

# THE VALUE OF TWINS AND THE IMPORTANCE OF TWIN RESEARCH



Twins always attract interest everywhere they go due to their similar physical appearances and behaviors.

Twins play an important role in health research. Twin studies help to determine how genetic and environmental factors influence health, disease and behaviours (e.g. smoking).



## Lets take a look at how twins are formed

There are two types of twins

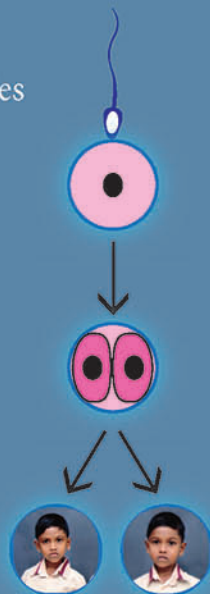
*Identical or Monozygotic (MZ) twins* & *Non-identical or Dizygotic (DZ) twins*

### How a twin pregnancy occurs

Identical twins are formed when one egg is fertilized by one sperm, which then divides into two halves.

They share all of their genes which is why they look so similar.

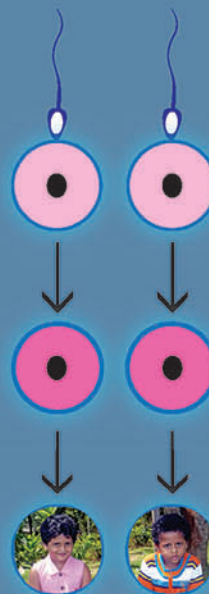
**MZ twins share 100% of their genes!**



Non-identical twins are formed when two egg cells are each fertilized by a different sperm.

The twins can be of the same or opposite gender and they don't have to look at all alike.

**DZ twins share 50% of their genes!**



As identical and non-identical twins only differ in the extent to which they share their DNA (if they grow up in the same family); twins represent an ideal opportunity to study health and behaviour.

## How do twin studies work?

We know that many health disorders, behaviours and personalities run in families. But we don't know how much of this is due to them growing up in the same environment or because they share the same genes.

Twin studies allow us to disentangle these effects, because of the unique nature of both types of twins.

This is because twin studies take advantage of two sets of naturally occurring twins: identical and non-identical.

If genetic influences are important for a trait identical twins will be more similar than non-identical twins (who only share 50% of their genes).

In our recent study the *Colombo Twin and Singleton follow-up Study* (CoTaSS 2), we were particularly interested in investigating diabetes, heart disease and depression.

Let's take diabetes as an example. In CoTaSS 2, we used several clinical tests to diagnose diabetes in the twins.

To investigate the relative influence of genes and environment on conditions such as diabetes we would need to compare the **degree of similarity** in identical and non-identical twins.

If diabetes is influenced by genes then we would expect in a pair of identical twins; if one twin has diabetes then their co-twin is more likely to have diabetes compared to a non-identical twin pair.

### Lets try a hypothetical example

We gather **100 pairs of identical twins** and **100 pairs of non-identical twins** from the Sri Lankan Twin Registry, and check them all for diabetes. And get the following results:

#### Identical twins

**In 50 pairs BOTH TWINS have diabetes**

In 15 pairs only 1 twin has diabetes

In 35 pairs neither twin has diabetes

**HIGH DEGREE of similarity within the pairs**

#### Non-identical twins

**In 35 pairs BOTH TWINS have diabetes**

In 45 pairs only 1 twin has diabetes

In 15 pairs neither twin has diabetes

**LOW DEGREE of similarity within the pairs**

In this hypothetical experiment identical twins are more similar than non-identical twins.

These results would suggest that genetic influences are important in diabetes.

BUT these results would also suggest that environmental influences are important for diabetes.

**WHY?** If only genetic influences were important then we would expect the identical twins to be 100% similar as these twins share all of their DNA.

In actuality the methods used to calculate the results and interpret them are much more complicated.

Although researchers concentrate on twins in a city or country, the results can be generalised to the entire population (if the twin study is representative of the population).

Twin research provides vital clues for treating diseases simply by identifying the genetic and environmental influences that cause diseases.

Large scale twin studies are only possible with twin registries.

Health research is essential to the overall development of any country.



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The Sri Lankan Twin Registry is open to all Sri Lankan twins. Please contact us for more information.