

---

# Conditional mutating



Introduction .....	
Learning objectives .....	
Packages .....	
Datasets .....	
Reminder: relational operators (comparators) in R .....	
Introduction to <code>case_when()</code> .....	
The <code>TRUE</code> default argument .....	
Matching NA's with <code>is.na()</code> .....	
Keeping default values of a variable .....	
Multiple conditions on a single variable .....	
Multiple conditions on multiple variables .....	
Order of priority of conditions in <code>case_when()</code> .....	
Overlapping conditions within <code>case_when()</code> .....	
Binary conditions: <code>dplyr::if_else()</code> .....	
Wrap up .....	

## Introduction

In the last lesson, you learned the basics of data transformation using the `{dplyr}` function `mutate()`.

In that lesson, we mostly looked at *global* transformations; that is, transformations that did the same thing to an entire variable. In this lesson, we will look at how to *conditionally* manipulate certain rows based on whether or not they meet defined criteria.

For this, we will mostly use the `case_when()` function, which you will likely come to see as one of the most important functions in `{dplyr}` for data wrangling tasks.

Let's get started.



Fig: the `case_when()` conditions

---

## Learning objectives

1. You can transform or create new variables based on conditions using `dplyr::case_when()`
2. You know how to use the `TRUE` condition in `case_when()` to match unmatched cases.
3. You can handle `NA` values in `case_when()` transformations.
4. You understand how to keep the default values of a variable in a `case_when()` formula
5. You can write `case_when()` conditions involving multiple comparators and multiple variables.
6. You understand `case_when()` conditions priority order.
7. You can use `dplyr::if_else()` for binary conditional assignment.

---

## Packages

This lesson will require the tidyverse suite of packages:

```
if(!require(pacman)) install.packages("pacman")
pacman::p_load(tidyverse)
```

---

## Datasets

In this lesson, we will again use data from the COVID-19 serological survey conducted in Yaounde, Cameroon.

```
# Import and view the dataset
yaounde <-
  read_csv(here::here('data/yaounde_data.csv')) %>%
  ## make every 5th age missing
  mutate(age = case_when(row_number() %in% seq(5, 900, by = 5) ~ NA_real_,
                        TRUE ~ age)) %>%
  ## rename the age variable
  rename(age_years = age) %>%
  # drop the age category column
  select(-age_category)

yaounde
```

Note that in the code chunk above, we slightly modified the age column, artificially introducing some missing values, and we also dropped the `age_category` column. This is to help illustrate some key points in the tutorial.

For practice questions, we will also use an outbreak linelist of 136 cases of influenza A H7N9 from a [2013 outbreak](#) in China. This is a modified version of a dataset compiled by Kucharski et al. (2014).

```
# Import and view the dataset
flu_linelist <- read_csv(here::here('data/flu_h7n9_china_2013.csv'))
flu_linelist
```

## Reminder: relational operators (comparators) in R

Throughout this lesson, you will use a lot of relational operators in R. Recall that relational operators, sometimes called “comparators”, test the relation between two values, and return `TRUE`, `FALSE` or `NA`.

A list of the most common operators is given below:

Operator is TRUE if	
<code>A &lt; B</code>	A is <b>less than</b> B
<code>A &lt;= B</code>	A is <b>less than or equal</b> to B
<code>A &gt; B</code>	A is <b>greater than</b> B
<code>A &gt;= B</code>	A is <b>greater than or equal to</b> B
<code>A == B</code>	A is <b>equal</b> to B
<code>A != B</code>	A is <b>not equal</b> to B
<code>A %in% B</code>	A <b>is an element of</b> B

## Introduction to `case_when()`

To get familiar with `case_when()`, let's begin with a simple conditional transformation on the `age_years` column of the `yaounde` dataset. First we subset the data frame to just the `age_years` column for easy illustration:

```
yaounde_age <-  
  yaounde %>%  
    select(age_years)  
  
yaounde_age
```

Now, using `case_when()`, we can make a new column, called “age\_group”, that has the value “Child” if the person is below 18, and “Adult” if the person is 18 and up:

```
yaounde_age %>%  
  mutate(age_group = case_when(age_years < 18 ~ "Child",  
                                age_years >= 18 ~ "Adult"))
```

The `case_when()` syntax may seem a bit foreign, but it is quite simple: on the left-hand side (LHS) of the `~` sign (called a “tilde”), you provide the condition(s) you want to evaluate, and on the right-hand side (RHS), you provide a value to put in if the condition is true.

