Foundations of Pain Management
BioPsychoSocial Issues

Mi-CCSI

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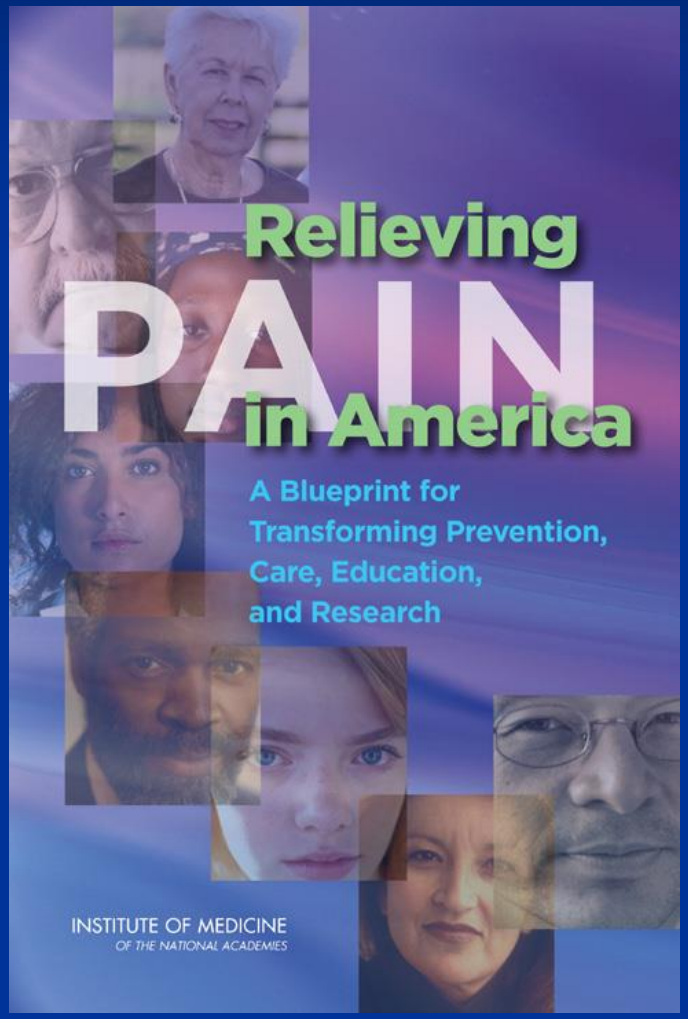
Disclosures

- Consultant to Community Health Focus Inc.
- Immediate Past-President of the American Pain Society
- Funded for research by NIH

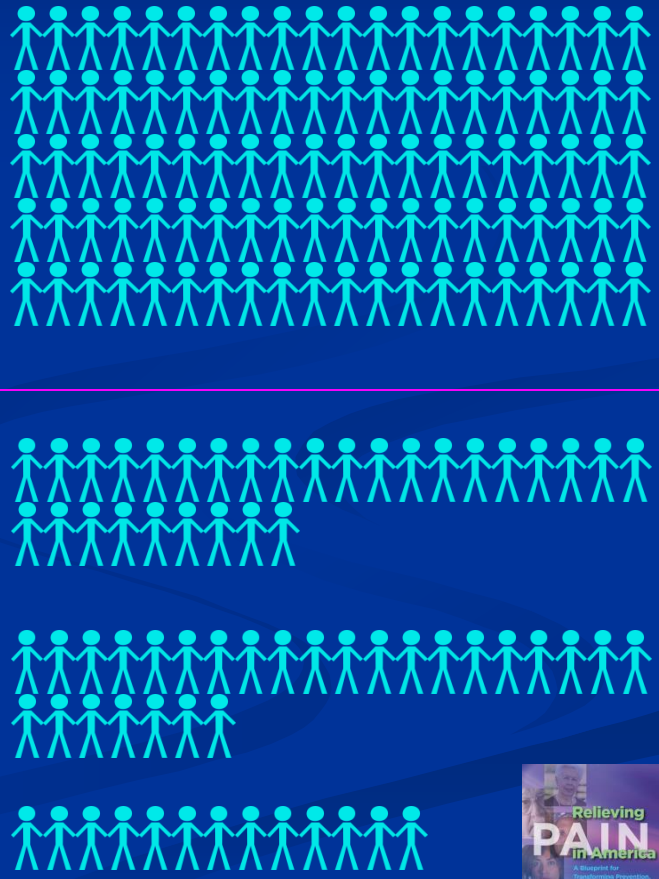
There will be no use of off-label medications in this presentation.

100 Million Individuals in the U.S. have Chronic Pain

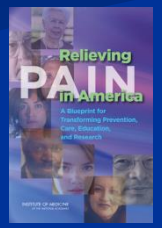


More people have Chronic Pain than Diabetes, Heart Disease, and Cancer Combined

Chronic Pain	100 Million
Diabetes	29.1 Million
Heart Disease	27.6 Million
Cancer	13.7 Million



= 1 Million individuals



Most Pain Care Visits occur within Primary Care

Peterson K, et al.. VA ESP Project #09-199; 2017.

Pain Medicine Versus Pain Management: Ethical Dilemmas Created by Contemporary Medicine and Business

John D. Loeser, MD† and Alex Cahana, MD, PhD*†*

Biomedical Model
Interventional
Pain Medicine

- Procedure Driven
- Focus on curing/fixing

Patient is passive recipient

Biopsychosocial model
Interdisciplinary
Pain Management

- Focus on multidisciplinary teams
- Focus on pain management

Patient is active participant

Loeser, J & Cahana, A. (2013). Clinical Journal of Pain, 29 (4): 311-316.

How good is our black bag for treating chronic pain?

Treatment	Impact on Chronic Pain
Long term opioids	32% reduction
Pain drugs generally (across classes)	30% - 40% get 40% - 50% relief
Spinal fusion	75% still have pain
Repair herniated disk	70% still have pain
Repeat Surgery	66% still have pain
Spinal cord stimulators	61% still in pain after 4 yrs. average pain relief 18% across studies

Turk, D. C. (2002). *Clin.J Pain, 18*(6), 355-365; Backonja MM et al. *Curr Pain Headache Rep* 2006;10:34-38

Facet blocks: Limited evidence

Slipman CW, Bhat AL, Gilchrist RV, Isaac Z, Chou L, Lenrow DA. A critical review of the evidence for the use of zygapophysial injections and radiofrequency denervation in the treatment of low back pain. *Spine J*. 2003; 3:310-316.

Carette S, Marcouux S, Truchon R, et al. A controlled trial of corticosteroid injections into facet joints for chronic low back pain. *N Eng J Med*. 1991; 325:1002-1007.

Epidural steroid injections: Limited evidence

Armon C, Argoff CE, Samuels J, Backonja M. Assessment: use of epidural injections to treat radicular lumbosacral pain: report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. *Neurology*. 2007; 68:723-729.

Bowman SJ, Wedderburn L, Whaley A, Grahame R, Newman S. Outcome assessment after epidural corticosteroid injection for low back pain and sciatica. *Spine*. 1993; 18:1345-1350.

Carette S, Leclaire R, Marcoux S, et al. Epidural corticosteroid injections for sciatica due to herniated nucleus pulposus. *N Eng J Med*. 1997; 336:1634-1640.

Koes BW, Scholten RJPM, Mens JMA, Bouter LM. Efficacy of epidural steroid injections for low-back pain and sciatica: a systematic review of randomized clinical trials. *Pain*. 1995; 63:279-288.

Biomedical Model Generally: Limited evidence

Chou R, Loeser JD, Owens DK, et al. Interventional therapies, surgery, and interdisciplinary rehabilitation for low back pain: an evidenced-based clinical practice guideline from the American Pain Society. *Spine*. 2009; 34:1066-1077.

Hogan QH, Abram SE. Neural blockade for diagnosis and prognosis: a review. *Anesthes*. 1997; 86:216-241.

Merrill DG. Hoffman's glasses: evidenced-base medicine and the search for quality in the literature on pain medicine. *Reg Anesth Pain Med*. 2003; 28:547-560.

Staal JB, de Bie RA, de Vet HCW, Hildebrandt J, Nelemans P. Injection therapy for subacute and chronic low back pain: an updated Cochrane review. *Spine*. 2009; 34:49-59.

If Patients don't respond to the BioMedical model…

- They must be crazy
- The pain is all in their heads
- They don't want to get better

If Patients don't respond to the BioMedical model…

- They must be crazy
- The pain is all in their heads
- They don't want to get better

OR perhaps

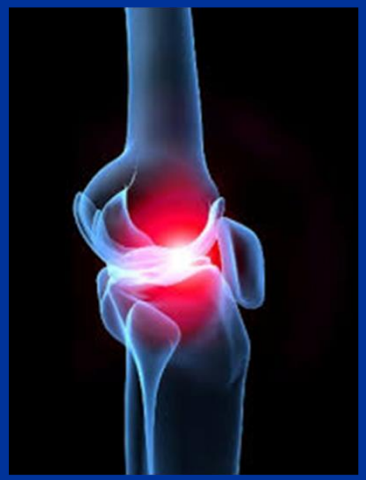
- We don't fully understand pain
- Treatment of pain requires a different approach than the traditional biomedical model
- Effective pain treatment requires a different financial model

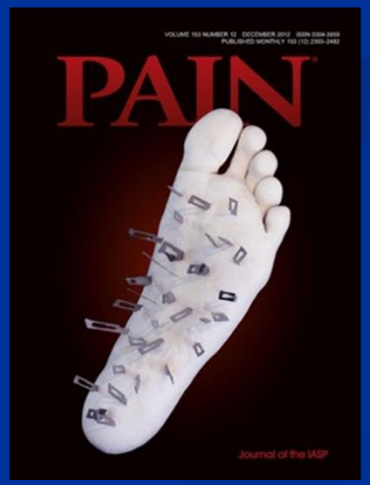
How is Pain Classified?

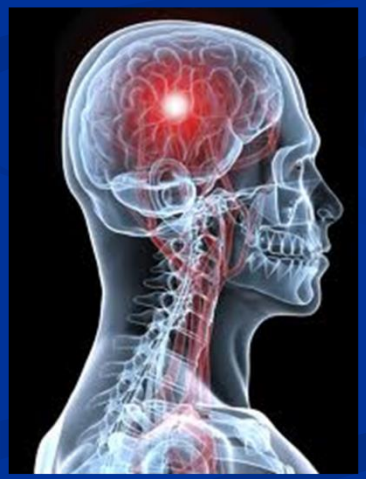
Time	Body Location	Suspected Etiology
Acute Vs Chronic	Head, Neck, Back, Pelvis	Cancer, Rheumatic, etc.

