

[multi\_overview]  
[wavelength\_analysis]  
ELISA Analysis Report  
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ELISA Analysis Report  
[overall\_conclusions]

# Multi-Wavelength Bioassay Analysis Report

Kristof Moeller (IAEA, Monaco) and Arnold Molina Porras (Universidad de Costa Rica)

## [multi\_overview]

[multi\_overview\_desc]

[multi\_compare]

- [multi\_benefit1]
- [multi\_benefit2]
- [multi\_benefit3]

[multi\_sections]

- [multi\_exec\_summary]
- [multi\_detailed]

## [exec\_summary\_title]

## [wavelength\_analysis]

[analysis\_n\_of]

## ELISA Analysis Report

**Assay Type:** ELISA

**Analysis Date:** 2026-02-10

**Analyst:** MOELLERKR

This report analyzes ELISA data using a four-parameter logistic dose-response curve to estimate concentrations of cortisol in unknown samples.

**Method:** Competitive enzyme-linked immunosorbent assay with %B/B<sub>0</sub> normalization

## Analysis Notes

*No additional notes provided.*

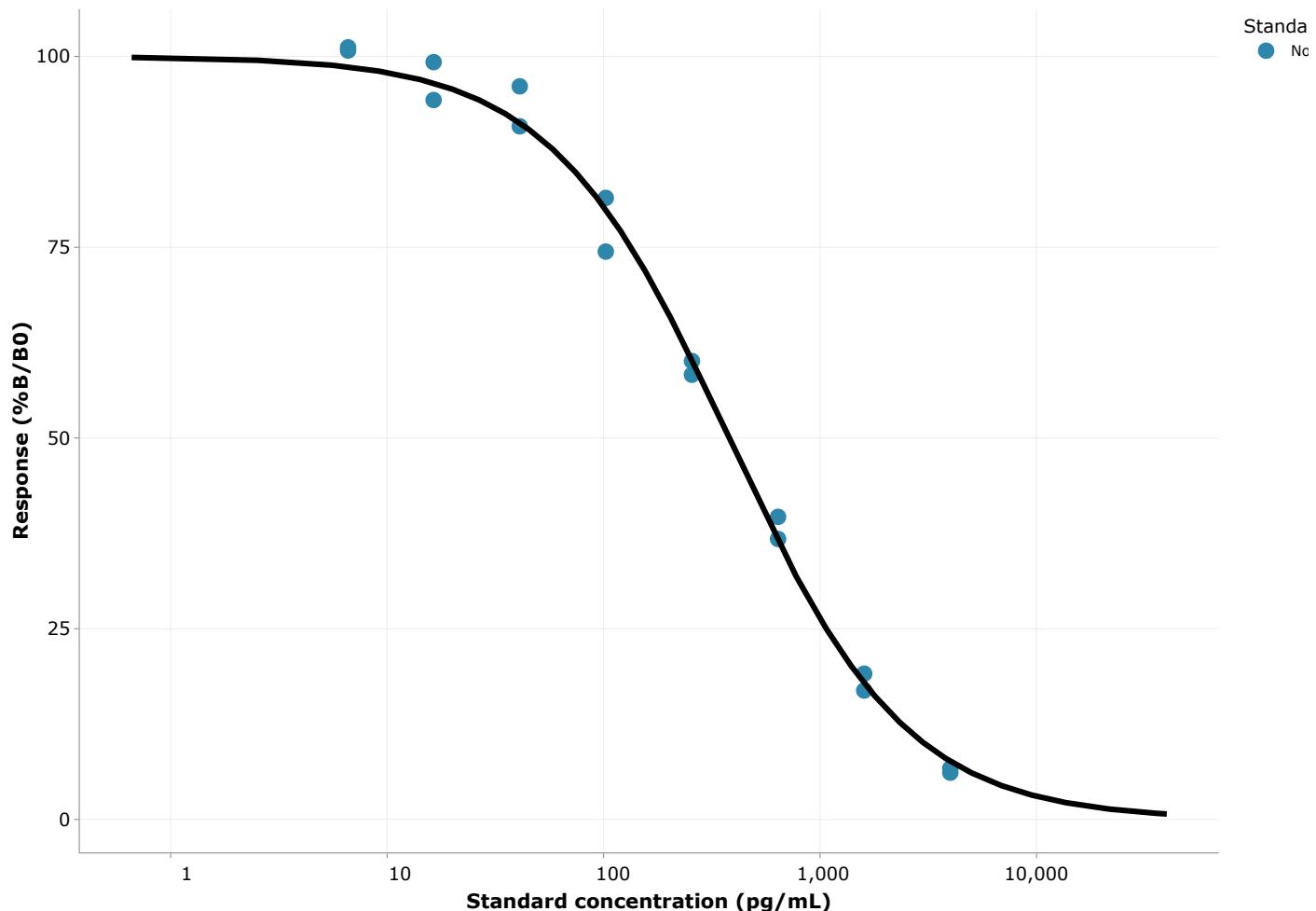
## Standard Curve Configuration

Standard Concentrations	
Standard	Concentration (pg/mL)
1	4,000.0
2	1,600.0
3	640.0
4	256.0
5	102.4
6	41.0
7	16.4
8	6.6

## Dose–Response Curve Analysis

All standards show acceptable variability (<30% CV).

### Four-Parameter Logistic Model - ELISA Analysis



## Model Parameters

Four-Parameter Logistic Model Coefficients

Parameter	Estimate	Std. Error	P-value
b:(Intercept) Hill Slope	1.06	0.10	NA
c:(Intercept) Bottom	0.00	3.80	NA
d:(Intercept) Top	100.00	1.83	NA
e:(Intercept) IC50	378.33	39.53	NA

#### Model Fit Statistics:

- $R^2 = 0.995$
- $RMSE = 2.488 \%B/B_0$
- Standards Used = 16 of 8

## Standard Back-Calculation and Recovery

Standard Back-Calculation and Recovery

Nominal (pg/mL)	n	Back-Calc. (pg/mL)	SD (pg/mL)	Recovery (%)
4,000.0	2	4,784.14	294.1	119.60
1,600.0	2	1,594.29	159.4	99.64
640.0	2	597.26	49.0	93.32
256.0	2	266.32	13.2	104.03
102.4	2	115.46	31.4	112.75
41.0	2	30.72	17.6	74.92
16.4	2	15.14	16.2	92.30
6.6	2	NaN	—	—

```
##  
## **Overall Mean Recovery:** 99.5%
```

```
##  Overall recovery is within acceptable range (80–120%).
```

