

SM06: An Experience of Creating Questionnaire ADaMs Using the {admiral} ADQS Vignette

Scripts and Macros Stream

Phuse EU Connect 2023

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Current State of Questionnaire Programming

*The current way in which
questionnaires are programmed is not
good enough!*

Definition of Questionnaires in this presentation

Questionnaires, Ratings and Scales (QRS)



PRO (Patient Reported Outcome) **directly from patient**



ObsRO (Observer Reported Outcome) **from observer other than HCP**



ClinRO (Clinician Reported Outcome) **from HCP**



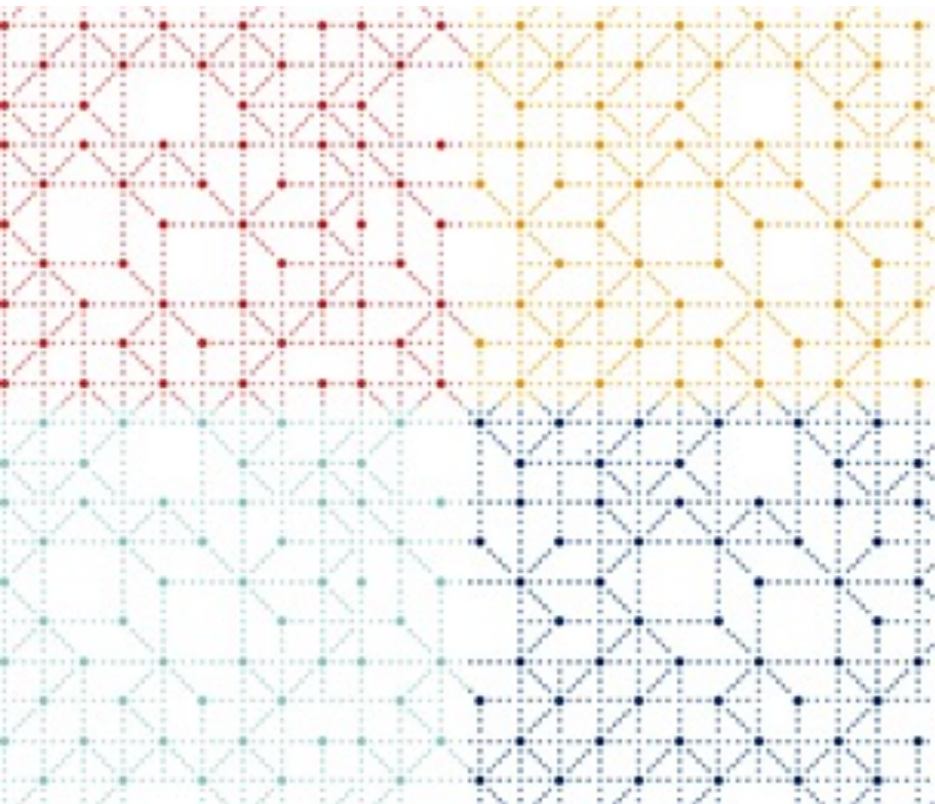
PerfO (Performance Outcome) **patient-performed task**



Passive Monitoring COAs (Potential 5th COA type) **daily life activity**
passively measured by a digital tool

(Roche, 2021)

Mapped to QS/FT/RS SDTM or ADQS ADaM



“Each QRS instrument is a series of questions, tasks or assessments used in clinical research to provide a qualitative or quantitative assessment of a clinical concept or task-based observation.”