Newest Classification: Pain Mechanisms

Nociceptive Peripheral damage or inflammation	Neuropathic	Central







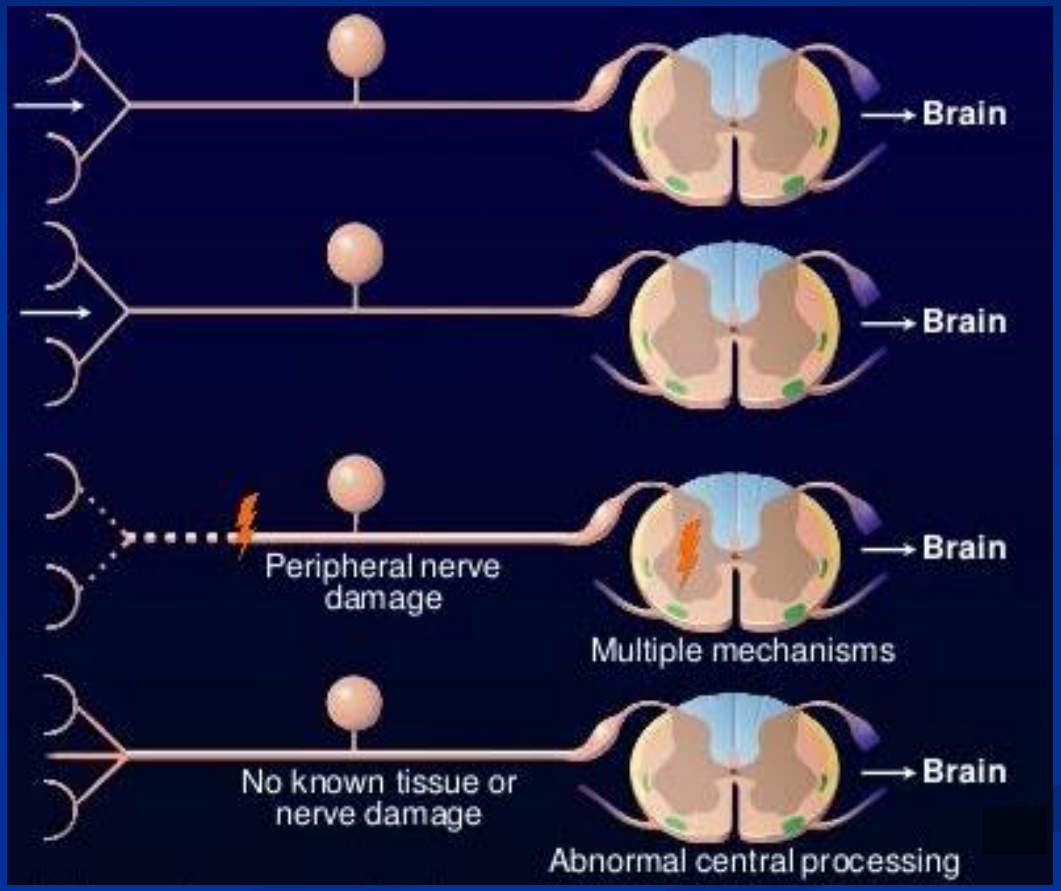
[1]Woolf CJ. *J Clin Invest*. 2010;120(11):3742-3744. [2]Costigan M, et al. *Annu Rev Neurosci*. 2009;32:1-32. [3]Dickinson BD, et al. *Pain Med*. 2010;11:1635-1653. [4]Williams DA, Clauw DJ. *J Pain.* 2009;10(8):777-791.

Mechanisms of Pain

Nociceptive and Inflammatory — **Noxious Peripheral Stimuli** / Inflammation

Neuropathic — Peripheral or Central damage

Centrally Driven Pain



Adapted from Woolfe, CJ, Ann Intern Med. 2004;140:441-451

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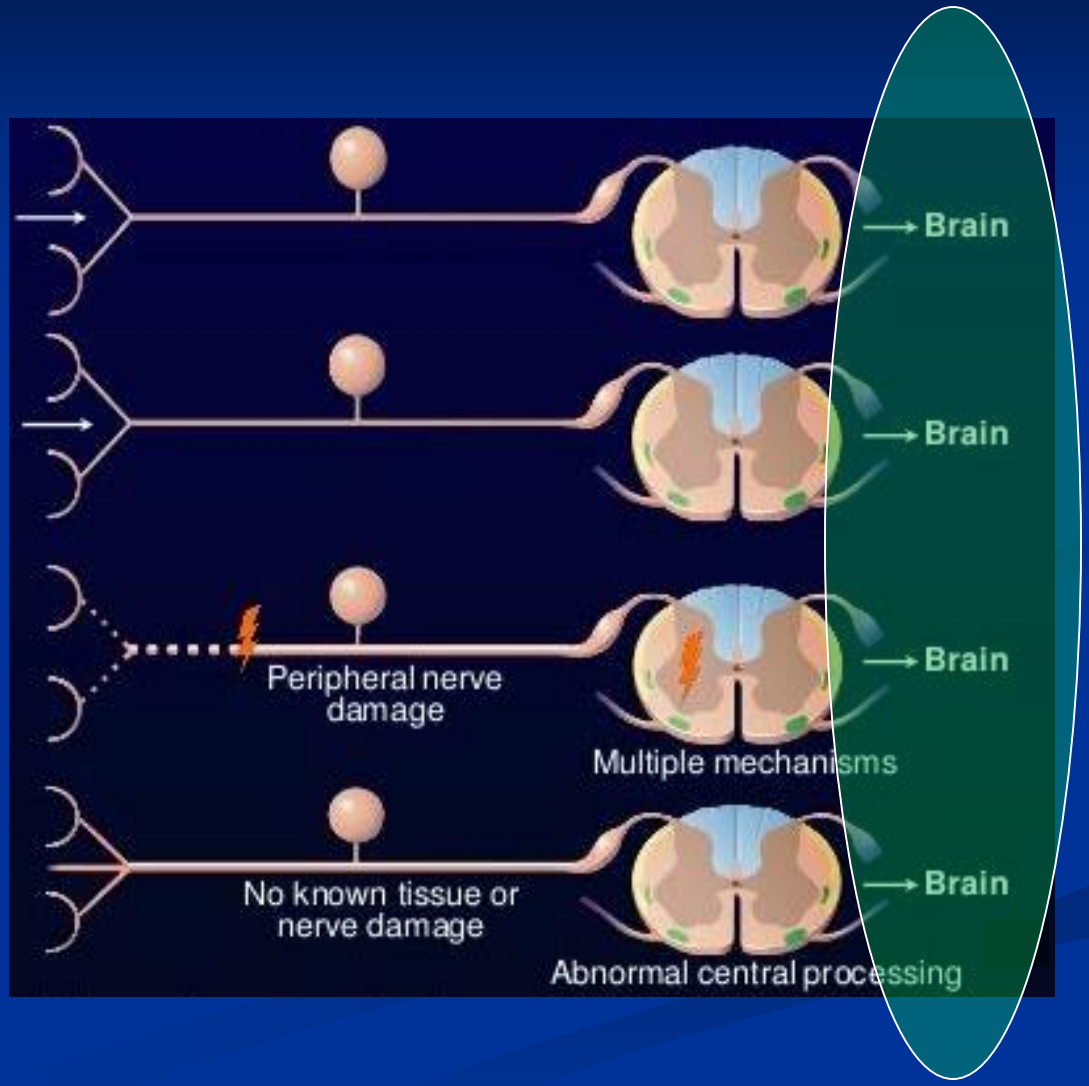

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Neurobiological perspective

Brain regions associated with pain processing involve both sensory and affective/cognitive regions

- Sensory / discriminative dimension
  - Somatosensory cortices (S1, S2)
  - Dorsal posterior insula
- Affective / Cognitive dimensions
  - Anterior insula
  - Prefrontal cortex
  - Anterior cingulate cortex
  - Thalamus
  - Amygdala
  - Hippocampus

Goesling, Clauw & Hassett. Curr Psychiatry Rep. 2013;15:421

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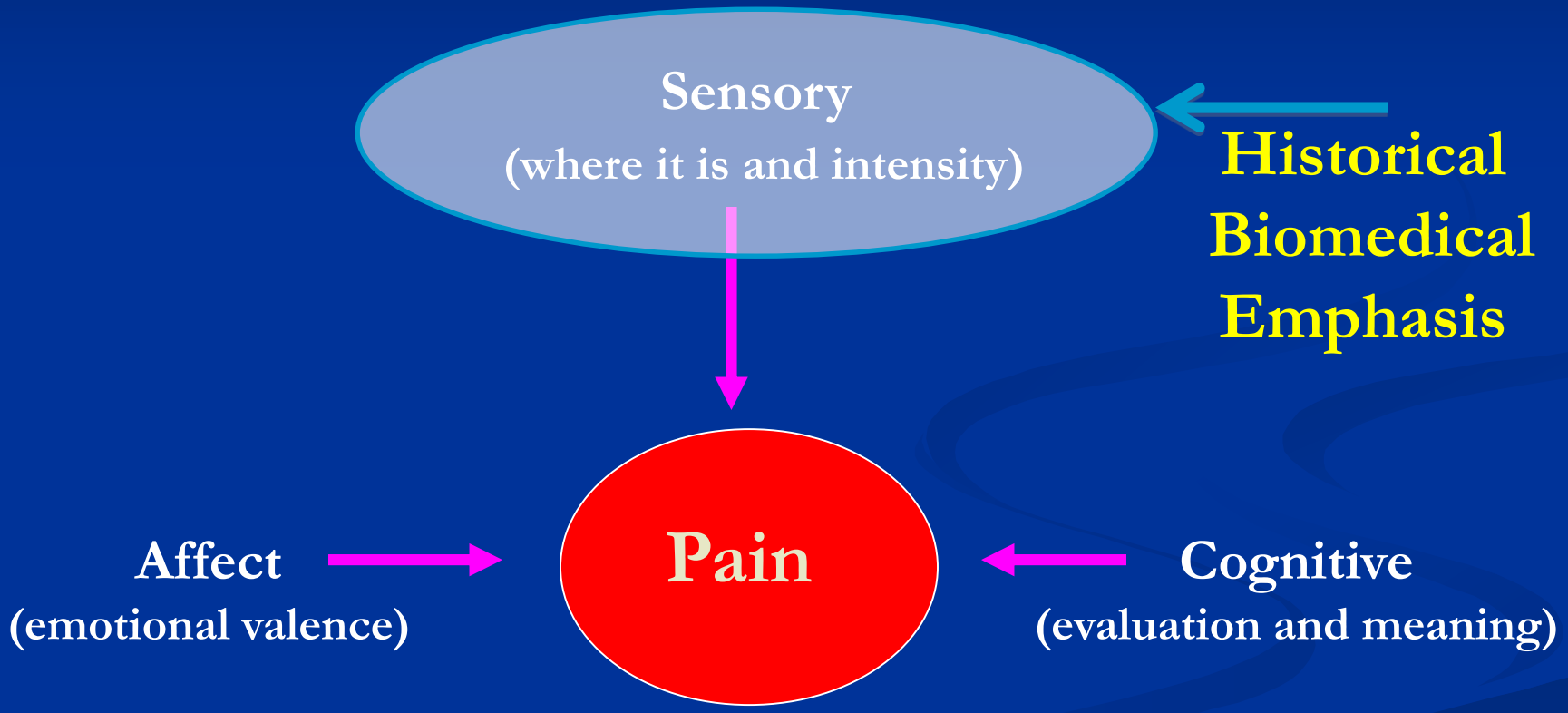
Chronic Pain

- Similar in mechanism to an emotion but experienced as a bodily sensation

Gatchel RJ, et al. Psychol *Bull*. 2007;133(4):581-624 ; Baliki & Apkerian (2015). Neuron, 87(3):474-491; Vachon-Presseau et al. (2016). J. Dental Research, 95(6):605-612.

Chronic Pain has Three Components: The BioMedical Model Focuses on 1 of Them



Casey KL. *Headache*. 1969;8(4):141-153; Melzack R, Wall PD. *Science*. 1965;150(699):971-979.

