Descriptive / Explanatory Analytics

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Disclosures

- NIH funding for BACPAC
- Cerebral Palsy Research Network



1. Defining Terms

- 2. Data In & Data Out MM PM&R Spine LHS
- 3. So What? Data

 Knowledge
 Practice

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"What happened?"

Descriptive Analytics

Summarizing historical data to identify patterns, trends, and insights.

- •Descriptive statistics: Mean, median, mode, & standard deviation.
- Data visualization: Charts, graphs, & tables.
 Reports and dashboards: Summarized data for quick insights.



Source: MS CoPilot

"Why did it happen?"

Explanatory Analytics

A step beyond DA by trying to understand the reasons behind the patterns and trends

- **Causal analysis**: Cause-and-effect relationships between variables.
- **Regression analysis**: Changes in dependent variable based on changes in independent variables.
- **Hypothesis testing**: Testing assumptions to determine if they hold true for the data.

DA provides a clear picture of past events...

EA helps to understand the underlying causes and relationships.



Source: MS CoPilot

How can LHS data help spine care?

1. Who are our patients?

2. What are we doing for them?

3. Are they getting any better?

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The Patient Experience

AAPM&R Low Back Pain Registry

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2.1.1.						Acute (less than 3 months ago)	0%	10%	20%	30%	40%	50%	60%	70%
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		10	(AI)	•	How do you think your problem started?	An unknown cause - it just began								2,686
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Safety	~					Spine injections		381	314					
Seating	ų.	N				Surgery		319						
						Occupational therapy		304						
Door count	¥					Pain psychology/counseling		233						

🕤 Data Datails 🛛 🕞 Edit 🔄 View: Original Visit Date **Total Patient Respondents** 10/19/2022 7/9/2024 4,776 C LIIS Smartlists Primary Complaint Loc 136.5 Are you currently experiencing any of None of the above

"Patient reports..."

Onset:

- 14% acute, 18% acute on chronic, & 67% chronic

Red Flags:

- 37% report progressive weakness
- 15% report change in bowel/bladder function
- 6-8% report recent injury, fall, or fracture

Cause:

- 56% unknown cause – "It just began"; 3-6% accident or illness

Tried:

- 74% meds, 65% PT, 17% injections, 7-14% surgery, 5% pain psychology

Impact:

- 11% short- or long-term disability
- 35% financial, 28% transportation 19% insurance

What do patients want?

- 1. 80% Discuss treatment options
- 2. 69% Pain relief
- **3.** 65% Learn how to better manage condition
- 4. 62% Establish a diagnosis
- 5. 57% Return to prior level of activity
- 6. 46% Learn appropriate exercises program
- 7. 19% Reduce dependence on pain medications
- 8. 7% Learn about community resources

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Most test ordered at 1st visit

![](_page_15_Picture_3.jpeg)

![](_page_15_Picture_4.jpeg)

![](_page_16_Figure_0.jpeg)

### Acute vs Chronic? Focal vs Widespread?

![](_page_17_Picture_1.jpeg)

![](_page_17_Picture_2.jpeg)

![](_page_17_Picture_3.jpeg)

Figure, Example of a Patient Self-report Survey for the Assessment of Fibromvalgia Based on Criteria in the 2011 Modification of the ACR Preliminary Diagnostic Criteria for Fibromvalgia⁷

![](_page_18_Figure_2.jpeg)

ACR indicates American College of Rheumatology. Scoring information is shown in blue. The possible score ranges from 0 to 31 points; a score ≥13 points is consistent with a diagnosis of fibromyalgia. Additional scoring information and a

Right

Right

printer-ready version of this survey that patients can complete are available online (eFigure 1 and eFigure 2 in the Supplement).

![](_page_18_Figure_5.jpeg)

Clauw JAMA 2014

![](_page_19_Picture_0.jpeg)

### The Provider Experience – Heads Up!!!

![](_page_20_Picture_1.jpeg)

### The Provider Experience – The LHS Box

- **Duration:** {acute; acute on chronic; chronic}
- Side: {right, left, bilateral, midline, ***}
- Location: {neck; arm pain, shoulder pain, mid back pain, low back pain; pelvic pain; hip pain; leg pain; widespread pain}
- **Diagnosis Category:** {CNS lesion; disc/radiculopathy; spinal stenosis; facet mediated pain; SI joint pain; hip pain; shoulder pain; inflammatory condition; muscle/myofascial pain; bony fracture; spinal deformity; centralized pain; ***}

IMPRESSION: John Johnson is a 55-year-old male with acute on chronic right low back and leg pain consistent with a disc/radiculopathy in a left 5 radiculopathy pattern from a L45 disc herniation.