CDISC

Current State of Questionnaire Programming

Frequency of questionnaires is high

Used in Neuroscience as Primary and Secondary, Safety and Efficacy endpoints

Example: Phase 1 trial in Angelmans Syndrome (AS) at Roche



Cannot speak	Severe cognitive impairment	Motor impairments
Sleep Disturbances	<i>Life limiting features of AS*</i>	Seizures
Aggression, Hyperactivity	Never live independently	Self Injury

Current State of Questionnaire Programming

There aren't many templates for questionnaires

ADQS guidance available from presentations about PRO Data standards and analysis

- Guidance on structure of datasets

SAS templates available:

- CSSRS, EQ5DL, Generic ADQS and BDS

Internal Data standards guidance of PARAMCDs in QRS Metadata

But derivations are quite complex and most people are starting from scratch

Guiding Principles for Creating Questionnaire, Ratings, and Scales Analysis Datasets (ADQRS)

Cathy Yang/Tian Fang (DSG) 25 May 2023



General structure of the ADQRS dataset PARCATy's

Variable	Content
PARCAT1	Questionnaire name (e.g. «EORTC QLQ-C30»), copied from SDTM.-CAT**; Submission values are controlled by CDISC Code lists.
PARCAT1N	Questionnaire ID (COA ID) defined by QRS metadata (e.g. for EORTC QLQ-C30 this is «28»)
PARCAT2	Parameter type: «Original Items», «Original Items - Site Derived Scales», «Derived Scale», «Completion», or «Completion - Original Items»
PARCAT3+	Questionnaire specific groupings of original responses or derived parameters

** Replace double dashes in the -CAT with the domain designations (e.g. QSCAT for Questionnaires, RSCAT for Clinical Classifications or FTSCAT for Functional Tests). -CAT is available in [COA CSV](#). In general:

- C100129, Codelist Name Category of Questionnaire. CDISC Definition: A grouping of observations within the Questionnaires domain.
- C118971, Codelist Name Category of Clinical Classification. Definition: A grouping of observations within the Disease Response and Clin Classification domain.
- C115304, Codelist Name Category of Functional Test. Definition: A grouping of observations within the Functional Tests domain.

Current State of Questionnaire Programming

New ways of working and new tools available

**{admiral} & the
pharmaverse**



Creating Questionnaire ADaMs

Source: [vignettes/questionnaires.Rmd](#)

Roche Next Gen tools



Proposal

Our proposal was to create some R programming templates for questionnaire ADaMs which can be utilised across the company/industry.

- ADQS Vignette created by {admiral} team which gave a basis for ADQS, but we still wanted to create one template per questionnaire.
- The aim of this presentation will be to discuss the progress we have made so far into developing these template ADaMs using the {admiral} ADQS vignette. This will include some of the challenges and discussions we approached during the theory phase and what went well with regards to the final output.

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- 3. What's next?

Theory Phase

Theory Phase

Initial questions

3 Main Questions:

Can we share this code? Is this possible to be open source?

Which questionnaires should we start with?

What has already been done by the {admiral} & {admiralroche} team?

