3.1 HTML document

As we just mentioned before, Markdown was originally designed for HTML output, so it may not be surprising that the HTML format has the richest features among all output formats. We recommend that you read this full section before you learn other output formats, because other formats have several features in common with the HTML document format, and we will not repeat these features in the corresponding sections.

To create an HTML document from R Markdown, you specify the `html_document` output format in the YAML metadata of your document:

```yaml
---
title: Habits
author: John Doe
date: March 22, 2005
output: html_document
---
```

3.1.1 Table of contents

You can add a table of contents (TOC) using the `toc` option and specify the depth of headers that it applies to using the `toc_depth` option. For example:

```yaml
---
title: "Habits"
output:
  html_document:
    toc: true
    toc_depth: 2
---
```

If the table of contents depth is not explicitly specified, it defaults to 3 (meaning that all level 1, 2, and 3 headers will be included in the table of contents).

3.1.1.1 Floating TOC

You can specify the `toc_float` option to float the table of contents to the left of the main document content. The floating table of contents will always be visible even when the document is scrolled. For example:

```
---
title: "Habits"
output:
  html_document:
    toc: true
    toc_float: true
---
```

You may optionally specify a list of options for the `toc_float` parameter which control its behavior. These options include:

- `collapsed` (defaults to `TRUE`) controls whether the TOC appears with only the top-level (e.g., H2) headers. If collapsed initially, the TOC is automatically expanded inline when necessary.
- `smooth_scroll` (defaults to `TRUE`) controls whether page scrolls are animated when TOC items are navigated to via mouse clicks.

For example:

```
---
title: "Habits"
output:
  html_document:
    toc: true
    toc_float:
      collapsed: false
      smooth_scroll: false
---
```

3.1.2 Section numbering

You can add section numbering to headers using the `number_sections` option:

```
---
title: "Habits"
output:
  html_document:
    toc: true
    number_sections: true
---
```

Note that if you do choose to use the `number_sections` option, you will likely also want to use `#` (H1) headers in your document as `##` (H2) headers will include a decimal point, because without H1 headers, you H2 headers will be numbered with `0.1` , `0.2` , and so on.

3.1.3 Tabbed sections

You can organize content using tabs by applying the `.tabset` class attribute to headers within a document. This will cause all sub-headers of the header with the `.tabset` attribute to appear within tabs rather than as standalone sections. For example:

```
## Quarterly Results {.tabset}

### By Product

(tab content)

### By Region

(tab content)
```

You can also specify two additional attributes to control the appearance and behavior of the tabs. The `.tabset-fade` attribute causes the tabs to fade in and out when switching between tabs. The `.tabset-pills` attribute causes the visual appearance of the tabs to be "pill" (see Figure 3.1) rather than traditional tabs. For example:

```
## Quarterly Results {.tabset .tabset-fade .tabset-pills}
```

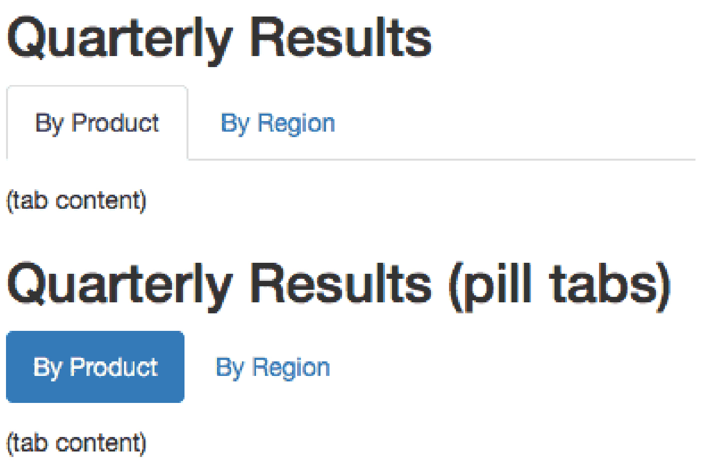


FIGURE 3.1: Traditional tabs and pill tabs on an HTML page.