So the statement `case_when(age_years < 18 ~ "Child", age_years >= 18 ~ "Adult")` can be read as: “if `age_years` is below 18, input ‘Child’, else if `age_years` is greater than or equal to 18, input ‘Adult’”.

### Formulas, LHS and RHS

#### VOCAB



Each line of a `case_when()` call is termed a “formula” or, sometimes, a “two-sided formula”. And each formula has a left-hand side (abbreviated LHS) and right-hand side (abbreviated RHS).

For example, the code `age_years < 18 ~ "Child"` is a “formula”, its LHS is `age_years < 18` while its RHS is `"Child"`.

You are likely to come across these terms when reading the documentation for the `case_when()` function, and we will also refer to them in this lesson.

After creating a new variable with `case_when()`, it is a good idea to inspect it thoroughly to make sure it worked as intended.

To inspect the variable, you can pipe your data frame into the `View()` function to view it in spreadsheet form:

```
yaounde_age %>%  
  mutate(age_group = case_when(age_years < 18 ~ "Child",  
                                age_years >= 18 ~ "Adult")) %>%  
  View()
```

This would open up a new tab in RStudio where you should manually scan through the new column, `age_group` and the referenced column `age_years` to make sure your `case_when()` statement did what you wanted it to do.

You could also pass the new column into the `tabyl()` function to ensure that the proportions “make sense”:

```
yaounde_age %>%  
  mutate(age_group = case_when(age_years < 18 ~ "Child",  
                                age_years >= 18 ~ "Adult")) %>%  
  tabyl(age_group)
```

With the `flu_linelist` data, make a new column, called `age_group`, that has the value “Below 50” for people under 50 and “50 and above” for people aged 50 and up. Use the `case_when()` function.



```
# Complete the code with your answer:  
Q_age_group <-  
  flu_linelist %>%  
  mutate(age_group = _____)
```

Out of the entire sample of individuals in the `flu_linelist` dataset, what percentage are confirmed to be below 60? (Repeat the above procedure but with the 60 cutoff, then call `tabyl()` on the age group variable. Use the `percent` column, not the `valid_percent` column.)

```
# Enter your answer as a number without quotes:  
Q_age_group_percentage <- YOUR_ANSWER_HERE
```

---

## The TRUE default argument

In a `case_when()` statement, you can use a literal `TRUE` condition to match any rows not yet matched with provided conditions.

For example, if we only keep only the first condition from the previous example, `age_years < 18`, and define the default value to be `TRUE ~ "Not child"` then all adults and NA values in the data set will be labeled "Not child" by default.

```
yaounde_age %>%  
  mutate(age_group = case_when(age_years < 18 ~ "Child",  
                                TRUE ~ "Not child"))
```

This `TRUE` condition can be read as “for everything else...”.

So the full `case_when()` statement used above, `age_years < 18 ~ "Child", TRUE ~ "Not child"`, would then be read as: “if age is below 18, input ‘Child’ and *for everyone else not yet matched*, input ‘Not child’”.

### WATCH OUT



It is important to use `TRUE` as the *final* condition in `case_when()`. If you use it as the first condition, it will take precedence over all others, as seen here:

```
yaounde_age %>%  
  mutate(age_group = case_when(TRUE ~ "Not child",  
                                age_years < 18 ~ "Child"))
```

As you can observe, all individuals are now coded with “Not child”, because the `TRUE` condition was placed first, and therefore took precedence. We will explore the issue of precedence further below.

---

## Matching NA's with `is.na()`

We can match missing values manually with `is.na()`. Below we match NA ages with `is.na()` and set their age group to “Missing age”:

```
yaounde_age %>%  
  mutate(age_group = case_when(age_years < 18 ~ "Child",  
                                age_years >= 18 ~ "Adult",  
                                is.na(age_years) ~ "Missing age"))
```



## PRACTICE



(in RMD)

As before, using the `flu_linelist` data, make a new column, called `age_group`, that has the value “Below 60” for people under 60 and “60 and above” for people aged 60 and up. But this time, also set those with missing ages to “Missing age”.

```
# Complete the code with your answer:
Q_age_group_nas <-
  flu_linelist %>%
```

## PRACTICE



(in RMD)

The `gender` column of the `flu_linelist` dataset contains the values “f”, “m” and NA:

```
flu_linelist %>%
  tabyl(gender)
```

Recode “f”, “m” and NA to “Female”, “Male” and “Missing gender” respectively. You should modify the existing `gender` column, not create a new column.

```
# Complete the code with your answer:
Q_gender_recode <-
  flu_linelist %>%
```

## Keeping default values of a variable

The right-hand side (RHS) of a `case_when()` formula can also take in a variable from your data frame. This is often useful when you want to change just a few values in a column.

