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The Logic of Analyzing a Problem:

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The problem you are analyzing: ANALYZING ACCIDENTAL DRUG OVERDOSE IN CONNECTICUT

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Edit/Return to your Problem

The logic of the question you have reasoned through can be found here. Beside each of your answers, you will find checkpoints, or guidelines for making sure you have reasoned well through each element. If you are unclear as to how to interpret any of these "checkpoints," read more deeply about the elements of reasoning and intellectual standards.

Statement of the problem:

Drug use, and consequently [accidental] deaths due to drug overdose (hereafter "OD"), have dramatically increased throughout the United States in the last 15 years [5]. In fact, the Center for Disease Control (CDC) has confirmed that drug OD are the "leading cause of death among Americans under the age of 50" [5]. Each year, tens of thousands of incidents occur, causing states to lament over the loss of public life. Connecticut (hereafter "CT") in particular, has experienced a drug-related health crisis of its own, with roughly 3,600 deaths being recorded between 2012 and 2017 [2]. The variability of deaths that occur each year range in characteristics such as identity, location, substance type, and frequency of death. When these deaths occur, they are notarized by the Office of the Chief Medical Examiner. The incidents are then documented, cataloged, and stored in an open database for public reference. However, conventional analysis is only capable of providing basic interpretation of the data. For instance, what drugs are uniquely present in OD victims? Interesting nonetheless, but herein lies the problem: drug OD is a perpetual act, and unless analyzed properly, deaths will continue to surge. Our group believes that data mining (hereafter “DM”) will reveal abstract patterns to help prevent drug OD, and can even inspire procedural changes that support drug rehabilitation before it amounts to OD style deaths.

- The key **question** at issue is...

  After identifying the problem and reviewing the data, our team has discussed several important questions; questions that surpass conventional analysis: 1. Is there a correlation between drug OD and related actions such as drinking alcohol or meditation use? 2. Do these affinitive “drug and related action” situations result in an accidental or natural death? 3.Is there a relationship between certain drug combinations and drug OD? 4. What drug combinations are most common in locations around CT? 5. Which drugs are rare and where is the use concentrated around CT? 6. Is there a correlation between certain drugs and the victim's demographic (i.e., gender, race, age, residence)? 7. Should specific cities be receiving more administrative attention based on the clustering of drug OD? Using the concepts and information below, our team intends to find a solution for the problem stated earlier as well as questions stated above.

  Clarify the question: Have I stated the question as clearly and precisely as possible? Have I stated the question so as to detail the complexities in it? Does my formulation of the question give me [or others] some unjust advantage?

- The **purpose** of reasoning through the issue is...

  Our objective is to reveal abstract patterns that are imperceivable in the growing database of accidental drug OD that sadly occur in CT each year. As a result, the purpose of our findings is to aide health, safety, and administrative organizations understand the behavior behind drug related casualties. We believe hospitals, and even agencies like the DEA, can use our analysis to enhance statewide strategies for drug prevention, rehabilitation, and perhaps drug aversion.

  Check your purpose: Have I stated the question as clearly and precisely as possible? Have I stated the question so as to detail the complexities in it? Does my formulation of the question give me [or others] some unjust advantage?

- The **information** I need to use in answering this question is...

  Information from several sources will be utilized throughout the project: 1. Death records/drug OD cases derived from the Accidental Drug Related Deaths 2012 - June 2017 database [2] will be our primary source of data. This database has been made publicly available through Connecticut's Open Data initiative on www.data.gov. 2. Case studies and articles illustrating past drug-related incidents in CT will provide a qualitative perspective on who, what, when, and why some of these casualties have occurred [1, 3, 4].

  Assess your information: Have I included all the important relevant information? Have I left out any relevant information I would rather not have to consider? Have I checked to see that my information is accurate?

- The **assumptions** I am making when reasoning through this issue are...

  Based on the information presented herein, our group has formed several assumptions: 1. There are certain time periods and places in CT where death due to drug OD occur — by chance and by factors like the availability of drugs. 2. Funding (i.e., rehab centers and medical facilities) for CT health and safety organizations are currently distributed based on traditional analysis of drug OD data. 3. CT organizations would welcome new, analyzed data derived from DM that could make their jobs easier, safer, and more efficient. 4. The operation and efficacy of health and safety organizations are dependent and proportional to the data they have when addressing drug OD — better “intel,” equals better results. 5. Accidental deaths due to drug OD should decrease, and prevention should increase.

