Supporting Information: Bayesian modeling of enteric virus density in wastewater using left-censored data

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Figures 1S–39S

We simulated three situations: The numbers of samples gathered from treated wastewater, n, were 12, 24, and 48. For the dataset with $n = 12$ samples, we considered twelve cases where the numbers of detect-data, say n_v, were $1, 2, \ldots, 12$. For $n = 24$, we added a case of $n_v = 24$. For $n = 48$, we further added a case of $n_v = 48$. Totally, we considered $12 + 13 + 14 = 39$ cases. Each of Figures 1S–39S shows the Bayesian inferences for one of 39 cases.

For each case of (n, n_v), a hundred datasets of treated wastewater were generated for our simulation. We here denoted the k-th dataset by $\mathcal{X}_{k,\mathrm{post}}$. The common logarithm of concentration data in each dataset were generated according to a normal distribution $\mathcal{N}(1, 1)$, but the detection limit θ_v was adjusted so that the number of non-detect data was exactly n_0. In the panels (a) of each figure, the probabilistic density function of the normal distribution $\mathcal{N}(1, 1)$ is plotted in red color with a vertical line segmented indicating the location of the detection limit for the first five datasets, $\mathcal{X}_{1,\mathrm{post}}$, $\mathcal{X}_{2,\mathrm{post}}$, $\ldots$, $\mathcal{X}_{5,\mathrm{post}}$. In the panels (a), red circles and blue circles represent the common logarithms of detect data and non-detect data, respectively.

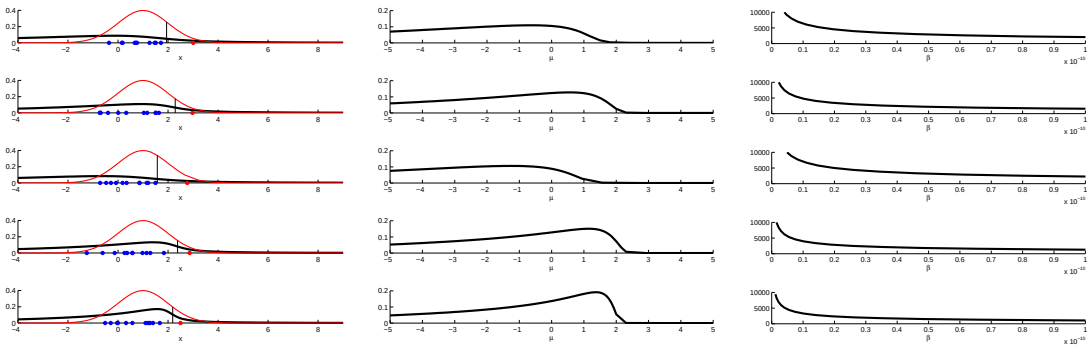
Furthermore, for each of the treated wastewater datasets, an untreated wastewater dataset, denoted by $\mathcal{X}_{k,\mathrm{pre}}$, was generated to be coupled with the corresponding $\mathcal{X}_{k,\mathrm{post}}$. The common logarithms of concentration data in $\mathcal{X}_{k,\mathrm{pre}}$ were generated according to $\mathcal{N}(4, 1)$, where the number of samples is n. In $\mathcal{X}_{k,\mathrm{pre}}$, the generated data less than θ_v were treated as non-detect data, where θ_v was equal to the value used to generate the corresponding $\mathcal{X}_{k,\mathrm{post}}$. In the panels (d) of each figure, the density function of $\mathcal{N}(4, 1)$ is plotted in red color for the first five datasets, $\mathcal{X}_{1,\mathrm{pre}}$, $\mathcal{X}_{2,\mathrm{pre}}$, $\ldots$, $\mathcal{X}_{5,\mathrm{pre}}$. The common logarithms of detect data and non-detect data, respectively, were also depicted with red circles and blue circles.

Panels (g-1),$\ldots$,(g-5) use contours to show the posterior distributions of model parameters for treated wastewater datasets, say $p(\mu, \beta|\mathcal{X}_{k,\mathrm{post}})$. Panels (h-1),$\ldots$,(h-5) are for untreated wastewater datasets.

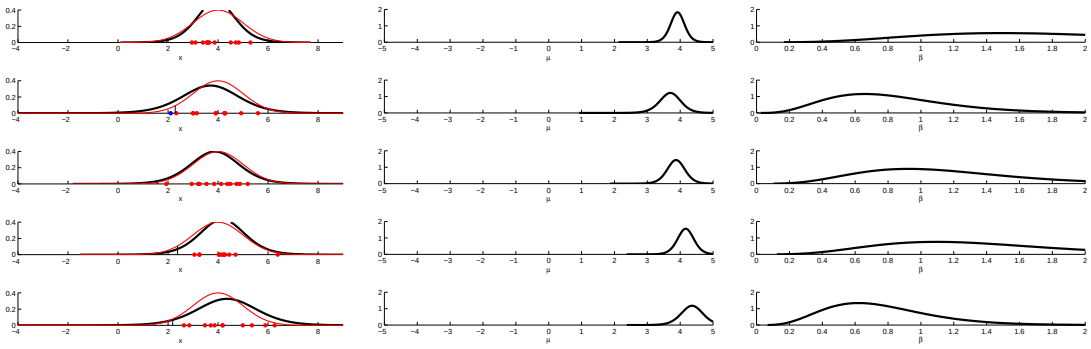
Marginal posteriors, $p(\mu|\mathcal{X}_{k,\mathrm{post}})$ and $p(\beta|\mathcal{X}_{k,\mathrm{post}})$, for the first five treated wastewater datasets are plotted in (b) and (c), respectively. Panels (e) and (f) are of the untreated wastewater datasets.

Black curves in (a) are the posterior predictive distribution $p(c_{\mathrm{post}}|\mathcal{X}_{k,\mathrm{post}})$, inferred from a treated wastewater dataset. Ideally, the posterior predictive distributions would approach to the true distribution $\mathcal{N}(1, 1)$, depicted with red curves. Black curves in (d) are for untreated wastewater datasets.

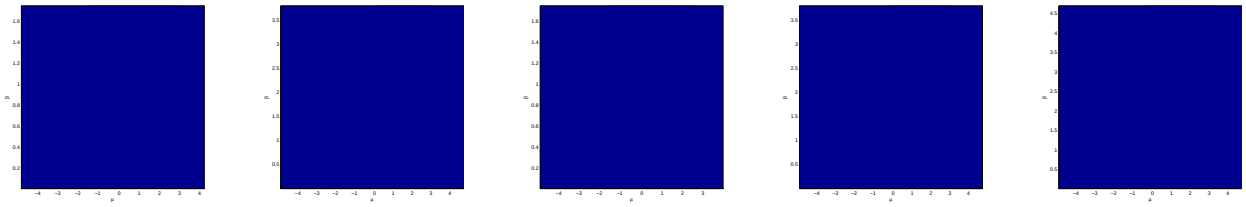
Panels (i-1),$\ldots$,(i-5) depict the log ratio posteriors that are the posterior distribution of the log ratio between concentration data in untreated wastewater and those in treated wastewater. For comparison, the true distribution $\mathcal{N}(3, 2)$ is also drawn in each plot.



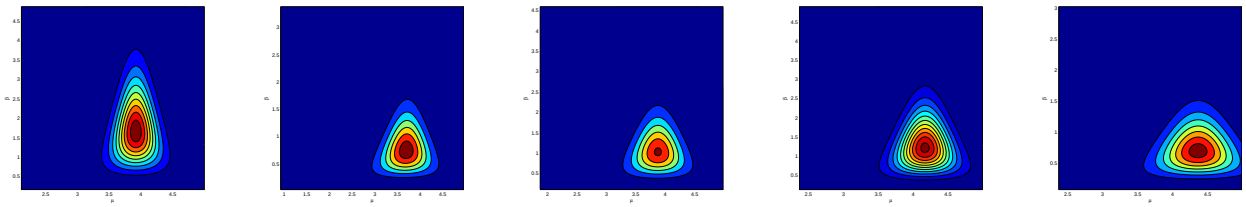
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$

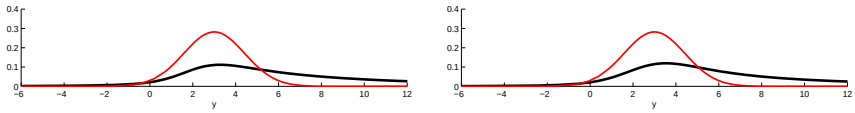


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



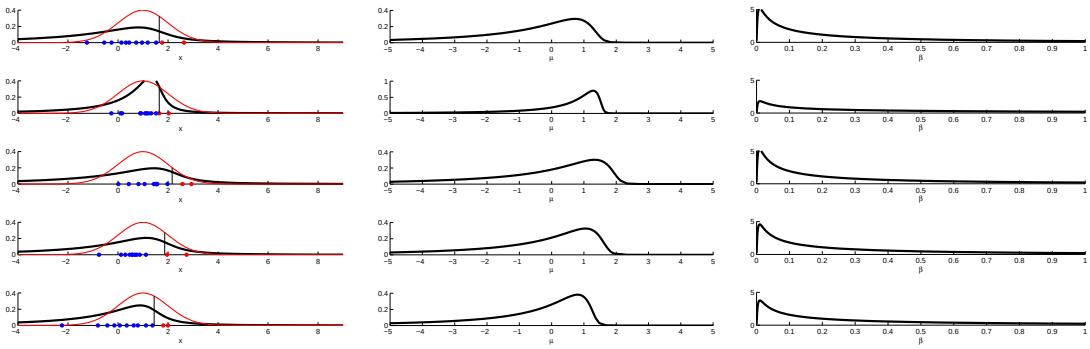
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

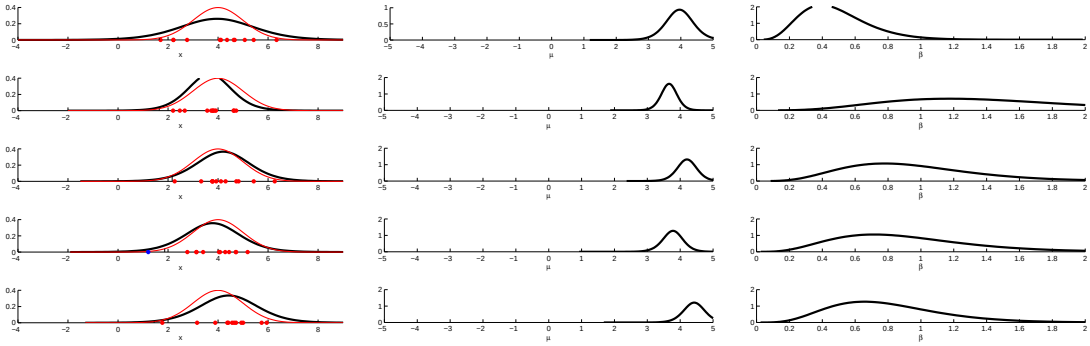


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

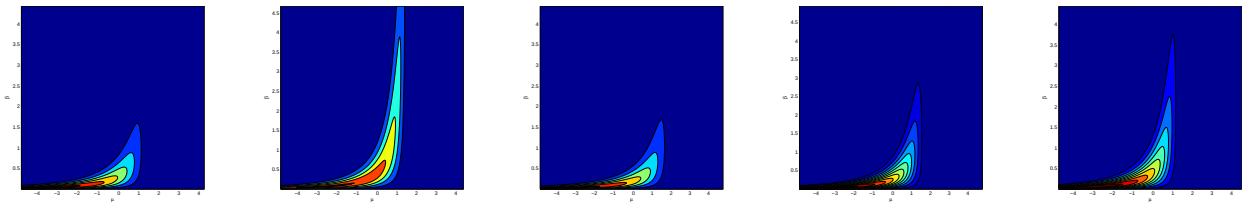
Figure 1S: Bayesian inferences on five datasets, each of which contains $n_v = 1$ detect data out of $n = 12$ samples.



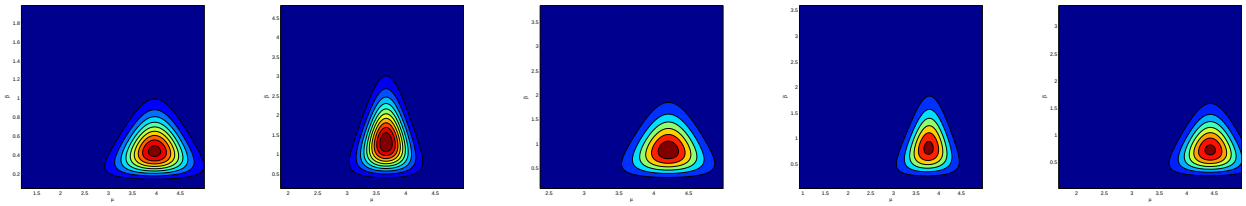
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$

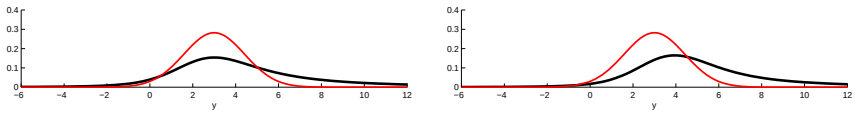


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



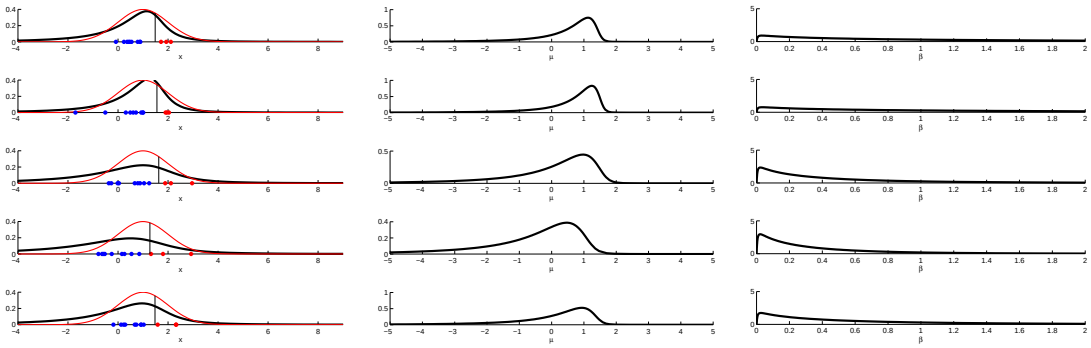
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

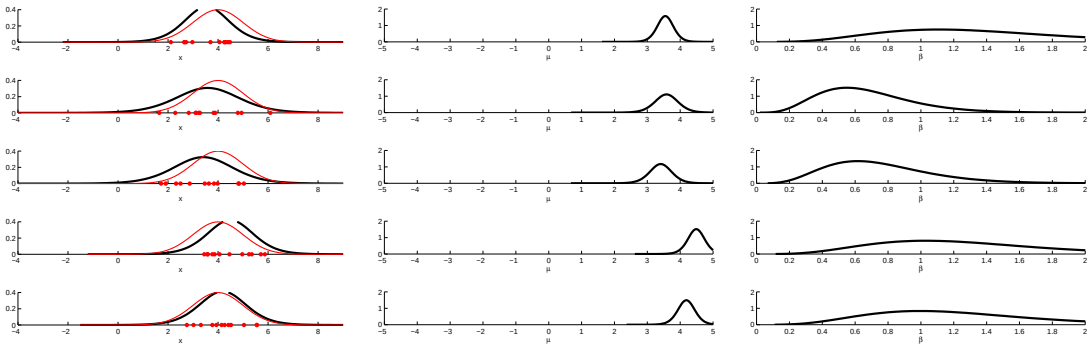


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

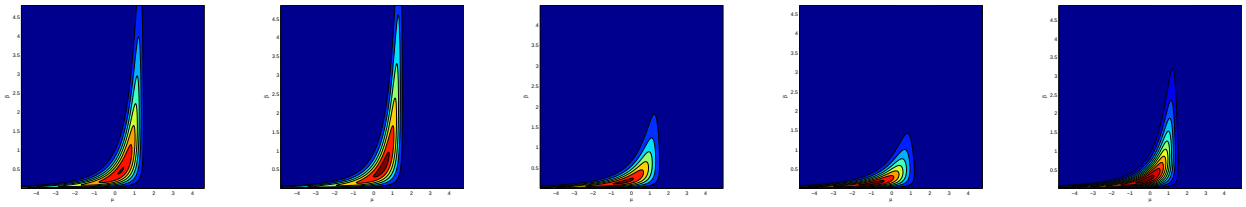
Figure 2S: Bayesian inferences on five datasets, each of which contains $n_v = 2$ detect data out of $n = 12$ samples.



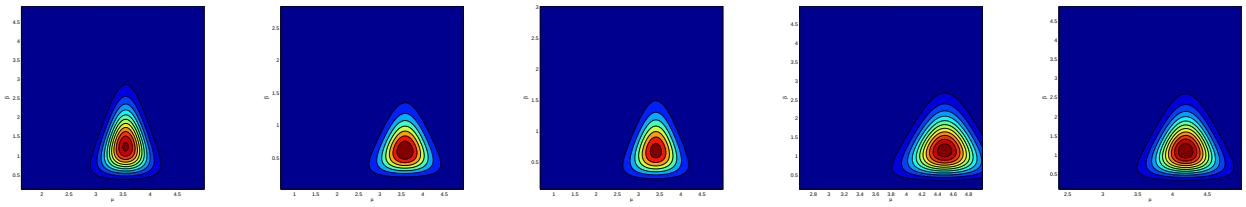
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



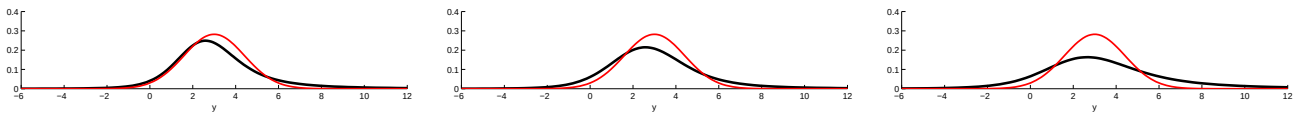
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



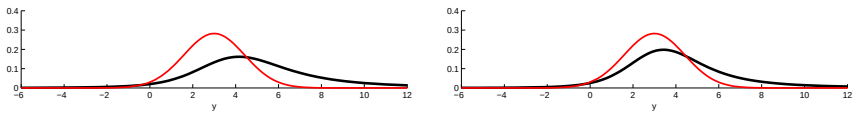
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

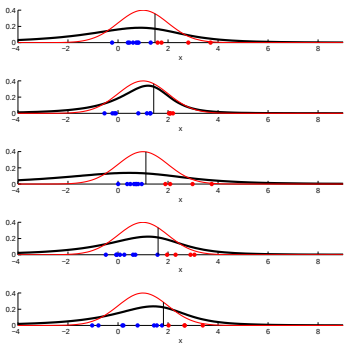


(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

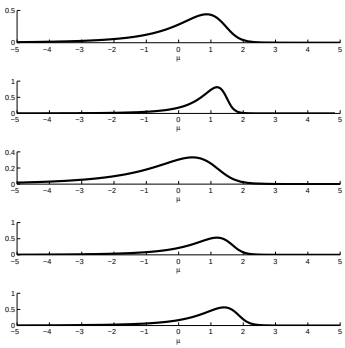


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

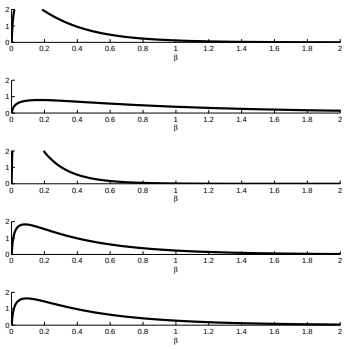
Figure 3S: Bayesian inferences on five datasets, each of which contains $n_v = 3$ detect data out of $n = 12$ samples.



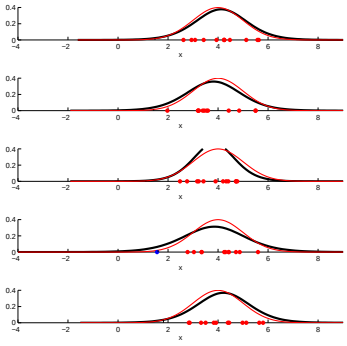
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



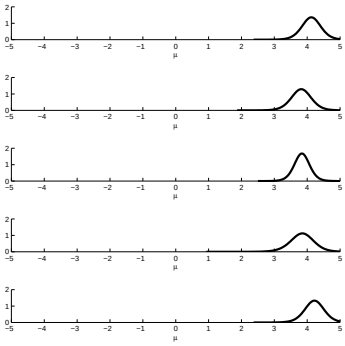
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



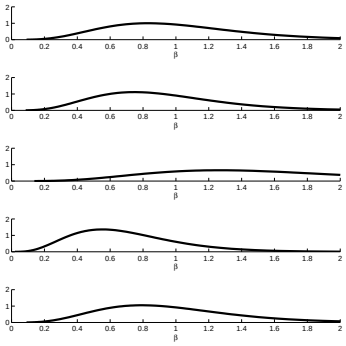
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



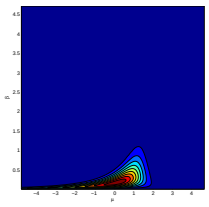
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



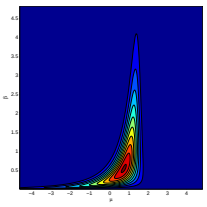
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



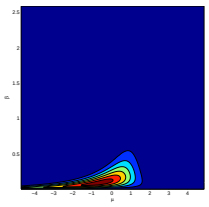
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



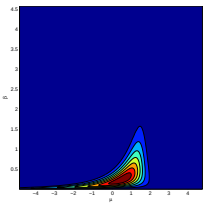
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



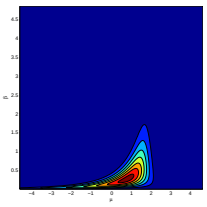
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



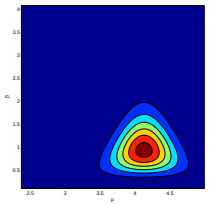
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



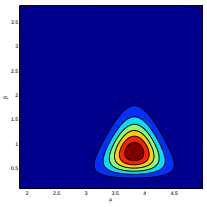
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



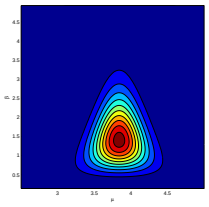
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



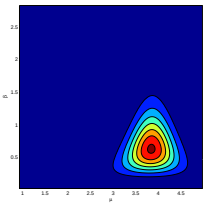
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



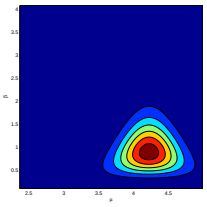
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$

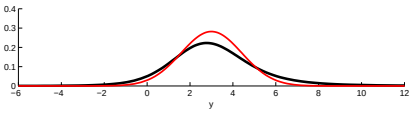


(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$



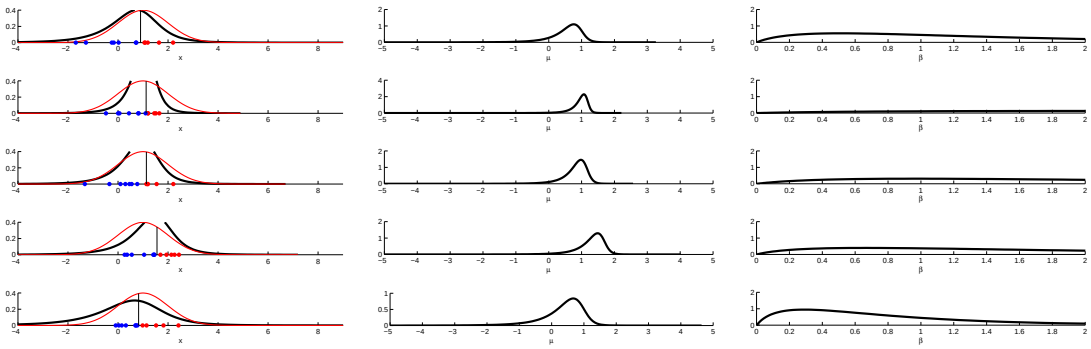
(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

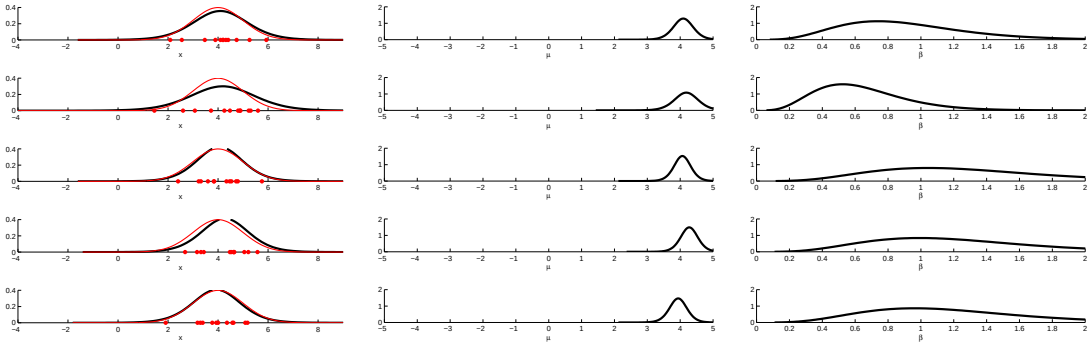
(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

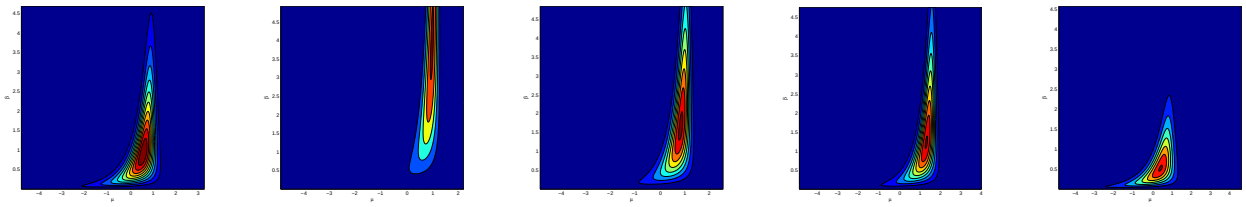
Figure 4S: Bayesian inferences on five datasets, each of which contains $n_v = 4$ detect data out of $n = 12$ samples.