Let’s see an example with the `highest_education` column, which contains the highest education level attained by a respondent:

```
yaounde_educ <-
  yaounde %>%
    select(highest_education)
yaounde_educ
```

Below, we create a new column, `highest_educ_recode`, where we recode both “University” and “Doctorate” to the value “Post-secondary”:

```
yaounde_educ %>%
  mutate(highest_educ_recode =
    case_when(
      highest_education %in% c("University", "Doctorate") ~ "Post-
secondary"
    )
  )
```

It worked, but now we have NAs for all other rows. To keep these other rows at their default values, we can add the line `TRUE ~ highest_education` (with a variable, `highest_education`, on the right-hand side of a formula):

```
yaounde_educ %>%
  mutate(highest_educ_recode =
    case_when(
      highest_education %in% c("University", "Doctorate") ~ "Post-
secondary",
      TRUE ~ highest_education
    )
  )
```

Now the `case_when()` statement reads: 'If highest education is "University" or "Doctorate", input "Post-secondary". For everyone else, input the value from `highest_education`'.

Above we have been putting the recoded values in a separate column, `highest_educ_recode`, but for this kind of replacement, it is more common to simply overwrite the existing column:

```
yaounde_educ %>%
  mutate(highest_education =
    case_when(
      highest_education %in% c("University", "Doctorate") ~ "Post-
secondary",
      TRUE ~ highest_education
    )
  )
```

We can read this last `case_when()` statement as: 'If highest education is "University" or "Doctorate", *change the value to* "Post-secondary". For everyone else, *leave in* the value from `highest_education`'.

## PRACTICE



Using the `flu_linelist` data, modify the existing column `outcome` by replacing the value "Recover" with "Recovery".

```
# Complete the code with your answer:
Q_recode_recovery <-
  flu_linelist
```

## PRACTICE

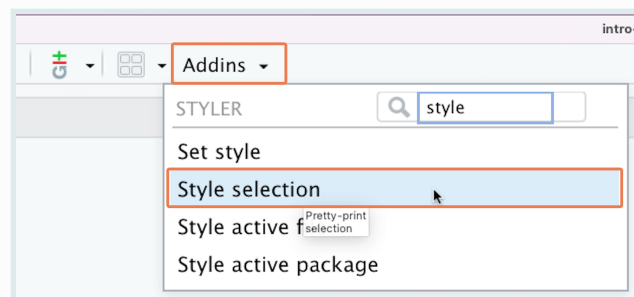


(We know it's a lot of code for such a simple change. Later you will see easier ways to do this.)

**Avoiding long code lines** As you start to write increasingly complex `case_when()` statements, it will become helpful to use line breaks to avoid long lines of code.

To assist with creating line breaks, you can use the `{styler}` package. Install it with `pacman::p_load(styler)`. Then to reformat any piece of code, highlight the code, click the “Addins” button in RStudio, then click on “Style selection”:

## PRO TIP



Alternatively, you could highlight the code and use the shortcut `Shift + Command/Control + A` to use RStudio's built-in code reformatter.

Sometimes `{styler}` does a better job at reformatting. Sometimes the built-in reformatter does a better job.

## Multiple conditions on a single variable

LHS conditions in `case_when()` formulas can have multiple parts. Let's see an example of this.

But first, we will inspire ourselves from what we learnt in the `mutate()` lesson and recreate the BMI variable. This involves first converting the `height_cm` variable to meters, then calculating BMI.

```
yaounde_BMI <-
  yaounde %>%
  mutate(height_m = height_cm/100,
         BMI = (weight_kg / (height_m)^2)) %>%
  select (BMI)

yaounde_BMI
```

Recall the following BMI categories:

- If the BMI is inferior to 18.5, the person is considered underweight.
- A normal BMI is greater than or equal to 18.5 and less than 25.
- An overweight BMI is greater than or equal to 25 and less than 30.
- An obese BMI is BMI is greater than or equal to 30.

