

[7]Shekelle P., & Vernon, H. (2018). Spinal manipulation in the treatment of musculoskeletal pain., *UpToDate*. Retrieved Aug 31, 2018, from https://www.uptodate.com/contents/spinal-manipulation-in-the-treatment-of-musculoskeletal-pain

SPINAL MANIPULATION — Spinal manipulation is a form of manual therapy that involves the movement of a joint near the end of the clinical range of motion. This movement of the joint is frequently accompanied by an audible cracking or popping sound.

Types of manipulation — Spinal manipulation is classified into one of two forms, depending upon the lever arm used to help the practitioner apply the load necessary for the manipulation:

- The first type includes long-lever, low- to high-velocity, or nonspecific manipulations; this form uses one of the long bones of the limbs (frequently the femur) to amplify the load applied by the clinician's hands to one or several spinal joints.
- The second type includes short-lever, high-velocity manipulations, or specific spinal adjustments; this form involves a short, forceful thrust on a specific vertebral transverse process, thereby moving the specific joint.

Postulated mechanisms of benefit — Several hypotheses have been proposed to explain the benefits of manipulation [1,2]:

- Relaxation of hypertonic muscle by sudden stretching
- Disruption of articular or periarticular adhesions
- Unblocking of motion segments that have undergone disproportionate displacements
- Alteration of pain-related reflexes by proprioceptive bombardment
- Changes in central pain pathways
- Reflexive muscle activation due to increased afferent output

Although some research supports each of these hypotheses, there is no convincing evidence proving the pathophysiologic mechanism underlying the benefit of spinal manipulation [2]. (Note: reference pertaining to the article)

MD and DO Enrollment Growth 2002-2017[5]

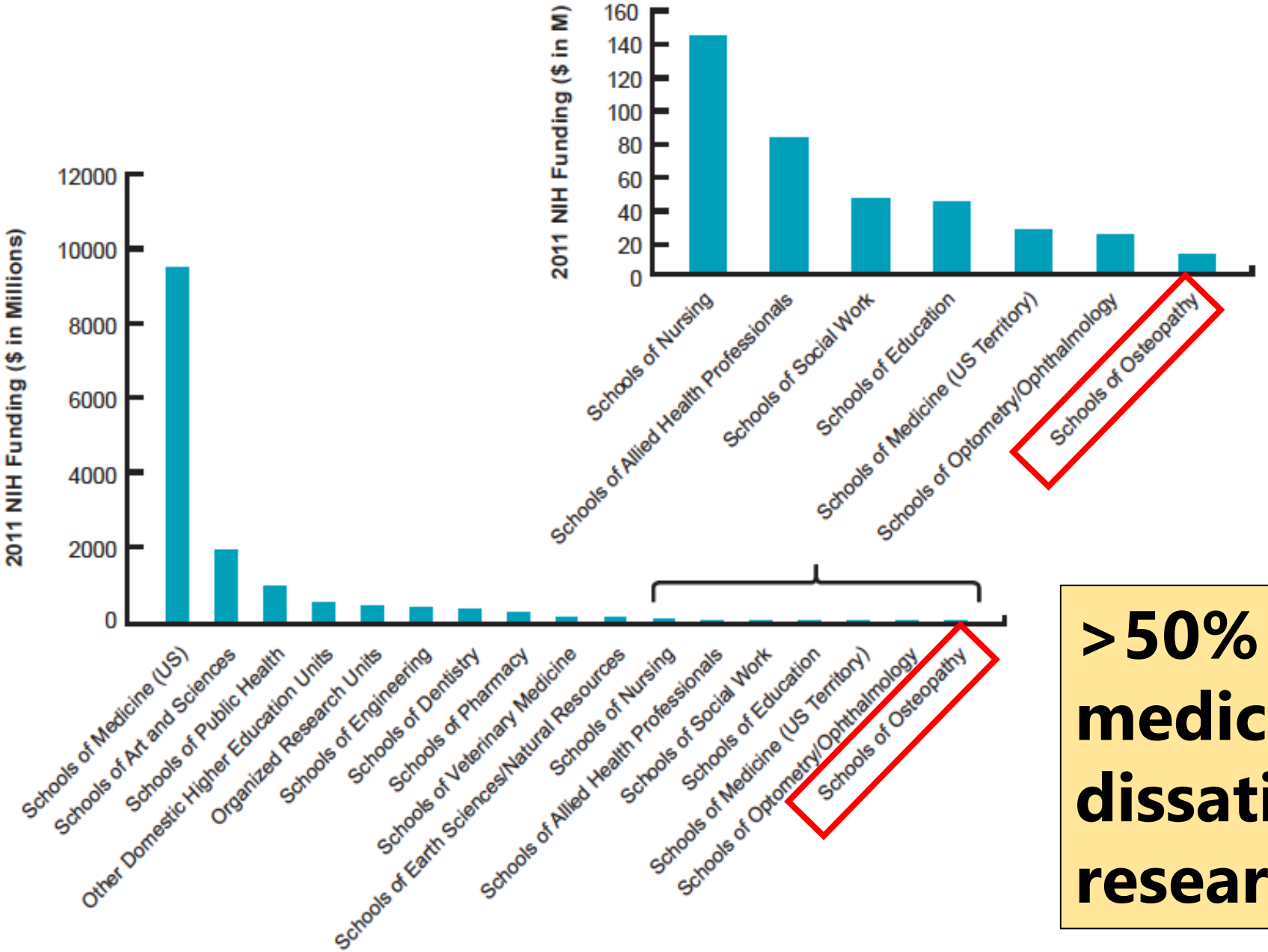
	2002 First Yr Enrollment	2017 First Yr Enrollment	% Increase
MD	16,488	21,338	29
DO	3,079	8,088	**163**

- **14 new DO schools** since 2002-2003
- **>25%** of U.S. medical students are **osteopathic** medical students

Research Expenditures for Colleges of Osteopathic Medicine in 2004 and 2009[8]

	2004	2009	% Change
Total no. of faculty	1,445	1,733	**19.9%**
Total research expenditures	41.567	58.600	**41.0%**
Total award amount[A]	115.169	216.621	**88.1%**
Total no. of awards	450	665	**47.8%**
Average amount per award[A]	0.208	0.268	**28.8%**

[A] Millions of U.S. Dollars; 2004 amounts adjusted for inflation.



