June 26, 2026

Abbott Point of Care, Inc.
Brian Ma
Principal Specialist, Regulatory Affairs
400 College Road East
Princeton, New Jersey 08540

Re: K261039
Trade/Device Name: i-STAT Crea cartridge with the i-STAT 1 System
Regulation Number: 21 CFR 862.1225
Regulation Name: Creatinine test system
Regulatory Class: Class II
Product Code: CGL
Dated: March 30, 2026
Received: March 30, 2026

Dear Brian Ma:

We have reviewed your section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (the Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. Although this letter refers to your product as a device, please be aware that some cleared products may instead be combination products. The 510(k) Premarket Notification Database available at https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmn.cfm identifies combination product submissions. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Additional information about changes that may require a new premarket notification are provided in the FDA guidance documents entitled "Deciding When to Submit a 510(k) for a Change to an Existing Device" (https://www.fda.gov/media/99812/download) and "Deciding When to Submit a 510(k) for a Software Change to an Existing Device" (https://www.fda.gov/media/99785/download).

Your device is also subject to, among other requirements, the Quality Management System Regulation (QMSR) (21 CFR Part 820), which includes, but is not limited to, ISO 13485 clause 7.3 (Design controls), ISO 13485 clause 8.3 (Nonconforming product), ISO 13485 clause 8.5.2 (Corrective action), and ISO 13485 clause 8.5.3 (Preventative action). Please note that regardless of whether a change requires premarket review, the QMSR requires device manufacturers to review and approve changes to device design and production (ISO 13485 clause 7.3 and ISO 13485 clause 7.5) and document changes and approvals in the Medical Device File (ISO 13485 clause 4.2.3).

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801 and Part 809); medical device reporting (reporting of medical device-related adverse events) (21 CFR Part 803) for devices or postmarketing safety reporting (21 CFR Part 4, Subpart B) for combination products (see https://www.fda.gov/combination-products/guidance-regulatory-information/postmarketing-safety-reporting-combination-products); good manufacturing practice requirements as set forth in the Quality Management System Regulation (QMSR) (21 CFR Part 820) for devices or current good manufacturing practices (21 CFR Part 4, Subpart A) for combination products; and, if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR Parts 1000-1050.

All medical devices, including Class I and unclassified devices and combination product device constituent parts are required to be in compliance with the final Unique Device Identification System rule ("UDI Rule"). The UDI Rule requires, among other things, that a device bear a unique device identifier (UDI) on its label and package (21 CFR 801.20(a)) unless an exception or alternative applies (21 CFR 801.20(b)) and that the dates on the device label be formatted in accordance with 21 CFR 801.18. The UDI Rule (21 CFR 830.300(a) and 830.320(b)) also requires that certain information be submitted to the Global Unique Device Identification Database (GUDID) (21 CFR Part 830 Subpart E). For additional information on these requirements, please see the UDI System webpage at https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/unique-device-identification-system-udi-system.

Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to https://www.fda.gov/medical-devices/medical-device-safety/medical-device-reporting-mdr-how-report-medical-device-problems.

For comprehensive regulatory information about medical devices and radiation-emitting products, including information about labeling regulations, please see Device Advice (https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance) and CDRH Learn (https://www.fda.gov/training-and-continuing-education/cdrh-learn). Additionally, you may contact the Division of Industry and Consumer Education (DICE) to ask a question about a specific regulatory topic. See the DICE website (https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-

assistance/contact-us-division-industry-and-consumer-education-dice) for more information or contact DICE by email (DICE@fda.hhs.gov) or phone (1-800-638-2041 or 301-796-7100).

Sincerely,

PAULA V. CAPOSINO -S

Paula Caposino, Ph.D.
Deputy Director
Division of Chemistry and
Toxicology Devices
OHT7: Office of In Vitro Diagnostics
Office of Product Evaluation and Quality
Center for Devices and Radiological Health

Enclosure

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: 07/31/2026
See PRA Statement below.

510(k) Number *(if known)*
K261039

Device Name
i-STAT Crea cartridge with the i-STAT 1 System

Indications for Use *(Describe)*
The i-STAT Crea cartridge with the i-STAT 1 System is intended for use in the in vitro quantification of creatinine in arterial, venous, or capillary whole blood in point of care or clinical laboratory settings.

Creatinine measurements are used in the diagnosis and treatment of renal diseases, in monitoring renal dialysis, and as a calculation basis for measuring other urine analytes.

