Capstone Exercise Handout

**Capstone Exercise #1 – Specify the Decision Problem**

**Objectives**

* Clarify and specify the decision problem you are addressing
* Describe and define the
  + Specific health condition(s)/issue(s)
  + Specific population(s) affected
  + Current public health consequences
  + Current and alternative strategies

**Deliverables**

* Create initial/draft slides for final presentation that introduce your decision
  + Slide 1 – Title, Team name, and Members

*Tell us who you are*

* + Slide 2 – Background

*What is the health condition/issue you are trying to address and what is the motivation for addressing it?*

* + Slide 3 – Objective

*What is the decision problem or comparison you will be modeling?*

* + Slide 4 – Strategy options

*Describe the status quo and the options you are considering*

Capstone Exercise Handout

**Capstone Exercise #2 – Build a Decision Tree in Amua**

**Objectives**

* Construct a decision tree in Amua comparing the status quo to your specific strategy(ies)
  + Link to a wiki on decision trees in Amua – <https://github.com/zward/Amua/wiki/Decision-Trees>
  + Link to the workshop curricula for Amua lecture slides – <https://graveja0.github.io/vital-istanbul-2024/lectures/cs_decision-tree-amua.qmd>
* Parameterize decision tree and estimate outcomes
  + *Use known parameters, if possible*
  + *It is ok to use educated guesses (assumptions) if parameters are unknown at this time*

**Deliverables**

* Create slide for final presentation that graphically displays your decision options using a decision tree
  + Slide 5 – Decision tree graphic with expected values

*How do they copy the decision tree graphic out of Amua into PPT?*

Capstone Exercise Handout

**Capstone Exercise #3 – Group Work**

**Objectives**

* Work as a team to refine your decision problem and strategies based on your Amua decision tree

*What did you have to specify for the model that was not in your initial description of the decision problem and strategies?*

**Deliverables**

* Refined descriptions of decision problem and strategies
  + Slide 3 – Objective/Decision problem

*What do you have to add or subtract to match the decision tree?*

* + Slide 4 – Strategy options

*What should you add or subtract to match the decision tree?*

Capstone Exercise Handout

**Capstone Exercise #4 – Paired Group Work**

**Objectives**

* Present your draft Background, Objective/Decision Problem, and Strategy Options to your paired team

*Quick, 5-minute presentation. Allow plenty of time for feedback.*

* Provide feedback on clarity and completeness of descriptions

*How can the health issue/condition be more clearly described?*

*Was the motivation to address the health condition/issue well described? What else is needed to convince you it is important?*

*Is the decision problem clearly defined?*

*How well do the strategy options match the background and decision problem?*

**Deliverables**

* Refined slide descriptions of background, decision problem, and strategies based on feedback
  + Slide 2 – Background
  + Slide 3 – Objective/Decision problem
  + Slide 4 – Strategy options

Capstone Exercise Handout

**Capstone Exercise #5 – Design a Markov Model**

**Objectives**

* Use your decision problem, strategies, and decision tree from slides 3, 4, and 5
  + Determine the health states of the decision problem

*These become your Markov states*

* + Determine the transitions

*Which state(s) does your population move in and out of? Is there an order?*

* + Determine parameters
    - Population – *who?*
    - Cycle length – *how long does it take to move through the states?*
    - Time horizon – *how far into the future?*
    - Probabilities (fill these in later)

**Deliverables**

* Create slide for final presentation that displays your decision problem as a Markov schematic
  + Slide 6 – bubble diagram graphic, parameter table headers, transition matrix framework

*Your draft bubble diagram should indicate the various health/intervention states and directional pathways between states*

*The parameter table should list the parameters needed to define and run the model – ages, costs, utility weights, time horizon – it does not need parameter estimates yet*

*Use the transition matrix to define the health/intervention states that the population can move between – probability estimates are not needed yet*

Capstone Exercise Handout

**Capstone Exercise #6 – Build & Run a Markov Model**

**Objectives**

* Determine parameter estimates and complete the parameter table

*What are the data points you have on hand? Which ones do you need to make assumptions for in order to run the model?*

* Determine transition probabilities and fill in the transition matrix

*What are the probabilities you have on hand? Which ones do you need to make assumptions for in order to run the model?*

* Run Markov model in Amua

Link to a wiki on running Markov models in Amua – <https://github.com/zward/Amua/wiki/Markov-Models>

**Deliverables**

* Create slides for final presentation that fills in and documents your Markov model inputs and calculation
  + Slide 7 – filled in parameter table, transition matrix

*Be sure to indicate which estimates are assumptions*

* + Slide 8 – Markov bubble schematic and “reward” calculations