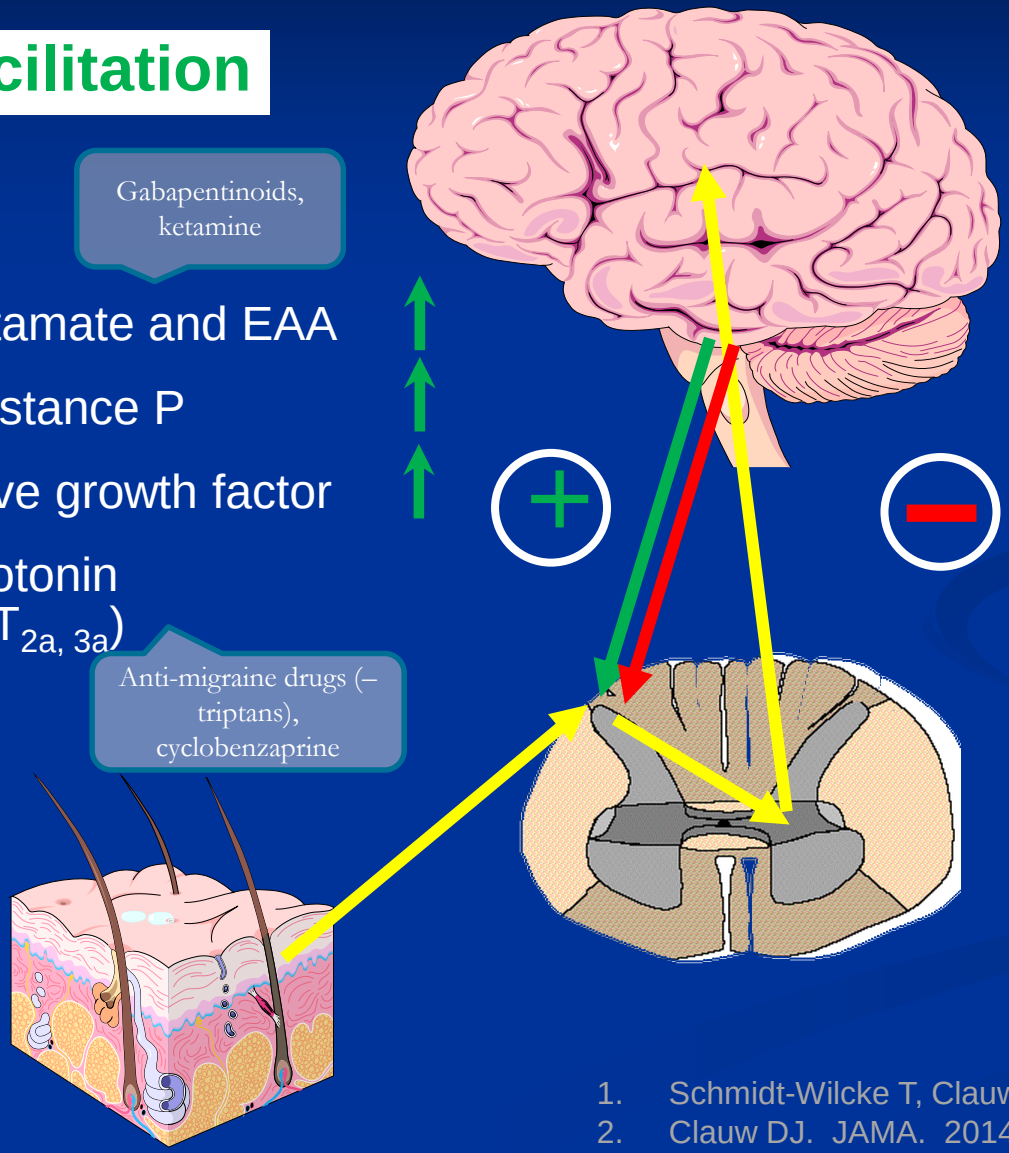
CNS Neurotransmitters Influencing Pain

Facilitation

Gabapentinoids, ketamine

- Glutamate and EAA
- Substance P
- Nerve growth factor
- Serotonin ($5HT_{2a, 3a}$)

Anti-migraine drugs (–triptans), cyclobenzaprine



Inhibition

Descending anti-nociceptive pathways

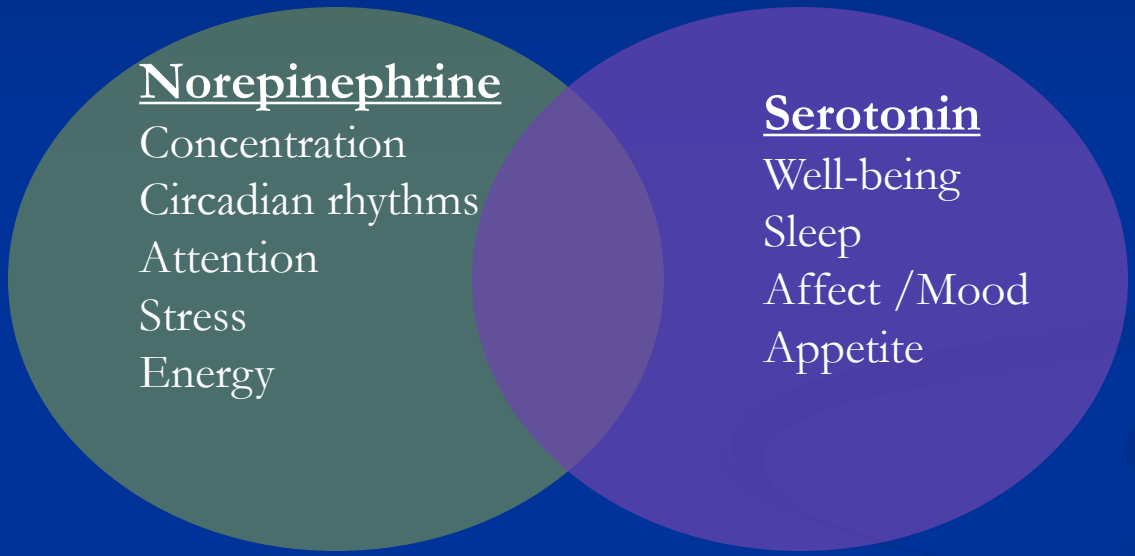
- ↓ Norepinephrine-serotonin ($5HT_{1a,b}$), dopamine
  - Tricyclics, SNRIs. tramadol
- ↑ Opioids
  - Low dose naltrexone
- Cannabinoids
  - No knowledge of endocannabinoid activity but this class of drugs is effective
- ↓ GABA
  - Gammahydroxybutyrate, moderate alcohol consumption

1. Schmidt-Wilcke T, Clauw DJ. *Nat Rev Rheumatol.* Jul 19 2011.
2. Clauw DJ. JAMA. 2014.

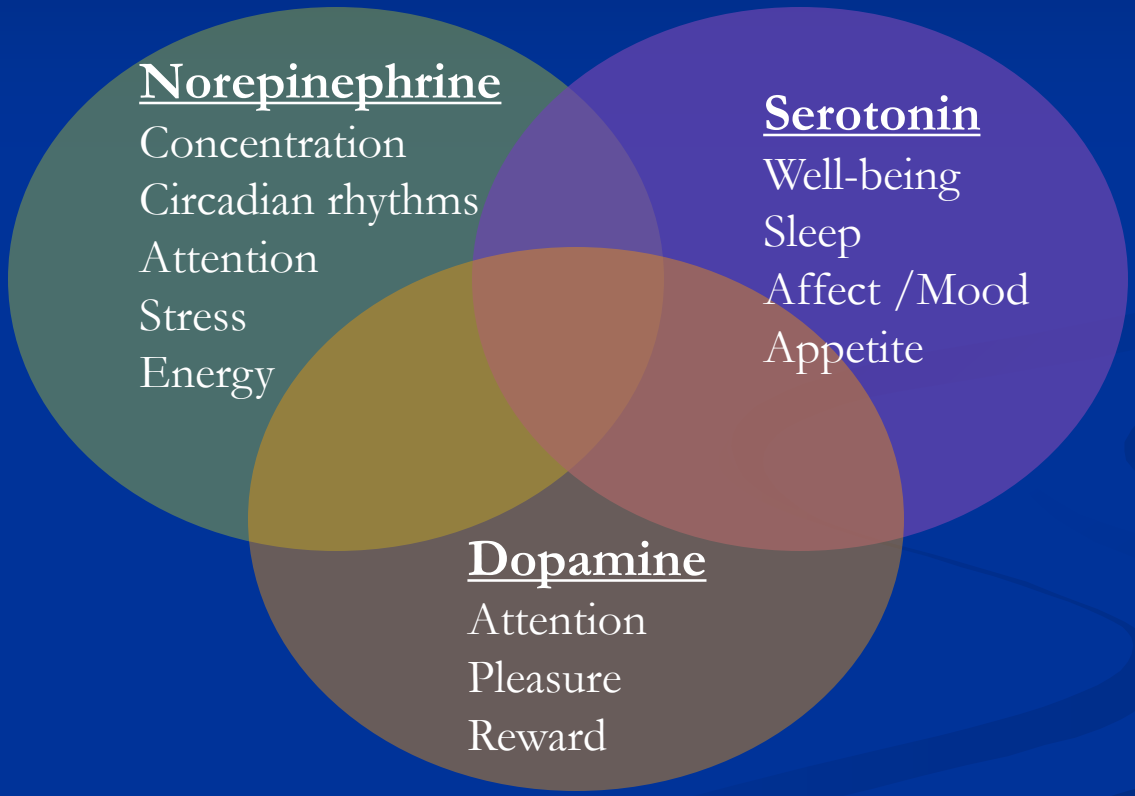
Neurotransmitters for Pain Processing

Norepinephrine
Concentration
Circadian rhythms
Attention
Stress
Energy

Neurotransmitters for Pain Processing



Neurotransmitters for Pain Processing



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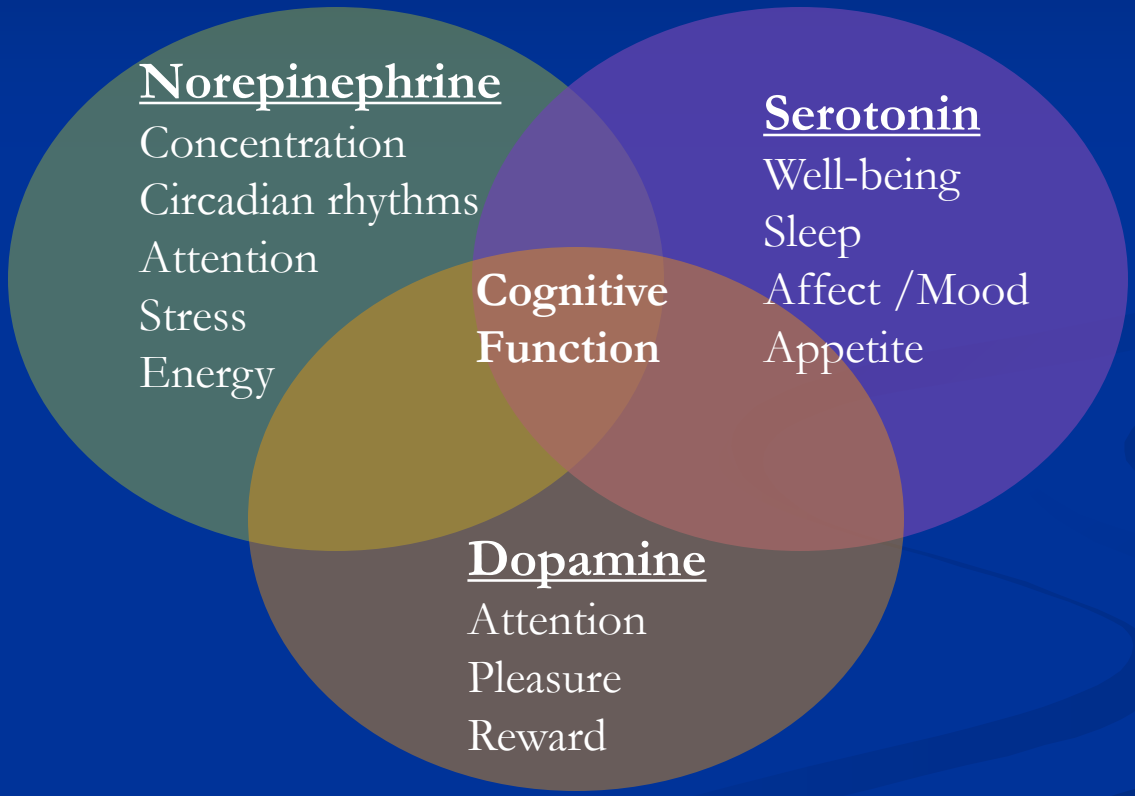

