

## Dermatology Residency Scheduling Tool

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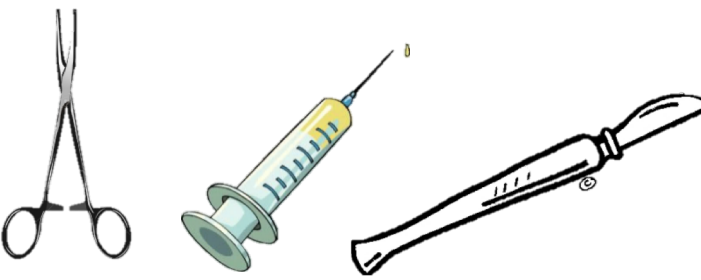
### Problem Statement

#### Background

The Dermatology Residency Program at the University of Michigan requires each resident be assigned to a specific activity each weekday during the morning and afternoon, within a month-long planning horizon. Each activity must meet staffing requirements, and the residents must adhere to educational requirements.



**24 Residents**



**28 Activities**



**28-31 Dates**

#### Traditional Approach

Chief residents typically create monthly schedules by hand. Due to the numerous rules chiefs must abide by, the process of building a feasible schedule typically requires numerous hours to complete, and building a high-quality schedule by hand is nearly impossible.

#### Feasible Schedule

A valid schedule that meets all of the hard requirements given by the Dermatology chief residents.

#### High-Quality Schedule

High-quality schedules limit the number of undesirable characteristics, such as intra-day travel and shortages of jeopardy time.

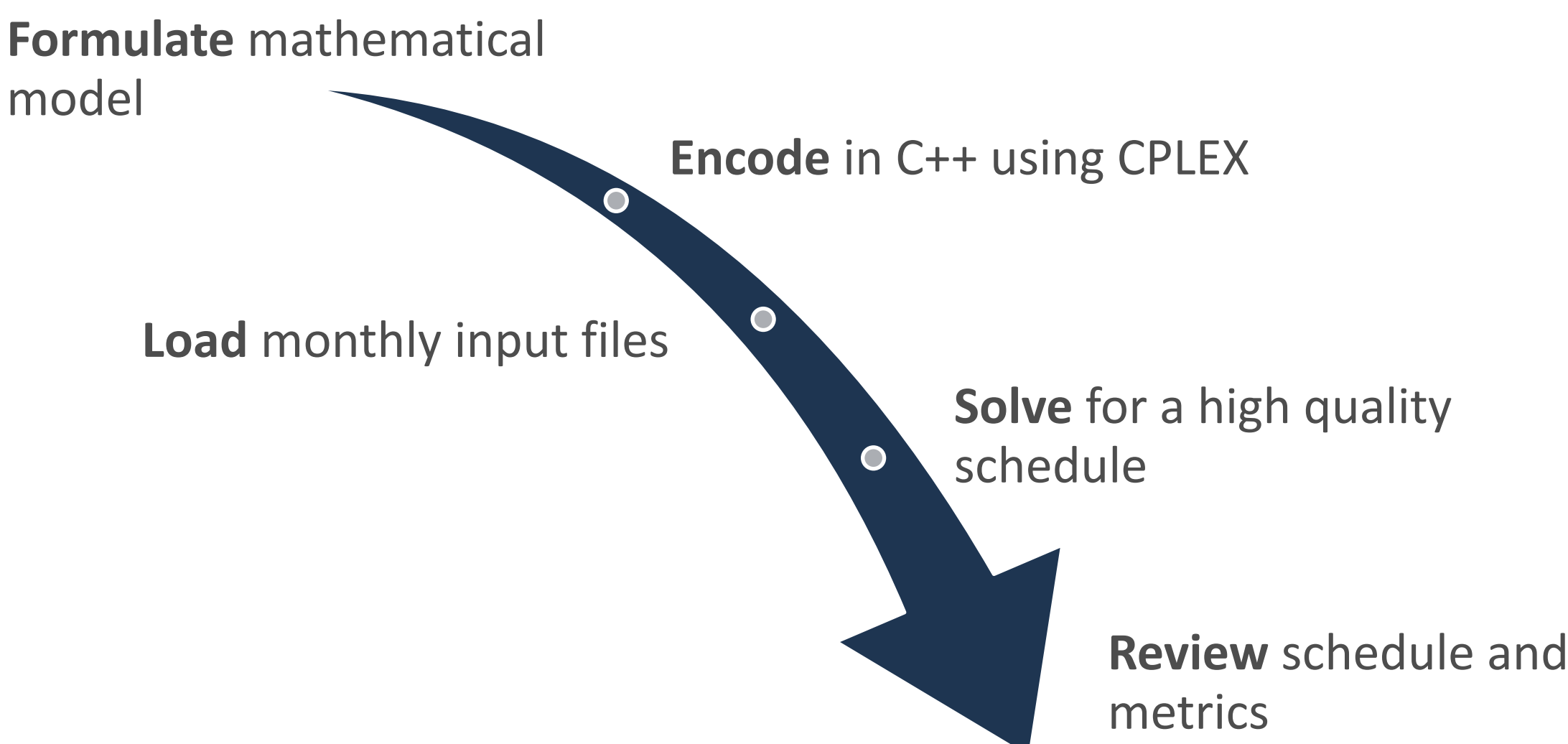
#### Challenges

- Chief residents spend valuable time creating schedules rather than focusing on patient care
- Residents are given insufficient jeopardy time to balance their clinical duties
- Residents are often required to travel between clinical sites, which wastes time finding parking, and can cause missing lunch

#### Research Goals

- Work with chief residents to determine the scheduling rules and quality metrics.
- Formulate a mathematical model, and build a computerized tool which rapidly generates high-quality schedules.