The condition `BMI >= 18.5 & BMI < 25` to define Normal weight is a compound condition because it has *two* comparators: `>=` and `<`.

```
yaounde_BMI <-
  yaounde_BMI %>%
  mutate(BMI_classification = case_when(BMI < 18.5 ~ 'Underweight',
                                       BMI >= 18.5 & BMI < 25 ~ 'Normal
                                       weight',
                                       BMI >= 25 & BMI < 30 ~ 'Overweight',
                                       BMI >= 30 ~ 'Obese'))

yaounde_BMI
```

Let's use `tabyl()` to have a look at our data:

```
yaounde_BMI %>%
  tabyl(BMI_classification)
```

But you can see that the levels of BMI are defined in alphabetical order from Normal weight to Underweight, instead of from lightest (Underweight) to heaviest (Obese). Remember that if you want to have a certain order you can make `BMI_classification` a factor using `mutate()` and define its levels.

```
yaounde_BMI %>%
  mutate(BMI_classification = factor(BMI_classification, levels=c("Obese",
                                                                    "Overweight",
                                                                    "Normal
                                                                    weight",
                                                                    "Underweight")))) %>%
  tabyl(BMI_classification)
```

### WATCH OUT



With compound conditions, you should remember to input the variable name *everytime* there is a comparator. R learners often forget this and will try to run code that looks like this:

```
yaounde_BMI %>%  
  mutate(BMI_classification = case_when(BMI < 18.5 ~  
    'Underweight',  
    BMI >= 18.5 & < 25 ~  
    'Normal weight',  
    BMI >= 25 & < 30 ~  
    'Overweight',  
    BMI >= 30 ~ 'Obese'))
```

The definitions for the “Normal weight” and “Overweight” categories are mistaken. Do you see the problem? Try to run the code to spot the error.

### PRACTICE



(in RMD)

With the `flu_linelist` data, make a new column, called `adolescent`, that has the value “Yes” for people in the 10-19 (at least 10 and less than 20) age group, and “No” for everyone else.

```
# Complete the code with your answer:  
Q_adolescent_grouping <-  
  flu_linelist %>%
```

## Multiple conditions on multiple variables

In all examples seen so far, you have only used conditions involving a single variable at a time. But LHS conditions often refer to multiple variables at once.

Let’s see a simple example with age and sex in the `yaounde` data frame. First, we select just these two variables for easy illustration:

```
yaounde_age_sex <-  
  yaounde %>%  
  select(age_years, sex)  
  
yaounde_age_sex
```

Now, imagine we want to recruit women and men in the 20-29 age group into two studies. For this we’d like to create a column, called `recruit`, with the following schema:

- Women aged 20-29 should have the value “Recruit to female study”

- Men aged 20-29 should have the value “Recruit to male study”
- Everyone else should have the value “Do not recruit”

To do this, we run the following case\_when statement:

```
yaounde_age_sex %>%
  mutate(recruit = case_when(
    sex == "Female" & age_years >= 20 & age_years <= 29 ~ "Recruit to female study",
    sex == "Male" & age_years >= 20 & age_years <= 29 ~ "Recruit to male study",
    TRUE ~ "Do not recruit"
  ))
```

You could also add extra pairs of parentheses around the age criteria within each condition:

```
yaounde_age_sex %>%
  mutate(recruit = case_when(
    sex == "Female" & (age_years >= 20 & age_years <= 29) ~ "Recruit to female study",
    sex == "Male" & (age_years >= 20 & age_years <= 29) ~ "Recruit to male study",
    TRUE ~ "Do not recruit"
  ))
```

This extra pair of parentheses does not change the code output, but it improves coherence because the reader can visually see that your condition is made of two parts, one for gender, `sex == "Female"`, and another for age, `(age_years >= 20 & age_years <= 29)`.

With the `flu_linelist` data, make a new column, called `recruit` with the following schema:



- Individuals aged 30-59 (at least 30, younger than 60) from the Jiangsu province should have the value “Recruit to Jiangsu study”
- Individuals aged 30-59 from the Zhejiang province should have the value “Recruit to Zhejiang study”
- Everyone else should have the value “Do not recruit”

```
# Complete the code with your answer:
Q_age_province_grouping <-
  flu_linelist %>%
  mutate(recruit = _____)
```

## Order of priority of conditions in `case_when()`

Note that the order of conditions is important, because conditions listed at the top of your `case_when()` statement take priority over others.

To understand this, run the example below:

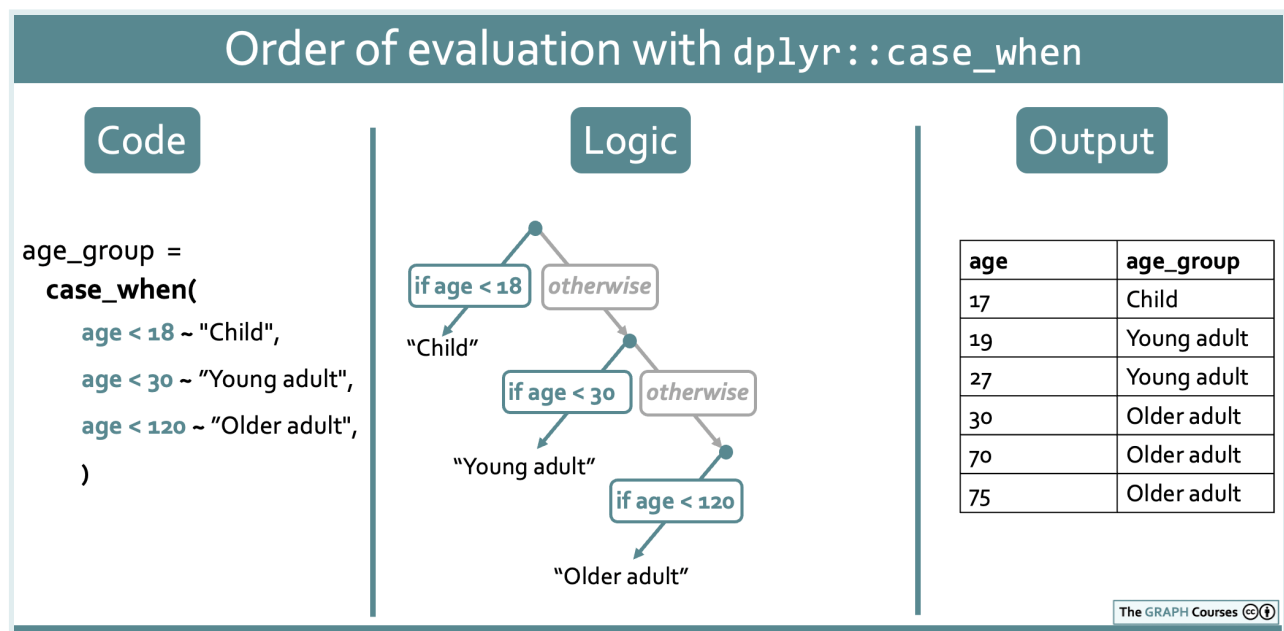
```
yaounde_age_sex %>%  
  mutate(age_group = case_when(age_years < 18 ~ "Child",  
                                age_years < 30 ~ "Young adult",  
                                age_years < 120 ~ "Older adult"))
```

This initially looks like a faulty `case_when()` statement because the age conditions overlap. For example, the statement `age_years < 120 ~ "Older adult"` (which reads "if age is below 120, input 'Older adult'") suggests that *anyone* between ages 0 and 120 (even a 1-year old baby!, would be coded as "Older adult".

But as you saw, the code actually works fine! People under 18 are still coded as "Child".

What's going on? Essentially, the `case_when()` statement is interpreted as a series of branching logical steps, starting with the first condition. So this particular statement can be read as: "If age is below 18, input 'Child', *and otherwise*, if age is below 30, input 'Young adult', *and otherwise*, if age is below 120, input 'Older adult'".

This is illustrated in the schematic below:

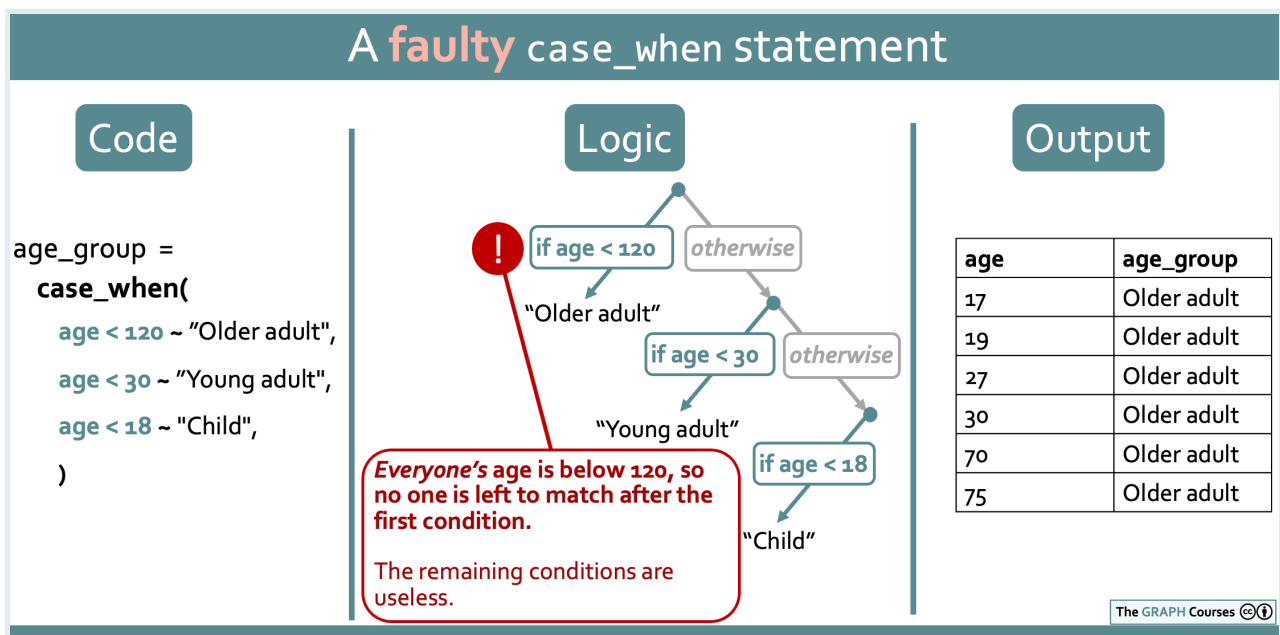


This means that if you swap the order of the conditions, you will end up with a faulty `case_when()` statement:

```
yaounde_age %>%
  mutate(age_group = case_when(age_years < 120 ~ "Older adult",
                                age_years < 30 ~ "Young adult",
                                age_years < 18 ~ "Child"))
```

As you can see, everyone is coded as “Older adult”. This happens because the first condition matches everyone, so there is no one left to match with the subsequent conditions. The statement can be read “If age is below 120, input ‘Older adult’, *and otherwise* if age is below 30....” But there is no “otherwise” because everyone has already been matched!

This is illustrated in the diagram below:



Although we have spent much time explaining the importance of the order of conditions, in this specific example, there would be a much clearer way to write this code that would not depend on the order of conditions. Rather than leave the age groups open-ended like this:

```
age_years < 120 ~ "Older adult"
```

you should actually use *closed* age bounds like this:

```
age_years >= 30 & age_years < 120 ~ "Older adult"
```

which is read: “if age is greater than or equal to 30 and less than 120, input ‘Older adult’”.

With such closed conditions, the order of conditions no longer matters. You get the same result no matter how you arrange the conditions:



```
# start with "Older adult" condition
yaounde_age %>%
  mutate(age_group = case_when(age_years >= 30 & age_years < 120 ~ "Older
    adult",
                                age_years >= 18 & age_years < 30 ~ "Young
    adult",
                                age_years >= 0 & age_years < 18 ~ "Child"))
```

```
# start with "Child" condition
yaounde_age %>%
  mutate(age_group = case_when(age_years >= 0 & age_years < 18 ~ "Child",
                                age_years >= 18 & age_years < 30 ~ "Young
    adult",
                                age_years >= 30 & age_years < 120 ~ "Older
    adult"))
```

Nice and clean!

So why did we spend so much time explaining the importance of condition order if you can simply avoid open-ended categories and not have to worry about condition order?

One reason is that understanding condition order should now help you see why it is important to put the `TRUE` condition as the final line in your `case_when()` statement. The `TRUE` condition matches *every row that has not yet been matched*, so if you use it first in the `case_when()`, it will match *everyone*!

The other reason is that there are certain cases where you *may* want to use open-ended overlapping conditions, and so you will have to pay attention to the order of conditions. Let's see one such example now: identifying COVID-like symptoms. Note that this is somewhat advanced material, likely a bit above your current needs. We are introducing it now so you are aware and can stay vigilant with `case_when()` in the future.

### Overlapping conditions within `case_when()`

We want to identify COVID-like symptoms in our data. Consider the symptoms columns in the `yaounde` data frame, which indicates which symptoms were experienced by respondents over a 6-month period:

```
yaounde %>%
  select(starts_with("symp_"))
```

We would like to use this to assess whether a person may have had COVID, partly following guidelines recommended by the [WHO](#).

- Individuals with cough are to be classed as “possible COVID cases”
- Individuals with anosmia/ageusia (loss of smell or loss of taste) are to be classed as “probable COVID cases”.

Now, keeping these criteria in mind, consider an individual, let's call her Osma, who has cough AND anosmia/ageusia? How should we classify Osma?

She meets the criteria for “possible COVID” (because she has cough), but she *also* meets the criteria for “probable COVID” (because she has anosmia/ageusia). So which group should she be classed as, “possible COVID” or “probable COVID”? Think about it for a minute.

Hopefully you guessed that she should be classed as a “probable COVID case”. “Probable” is more likely than “Possible”; and the anosmia/ageusia symptom is more *significant* than the cough symptom. One might say that the criterion for “probable COVID” has a higher specificity or a higher *precedence* than the criterion for “possible COVID”.