>50% of Osteopathic medical students are dissatisfied with lack of research opportunities[9]

Figure: NIH Research Funding sorted by educational institution type (2011).[9]

1990's

EVIDENCE BASED MEDICINE

Primary Research
Systematic Reviews
Summaries & Guidelines

Schematic diagram of components of evidence-based medicine

Evidence-based medicine [EBM] is the care of patients using the best available research evidence to guide clinical decision making. The focus is upon applying the results of research involving patients and important clinical outcomes (eg, death, symptoms). Evidence-based medicine is meant to complement, not replace, clinical judgment tailored to individual patients. Similarly, evidence-based medicine and the delivery of culturally, socially, and individually sensitive and effective care are complementary, not contradictory."

[10]Evans, AT., & Mints, G. (2018). Evidence-based medicine., *UpToDate*. Retrieved Aug 31, 2018, from https://www.uptodate.com/ contents /evidence-based-medicine.

We all know about OMT and….

- ✓ Pneumonia
- ✓ Otitis Media
- ✓ Tension Headaches
- ✓ Asthma
- ✓ Post-operative pain
- ✓ Parkinson’s Disease
- ✓ Sprains
- ✓ Carpal tunnel
- ✓ Shoulder pain

We all know about OMT and

✓ **LOW BACK PAIN**

Results of OMT of LBP show conflicting evidence

OMT & Low Back Pain: The ***Bad/Ugly*** Reviews

- "Although some **results are promising**, the efficacy of manipulation has not been convincingly shown" (N=1421)[11]
- "..there is **high quality evidence** that spinal manipulative therapy has a small, statistically significant but not clinically relevant, short-term effect on pain relief and functional status compared to other interventions" (N=6070)[12]
- "SMT is no more effective for acute low back pain than inert interventions, sham SMT or as adjunct therapy. SMT also seems to be no better than other recommended therapies." (N=2674)[13]
- "It remains unclear whether the **benefits of osteopathic manipulative treatment** can be attributed to the manipulative techniques themselves or whether they are *related to other aspects of osteopathic manipulative treatment, such as range of motion activities or time spent interacting with patients, which may represent placebo effects*." (N=91)[14]
- "..one trial concluded that [OMT] was similar in effect to a sham intervention, and the other study suggests similarity of effect between osteopathic intervention, exercise, and physiotherapy" (N=330)[15]
- "..a total of five of the 16 RCTs showed that OMT is effective for musculoskeletal pain (MSP) and 11 showed no difference between OMT and controls … The evidence is therefore inconclusive"[16]

OMT & Low Back Pain: The *Bad/Ugly* Reviews

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- "..there is **high quality evidence** that sp …statistically significant but not clinically relevant, short-term effect on pain relief …er interventions" (N=6070)[12]
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- "..one trial concluded that [OMT] was sir…nd the other study suggests similarity of effect between osteopathic intervention …15
- "..a total of five of the 16 RCTs showed th…l pain (MSP) and 11 showed no difference between OMT and controls … The evide…

OMT & Low Back Pain: The ***Good*** Studies & Reviews

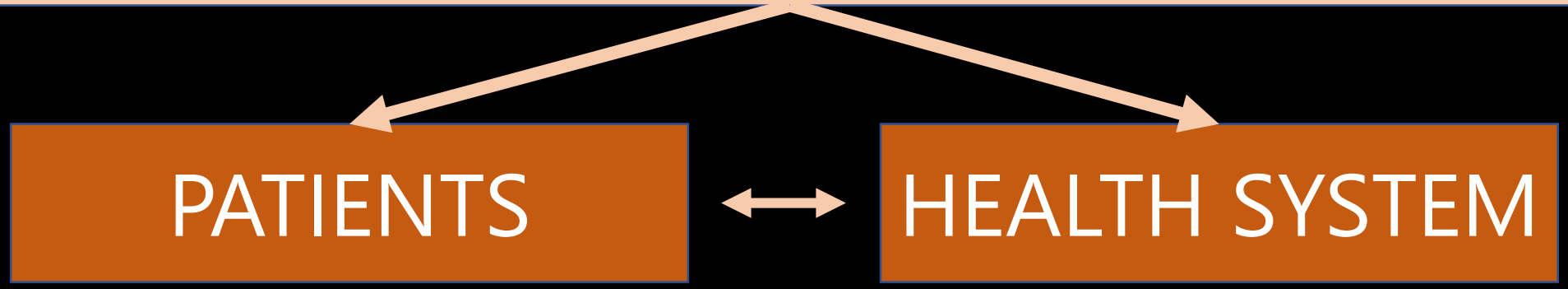
- Pain reduction (N=109)[17], (N=455)[18], (N=525)[19], (N=1502)[20]
- Improves functional ability (N=1502)[20]
- Better outcomes than NSAIDs (N=101)[21]
- Cost effective (N=1334)[22], (N=201)[23]
- Safe (N=455)[18]
- Helps pregnant/post-partum patients (N=144)[24], (N=5121)[25]

What do *we* offer?