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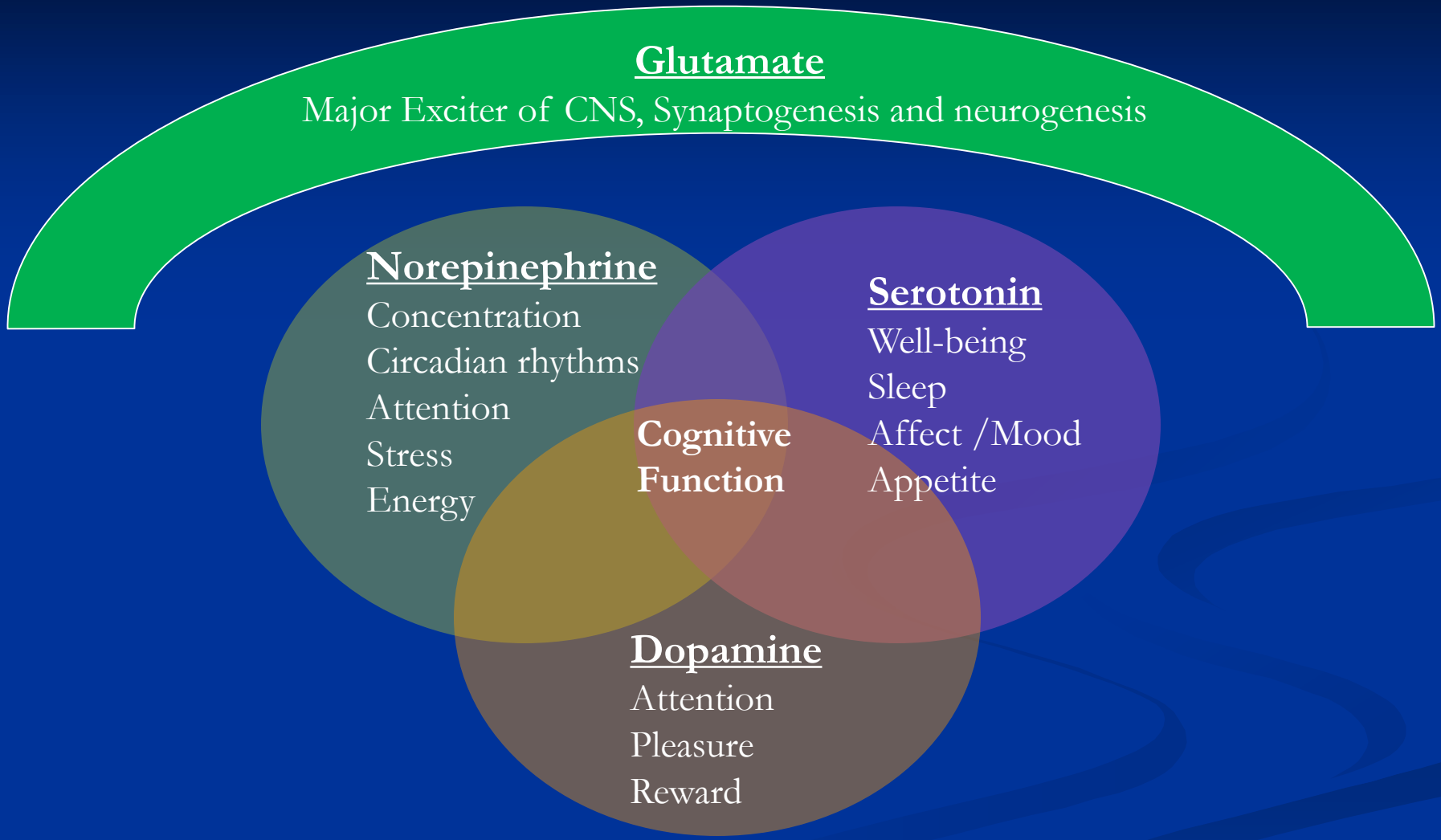

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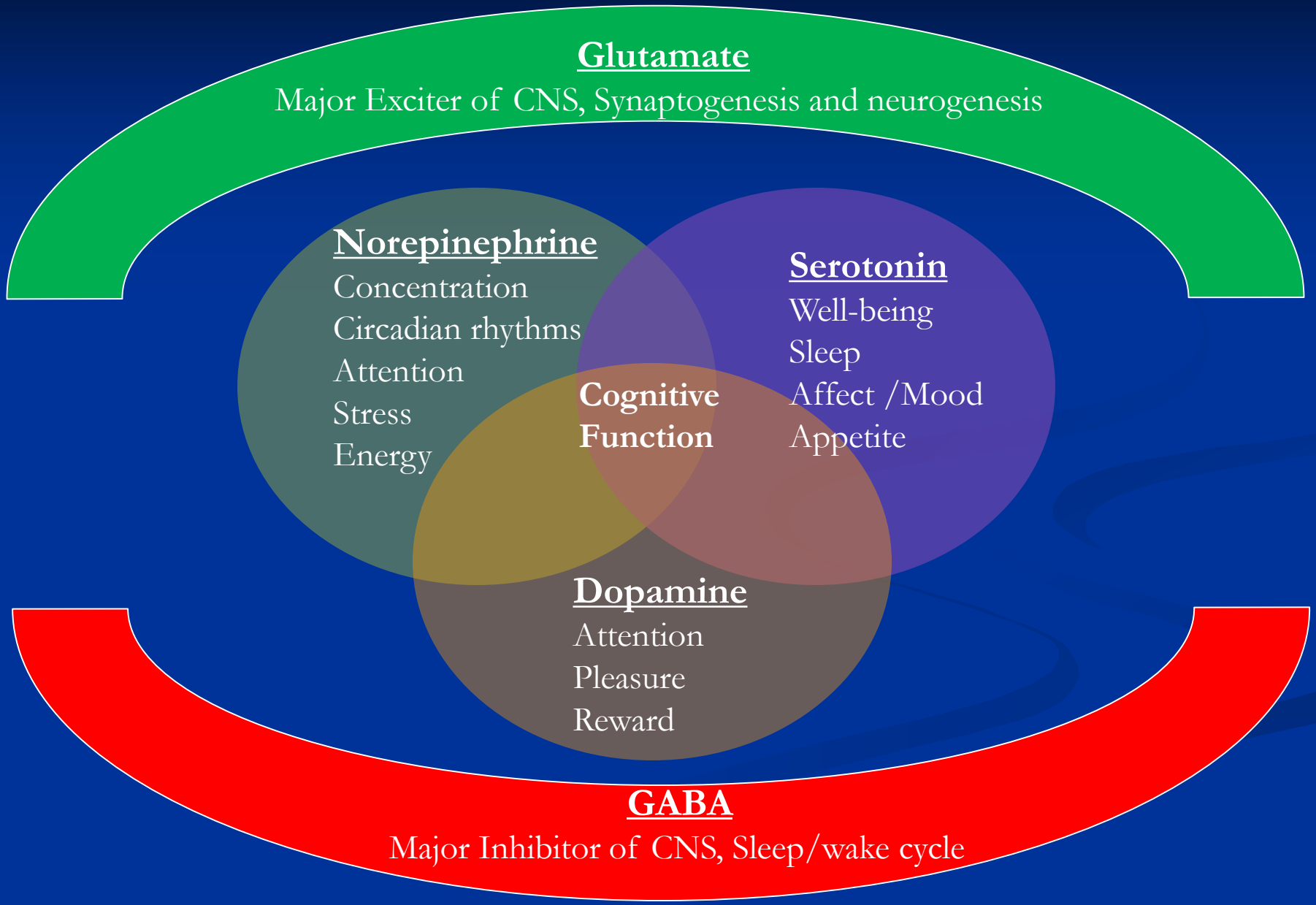


Shared Neurotransmitters Explain

- The complexity of chronic pain presentation

Williams, DA (2018). JABR, 23(2):e12135. Schrepf, A et al., JPain, 2018 (in press).

Shared Neurotransmitters Explain

- The complexity of chronic pain presentation

- Sleep, Pain, Affect, Cognition, Energy

Williams, DA (2018). JABR, 23(2):e12135. Schrepf, A et al., JPain, 2018 (in press).

Shared Neurotransmitters Explain

- The complexity of chronic pain presentation

- Sleep, Pain, Affect, Cognition, Energy
- New targets for treating pain perception

Williams, DA (2018). JABR, 23(2):e12135. Schrepf, A et al., JPain, 2018 (in press).

A Closer Look at Central Pain

Pain

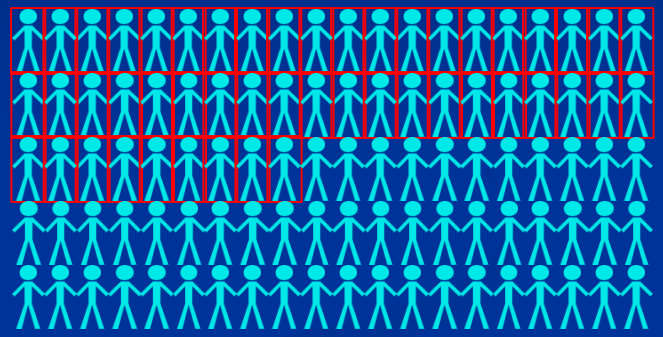
Pain

Pain

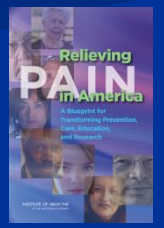
Pain

In U.S., More people have Chronic Pain than Diabetes, Heart Disease, and Cancer Combined

Chronic Pain	100 Million
Diabetes	29.1 Million
Heart Disease	27.6 Million
Cancer	13.7 Million



= 1 Million individuals



Chronic Overlapping Pain Conditions

COPCs	US Prevalence
Irritable Bowel Syndrome	44 Million
Temporomandibular Disorder	35 Million
Chronic Low Back Pain	20 Million
Interstitial Cystitis / Bladder Pain Syndrome	8 Million
Migraine Headache	7 Million
Tension Headache	7 Million
Endometriosis	6 Million
Vulvodynia	6 Million
Fibromyalgia	6 Million
Myalgic Encephalopathy / CFS	4 Million

[1]Veasley, C. et al (2015). White paper from the *Chronic Pain Research Alliance*.

Central Sensitization

Clinical Assessment:

- Pain disproportionate to nature and extent of injury (not nociceptive)
- Not due to lesions or damage within CNS (not neuropathic)
- Wide-spread pain distribution
- General hypersensitivity of senses, stress, emotions, mental load,
- S.P.A.C.E.

Staud R, Rodriguez ME. *Nat Clin Pract Rheumatol*. 2005;2:90-98.

Thinking Differently about Chronic Pain (1)

- Acute pain often has 1:1 relationship between tissue damage and pain.
  - Chronic pain does not.
  - Similar in mechanism to an emotion but experienced as a bodily sensation

Gatchel RJ, et al. Psychol *Bull*. 2007;133(4):581-624 ; Baliki & Apkerian (2015). Neuron, 87(3):474-491; Vachon-Presseau et al. (2016). J. Dental Research, 95(6):605-612.

Thinking Differently about Chronic Pain (2)

- Damaged tissue and pain are not the same thing

Thinking Differently about Chronic Pain (3)

- Pain is a Perceptual Experience formed in the brain
  - Other perceptual experiences with flexible biological associations include the following:
    - hunger, itch, tickle, urinary urgency, orgasm

Thinking Differently about Chronic Pain (4)

- Treating a perception requires different techniques than fixing damaged tissues
- Pain Treatment too often focuses on fixing some body part and not on how pain is processed

Functioning Detector

- Beeps when smoke is present
- Warns of fire
- Behavior:
  - Search for fire
  - Put out fire
- Detector is silent when fire is out

Functioning Detector

- Beeps when smoke is present
- Warns of fire
- Behavior:
  - Search for fire
  - Put out fire
- Detector is silent when fire is out
- Acute/Nociceptive pain

Broken Detector

- Beeps due to processing malfunction
- Behavior:
  - Search for fire?
  - Throw water?
- Better Behavior:
  - Fix the processor in the detector
- Chronic / Central Pain

Neurology: headache

GI, Urology: IBS UCPPS

Rehab, Neurology: LBP

Dentistry: TMD

OBGYN: Endo, VVD

Rheumatology: FM

Infectious Disease: ME/CFS

Action of Non-Pharmacological Interventions across COPC's

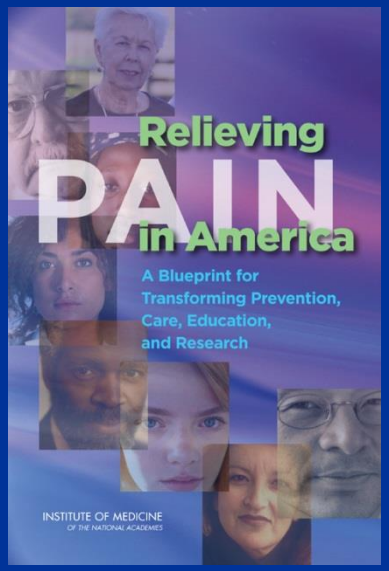
- Interventions that are successful at desensitizing or calming CNS activity associated with central sensitization are likely to be beneficial across conditions
- Interventions that diminish "central load" are likely to be helpful over time. It takes time to calm (reset) a sensitized CNS.

Williams, D. A. (2016). *Curr Rheumatol Rev, 12*(1), 2-12.