Theory Phase

Open Source or closed source

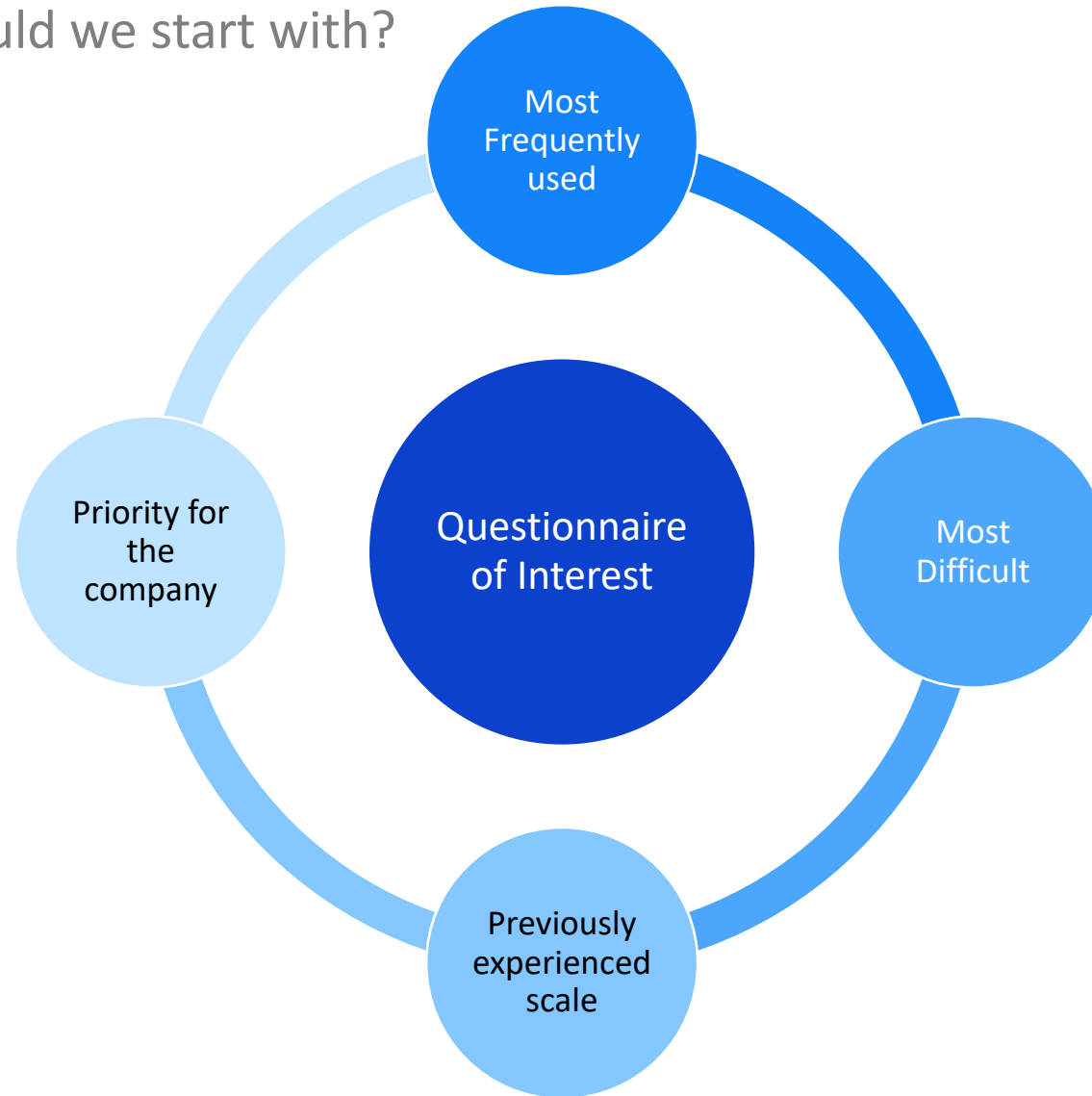
- Intention for open source, as admiral is open source
- Additional functions and programs can be created internally based on requirements
- {admiralroche}
- This must be an internal exercise (for now), due to licensing agreements with the questionnaires
- Restricted questionnaires in CDISC website.

QRS Name	Short Name (--CAT)	SDTM Domain/ADaM Dataset	Permission	Version Release Date
12-Item Multiple Sclerosis Walking Scale	MSWS-12	QS	No Response Received	N/A
Abnormal Involuntary Movement Scale	AIMS	RS	Public Domain	Version: 1.0 22 May 2013 Version: 2.0 3 Apr 2021
ADHD Rating Scale-IV Home Version	ADHD-RS-IV HOME VERSION	QS	No Response Received	N/A
Alzheimer's Disease Assessment Scale - Cognitive (ADAS-Cog)	ADAS-COG	QS	Granted	Version: 1.0 26 Jan 2012
Amsterdam Stool Scale			No Response Received	N/A
Arizona Sexual Experiences Scale - Female	ASEX-FEMALE	QS	Granted	Version: 1.0 1 Feb 2017

(CDISC, 2023)

Theory Phase

Which questionnaires should we start with?