## Sample Concentration Results

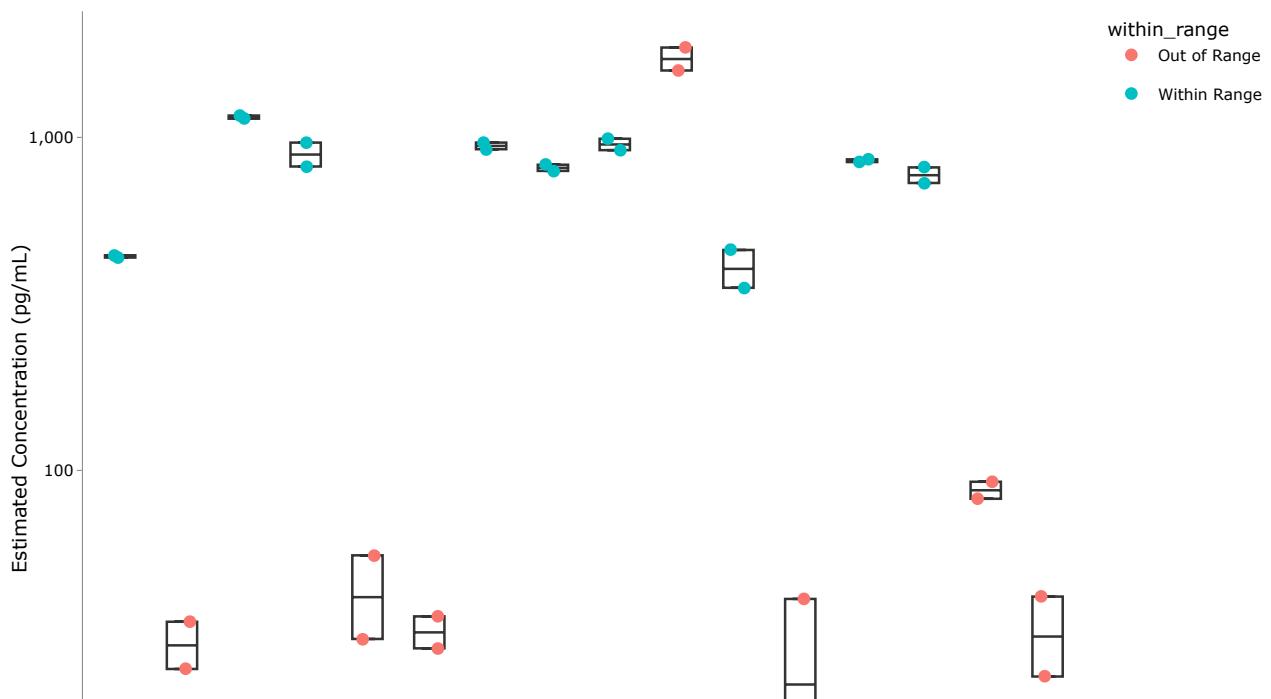
```
##  
## **Output Files Created:**  
## - `unknown_results.csv` - Individual well results  
## - `unknown_results_summary.csv` - Replicate group statistics with confidence intervals  
##  
## **⚠️ Quality Alert:**  
## - Replicate groups with high variability (CV > 30%): AE, BD, BH  
## - Consider checking sample preparation or dilution consistency
```

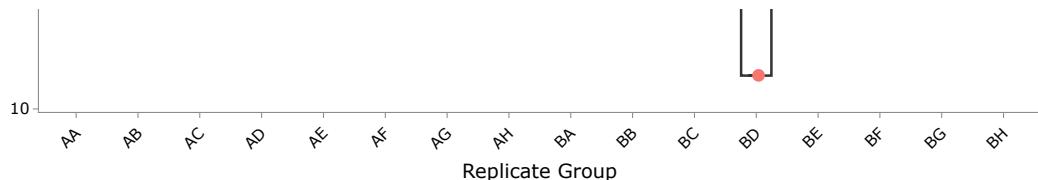
## Detailed Sample Results Summary

[detailed\_caption]