### Solution Approach



#### Decisions

Do we assign resident  $r$  to activity  $a$  on date  $d$  during shift type  $s$ ?

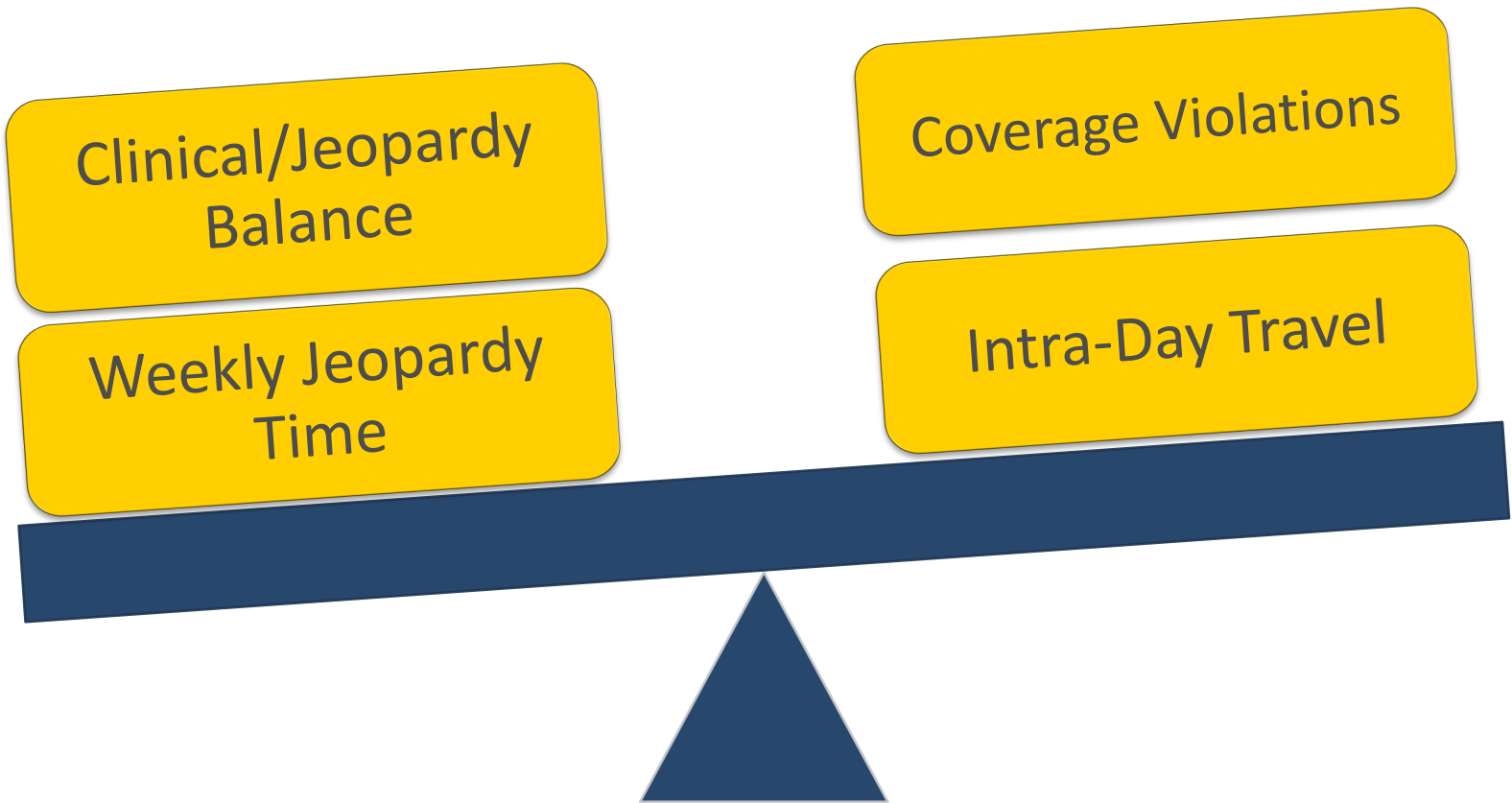
#### Rules

All of the rules, modeled as constraints, must be satisfied for a schedule to be feasible.