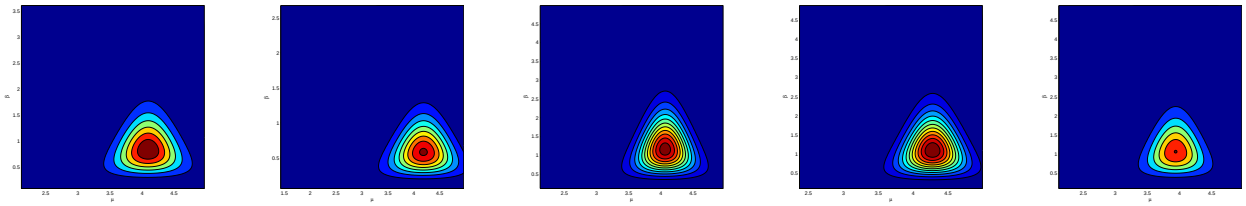
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$

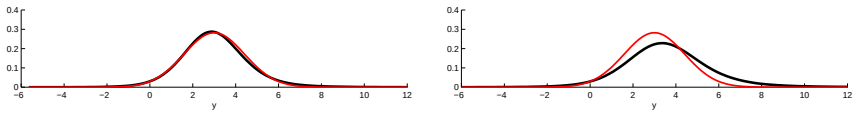


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



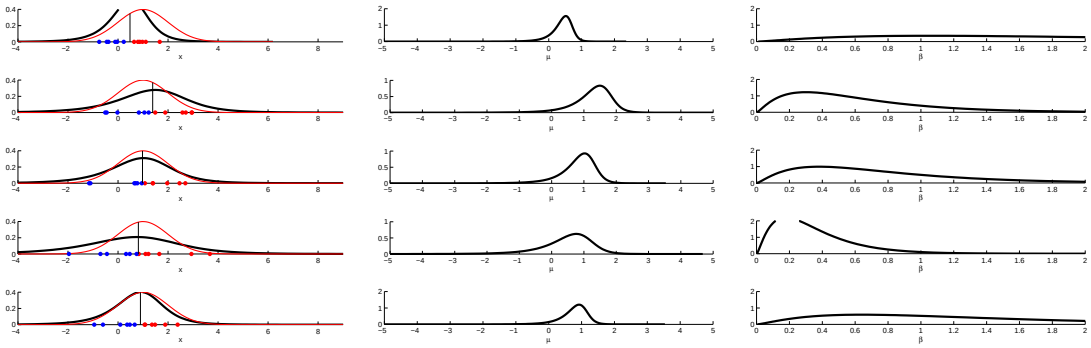
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

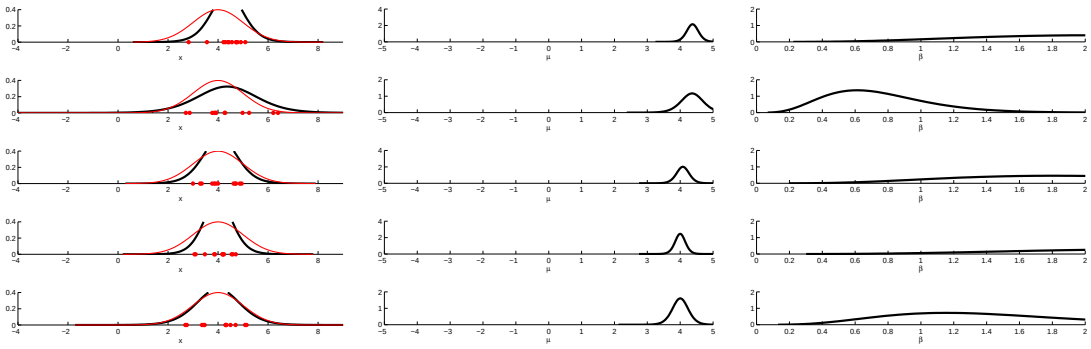


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

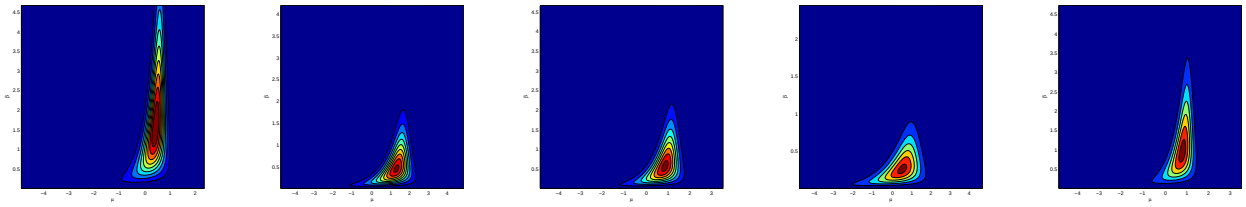
Figure 5S: Bayesian inferences on five datasets, each of which contains $n_v = 5$ detect data out of $n = 12$ samples.



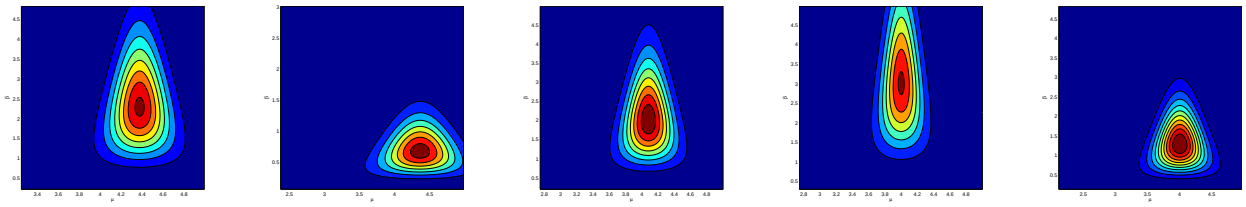
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$

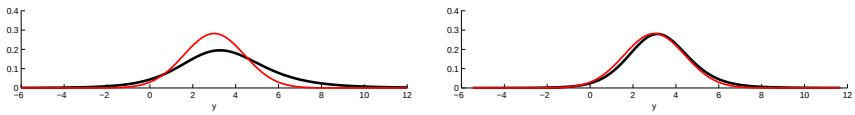


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



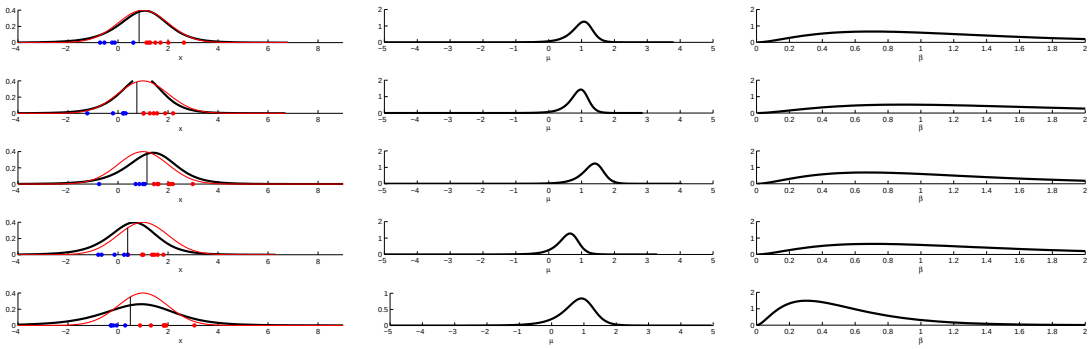
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

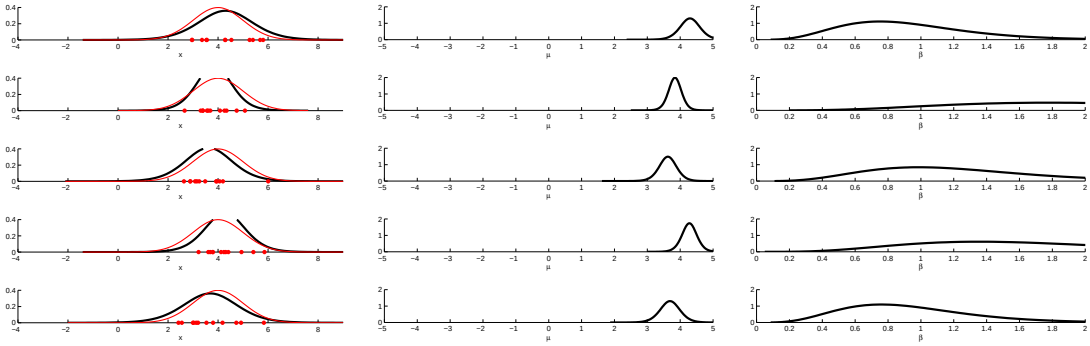


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

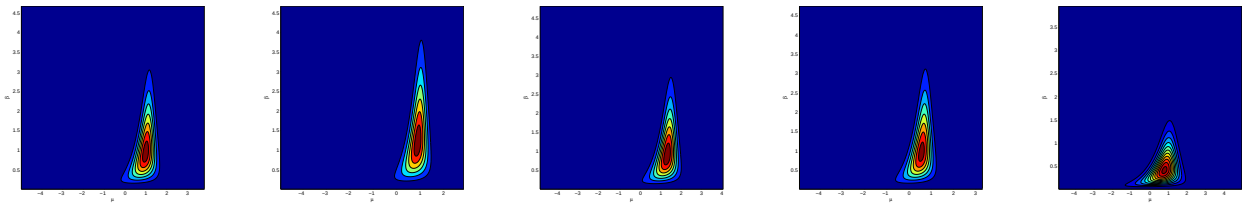
Figure 6S: Bayesian inferences on five datasets, each of which contains $n_v = 6$ detect data out of $n = 12$ samples.



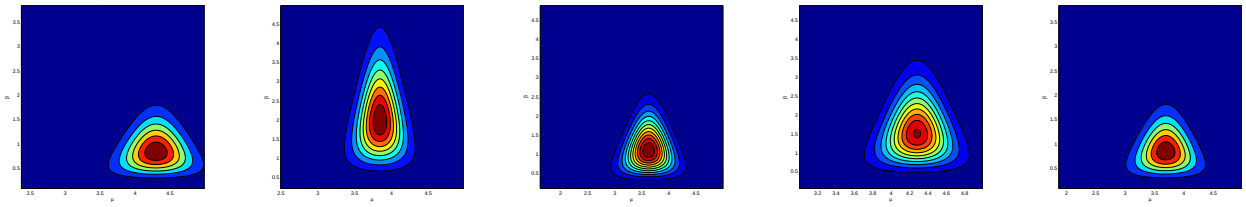
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



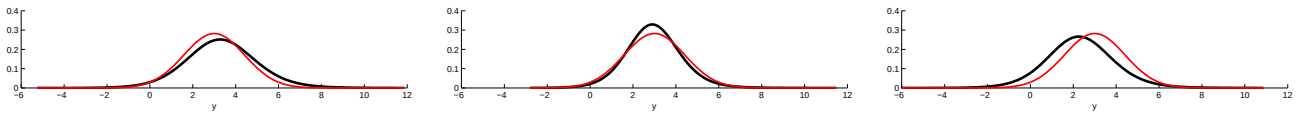
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



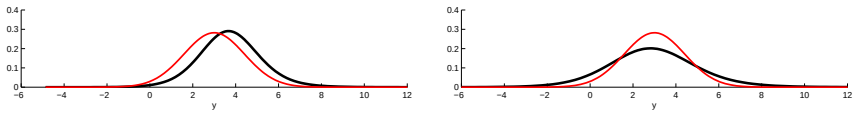
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

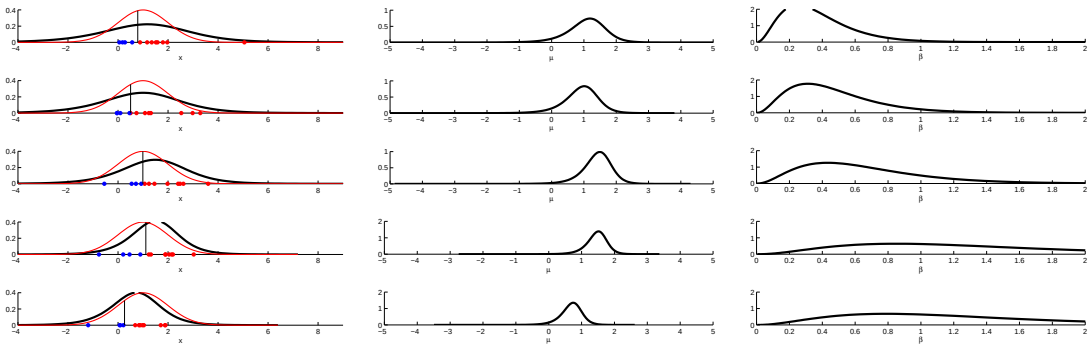


(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

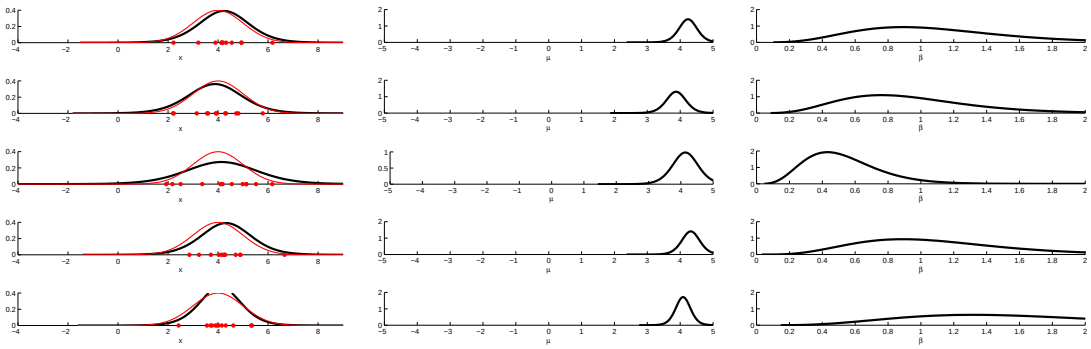


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

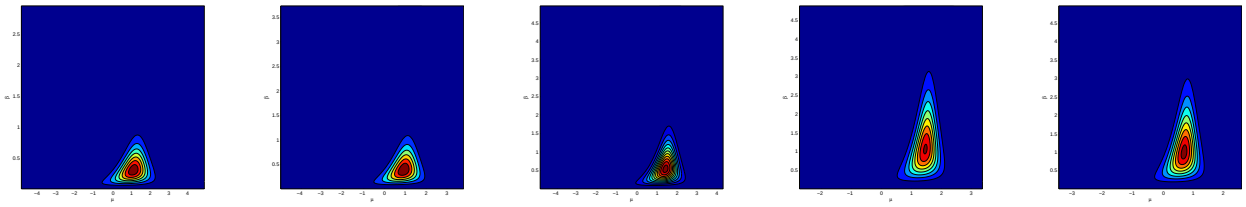
Figure 7S: Bayesian inferences on five datasets, each of which contains $n_v = 7$ detect data out of $n = 12$ samples.



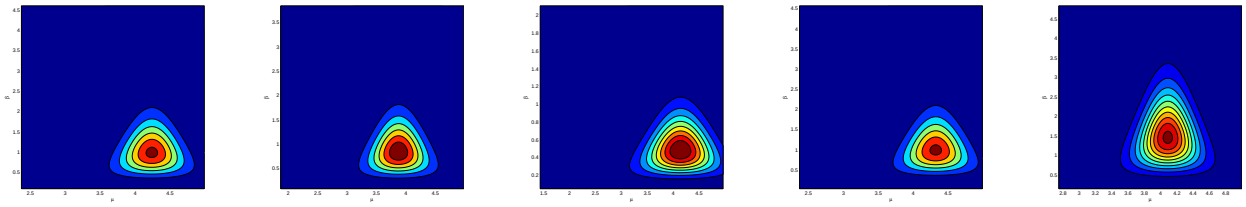
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



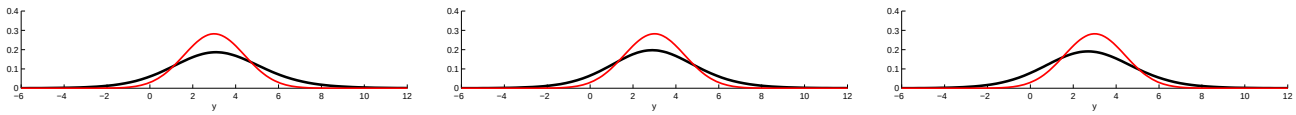
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



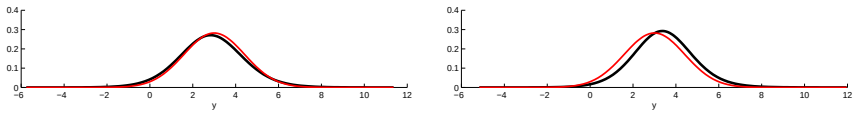
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

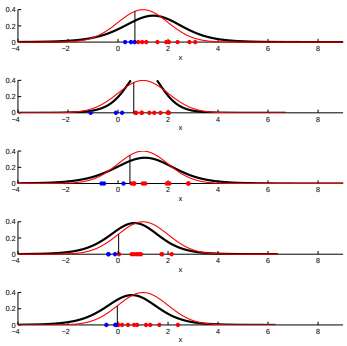


(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

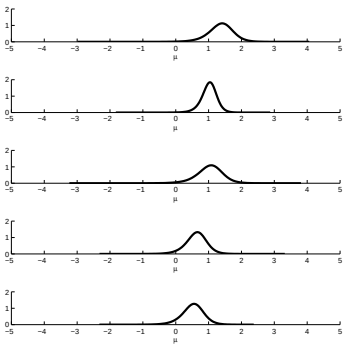


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

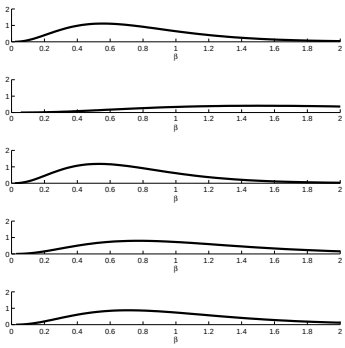
Figure 8S: Bayesian inferences on five datasets, each of which contains $n_v = 8$ detect data out of $n = 12$ samples.



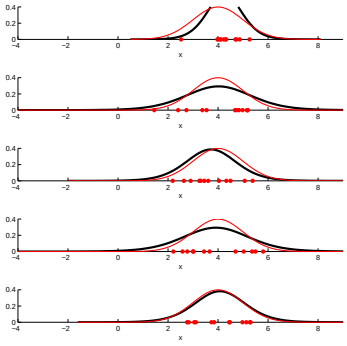
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



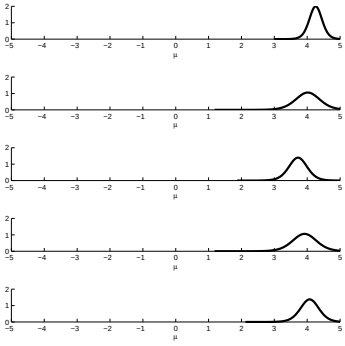
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



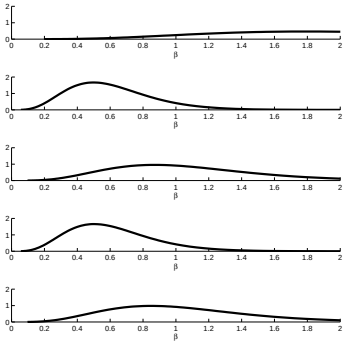
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



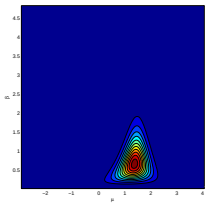
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



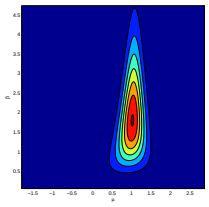
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



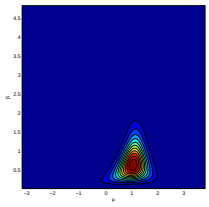
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



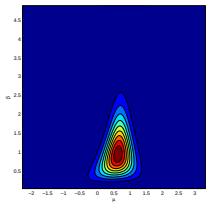
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



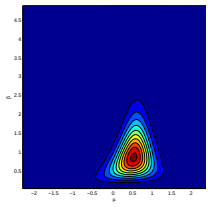
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



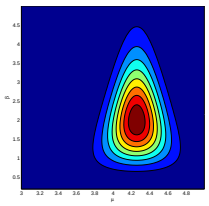
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



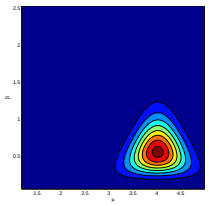
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



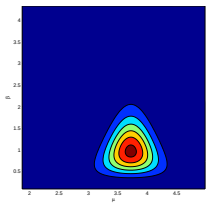
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



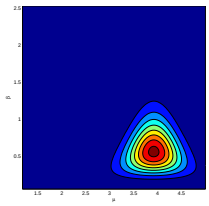
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



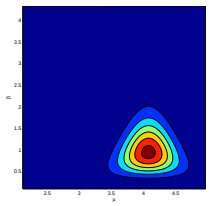
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



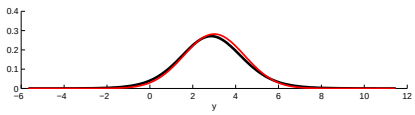
(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$



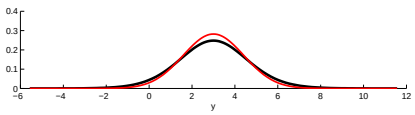
(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$



(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$



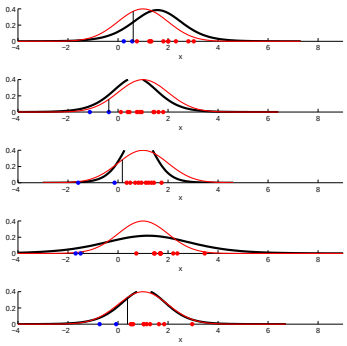
(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

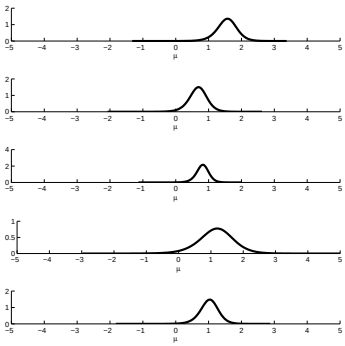
(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

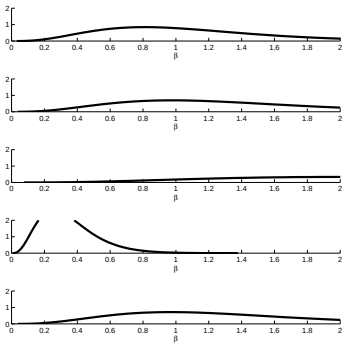
Figure 9S: Bayesian inferences on five datasets, each of which contains $n_v = 9$ detect data out of $n = 12$ samples.



