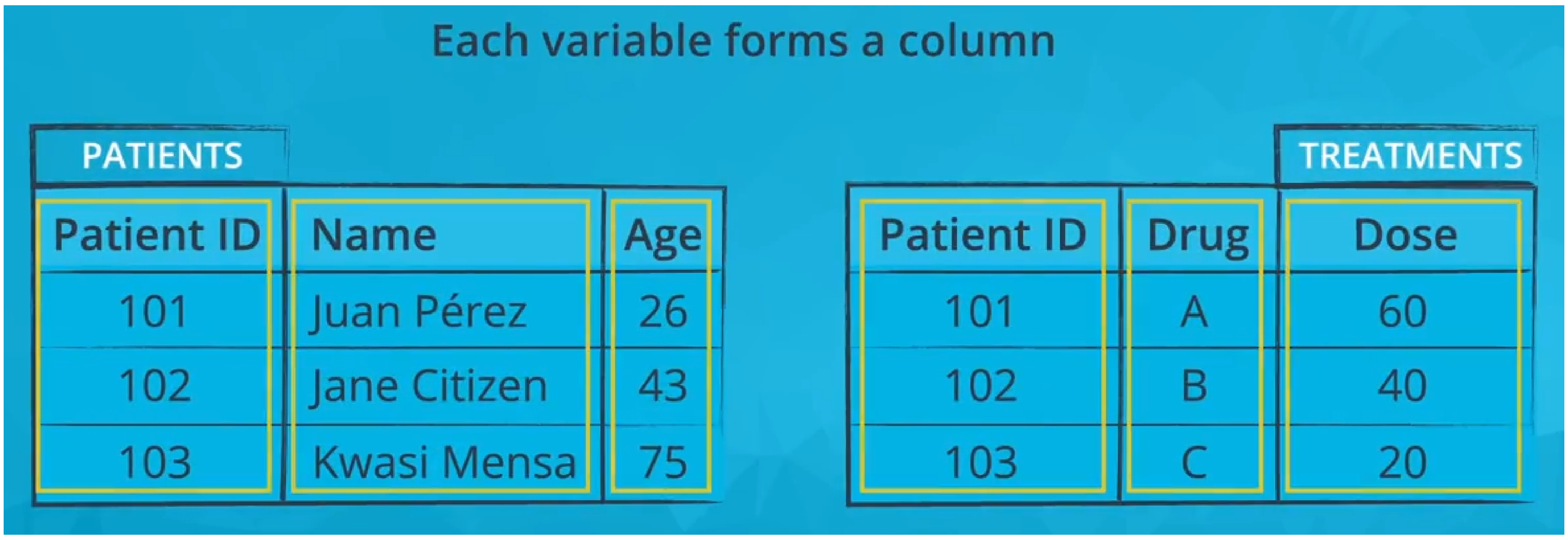
02. Tidy Data

What is Tidy Data?

In this course, it is expected that your data is organized in some kind of tidy format. In short, a tidy dataset is a tabular dataset where:

- each variable is a column
- each observation is a row
- each type of observational unit is a table

The first three images below depict a tidy dataset. This tidy dataset is in the field of healthcare and has two tables: one for patients (with their patient ID, name, and age) and one for treatments (with patient ID, what drug that patient is taking, and the dose of that drug).