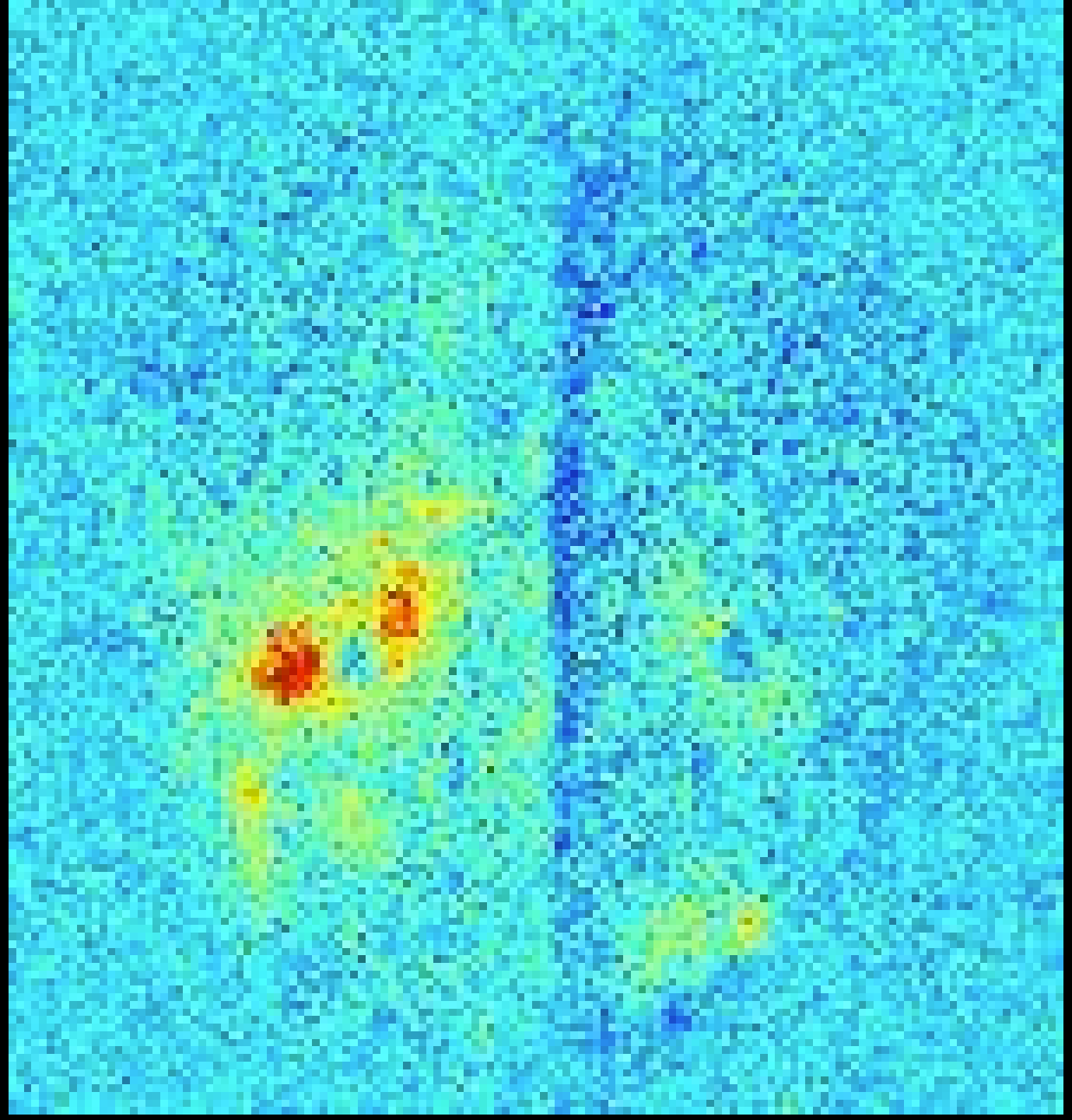
- Real time: evaluation → intervention → response
- Goal: address causes (remote?) not symptoms
- Comprehensive, cost-effective, less invasive
- Focus on patient function and self-correction/healing
- Enhanced patient rapport and satisfaction[26]

"PRIMUM NIL NOCERE"

"PRIMUM NIL NOCERE"

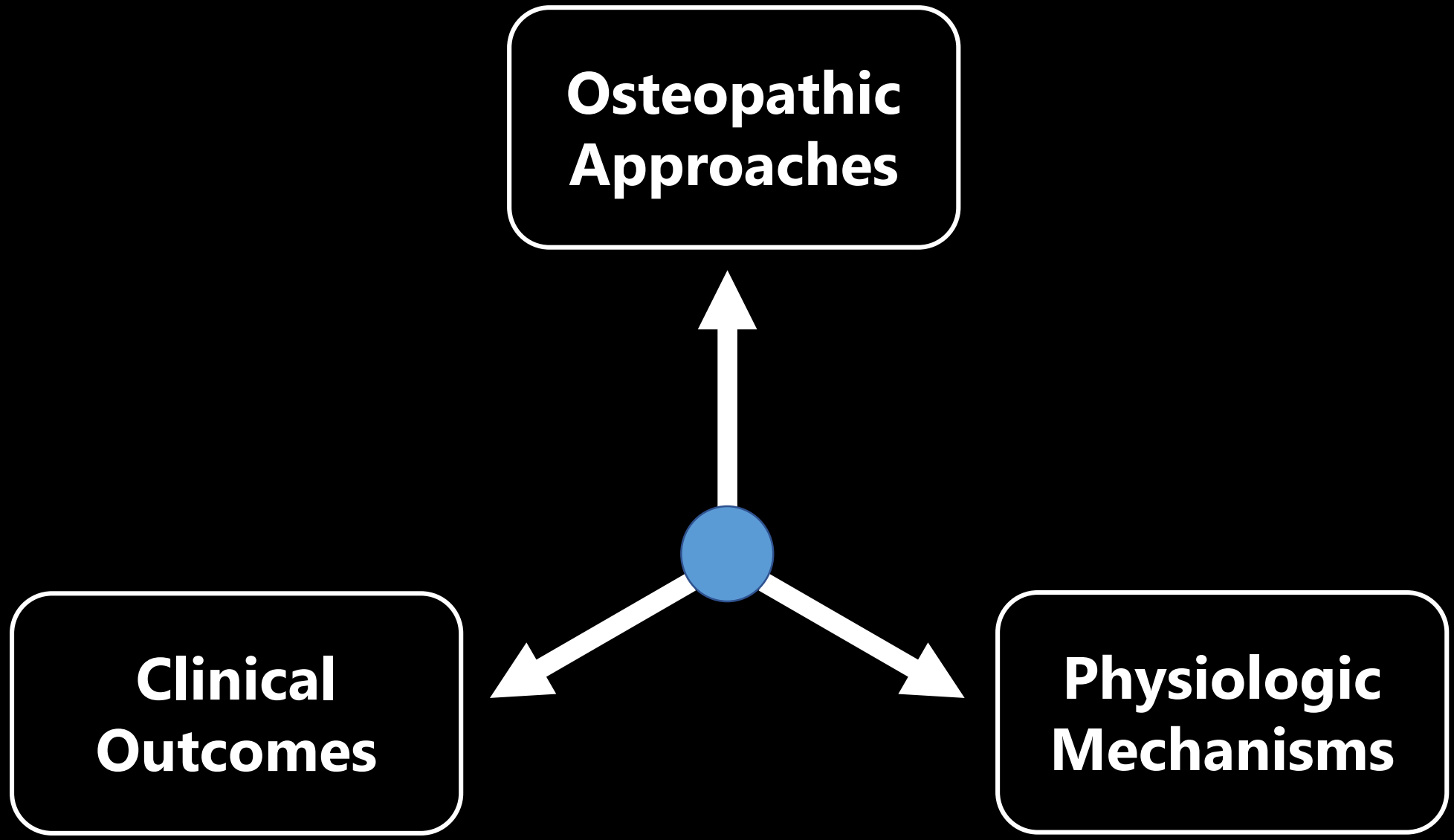


Where do we go from here?