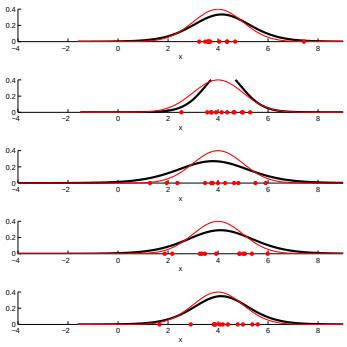
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



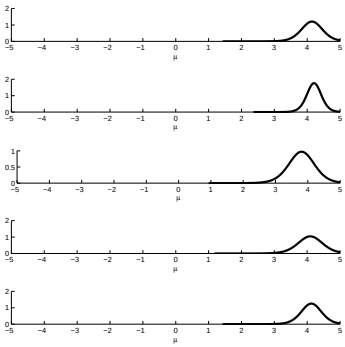
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



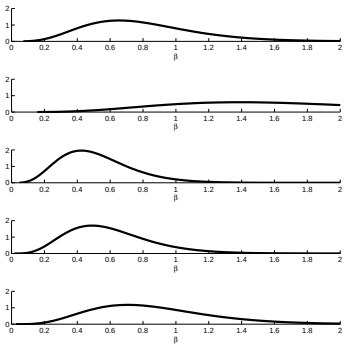
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



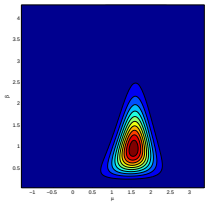
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



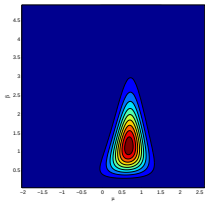
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



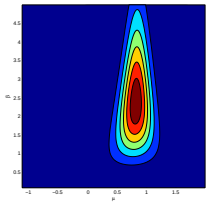
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



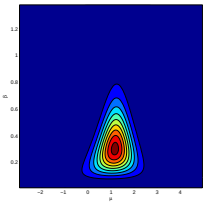
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



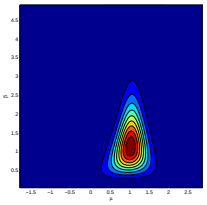
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



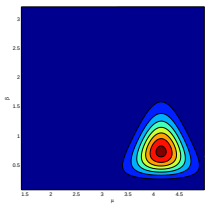
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



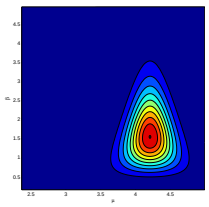
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



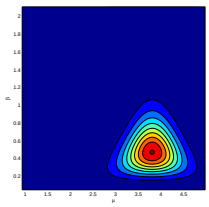
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



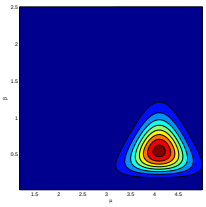
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



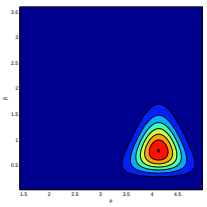
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$

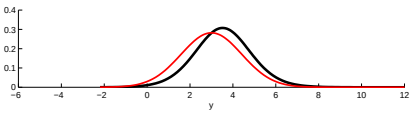


(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



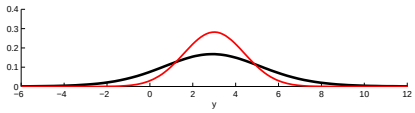
(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$

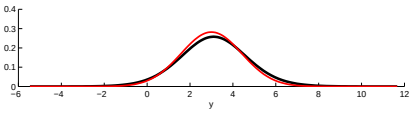


(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

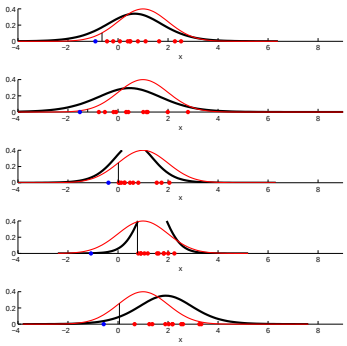


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

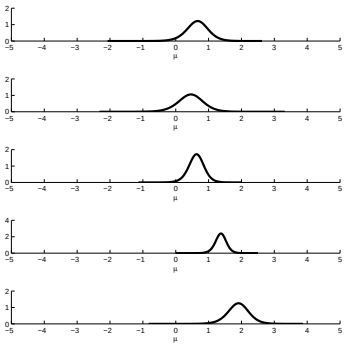


(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

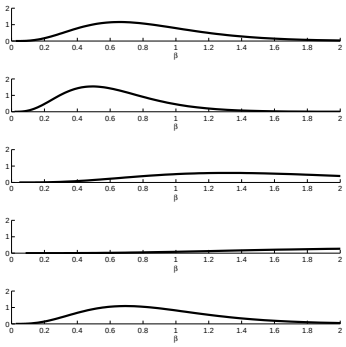
Figure 10S: Bayesian inferences on five datasets, each of which contains $n_v = 10$ detect data out of $n = 12$ samples.



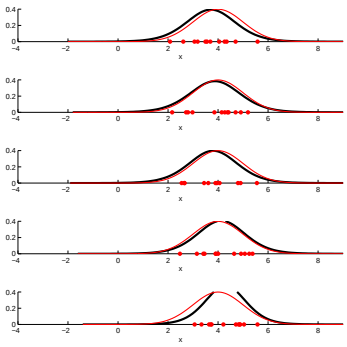
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



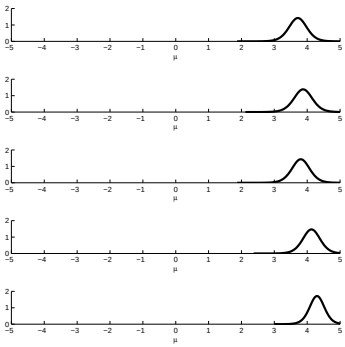
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



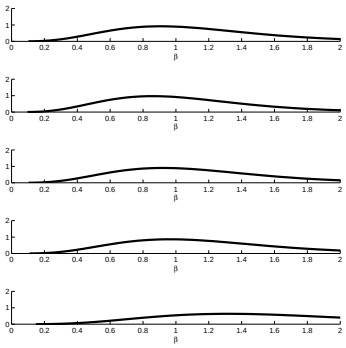
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



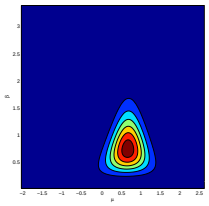
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



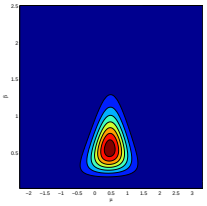
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



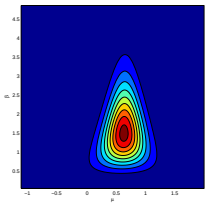
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



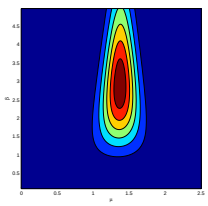
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



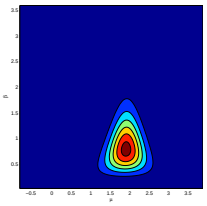
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



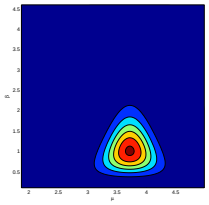
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



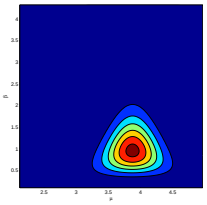
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



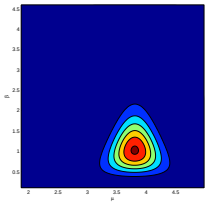
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



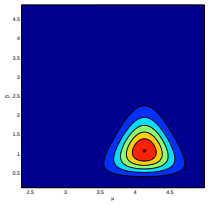
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



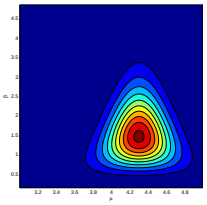
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



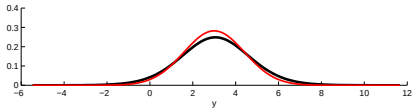
(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$



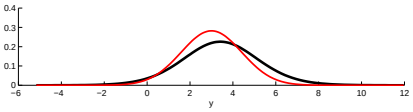
(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

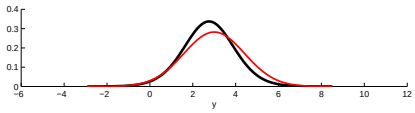


(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$



(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

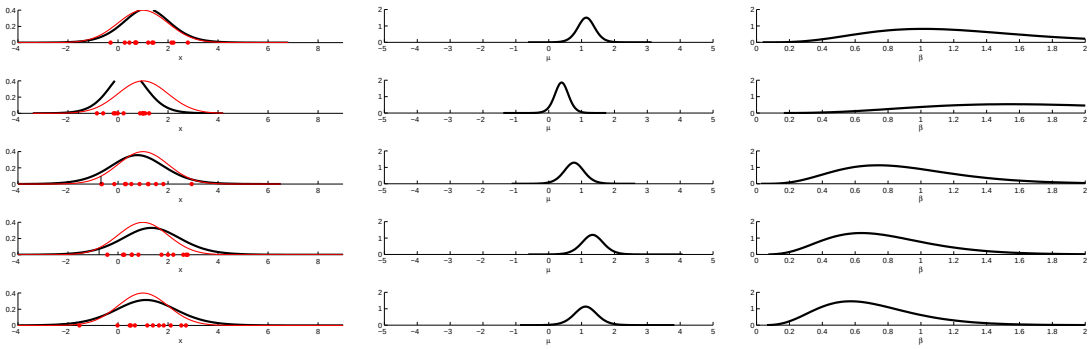
(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$



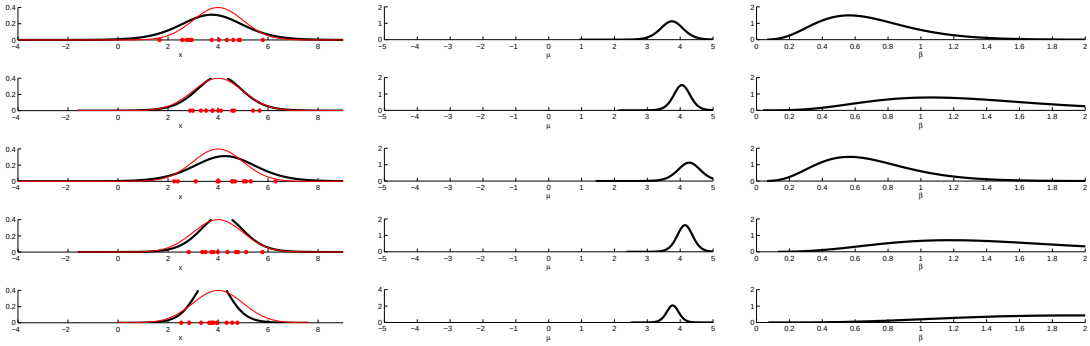
(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

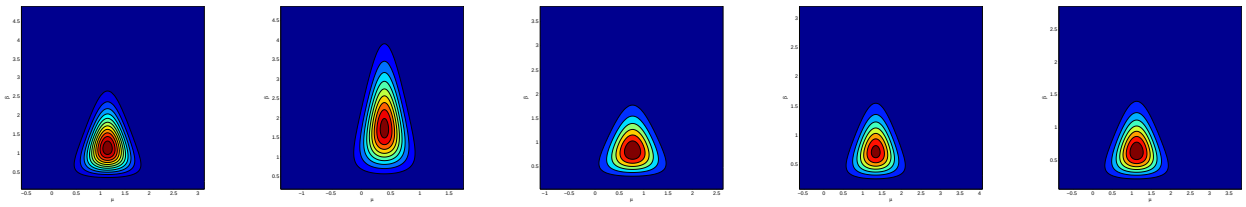
Figure 11S: Bayesian inferences on five datasets, each of which contains $n_v = 11$ detect data out of $n = 12$ samples.



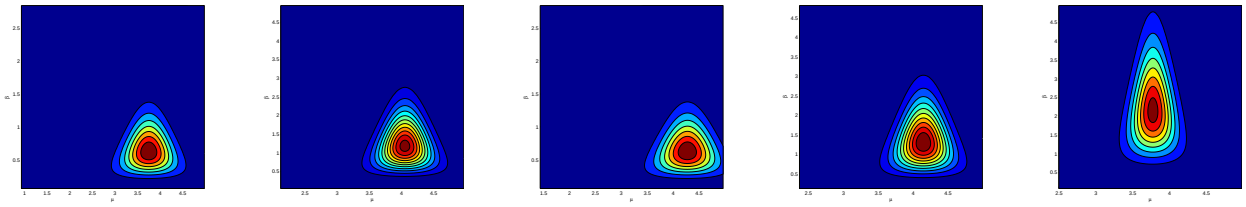
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$

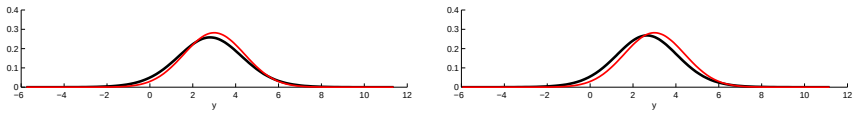


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



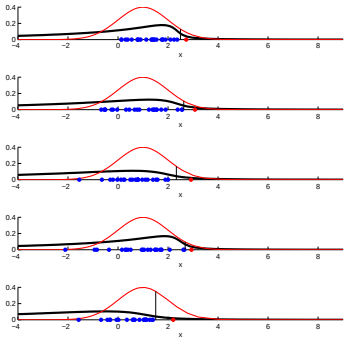
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

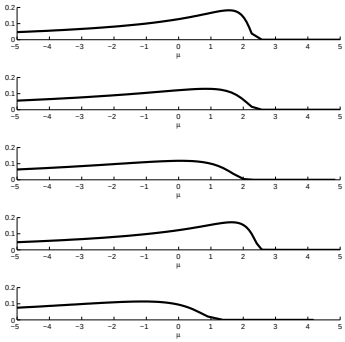


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

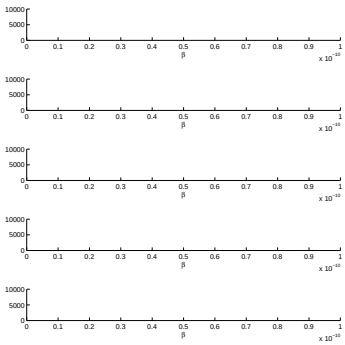
Figure 12S: Bayesian inferences on five datasets, each of which contains $n_v = 12$ detect data out of $n = 12$ samples.



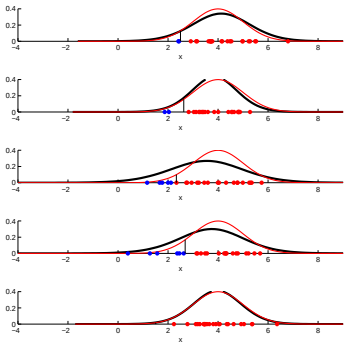
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



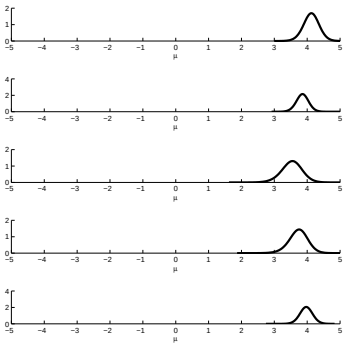
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



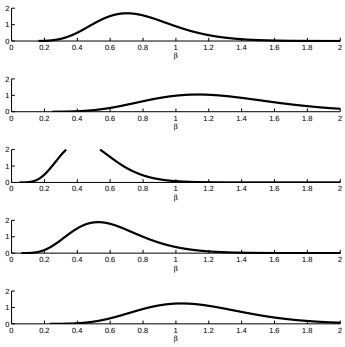
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



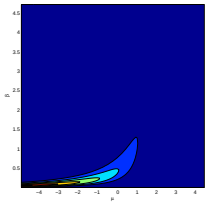
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



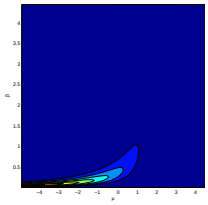
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



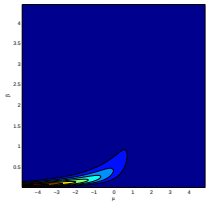
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



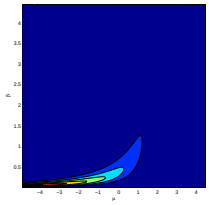
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



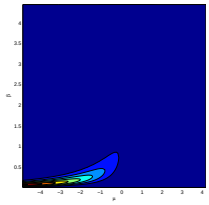
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



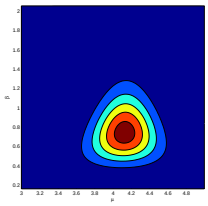
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



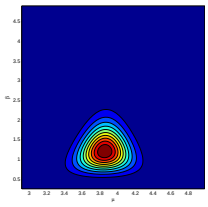
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



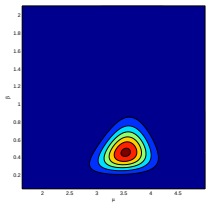
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



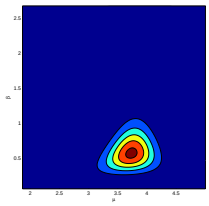
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



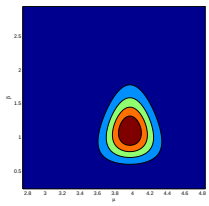
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



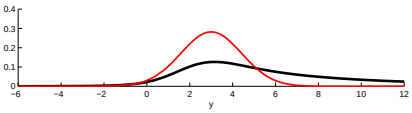
(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$



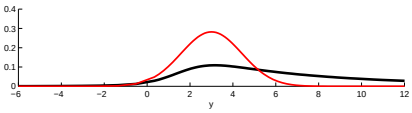
(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$



(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$



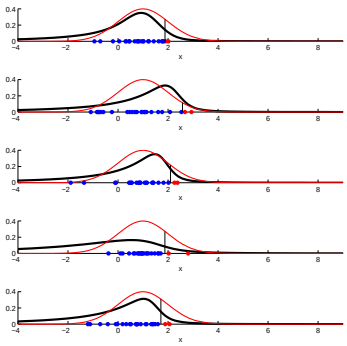
(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

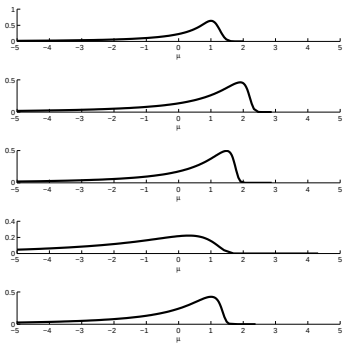
(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

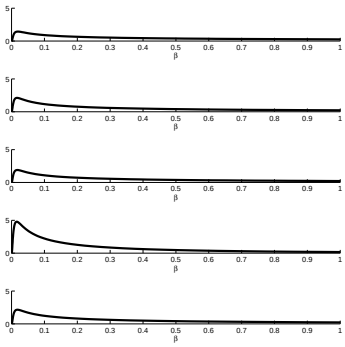
Figure 13S: Bayesian inferences on five datasets, each of which contains $n_v = 1$ detect data out of $n = 24$ samples.



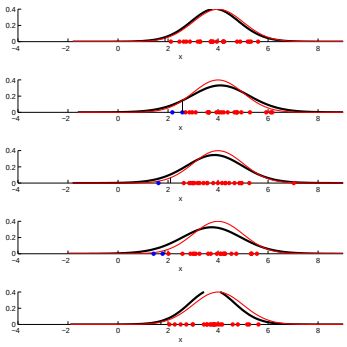
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



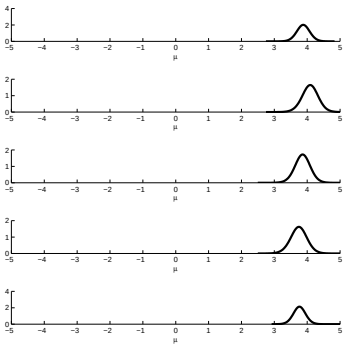
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



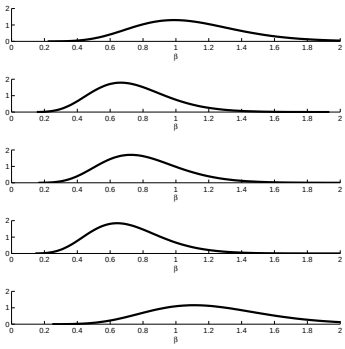
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



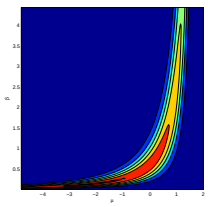
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



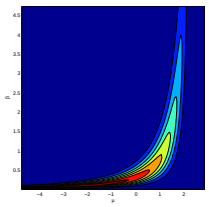
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



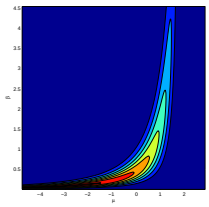
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



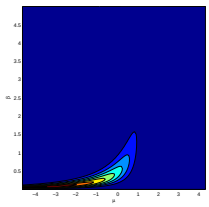
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



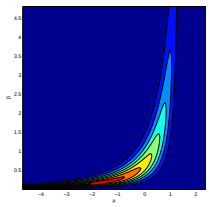
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



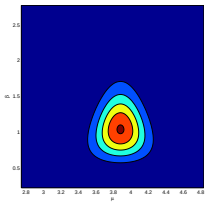
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



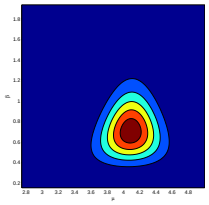
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



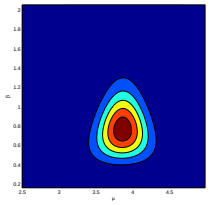
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



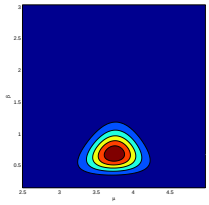
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



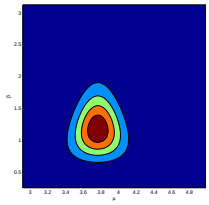
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$

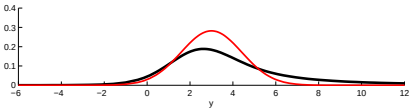


(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$



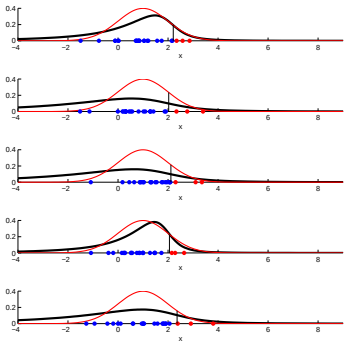
(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

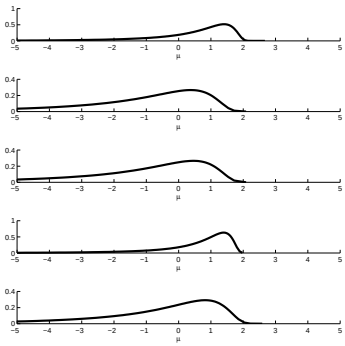
(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

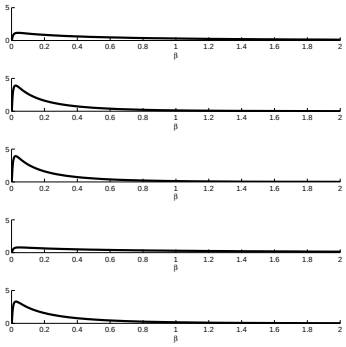
Figure 14S: Bayesian inferences on five datasets, each of which contains $n_v = 2$ detect data out of $n = 24$ samples.



