Modeling the cumulative incidence function of clustered competing risk data

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Clustered competing risk data

Key terms:

- » Clustered: groups with a dependence structure (e.g. families);
- » Causes competing by *something*.

Something?

- » **Failure** of an industrial or electronic component;
- » **Occurence** or **cure** of a disease;
- » **Progress** of a patient clinic state.
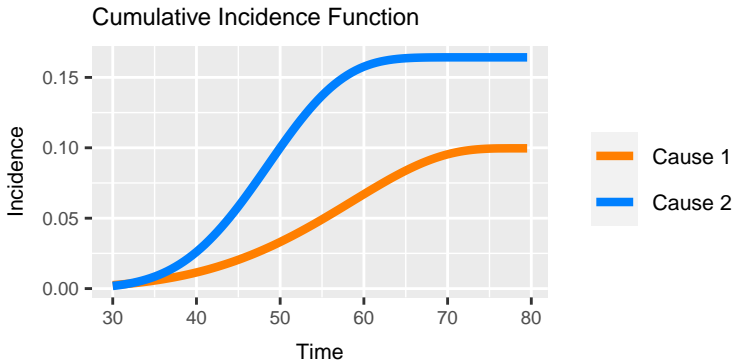
Independent of the application, always the same framework

Cluster	ID	Cause 1	Cause 2	Censorship	Time
1	1	Yes	No	No	10
1	2	No	No	Yes	8
2	1	No	No	Yes	7
2	2	No	Yes	No	5

We model the probability of each **competing cause** along the time and taking into account the possible within-cluster dependence

... all this in terms of a

Cumulative Incidence Function

Clustered competing risks data
↳ Clusters? Families
↳ Family studies
↳ Twins data

Family studies $\Rightarrow$ within-family dependence

That may reflect

» Disease **heritability**;

» The impact of shared **environmental effects**;
  » **Parental effects**:
    continuity of the phenotype across generations.

Challenges

» The data is very simple,
we just know the outcome (**yes** or **no**);

» With this, we have to be able to construct the
cumulative incidence curves;

» And we have to accommodate the within-family dependence properly,
that can happen in different manners;

» . . .

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