Courtesy of
Raddy Ramos,

Future directions of osteopathic research



Physiologic Mechanisms

- Biomechanics
- Neuroimmunology
- Electric medicine
- Imaging studies (e.g. in vivo)
- Tissue, textures & skin change measurements

Osteopathic Approaches

- Principles & Tenets of Osteopathic Medicine
- “Making Connections”
- “Conscious-Unconscious Continuum”
- Novel-unconventional ideas (‘challenge us!’)
- “Is there a uniquely osteopathic medical approach?”

Osteopathic Approaches

“What I do know is that when I put my hands on a patient as part of a comprehensive physical exam, I begin to evolve a line of questioning that isn’t entirely conscious. I pick up information in my hands that guide the questions I next need to ask.”

Philip E. Greenman, DO, FAAO

Clinical Outcomes

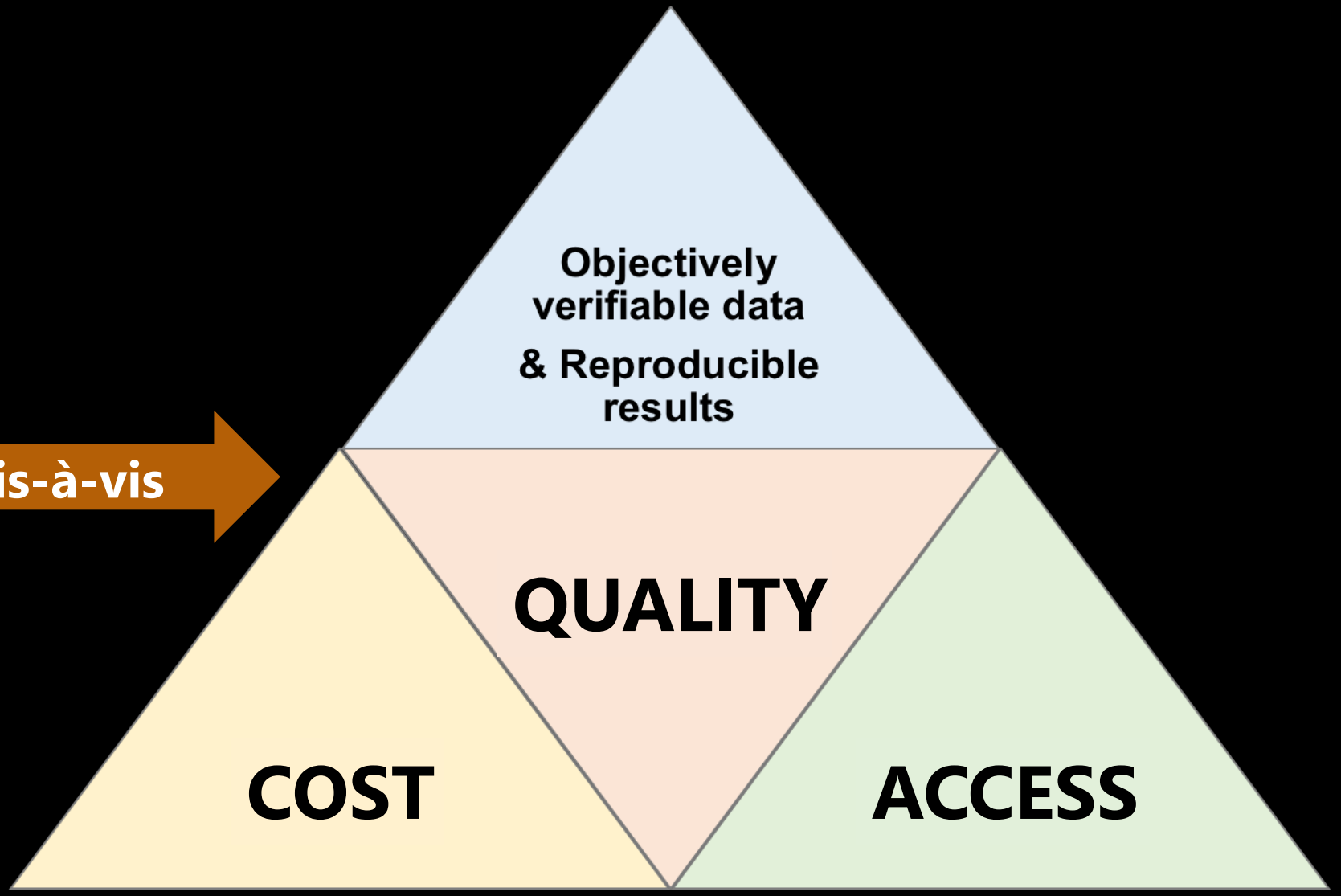
- Population & Systems based studies
- Stratification of disorders
- Social Determinants of Health
- Global Health Satisfaction: Patient, Physician, Society