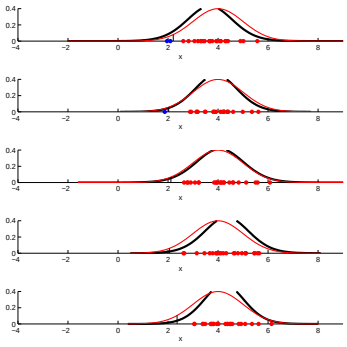
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



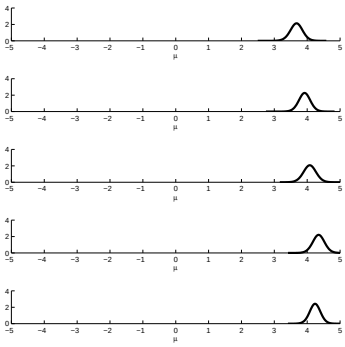
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



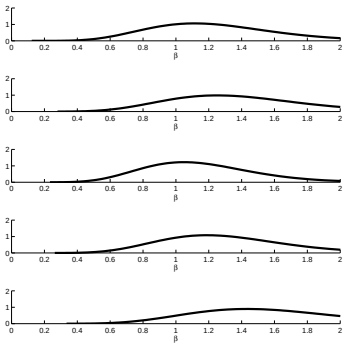
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



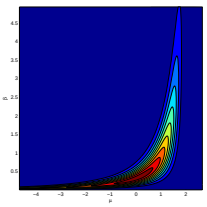
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



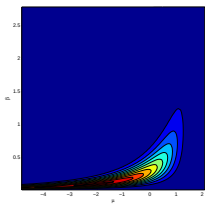
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



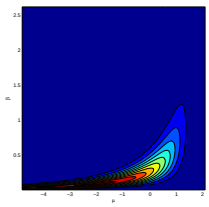
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



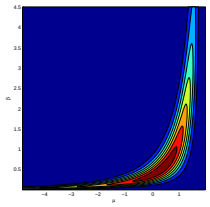
(g-1) $p(\mu, \beta|\mathcal{X}_{1,\text{post}})$



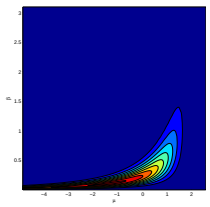
(g-2) $p(\mu, \beta|\mathcal{X}_{2,\text{post}})$



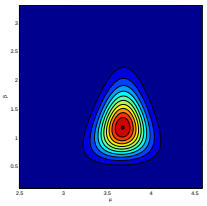
(g-3) $p(\mu, \beta|\mathcal{X}_{3,\text{post}})$



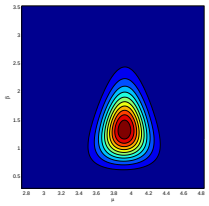
(g-4) $p(\mu, \beta|\mathcal{X}_{4,\text{post}})$



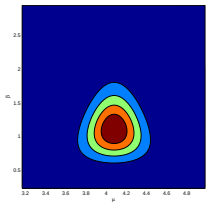
(g-5) $p(\mu, \beta|\mathcal{X}_{5,\text{post}})$



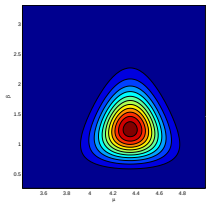
(h-1) $p(\mu, \beta|\mathcal{X}_{1,\text{pre}})$



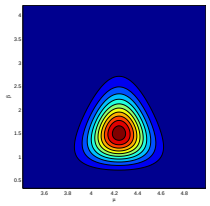
(h-2) $p(\mu, \beta|\mathcal{X}_{2,\text{pre}})$



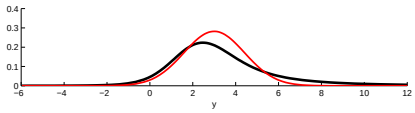
(h-3) $p(\mu, \beta|\mathcal{X}_{3,\text{pre}})$



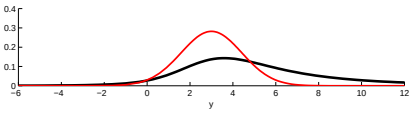
(h-4) $p(\mu, \beta|\mathcal{X}_{4,\text{pre}})$



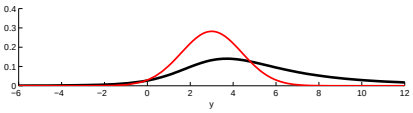
(h-5) $p(\mu, \beta|\mathcal{X}_{5,\text{pre}})$



(i-1) $p(y|\mathcal{X}_{1,\text{pre}}, \mathcal{X}_{1,\text{post}})$

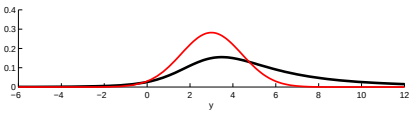


(i-2) $p(y|\mathcal{X}_{2,\text{pre}}, \mathcal{X}_{2,\text{post}})$



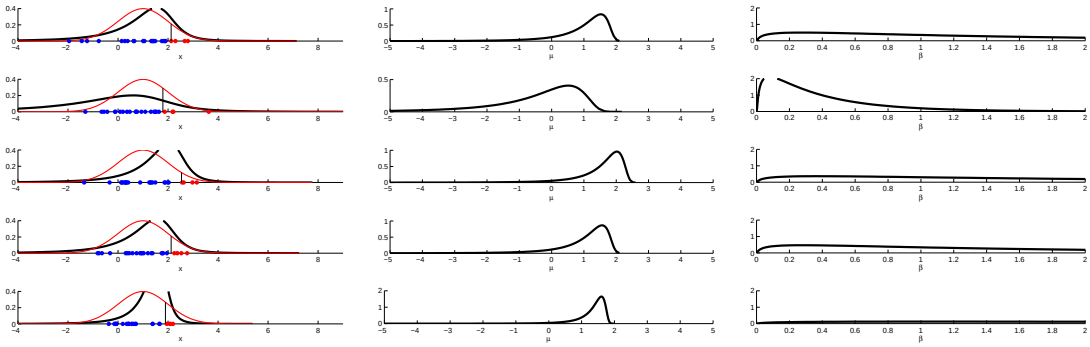
(i-3) $p(y|\mathcal{X}_{3,\text{pre}}, \mathcal{X}_{3,\text{post}})$

(i-4) $p(y|\mathcal{X}_{4,\text{pre}}, \mathcal{X}_{4,\text{post}})$

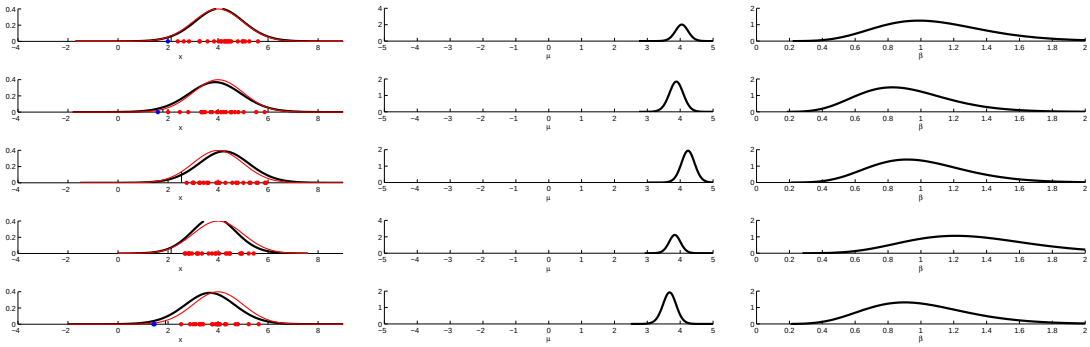


(i-5) $p(y|\mathcal{X}_{5,\text{pre}}, \mathcal{X}_{5,\text{post}})$

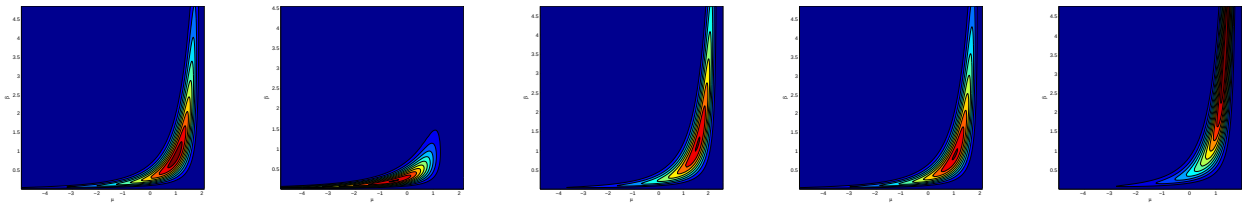
Figure 15S: Bayesian inferences on five datasets, each of which contains $n_v = 3$ detect data out of $n = 24$ samples.



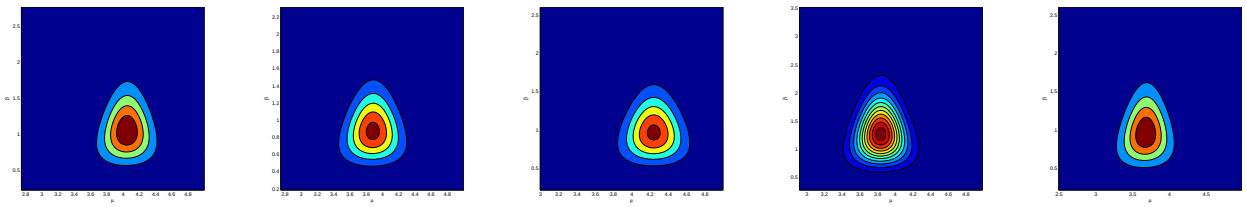
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$

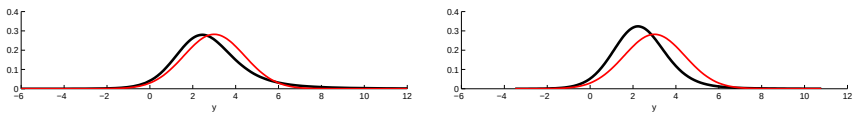


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



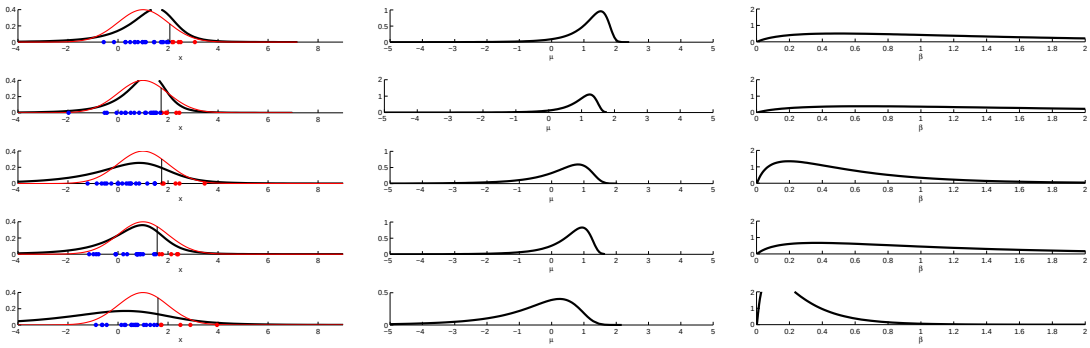
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

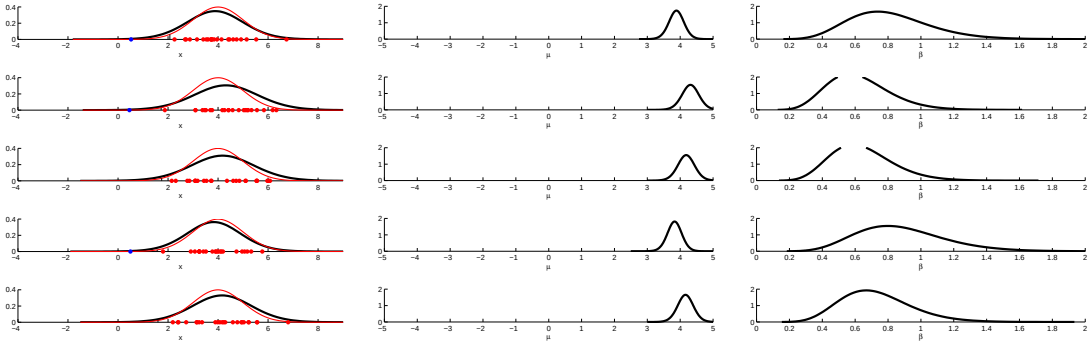


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

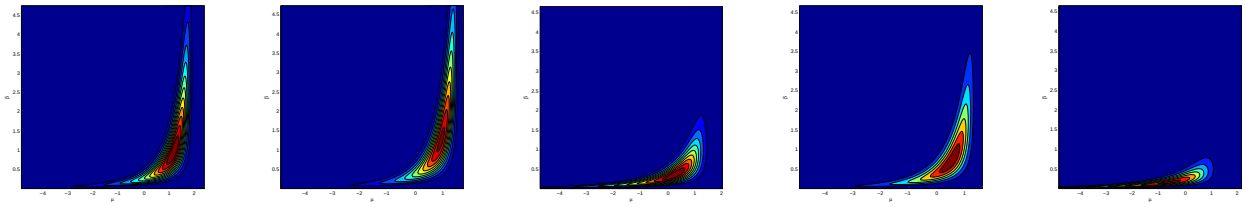
Figure 16S: Bayesian inferences on five datasets, each of which contains $n_v = 4$ detect data out of $n = 24$ samples.



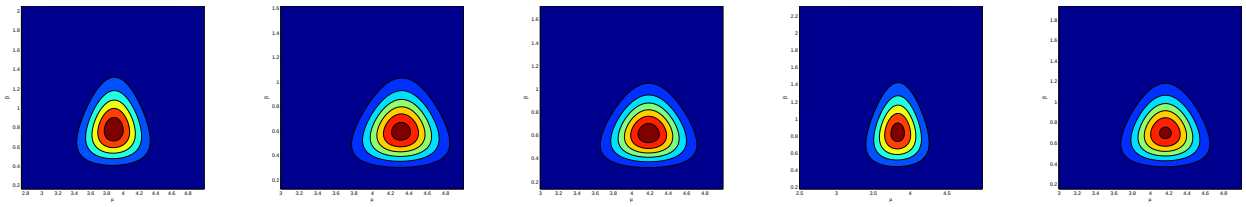
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$

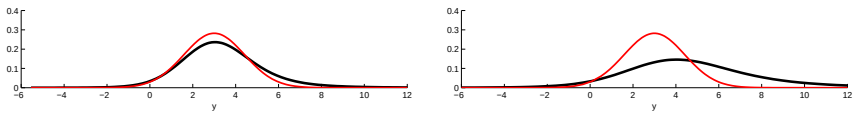


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



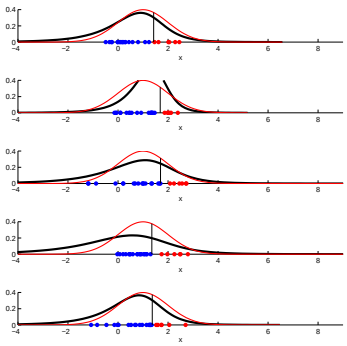
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

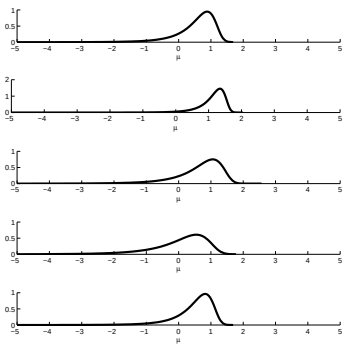


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

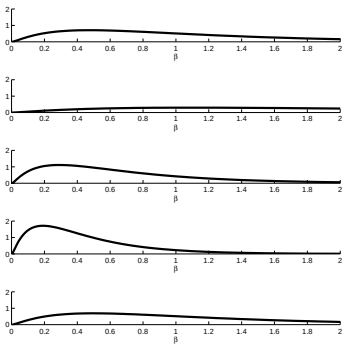
Figure 17S: Bayesian inferences on five datasets, each of which contains $n_v = 5$ detect data out of $n = 24$ samples.



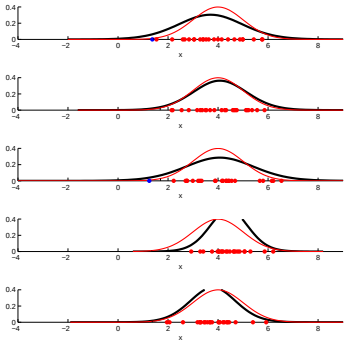
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



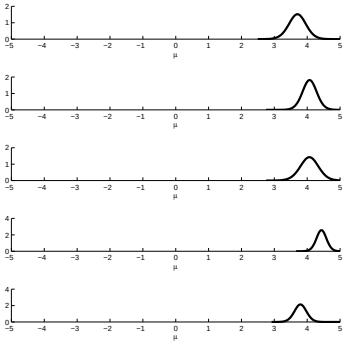
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



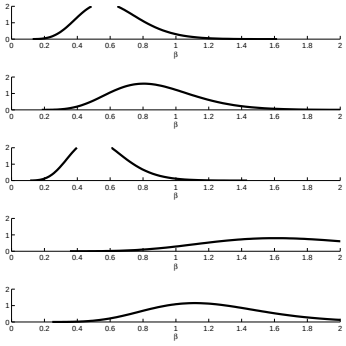
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



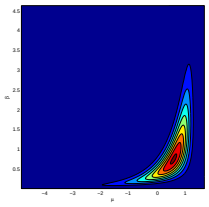
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



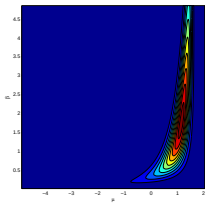
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



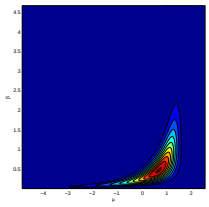
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



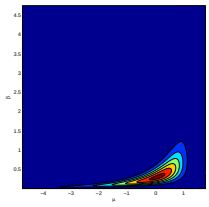
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



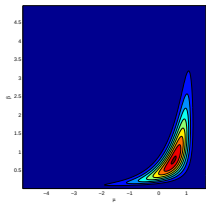
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



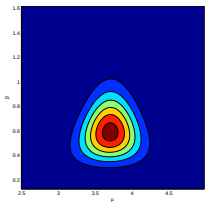
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



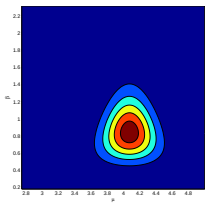
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



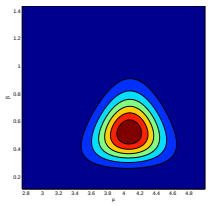
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



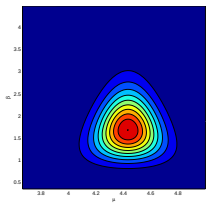
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



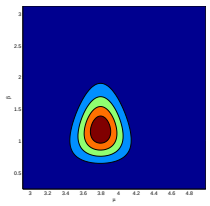
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$

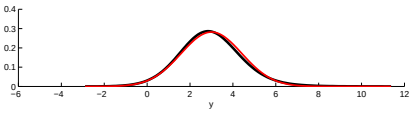


(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



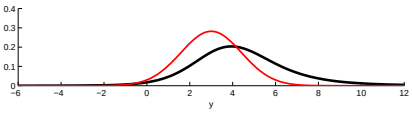
(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$



(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

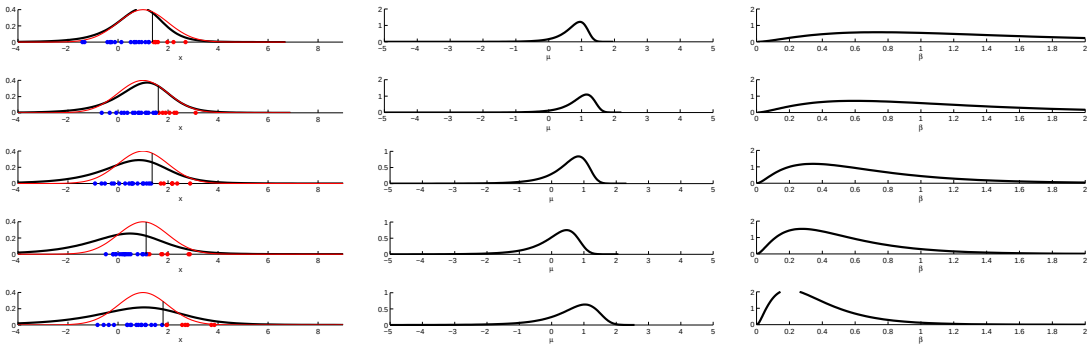
(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$



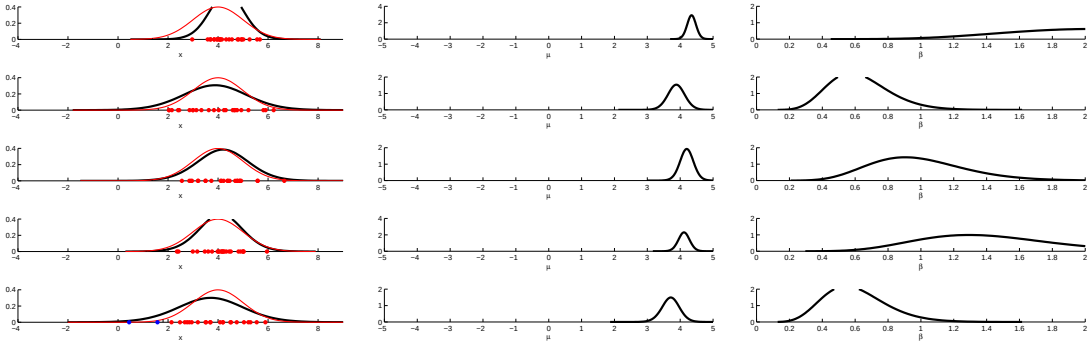
(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

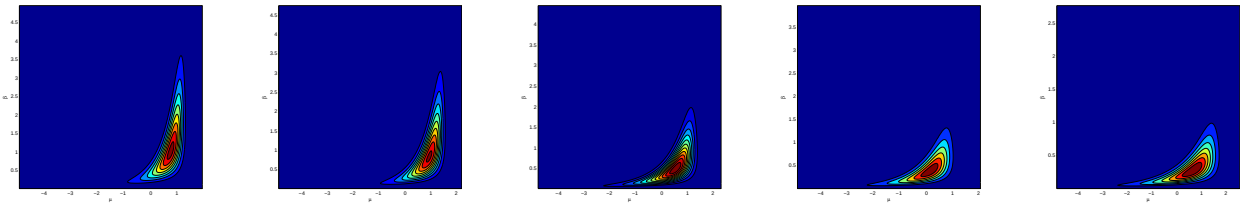
Figure 18S: Bayesian inferences on five datasets, each of which contains $n_v = 6$ detect data out of $n = 24$ samples.



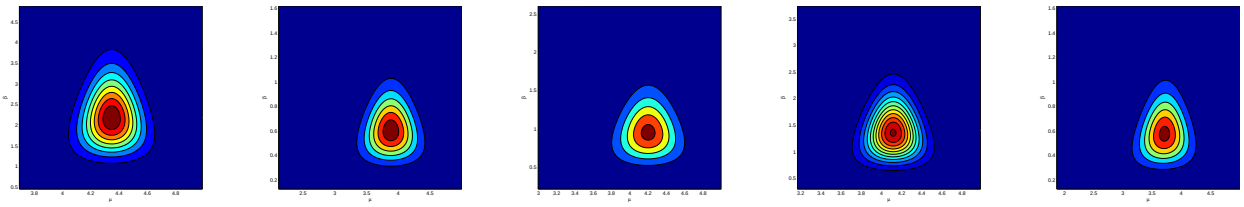
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$

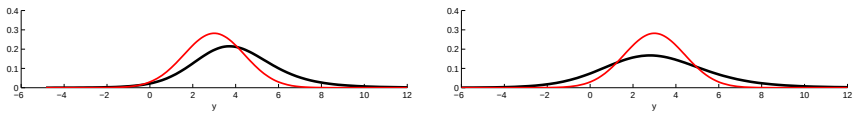


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



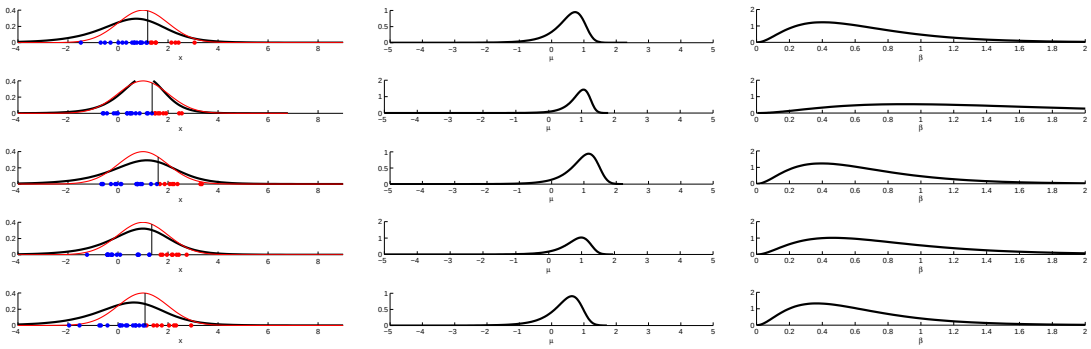
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

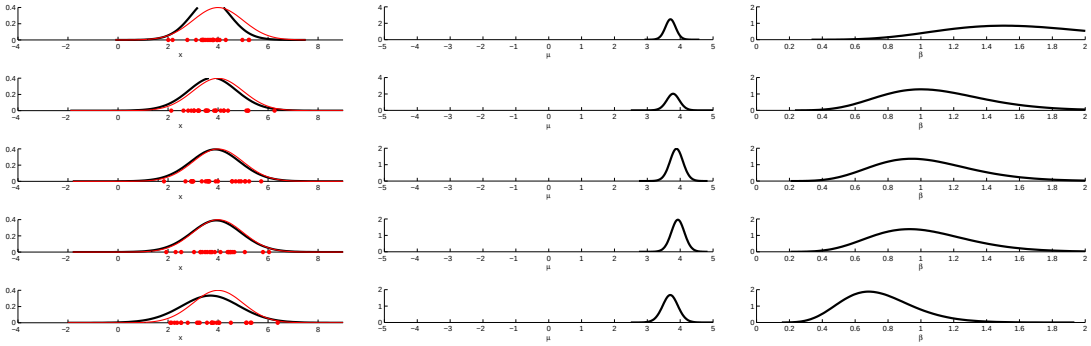


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

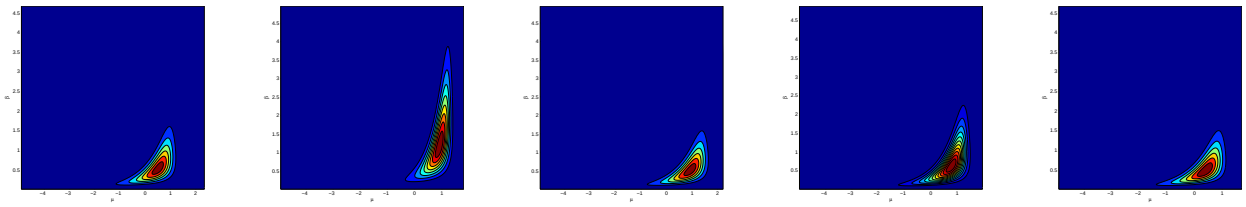
Figure 19S: Bayesian inferences on five datasets, each of which contains $n_v = 7$ detect data out of $n = 24$ samples.



