



Share your R, with R

R4CR: Education for Clinical Researchers via Quarto

Jinhwan Kim @ Zarathu



In this talk...

I'll cover

- **How to share** own R contents online without financial, technical cost
- **Things I considered** before choosing Quarto
- **Key steps** to build web page with simple example

I'll not cover

- **Detailed guide** for R / Quarto / revealjs
- Make **own R content**
- Detailed instructions for **customized functions**

 I'll share experiences of building web page for teaching R using Quarto.

If you have own R contents and want to share it in online, this talk will be helpful for you.



What is R4CR

- **R for Clinical Researchers.** (Inspired by R4DS, R4CSR, and strongly R4SS)
- Contents: related with R
- Custom features: util (external service)
- made with R and Quarto



tidyverse - magrittr

R lecture notes
with Quarto Presentation

Pipe

```

1 data <- read_data("FILE") # Not work
2 transform_data <- transform(data)
3 result <- transform %>%
4 result <- make_gpt(graph)

1 result <- "FILE" %>% Not work
2 result %>%
3 transform %>%
4 make_image() %>%
5 make_gpt()
  
```

전부 동일한 결과

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R for Clinical Research
의학연구를 위한 R 워크샵

워크샵의 개요

- R은 단순한 통계프로그램이 아닌 데이터분석 전 과정을 포함하는 플랫폼으로 의학연구에 필수입니다.
- 본 워크샵을 통해 의학연구에 필요한 데이터 매니지먼트, 통계, 그리고 분석결과 정리(문서/슬라이드/웹)를 배우실 수 있으며, 모든 예시는 보험공단 빅데이터를 이용하므로 워크샵 이후 바로 공단/심평원 빅데이터를 분석하실 수 있습니다.
- 실습코드를 개인 github 저장소에서 관리하면서 오픈소스 생태계에 익숙해지고, 장·단기 R 패키지를 만들어 의학연구에 기여할 수 있을 기회입니다.

워크샵 대상

- R로 의학연구를 수행하려는 분
- 공단/심평원 빅데이터를 분석하려는 분석가, 제약업계 임직원
- R로 헬스플러케이션을 만들고 싶은 분

① 본인의 연구를 위한 데이터를 준비해오시면 좋습니다

워크샵의 커리큘럼

1일차: R 데이터 매니지먼트

- R 데이터 매니지먼트 기초
- R 데이터 매니지먼트: tidyverse
- R 데이터 매니지먼트: data.table
- 실습: 공단 제제데이터 이용 코드 만들기
- R plot 기초

Custom feature
(chat service)

3일차: R로 컨텐츠 만들기

- Github을 활용한 버전 컨트롤
- rmarkdown/quarto: 코드와 분석 결과를 포함한 문서 만들기
- Shiny: 웹 애플리케이션

Zarathu에 문의하기

메시지를 입력해주세요.

R in Clinical Research

Clinical or Medical field is one of the most important area that R is used.

Because

- Management of Data
- Statistic analysis
- Re-shape output for use by a variety of audiences, such as regulators and academics.

Both SAS and R used, but R is increasingly popular due to its flexibility and open-source nature.

- Traditionally, Researchers focus on the design and execution of the study and leave the coding to professional statistical programmers and statisticians
- Now, researchers are increasingly coding themselves.
- Zarathu is a research support organisation, recently started training researchers to code to meet this demand.



Why this matter?

- **R is used extensively** in various data fields including medical / academy.
- **Many R contents** ([slide](#), [recording](#), [document](#), [report](#)) existed in various location.
- Need to **organize and share** to be used easily.
- Also our team, [Zarathu](#) had a **number of R content** for medical school / pharma members
- Used for seminars, but need to **create a new repository** for it each time.



Before

In Github (README.MD)

Previous presentations

- [COOL PRESENTATION](#)
- [AWESOME LECTURE NOTE](#)
- [NICE TALK](#)

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The slide shows the Quarto logo and the text "Quarto Presentations" followed by a right-pointing arrow. Below it says "Create beautiful interactive slide decks with Reveal.js". At the bottom are navigation icons and links to the Quarto website.

Not bad, but information are not organized well.