Theory Phase

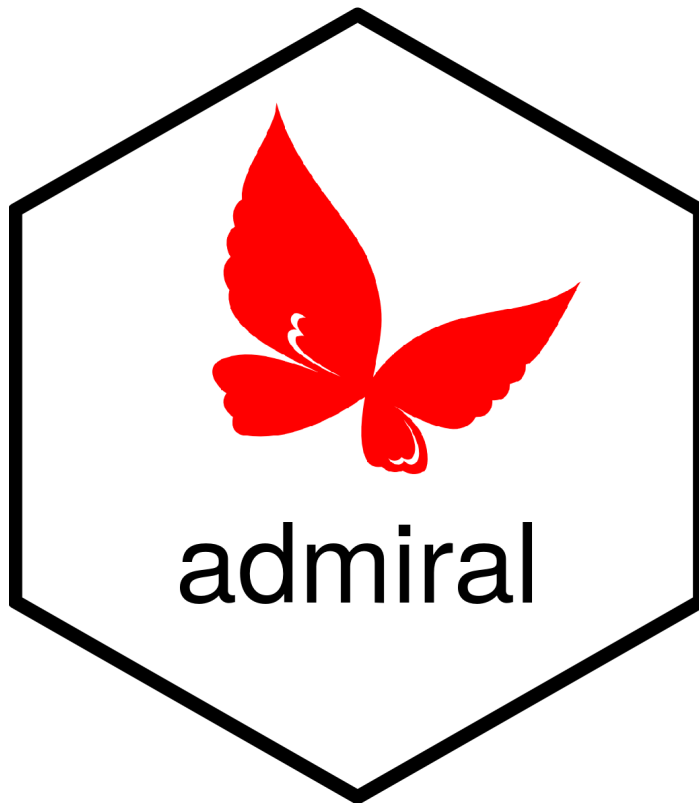
Which questionnaires should we start with?

Based on Discussions:

- Bayley's scale,
- Clinical Global Impression Scales (CGI)
- Mini-Mental Status Exam (MMSE)
- Montreal Cognitive Assessment

We are now involved in questionnaire standards working groups





“At the moment, admiral does not provide functions or metadata for specific questionnaires nor functionality for handling the vast amount of questionnaires and related parameters...” “We plan to provide it in future releases.

{admiral} team

Theory Phase

Connection with the admiral community & second proposal

{admiralroche} templates

 [ad_aag.R](#)

 [ad_acg.R](#)

 [ad_adae.R](#)

 [ad_adcm.R](#)

 [ad_adcssrs.R](#)

 [ad_addv.R](#)

 [ad_adeq.R](#)

 [ad_adeq5d5L.R](#)

- There are some templates for questionnaires in {admiralroche}
- Only standard questionnaires
- Also a need for other non-standard draft templates

Columbia Suicide Severity Rating Scale (CSSRS)

```

---
139 ## PARCAT2 = SUICIDAL BEHAVIOR---
140
141 # filter on relevant PARAMCDs
142 adcssrs_cshsb <- adcssrs_aval %>%
143   filter(PARAMCD %in% c(
144     "CSCOMSUI", "CSACTAPY", "CSACTA", "CSINTAPY", "CSINTA",
145     "CSABOAPY", "CSABOA", "CSPABPY", "CSPAB"
146   ) & SAFFL == "Y")
147
148 # filter on pre-treatment visits and PARAMCDs
149 adcssrs_cshsb_base <- adcssrs_cshsb %>%
150   filter(PARAMCD %in% c("CSCOMSUI", "CSACTAPY", "CSINTAPY", "CSABOAPY", "CSPABPY")) %>%
151   filter(AVISITN %in% c("PRE-BASELINE", "BASELINE")) %>%
152   derive_extreme_event(
153     by_vars = summary_by_vars,
154     order = exprs(ADTM),
155     mode = "first",
156     events = list(
157       event(
158         condition = PARAMCD == "CSCOMSUI" & AVALC == "Y",
159         set_values_to = exprs(
160           AVAL = 1,
161           AVALC = "SB1: Completed Suicide"
162         )
163       ),
164       event(
165         condition = PARAMCD == "CSACTAPY" & AVALC == "Y",
166         set_values_to = exprs(
167           AVAL = 2,
168           AVALC = "SB2: Suicide attempt"
169         )
170       )
171     )
172   )

```

Theory Phase

Connection with the admiral community & second proposal

A second proposal to create a Roche {admiral} Community Gitlab repository for collaboration of the community as the basis of standards in the future. We will start with questionnaires as our focus on proof of concept.

