(ALES, Cronbach's alpha = 0.71) to identify lifelong adversities faced and the overall duration (chronicity). Measures of psychological distress included the Perinatal Anxiety Screening Scale (PASS, Cronbach's alpha = 0.96), the Edinburg Postnatal Depression Scale (EDPS, Cronbach's alpha = 0.87), the Perceived Stress Scale (PSS, Cronbach's alpha = 0.79), and the Brief Resilience Scale (BRS, Cronbach's alpha = 0.86). Descriptive and Spearman's rho correlation analyses were conducted. RESULTS/ANTICIPATED RESULTS: The mean age of the participants was 27.90 years (SD = 6.05), with most in the first trimester (66.0%). On average, participants reported 4.32 (SD = 3.1) out of 23 lifetime adversities. The most common adversities were natural disasters (60.0%), loss of a beloved (58.0%), and financial difficulties (38.0%). Nearly half (44.0%) experienced five or more adversities. A significant number of participants met the clinical threshold for anxiety (38.0%, PASS), depression risk (22.0%, EPDS), moderate-to-severe perceived stress (52.0%, PSS), and low resilience (24.0%, BRS). The overall duration of adversities was significantly associated with anxiety (rs = 0.50, p = 0.001) and stress (rs = 0.50, p = 0.007). DISCUSSION/SIGNIFICANCE OF IMPACT: Hispanic pregnant women in PR face high levels of adversity and distress, which can negatively affect both maternal health and fetal development, influencing long-term child outcomes. Early identification and targeted interventions addressing adversities, can improve maternal mental health and child health-development outcomes.

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Income predicts low back pain but not lumbar disc height: Data for the UK Biobank Image Dataset

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OBJECTIVES/GOALS: Here, we utilize deep learning to automate the analysis of dual X-ray absorptiometry (DEXA) scans in the UK Biobank (UKB) imaging dataset to enable a large-scale assessment of lumbar spine disc degeneration, low back pain, and socioeconomic status. METHODS/STUDY POPULATION: Study Population: The UKB is a biomedical database that includes lateral spine DEXA imaging for 50,000 participants. Deep Learning Model Development: A computer vision model was developed that receives a DEXA scan as input and outputs a quadrilateral that corresponds to the corners of 5 lumbar vertebral bodies. The model is a deep, fully convolutional, encoder–decoder network using DeepLabV3. Statistical Analysis: To determine our preliminary model accuracy, we used the intersection over union (IoU) metric.We analyzed data using an ordinal regression model to determine the relationship between income/ neighborhood level multiple deprivation index (MDI) and low back pain (LBP), as well as a mixed effects model to estimate the relationship between income/MDI and disc height index (DHI). RESULTS/ANTICIPATED RESULTS: Our model predicted vertebral body quadrilaterals in training and unseen test data (train IoU = 0.96, test IoU = .91) and was used to infer data for 10,440 participants. Confirming previous studies, there were significant relationships (p0.05) between income or MDI and DHI (Figure 2). DISCUSSION/SIGNIFICANCE OF IMPACT: Low back pain is the world's leading cause of disability, and socioeconomic factors play an important role. We found no relationship between disc height index and socioeconomic status. Thus, disc degeneration may not be a factor in this low back pain phenotype.

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Modeling long-term environmental effects on discrete events using shapelets: An application for stillbirth

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OBJECTIVES/GOALS: To develop an informatics framework that will allow study of environmental effects on stillbirth at large scale (i.e., US-level) and leverage recent advances in machine learning and artificial intelligence to produce reproducible results that can be compared across multiple institutional settings. METHODS/STUDY POPULATION: Experimental exposure data are often available in "absolute time," where a clinical event can be anchored using a timeline transformation. We associate each stillbirth event with a set of {ti…ti+1}L shapelets [1] associated with a location, L, and time intervals for the entire dataset. These shapeless are aggregated using a state-of-the-art shapelet classifier [2]. An autoencoder is used to reduce the dimensionality of the stillbirth classification and to cluster stillbirth events according to their corresponding exposure patterns. The stillbirth cluster can be analyzed for other nonexposure (i.e., genetic, SDoH, and demographics) factors, which may be enriched and/or depleted. RESULTS/ANTICIPATED RESULTS: The framework we are developing leverages a shapelet-based approach to produce clusters of stillbirth events according to their corresponding exposure patterns. These clusters can be analyzed for depletion or enrichment of nonenvironmental factors. This analysis will inform how to formulate (or not) class models of exposure that can be more informative and have better predictive power than overall population models. Moreover, the finding of depletion and enrichment of physiological properties of the individuals may lead to novel physiological hypotheses to better understand the injury mechanisms that the environmental exposure profile produces. DISCUSSION/SIGNIFICANCE OF IMPACT: Nearly 20,000 babies are stillborn in the USA each year [3]. Environmental exposures, usually studied as time averages over certain periods of time, have produced mixed results for stillbirth risk [4]. However, temporal profiles matter [1], and we argue that they can be assessed using shapelet technology.

https://doi.org/10.1017/cts.2024.974 Published online by Cambridge University Press