

Efficient Temperature Report Generation Using An Application Programming Interface

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Purpose

- The Investigational Drug Services (IDS) utilizes a manual process as a secondary system to document daily temperature on paper for 11 storage areas from approximately 160 oncology and non-oncology studies.
- Paper method requires scanning, renaming, and physically archiving records, diverting staff from essential operations.
- IDS transitioned to store data in **REDCap**^{1,2}, a purpose-built electronic database.
- This project integrated an Application Programming Interface (**API**) to streamline archiving workflows, improve efficiency, accuracy, and optimize resource utilization.

Methods

- Figure 1:** REDCap, RStudio³, R⁴ and the associated packages that were used.
- Figure 2:** REDCap data entry instrument.
- Figure 3:** Tabulated data were compiled into a single PDF from all storage areas using R Markdown and the knitr⁵ package.
- Sample report showing date, time, minimum, maximum, current temperatures, comments and user identifier.
- Figure 4:** REDCapTidieR⁶ package was used to extract data from REDCap.
- Figure 5:** A Shiny⁷ dashboard was developed to facilitate interactive, real-time visualization of temperature data without logging into REDCap, improving both accessibility and operational efficiency. Users can search by specific dates to retrieve data for a desired period.

Results

Figure 1. Data Reporting Workflow

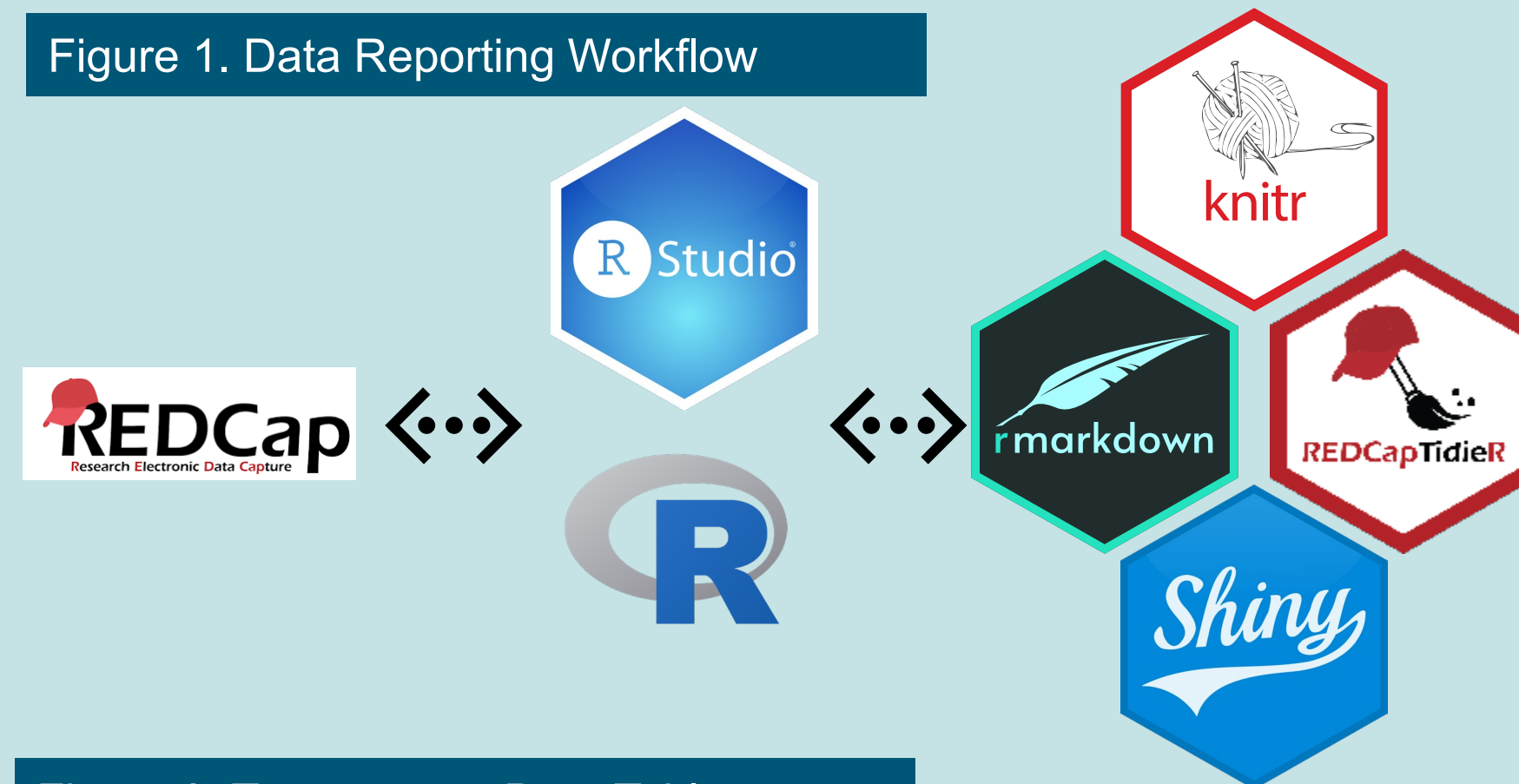


Figure 3. Temperature Data Table

1 Room C305A Ambient Temperature						
Table 1: Room C305A Ambient Temperature						
Date	Time	Current Temperature	Minimum Temperature	Maximum Temperature	Comments	User
2025-03-03	06:39:00	22.5	22.1	24.0	NA	mvillarr
2025-03-04	07:19:00	23.5	22.4	23.5	NA	jiang34
2025-03-05	07:05:00	22.1	22.0	23.5	NA	svarghe
2025-03-06	07:02:00	22.2	21.9	22.9	NA	svarghe
2025-03-07	07:33:00	22.2	21.8	22.5	NA	svarghe
2025-03-10	07:10:00	22.2	21.6	23.1	NA	svarghe
2025-03-11	07:14:00	22.3	21.9	23.9	NA	jiang34
