

# Package ‘fahb’

September 25, 2026

**Title** Design and Analysis of Pilot Trials Assessing Recruitment Feasibility

**Version** 1.0.1

**Description** Find optimal decisions rules for guiding progression decisions following a pilot trial, assuming a hierarchical recruitment model. Estimate the time until the main trial recruits to target, given the recruitment data observed in the pilot.

**License** MIT + file LICENSE

**Encoding** UTF-8

**Suggests** BH, knitr, patchwork, RcppEigen, rmarkdown, testthat (>= 3.0.0)

**Config/testthat/edition** 3

**Imports** brms, ggplot2, mco, mgcv, posterior, rlang

**VignetteBuilder** knitr

**URL** <https://lictr.github.io/fahb/>, <https://github.com/lictr/fahb>

**BugReports** <https://github.com/lictr/fahb/issues>

**Config/roxygen2/version** 8.1.0

**NeedsCompilation** no

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**Repository** CRAN

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|              |                                 |
|--------------|---------------------------------|
| check_priors | <i>Plot prior distributions</i> |
|--------------|---------------------------------|

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**Description**

Given the hyperparameters encoded in a fahb\_problem object, return plots of the three prior distributions and a plot of the prior predictive distribution of the recruitment rate at a randomly selected site.

**Usage**

```
check_priors(problem)
```

**Arguments**

problem            an object of class fahb\_problem.

**Value**

a list of ggplot2 plots.

**Examples**

```
problem <- fahb_problem()
check_priors(problem)
```

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|               |                                     |
|---------------|-------------------------------------|
| fahb_analysis | <i>Build a fahb analysis object</i> |
|---------------|-------------------------------------|

---

**Description**

Given a fahb\_problem object calculate summary statistics which can inform progression decisions. These include both standard progression criteria statistics, and the expectation of the posterior predictive distribution of the time until the trial recruits.

**Usage**

```
fahb_analysis(n_pilot, t_pilot, problem, site_t = NULL, bayes_model = NULL)
```

**Arguments**

|             |                                                                                                                                              |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| n_pilot     | integer vector of numbers recruited at each open site.                                                                                       |
| t_pilot     | numeric vector of time (in years) each site has been open.                                                                                   |
| problem     | object of class fahb_problem.                                                                                                                |
| site_t      | In the case of an external pilot, the time taken for all pilot sites to open.                                                                |
| bayes_model | optional object of class brmsfit which will be used in the Bayesian analysis via <code>brms::update()</code> to avoid compiling a new model. |

**Value**

An object of class fahb\_analysis.

**Examples**

```
## Example illustrating a full analysis workflow
## (Not run on CRAN due to Bayesian model fitting)

problem <- fahb_problem()
problem <- forecast(problem)

## Pilot trial data
n_pilot <- c(3, 5, 2)
t_pilot <- c(0.5, 0.6, 0.4)

analysis <- fahb_analysis(
  n_pilot = n_pilot,
  t_pilot = t_pilot,
  problem = problem
)

print(analysis)
plot(analysis)
```

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|             |                                   |
|-------------|-----------------------------------|
| fahb_design | <i>Build a fahb design object</i> |
|-------------|-----------------------------------|

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**Description**

Given a fahb\_problem object, find efficient progression decision rules. These can include rules of the standard "progression criteria form", or rules based on a Bayesian analysis of the pilot trial data, or both.

**Usage**

```
fahb_design(problem, quietly = TRUE)
```

**Arguments**

|         |                                                                                                                                           |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------|
| problem | an object of class fahb_problem.                                                                                                          |
| quietly | if this argument is set to FALSE then information about which steps have been completed will be printed to the console. Defaults to TRUE. |

**Value**

an object of class fahb\_design.

**Examples**

```
problem <- forecast(fahb_problem(), n_sims = 500)
fahb_design(problem)
```

---

|              |                                    |
|--------------|------------------------------------|
| fahb_problem | <i>Build a fahb_problem object</i> |
|--------------|------------------------------------|

---

**Description**

Given a trial design and a set of model hyperparameters, build an object of class fahb\_problem.