Each variable forms a column

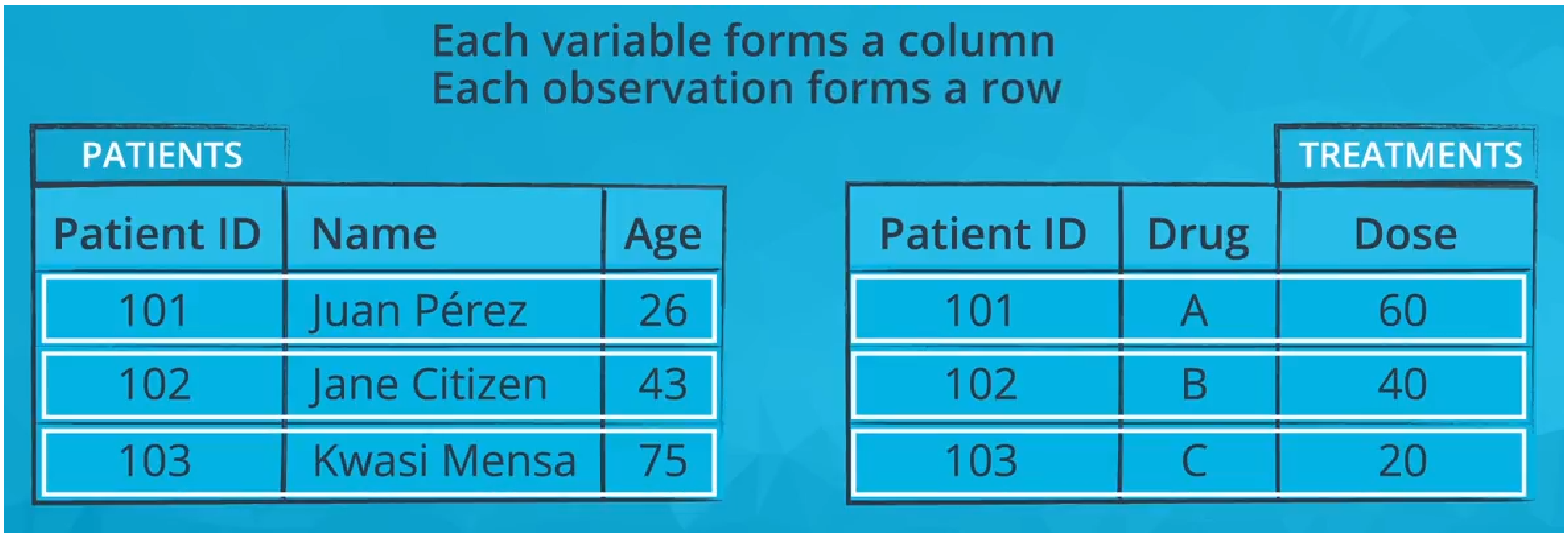
PATIENTS

Patient ID	Name	Age
101	Juan Pérez	26
102	Jane Citizen	43
103	Kwasi Mensa	75

TREATMENTS

Patient ID	Drug	Dose
101	A	60
102	B	40
103	C	20

Each variable in a tidy dataset must have its own column



Each variable forms a column
Each observation forms a row

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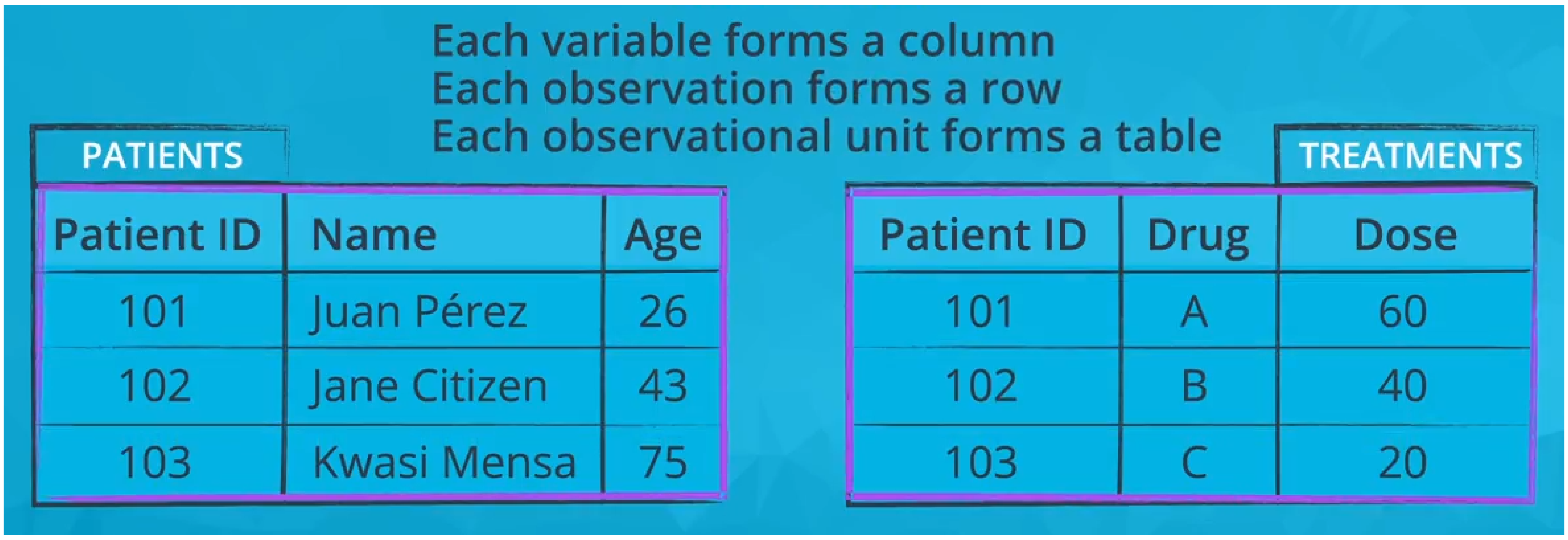
Each observation in a tidy dataset must have its own row



