**Question 1:** Identifying Factors Affecting Mental Health in Adolescents

**Question 2:** Analyzing Factors Influencing Nutritional Habits in Adolescents

**Question 3:** Electronic vapor usage by Different Adolescent Demographics Over Time

**Introduction 1:**

With access to digital connectivity, the influences of social media on adolescents have become a subject of deep concern regarding the impacts social media has on adolescents' mental health. As these platforms have woven themselves into the daily activities of modern life, their impacts on the psychological, emotional, and social development of adolescents have become increasingly apparent. With the ability to connect with friends, share thoughts, and access a large variety of information at their fingertips, adolescents today experience both unprecedented opportunities and challenges in navigating a digital landscape. This has given rise to many studies on the relationship between social media and mental health that explore the challenges and opportunities faced by adolescents in the digital age.

**Learning Problem 1:** Identifying Factors Affecting Mental Health in Adolescents

The learning problem concerns the correlation between social media and the mental health of adolescents that are impacted by both positive and negative factors of social media use. How does excessive social media use among adolescents affect their mental health, and what strategies can be developed to promote healthier digital habits and mitigate potential negative outcomes?

This learning problem addresses the relationship between mental health and social media use in adolescents, focusing on both understanding the impact and exploring potential solutions to foster better mental well-being in the digital age.

**Features 1:**

Features, or variables, that can impact the mental well-being of adolescents can be based on the positive and negative impacts that social media has on adolescents. Some factors such as screen time, frequency of use, parental monitoring, digital literacy, and cyberbullying can be important measures to take into consideration when looking at the psychological, emotional, and social aspects of social media use. These measures can be used to gain a more comprehensive understanding of the impacts social media has on mental well-being.

**Methodology 1:**

**Supervised learning**, specifically binary classification algorithms, will be employed to predict an individual's risk of mental health issues based on the selected features. By training the algorithm on labeled data, it can learn to identify patterns and correlations between the features and mental health outcomes.

**External Data Sources 1:**

In the quest to unravel the complex landscape of adolescent mental health, external data sources such as local mental health services and community support systems will be considered. These sources can provide additional context and valuable information regarding the availability of resources to aid adolescents facing mental health issues.

**Research Question 1:**

The primary research question in this learning problem is, " What are the long-term psychological and emotional effects of social media use on adolescents, and how can interventions and support systems be effectively designed to mitigate these effects and promote their mental well-being?"

**Introduction 2:**

In the rapidly evolving landscape of American health, nutritional habits during the pivotal phase of adolescence play a significant role in determining long-term health outcomes. Adolescents stand at the crossroads of childhood and adulthood, with their eating behaviors frequently solidifying into patterns that persist into their later years. As these nutritional habits shape their present and future well-being, it becomes paramount to delve deeper into understanding the underlying influences.

**Learning Problem 2:** Analyzing Factors Influencing Nutritional Habits in Adolescents

The second learning problem focuses on the nutritional habits of adolescents. Adolescence is a critical period for developing lifelong eating habits, and understanding the factors that influence these habits is essential for promoting overall health. The objective is to analyze the factors influencing adolescents' nutritional habits and classify them into dietary habits categories.

**Features 2:**

Demographic features, including age, gender, and parental income, can provide insights into the socio-economic factors influencing dietary choices. Behavioral features, such as the frequency of fast food consumption, school lunch participation, and knowledge of nutritional guidelines, shed light on their dietary practices and awareness.

**Methodology 2:**

This learning problem employs multiclass classification algorithms to categorize adolescents into dietary habits categories. By utilizing these algorithms, we can better understand the factors that impact their nutritional choices.

**External Data Sources 2:**

To gain a comprehensive understanding of the factors influencing adolescents' nutritional habits, external data sources related to local school nutrition programs, community initiatives promoting healthy eating, and parental support for nutritious meals will be explored.

**Research Question 2:**

The central research question for this learning problem is, "What demographic and behavioral factors impact the dietary habits of adolescents, and how can this information guide interventions to improve their nutritional choices and overall health?"

**Introduction 3:**

Over the past few decades, the usage of tobacco products has changed among adolescents in different demographics across the United States. It has led to numerous health complications and issues among young adults. Associated use of such products has linked many adolescents to nicotine dependence and causes these youth to consistently use harmful smoking products. Particularly during COVID we have seen fluctuations among adolescents using tobacco. Tobacco usage varies across key demographics, however, by looking at variables such as the introduction of new tobacco regulations, social/cultural influences, peer pressure, and other environmental factors there is some correlation between these variables and tobacco usage.

**Learning Problem 3:** Tobaccousage different Adolescent Demographics Over Time

Understanding how and why there is a trend among adolescents taking tobacco products needs to be classified and understood based on separate demographic categories based on categories such as race, sex, gender, sexual orientation. We must then analyze which external factors have the most impact on adolescents. Our objective is to find what environmental factors have any correlation to tobacco usage among the demographics

**Features 3:**

Over time we can measure the usage of tobacco over time among different demographics including those demographic traits such as sex, gender, age, race, and we will compare the rates of usage based on different factors including: the growth of popularity of e-tobacco, policies of restriction of tobacco usage, adolescents that know someone who uses tobacco products, social, cultural influences.

**Methodology 3:**

We shall use supervised learning algorithms to see which environmental factors have the biggest impact on adolescent tobacco usage over time by feeding it data sets of various adolescents who have been influenced by one of the indicated environmental factors over time. We will be using regression over time to also see if certain environmental factors have increased or decreased tobacco usage over time.

**External Data Sources 3:**

We can use outside datasets comparing the usage of how various legislative acts have affected the overall tobacco usage in the United States as well as understanding datasets that show which environemntal factors increase the risk of tobacco usage. The usage of also understanding the growth of social media and various trends should also be analyzed.

**Research Question 3:**

Based on different demographics, what factors have contributed to the usage of tobacco among adolescents?

**Conclusion**

Adolescent health and well-being are paramount for their present and future quality of life. The learning problems discussed in this essay aim to address critical issues related to mental health and nutritional habits in adolescents. By leveraging the wealth of data available in the YRBSS dataset and employing various machine learning techniques, we can gain insights into the complex factors influencing the well-being of adolescents. Ultimately, the findings from these analyses have the potential to inform targeted interventions and support strategies to improve the overall health and well-being of young individuals during this crucial phase of their lives.