3.1.4 Appearance and style

There are several options that control the appearance of HTML documents:

- `theme` specifies the Bootstrap theme to use for the page (themes are drawn from the Bootswatch theme library). Valid themes include default, bootstrap, cerulean, cosmo, darkly, flatly, journal, lumen, paper, readable, sandstone, simplex, spacelab, united, and yeti. Pass `null` for no theme (in this case you can use the `css` parameter to add your own styles).
- `highlight` specifies the syntax highlighting style. Supported styles include `default`, `tango`, `pygments`, `kate`, `monochrome`, `espresso`, `zenburn`, `haddock`, `breezedark`, and `textmate`. Pass `null` to prevent syntax highlighting.
- `smart` indicates whether to produce typographically correct output, converting straight quotes to curly quotes, `---` to em-dashes, `--` to en-dashes, and `...` to ellipses. Note that `smart` is enabled by default.

For example:

```
---
title: "Habits"
output:
  html_document:
    theme: united
    highlight: tango
---
```

3.1.4.1 Custom CSS

You can add your own CSS to an HTML document using the `css` option:

```
---
title: "Habits"
output:
  html_document:
    css: styles.css
---
```

If you want to provide all of the styles for the document from your own CSS you set the `theme` (and potentially `highlight`) to `null`:

```
---
title: "Habits"
output:
  html_document:
    theme: null
    highlight: null
    css: styles.css
---
```

You can also target specific sections of documents with custom CSS by adding ids or classes to section headers within your document. For example the following section header:

```
## Next Steps {#nextsteps .emphasized}
```

Would enable you to apply CSS to all of its content using either of the following CSS selectors:

```
#nextsteps {
   color: blue;
}

.emphasized {
   font-size: 1.2em;
}
```

3.1.5 Figure options

There are a number of options that affect the output of figures within HTML documents:

- `fig_width` and `fig_height` can be used to control the default figure width and height (7x5 is used by default).
- `fig_retina` specifies the scaling to perform for retina displays (defaults to 2, which currently works for all widely used retina displays). Set to `null` to prevent retina scaling.
- `fig_caption` controls whether figures are rendered with captions.

- `dev` controls the graphics device used to render figures (defaults to `png`).

For example:

```yaml
---
title: "Habits"
output:
  html_document:
    fig_width: 7
    fig_height: 6
    fig_caption: true
---
```

3.1.6 Data frame printing

You can enhance the default display of data frames via the `df_print` option. Valid values are shown in Table 3.1.

TABLE 3.1: The possible values of the `df_print` option for the `html_document` format.

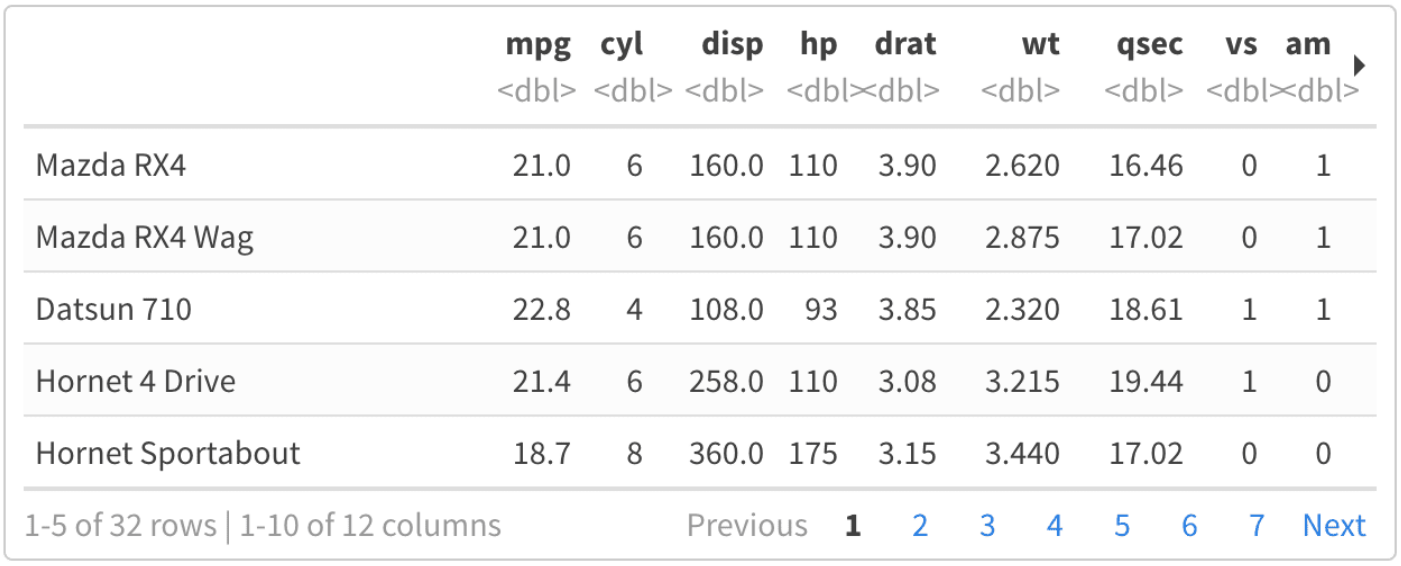
Option	Description
default	Call the `print.data.frame` generic method
kable	Use the `knitr::kable` function
tibble	Use the `tibble::print.tbl_df` function
paged	Use `rmarkdown::paged_table` to create a pageable table
A custom function	Use the function to create the table