Therefore, when constructing a `case_when()` statement, the “probable COVID” condition should also take higher precedence—it should come *first* in the conditions provided to `case_when()`. Let’s see this now.

First we select the relevant variables, for easy illustration. We also identify and `slice()` specific rows that are useful for the demonstration:

```
yaounde_symptoms_slice <-  
  yaounde %>%  
  select(symp_cough, symp_anosmia_or_ageusia) %>%  
  # slice of specific rows useful for demo  
  # Once you find the right code, you would remove this slice  
  slice(32, 711, 625, 651 )  
  
yaounde_symptoms_slice
```

Now, the correct `case_when()` statement, which has the “Probable COVID” condition first:

```
yaounde_symptoms_slice %>%  
  mutate(covid_status = case_when(  
    symp_anosmia_or_ageusia == "Yes" ~ "Probable COVID",  
    symp_cough == "Yes" ~ "Possible COVID"  
  ))
```

This `case_when()` statement can be read in simple terms as ‘If the person has anosmia/ageusia, input “Probable COVID”, and otherwise, if the person has cough, input “Possible COVID”’.

Now, spend some time looking through the output data frame, especially the last three individuals. The individual in row 2 meets the criterion for “Possible COVID” because they have cough (`symp_cough == “Yes”`), and the individual in row 3 meets the criterion for “Probable COVID” because they have anosmia/ageusia (`symp_anosmia_or_ageusia == “Yes”`).

The individual in row 4 is Osma, who both meets the criteria for “possible COVID” *and* for “probable COVID”. And because we arranged our `case_when()` conditions in the right order, she is coded correctly as “probable COVID”. Great!

But notice what happens if we swap the order of the conditions:

```
yaounde_symptoms_slice %>%
  mutate(covid_status = case_when(
    symp_cough == "Yes" ~ "Possible COVID",
    symp_anosmia_or_ageusia == "Yes" ~ "Probable COVID"
  ))
```

Oh no! Osma in row 4 is now misclassified as “Possible COVID” even though she has the more significant anosmia/ageusia symptom. This is because the first condition `symp_cough == "Yes"` matched her first, and so the second condition was not able to match her!

So now you see why you sometimes need to think deeply about the order of your `case_when()` conditions. It is a minor point, but it can bite you at unexpected times. Even experienced analysts tend to make mistakes that can be traced to improper arrangement of `case_when()` statements.

#### CHALLENGE



In reality, there *is* still another solution to avoid misclassifying the person with cough and anosmia/ageusia. That is to add `symp_anosmia_or_ageusia != "Yes"` (not equal to “Yes”) to the conditions for “Possible COVID”. Can you think of why this works?

```
yaounde_symptoms_slice %>%
  mutate(covid_status = case_when(
    symp_cough == "Yes" & symp_anosmia_or_ageusia != "Yes" ~
      "Possible COVID",
    symp_anosmia_or_ageusia == "Yes" ~ "Probable COVID"))
```

#### PRACTICE



(in RMD)

With the `flu_linelist` dataset, create a new column called `follow_up_priority` that implements the following schema:

- Women should be considered “High priority”
- All children (under 18 years) of any gender should be considered “Highest priority”.
- Everyone else should have the value “No priority”

```
# Complete the code with your answer:
Q_priority_groups <-
flu_linelist %>%
  mutate(follow_up_priority = _____
  )
```

## Binary conditions: `dplyr::if_else()`

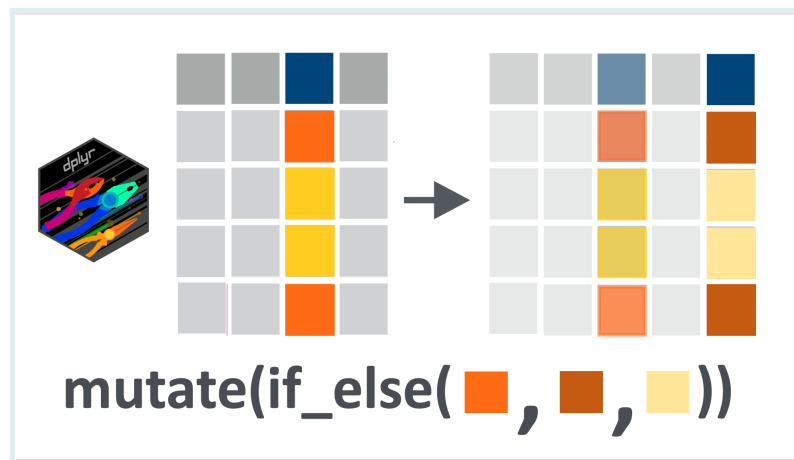


Fig: the `if_else()` conditions

There is another {dplyr} verb similar to `case_when()` for when we want to apply a binary condition to a variable: `if_else()`. A binary condition is either `TRUE` or `FALSE`.