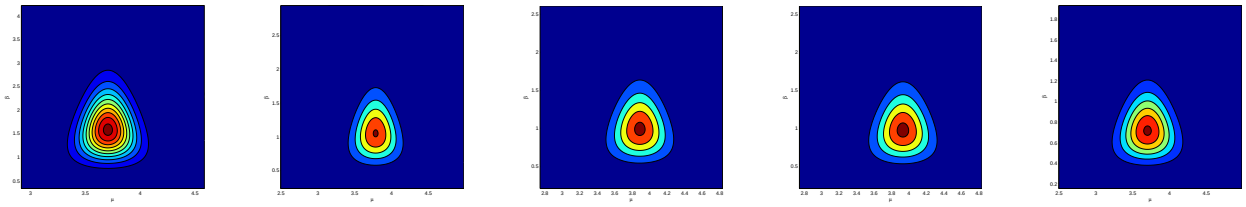
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



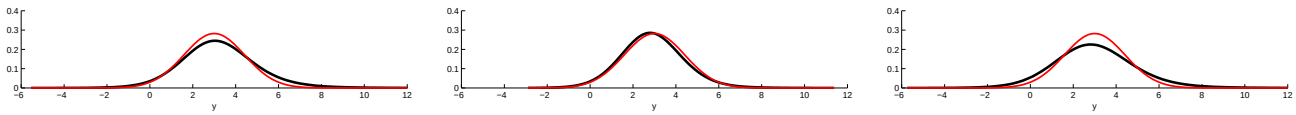
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



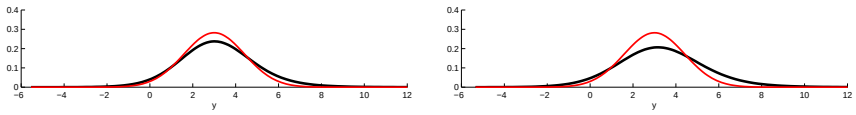
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

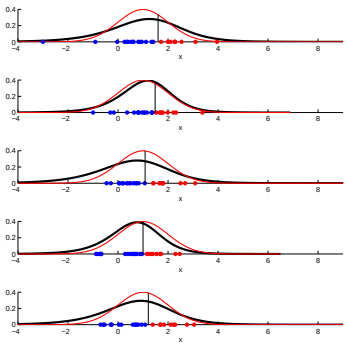


(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

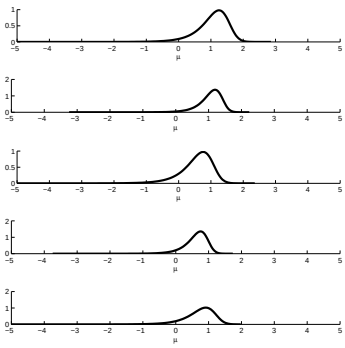


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

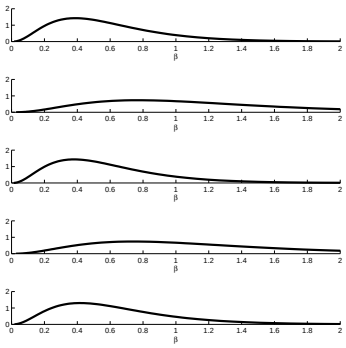
Figure 20S: Bayesian inferences on five datasets, each of which contains $n_v = 8$ detect data out of $n = 24$ samples.



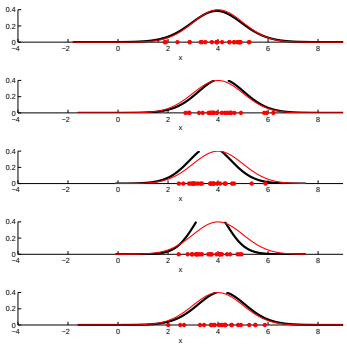
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



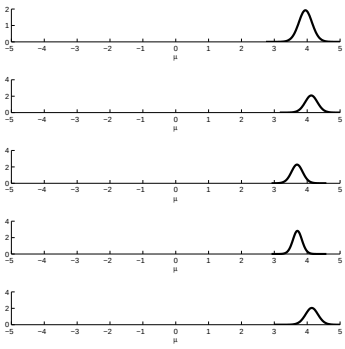
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



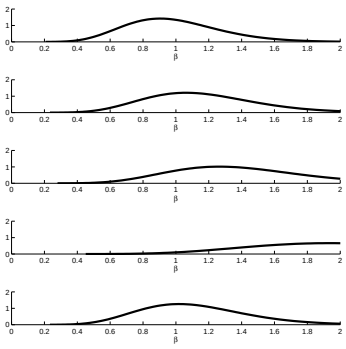
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



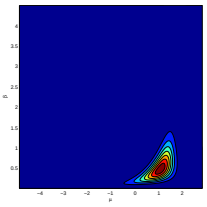
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



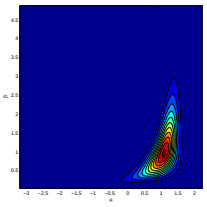
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



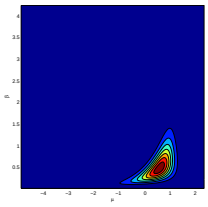
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



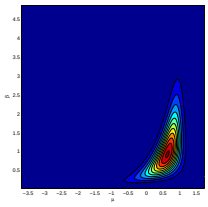
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



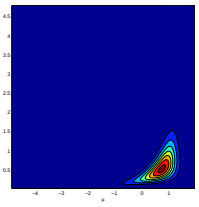
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



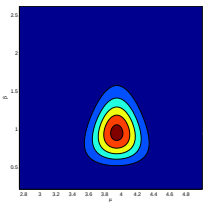
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



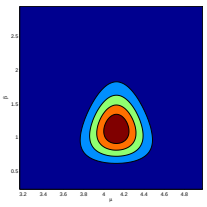
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



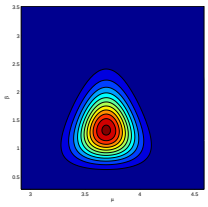
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



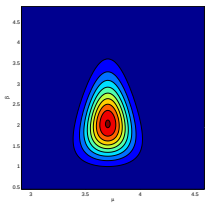
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



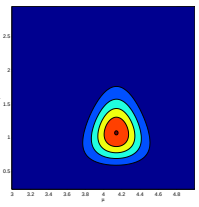
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



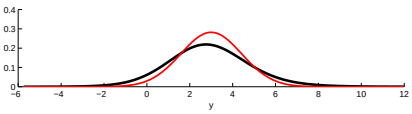
(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$



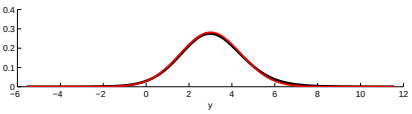
(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$



(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$



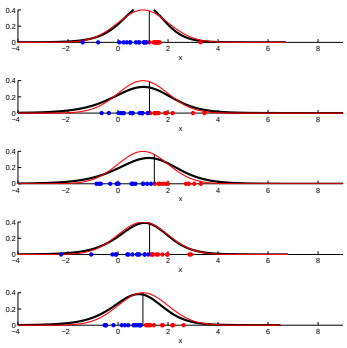
(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

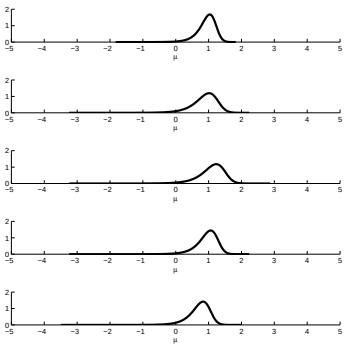
(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

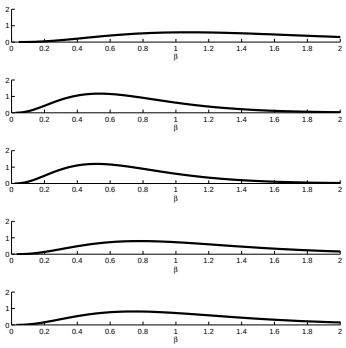
Figure 21S: Bayesian inferences on five datasets, each of which contains $n_v = 9$ detect data out of $n = 24$ samples.



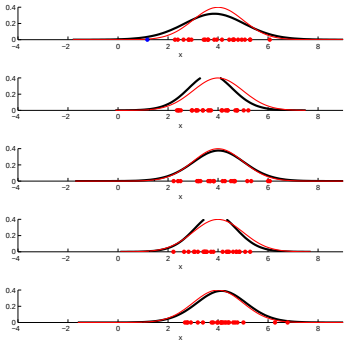
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



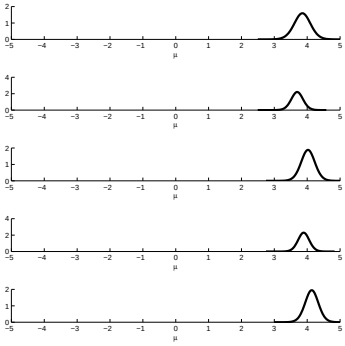
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



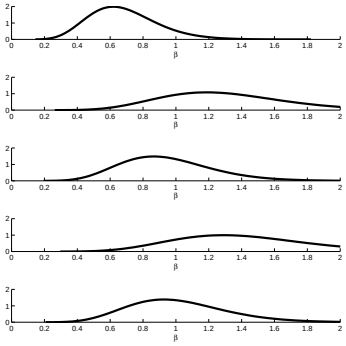
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



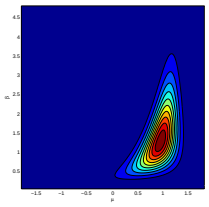
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



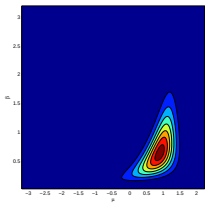
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



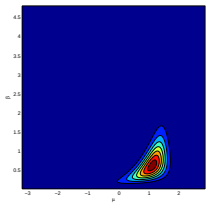
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



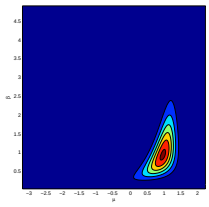
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



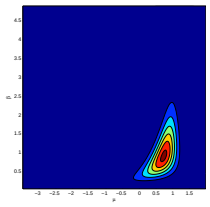
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



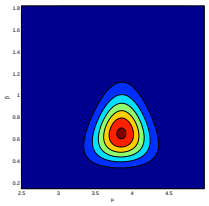
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



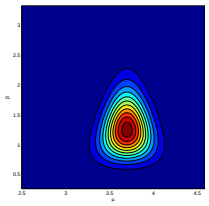
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



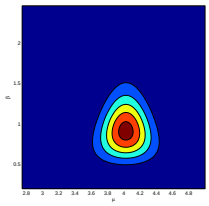
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



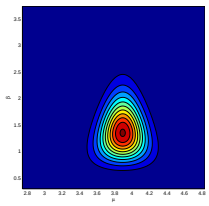
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



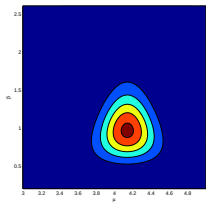
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$



(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$

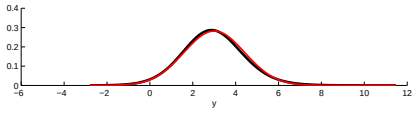


(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$

(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

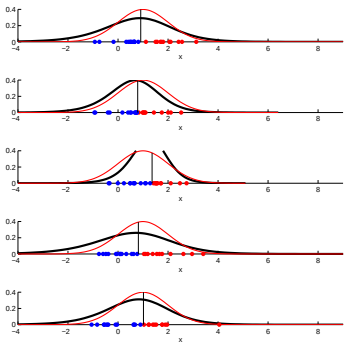
(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$



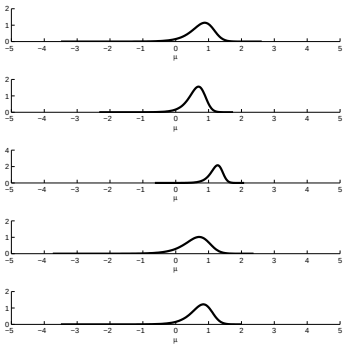
(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

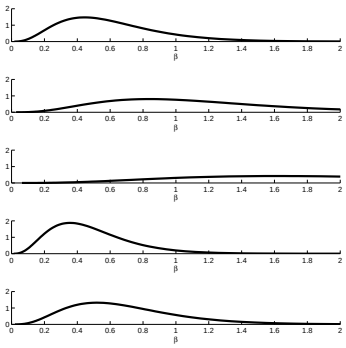
Figure 22S: Bayesian inferences on five datasets, each of which contains $n_v = 10$ detect data out of $n = 24$ samples.



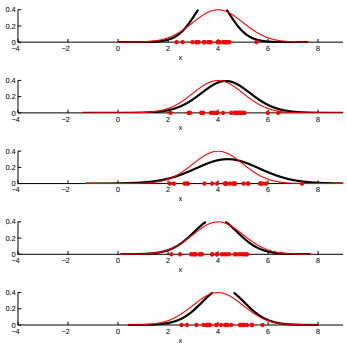
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



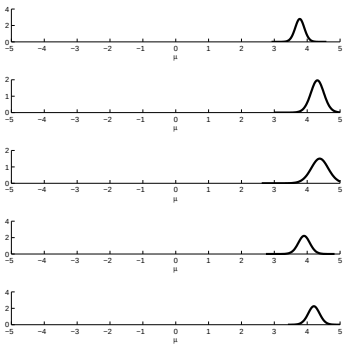
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



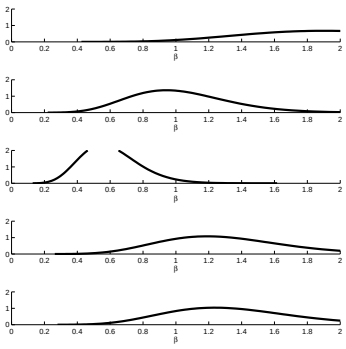
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



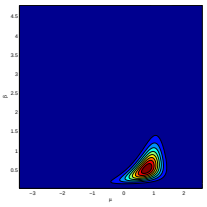
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



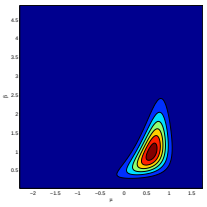
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



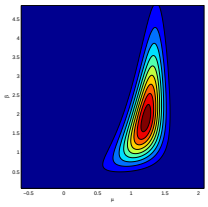
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



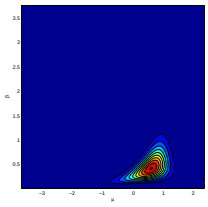
(g-1) $p(\mu, \beta|\mathcal{X}_{1,\text{post}})$



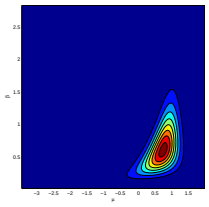
(g-2) $p(\mu, \beta|\mathcal{X}_{2,\text{post}})$



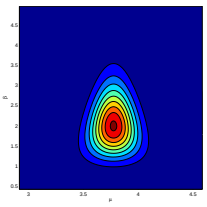
(g-3) $p(\mu, \beta|\mathcal{X}_{3,\text{post}})$



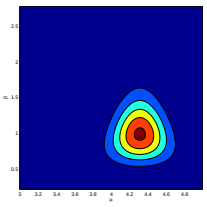
(g-4) $p(\mu, \beta|\mathcal{X}_{4,\text{post}})$



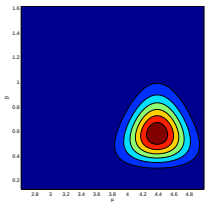
(g-5) $p(\mu, \beta|\mathcal{X}_{5,\text{post}})$



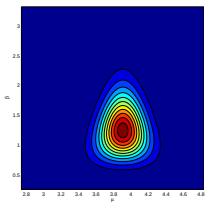
(h-1) $p(\mu, \beta|\mathcal{X}_{1,\text{pre}})$



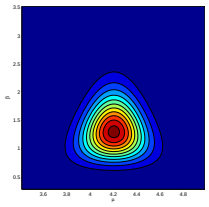
(h-2) $p(\mu, \beta|\mathcal{X}_{2,\text{pre}})$



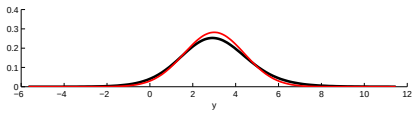
(h-3) $p(\mu, \beta|\mathcal{X}_{3,\text{pre}})$



(h-4) $p(\mu, \beta|\mathcal{X}_{4,\text{pre}})$

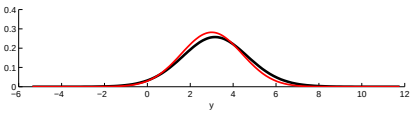


(h-5) $p(\mu, \beta|\mathcal{X}_{5,\text{pre}})$

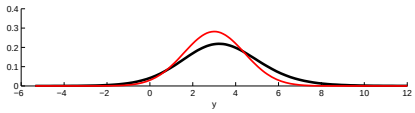


(i-1) $p(y|\mathcal{X}_{1,\text{pre}}, \mathcal{X}_{1,\text{post}})$

(i-2) $p(y|\mathcal{X}_{2,\text{pre}}, \mathcal{X}_{2,\text{post}})$



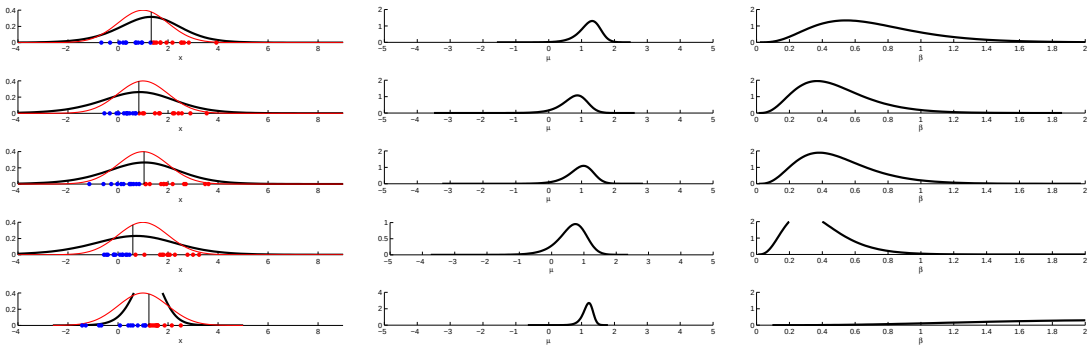
(i-3) $p(y|\mathcal{X}_{3,\text{pre}}, \mathcal{X}_{3,\text{post}})$



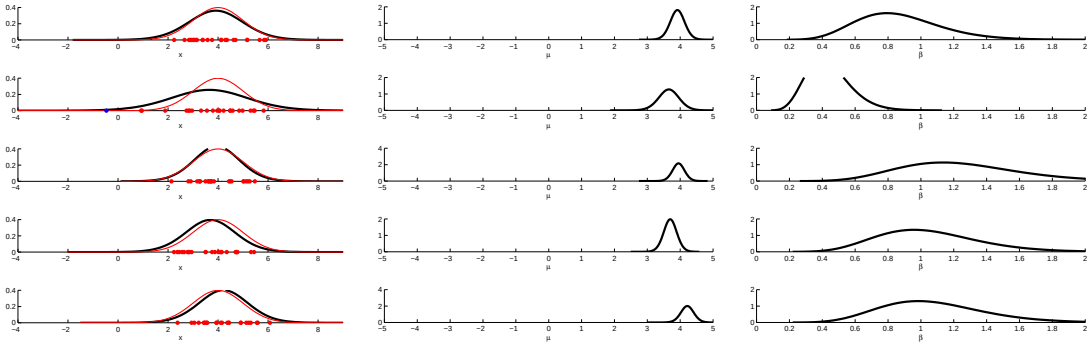
(i-4) $p(y|\mathcal{X}_{4,\text{pre}}, \mathcal{X}_{4,\text{post}})$

(i-5) $p(y|\mathcal{X}_{5,\text{pre}}, \mathcal{X}_{5,\text{post}})$

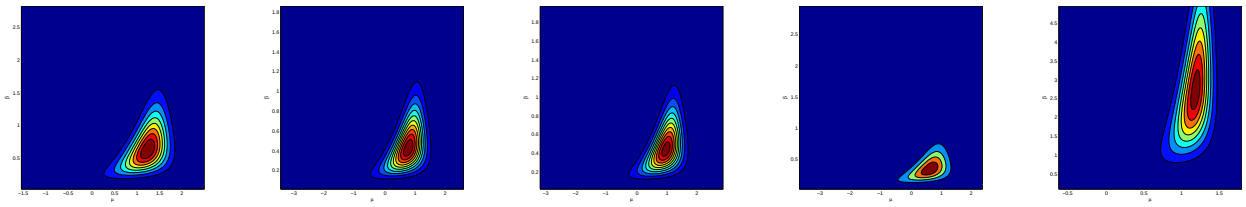
Figure 23S: Bayesian inferences on five datasets, each of which contains $n_v = 11$ detect data out of $n = 24$ samples.



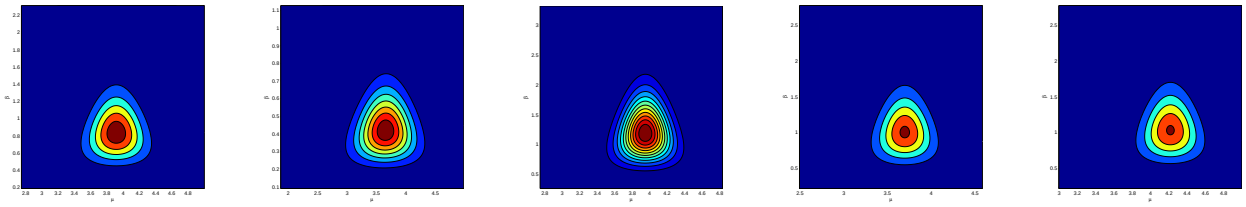
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$

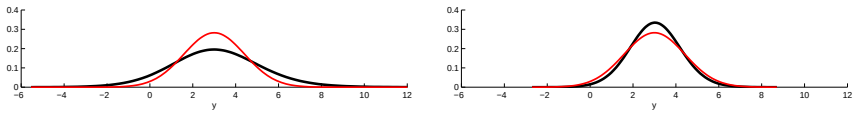


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



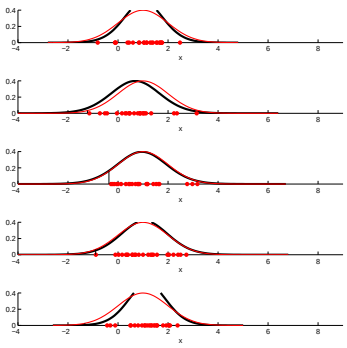
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

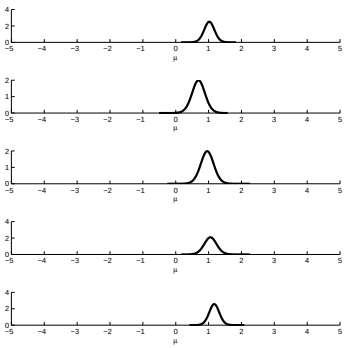


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

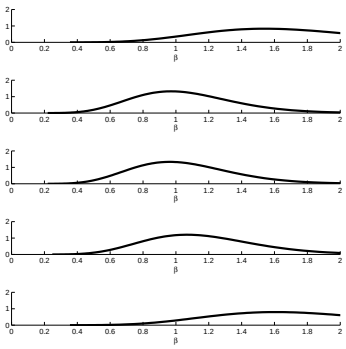
Figure 24S: Bayesian inferences on five datasets, each of which contains $n_v = 12$ detect data out of $n = 24$ samples.



