**Difference:** One limitation of standard count models is that the zeros and the nonzeros (positives) are assumed to come from the same data-generating process. **With hurdle models**, these two processes are not constrained to be the same. The basic idea is that a Bernoulli probability governs the binary outcome of whether a count variate has a zero or positive realization. If the realization is positive, the hurdle is crossed, and the conditional distribution of the positives is governed by a truncated-at-zero count data model. **With zero-inflated models**, the response variable is modelled as a mixture of a Bernoulli distribution (or call it a point mass at zero) and a Poisson distribution (or any other count distribution supported on non-negative integers). For more detail and formulae, see, for example, Gurmu and Trivedi (2011) and Dalrymple, Hudson, and Ford (2003).

**Example:** Hurdle models can be motivated by sequential decision-making processes confronted by individuals. You first decide if you need to buy something, and then you decide on the quantity of that something (which must be positive). When you are allowed to (or can potentially) buy nothing after your decision to buy something is an example of a situation where zero-inflated model is appropriate. Zeros may come from two sources: a) no decision to buy; b) wanted to buy but ended up buying nothing (e.g. out of stock).

Hurdle models assume that there is only one process by which a zero can be produced, while zero-inflated models assume that there are 2 different processes that can produce a zero.

Hurdle models assume 2 types of subjects: (1) those who never experience the outcome and (2) those who always experience the outcome at least once. Zero-inflated models conceptualize subjects as (1) those who never experience the outcome and (2) those who can experience the outcome but don't always.

In simple terms: both zero-inflated and hurdle models are described in two parts.

The first is the on-off part, which is a binary process. The system is "off" with probability *π*

and "on" with probability 1−*π*. (Here, *π* is known as the inflation probability.) When the system is "off," only zero counts are possible. This part is the same for zero-inflated and hurdle models.

The second part is the counting part, which occurs when the system is "on." This is where zero-inflated and hurdle models differ. In zero-inflated models, counts can still be zero. In hurdle models they must be nonzero. For this part, zero-inflated models use a "usual" discrete probability distribution while hurdle models use a zero-truncated discrete probability distribution function.

Example of a hurdle model: An automobile manufacturer wants to compare two quality control programs for its automobiles. It will compare them on the basis of the number of warranty claims filed. For each program, a set of randomly selected customers are followed for 1 year and the number of warranty claims they file is counted. The inflation probabilities for each of the two programs are then compared. The “off” state is “filed zero claims” while the “on” state is “filed at least one claim.”

Example of a zero-inflated model: In the same study above, the researchers find out that some repairs on the automobiles were fixed without the filing of a warranty claim. In this way, the zeroes are a mixture of the absence of quality control problems as well as the presence of quality control problems that involved no warranty claims. The “off” state means “filed zero claims” while the “on” state means “filed at least one claim OR had repairs fixed without filing a claim.”