So what's a doctor to do?

Recommendations in Multiple Federal Documents

Self-Management, Evidence-Based, Patient-Centric, Multi-Modal Pain Care



National Pain Strategy

A Comprehensive Population Health-Level Strategy for Pain

HealthyPeople.gov

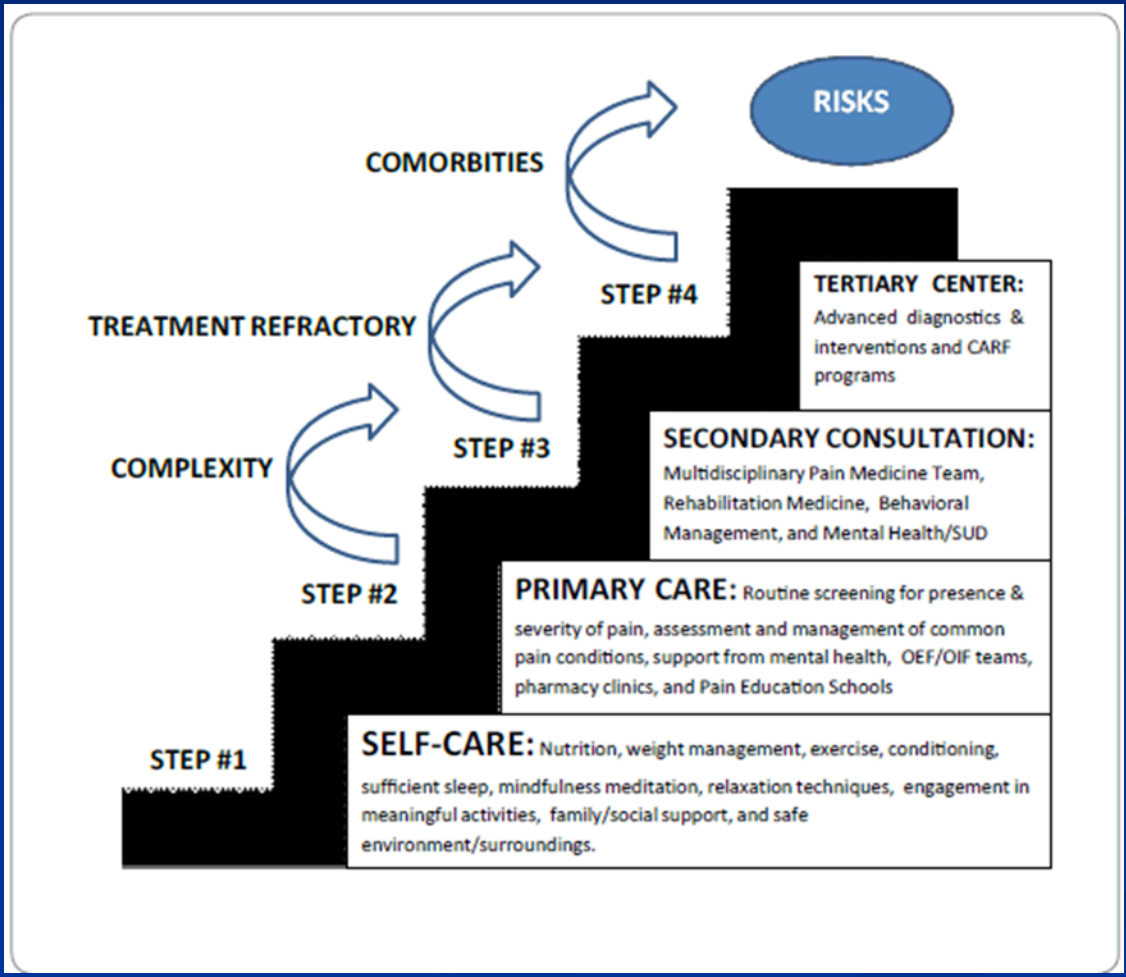
Healthy People 2020

EFFECTIVELY AND RESPONSIBLY MANAGE CHRONIC PAIN

GUIDELINE FOR PRESCRIBING OPIOIDS FOR CHRONIC PAIN

www.cdc.gov

VA's Stepped Care Model of Pain Management



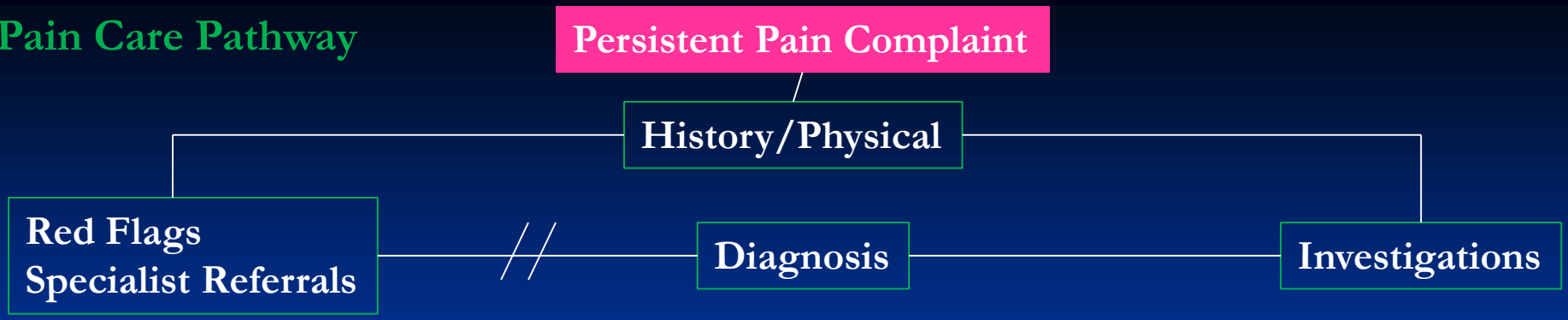
Kerns et al (2011). Transl Behav Med, 1:635-643. Coslo & Swaroop. (2016). J Pain Mgt & Med., 2:2

Pain Care Pathway

Persistent Pain Complaint

Adapted from Macfarlane et al. Ann Rheum Dis, 2017;76:318-328; Lee, et al., BJA 2014; 112:16-24; Peterson et al, VA ESP Project #09-199, 2017

Pain Care Pathway



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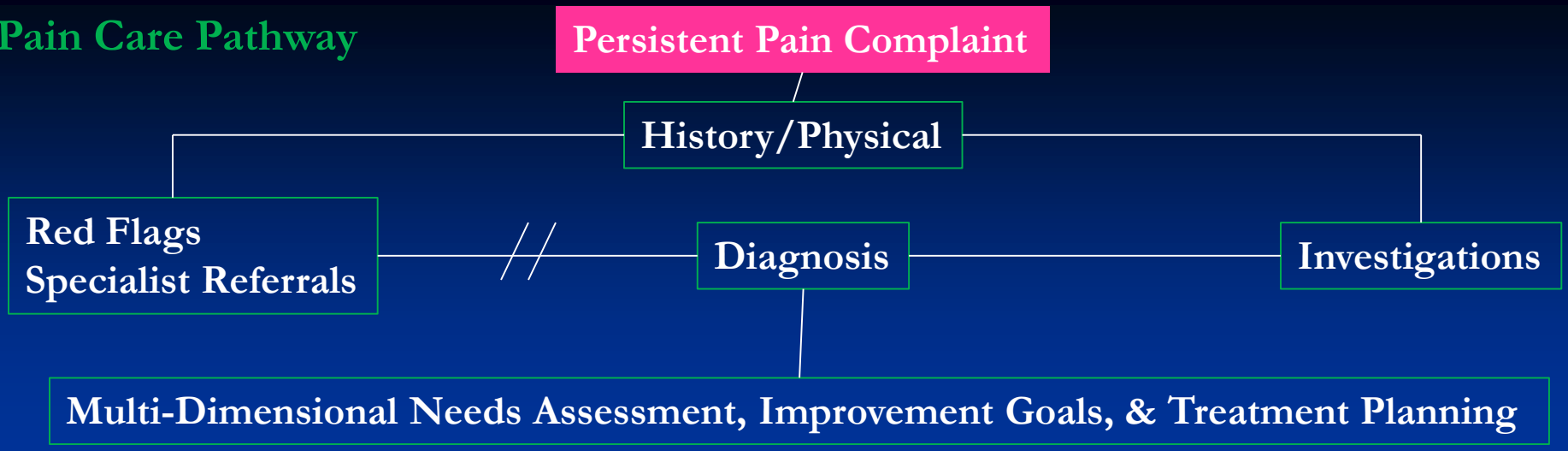

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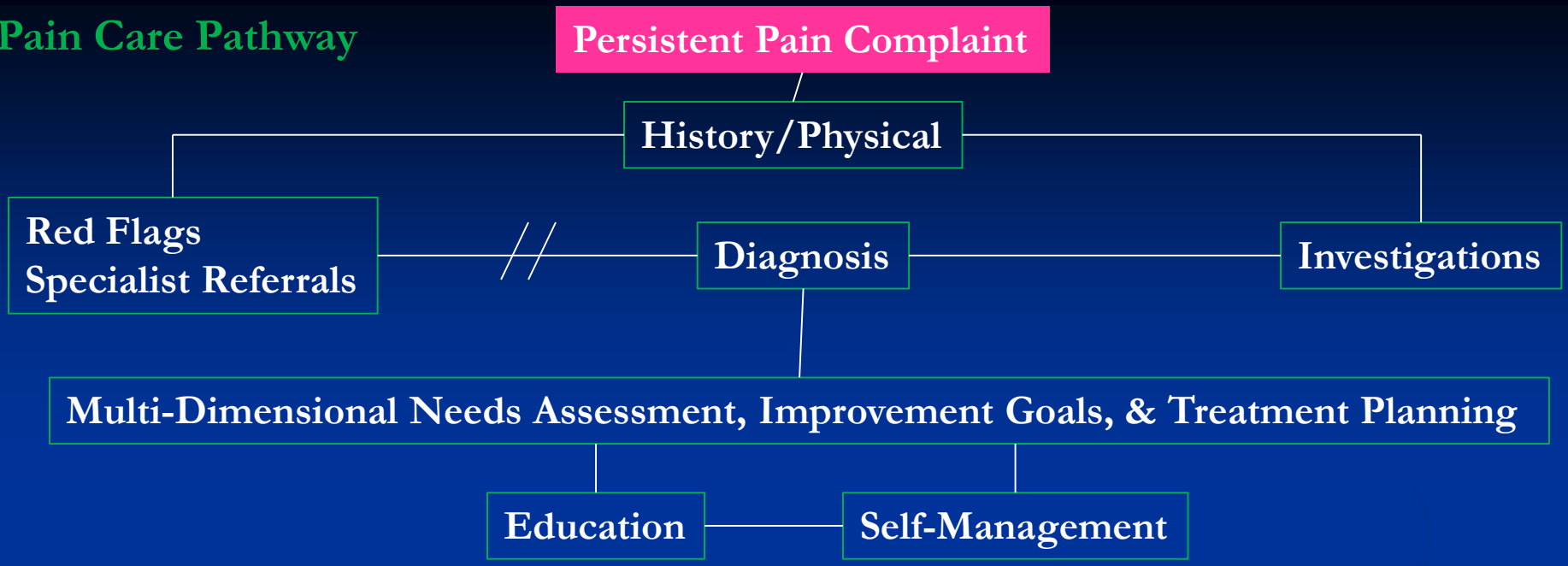

