

## Improving Patient Access to Weight Management Program for Morbidly Obese Patients

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### Weight Management Program

#### Purpose

- Promote weight reduction
- Support behavior change with physical activity
- Improve patient overall health

#### Design

- Regimented recurrent Physician and Dietitian visits anchored by 1<sup>st</sup> program visit
- Strict visit schedule for effectiveness
- Intensive weekly visits at program start

#### Challenge

- Inefficient scheduling process
- Long wait time for patients to enter program
- Insufficient capacity for patients to be seen according to schedule

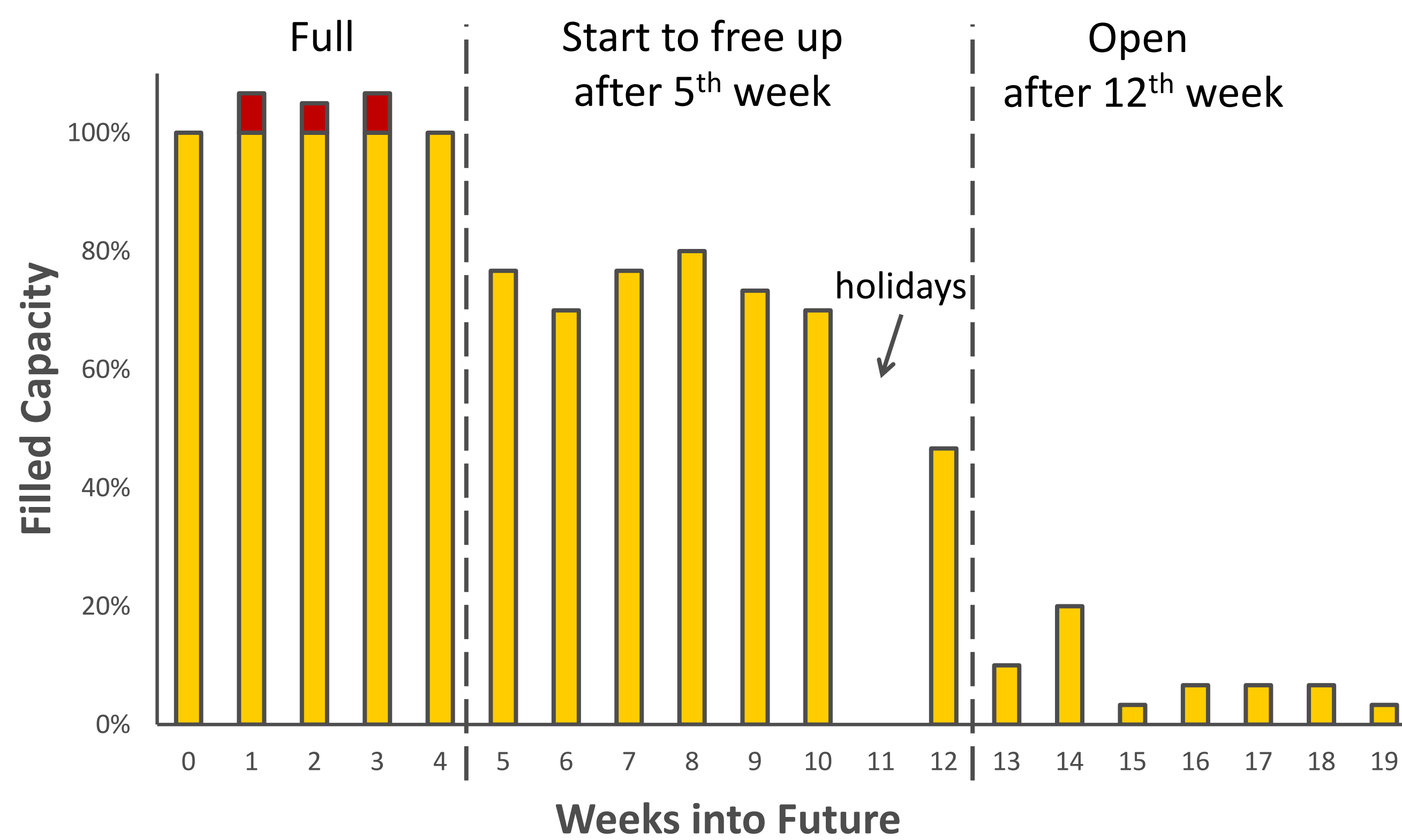
#### Improvement Opportunities

- Ensure timely access
- Provide adequate capacity for program adherence

### Current State

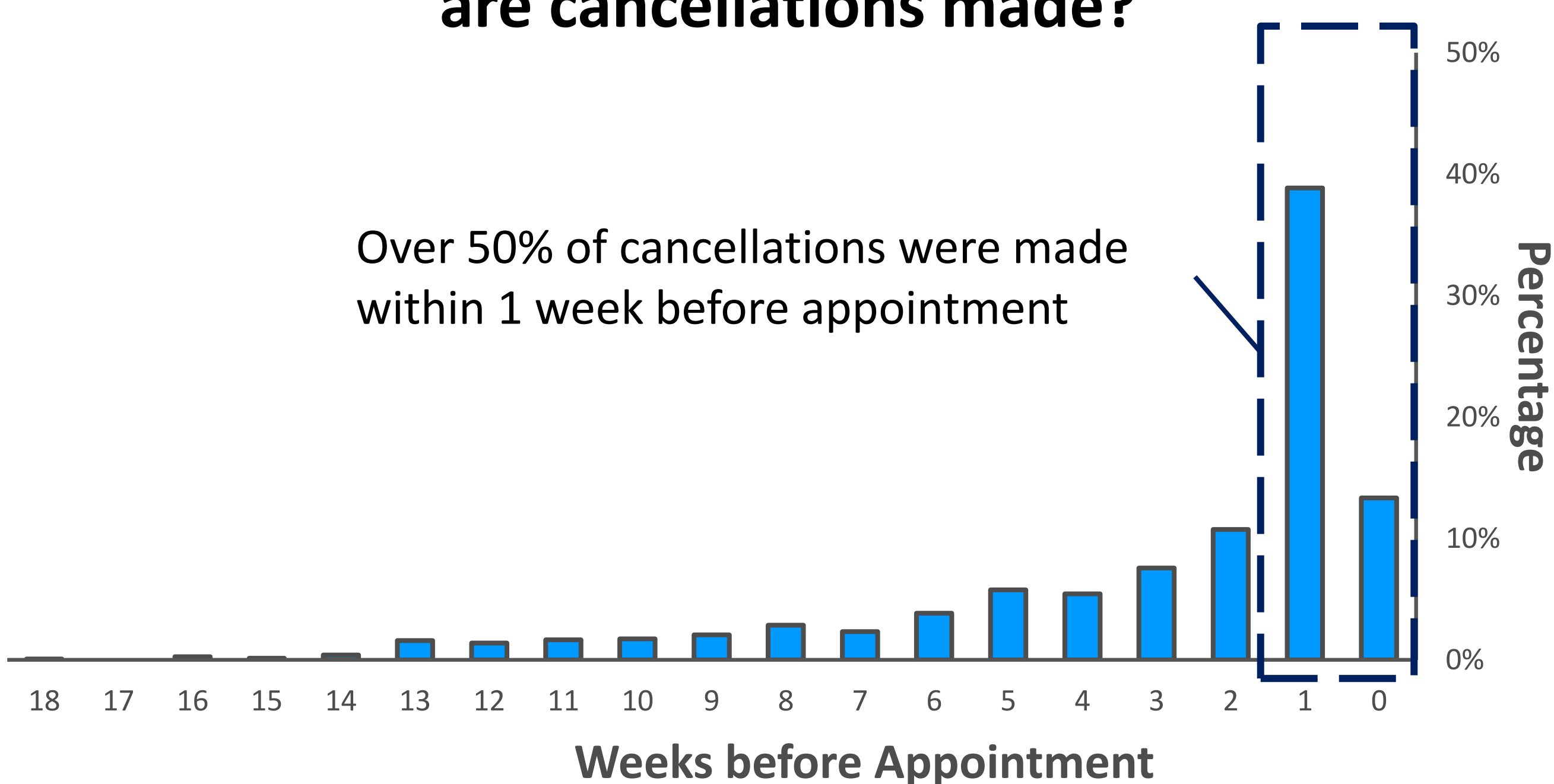
Providers are generally booked out for weeks