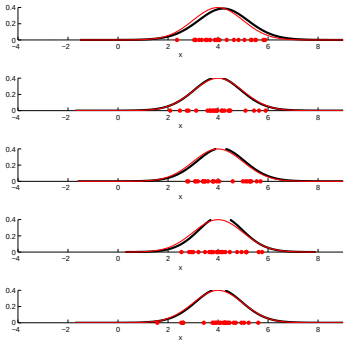
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



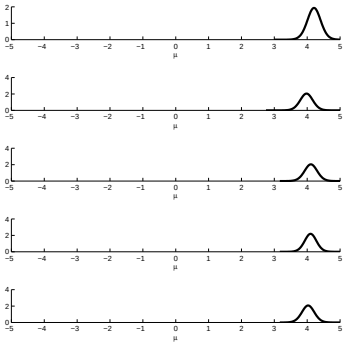
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



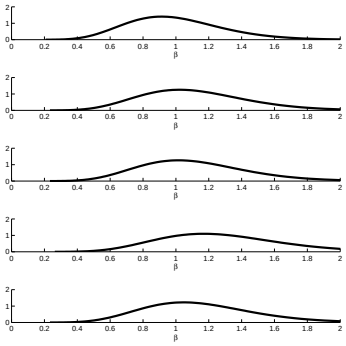
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



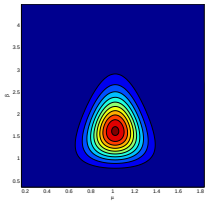
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



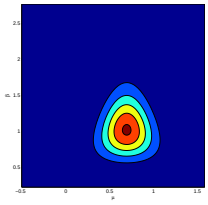
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



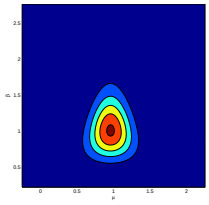
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



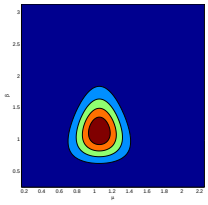
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



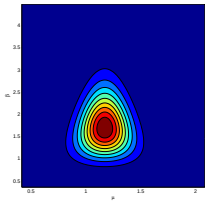
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



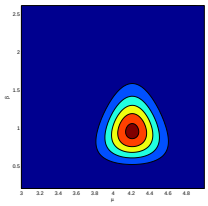
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



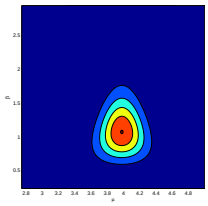
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



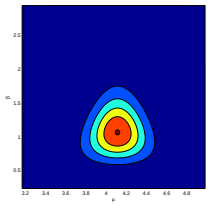
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



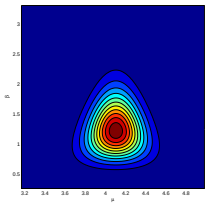
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



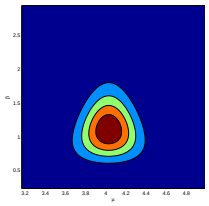
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



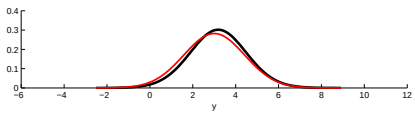
(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$



(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$

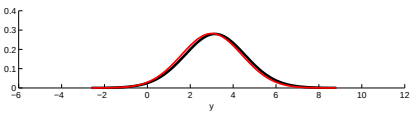


(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

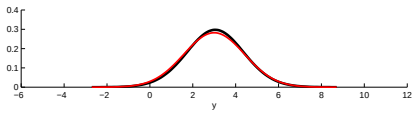


(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$

(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$



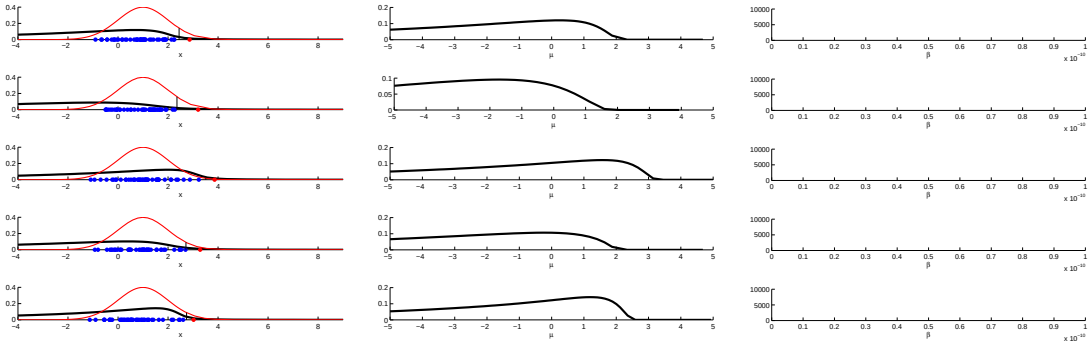
(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$



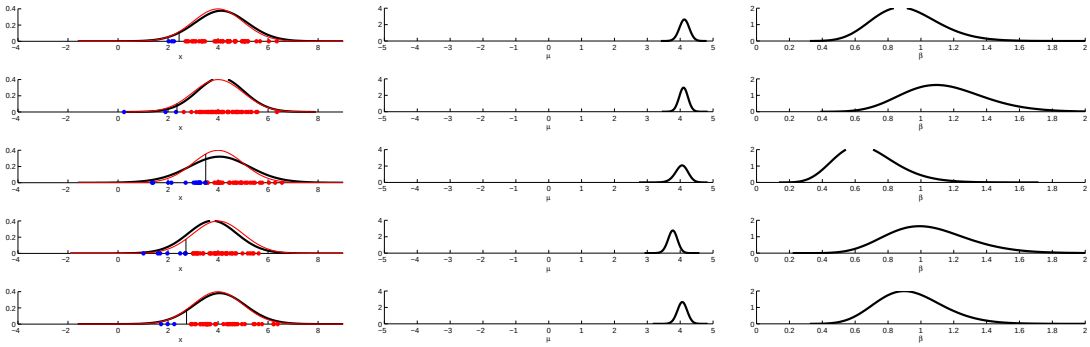
(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

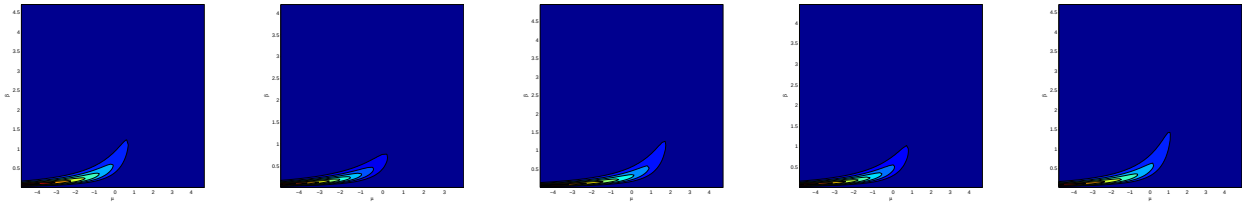
Figure 25S: Bayesian inferences on five datasets, each of which contains $n_v = 24$ detect data out of $n = 24$ samples.



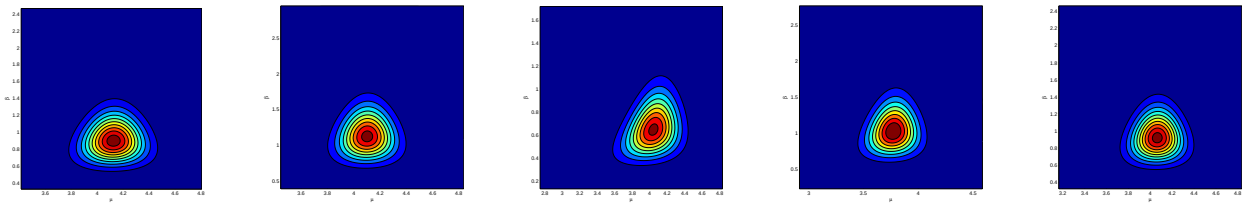
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$

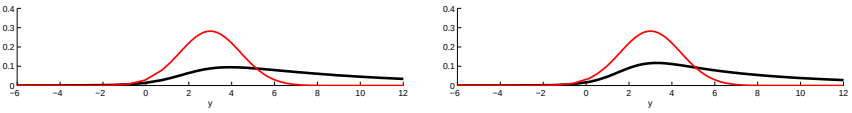


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



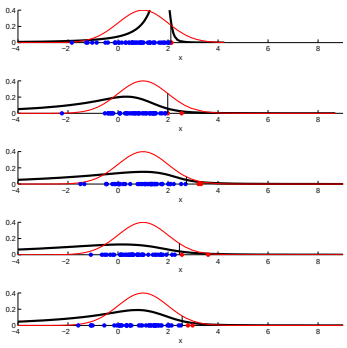
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

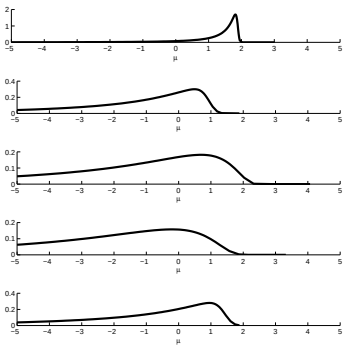


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

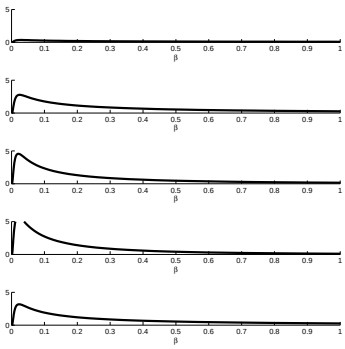
Figure 26S: Bayesian inferences on five datasets, each of which contains $n_v = 1$ detect data out of $n = 48$ samples.



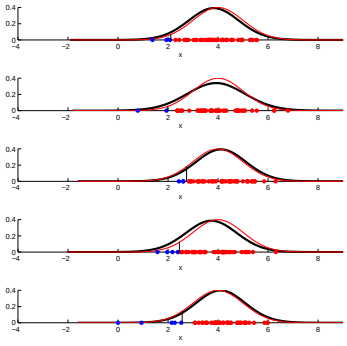
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



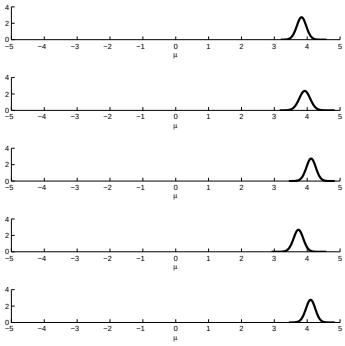
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



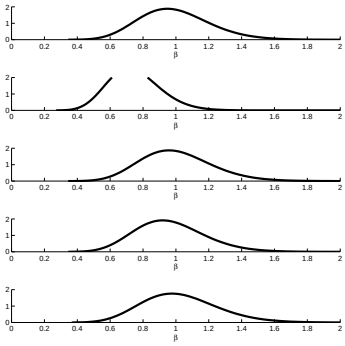
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



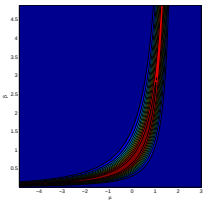
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



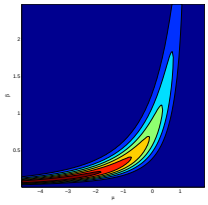
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



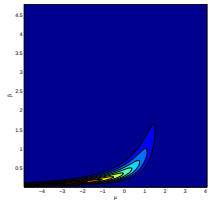
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



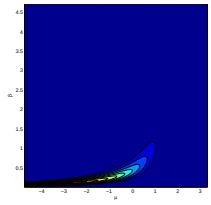
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



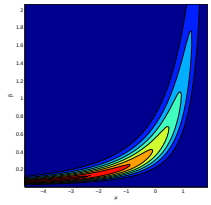
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



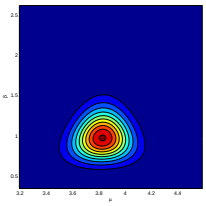
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



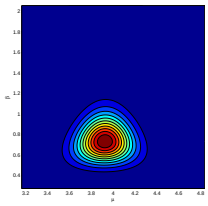
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



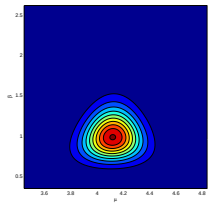
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



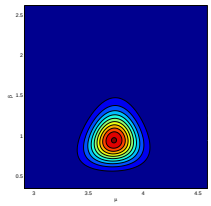
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



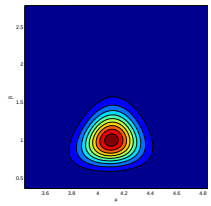
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$

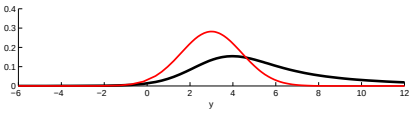


(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

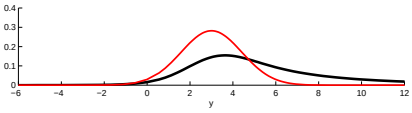
(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$



(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

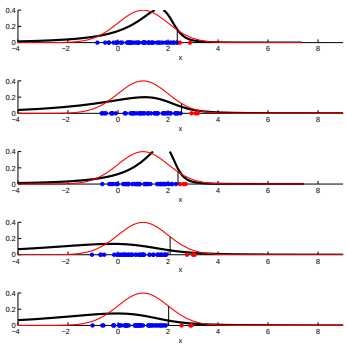
(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

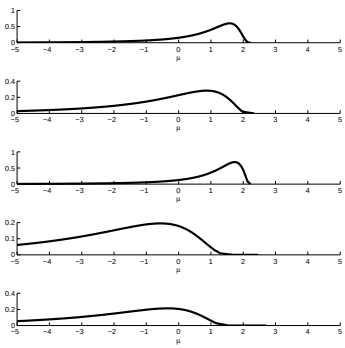


(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

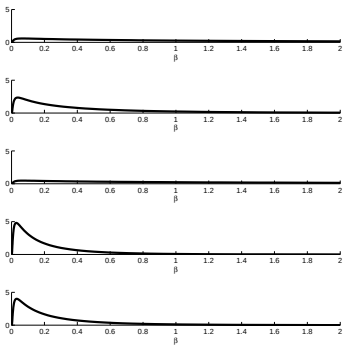
Figure 27S: Bayesian inferences on five datasets, each of which contains $n_v = 2$ detect data out of $n = 48$ samples.



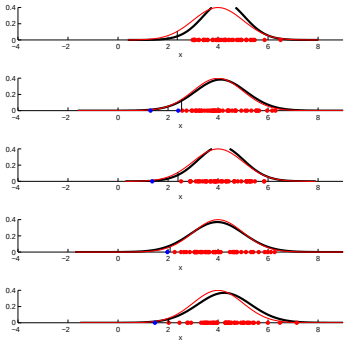
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



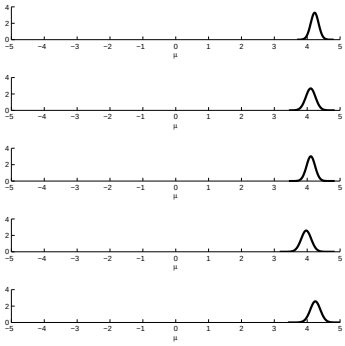
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



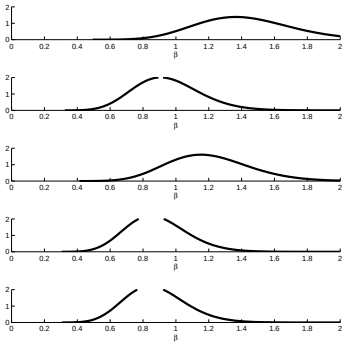
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



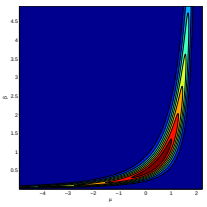
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



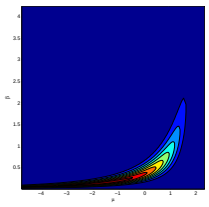
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



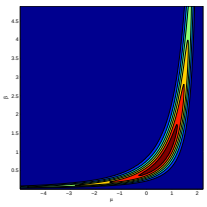
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



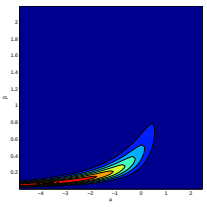
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



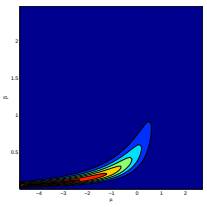
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



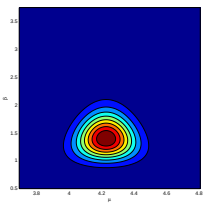
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



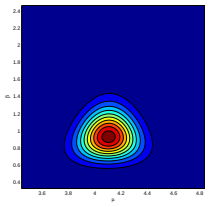
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



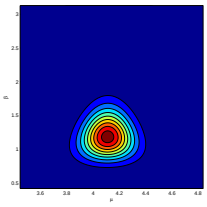
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



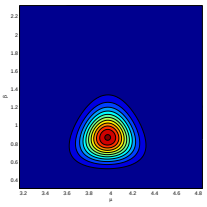
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



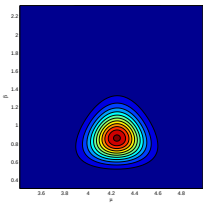
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



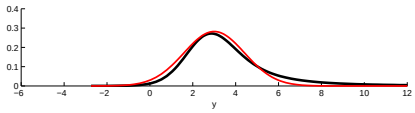
(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$



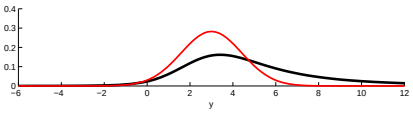
(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$



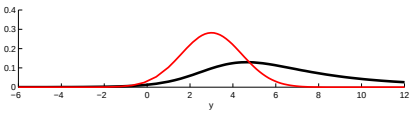
(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$



(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

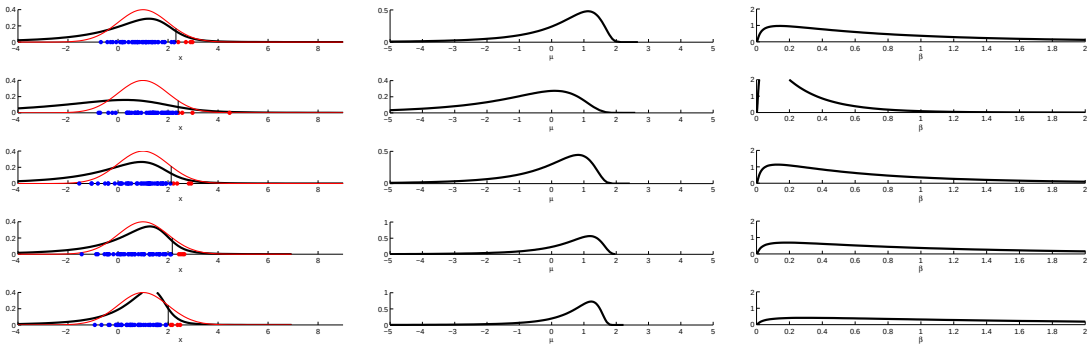
(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

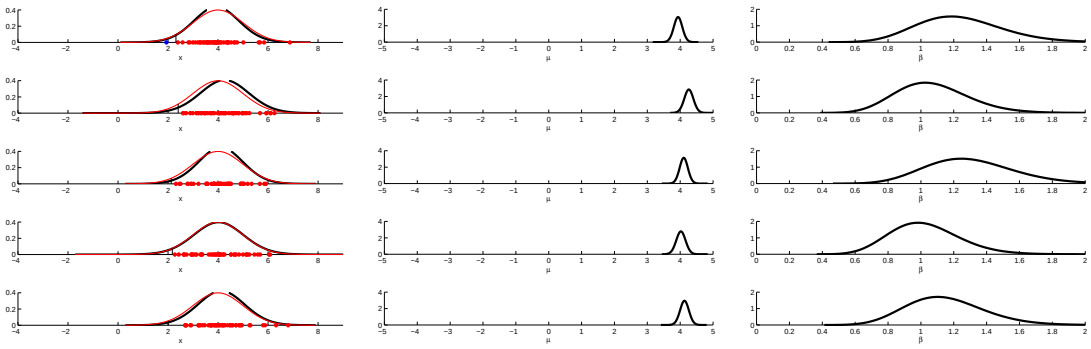


(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

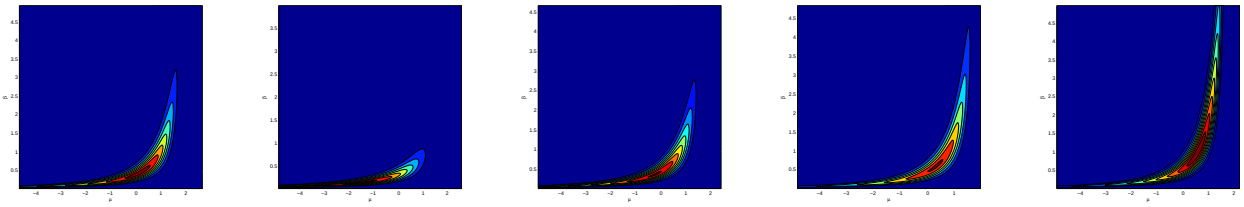
Figure 28S: Bayesian inferences on five datasets, each of which contains $n_v = 3$ detect data out of $n = 48$ samples.



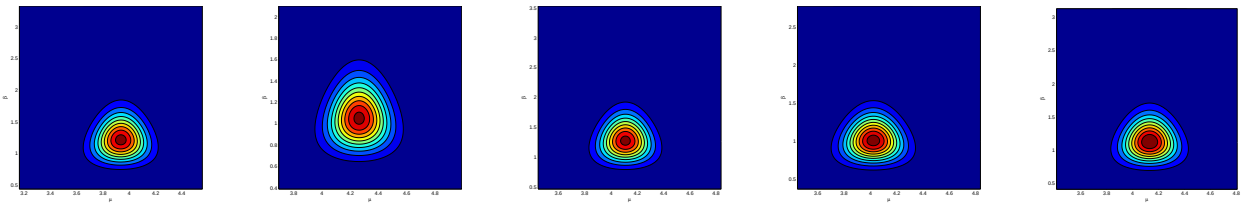
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



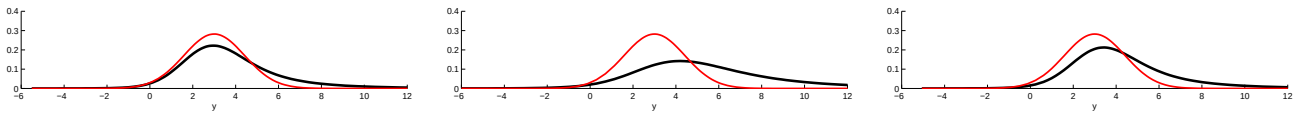
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



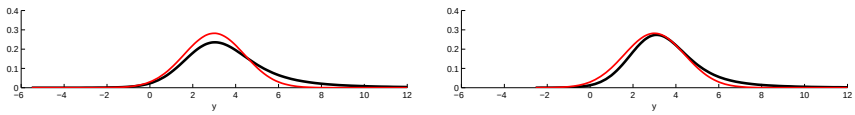
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

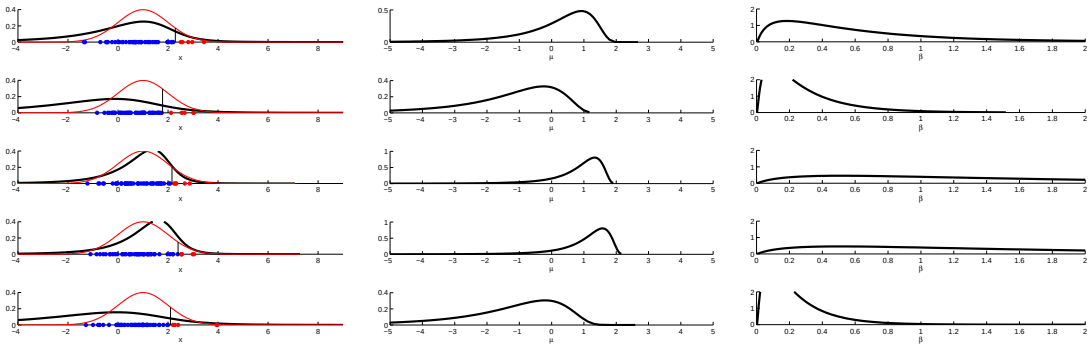


(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

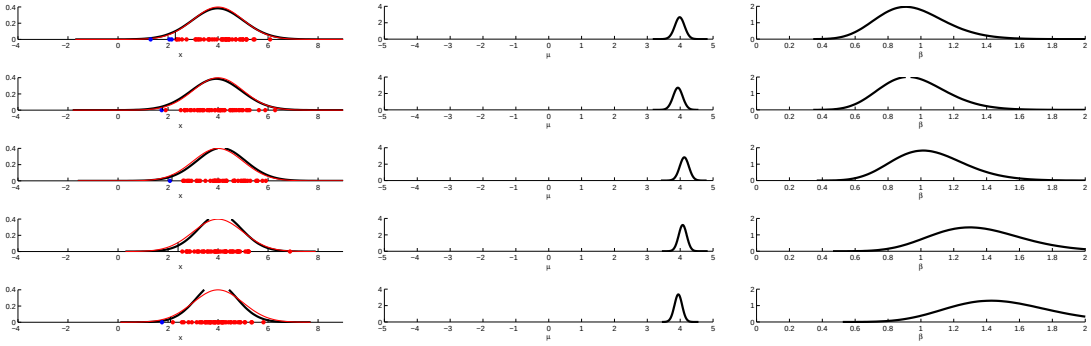


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

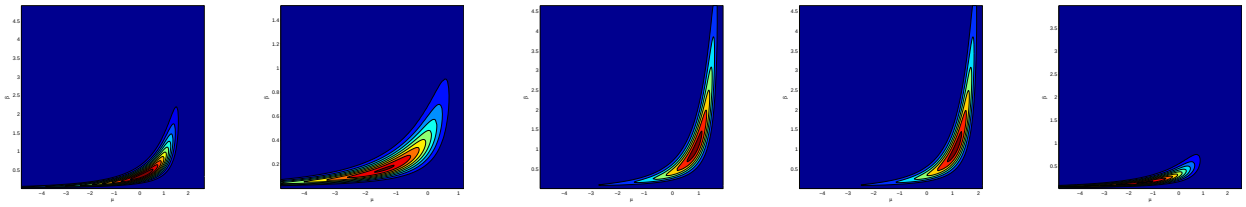
Figure 29S: Bayesian inferences on five datasets, each of which contains $n_v = 4$ detect data out of $n = 48$ samples.