![](_page_22_Figure_0.jpeg)

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#### Brine LHS Diagnosis Grouping Data

PMR Spine Duration

acute on chronic chronic

![](_page_24_Figure_1.jpeg)

Muscle >> Disc > Facet >> Stenosis >> SI 34%

#### Spine LHS Diagnosis Grouping Data

PMR Spine Duration
acute
acute on chronic
chronic

![](_page_25_Figure_1.jpeg)

#### Facet > Muscle > Disc >> Stenosis >> SI

![](_page_26_Picture_0.jpeg)

#### Spine LHS PROMIS Data Visit Date: Total New Patients Who Took PROMIS Questionnaire 10/19/2022 7/9/2024 0-3,838 **PROMIS T-Scores by Duration** Hnmary Complaint Loc QUEST_NA. SCORE_RA. Anxiety T- WNL AIC . SCORE Mile Primary Dx Calegory Moderate AIT Severe . Cognitive WNL Function T-Milc Age Group SCORE Moderate. (AII) Severe ٠ WNL Depression T-SCORE Mile Sex Moderate (AII) . Severe Fatigue T-WINL Face SCORE Mile Moderate (AIT . Severe WNL Pain **Narital Status** Interterence Milc (AIT . T-SDORE Moderate Severe WNL Physical Tobacco Use Function I-Mile SCORE (AIC ٠ Moderate Severe WNL Sleep Euration Disturbance Mile acute T-SCORE Moderate acute on chronic Severe 1111 chronic Social WNL. Activities T-Mile SCORE Moderate Severe 0% 10% 20% 30% 40% 50% 60% 70% % of Total # of Encounters

Neck & Shoulder Myofascial Pain & Centralized Pain 18 yo or older

![](_page_27_Figure_2.jpeg)

![](_page_28_Figure_0.jpeg)

![](_page_29_Figure_0.jpeg)

![](_page_30_Figure_0.jpeg)

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![](_page_32_Picture_0.jpeg)

![](_page_33_Figure_0.jpeg)

### The Provider Experience – Outcomes

Docu

L

	2/0/2023 9:55 AM	5/19/202 6:44 Al	23 M	8/4/2023 7:37 AM
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Y: No ref. provider found PROMIS 29+2 Scon	es			
the Michigan Medicine Physical M Physical Function	39.2 (Moderate)	37.9 (Moderate)	43.5 (Mild)	45.5 (Mild)
/o. male with a history of *** refe ed in the *** back (DK NOTE WIT	89.3 (Moderate)	63.4 (Moderale)	59.5 (Mild)	53.7 (WNL)
ry. Most recently, ***. Depression	57.3 (Mild)	58.9 (Mild)	41 (WNL)	11 (WNL)
reports ***. Faluue	51 (WNL)	62.7 (Moderate)	46 (WNL)	46 (WNL)
sitive and negative systems are Sleep Disturbance	52.4 (WNL)	63.8 (Moderate)	50.5 (WNL)	46.2 (WNL)
LTH SYSTEMS QUESTIONNAL Social Roles	46.2 (WNL)	42.3 (Mild)	46.2 (WNL)	51.9 (WNL)
	59.9 (Mild)	63.8 (Moderate)	58.5 (Mid)	55.6 (Mild)
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resign of B/9/2022 B/13/2022 ge 3 - A little better 1 - Very much better ment 50% 100% - Very much better				
		v		

### The Provider Experience - Trending

![](_page_35_Figure_1.jpeg)

![](_page_36_Picture_0.jpeg)

Local Coverage Determination (LCD)

#### **Facet Joint Interventions for Pain Management**

Note: The scales used for measurement of pain and/or disability must be documented in the medical record. Acceptable scales include but are not limited to: verbal rating scales, Numerical Rating Scale (NRS) and Visual Analog Scale (VAS) for pain assessment, and Pain Disability Assessment Scale (PDAS), Oswestry Disability Index (ODI). Oswestry Low Back Pain Disability Questionnaire (OSW), Quebec Back Pain Disability Scale (QUE). Roland Morris Pain Scale, Back Pain Functional Scale (BPFS), and the **PROMIS** profile domains to assess function.

![](_page_37_Picture_0.jpeg)

### Author Manuscript

Arthetits Rheum, Author manuscript; available in PMC 2015 March 01

Published in final edited form as: Arthritis Rheum. 2013 December ; 65(12): 3285-3292. doi:10.1002/art.38178.