Type of Use *(Select one or both, as applicable)*

☒ Prescription Use (Part 21 CFR 801 Subpart D) ☐ Over-The-Counter Use (21 CFR 801 Subpart C)

CONTINUE ON A SEPARATE PAGE IF NEEDED.

This section applies only to requirements of the Paperwork Reduction Act of 1995.

DO NOT SEND YOUR COMPLETED FORM TO THE PRA STAFF EMAIL ADDRESS BELOW.

The burden time for this collection of information is estimated to average 79 hours per response, including the time to review instructions, search existing data sources, gather and maintain the data needed and complete and review the collection of information. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden, to:

Department of Health and Human Services
Food and Drug Administration
Office of Chief Information Officer
Paperwork Reduction Act (PRA) Staff
PRAStaff@fda.hhs.gov

"An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB number."

510(k) Summary

The information in this 510(k) summary is being submitted in accordance with the requirements of 21 CFR 807.92.

1. Submitter Information

Owner	Abbott Point of Care Inc. 400 College Road East Princeton, NJ 08540
Contact	Primary: Brian Ma, PhD Principal Specialist, Regulatory Affairs Phone: 613-688-5949 Secondary: Mojgan Soleimani Director, Quality Operations and Regulatory Strategy Phone: 613-295-0932
Date Prepared	June 25, 2026

2. Device Information

Proprietary Name: *i-STAT Crea* cartridge with the *i-STAT 1 System*

Common Name: Creatinine test, analyzer, handheld

510(k) Number: K261039

Product Code	Device Classification Name	Regulation Number	Class	Panel
CGL	Electrode, Ion Based, Enzymatic, Creatinine	862.1225	II	Clinical Chemistry

3. Predicate Device

Proprietary Name: Nova StatSensor Creatinine Hospital Meter System

510(k) Number: K171059

Product Code	Device Classification Name	Regulation Number	Class	Panel
CGL	Electrode, Ion Based, Enzymatic, Creatinine	862.1225	II	Clinical Chemistry

4. Device Description

The *i-STAT Crea* cartridge is used with the *i-STAT 1* analyzer as part of the *i-STAT 1 System* to measure creatinine in arterial, venous or capillary whole blood.

The *i-STAT 1 System* is an *in vitro* diagnostic medical device intended for the quantitative determination of various clinical chemistry tests contained within i-STAT cartridges using whole blood. The *i-STAT 1 System* consists of a portable blood analyzer (*i-STAT 1* analyzer), single-use disposable test cartridges (i-STAT cartridges), liquid quality control and calibration verification materials, and accessories (*i-STAT 1* Downloader/Recharger, *i-STAT* 9V NiMH Rechargeable Battery, *i-STAT* Electronic Simulator and *i-STAT 1* Printer). The *i-STAT 1 System*, including the *i-STAT Crea* cartridge, is designed for use by trained medical professionals in point of care or clinical laboratory settings and is for prescription use only.

The enabling technology for the *i-STAT 1 System* is in the microfabricated electrochemical sensors located in the single-use disposable i-STAT cartridges. Creatinine is measured amperometrically. It is hydrolyzed to creatine in a reaction catalyzed by the enzyme creatinine amidohydrolase. Creatine is then hydrolyzed to sarcosine by creatine amidinohydrolase. The oxidation of sarcosine, catalyzed by sarcosine oxidase, produces hydrogen peroxide (H_2O_2). The liberated hydrogen peroxide is oxidized at the platinum electrode to produce a current which is proportional to the sample creatinine concentration.

The *i-STAT Crea* cartridge contains the required sensors, a fluid pack (calibrant pouch), a sample entry well and closure, fluid channels, waste chamber, and the necessary mechanical features for controlled fluid movement within cartridge. All the test steps and fluid movements occur within the *i STAT Crea* cartridge. The *i-STAT 1* analyzer interacts with the *i-STAT C*rea cartridge to move fluid across the sensors and generate a quantitative result. Cartridges require two to three drops of whole blood applied to the cartridge using a transfer device, by the trained user before the cartridge is placed within the analyzer.

The *i-STAT 1* analyzer is a handheld, *in vitro* diagnostic device designed to run only i-STAT test cartridges. The analyzer functions as the main user interface and the electro-mechanical interface to the test cartridge. All within-cartridge fluid movements, as well as the timing and heating of the test cycle, are automated and controlled without user intervention by system software embedded within the analyzer.