Physiologic Mechanisms

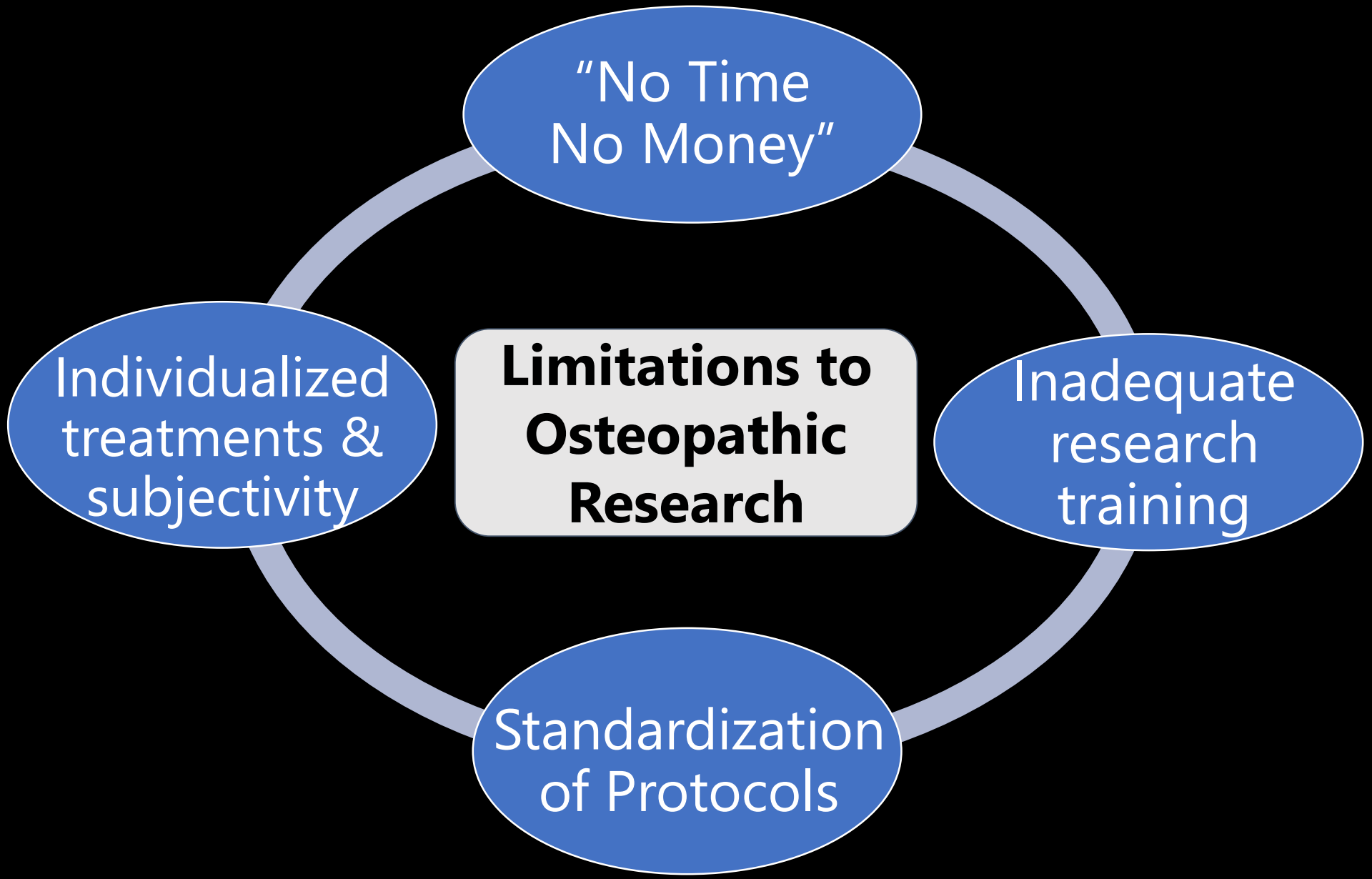
Osteopathic Approaches

Clinical Outcomes

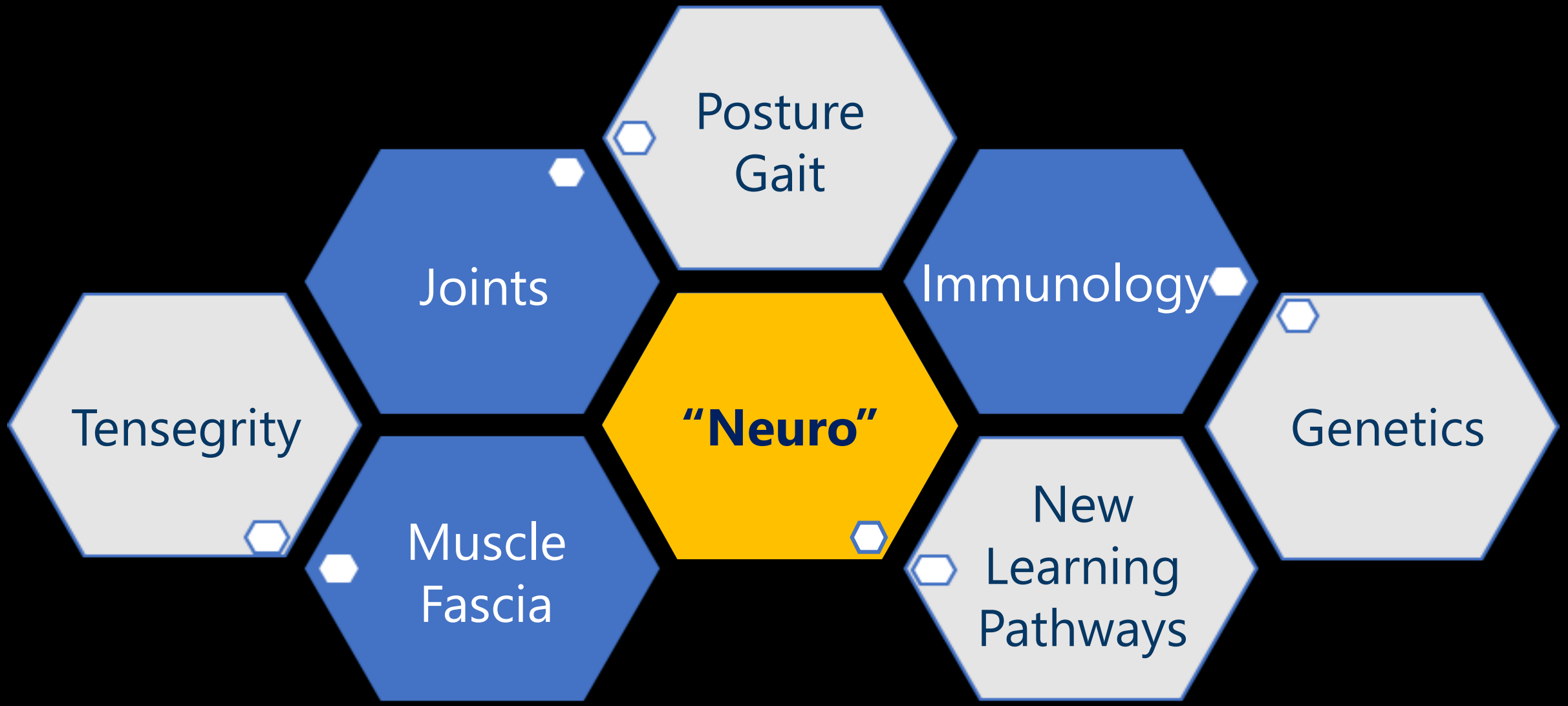
vis-à-vis



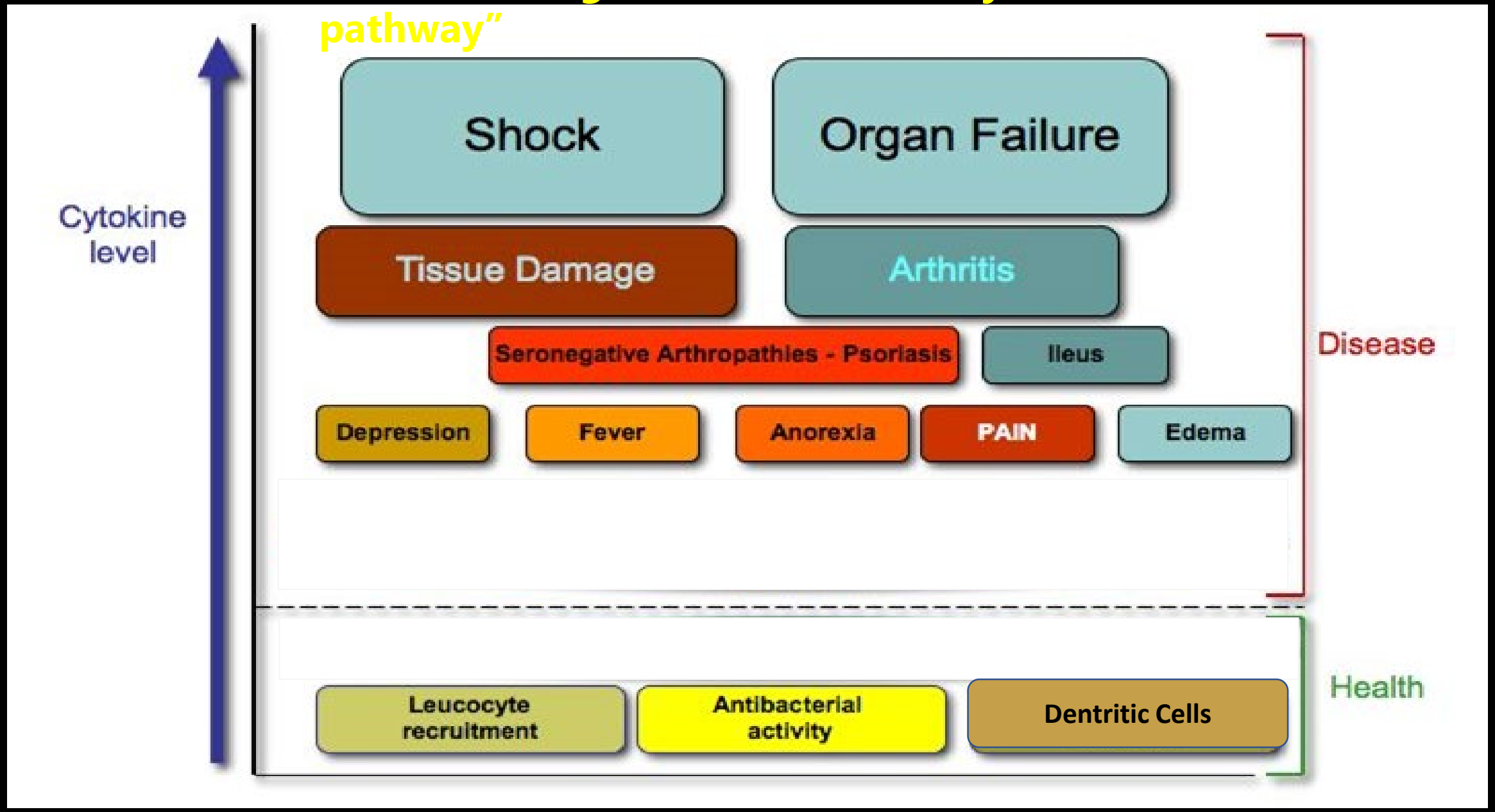
CHALLENGE: Find new paradigms & ways of scholarly investigation that work & meaning


"No Time
No Money"
Individualized treatments & subjectivity
Limitations to Osteopathic Research
Inadequate research training
Standardization of Protocols

Are you ready for a paradigm shift?


Posture
Gait
Joints
Immunology
Tensegrity
"Neuro"
Genetics
Muscle
Fascia
New
Learning
Pathways

"The cholinergic anti-inflammatory pathway"