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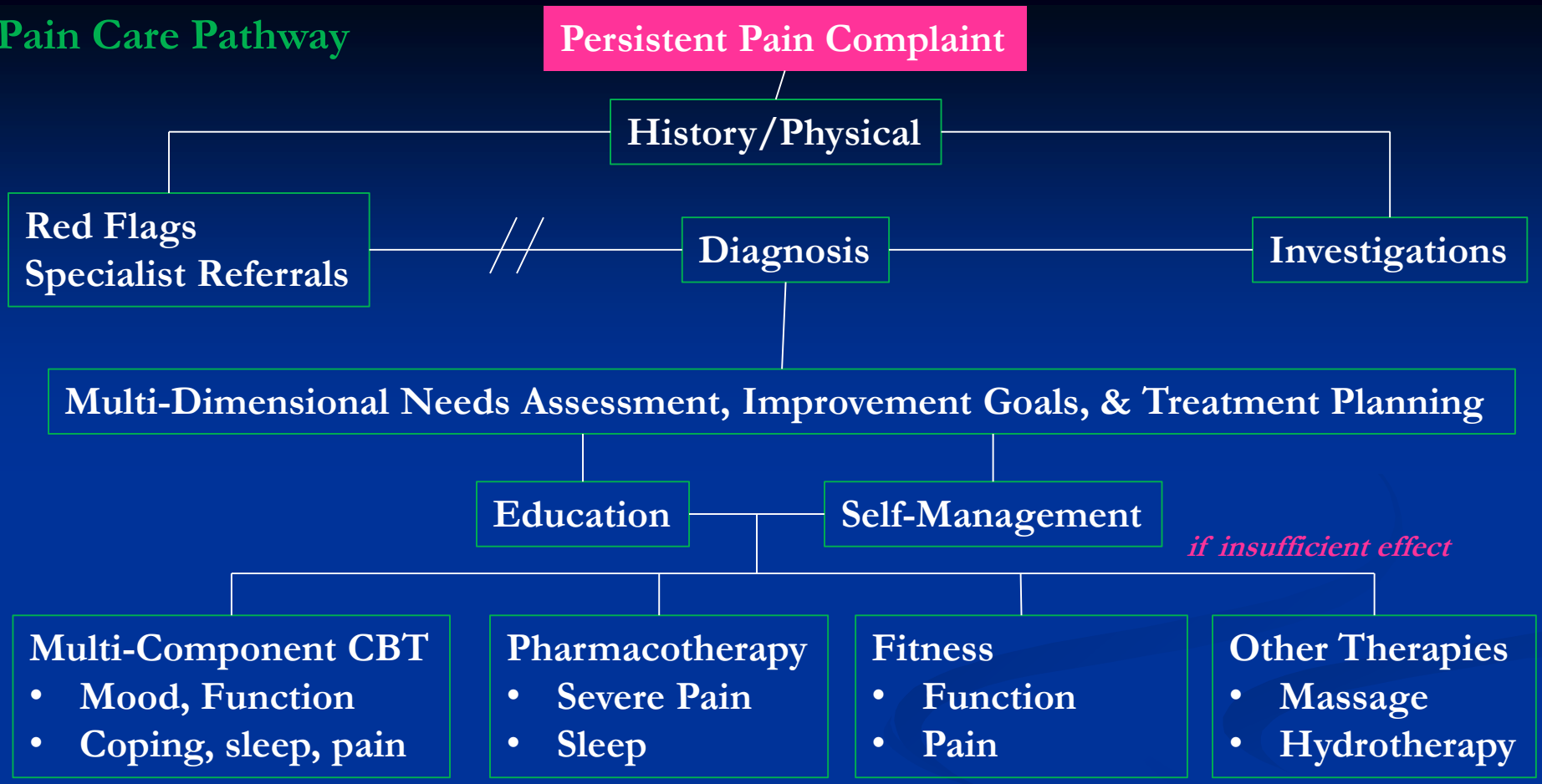

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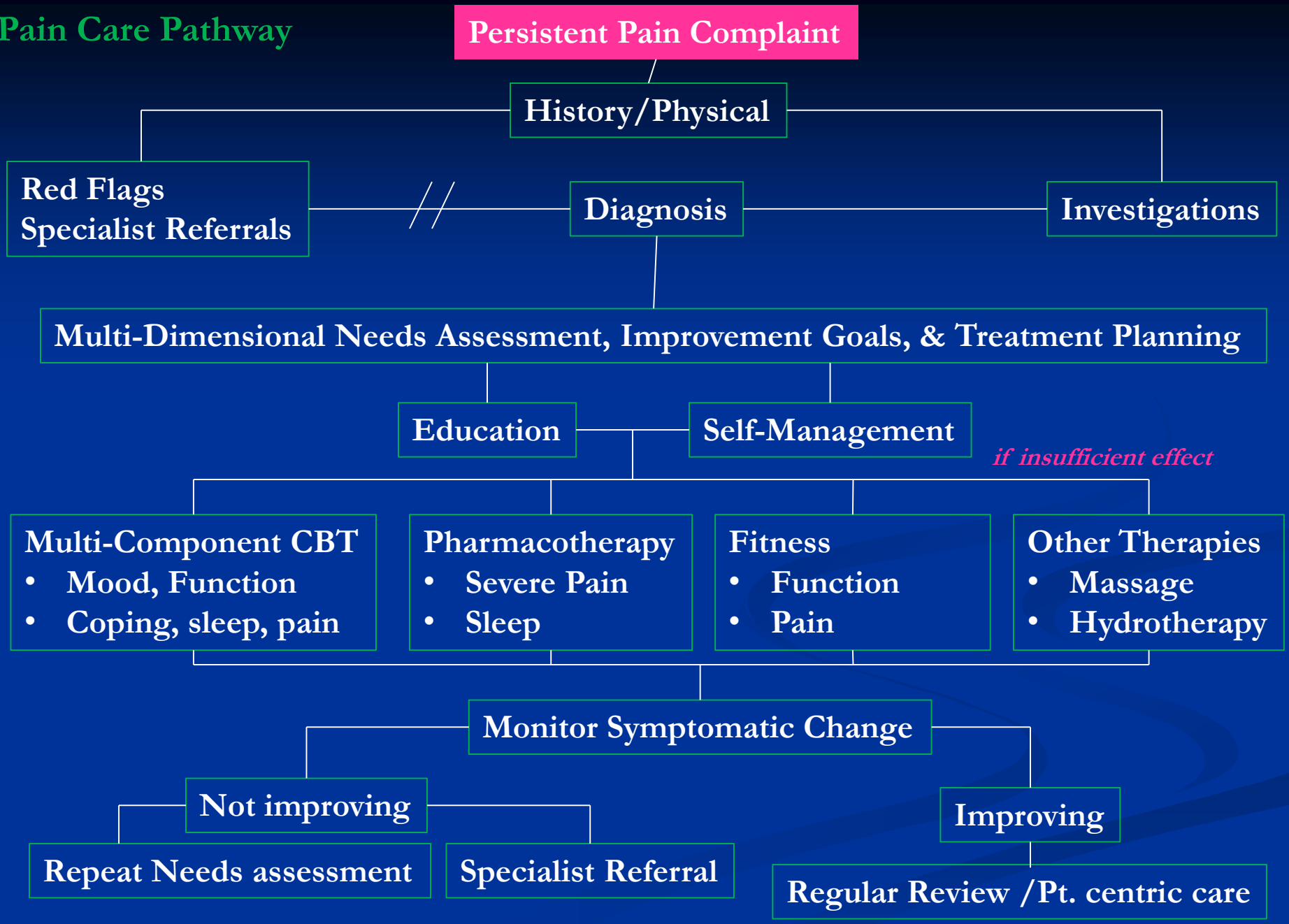

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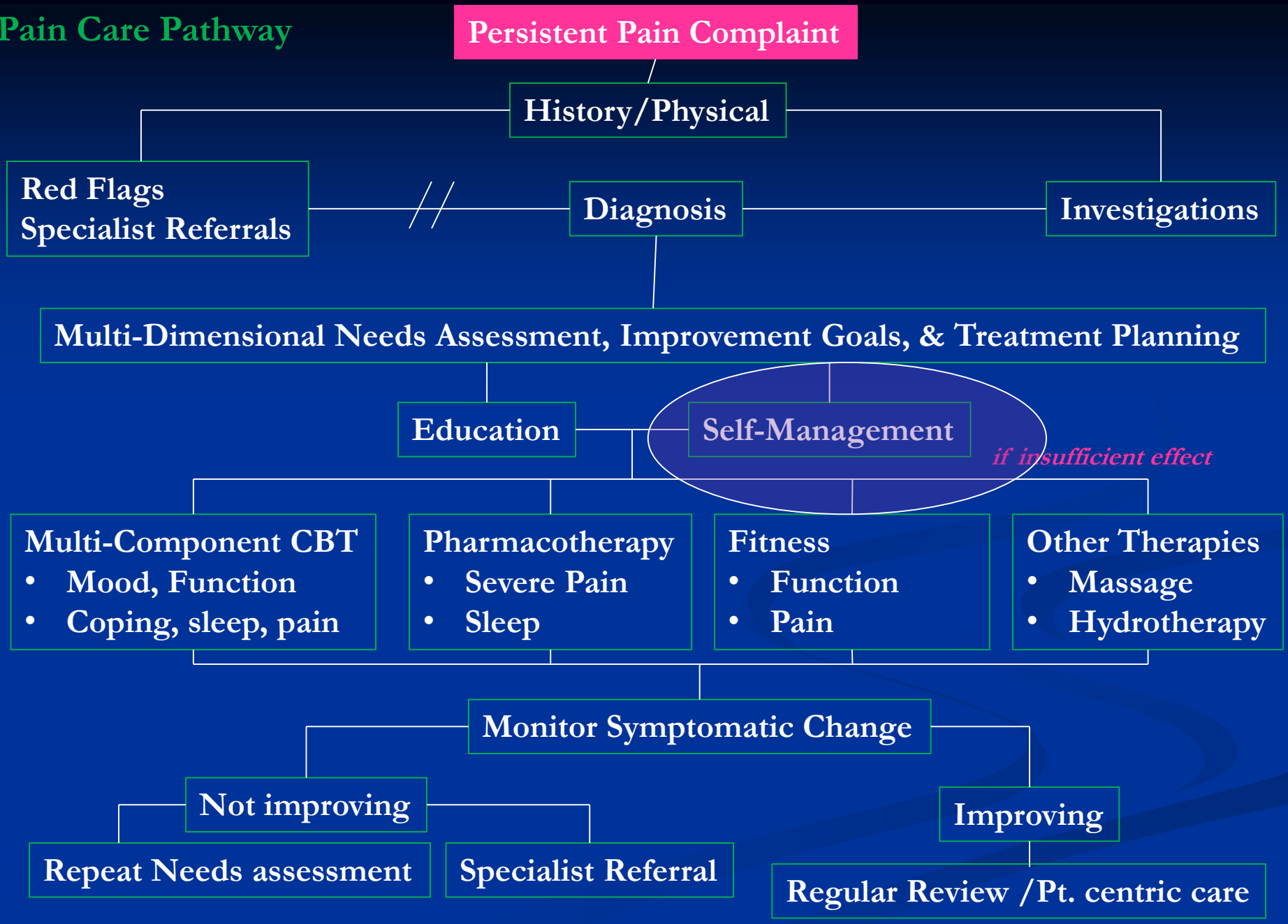

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How to ERASE S.P.A.C.E.

