

7. Cross-References

Referencing tables, figures, and sections

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In scientific documents, you often refer to tables, figures, or specific sections: “as shown in Table 1” or “see Figure 3”. With Quarto’s cross-reference system, these references are automatically numbered and updated — if you add or remove a figure, all numbers adjust automatically.

The basic principle

Cross-references work in two steps:

1. **Assign a label:** The element (table, figure, section) gets a unique label
2. **Reference it:** In the text, you refer to the element with `@label`

Quarto automatically replaces `@label` with the correct number and turns it into a clickable link.

Referencing figures

Assigning a label

The label must start with `fig-`:

```
ggplot(adelie, aes(x = bill_length_mm, y = bill_depth_mm)) +
  geom_point(alpha = 0.6) +
  labs(x = "Bill Length (mm)", y = "Bill Depth (mm)") +
  theme_minimal()
```

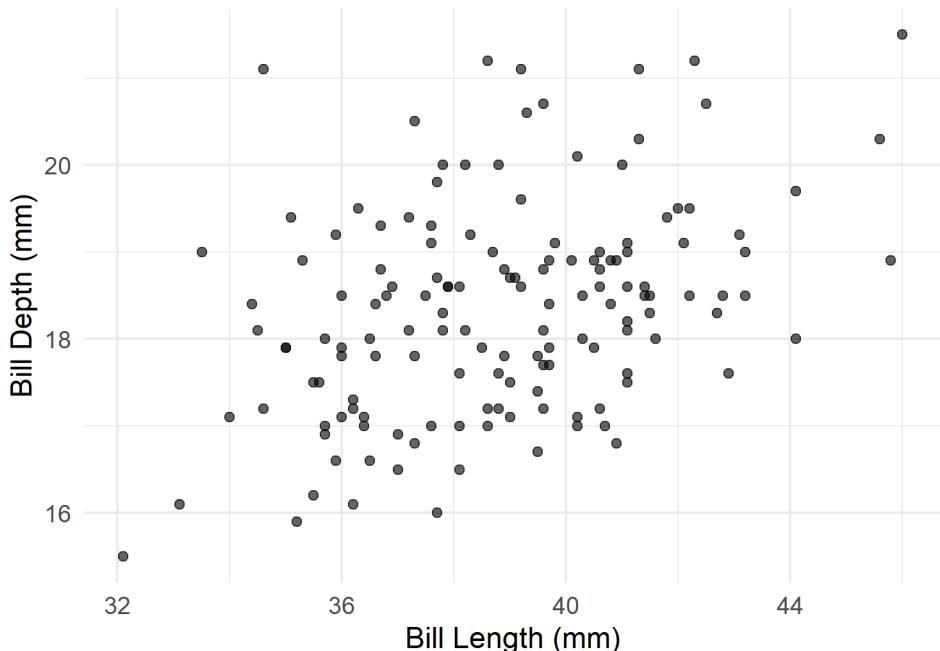


Figure 1: Bill measurements of Adelie penguins

Referencing in text

In the body text, you write:

As shown in `@fig-scatter`, there is a positive relationship between bill length and depth.

This becomes: As shown in Figure 1, there is a positive relationship between bill length and depth.

! Important

For cross-references to work, the figure needs **both** a `label` (with `fig-` prefix) **and** a `fig-cap` (figure caption).

Referencing tables

Assigning a label

The label must start with `tbl-`:

```
adelie %>%
  summarise(
    N = n(),
    `Bill Length (mm)` = round(mean(bill_length_mm), 1),
    `Body Mass (g)` = round(mean(body_mass_g), 0)
  ) %>%
  flextable() %>%
  autofit()
```

Table 1: Descriptive statistics of Adelie penguins

| N | Bill Length (mm) | Body Mass (g) |
|-----|------------------|---------------|
| 146 | 38.8 | 3,706 |

Referencing in text

`@tbl-summary` shows the key statistics.

This becomes: Table 1 shows the key statistics.

Referencing sections

Assigning a label

Sections receive their label directly after the heading:

```
# Methods {#sec-methods}
Here we describe the methods...
# Results {#sec-results}
The results were obtained using the methods described in @sec-methods.
```

Nested sections

```
## Data Collection {#sec-data-collection}

### Sample {#sec-sample}

As described in @sec-data-collection...
```

Reference formats

Quarto offers different formats for references:

| Syntax | Output |
|--------------------|----------------|
| @fig-scatter | Figure 1 |
| @tbl-summary | Table 1 |
| @sec-methods | Section 1 |
| [@fig-scatter] | (Figure 1) |
| [see @fig-scatter] | (see Figure 1) |

With square brackets, you can add additional text:

```
The data show a clear trend [see @fig-scatter].
```

Customizing language

For non-English documents, you can customize the reference labels in the YAML header:

```
---
title: "My Report"
lang: de
crossref:
  fig-title: "Abbildung"
  tbl-title: "Tabelle"
  fig-prefix: "Abb."
  tbl-prefix: "Tab."
---
```

With these settings, `@fig-scatter` becomes “Abb. 1” instead of “Figure 1”.

Practical example

Here is a document excerpt with cross-references:

```
# Introduction

This study examines the morphology of Adelie penguins.

# Methods {#sec-methods}

We analyzed 146 individuals from three islands.

# Results

@tbl-descriptive summarizes the descriptive statistics.
As shown in @fig-morphology, bill length and depth correlate
```

```
positively (see also @sec-methods for details on data collection).
```

```
```{r}
#| label: tbl-descriptive
#| tbl-cap: "Descriptive statistics by island"
Table code here
```

```
```{r}
#| label: fig-morphology
#| fig-cap: "Relationship of bill measurements"
# Plot code here
```
```

```
Tips and common errors
```

```
Label rules
```

- **Prefixes are required**: `fig-`, `tbl-`, `sec-`
- **No special characters**: Only letters, numbers, hyphens
- **Unique**: Each label can only occur once
- **Lowercase recommended**: `fig-scatter` not `fig-Scatter`

```
Common errors
```

| Problem                         | Solution                     |
|---------------------------------|------------------------------|
| Reference appears as `@fig-xyz` | Label or caption missing     |
| "Figure ???"                    | Label does not exist or typo |
| Wrong numbering                 | Use unique labels            |

```
::::{.callout-tip}
```

If cross-references are not working, check:

1. Does the chunk have a `label` with the correct prefix?
2. Does the figure have a `fig-cap` / the table have a `tbl-cap`?
3. Does the spelling of the reference exactly match the label?

```
:::
```

```
Customizing numbering
```

By default, Quarto numbers continuously. For chapter-wise numbering:

```
```yaml
---
crossref:
  chapters: true
---
```

Then figures are numbered as “Figure 2.1”, “Figure 2.2”, etc.

💡 Exercise: Apply cross-references

1. Create a document with at least one table and one figure
2. Assign labels with the correct prefixes (`tbl-`, `fig-`)
3. Add captions
4. Reference both elements in the body text with `@label`
5. Render to Word and check if the numbers appear correctly

Further resources

- Quarto Cross-References — Official documentation
- Quarto Cross-Reference Options — All options

What is next

In Chapter 8, we will learn how to add a table of contents and adjust the page layout — including landscape orientation for wide tables.

Bibliography