`if_else()` has a similar application as `case_when()` : if the condition is true, then one operation is applied, if the condition is false, the alternative is applied. The syntax is: `if_else(CONDITION, IF_TRUE, IF_FALSE)`. As you can see, this only allows for a binary condition (not multiple cases, such as handled by `case_when()`).

If we take one of the first examples about recoding the `highest_education` variable, we can write it either with `case_when()` or with `if_else()`.

Here is the version we already explored:

```
yaounde_educ %>%  
  mutate(highest_education =  
    case_when(  
      highest_education %in% c("University", "Doctorate") ~ "Post-  
secondary",  
      TRUE ~ highest_education  
    ))
```

And this is how we would write it using `if_else()`:

```
yaounde_educ %>%
  mutate(highest_education =
    if_else(
      highest_education %in% c("University", "Doctorate"),
      # if TRUE then we recode
      "Post-secondary",
      # if FALSE then we keep default value
      highest_education
    )
  )
```

As you can see, we get the same output, whether we use `if_else()` or `case_when()`.

With the `flu_linelist` data, make a new column, called `age_group`, that has the value “Below 50” for people under 50 and “50 and above” for people aged 50 and up. Use the `if_else()` function.

#### PRACTICE



This is exactly the same question as your first practice question, but this time you need to use `if_else()`.

```
# Complete the code with your answer:
Q_age_group_if_else <-
  flu_linelist %>%
  mutate(age_group = if_else(_____))
```

## Wrap up

Changing or constructing your variables based on conditions on other variables is one of the most repeated data wrangling tasks. To the point it deserved its very own lesson !

I hope now that you will feel comfortable using `case_when()` and `if_else()` within `mutate()` and that you are excited to learn more complex {dplyr} operations such as grouping variables and summarizing them.

See you next time!

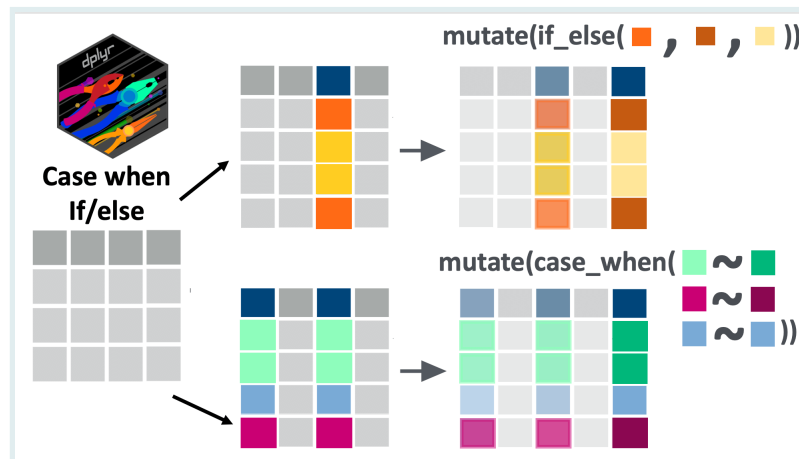


Fig: the conditional `mutate()` options

## Contributors

The following team members contributed to this lesson:



### LAURE VANCAUWENBERGHE

Data analyst, the GRAPH Network

A firm believer in science for good, striving to ally programming, health and education



### KENE DAVID NWOSU

Data analyst, the GRAPH Network

Passionate about world improvement

## References

Some material in this lesson was adapted from the following sources:

- Horst, A. (2022). *Dplyr-learnr*. <https://github.com/allisonhorst/dplyr-learnr> (Original work published 2020)
- *Create, modify, and delete columns – Mutate*. (n.d.). Retrieved 21 February 2022, from <https://dplyr.tidyverse.org/reference/mutate.html>

Artwork was adapted from:

- 
- Horst, A. (2022). *R & stats illustrations by Allison Horst*. <https://github.com/allisonhorst/stats-illustrations> (Original work published 2018)

title: "Conditional mutates" credits: "This document serves as an accompaniment for a lesson found on <https://thegraphcourses.org>.

The GRAPH Courses is a project of the Global Research and Analyses for Public Health (GRAPH) Network, with the support of the World Health Organization (WHO) and other partners" date: "November 2022" author: "The GRAPH Courses team" –