3.1.6.1 Paged printing

When the `df_print` option is set to `paged`, tables are printed as HTML tables with support for pagination over rows and columns. For instance (see Figure 3.2):

~~~
---
title: "Motor Trend Car Road Tests"
output:
  html_document:
    df_print: paged
---

```{r}
mtcars
```
~~~



	mpg	cyl	disp	hp	drat	wt	qsec	vs	am
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
Mazda RX4	21.0	6	160.0	110	3.90	2.620	16.46	0	1
Mazda RX4 Wag	21.0	6	160.0	110	3.90	2.875	17.02	0	1
Datsun 710	22.8	4	108.0	93	3.85	2.320	18.61	1	1
Hornet 4 Drive	21.4	6	258.0	110	3.08	3.215	19.44	1	0
Hornet Sportabout	18.7	8	360.0	175	3.15	3.440	17.02	0	0

1-5 of 32 rows | 1-10 of 12 columns

FIGURE 3.2: A paged table in the HTML output document.

Table 3.2 shows the available options for paged tables.

TABLE 3.2: The options for paged HTML tables.

Option	Description
max.print	The number of rows to print.
rows.print	The number of rows to display.
cols.print	The number of columns to display.
cols.min.print	The minimum number of columns to display.
pages.print	The number of pages to display under page navigation.
paged.print	When set to `FALSE` turns off paged tables.
rownames.print	When set to `FALSE` turns off row names.

These options are specified in each chunk like below:

~~~
```{r cols.print=3, rows.print=3}
mtcars
```
~~~

3.1.6.2 Custom function

The `df_print` option can also take an arbitrary function to create the table in the output document. This function must output in the correct format according to the output used.

For example,

```
rmarkdown::html_document(df_print = knitr::kable)
```

is the equivalent to using the method `"kable"`

```
rmarkdown::html_document(df_print = "kable")
```

To use a custom function in `df_print` within the YAML header, the tag `!expr` must be used so the R expression after it will be evaluated. See the `eval.expr` argument on the help page `?yaml::yaml.load` for details.

~~~
---
title: "Motor Trend Car Road Tests"
output:
  html_document:
    df_print: !expr pander::pander
---

```{r}
mtcars
```
~~~

3.1.7 Code folding

When the **knitr** chunk option `echo = TRUE` is specified (the default behavior), the R source code within chunks is included within the rendered document. In some cases, it may be appropriate to exclude code entirely (`echo = FALSE`) but in other cases you might want the code to be available but not visible by default.

The `code_folding: hide` option enables you to include R code but have it hidden by default. Users can then choose to show hidden R code chunks either individually or document wide. For example:

```
---
title: "Habits"
output:
  html_document:
    code_folding: hide
---
```

You can specify `code_folding: show` to still show all R code by default but then allow users to hide the code if they wish.

3.1.8 MathJax equations

By default, MathJax scripts are included in HTML documents for rendering LaTeX and MathML equations. You can use the `mathjax` option to control how MathJax is included:

- Specify `"default"` to use an HTTPS URL from a CDN host (currently provided by RStudio).
- Specify `"local"` to use a local version of MathJax (which is copied into the output directory). Note that when using `"local"` you also need to set the `self_contained` option to `false`.
- Specify an alternate URL to load MathJax from another location.
- Specify `null` to exclude MathJax entirely.