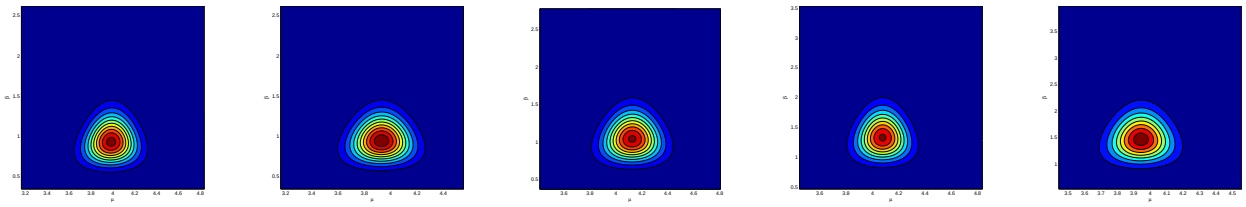
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$

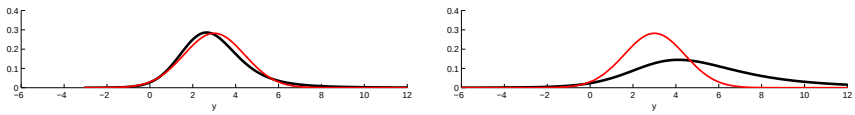


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



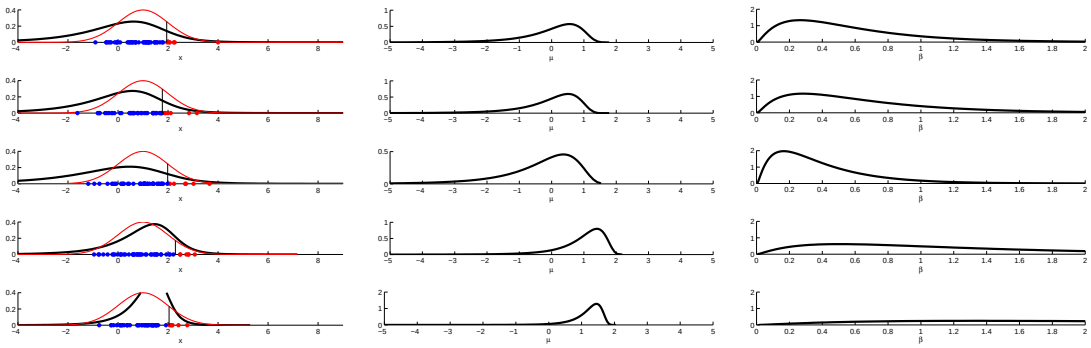
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

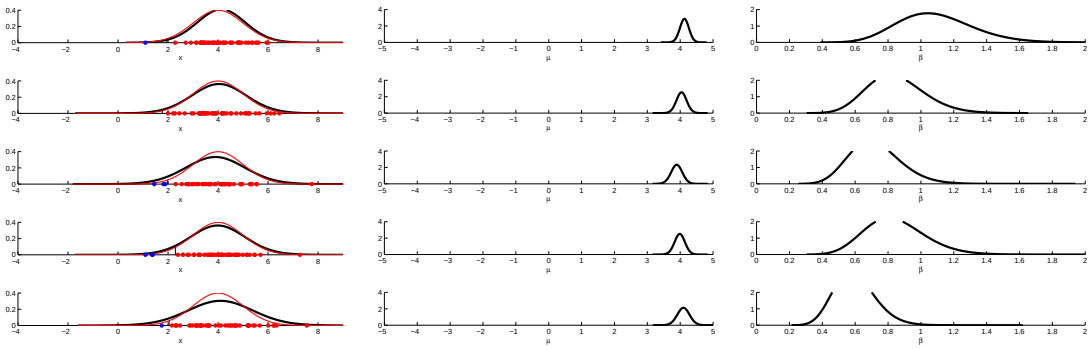


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

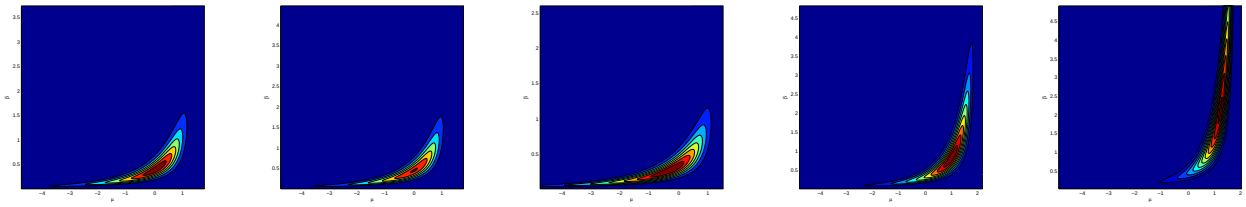
Figure 30S: Bayesian inferences on five datasets, each of which contains $n_v = 5$ detect data out of $n = 48$ samples.



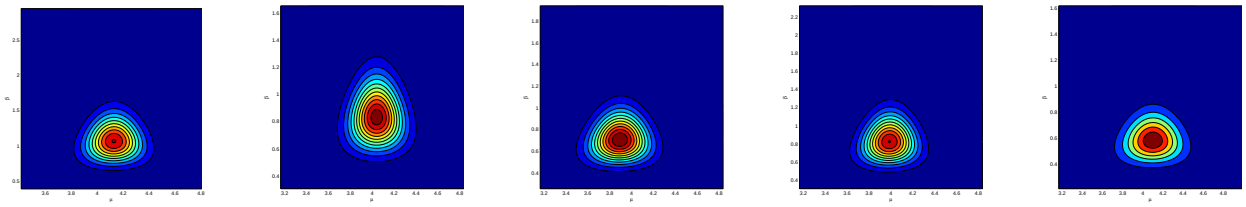
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$

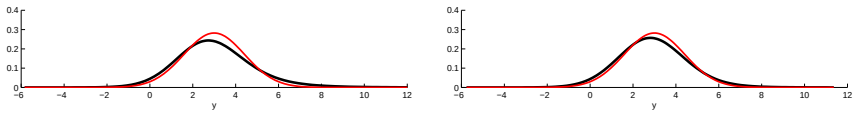


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



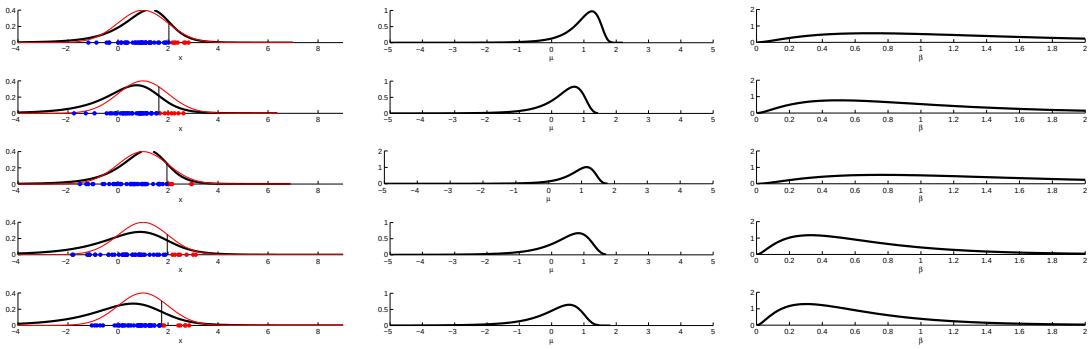
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

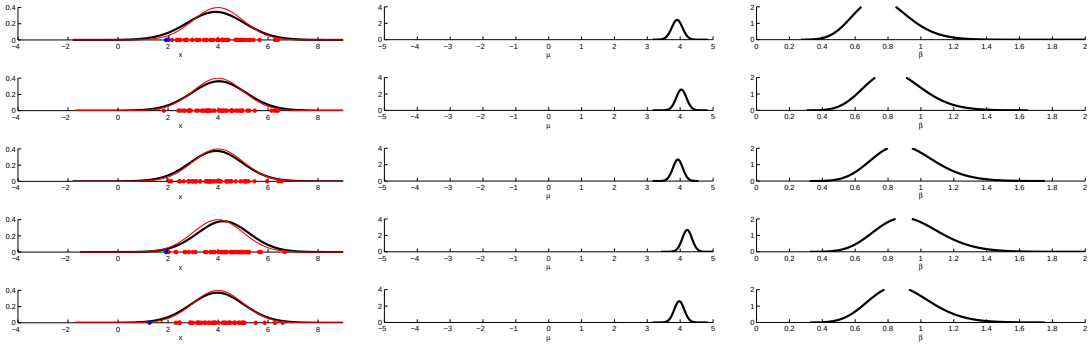


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

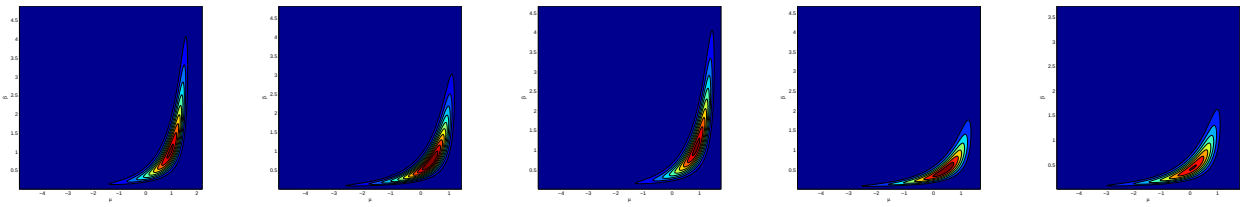
Figure 31S: Bayesian inferences on five datasets, each of which contains $n_v = 6$ detect data out of $n = 48$ samples.



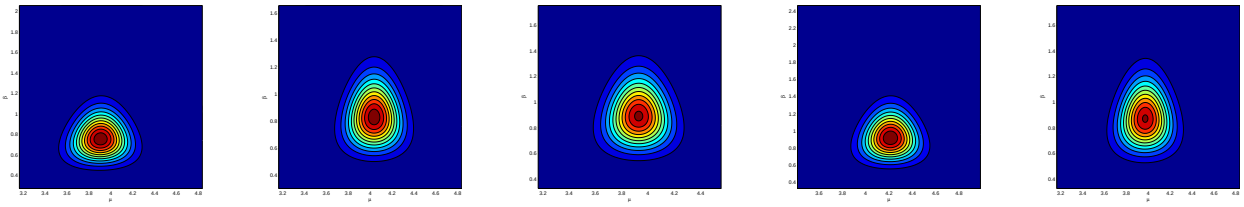
(a) $p(c_{\mathrm{post}}|\mathcal{X}_{k,\mathrm{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\mathrm{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\mathrm{post}})$



(d) $p(c_{\mathrm{pre}}|\mathcal{X}_{k,\mathrm{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\mathrm{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\mathrm{pre}})$

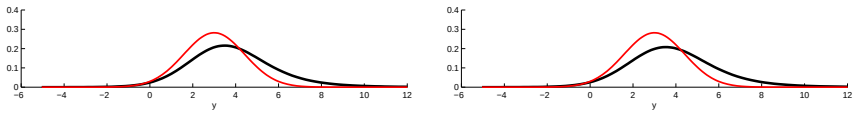


(g-1) $p(\mu,\beta|\mathcal{X}_{1,\mathrm{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\mathrm{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\mathrm{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\mathrm{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\mathrm{post}})$



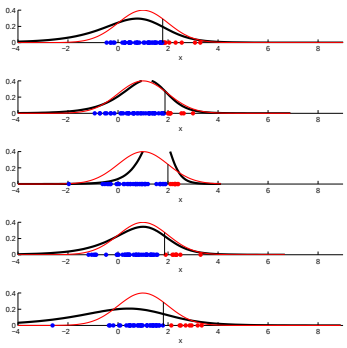
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\mathrm{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\mathrm{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\mathrm{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\mathrm{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\mathrm{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\mathrm{pre}},\mathcal{X}_{1,\mathrm{post}})$ (i-2) $p(y|\mathcal{X}_{2,\mathrm{pre}},\mathcal{X}_{2,\mathrm{post}})$ (i-3) $p(y|\mathcal{X}_{3,\mathrm{pre}},\mathcal{X}_{3,\mathrm{post}})$

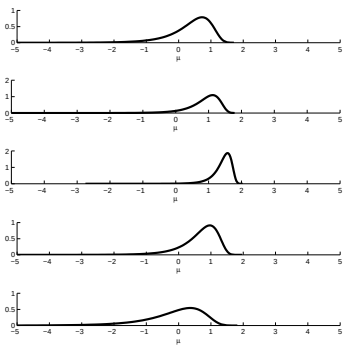


(i-4) $p(y|\mathcal{X}_{4,\mathrm{pre}},\mathcal{X}_{4,\mathrm{post}})$ (i-5) $p(y|\mathcal{X}_{5,\mathrm{pre}},\mathcal{X}_{5,\mathrm{post}})$

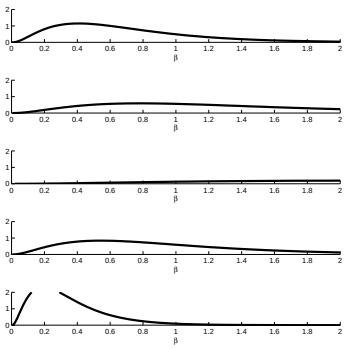
Figure 32S: Bayesian inferences on five datasets, each of which contains $n_v = 7$ detect data out of $n = 48$ samples.



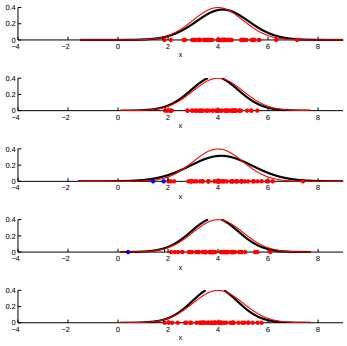
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



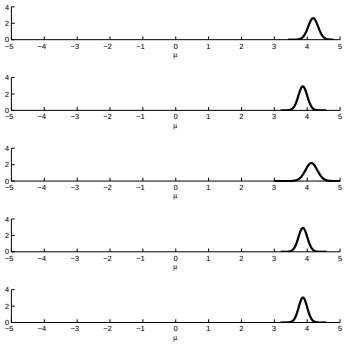
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



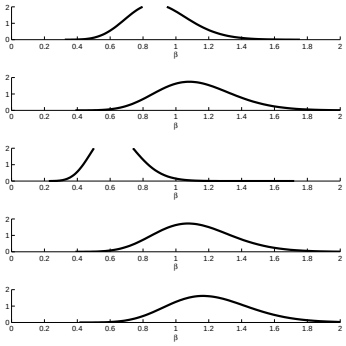
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



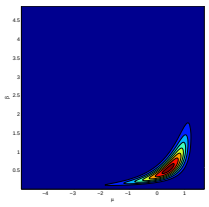
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



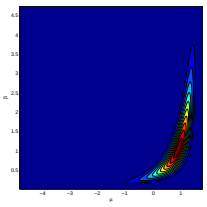
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



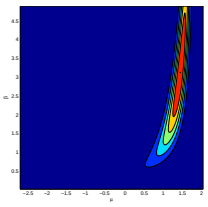
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



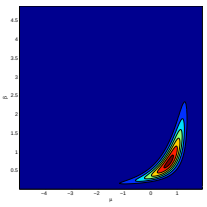
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



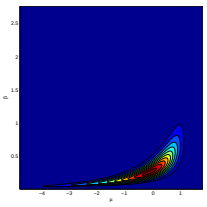
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



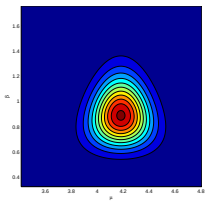
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



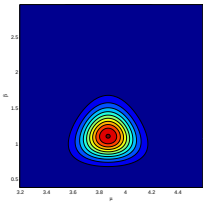
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



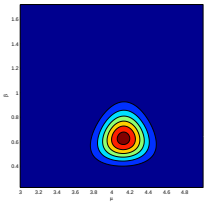
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



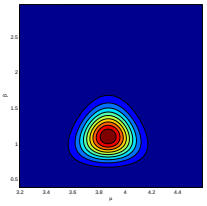
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



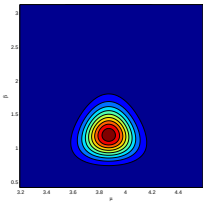
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



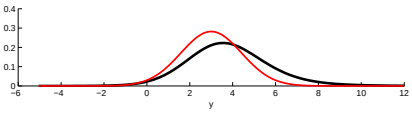
(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$



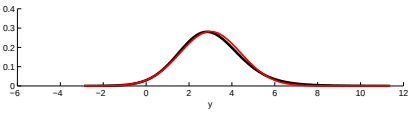
(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



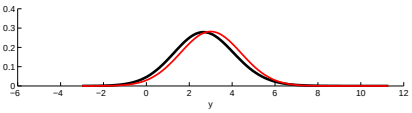
(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$



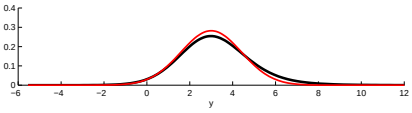
(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$



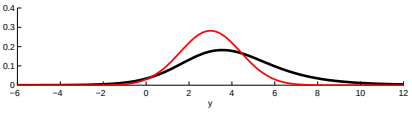
(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$



(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

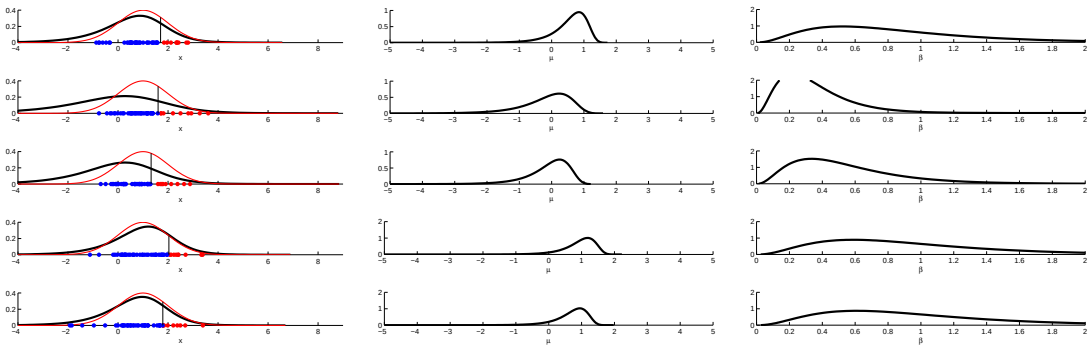


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

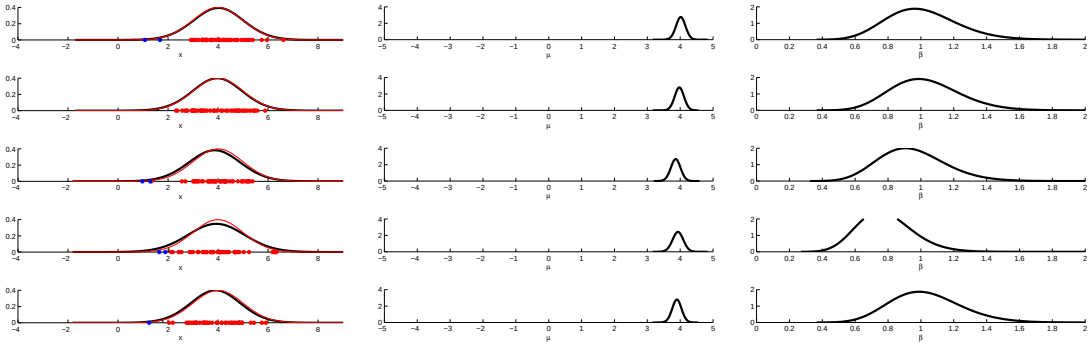


(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

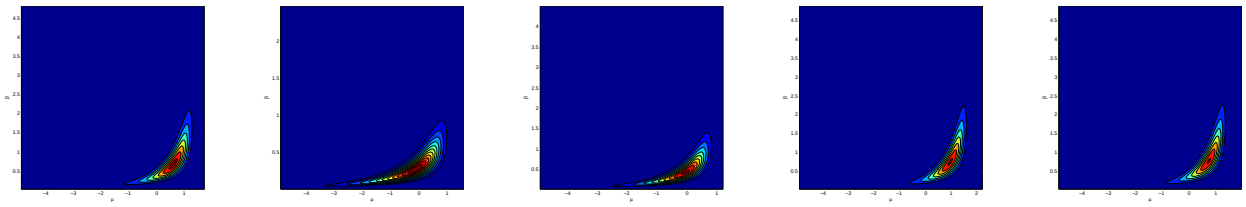
Figure 33S: Bayesian inferences on five datasets, each of which contains $n_v = 8$ detect data out of $n = 48$ samples.



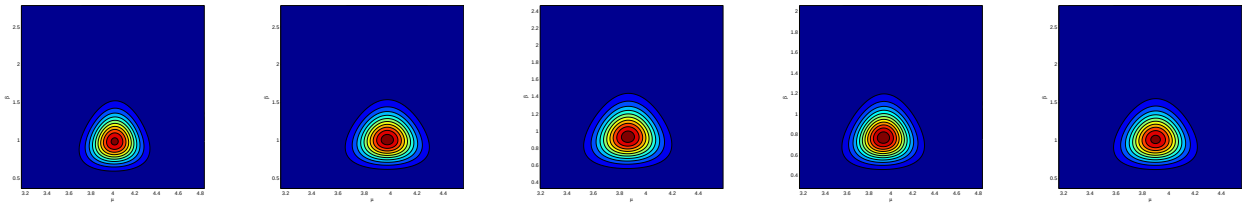
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



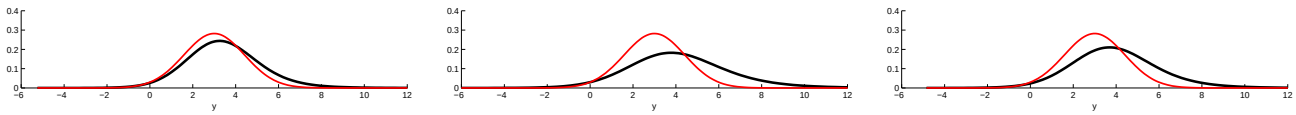
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



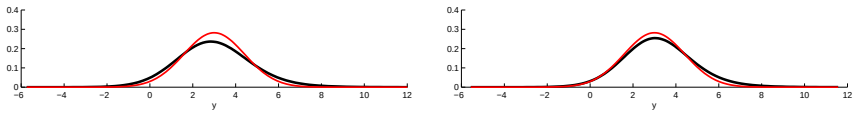
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

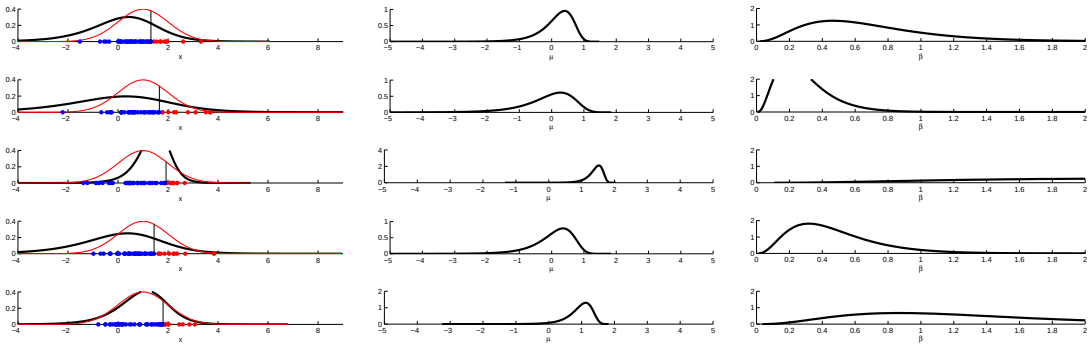


(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

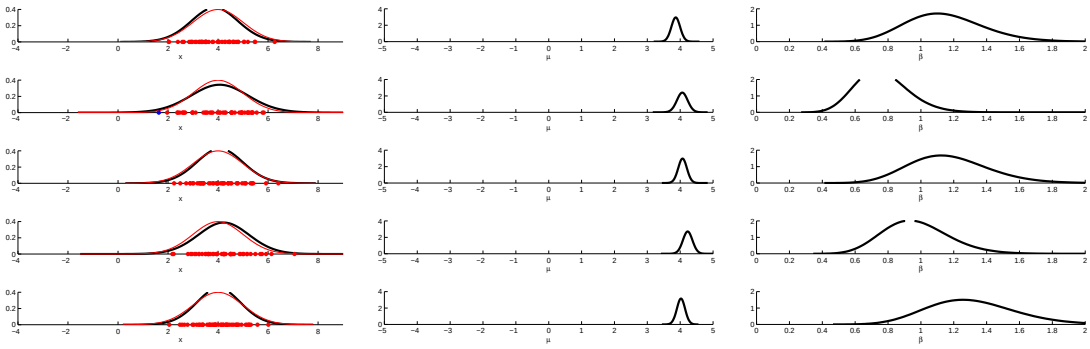


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

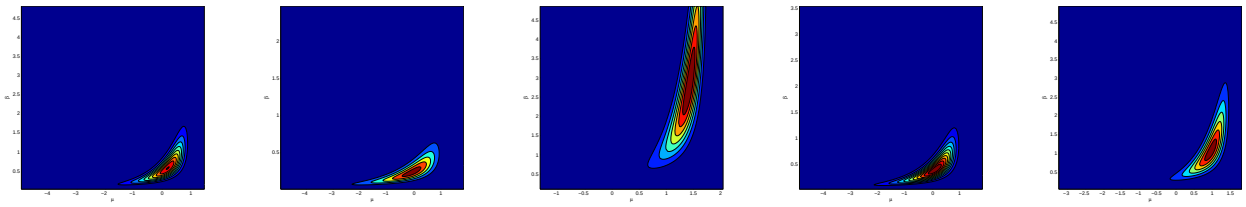
Figure 34S: Bayesian inferences on five datasets, each of which contains $n_v = 9$ detect data out of $n = 48$ samples.