Use this as a basis for all collaborative R programming and could define standards in future.

Programming phase

Programming Phase

Sprint 1 - preparation

Recruit Team



Identify Studies



Setup Gitlab
Repo



Create
Documentation



Assign Issues



Program

Regular check-ins

Set timeline

Programming Phase

Experience programming in {admiral}

- In order to build the templates we've needed to upskill in {admiral} & Roche next gen tools.
- Overall the experience of {admiral} programming has been very intuitive. Code is easier to read than previous Roche templates. Modular toolkit
- In this sense we can use the ADQS vignette to program in a likeminded fashion

black box

```
stream_vad_advs(
  dsin_vs = vs,
  dsin_adsl = adsl,
  hook_aval = hook,
  ...,
)
```



modular toolkit

```
vs %>%
  derive_var_a() %>%
  derive_var_b() %>%
  derive_param_x()
%>%
  ...
```



Creating a compliance record

```
adgdssf <- adgdssf %>%
  derive_expected_records(
    dataset_expected_obs = parm_visit_ref,
    by_vars = exprs(USUBJID),
    set_values_to = exprs(
      filled_in = 1
    )
  ) %>%
  derive_summary_records(
    filter = str_detect(PARAMCD, "GDS02[01][0-9]"),
    by_vars = exprs(USUBJID, AVISIT),
    analysis_var = AVAL,
    summary_fun = function(x) all(!is.na(x)),
    set_values_to = exprs(
      PARAMCD = "COMPLALL",
      PARAM = "Completed all questions?",
      AVALC = if_else(AVAL == 1, "YES", "NO")
    )
  ) %>%
  filter(is.na(filled_in)) %>%
  select(-filled_in)
```