For example, to use a local copy of MathJax:

```
---
title: "Habits"
output:
  html_document:
    mathjax: local
    self_contained: false
---
```

To use a self-hosted copy of MathJax:

```
---
title: "Habits"
output:
  html_document:
    mathjax: "http://example.com/MathJax.js"
---
```

To exclude MathJax entirely:

```yaml
---
title: "Habits"
output:
  html_document:
    mathjax: null
---
```

3.1.9 Document dependencies

By default, R Markdown produces standalone HTML files with no external dependencies, using `data:` URIs to incorporate the contents of linked scripts, stylesheets, images, and videos. This means you can share or publish the file just like you share Office documents or PDFs. If you would rather keep dependencies in external files, you can specify `self_contained: false`. For example:

```yaml
---
title: "Habits"
output:
  html_document:
    self_contained: false
---
```

Note that even for self-contained documents, MathJax is still loaded externally (this is necessary because of its big size). If you want to serve MathJax locally, you should specify `mathjax: local` and `self_contained: false`.

One common reason to keep dependencies external is for serving R Markdown documents from a website (external dependencies can be cached separately by browsers, leading to faster page load times). In the case of serving multiple R Markdown documents you may also want to consolidate dependent library files (e.g. Bootstrap, and MathJax, etc.) into a single directory shared by multiple documents. You can use the `lib_dir` option to do this. For example:

```yaml
---
title: "Habits"
output:
  html_document:
    self_contained: false
    lib_dir: libs
---
```

3.1.10 Advanced customization

3.1.10.1 Keeping Markdown

When **knitr** processes an R Markdown input file, it creates a Markdown (`*.md`) file that is subsequently transformed into HTML by Pandoc. If you want to keep a copy of the Markdown file after rendering, you can do so using the `keep_md` option:

```yaml
---
title: "Habits"
output:
  html_document:
    keep_md: true
---
```

3.1.10.2 Includes

You can do more advanced customization of output by including additional HTML content or by replacing the core Pandoc template entirely. To include content in the document header or before/after the document body, you use the `includes` option as follows:

```yaml
---
title: "Habits"
output:
  html_document:
    includes:
      in_header: header.html
      before_body: doc_prefix.html
      after_body: doc_suffix.html
---
```

3.1.10.3 Custom templates

You can also replace the underlying Pandoc template using the `template` option:

```yaml
---
title: "Habits"
output:
  html_document:
    template: quarterly_report.html
---
```

Consult the documentation on Pandoc templates for additional details on templates. You can also study the default HTML template `default.html5` as an example.

3.1.10.4 Markdown extensions

By default, R Markdown is defined as all Pandoc Markdown extensions with the following tweaks for backward compatibility with the old **markdown** package (Allaire et al. 2019):

```
+autolink_bare_uris
+tex_math_single_backslash
```

You can enable or disable Markdown extensions using the `md_extensions` option (you preface an option with `-` to disable and `+` to enable it). For example:

```
---
title: "Habits"
output:
  html_document:
    md_extensions: -autolink_bare_uris+hard_line_breaks
---
```

The above would disable the `autolink_bare_uris` extension, and enable the `hard_line_breaks` extension.

For more on available markdown extensions see the Pandoc Markdown specification.

3.1.10.5 Pandoc arguments

If there are Pandoc features that you want to use but lack equivalents in the YAML options described above, you can still use them by passing custom `pandoc_args`. For example:

```
---
title: "Habits"
output:
  html_document:
    pandoc_args: [
      "--title-prefix", "Foo",
      "--id-prefix", "Bar"
    ]
---
```

Documentation on all available pandoc arguments can be found in the Pandoc User Guide.

3.1.11 Shared options

If you want to specify a set of default options to be shared by multiple documents within a directory, you can include a file named `_output.yml` within the directory. Note that no YAML delimiters (`---`) or the enclosing `output` field are used in this file. For example:

```
html_document:
  self_contained: false
  theme: united
  highlight: textmate
```

It should not be written as:

```
---
output:
  html_document:
    self_contained: false
    theme: united
    highlight: textmate
---
```

All documents located in the same directory as `_output.yml` will inherit its options. Options defined explicitly within documents will override those specified in the shared options file.

3.1.12 HTML fragments

If you want to create an HTML fragment rather than a full HTML document, you can use the `html_fragment` format. For example:

```
---
output: html_fragment
---
```

Note that HTML fragments are not complete HTML documents. They do not contain the standard header content that HTML documents do (they only contain content in the `<body>` tags of normal HTML documents). They are intended for inclusion within other web pages or content management systems (like blogs). As such, they do not support features like themes or code highlighting (it is expected that the environment they are ultimately published within handles these things).

References

Allaire, JJ, Jeffrey Horner, Yihui Xie, Vicent Marti, and Natacha Porte. 2019. *Markdown: Render Markdown with the c Library Sundown*. https://github.com/rstudio/markdown.