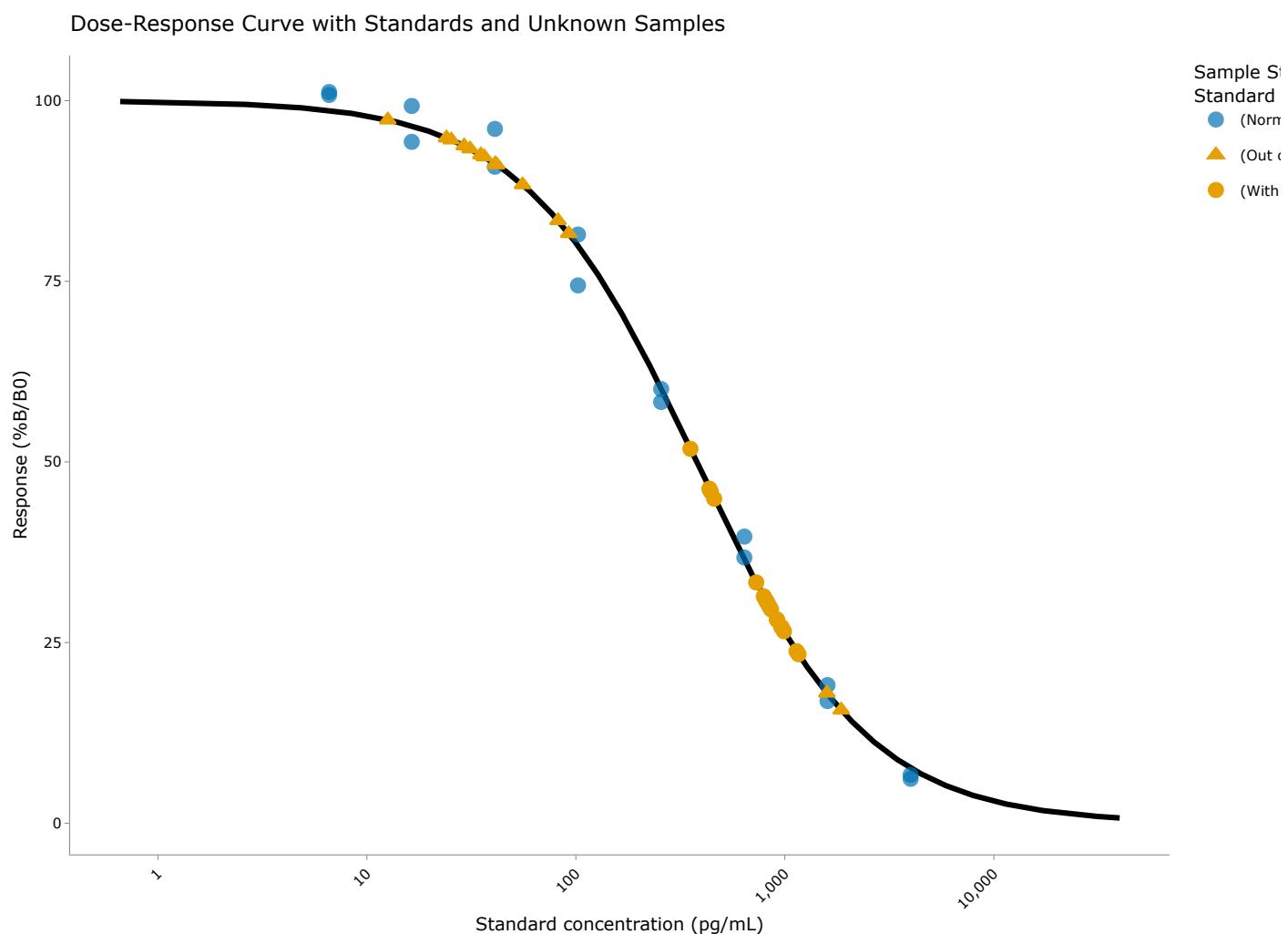
Replicate Group	Sample IDs	Sample Type	n	Mean (pg/mL)	SD (pg/mL)	SE (pg/mL)	95% CI	CV%	Range
AA	A4,A5	Sample	2	438.99	4.89	3.46	1.11	[395.0 – 482.9]	<input checked="" type="checkbox"/>
AB	C4,C5	Sample	2	30.22	6.92	4.89	22.89	[ 0.0 – 92.4]	<LLOQ
AC	E4,E5	Sample	2	1,150.11	17.66	12.49	1.54	[991.4 – 1308.8]	<input checked="" type="checkbox"/>
AD	G4,G5	Sample	2	890.87	103.89	73.46	11.66	[ 0.0 – 1824.3]	<input checked="" type="checkbox"/>
AE	B4,B5	Sample	2	43.37	17.26	12.20	39.79	[ 0.0 – 198.4]	<LLOQ
AF	D4,D5	Sample	2	32.83	5.11	3.61	15.56	[ 0.0 – 78.7]	<LLOQ
AG	F4,F5	Sample	2	942.78	30.48	21.55	3.23	[668.9 – 1216.6]	<input checked="" type="checkbox"/>
AH	H4,H5	Sample	2	810.20	24.51	17.33	3.03	[590.0 – 1030.4]	<input checked="" type="checkbox"/>
BA	A6,A7	Sample	2	952.81	53.05	37.51	5.57	[476.2 – 1429.4]	<input checked="" type="checkbox"/>
BB	C6,C7	Sample	2	1,724.14	193.09	136.54	11.20	[ 0.0 – 3459.0]	>ULOQ
BC	E6,E7	Sample	2	406.20	74.75	52.86	18.40	[ 0.0 – 1077.8]	<input checked="" type="checkbox"/>
BD	G6,G7	Sample	2	26.85	20.17	14.26	75.11	[ 0.0 – 208.1]	<LLOQ
BE	B6,B7	Sample	2	851.00	11.26	7.96	1.32	[749.8 – 952.2]	<input checked="" type="checkbox"/>
BF	D6,D7	Sample	2	770.88	58.74	41.54	7.62	[243.1 – 1298.6]	<input checked="" type="checkbox"/>
BG	F6,F7	Sample	2	87.30	7.25	5.13	8.31	[ 22.1 – 152.5]	<LLOQ
BH	H6,H7	Sample	2	32.92	12.55	8.87	38.12	[ 0.0 – 145.6]	<LLOQ

## Sample Variability Visualization





## Dose-Response Curve with Unknown Samples



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Contact: kr.moeller@iaea.org (mailto:kr.moeller@iaea.org)

Feedback: Online Form (<https://forms.office.com/e/q8eqJfp4QM>)

Automated bioassay analysis using modular system v2.0

## [wavelength\_analysis]

[analysis\_n\_of]

## ELISA Analysis Report

Assay Type: ELISA

Analysis Date: 2026-02-10

Analyst: MOELLERKR

This report analyzes ELISA data using a four-parameter logistic dose-response curve to estimate concentrations of cortisol in unknown samples.

Method: Competitive enzyme-linked immunosorbent assay with %B/B0 normalization

## Analysis Notes

No additional notes provided.