- Browse all (^{long}) readme
- Click each and see in new page
- Problem if multiple contents are “connected”



Principles

Should

- **Support natively** R contents
- Can manage with in **one place**
- **Can custom** even external service

Avoid to

- Use **“Other languages”** except R
- **Spend the extra money** to do this



Considered methods

Before

Github README for link each contents

OptionsResolver

- LMS: **Pay**
- Blog: **not R**
- Professional webpage **Pay**
- Slide service: **not R**

Final

Website on **Github Pages** with **Quarto Blog**

 Vercel, Netlify may works



Benefit of using Quarto

- Build with **Markdown, R**
- Support R code and [Results](#)
- Works well with [Rstudio](#)
- Available to **customize** with JavaScript
- Website, Presentation, Dashboard, Books, and [More](#)
- Deploy via [Github](#) without cost



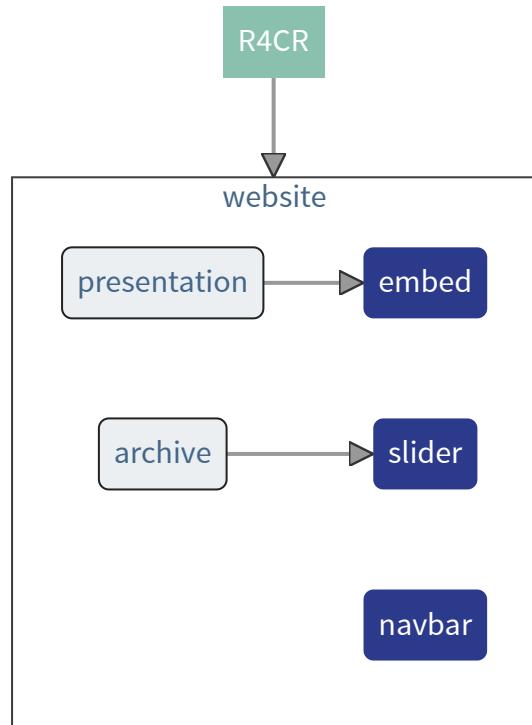
There are a lot of guide for learn Quarto, You should try





4 Key steps to build R4CR

Summary



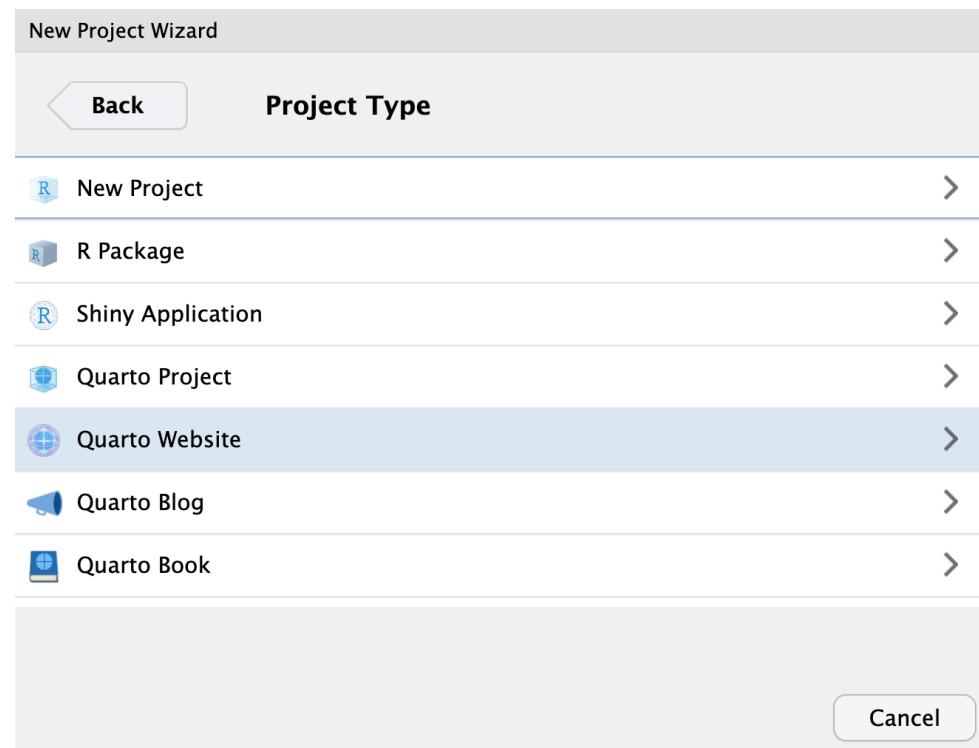
1. Build Quarto Website

- Build contents as [Quarto Presentation](#)
 - PDF also fine
- Decorate website
 - 2.** [Organize contents using navbar](#)
 - 3.** [Embedding slide](#)
 - 4.** [Customize slick \(slider\)](#)

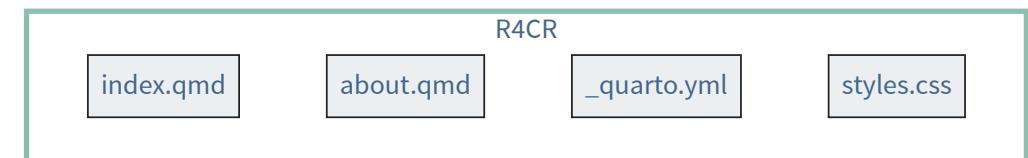


1. Build Quarto Website

Start from Rstudio's **New project** -> **Quarto website** feature.