Programming Phase

Clinical Global Impressions (CGI-S) as an example

Utilised the

- General function guidance in {admiral}
- ADQS Vignette
- Templates

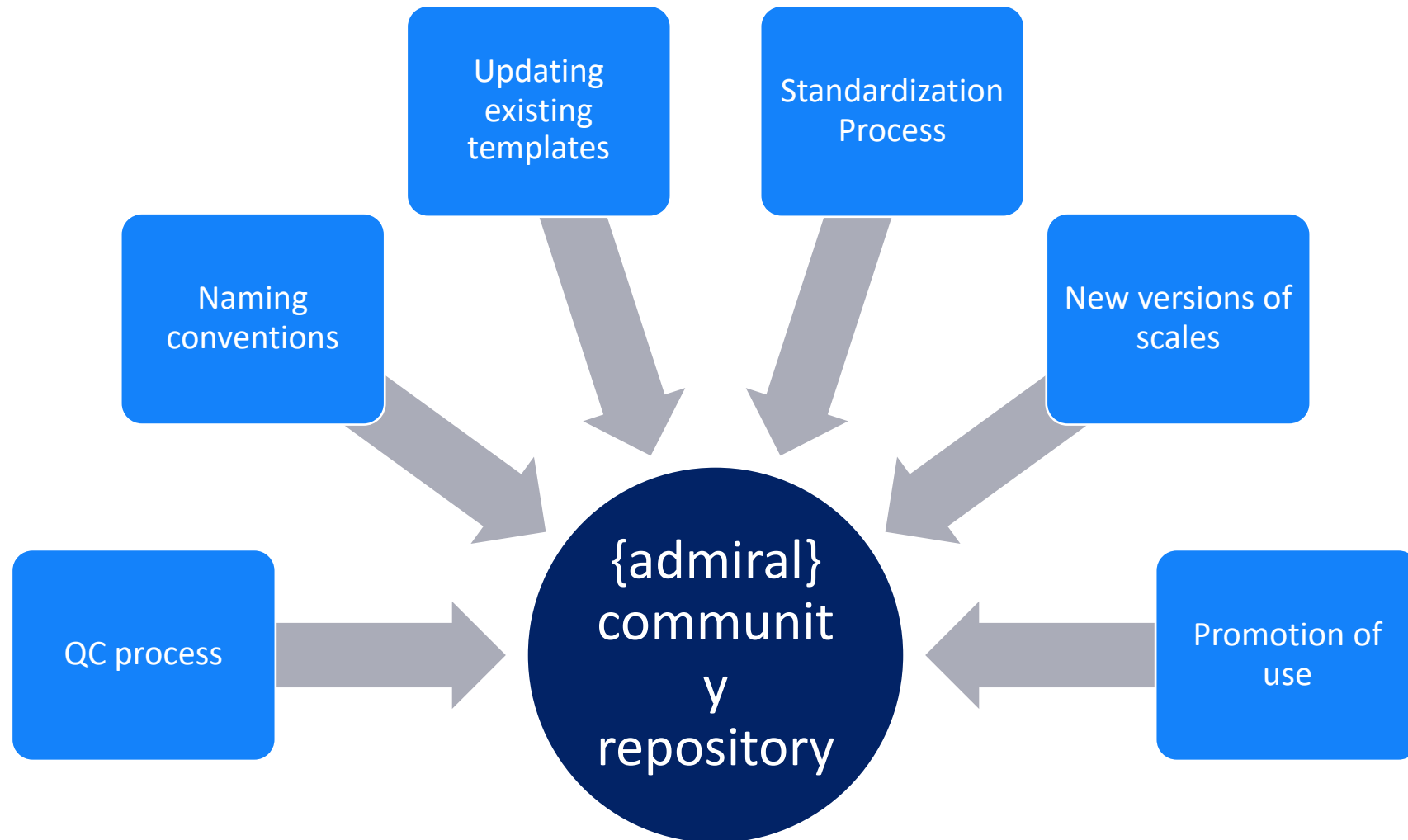
```
derive_summary_records(
  by_vars = exprs(STUDYID, USUBJID, !!!adsl_derv_vars, AVISITN, AVISIT),
  analysis_var = AVAL,
  summary_fun = function(x) sum(!is.na(x)) >= 1,
  set_values_to = exprs(
    PARAMCD = "C000801Q",
    PARCAT2 = "Completion",
    AVALC = if_else(AVAL == 1, "Completed at least 1 question", "Did not completed at least 1 question")
  )
) %>%
filter(PARAMCD == "C000801Q") %>%
select(-filled_in)
```

```
adcgis <- adqs %>%
# Select records to keep in the SAS-CGI-S ADaM
filter(PARCAT1 == "SAS-CGI-S") %>%
# Flag baseline records (last before treatment start)
restrict_derivation(
  derivation = derive_var_extreme_flag,
  args = params(
    by_vars = exprs(STUDYID, USUBJID, PARAMCD),
    order = exprs(ADT),
    new_var = ABLFL,
    mode = "last"
  ),
  filter = !is.na(AVAL) & ADT <= TRTSDT
) %>%
# Derive baseline and change from baseline variables
derive_var_base(
  by_vars = exprs(STUDYID, USUBJID, PARAMCD),
  source_var = AVAL,
  new_var = BASE
) %>%
derive_var_chg() %>%
derive_var_pchg() %>%
# Derive sequence number
derive_var_obs_number(
  by_vars = exprs(STUDYID, USUBJID),
  order = exprs(PARAMCD, ADT),
  check_type = "error"
)
```

Whats next?