## Standard Curve Configuration

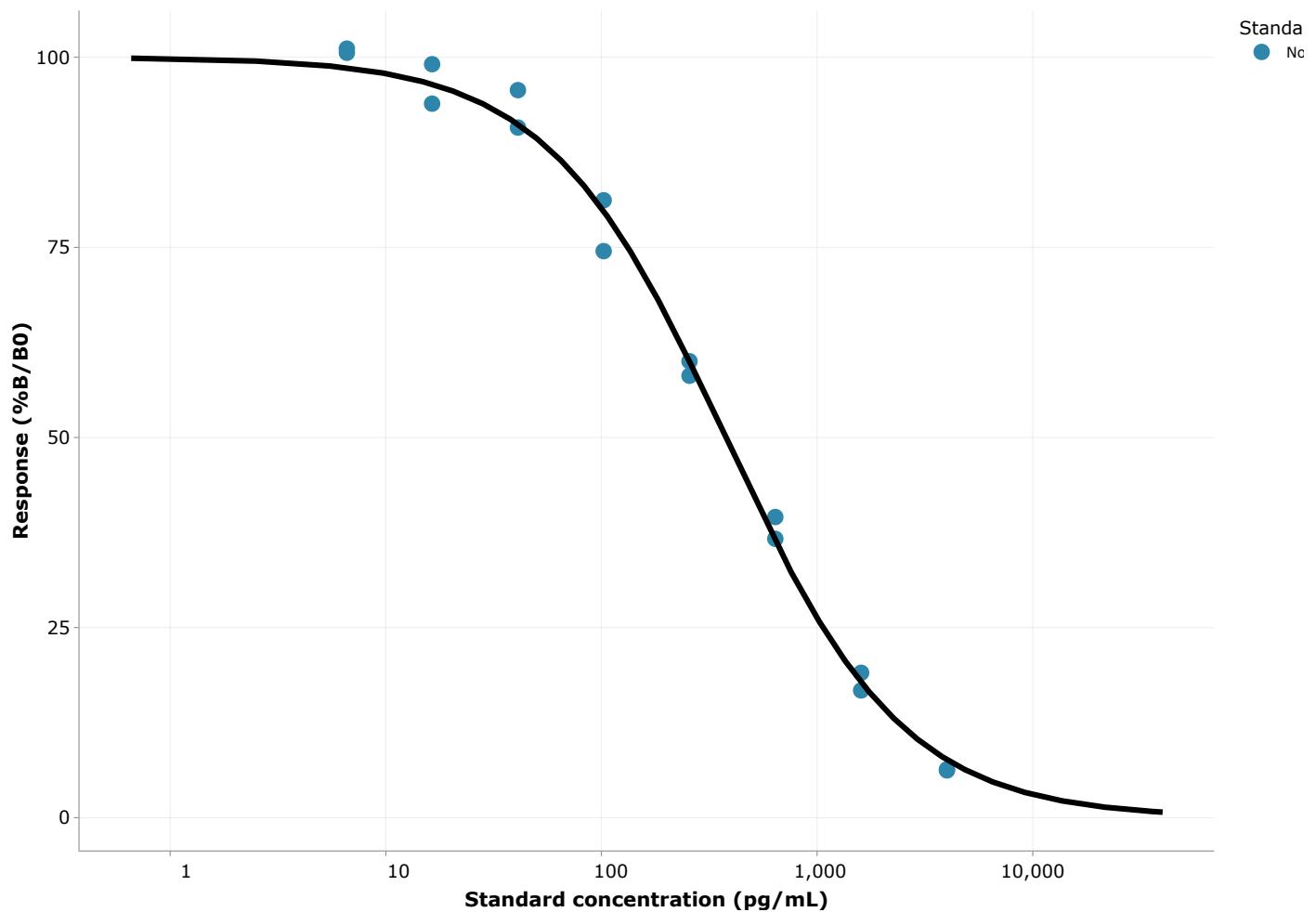
Standard Concentrations

Standard	Concentration (pg/mL)
1	4,000.0
2	1,600.0
3	640.0
4	256.0
5	102.4
6	41.0
7	16.4
8	6.6

## Dose–Response Curve Analysis

All standards show acceptable variability (<30% CV).

**Four-Parameter Logistic Model - ELISA Analysis**



## Model Parameters

Four-Parameter Logistic Model Coefficients

Parameter	Estimate	Std. Error	P-value
b:(Intercept)	Hill Slope	1.05	0.09 NA
c:(Intercept)	Bottom	0.00	3.68 NA
d:(Intercept)	Top	100.00	1.80 NA
e:(Intercept)	IC50	375.71	38.09 NA

### Model Fit Statistics:

- $R^2 = 0.995$
- RMSE = 2.425 %B/B0
- Standards Used = 16 of 8

## Standard Back-Calculation and Recovery

Standard Back-Calculation and Recovery

Nominal (pg/mL)	n	Back-Calc. (pg/mL)	SD (pg/mL)	Recovery (%)
4,000.0	2	4,874.24	75.8	121.86
1,600.0	2	1,601.11	169.6	100.07
640.0	2	596.38	48.6	93.18
256.0	2	265.45	14.1	103.69
102.4	2	114.87	29.7	112.17
41.0	2	31.49	16.3	76.81
16.4	2	16.26	16.8	99.13
6.6	2	NaN	—	—

```
##  
## **Overall Mean Recovery:** 101.0%
```

```
##  Overall recovery is within acceptable range (80-120%).
```

## Sample Concentration Results

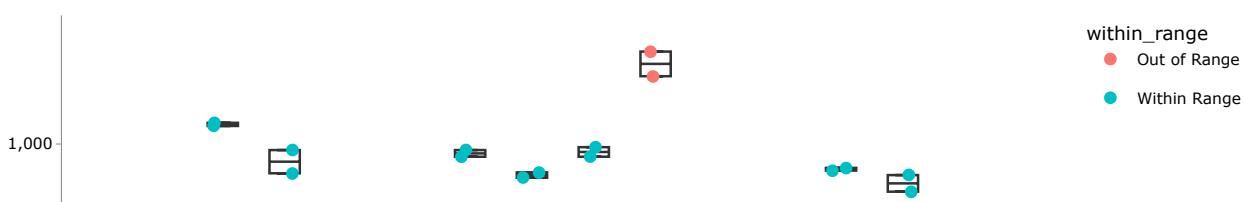
```
##  
## **Output Files Created:**  
## - `unknown_results.csv` - Individual well results  
## - `unknown_results_summary.csv` - Replicate group statistics with confidence intervals  
##  
## **⚠️ Quality Alert:**  
## - Replicate groups with high variability (CV > 30%): AE, BD, BH  
## - Consider checking sample preparation or dilution consistency
```