Emotions

Reflections

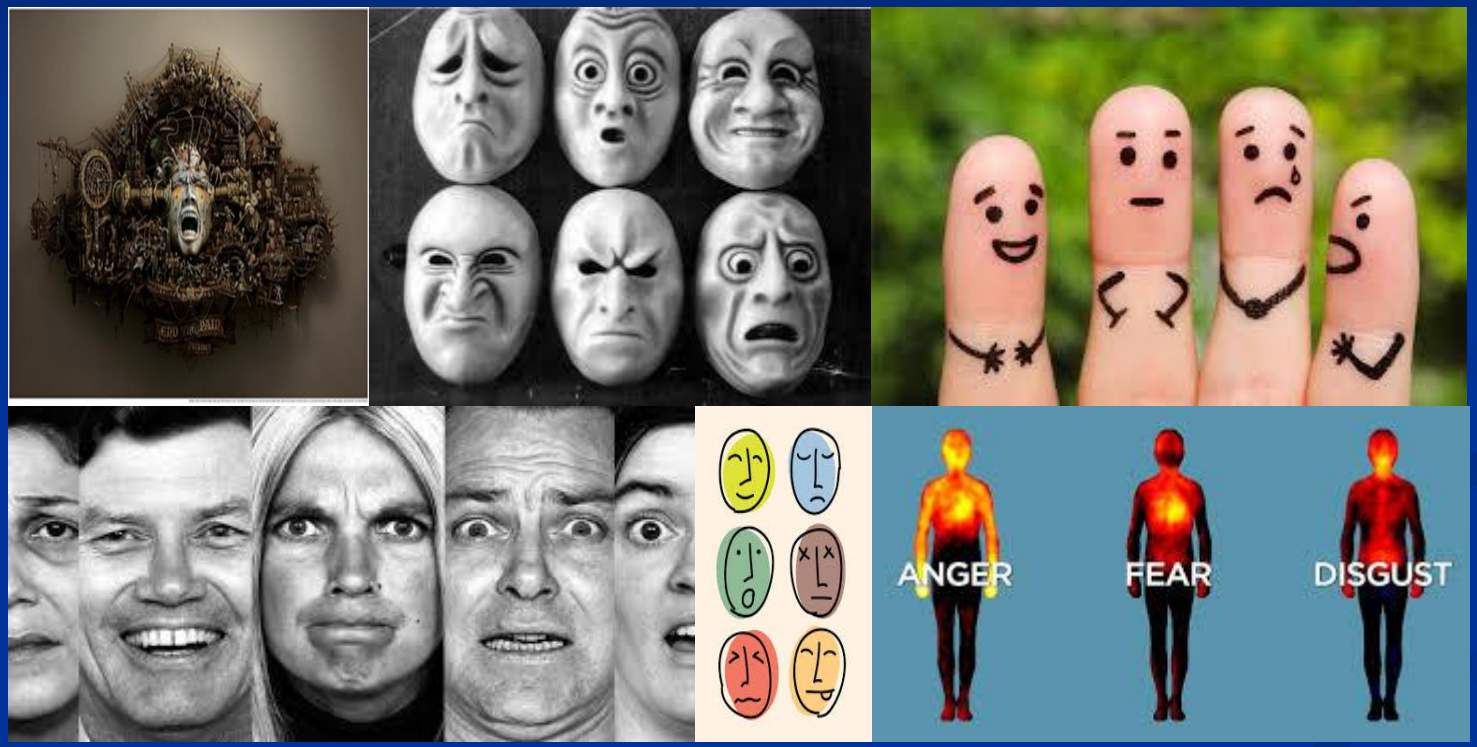
Actions

Sleep

Environment

ERASE

Emotions



Altering pain perception through Emotions

Psychiatric Co-Morbidities

Psychiatric Co-Morbidity in Chronic Pain

	Depression	Anxiety
General Population:	6.6%	18.1%
Chronic Pain:		30-54%

Kessler, RC et al (2003). JAMA, 289:3095; Kessler, RC et al (2005). Archives of Gen. Psychiatry, 62:617.
Banks et al, (1996). PsychBull, 119:95.; Eisendrath (1995), Neurology, 45:S26.

Personality Disorders in Chronic Pain Patients

Personality Disorders gen. pop: 5%-15%
chronic pain: 51-%-58%

Cluster A: Odd/Eccentric	Cluster B Emotional/Erratic	Cluster C Anxious/Fearful
• *Paranoid	• Antisocial	• Avoidant
• *Schizoid	• *Histrionic	• *Dependent
• Schizotypal	• Narcissistic	• OCPD
	• Borderline	
44%	31%	25%

Personality Disorders
Predictive of transition from acute to chronic status
Sub clinical P.D. impacts pain and treatment compliance

Gatchel (1997), Pain Forum, Williams et al, (2000), (Yeoman); American Psychiatric Assn. DSM5 (2013).

Patients do not need to be mentally ill to have chronic pain

Approaches to Resolve Negative Affect Influencing Chronic Pain

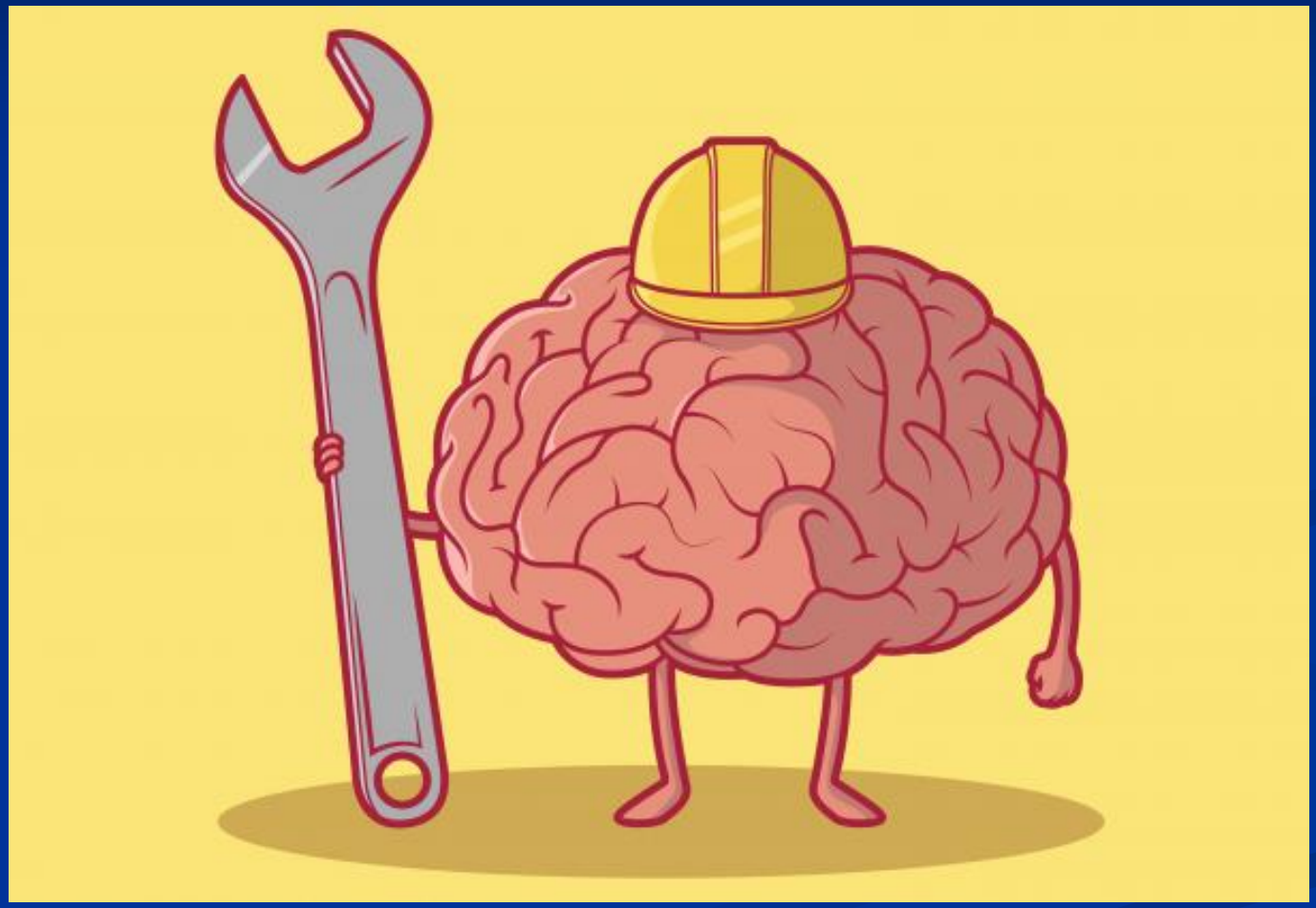
Emotional Awareness and Expression Therapy (EAET)

Pleasant Activity Scheduling

Traditional Psychotherapy

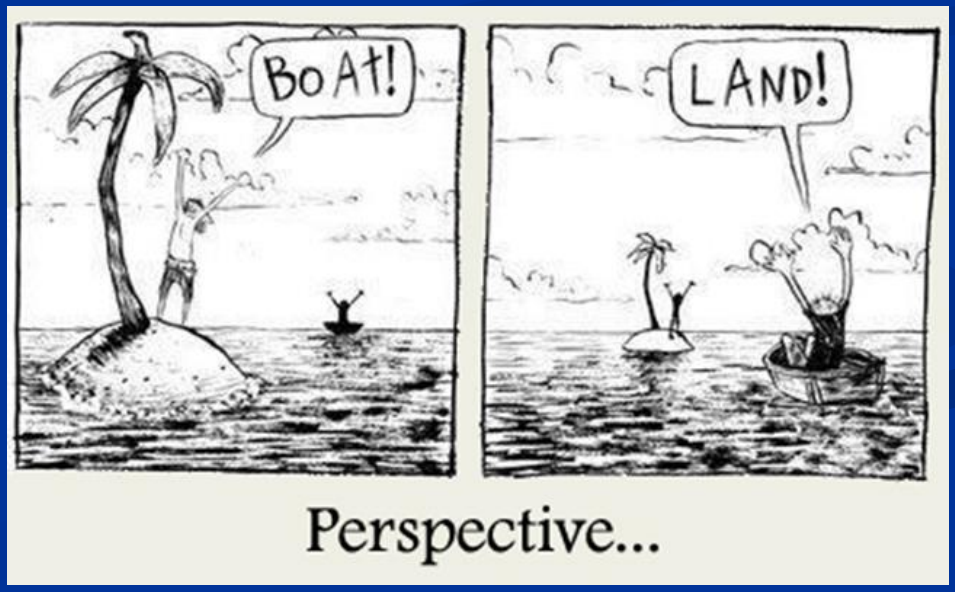
ERASE

Reflections



Using Cognition to alter pain perceptions

Reframing



The Relaxation Response

Visual Imagery

Meditation

Biofeedback

ERASE

Actions

Using Behavior to alter pain perceptions and provide a foundation of wellness

Exercise

- Multiple reviews and meta-analyses, and professional society guidelines recommend exercise and physical activity for the treatment of chronic pain and fatigue
- Increase Fitness
- Increase Function

Hassett & Williams. Best Pract Res Clin Rheumatol 2011;25:299-309

Pacing for Energy Efficiency

Problem Solving / Goal Setting

Nutrition

ERASE

Sleep

Altering Pain via Sleep

ERASE

Environment

Using the Environment to alter pain perceptions and provide a foundation of wellness