  Identify assumptions: Do I recognize the beliefs I have taken for granted in reasoning through this issue? In other words, have I uncovered the important assumptions guiding my thinking in this situation? Have I questioned assumptions that may not be based in sound reasoning? Am I holding onto assumptions that cannot be justified based on the evidence?

- The primary **concepts** guiding my reasoning about this issue are...

  Several concepts will help our team answer the questions stated earlier: 1. Microsoft Excel will be used to preprocess the data. It will be used to replace any null values with a semantic placeholder value. For example, missing values in the “Gender” and “Race” attribute will be filled with "Unknown" and values in the drug classifications will be filled with "Absent" (e.g. None). This operation caused us to reevaluate the initial, positive “Y” value; we changed the “Y” values to be “Present” instead. Moreover, Excel will be used to remove irrelevant data attributes from the dataset. For example,

  Understand the concepts: Have I identified the main concepts guiding my thinking through this issue? Am I even clear about what a concept is and the role concepts play in human thinking? Have I distorted some idea to fit my vested interest? Do any of my concepts need to be questioned? Have I thought deeply about the concepts I am using? Am I using concepts superficially?

the "Incident Number, State of Residence", and "State of Death" will be eliminated. 2. If there is any missing value, we would use mode instead of mean if the attribute value is discrete. 3. Discretization is performed to change numeric to nominal value. 4. Weka will be used to analyze the Accidental Drug Related Deaths 2012 - June 2017 database [2]. 5. We realised that when there is no class value present in the dataset, clustering comes into the picture to perform categorizing the data into a number of clusters. 6. Clustering algorithms like SimpleKmeans was used to perform categorization and then the given cluster value was further selected as class value and classification algorithms like IBK, naive bayes was used. 7. Composite distance metric integration technique can be used for victim similarity assessments [6]. 8. Tableau will be used to visualize new patterns derived from the analysis process graphically.

- Some important **implications** of reasoning through this problem well or poorly are...

There are a number of positive and negative implications for performing this work and solving the previously stated problem. Some positive implications include: 1. New patterns will help health and safety organizations identify specific trends ultimately reducing mortality due to drug OD in CT. 2. CT officials can correlate deaths with drug related areas. Ambulatory services and paramedics in particular areas can be equipped with life-saving tools to deal with specific OD emergencies. 3. By understanding the patterns, lawmakers can improve and implement new laws to combat rampant drug abuse. 4. This work will help authorities during budget allocation to distribute resources based on death rate, severity, and other unforeseen factors rather than arbitrary analytics. 5. Awareness programs can be established to rehabilitate local populations that are directly and indirectly affected by drug abuse. Our intention in doing this project is to help CT with its surging drug problem but there may be negative implications after conducting the work: 1. If our analysis, and consequently the protocols created because of it, does not take into account new information, then the patterns can become skewed over time.The process must result in a continuous cycle of collecting information, analyzing it and implementing the changes in reality, if it is to be successful. 2. Resources needed for other vital projects may be reduced if funds are rerouted to aide other organizations in the rehabilitation and prevention of deaths due to OD. 3. There is a possibility that after the creation and distribution of our model to authorities, they may fail to implement the changes suggested by the work due to various reasons such as political compulsions, lack of funds, and regulations. In the event that this is true, the project will not reduce mortality rates due to OD and the people of CT, and society in general, will continue to suffer.

Recognize the implications: Have I traced out the important implications in this situation? Have I thought through the potential negative as well as positive implications connected with this issue? Are there implications I would rather not face, and so I am refusing to consider them? Have I anticipated the implications of the obvious implications, and then the implications of those implications, and the implications of those implications, and so on, as well?

- The **point of view** from which I am looking at this situation is...

There are multiple viewpoints that we've considered in reasoning through the main problem: 1. Data Mining Team's POV: we believe that DM will significantly increase the discovery of abstract patterns. We see this enhancing the abilities of CT officials when it comes to preventing death due to drug OD in CT. 2. CT Health Organization's POV: they see drug abuse and deaths increasing into the future. The problem is growing in complexity each year and is becoming harder and harder to manage. They need resources (i.e., funding, equipment, and protocols). In addition, they need analytics to better serve the public medically. 3. CT Safety Organization's POV: law enforcement, and agencies alike, hold a high stake regarding the use of this data. They have a local presence and can suppress the drug supply at a particular location. As a result, their presence has a dramatic effect on the areas heavily plagued by accidental deaths due to drug OD. 4. CT Administrative Organization's POV: lawmakers instantiate new policy in response to new patterns that surface. Their POV will play heavily in the timing and management of such litigation. They want drugs off their streets and will impose protocols to make sure that objective is met. 5. CT Citizen's POV: the public wants a safe and healthy society in which to live. They do not want to be in proximity of drug abuse, drug dealers, and police conflict.