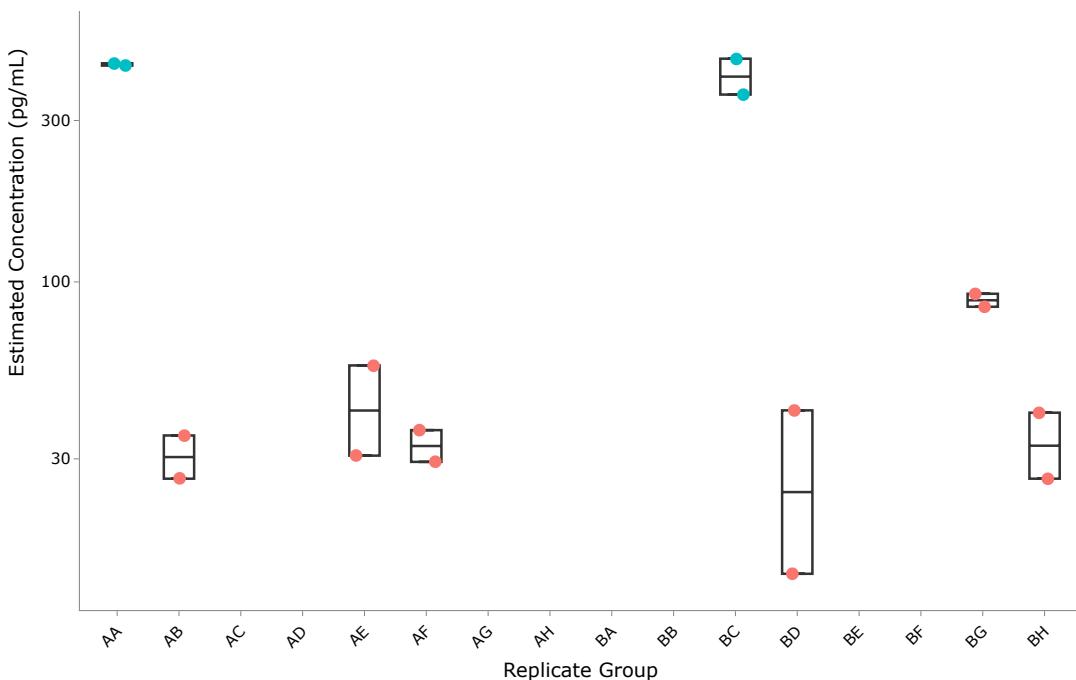
## Detailed Sample Results Summary

[detailed\_caption]

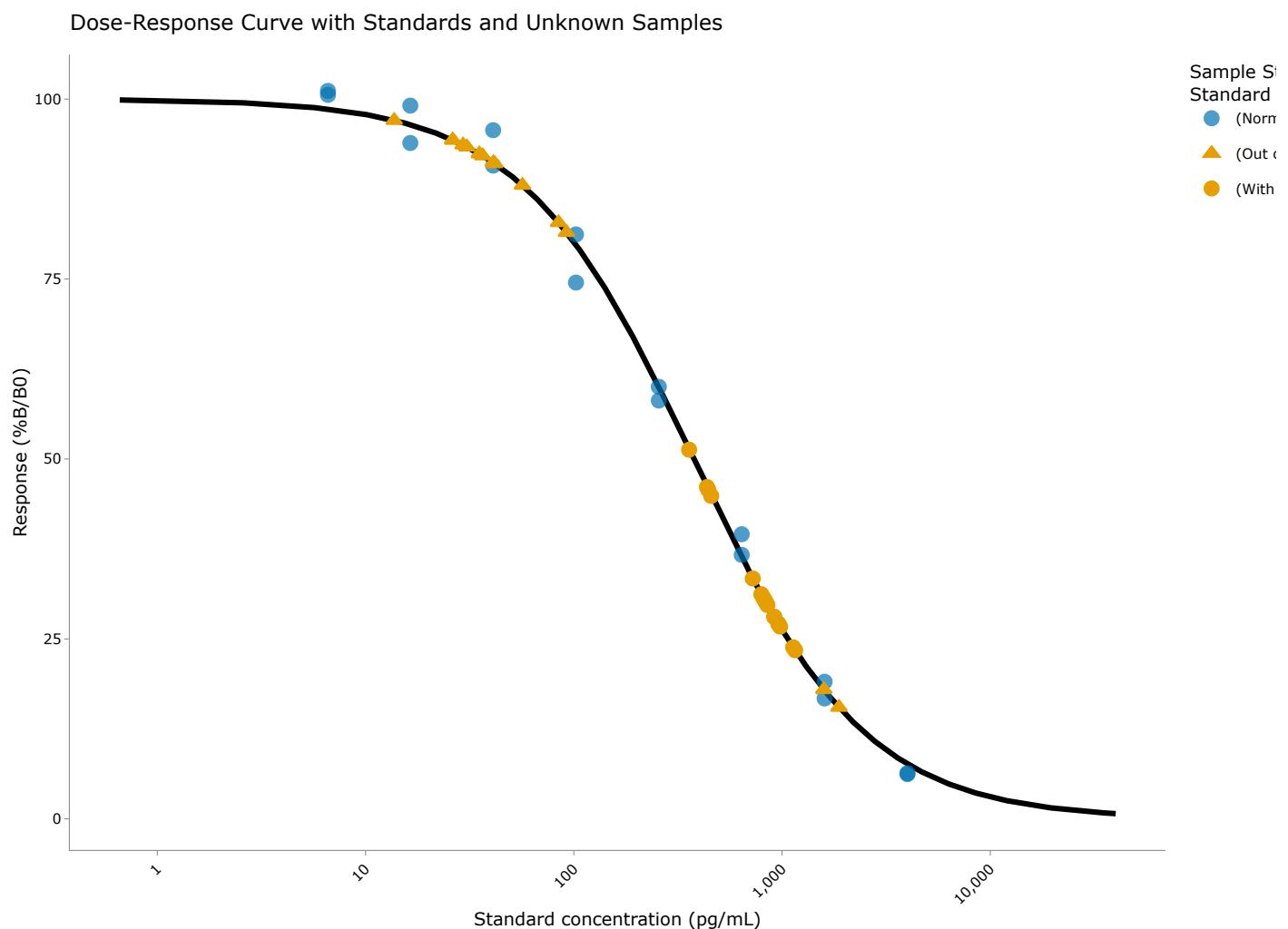
Replicate Group	Sample IDs	Sample Type	n	Mean (pg/mL)	SD (pg/mL)	SE (pg/mL)	95% CI	CV%	Range
AA	A4,A5	Sample	2	439.25	4.86	3.44	1.11	[395.6 – 482.9]	<input checked="" type="checkbox"/>
AB	C4,C5	Sample	2	30.69	6.34	4.48	20.65	[ 0.0 – 87.6]	<LLOQ
AC	E4,E5	Sample	2	1,143.01	17.40	12.31	1.52	[986.7 – 1299.4]	<input checked="" type="checkbox"/>
AD	G4,G5	Sample	2	889.63	99.18	70.13	11.15	[ 0.0 – 1780.7]	<input checked="" type="checkbox"/>
AE	B4,B5	Sample	2	43.66	18.38	13.00	42.09	[ 0.0 – 208.8]	<LLOQ
AF	D4,D5	Sample	2	32.93	5.01	3.54	15.22	[ 0.0 – 78.0]	<LLOQ
AG	F4,F5	Sample	2	938.46	30.11	21.29	3.21	[667.9 – 1209.0]	<input checked="" type="checkbox"/>
AH	H4,H5	Sample	2	809.76	20.88	14.76	2.58	[622.2 – 997.3]	<input checked="" type="checkbox"/>
BA	A6,A7	Sample	2	948.04	43.65	30.87	4.60	[555.8 – 1340.3]	<input checked="" type="checkbox"/>
BB	C6,C7	Sample	2	1,731.31	204.69	144.74	11.82	[ 0.0 – 3570.4]	>ULOQ
BC	E6,E7	Sample	2	407.30	69.98	49.49	17.18	[ 0.0 – 1036.1]	<input checked="" type="checkbox"/>
BD	G6,G7	Sample	2	27.73	19.80	14.00	71.42	[ 0.0 – 205.6]	<LLOQ
BE	B6,B7	Sample	2	842.52	11.04	7.81	1.31	[743.3 – 941.7]	<input checked="" type="checkbox"/>
BF	D6,D7	Sample	2	766.34	61.15	43.24	7.98	[217.0 – 1315.7]	<input checked="" type="checkbox"/>
BG	F6,F7	Sample	2	88.35	5.52	3.90	6.25	[ 38.8 – 137.9]	<LLOQ
BH	H6,H7	Sample	2	33.64	10.50	7.43	31.22	[ 0.0 – 128.0]	<LLOQ