#### Prevalence of the Fibromyalgia Phenotype in Spine Pain Patients Presenting to a Tertiary Care Pain Clinic and the Potential Treatment Implications

Chad M. Brummett, M.D.¹ [Assistant Professor], Jenna Goesling, Ph.D.¹ [Post-doctoral fellow]. Alex Tsodikov, PhD² [Professor], Taha S. Meraj, B.S.³ [Medical Student], Ronald A. Wasserman, M.D.¹ [Clinical Assistant Professor], Daniel J. Clauw, MD¹ [Professor], and Afton L. Hassett, Psy.D.¹ [Associate Research Scientist] ¹Department of Anesthesiology, University of Michigan

²Department of Biostatistics, School of Public Health

³University of Michigan Medical School

![](_page_37_Picture_8.jpeg)

![](_page_37_Picture_9.jpeg)

![](_page_38_Picture_0.jpeg)

Loc: Spine Pain

![](_page_38_Figure_2.jpeg)

Journal of Back and Museuloske leal Rehabilitation 35 (2022) 1143–1151 DOI 10.3233/BMR-210244 IJS Press

# The impact of nociplastic pain features on the response to physical therapy in patients with primary myofascial pain

David J. Kohns^{n,*}, Ryan Scott^b, Joel Castellanos^c, Darin Scribnerⁿ, Ryan Hodgesⁿ and Daniel J. Clauw^b ⁶Department of Physical Medicine and Rehabilitation, University of Michigan Health System, Ann Arbor, MI, USA ^bChronic Pain and Fatigue Research Center, University of Michigan, Ann Arbor, MI, USA ^cCenter of Pain Medicine, Department of Anesthesia, University of California San Diego, La Jolla, CA, USA

![](_page_39_Picture_3.jpeg)

X6 3.5 Years

1143

![](_page_40_Picture_0.jpeg)

#### Loc: Neck or Shoulder Dx:

Myofascial Pain Centralized Pain **Age:** 18 yo or older

![](_page_40_Figure_3.jpeg)

Published in final edited form as: *Am J Prov Med* 2015 September ; 49(3): 409-413. doi:10.1016/j.amepre.2015.02.020.

![](_page_41_Picture_1.jpeg)

#### Trends in Opioid Analgesic-Prescribing Rates by Specialty, U.S., 2007–2012

![](_page_41_Picture_3.jpeg)

#### Benjamin Levy, MD, Leonard Paulozzi, MD, Karin A. Mack, PhD, and Christopher M. Jones, PharmD, MPH

From the Division of Unintentional Injury Prevention (Levy, Poulozzi); Division of Analysis, Research, and Practice Integration (Mack), National Center for Injury Prevention and Control, CDC, Atlanta, Georgia; and the Office of Public Health Strategy and Analysis (Jones), Office of the Commissioner, Food and Drug Administration, Sliver Spring, Maryland

Results: "Primary care specialties accounted for nearly half of all dispensed opioid prescriptions. The rate of opioid prescribing was highest for specialists in **pain medicine (48.6%)**; surgery (36.5%); and physical medicine/rehabilitation (35.5%). The greatest percentage increase in opioid-prescribing rates during 2007–2012 occurred among physical medicine/rehabilitation specialists (+12.0%).

![](_page_42_Figure_0.jpeg)

![](_page_43_Figure_0.jpeg)

![](_page_44_Figure_0.jpeg)

#### Medications for Acute vs Chronic Lumbar Radiculopathy

![](_page_45_Figure_1.jpeg)

#### Medications for <u>Acute</u> vs <u>Chronic</u> Axial Back Pain

#### Acute or Acute on Chronic

![](_page_46_Figure_2.jpeg)

![](_page_46_Figure_3.jpeg)

![](_page_46_Figure_4.jpeg)

![](_page_46_Figure_5.jpeg)

![](_page_46_Figure_6.jpeg)

![](_page_46_Figure_7.jpeg)

#### Medications for Nociplastic Pain

![](_page_47_Figure_1.jpeg)

### Summary

- **Descriptive Analytics** provide a clear picture of past events... **Explanatory Analytics** help to understand the underlying causes & relationships.
- LHS data is an efficient and effective way to drive clinical-based research & quality improvement; however, it is only as good as its framework for data in & data out.
- LHS data can help **guide patient encounters** from history to impression and quantify outcomes in spine care.

### Thank you & Go Blue!!!

![](_page_49_Picture_1.jpeg)

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