Social Challenges

Dr. -Patient

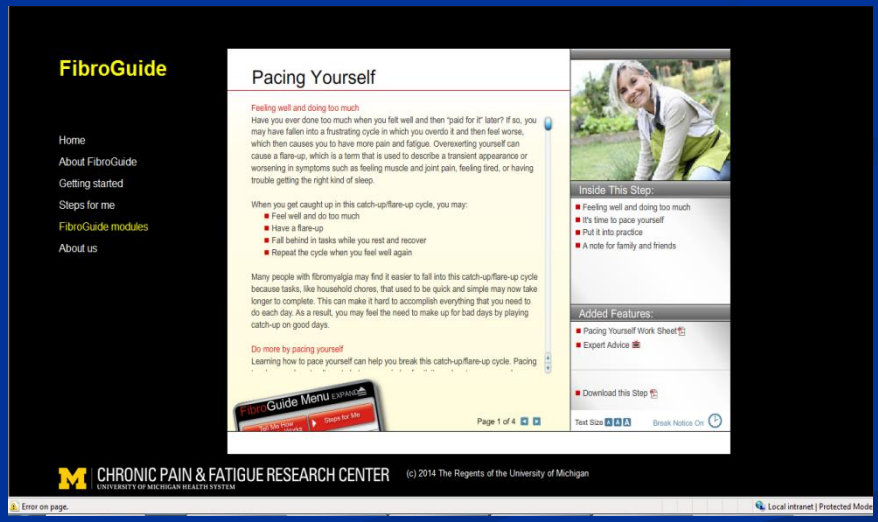
Friends

Family

Employer and co-workers

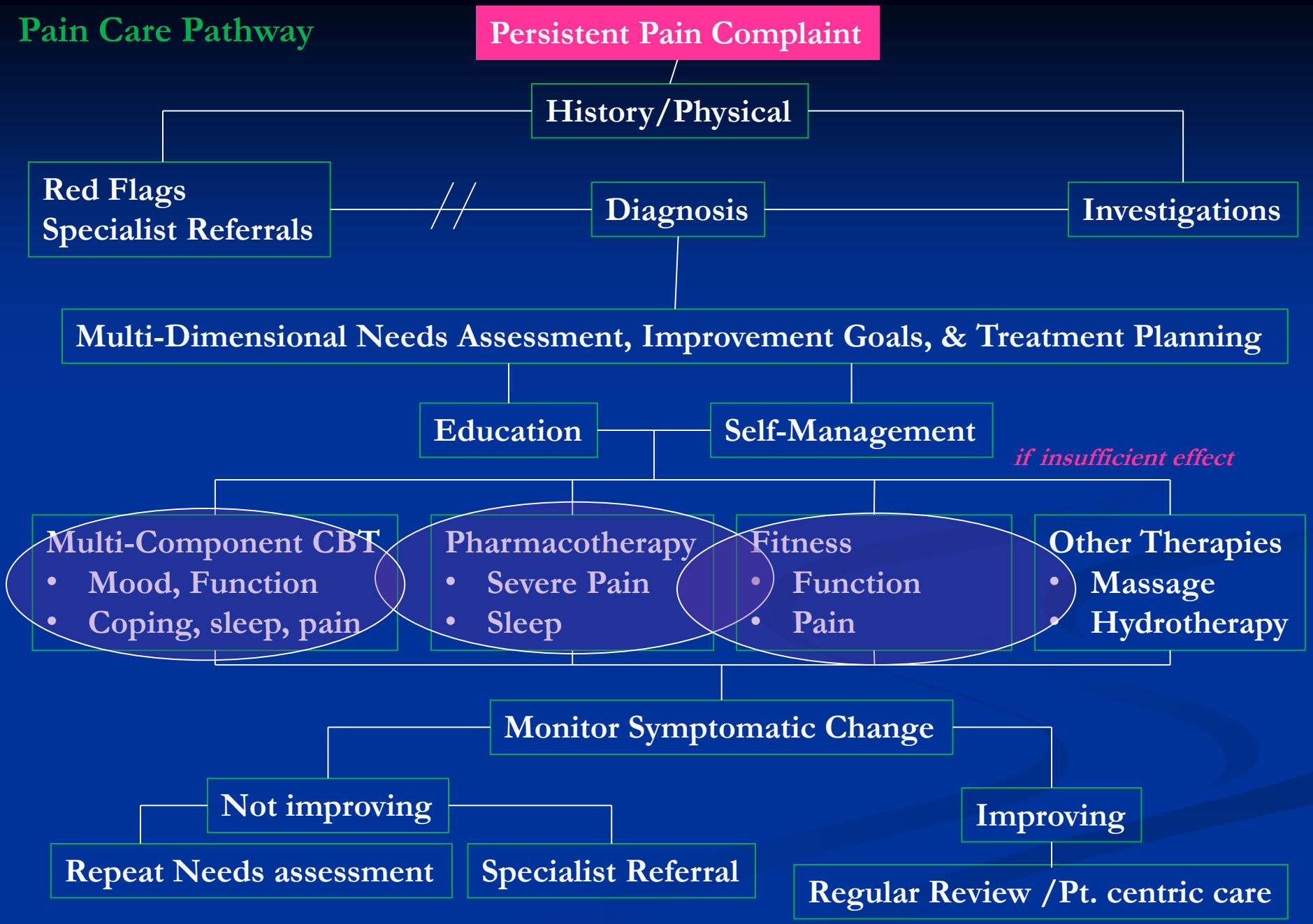
Physical Challenges

Web-based self-management “FibroGuide”



http://fibroguide.med.umich.edu/

Pain Care Pathway



Adapted from Macfarlane et al. Ann Rheum Dis, 2017;76:318-328; Lee, et al., BJA 2014; 112:16-24; Peterson et al, VA ESP Project #09-199, 2017

Pharmacological Therapies for Central Pain States

Strong Evidence	▪ Dual reuptake inhibitors such as
	  ▪ Tricyclic compounds (amitriptyline, cyclobenzaprine)
	  ▪ SNRIs and NSRIs (milnacipran, duloxetine, venlafaxine?)
	▪ Anticonvulsants (e.g., pregabalin, gabapentin)

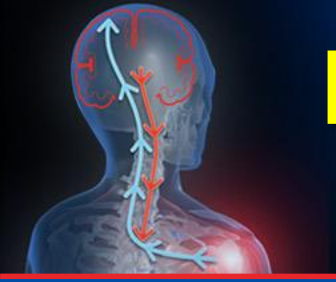
Modest Evidence	▪ Tramadol ▪ Older less selective SSRIs ▪ Gamma hydroxybutyrate ▪ Low dose naltrexone ▪ Cannabinoids
Weak Evidence	▪ Growth hormone, 5-hydroxytryptamine, tropisetron, S-adenosyl-L-methionine (SAMe)
No Evidence	▪ Opioids, corticosteroids, nonsteroidal anti-inflammatory drugs, benzodiazepine and nonbenzodiazepine hypnotics, guanifenesin

Modified from Goldenberg et al. *JAMA*. 2004;292:2388-95.

Non-Pharmacological Therapies for Chronic Pain States

Strong Evidence	■ Education ■ Aerobic exercise ■ Cognitive behavior therapy
Modest Evidence	■ Strength training ■ Hypnotherapy, biofeedback, balneotherapy
Weak Evidence	■ Acupuncture, chiropractic, manual and massage therapy, electrotherapy, ultrasound
No Evidence	■ Tender (trigger) point injections, flexibility exercise

Goldenberg et al. *JAMA*. 2004;292:2388-95.



Dually Focused Management of Chronic Pain

Symptoms of Pain, Fatigue, etc.

- Nociceptive processes (damage or inflammation of tissues)
- Disordered sensory processing

Functional Consequences of Symptoms

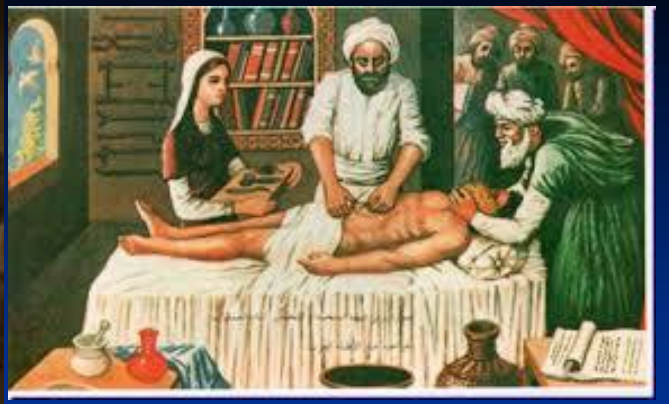
- Increased Distress
- Decreased activity
- Isolation
- Poor sleep
- Maladaptive illness behaviors

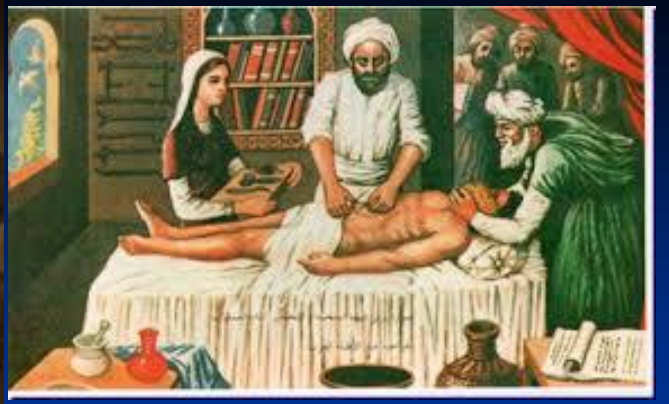
Pharmacological therapies to improve symptoms

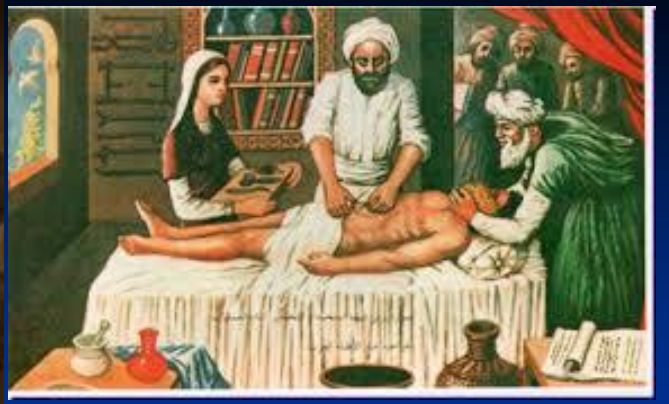
Nonpharmacological therapies to address dysfunction

Clauw DJ, Crofford LJ. *Best Pract Res Clin Rheumatol*. 2003;17(4):685-701.

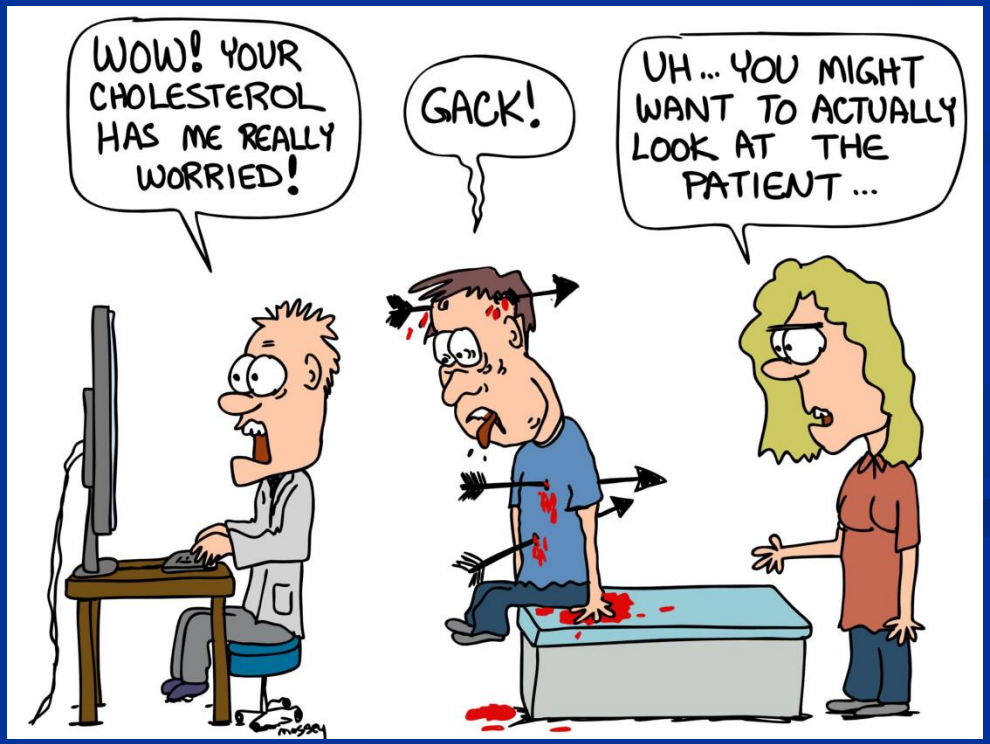
Intervening in the PCP Encounter







Where's the patient?



HARVARD MEDICAL SCHOOL

Are we losing touch — literal touch — in the doctor-patient relationship?

Sacha Pfeiffer *August 18, 2014*

https://hms .harvard.edu/news/

The New York Times

HEALTH

Are Doctors Losing Touch With Hands-On Medicine?

By ABIGAIL ZUGER JULY 13, 1999

The New York Times

HEALTH | CASES

Not on the Doctor's Checklist, but Touch Matters

DANIELLE OFRI and M.D. AUG. 2, 2010

KHN
KAISER HEALTH NEWS

Patients Lose When Doctors Can't Do Good Physical Exams

By **Sandra G. Boodman** | May 20, 2014

This KHN story was produced in collaboration with The Washington Post

By MARLYS HARRIS / MONEYWATCH / *May 2, 2011, 12:20 PM*

Are Doctors Losing Their Touch?

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Last Updated May 13, 2011 1:07 PM EDT


AP / Tony Dejak

Three things you can Practice Tomorrow

- 1. Maximize the power of touch through physical exam
- 2. You don't always need to have a psychologist deliver emotional support to patients. Just listen to the story. You will be treating the affective and social components of pain.
- 3. If you recommend self-management (exercise, relaxation, sleep hygiene etc.), ask about it with the same enthusiasm and regularity that you ask about drugs. Patients learn what you think is <u>really</u> important by what you ask about.