## Sample Variability Visualization





## Dose-Response Curve with Unknown Samples



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Feedback: Online Form (<https://forms.office.com/e/q8eqJfp4QM>)

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[wavelength\_analysis]

[analysis\_n\_of]

# ELISA Analysis Report

Assay Type: ELISA

Analysis Date: 2026-02-10

Analyst: MOELLERKR

This report analyzes ELISA data using a four-parameter logistic dose-response curve to estimate concentrations of cortisol in unknown samples.

Method: Competitive enzyme-linked immunosorbent assay with %B/B<sub>0</sub> normalization

## Analysis Notes

No additional notes provided.

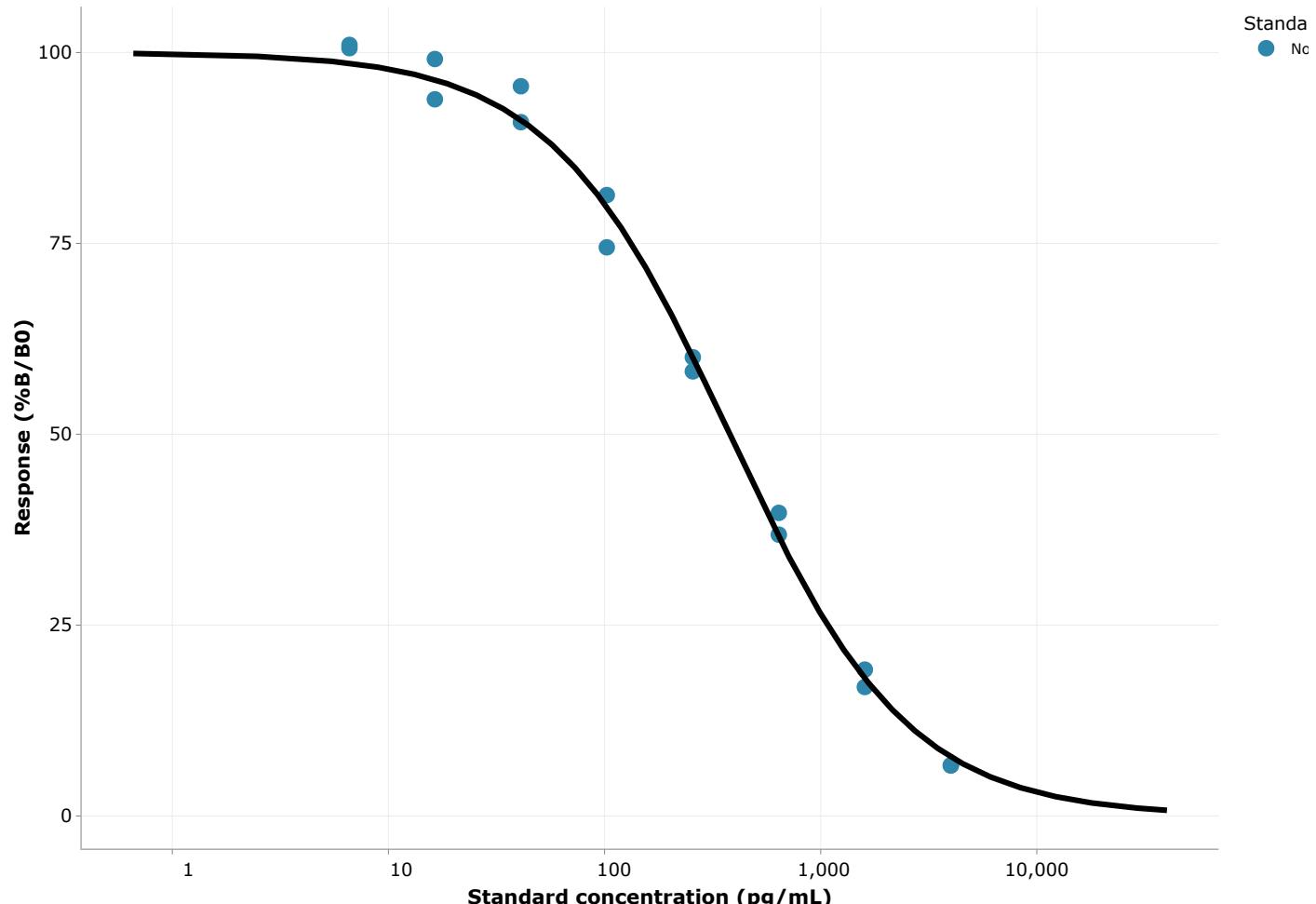
## Standard Curve Configuration

Standard Concentrations	
Standard	Concentration (pg/mL)
1	4,000.0
2	1,600.0
3	640.0
4	256.0
5	102.4
6	41.0
7	16.4
8	6.6

## Dose-Response Curve Analysis

All standards show acceptable variability (<30% CV).