#### Metrics

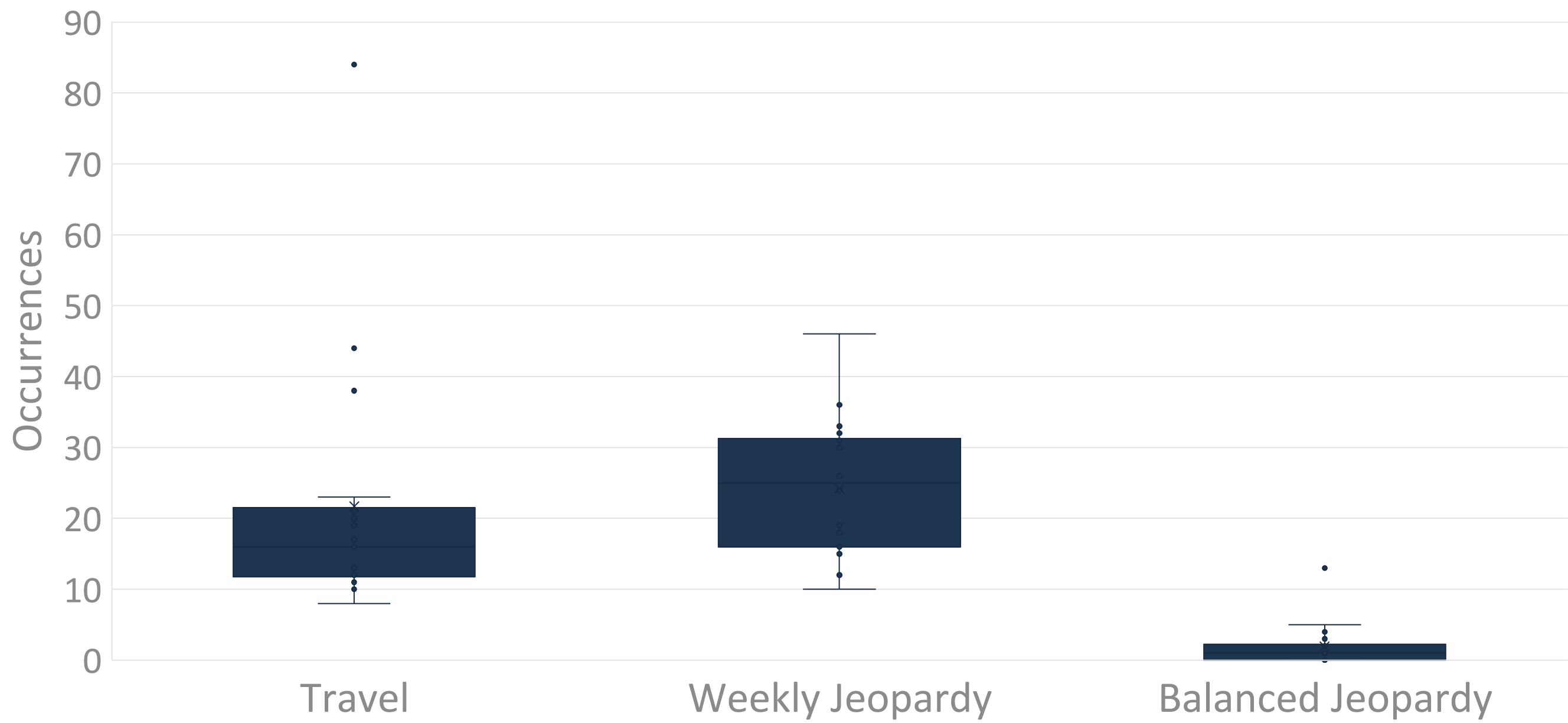
After obtaining a feasible schedule, we incorporate metrics to find a high-quality schedule. Since optimizing one metric may result in other metrics being suboptimal, we work with the chief residents to determine an acceptable balance.



### Impact/Results

#### Data Tracking

The tool enables the chief residents to track metric data on a monthly basis



Rapidly-Generated, High-Quality Schedules

Less Time Required By Chief Residents to Create Schedules

Increased Patient Experience

#### Sample Output

The schedule reports are easier to interpret than the old documentation

Name	Time	3-Sep	4-Sep	5-Sep	6-Sep	7-Sep
Resident_0	AM	Holiday	Didactics	Melanoma	Didactics	Continuity
MEL1/MEL1	PM	Holiday	Merkel	Continuity	Continuity	Jeopardy
Resident_1	AM	Holiday	Didactics	Jeopardy	Didactics	VA-ENT
VA1/VA1	PM	Holiday	Continuity	VA-PM	TC	VA-ENT
Resident_3	AM	Holiday	Time-Off	Time-Off	Time-Off	Time-Off
VAST/Clinic	PM	Holiday	Time-Off	Time-Off	Time-Off	Time-Off
Resident_4	AM	Holiday	Didactics	Continuity	Didactics	TC
MEL2/MEL2	PM	Holiday	Merkel	Melanoma	CPU	CPU

### Acknowledgements

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University of Michigan  
Medical School