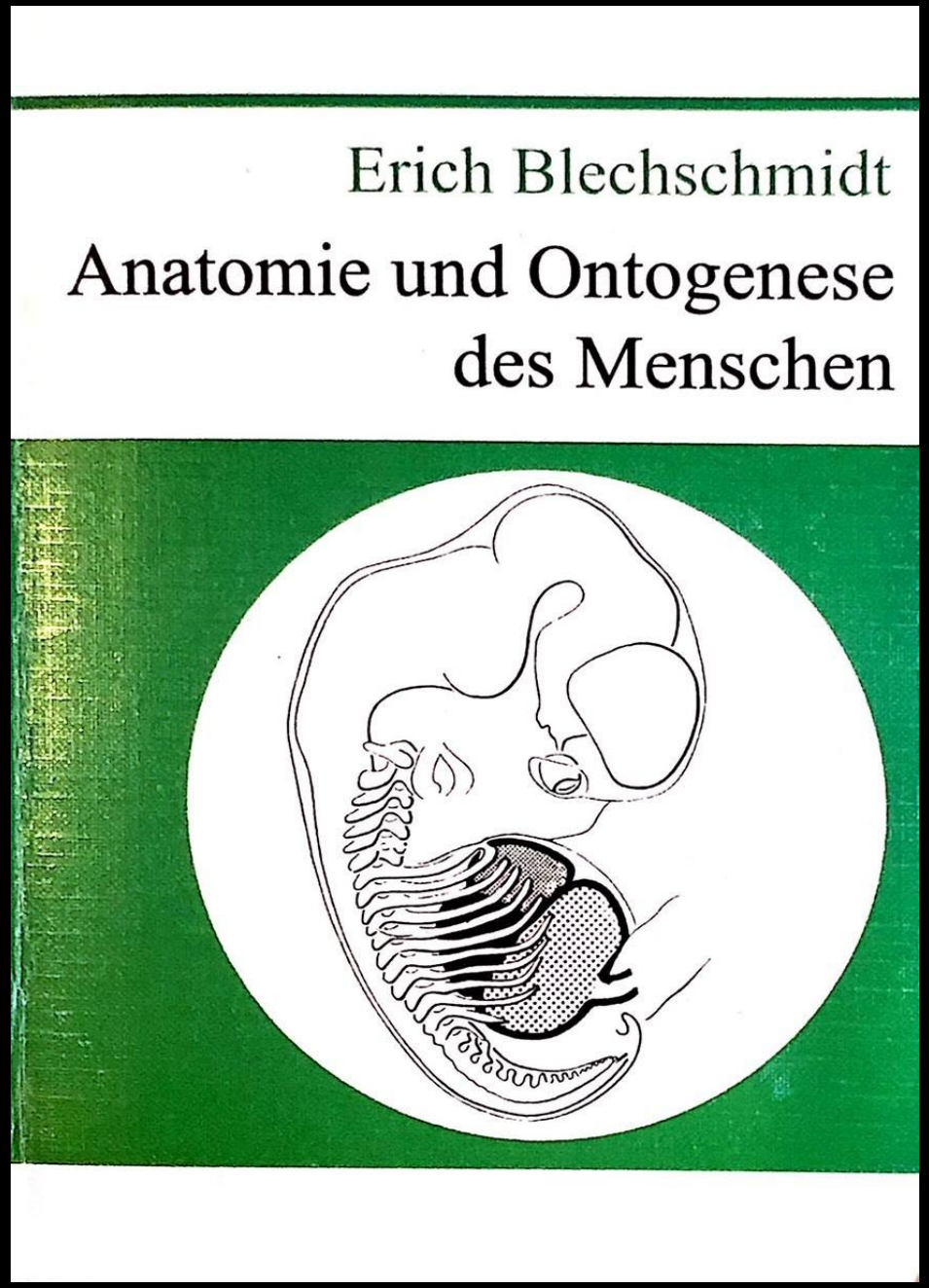


27 Tracey K. Physiology and immunology of the cholinergic antiinflammatory pathway. J Clin Invest. 2007 Feb 1; 117(2): 289–

Molecular Medicine Meets Manual Medicine: "Genomics"

"...Ultimately, when it comes to Osteopathic Manipulation I could foresee a time when variants are identified that correlate with, say, risk for somatic dysfunction, where studies could be designed to see how OMT could proactively reduce that risk and move OMT from a secondary/tertiary modality to a genetically personalized primary preventive modality..."

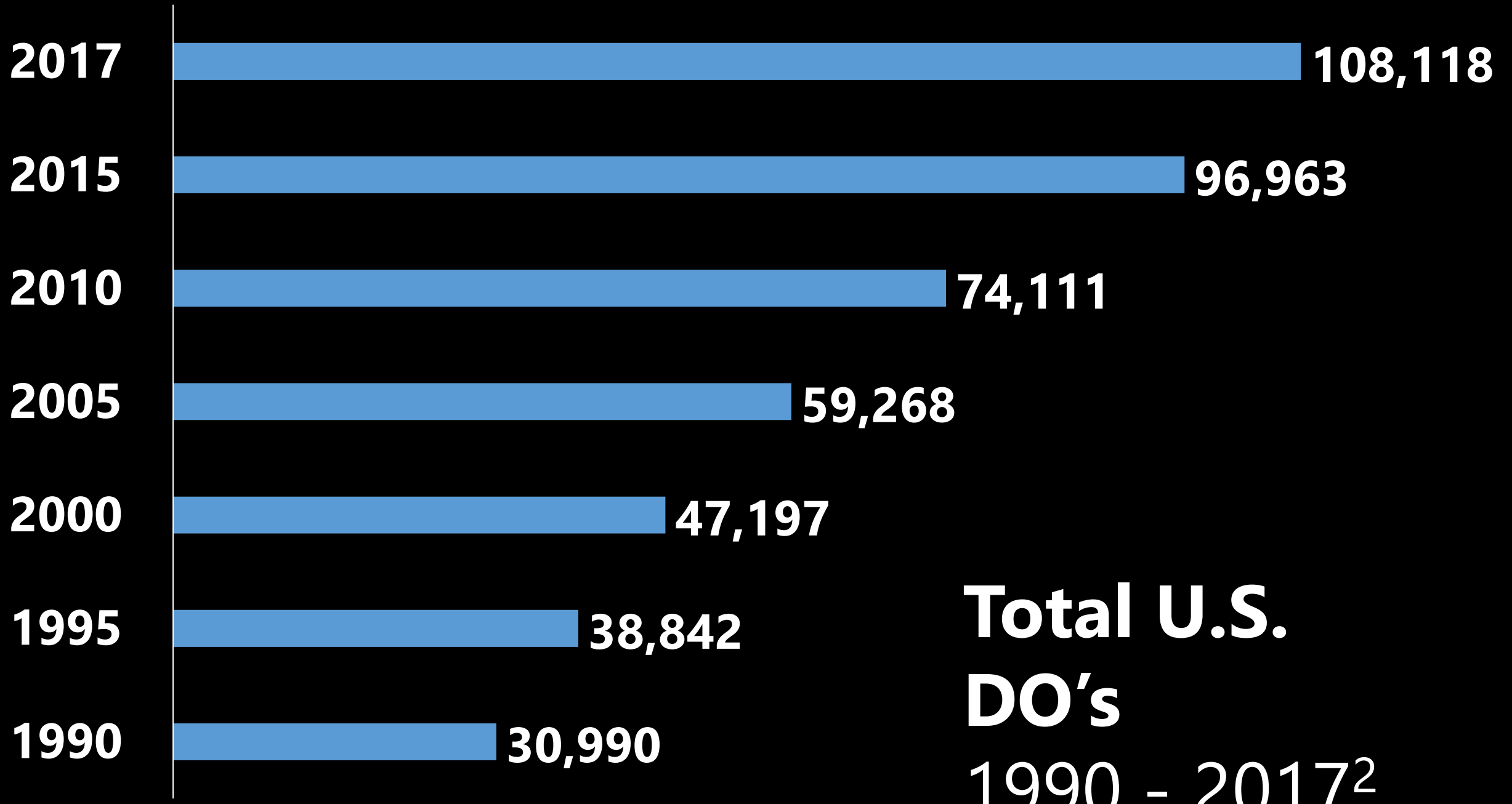
David Tegay, DO - Clinical Geneticist



"It appears that when we use our hands, we develop a set of 'tool-consciousness', wherein we actually find that the hands perform some sort of 'thinking' along the entire process of doing...."

"...this has never been really explicitly studied..."