2025-03-12	06:42:00	22.2	21.9	23.1	NA	mvillarr
2025-03-13	07:08:00	22.2	21.9	22.7	NA	svarghe
2025-03-14	06:44:00	22.2	21.9	23.1	NA	mvillarr
2025-03-17	06:53:00	22.3	21.9	23.1	NA	mvillarr
2025-03-18	06:46:00	22.1	22.0	22.7	NA	mvillarr
2025-03-19	07:06:00	22.2	22.0	23.4	NA	svarghe
2025-03-20	06:42:00	22.2	21.9	23.0	NA	mvillarr
2025-03-21	07:04:00	22.2	21.9	22.5	NA	svarghe
2025-03-24	07:13:00	22.3	22.0	23.2	NA	jiang34
2025-03-25	07:15:00	22.1	21.9	22.4	NA	jiang34
2025-03-26	07:26:00	22.1	22.0	22.7	NA	jiang34
2025-03-27	07:08:00	22.2	22.0	22.5	NA	svarghe
2025-03-28	07:21:00	22.5	21.9	23.2	NA	jiang34
2025-03-31	07:08:00	22.1	21.9	23.2	NA	svarghe

Figure 4. Sample Code Chunk in RStudio

```
```\r Report Date Range, include = FALSE\rbegins <- ymd("2025-3-01")\rends <- ymd("2025-3-10")\r```\r\r```\r REDCap API call, include = FALSE\rtoken <- "TOKEN"\rurl <- https://www.redcap.ihrp.uic.edu/api/formData <- list("token"=token, content='PROJ_ID', format='csv', returnFormat='csv')\r```\r
```

Figure 2. REDCap Data Entry Instrument

Figure 5. Shiny Dashboard



## Discussion

- The **API** method enabled generation of reports for all storage areas simultaneously.
- The paper and **REDCap** methods required processing individually.

Archiving Method	Hands-On Time to Complete All Reports
REDCap + R	~ 1 minute
REDCap Alone	~ 8 minutes
Paper Log Scanning	~ 110 minutes

- Shiny provided an accessible and user-friendly platform for real-time monitoring, enhancing data transparency and responsiveness.

## Conclusions

- Automating data reporting significantly reduced hands-on time and improved IDS operational efficiency.
- Future directions include expanding **API** integration to other IDS tasks.

## References

Access to REDCap [1, 2] was provided by University of Illinois Chicago Center for Clinical and Translational Science (CCTS), which is supported by the National Center for Advancing Translational Sciences (NCATS), National Institutes of Health, through Grant Award Number UL1TR002003.

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