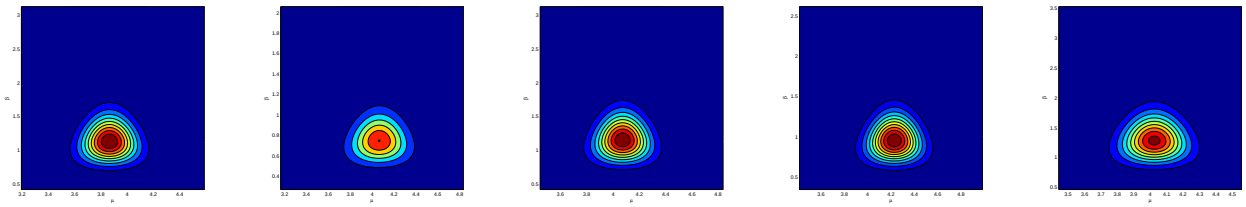
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$ (b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$ (c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



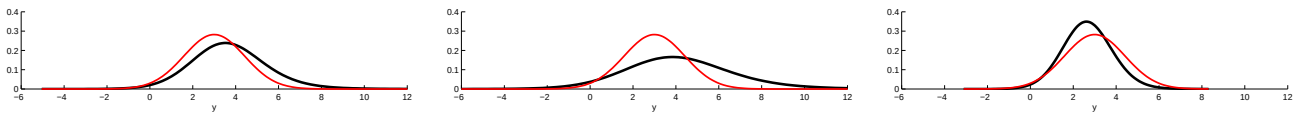
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$ (e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$ (f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



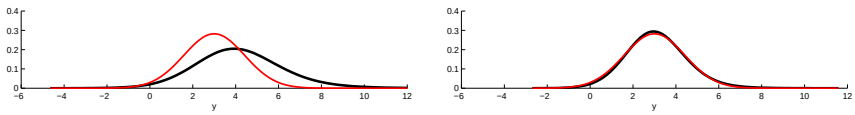
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$ (g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$ (g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$ (g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$ (g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$ (h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$ (h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$ (h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$ (h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

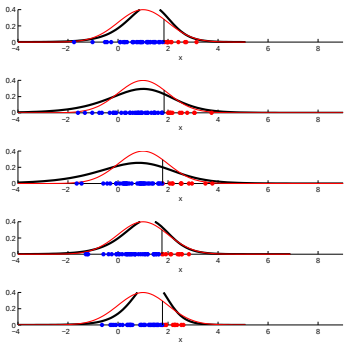


(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$ (i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$ (i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

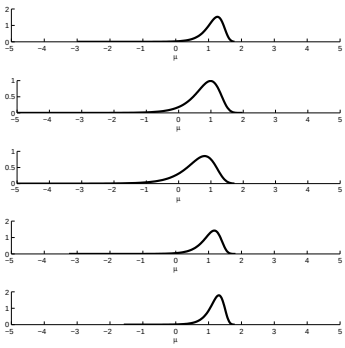


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$ (i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

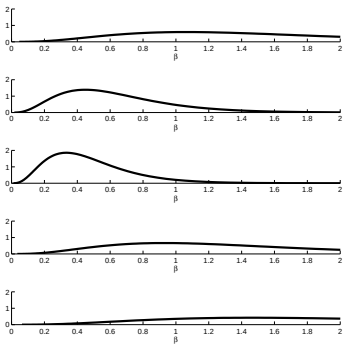
Figure 35S: Bayesian inferences on five datasets, each of which contains $n_v = 10$ detect data out of $n = 48$ samples.



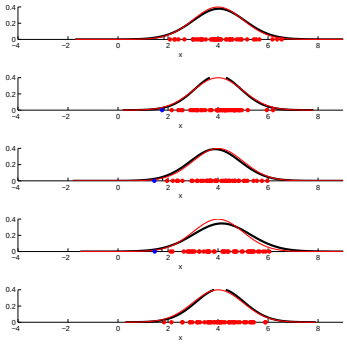
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



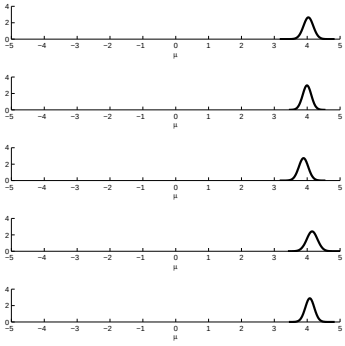
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



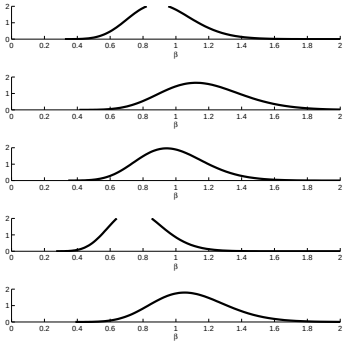
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



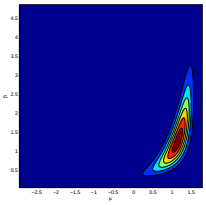
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



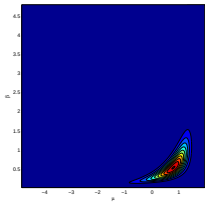
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



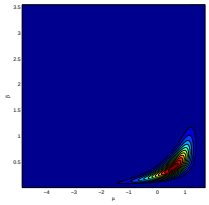
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



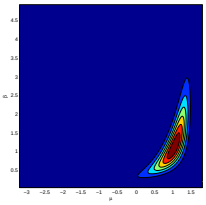
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



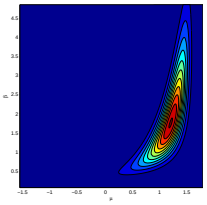
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



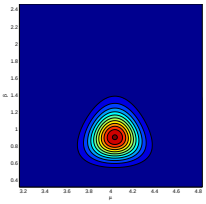
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



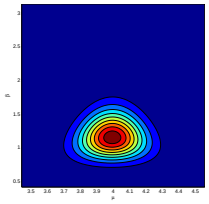
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



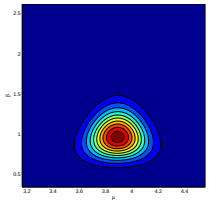
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



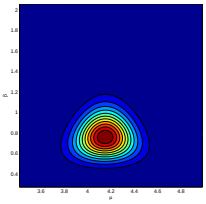
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



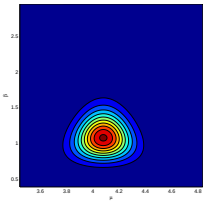
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



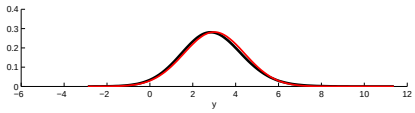
(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$



(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



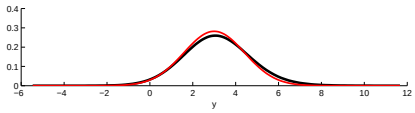
(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$



(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$

(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

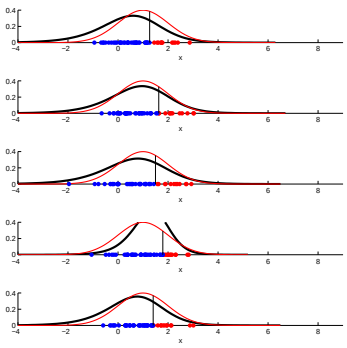
(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$



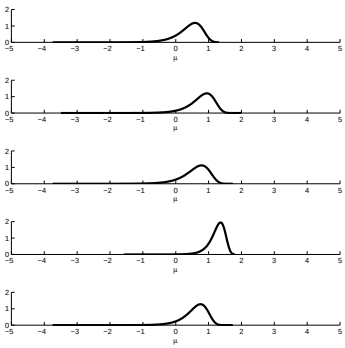
(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

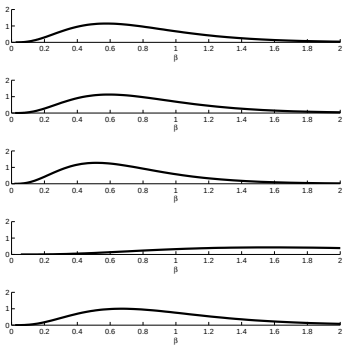
Figure 36S: Bayesian inferences on five datasets, each of which contains $n_v = 11$ detect data out of $n = 48$ samples.



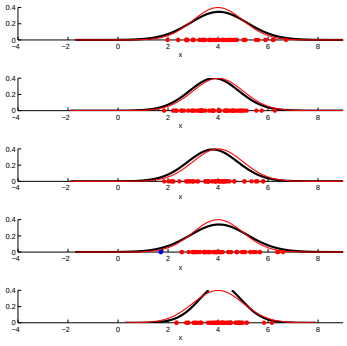
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



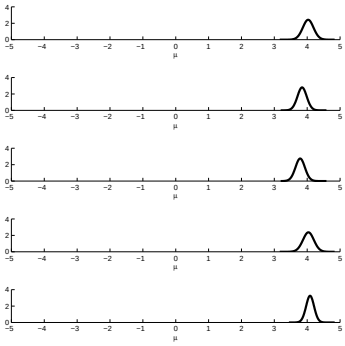
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



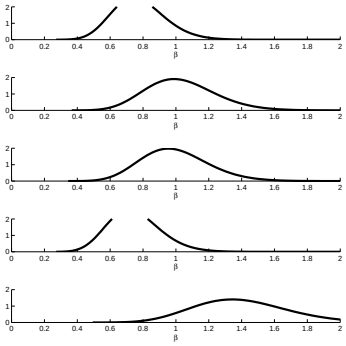
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



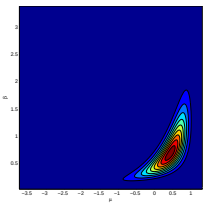
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



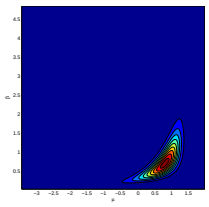
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



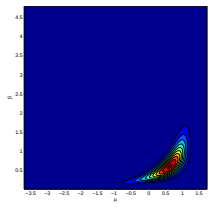
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



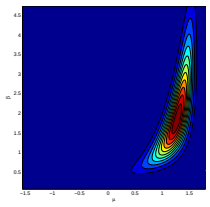
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



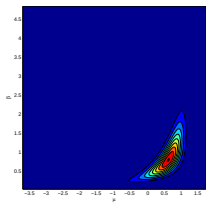
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



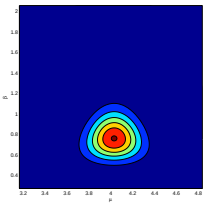
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



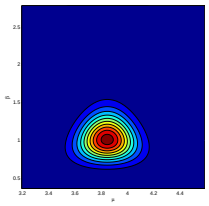
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



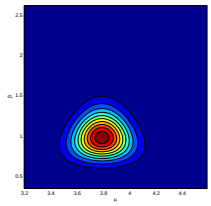
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



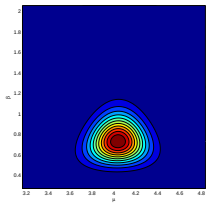
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



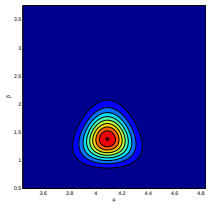
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$



(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$

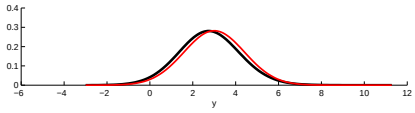


(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

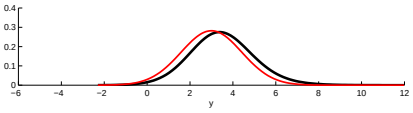
(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$

(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$

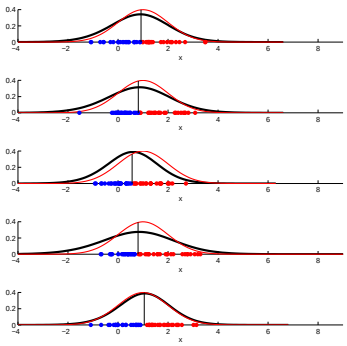


(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

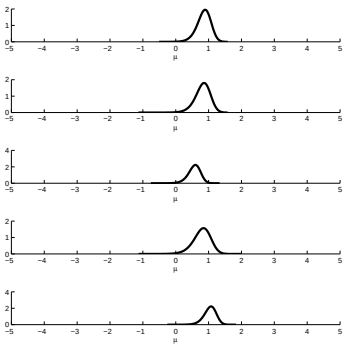


(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

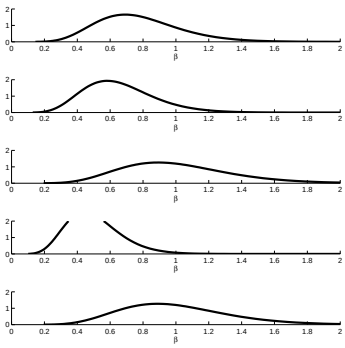
Figure 37S: Bayesian inferences on five datasets, each of which contains $n_v = 12$ detect data out of $n = 48$ samples.



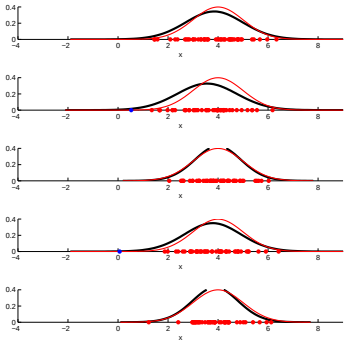
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



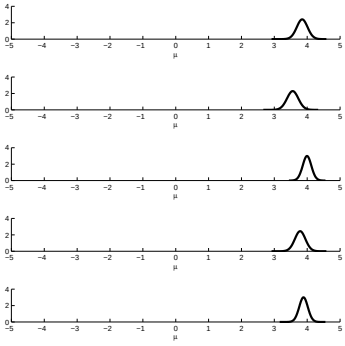
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



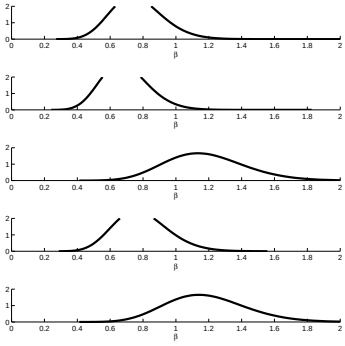
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



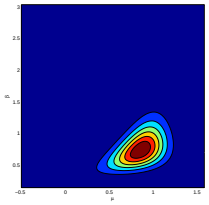
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



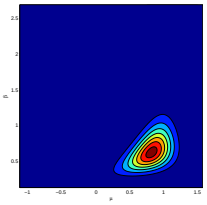
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



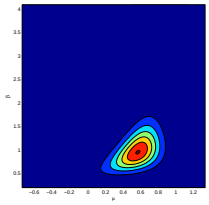
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



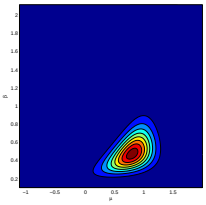
(g-1) $p(\mu, \beta|\mathcal{X}_{1,\text{post}})$



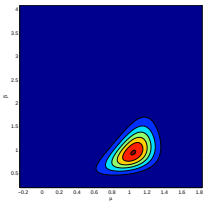
(g-2) $p(\mu, \beta|\mathcal{X}_{2,\text{post}})$



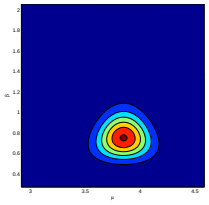
(g-3) $p(\mu, \beta|\mathcal{X}_{3,\text{post}})$



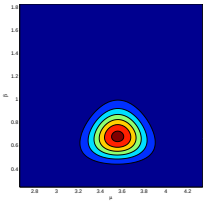
(g-4) $p(\mu, \beta|\mathcal{X}_{4,\text{post}})$



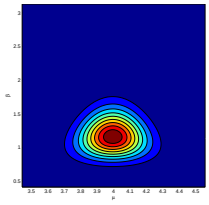
(g-5) $p(\mu, \beta|\mathcal{X}_{5,\text{post}})$



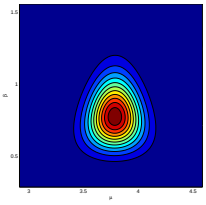
(h-1) $p(\mu, \beta|\mathcal{X}_{1,\text{pre}})$



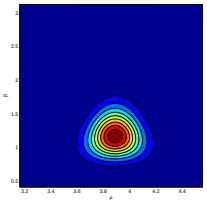
(h-2) $p(\mu, \beta|\mathcal{X}_{2,\text{pre}})$



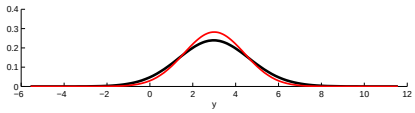
(h-3) $p(\mu, \beta|\mathcal{X}_{3,\text{pre}})$



(h-4) $p(\mu, \beta|\mathcal{X}_{4,\text{pre}})$



(h-5) $p(\mu, \beta|\mathcal{X}_{5,\text{pre}})$

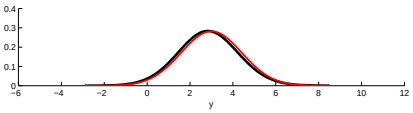


(i-1) $p(y|\mathcal{X}_{1,\text{pre}}, \mathcal{X}_{1,\text{post}})$

(i-2) $p(y|\mathcal{X}_{2,\text{pre}}, \mathcal{X}_{2,\text{post}})$

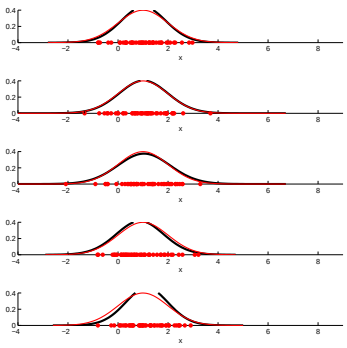
(i-3) $p(y|\mathcal{X}_{3,\text{pre}}, \mathcal{X}_{3,\text{post}})$

(i-4) $p(y|\mathcal{X}_{4,\text{pre}}, \mathcal{X}_{4,\text{post}})$

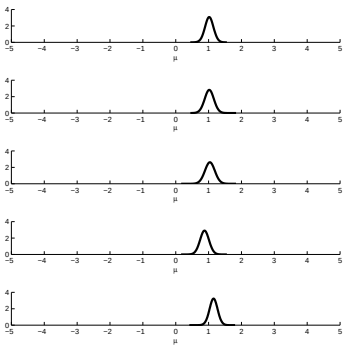


(i-5) $p(y|\mathcal{X}_{5,\text{pre}}, \mathcal{X}_{5,\text{post}})$

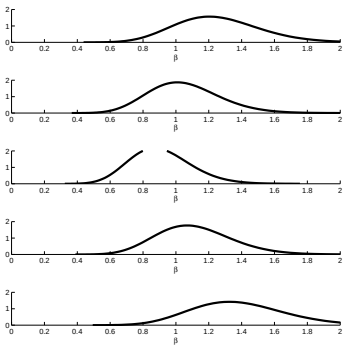
Figure 38S: Bayesian inferences on five datasets, each of which contains $n_v = 24$ detect data out of $n = 48$ samples.



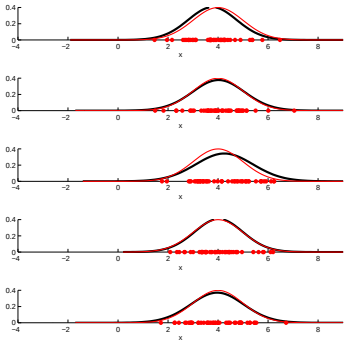
(a) $p(c_{\text{post}}|\mathcal{X}_{k,\text{post}})$



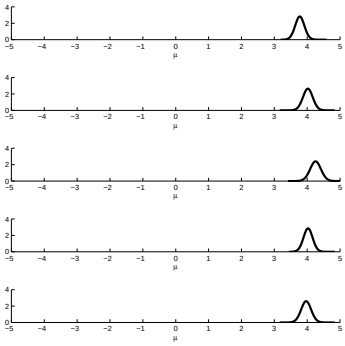
(b) $p(\mu_1|\mathcal{X}_{k,\text{post}})$



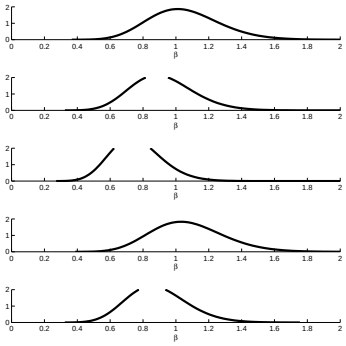
(c) $p(\beta_1|\mathcal{X}_{k,\text{post}})$



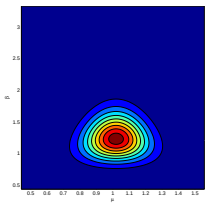
(d) $p(c_{\text{pre}}|\mathcal{X}_{k,\text{pre}})$



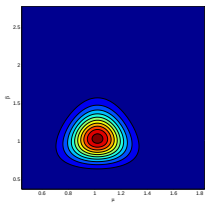
(e) $p(\mu_1|\mathcal{X}_{k,\text{pre}})$



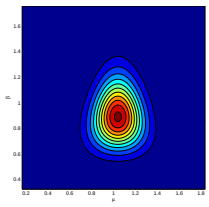
(f) $p(\beta_1|\mathcal{X}_{k,\text{pre}})$



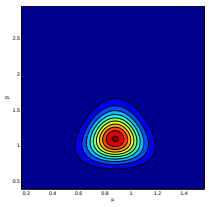
(g-1) $p(\mu,\beta|\mathcal{X}_{1,\text{post}})$



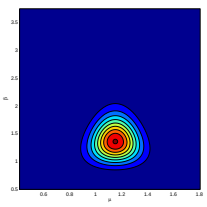
(g-2) $p(\mu,\beta|\mathcal{X}_{2,\text{post}})$



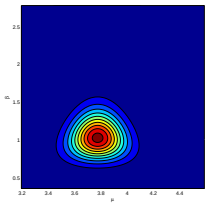
(g-3) $p(\mu,\beta|\mathcal{X}_{3,\text{post}})$



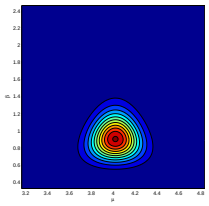
(g-4) $p(\mu,\beta|\mathcal{X}_{4,\text{post}})$



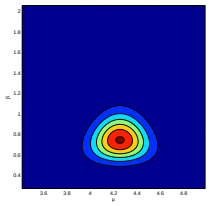
(g-5) $p(\mu,\beta|\mathcal{X}_{5,\text{post}})$



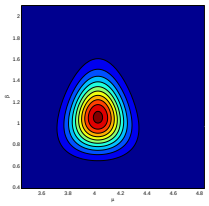
(h-1) $p(\mu,\beta|\mathcal{X}_{1,\text{pre}})$



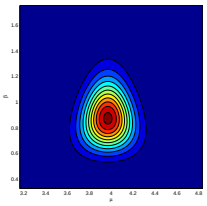
(h-2) $p(\mu,\beta|\mathcal{X}_{2,\text{pre}})$



(h-3) $p(\mu,\beta|\mathcal{X}_{3,\text{pre}})$

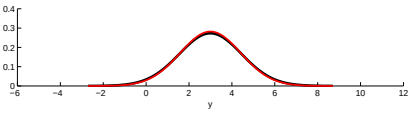


(h-4) $p(\mu,\beta|\mathcal{X}_{4,\text{pre}})$



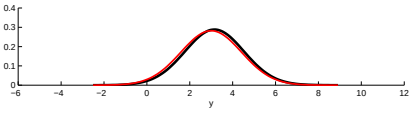
(h-5) $p(\mu,\beta|\mathcal{X}_{5,\text{pre}})$

(i-1) $p(y|\mathcal{X}_{1,\text{pre}},\mathcal{X}_{1,\text{post}})$



(i-2) $p(y|\mathcal{X}_{2,\text{pre}},\mathcal{X}_{2,\text{post}})$

(i-3) $p(y|\mathcal{X}_{3,\text{pre}},\mathcal{X}_{3,\text{post}})$



(i-4) $p(y|\mathcal{X}_{4,\text{pre}},\mathcal{X}_{4,\text{post}})$

(i-5) $p(y|\mathcal{X}_{5,\text{pre}},\mathcal{X}_{5,\text{post}})$

Figure 39S: Bayesian inferences on five datasets, each of which contains $n_v = 48$ detect data out of $n = 48$ samples.