

# Poisson Distribution

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## 1 Poisson Distribution

- Based on
- Examples
- Assumptions

"Probability with R: An Introduction with Computer Science Applications"

Jane Horgan

[https://en.wikipedia.org/wiki/Hypergeometric\\_distribution](https://en.wikipedia.org/wiki/Hypergeometric_distribution)

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# Example

- The number of meteorites greater than 1 meter diameter that strike Earth in a year
- The number of patients arriving in an emergency room between 10 and 11 pm

# Assumption (1)

- $k$  is the number of times an event occurs in an interval and  $k$  can take values  $0, 1, 2, \dots$
- The occurrence of one event does not affect the probability that a second event will occur. That is, events occur independently.
- The rate at which events occur is constant. The rate cannot be higher in some intervals and lower in other intervals.
- Two events cannot occur at exactly the same instant; instead, at each very small sub-interval exactly one event either occurs or does not occur.

## Assumption (2)

- The probability of an event in a small sub-interval is proportional to the length of the sub-interval.  
Or
- The actual probability distribution is given by a binomial distribution and the number of trials is sufficiently bigger than the number of successes one is asking about