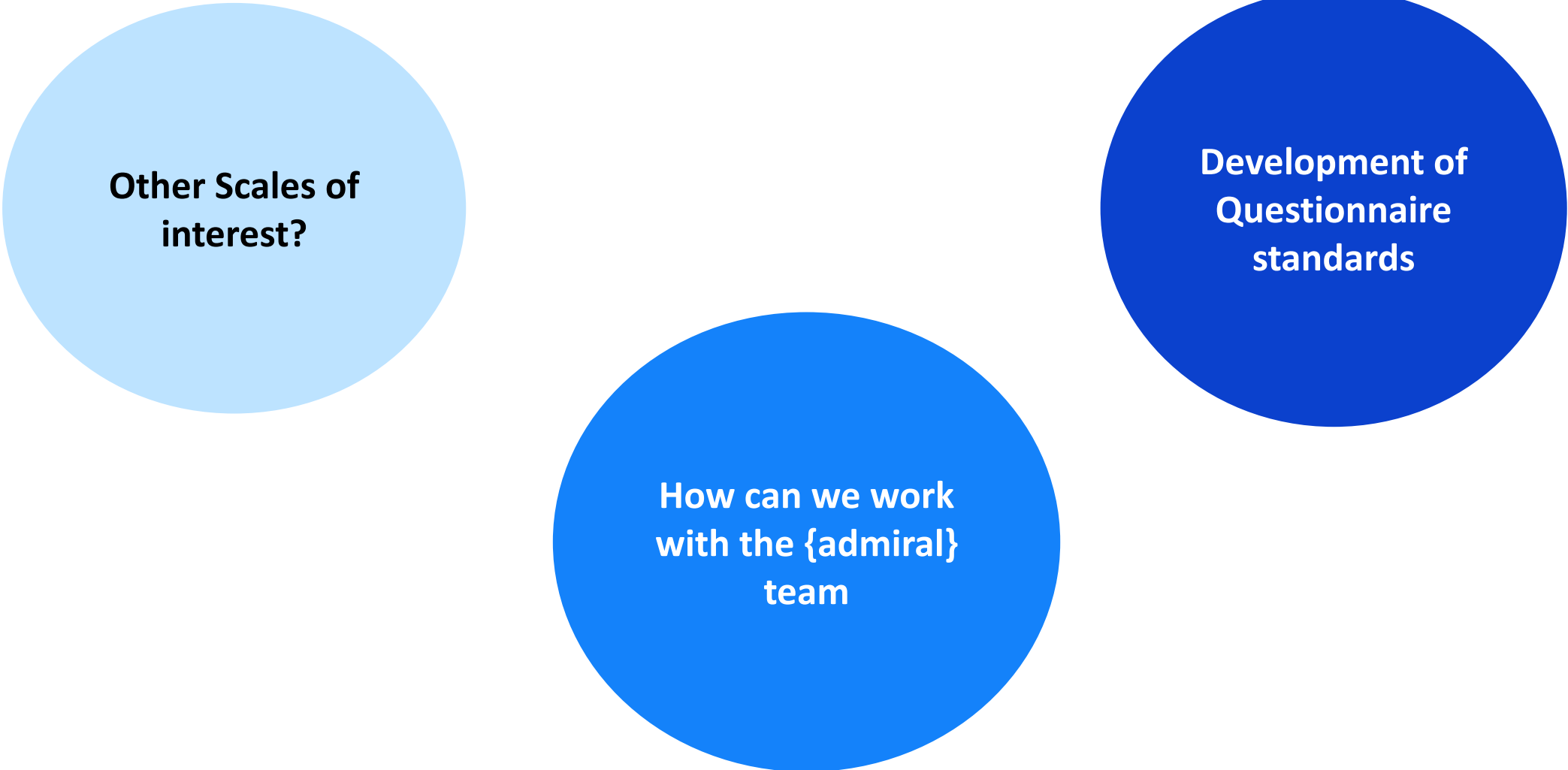
Next Steps

Gitlab Community Repository



Next Steps

Questionnaire templates

A diagram showing three circles representing next steps. The top-left circle is light blue and contains the text "Other Scales of interest?". The bottom circle is medium blue and contains the text "How can we work with the {admiral} team". The top-right circle is dark blue and contains the text "Development of Questionnaire standards".

**Other Scales of
interest?**

**How can we work
with the {admiral}
team**

**Development of
Questionnaire
standards**

Conclusion

1. {admiral} questionnaire templates have been created. More to come.
2. Roche Gitlab community repository created.
3. Working on neuroscience questionnaire ADaM standards

Key Take-home:

Try {admiral} for yourself.
Consider an internal community repository.

Doing now what patients need next