Erich Blechschmidt, MD



Total U.S. DO's

1990 - 2017[2]

“What generally is overlooked is the positive economic impact physicians have on their communities and affiliated hospitals*”

Philip Miller, Merritt Hawkins

*’*The National Economic Impact of Physicians Report’ (AMA March 2018)*[29]

$1.4 million (17 jobs/benefits)
$1.5 million (net revenue)
$2.3 trillion (economic output by physicians)

Moving from "we say so" → "let's do so"

Creating the
LEARNING ORGANIZATION

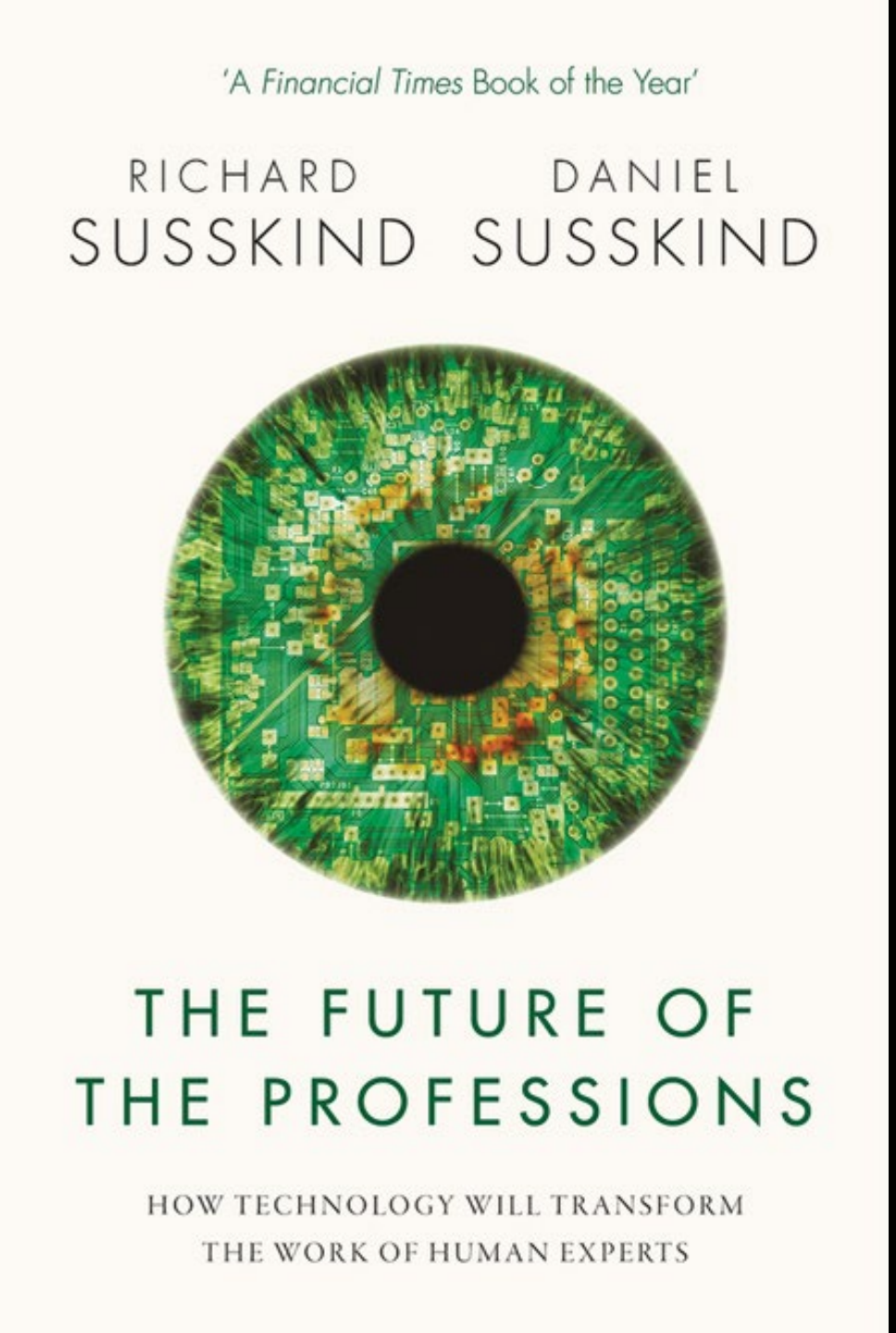
1) Open Systems Thinking – Permeable
2) Individual learning is integrated & systematized
3) Learning and outcomes occur in teams
4) New creative approaches to old problems
5) Shared vision and coherent values with clear implementation strategies (that actually work!)

Peter M. Senge: *The fifth discipline* (1993)

***From ONTOLOGY to PHENOMENOLOGY**

“Whatever theoretical approach you take to change, converting your theories into practice will be a tough challenge”

Trisha Greenhalgh (2011)



"The traditional role of a professional as a gatekeeper to exclusive information in a certain field is long over."

What's next?

"Professionals need to be prepared to go with the flow to ensure they stay relevant in our modern world. Technology is a tool to make knowledge more accessible; it helps

Future Invitations… may look like this

- Eliminate complacency
- Create new, ‘best-fit’ research methodologies – new paradigms?
- Single GME accreditation system: opportunity vs resistance
- Inclusive, open minded community: students & patients & public
- Technology: support vs supplant
- Research/scholarly activities are major drivers

Summary

The scientific method and evidence-based clinical outcomes must adhere to **THREE RULES** in order to assure both the SCIENCE and ART of Medicine:

RULE 1: **Guidance before Guidelines**

(patient & population are the focus)

RULE 2: **Outcomes before Revenue**

Summary

The scientific method and evidence-based clinical outcomes must adhere to **THREE RULES** in order to assure both the SCIENCE and ART of Medicine:

RULE 1: **Guidance before Guidelines**

(patient & population are the focus)

RULE 2: **Outcomes before Income**

Summary

RULE 3: There is only rule (1) & (2)


FUTURE


JAZZ

Individual Patient

Physician Role

PUBLIC

We've Got This!

"COMMUNITER VINCIMUS*"

*Osteopathic Medical Student

We've Got This!

Theory

We've Got This!

Practice

We've Got This!

BEST Practice


BALANCE


MOTION

M. O. A. Interne Library

Never lose sight of the fact that the only excuse for our existance is our ability to adjust the various tissues of the body. The success of any Osteopathic Physician depends upon his perfection in doing just that.

Perrin T. Wilson D. O.

Thank you!

Thank you!

Questions?
Comments?
Concerns?

THE END!
FIN!
ENDE!

References

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