Consider your Point of View: Have I considered all important viewpoints relevant to this situation before formulating my viewpoint? Have I inadvertently distorted some other viewpoints in order to maintain my viewpoint? Have I articulated and considered other ways of looking at the situation, in good faith, before coming to conclusions about how to think and how to act?)

- In reasoning through this issue, the main **inferences** I have made and **conclusion(s)** I have come to, in terms of how to deal with the issue are…

Pending research and after collecting all the required information, our team comes to several inferences: 1. If we do not conduct this work, or if there are flaws in the analysis, then the drug OD in CT may be unaffected. However, deaths will likely increase over time due to the lack of awareness and understanding of the data. 2. Awareness of drug OD and the correlations between drug OD will increase due to this work. As a result, CT health, safety, and administrative organizations will be more informed of locations, times, and drug categories that may need more attention whether it be physically or financially. 3. Drug prevention will increase, and drug OD can decrease. We realize that all drug OD cannot be entirely prevented, however, this project can help reduce the frequency of incidents by allowing health, safety, and administrative organizations understand the patterns more precisely. 4. CT organization's budgets and resources may shift as a result of a complete analysis. Consequently, this might raise the stress levels of individual organizations due to an influx of attention from new governance. 5. Areas affected by a high frequency of drug OD may receive new preventive forces that can save lives when incidents are initially reported. 6. New rehabilitative facilities may open in locations that are crippled by the effect of drug abuse. This may also cause people to migrate around the state if they don't want rehab centers in their location.

Analyze your interpretations: Am I clear about the inferences I have made in coming to this conclusion? Have I considered the fact that any or all of my inferences may be more or less sound? Do my inferences clearly follow from the evidence, or have I failed to consider important information in coming to my conclusions? Can I articulate the assumptions that have led to my inferences? Do I have a vested interest in coming to a particular conclusion, and if so, has this clouded my judgment?

Summary:
While reasoning through the logic of this problem, I have gained the following insights and come to the following decisions.

Plan of action:

We will perform literature review, study different related work done in this area, perform brainstorming and conduct interviews with health care and security officials, speak to victim's family and understand why the victim got influenced by drugs,find out how do the victims get access to the harmful and illegal drugs, arrange counselling and rehabilitation for the victim's family and closed ones.

Summary:

While reasoning through the logic of this problem, we have gained the following insights and come to the following conclusions: accidental death due to drug OD is a serious issue in the US and CT in particular. We believe drug OD can be significantly reduced or prevented by analyzing the abstract relationships that exist between victims, drugs, and other related attributes. We believe DM, and technology in general, can be used as another form of intelligence to help health, safety, and administrative organizations reduce the presence of drugs in the state of CT. Our proposal includes preprocessing steps and a DM strategy that includes algorithms for clustering, association, and affinity analysis. With these tools and information, we plan to analyze the relationships between various data attributes and then create a graphical representation of the data with tools like Tableau. The process, if successfully implemented and analyzed using various mentioned earlier will diminish mortality due to drug OD. Lastly, and importantly, the questions proposed earlier will be answered in detail after the initial analysis phase.

References:

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[5] TheUpshot. 2017. Drug Deaths in America Are Rising Faster Than Ever. Retrieved September 27, 2017, from https://wonder.cdc.gov/controller/datarequest/D76;jsessionid=61D42FCE91996BE4F8E1C638A493A283

[6] Wang, F., Sun, J., & Ebadollahi, S. (2012). Composite distance metric integration by leveraging multiple experts' inputs and its application in patient similarity assessment. Retrieved from https://pdfs.semanticscholar.org/f9b7/7a14efa2726ebb5061263ea3a31795276d96.pdf

Save Conclusions / Finish Problem

If you are unclear as to how to interpret any of these "checkpoints," read more deeply about the elements of reasoning and intellectual standards. We suggest the following materials:

- The Thinker's Guide to Analytic Thinking
- Critical Thinking: Tools for Taking Charge of Your Professional and Personal Life
- Critical Thinking: Tools for Taking Charge of Your Learning and Your Life