Four-Parameter Logistic Model - ELISA Analysis



# Model Parameters

Four-Parameter Logistic Model Coefficients

	Parameter	Estimate	Std. Error	P-value
b:(Intercept)	Hill Slope	1.05	0.09	NA
c:(Intercept)	Bottom	0.00	3.71	NA
d:(Intercept)	Top	100.00	1.79	NA
e:(Intercept)	IC50	378.15	38.52	NA

## Model Fit Statistics:

- $R^2 = 0.995$
- RMSE = 2.403 %B/B0
- Standards Used = 16 of 8

## Standard Back-Calculation and Recovery

Standard Back-Calculation and Recovery

Nominal (pg/mL)	n	Back-Calc. (pg/mL)	SD (pg/mL)	Recovery (%)
4,000.0	2	4,697.73	0.0	117.44
1,600.0	2	1,606.84	166.9	100.43
640.0	2	597.37	48.5	93.34
256.0	2	265.84	13.7	103.84
102.4	2	114.71	30.5	112.03
41.0	2	31.29	15.6	76.31
16.4	2	16.10	17.0	98.17
6.6	2	NaN	—	—

```
##  
## **Overall Mean Recovery:** 100.2%
```

```
##  Overall recovery is within acceptable range (80-120%).
```

## Sample Concentration Results

```
##  
## **Output Files Created:**  
## - `unknown_results.csv` - Individual well results  
## - `unknown_results_summary.csv` - Replicate group statistics with confidence intervals  
##  
## **⚠️ Quality Alert:**  
## - Replicate groups with high variability (CV > 30%): AE, BD, BH  
## - Consider checking sample preparation or dilution consistency
```

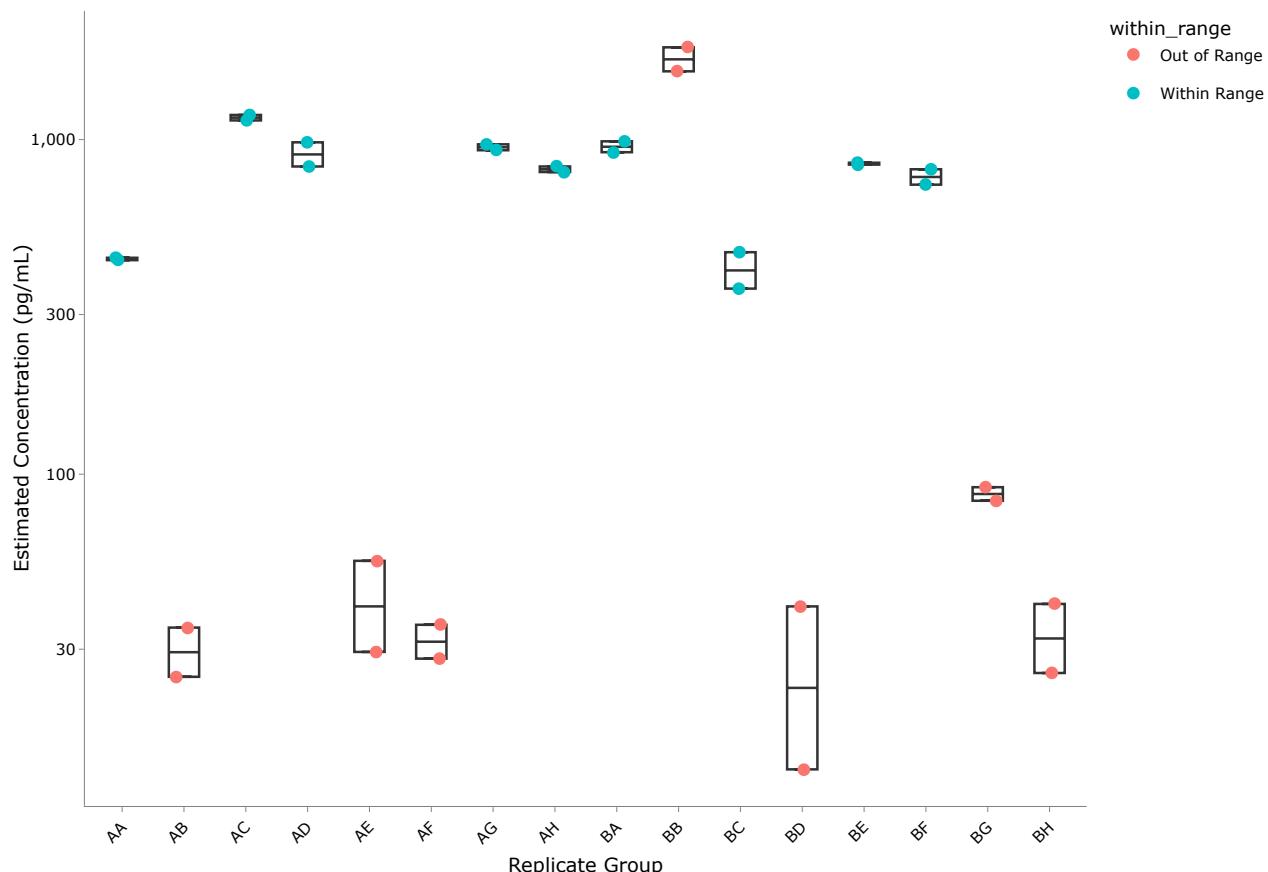
## Detailed Sample Results Summary

[detailed\_caption]