#### Example: Provider Capacity Into the Future



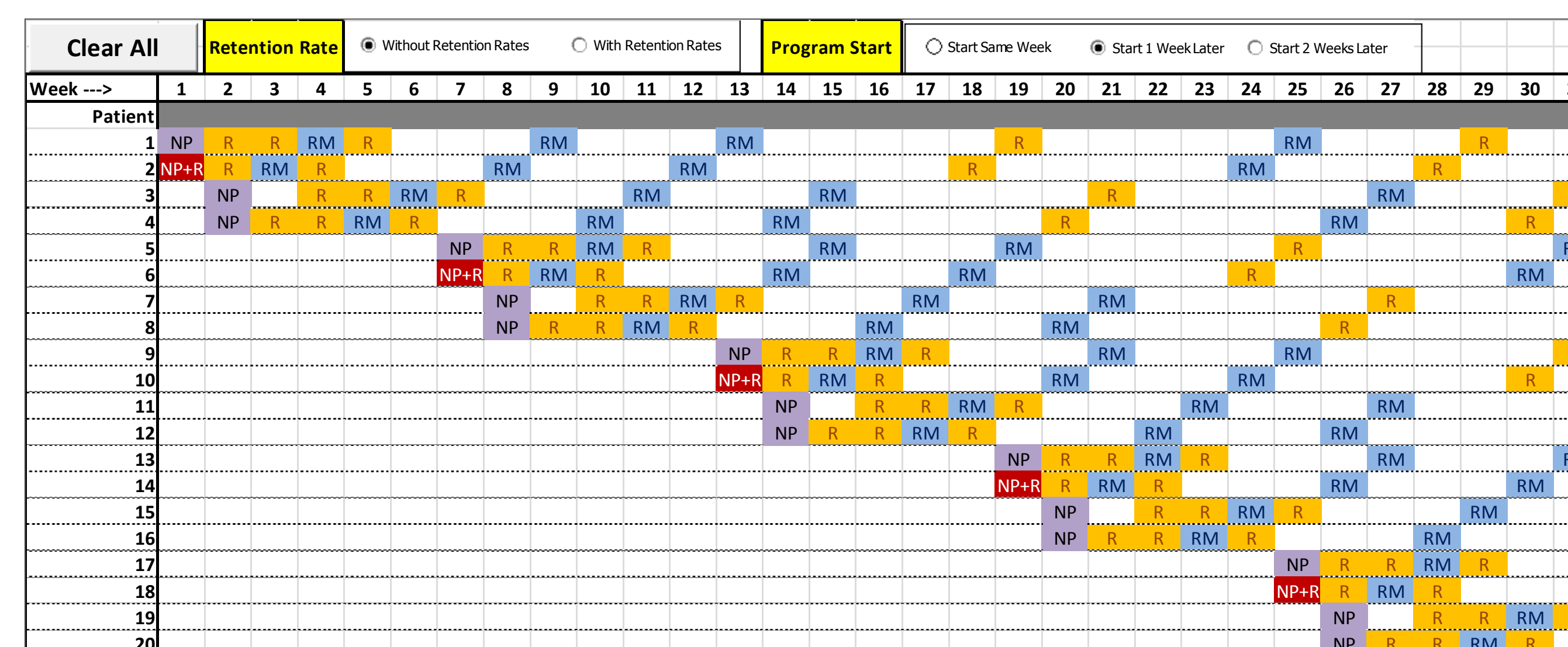
Patients cancel appointments at the last minute

#### How long before an appointment are cancellations made?



### Solution Approach

GAME: Visualization with an interactive spreadsheet



Patient scheduling as an integer program

#### Sets and Parameters

- $P$ : Set of patients
- $W$ : Set of weeks in planning horizon
- $W^s \subset W$ : Set of weeks patients can start program
- $V_s \subset W$ : Set of weeks patients who started in week  $s$  are expected to visit

#### Decision Variables

- $x_{ps} \in \{0,1\}$ : 1 if patient  $p$  starts in week  $s$ ,  $\forall p \in P, s \in W^s$ ; 0 otherwise
- $u_w$ : Usage of capacity,  $\forall w \in W$
- $z$ : Max no. of appointment across planning horizon

#### Constraints

Every patient starts once

$$\sum_{s \in W^s} x_{ps} = 1 \quad \forall p \in P$$

Usage of capacity

$$\sum_{p \in P} \sum_{s: w \in V_s} x_{ps} = u_w \quad \forall w \in W$$

Max no. of appointments

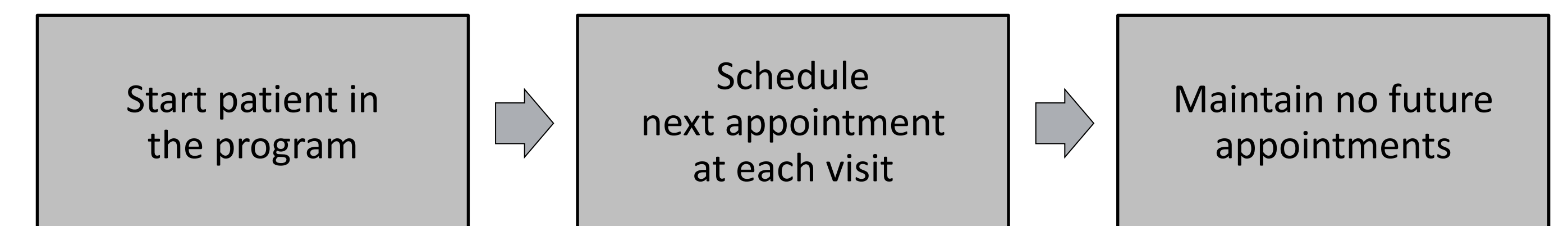
$$u_w \leq z \quad \forall w \in W$$

#### Objective

$$\min z$$

### Implementation

Classic Scheduling Process



- No available time slots to schedule next appointment
- Suitable for unknown appointment intervals
- Difficult to predict clinic utilization

Proposed Scheduling Process: Chelsea Health Center



- Prioritize time-sensitive patient scheduling
- Improve patient adherence to the program
- Early identification of patient schedule conflict
- Suitable for predetermined appointment intervals

#### Future Work:

- Stochastic programming model incorporating withdrawal rates
- Optimization-based recommendations (How many patients should start per week?)

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