**Usage**

```
fahb_problem(
  N = 320,
  m = 20,
  t = 0.5,
  n_ext = NULL,
  m_ext = NULL,
  rel_thr = 1.2,
  so_hps = c(30, 2.85),
  mean_rr_hps = c(2, 0.329),
  sd_rr_hps = c(30, 100)
)
```

**Arguments**

|         |                                                                                                              |
|---------|--------------------------------------------------------------------------------------------------------------|
| N       | target sample size.                                                                                          |
| m       | number of recruiting sites.                                                                                  |
| t       | timing of the pilot analysis in years.                                                                       |
| n_ext   | number of participants to recruit to an external pilot.                                                      |
| m_ext   | number of sites to open in an external pilot.                                                                |
| rel_thr | threshold which discriminates feasible and infeasible trials, as a multiple of the expected time to recruit. |

|             |                                                                                        |
|-------------|----------------------------------------------------------------------------------------|
| so_hps      | site opening rate hyperparameters (shape and rate for a Gamma prior).                  |
| mean_rr_hps | mean site recruitment rate hyperparameters (mean and sd for a lognormal prior).        |
| sd_rr_hps   | variance in site recruitment rates hyperparameters (shape and rate for a Gamma prior). |

**Value**

an object of class fahb\_problem

**Examples**

```
fahb_problem()
```

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|          |                                                              |
|----------|--------------------------------------------------------------|
| forecast | <i>Generate probabilistic forecasts of trial recruitment</i> |
|----------|--------------------------------------------------------------|

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**Description**

Generate probabilistic forecasts of trial recruitment

**Usage**

```
forecast(problem, n_sims = 10^4, overwrite = FALSE, data_sum = FALSE)
```

**Arguments**

|           |                                                                                                                                            |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------|
| problem   | an object of class fahb_problem.                                                                                                           |
| n_sims    | number of replicates to use in the simulation.                                                                                             |
| overwrite | boolean indicating if we want to overwrite any simulation data currently held (defaults to FALSE).                                         |
| data_sum  | boolean indicating if we want to return all the information needed to run a Bayesian analysis of the recruitment data (defaults to FALSE). |

**Value**

an object of class fahb\_problem.

**Examples**

```
problem <- fahb_problem()
problem <- forecast(problem, n_sims = 10^3)
```

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|                    |                                                          |
|--------------------|----------------------------------------------------------|
| plot.fahb_analysis | <i>Plot posterior distributions from a fahb analysis</i> |
|--------------------|----------------------------------------------------------|

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**Description**

Takes an object of class fahb\_analysis and plots the posterior distributions of the predicted time for the trial to recruit and of the three model parameters.

**Usage**

```
## S3 method for class 'fahb_analysis'
plot(x, ...)
```

**Arguments**

|     |                                                               |
|-----|---------------------------------------------------------------|
| x   | object of class fahb_analysis as produced by fahb_analysis(). |
| ... | further arguments passed to or from other methods.            |

**Value**

no return value, called for side effects.

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|                  |                                                       |
|------------------|-------------------------------------------------------|
| plot.fahb_design | <i>Plot operating characteristics of fahb designs</i> |
|------------------|-------------------------------------------------------|

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**Description**

Takes an object of class fahb\_design and plots the estimated operating characteristics of decision rules - based on standard progression criteria, an approximate Bayesian analysis, or both.

**Usage**

```
## S3 method for class 'fahb_design'
plot(x, ...)
```

**Arguments**

|     |                                                           |
|-----|-----------------------------------------------------------|
| x   | object of class fahb_design as produced by fahb_design(). |
| ... | further arguments passed to or from other methods.        |

**Value**

no return value, called for side effects.

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|                     |                                     |
|---------------------|-------------------------------------|
| print.fahb_analysis | <i>Print a fahb analysis object</i> |
|---------------------|-------------------------------------|

---

**Description**

The default print method for a fahb\_analysis object.

**Usage**

```
## S3 method for class 'fahb_analysis'
print(x, ...)
```

**Arguments**

|     |                                                               |
|-----|---------------------------------------------------------------|
| x   | object of class fahb_analysis as produced by fahb_analysis(). |
| ... | further arguments passed to or from other methods.            |

**Value**

no return value, called for side effects.

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|                   |                                   |
|-------------------|-----------------------------------|
| print.fahb_design | <i>Print a fahb design object</i> |
|-------------------|-----------------------------------|

---

**Description**

The default print method for a fahb\_design object.

**Usage**

```
## S3 method for class 'fahb_design'
print(x, coarse = TRUE, ...)
```

**Arguments**

|        |                                                                                                       |
|--------|-------------------------------------------------------------------------------------------------------|
| x      | object of class fahb_design as produced by fahb_design().                                             |
| coarse | binary indicator that only a coarse subset of all decision rules should be printed. Defaults to TRUE. |
| ...    | further arguments passed to or from other methods.                                                    |

**Value**

no return value, called for side effects.

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