Each variable forms a column
Each observation forms a row
Each observational unit forms a table

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Patient ID	Name	Age
101	Juan Pérez	26
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TREATMENTS

Patient ID	Drug	Dose
101	A	60
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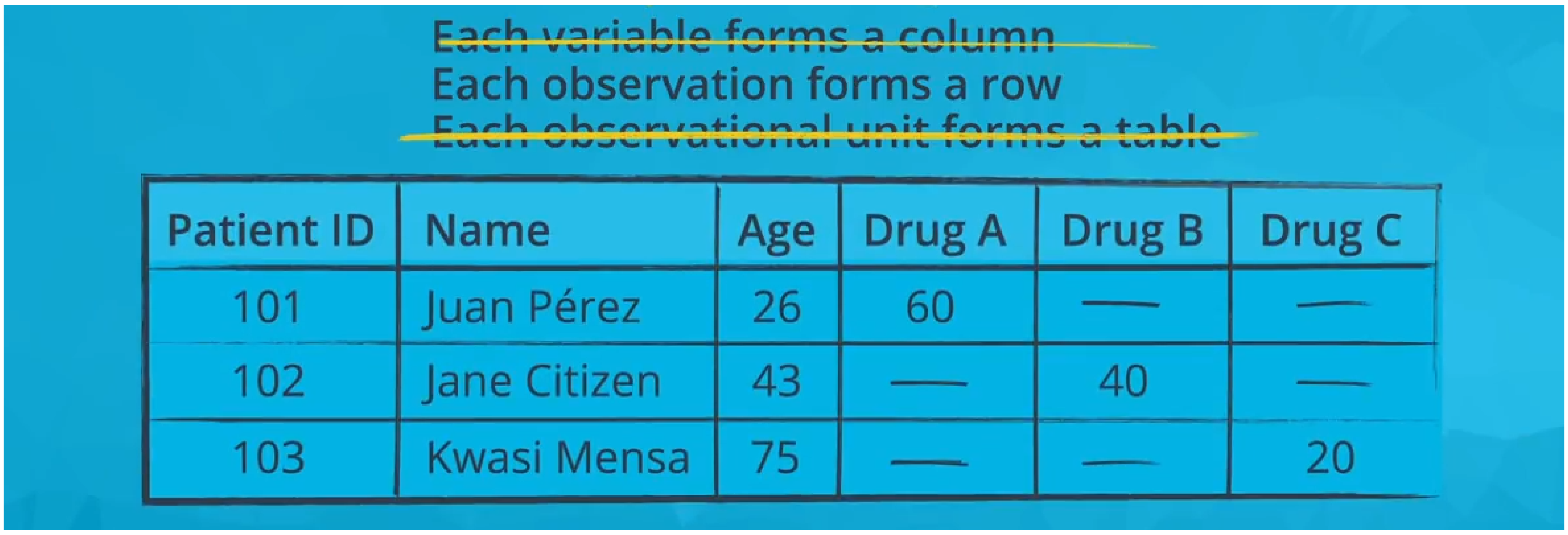
103	C	20

Each observational unit in a tidy dataset must have its own table

The next image depicts the same data but in one representation of a non-tidy format (there are other possible non-tidy representations). The *Drug A*, *Drug B*, and *Drug C* columns should form one 'Drug' column, since this is one variable. The entire table should be separated into two tables: a patients table and a treatments table.



~~Each variable forms a column~~
Each observation forms a row
~~Each observational unit forms a table~~

Patient ID	Name	Age	Drug A	Drug B	Drug C
101	Juan Pérez	26	60	—	—
102	Jane Citizen	43	—	40	—
103	Kwasi Mensa	75	—	—	20

Only the second rule of tidy data is satisfied in this non-tidy representation of the above data: each observation forms a row

While the data provided to you in the course will all be tidy, in practice, you may need to perform tidying work before exploration. You should be comfortable with reshaping your data or perform transformations to split or combine features in your data, resulting in new data columns. These operations collectively are called *data-wrangling*.

This is also not to say that tidy data is the *only* useful form that data can take. In fact, as you work with a dataset, you might need to summarize it in a non-tidy form in order to generate appropriate visualizations. You'll see one example of this (bivariate plotting) in the next lesson, where categorical counts need to put into a matrix form in order to create a heat map.

Recommended Read

Refer to the Data Wrangling with pandas Cheat Sheet for a summary of functions helpful for data-wrangling.

Next Concept