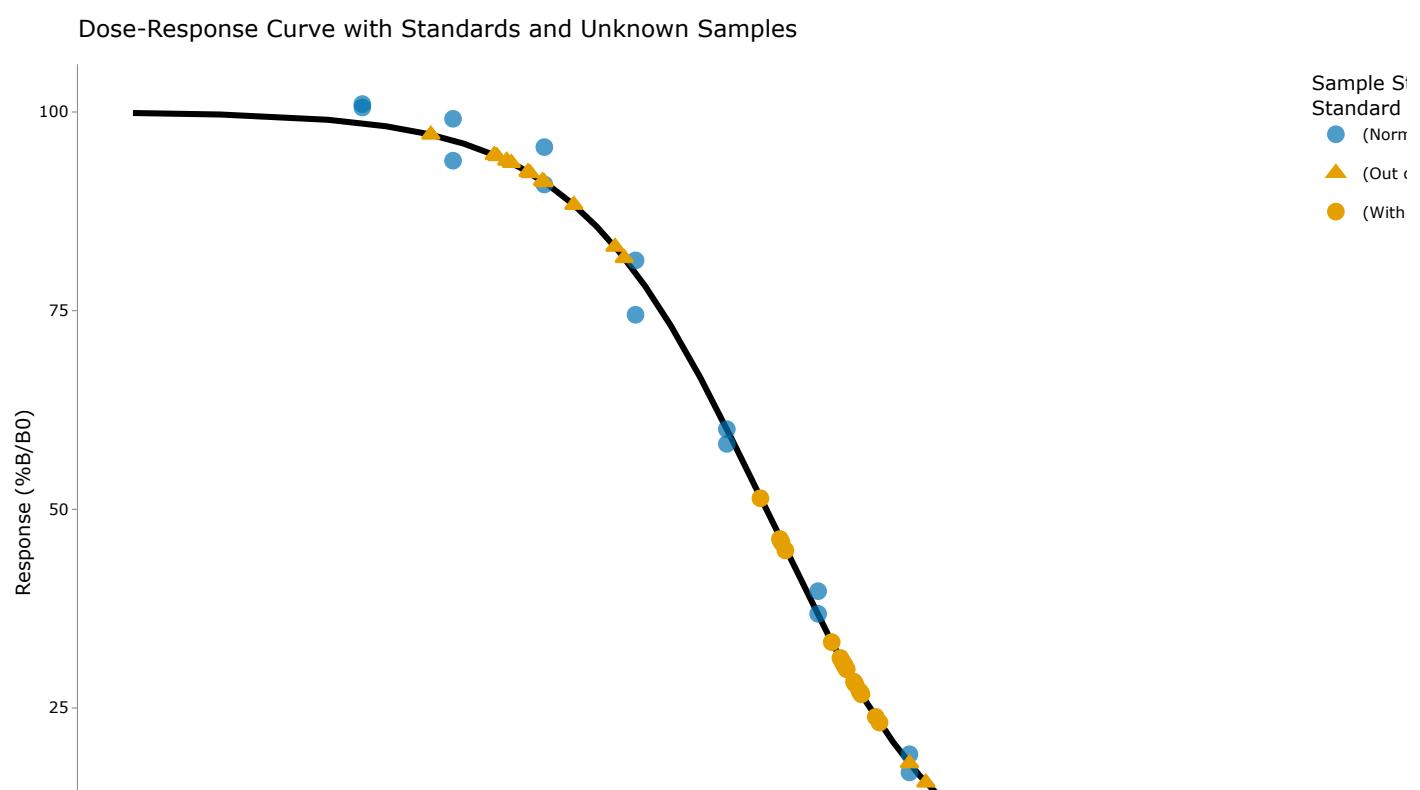
Replicate Group	Sample IDs	Sample Type	n	Mean (pg/mL)	SD (pg/mL)	SE (pg/mL)	95% CI	CV%	Range
AA	A4,A5	Sample	2	439.82	5.10	3.61	1.159 [394.0 – 485.6]	<input checked="" type="checkbox"/>	<LLOQ
AB	C4,C5	Sample	2	29.81	7.07	5.00	23.722 [ 0.0 – 93.3]	<LLOQ	<LLOQ
AC	E4,E5	Sample	2	1,162.91	31.03	21.94	2.669 [884.1 – 1441.7]	<input checked="" type="checkbox"/>	<LLOQ
AD	G4,G5	Sample	2	906.20	106.26	75.14	11.726 [ 0.0 – 1860.9]	<input checked="" type="checkbox"/>	<LLOQ
AE	B4,B5	Sample	2	42.27	18.14	12.83	42.926 [ 0.0 – 205.3]	<LLOQ	<LLOQ
AF	D4,D5	Sample	2	31.80	5.22	3.69	16.402 [ 0.0 – 78.7]	<LLOQ	<LLOQ
AG	F4,F5	Sample	2	948.57	27.35	19.34	2.884 [702.8 – 1194.3]	<input checked="" type="checkbox"/>	<LLOQ
AH	H4,H5	Sample	2	815.50	22.02	15.57	2.700 [617.7 – 1013.3]	<input checked="" type="checkbox"/>	<LLOQ
BA	A6,A7	Sample	2	952.49	50.43	35.66	5.294 [499.4 – 1405.6]	<input checked="" type="checkbox"/>	<LLOQ
BB	C6,C7	Sample	2	1,743.27	203.20	143.68	11.656 [ 0.0 – 3568.9]	>ULQ	>ULQ
BC	E6,E7	Sample	2	409.70	72.21	51.06	17.625 [ 0.0 – 1058.5]	<input checked="" type="checkbox"/>	<LLOQ

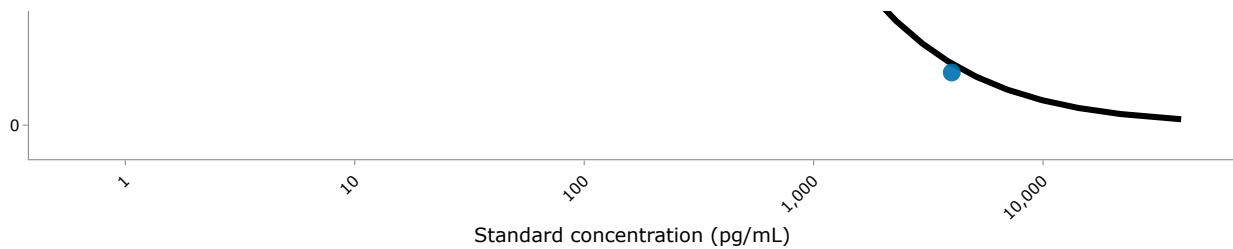
Replicate Group	Sample IDs	Sample Type	n	Mean (pg/mL)	SD (pg/mL)	SE (pg/mL)	95% CI	CV%	Range
BD	G6,G7	Sample	2	26.70	19.20	13.57	71.906	[ 0.0 – 199.2]	<LLOQ
BE	B6,B7	Sample	2	847.30	7.75	5.48	0.914	[777.7 – 916.9]	✓
BF	D6,D7	Sample	2	774.29	57.97	40.99	7.487	[253.4 – 1295.2]	✓
BG	F6,F7	Sample	2	87.38	5.76	4.08	6.596	[ 35.6 – 139.2]	<LLOQ
BH	H6,H7	Sample	2	33.21	10.95	7.75	32.984	[ 0.0 – 131.6]	<LLOQ

## Sample Variability Visualization



## Dose-Response Curve with Unknown Samples





**Report Generated:** 2026-02-10

**Contact:** kr.moeller@iaea.org (mailto:kr.moeller@iaea.org)

**Feedback:** Online Form (<https://forms.office.com/e/q8eqJfp4QM>)

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## [overall\_conclusions]

## [wavelength\_performance]

### [recommendations]

- [rec\_r2]
- [rec\_cv]
- [rec\_separation]

[report\_generated] 2026-02-10 [contact] kr.moeller@iaea.org (mailto:kr.moeller@iaea.org) [feedback] [online\_form] (<https://forms.office.com/e/q8eqJfp4QM>)

[automated\_multi]