5. Intended Use Statement

The *i-STAT Crea* cartridge with the *i-STAT 1 System* is intended for use in the *in vitro* quantification of creatinine in arterial, venous, or capillary whole blood in point of care or clinical laboratory settings.

Creatinine measurements are used in the diagnosis and treatment of renal diseases, in monitoring renal dialysis, and as a calculation basis for measuring other urine analytes.

6. Summary Comparison of Technological Characteristics

Table 1: **Similarities and Differences: System (Test and Instrument)**		
Feature or Characteristic	**Candidate Device: i-STAT Crea cartridge with the i-STAT 1 System**	**Predicate Device: Nova StatSensor Creatinine Hospital Meter System (K171059)**
Intended Use	The i-STAT Crea cartridge with the i-STAT 1 System is intended for use in the *in vitro* quantification of creatinine in arterial, venous, or capillary whole blood in point of care or clinical laboratory settings. Creatinine measurements are used in the diagnosis and treatment of renal diseases, in monitoring renal dialysis, and as a calculation basis for measuring other urine analytes.	The Nova StatSensor Creatinine Hospital Meter System consists of the StatSensor Creatinine Hospital Meter and the Stat-Sensor Creatinine Test Strips. The Nova StatSensor Creatinine Hospital Meter System is intended for in vitro diagnostic use by healthcare professionals and for point-of-care usage for the quantitative measurement of creatinine in capillary, venous, and arterial whole blood. Creatinine measurements are used in the diagnosis and treatment of renal diseases and in monitoring renal dialysis. Not for use in neonates.
Intended Use Setting	Clinical laboratory and point of care	Same
Device Classification	Class II	Same
Product Code	CGL	Same
Regulation Number	862.1225	Same
Measurand	Creatinine	Same
Principle of Measurement	Amperometric measurement of oxidized hydrogen peroxide	Same
Assay Format	Single use cartridge	Single use test strip
Reportable Result	Quantitative results	Same
Reportable Range	0.2 – 20.0 mg/dL	0.3 – 12.0 mg/dL
Sample Type	Arterial, venous, or capillary whole blood	Same
Sample Volume	65 µL	1.2 µL

Table 1: **Similarities and Differences: System (Test and Instrument)**		
Feature or Characteristic	**Candidate Device: i-STAT Crea cartridge with the i-STAT 1 System**	**Predicate Device: Nova StatSensor Creatinine Hospital Meter System (K171059)**
Sample Preparation	Ready to Use	Same
Sample Collection	• Without anticoagulant • With balanced heparin anticoagulant or lithium heparin anticoagulant	• With sodium heparin anticoagulant or lithium heparin anticoagulant
Traceability	Traceable to NIST SRM967	Same
Calibration	Automatic, 1-point on-board contained within cartridge	Automatic, calibration performed with each lot of test strips with no calibration code necessary
Instrument Platform	i-STAT 1 analyzer	StatSensor Creatinine Hospital Meter
Analyzer Type	Handheld	Same
Storage Conditions	Refrigerated (2 to 8°C / 35 to 46°F): until labelled expiration date. Room Temperature (18-30°C / 64-86°F): up to 14 days.	Refrigerated (2 to 8°C / 36 to 46°F): until expiration date.

7. Performance Characteristics

A. Analytical Performance

a. Precision/Reproducibility:

i. Precision 20 days (aqueous materials)

The precision of the i-STAT Creatinine test in the *i-STAT Crea* cartridge with the *i-STAT 1 System* was evaluated using five (5) levels of aqueous materials. The study followed the standard single-site 20x2x2 experimental design based on guidance provided in CLSI document EP05-A3: *Evaluation of Precision of Quantitative Measurement Procedures; Approved Guideline – Third Edition*. The study was conducted using multiple analyzers and one (1) test cartridge lot over at least 20 days at one (1) site. Repeatability, between-run, between-day, and within-laboratory precision were estimated for each level. The results of the 20-day precision study for the *i-STAT Crea* cartridge on the *i-STAT 1 System* are shown in **Table 2**.