Structure



2. Organize contents using navbar

Example code

_quarto.yml

```
1 navbar:
2   right:
3     - text: Home
4       href: index.qmd
5     - text: About
6       href: about.qmd
7     - text: Day 1
8       menu:
9         - text: Brief
10        href: day1/day1.qmd
11       - text: baseR
12        href: day1/baseR.qmd
13       - text: -----
14       - text: Tidyverse
15       - text: magrittr
16        href: day1/magrittr.qmd
17       - icon: github
18        href: https://github.com/ID/REPO
```

Result

The screenshot shows a website interface. At the top is a navigation bar with links for "Home", "About", "Day 1", and a user icon. The "Day 1" link is highlighted in blue with a dropdown arrow. Below the navigation bar is a main content area. The first section is titled "Brief". Underneath it is a horizontal grey bar. The next section is titled "baseR". Another horizontal grey bar follows. The third section is titled "TIDYVERSE". A final horizontal grey bar follows. The last section is titled "magrittr".

- Not need to explore very long list of readme



3. Embedding slide

Example code

styles.css baseR.qmd slide.baseR.qmd

```
1 .slide-deck {
2   border: 3px solid #dee2e6;
3   width: 100%;
4   height: 475px;
5   margin-top: 1em;
6   margin-bottom: 1em;
7 }
```

Result

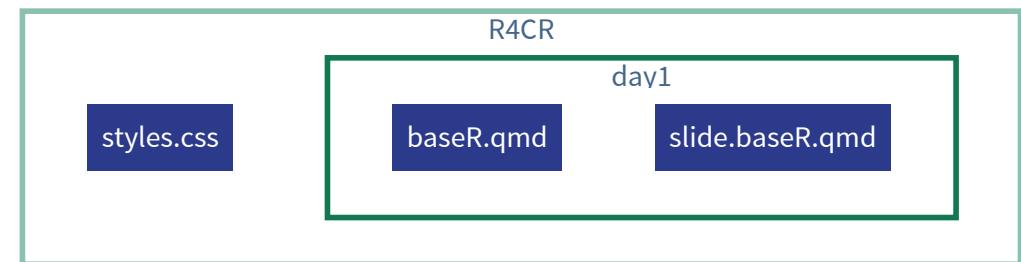
R4CR Workshop baseR.qmd Home About Day1

baseR

Title

slide.baseR.qmd

Structure



- modify slide container with `.slide-deck` in CSS
- **iframe option**, see [link](#)



