

# تحليل بقا

## Survival Analysis

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زمان بقا  
مدت زمانی که طول می کشد تا واقعه ای رخ دهد

- زمان تا ناتوانی
- Time to Failure
- زمان تا واقعه
- Time to Event

کارگاه پیشرفته روش تحقیق

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### What is Survival Time?

Survival time refers to a variable which measures the

- time from a particular **starting** point to a particular **endpoint** of interest
- e.g., Time **from** initiating the treatment **to** attaining certain functional abilities

starting time  $\xrightarrow{\text{Time}}$  Endpoint (event)

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### Events may include

- ✓ death
- ✓ injury
- ✓ Infection
- ✓ MI
- ✓ Hospitalization
- ✓ Recurrence of cancer after treatment
- ✓ onset of illness
- ✓ recovery from illness
- ✓ Starting smoking after quitting
- ✓ Transition above or below the clinical threshold of a meaningful continuous variable (e.g. CD4 counts).
- ✓ Marriage
- ✓ Soccer goal
- ✓ Light bulb fails, computer crashes

(binary variables)

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### What is the origin of time?

#### In clinical trials:

- Since
  - randomisation
  - beginning of treatment
  - onset of exposure
  - .....

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### What is the origin of time?

#### In Epidemiology:

- Since
  - birth
  - baseline examination
  - onset of continuous exposure
  - .....

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**The origin of time  
should be defined  
carefully and clearly.**

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### زمان بقا

نقطه شروع	→	نقطه پایان
تولد	→	مرگ
تشخیص بیماری	→	مرگ
مواجهه با عامل	→	بروز بیماری
عمل جراحی	→	عود بیماری
.....		.....

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# Censoring

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## Censored Data

Some subject may not experience event of interest

**•Incomplete follow-up**

- Lost to follow-up after a period of study
- Withdraws from study
- Death (if not being studied)

• Some patients may still be **alive** or in remission at the end of the study period.

•The exact survival times of these subjects are **unknown**.

•These are called **censored observation** or **censored times**.

کارگاه پیشرفته روش تحقیق

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## روش تحلیل بقا؟؟

- اگر چه زمان بقاء يك متغير پیوسته مي باشد استفاده از آزمونهاي متداول (مانند آزمون t و ...) براي تحليل آن به دلایل زیر صحیح نیست:
- توزیع زمان بقاء معمولاً نرمال نیست.
- معمولاً داده هاي سانسور شده (Censored Data) در مطالعات بقاء وجود دارد.

کارگاه پیشرفته روش تحقیق

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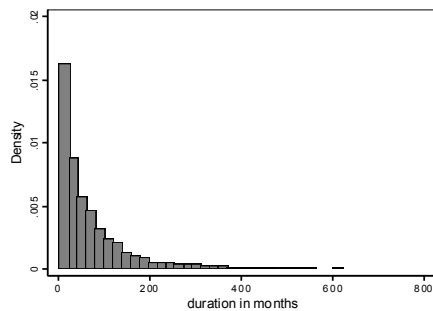
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## Histogram of duration



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روشهای تحلیل بقا

Life Table	روش جدول عمر
Kaplan Meier Method	روش کاپلان مایر
Cox Regression Analysis	آنالیز رگرسیون کاکس
Hazard Function	تابع مخاطره
Log Rank Test	آزمون لگاریتمی رتبه ای

کاربرد بیشتر روش تحقیق

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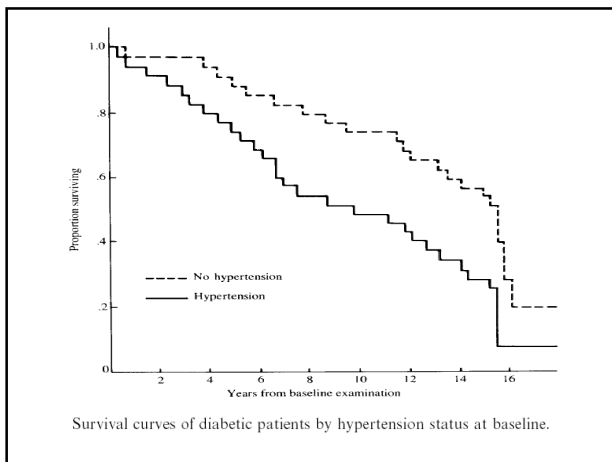
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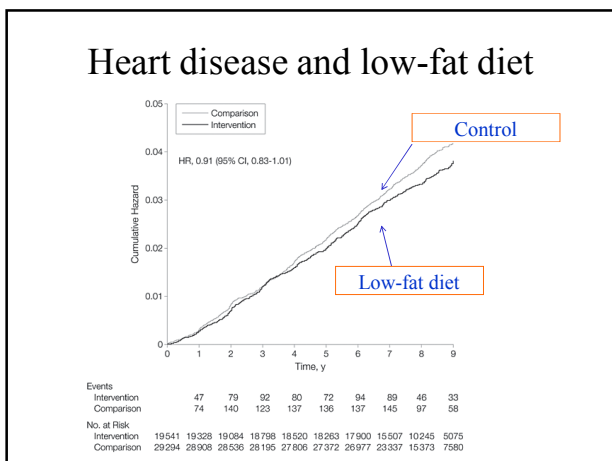
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