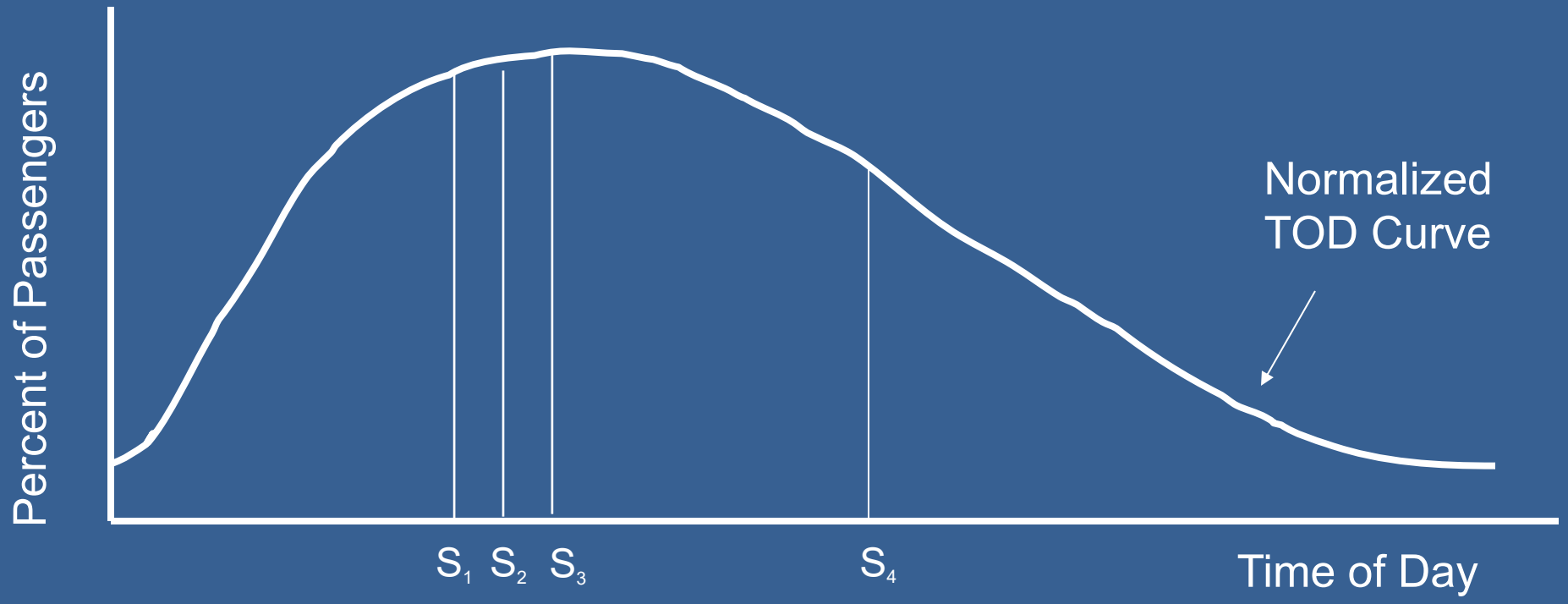
Displaced QSI

Displacement - The Problem

- Given four identical services except their TOD, a traditional QSI model does not recognize the proximity of services one, two and three.
  - As such, a forecast would allocate more passengers to those services due to their higher TOD making them more profitable relative to service four



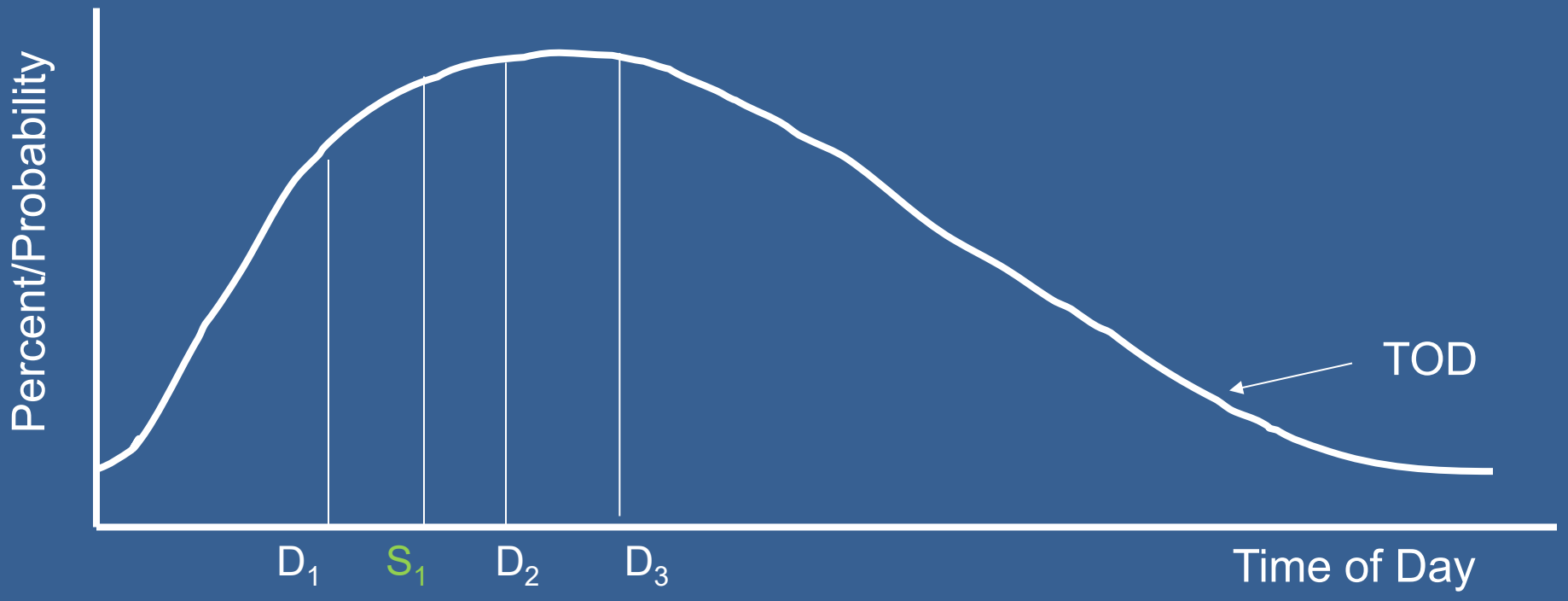
Displacement Methodology Model

- Displacement modifies QSI to consider the proximity of services to each other, and splitting passenger demand accordingly
  - The probability that a service will attract passengers displaced from their preferred departure time is a declining function of the time differential between the service's scheduled departure time and the passenger's preferred departure time

- The methodology can select the time period intervals (e.g., one hour, fifteen minutes, one minute) used to displace TOD demand
  - In practice, 15-minute intervals are granular enough to provide a "just meaningful difference" to the passenger
  - For demonstration, the following will consider one-hour intervals

Displacement Methodology

- A Time-of-Day (TOD) curve represents the percentage of passengers with a preferred departure time at each increment of the day
- If no service is available in their preferred time period, passengers must "displace" their demand to a time when service is available



Displacement Methodology

- These assumptions lead to the ability to develop probabilities that the passengers in each preferred departure time will “displace” their demand to any particular service
- The further the passenger has to “displace” their demand, the lower the probability that they will demand that service.