4. Customize (slick)

Example code

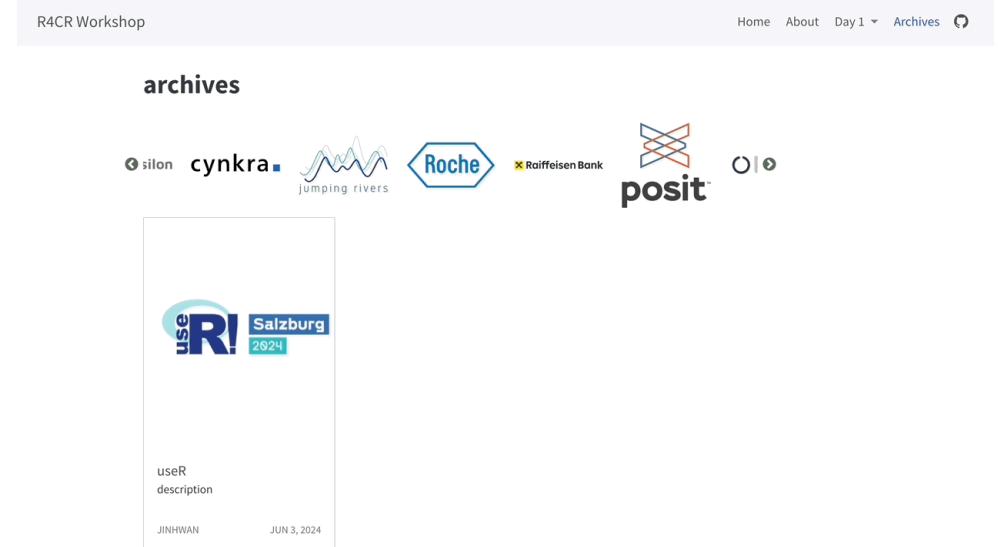
`archive.qmd` `index.qmd` `Slider.html`

```

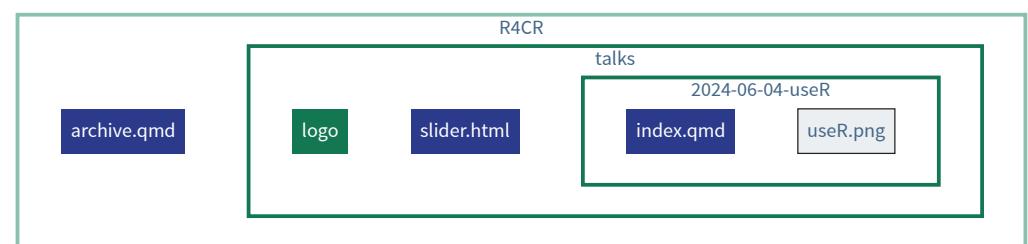
1  ---
2  title: "archives"
3  listing:
4  contents: talks
5  sort: "date desc"
6  type: grid
7  image-height: 300px
8  format: html
9  include-in-header: talks/slides.html
10 ---
11 <div class="slider">
12   
13
14 ...
15 </div>
```

- Include `slider.html` in `archive.qmd`
- `slider.html` contains JavaScript and CSS files for slick
- Common assets are located in `talks` folder in `talks`
- Each `index.qmd` separated folder
- `archive.qmd` is Quarto blog to show multiple element as card with thumbnails

Result



Structure



External Services

- SDK, API (Javascript code) using **include** similar with previous slick
- Implement **button** using HTML with **onclick**, send data as JSON to other HTML page using **axios**
- Github page is possible to **communicate with external**

The screenshot shows the R4CR Workshop website with a header featuring "CS chat" and "pay". Below the header is a navigation bar with links like "교수자", "기여율", "1일자", "2일자", "3일자", "종이", "교재가족", "기타", and "질문". The main content area has a title "R for Clinical Research" and subtitle "의학연구를 위한 R 워크샵". It includes a logo for "R4CR" and a section titled "워크샵의 개요" with a bulleted list of topics. A large orange box highlights a mobile phone screen displaying a Quarto-based communication service. The phone screen shows a message from "Zarathu" to "Zarathu" with the text "안녕하세요! Medical Research Supporters, Zarathu입니다." and "무엇을 도와드릴까요?". An arrow points from the text "Custom feature (chat service)" to this highlighted mobile screen.

Custom feature (chat service)

• 비선형분석: Generalized Additive Model (GAM)

3일차: R로 컨텐츠 만들기

- Github을 활용한 버전 컨트롤
- rmarkdown/quarto: 코드와 분석 결과를 포함한 문서 만들기
- Shiny: 웹 애플리케이션

Deploy

- [Github page](#) (very easy)
- Add custom domain **name with CNAME** (not essential, need to pay)

Final result

<https://education.zarathu.com/>



Note

- This site mainly built with Korean 🇰🇷
- Payment disabled for now



Challenges with Quarto

1. Experience of **R**, is necessary or [google sites](#) may work better
2. **Static site**, doesn't require "login" so EVERY user can see EVERY contents



Recap R4CR

Features

- **R4CR**: is managing system for clinical and R contents
- **Manage** webpage and contents in single project
- **R** and **Markdown (Quarto)**
- **Free**
- **Custom**

with R4CR

- **Provided R lecture** for several hospitals and universities as expected
- Since we shared contents as public, it **helped us with recruiting** process.
- We could **write a book** based on these materials.



Next steps

- **Interactive** with `webR` / `shinylive`
- **More** R / Clinical contents
- **I18N** using `profile`
- **Private R4CR**
- **Template** of R4CR



Questions?



Helpful resources

- Definitely, [Quarto guide](#)
 - Code repository for [this](#) quarto presentation
-

✉ hwanistic@gmail.com

in [in/jinhwan-kim](https://www.linkedin.com/in/jinhwan-kim)

GH [jhko530](https://github.com/jhko530)