Table 2: 20-day precision of the i-STAT Crea cartridge on the i-STAT 1 analyzer

Test (units)	Fluid Level	N	Mean	Repeatability		Between-Run		Between-Day		Within-Laboratory	
				SD	%CV	SD	%CV	SD	%CV	SD	%CV
Crea (mg/dL)	CV L1	82	16.46	0.363	2.20	0.005	0.03	0.245	1.49	0.438	2.66
	CV L2	83	4.38	0.101	2.31	0.033	0.74	0.039	0.88	0.113	2.58
	CV L3	83	1.67	0.034	2.06	0.000	0.00	0.015	0.88	0.037	2.24
	CV L4	82	0.46	0.019	4.22	0.004	0.89	0.007	1.49	0.021	4.57
	CV L5	81	0.23	0.020	8.31	0.009	3.80	0.003	1.46	0.022	9.25

ii. Multi-site, multi-day precision (aqueous materials)

Multi-site, multi-day precision testing was performed at three (3) point of care sites using *i-STAT* Calibration Verification fluids containing five (5) levels of creatinine. The study followed a 3x5x2x3 design based on guidance provided in CLSI EP05-A3: *Evaluation of Precision of Quantitative Measurement Procedures; Approved Guideline – Third Edition*. At each site, each level was tested once per day by two (2) operators for five (5) days on six (6) *i-STAT 1* analyzers using one (1) lot of *i-STAT Crea* cartridges. Repeatability, between-day, between-operator, within-site, between-site variance components, and reproducibility were calculated for all sites combined and provided in the **Table 3** below.

Table 3: Multi-site multi-day precision of the i-STAT Crea cartridge on the i-STAT 1 analyzer

Level	N	Mean	Repeatability		Between-Day		Between-Operator		Within-Site		Between-Site		Reproducibility	
			SD	%CV	SD	%CV	SD	%CV	SD	%CV	SD	%CV	SD	%CV
CV L1	90	16.33	0.415	2.5	0.263	1.6	0.000	0.0	0.492	3.0	0.520	3.2	0.715	4.4
CV L2	90	3.71	0.081	2.2	0.045	1.2	0.029	0.8	0.097	2.6	0.084	2.3	0.128	3.5
CV L3	90	1.02	0.037	3.6	0.023	2.2	0.000	0.0	0.043	4.2	0.020	2.0	0.047	4.6
CV L4	90	0.49	0.025	5.1	0.014	2.9	0.000	0.0	0.029	5.8	0.003	0.6	0.029	5.9
CV L5	90	0.37	0.043	11.6	0.007	1.9	0.000	0.0	0.043	11.7	0.021	5.7	0.048	13.0

iii. Precision (whole blood)

The precision of the i-STAT Creatinine test in the *i-STAT Crea* cartridge on the *i-STAT 1 System* was evaluated using whole blood specimens in point-of-care setting at multiple clinical sites. At each site, anticoagulated venous, arterial, or capillary whole blood specimens were tested in duplicate. For each sample type, the specimens were grouped into subintervals of the creatinine test reportable range for analysis. The results are summarized in **Table 4**.

Table 4: Whole blood precision of venous, arterial, and capillary whole blood for the i-STAT Crea cartridge on the i-STAT 1 analyzer

Test (units)	Sample Type	Sample Range	N	Mean	SD	%CV
Crea (mg/dL)	Venous Whole Blood	0.2-1.0	66	0.76	0.040	5.23
		>1.0-2.0	25	1.38	0.040	2.89
		>2.0-7.5	32	3.92	0.070	1.78
		>7.5-12.0	16	9.68	0.108	1.11
		>12.0-20.0	27	15.76	0.292	1.85
	Arterial Whole Blood	0.2-1.0	146	0.73	0.037	5.00
		>1.0-2.0	105	1.35	0.045	3.31
		>2.0-7.5	82	3.68	0.067	1.83
		>7.5-12.0	14	9.25	0.154	1.66
		>12.0-20.0	14	15.07	0.280	1.86
	Capillary Whole Blood	0.2-1.0	94	0.72	0.048	6.69
		>1.0-2.0	24	1.32	0.054	4.10
		>2.0-7.5	26	4.07	0.105	2.57
		>7.5-12.0	10	9.26	0.297	3.20
		>12.0-20.0	7	15.30	0.245	1.60

b. Linearity/assay reportable range:

i. Linearity

The linearity study was designed based on CLSI EP06-Ed2: *Evaluation of the Linearity of Quantitative Measurement Procedures – Second Edition*. The linearity of the i-STAT Creatinine test in the *i-STAT Crea* cartridge with the *i-STAT 1 System* were evaluated by preparing whole blood samples of varying creatinine levels for each i-STAT test. Each level was tested using five (5) lots of *i-STAT Crea* cartridge. The i-STAT Creatinine test in the *i-STAT Crea* cartridge demonstrated linearity across the reportable range. The regression summary of the results for the i-STAT Creatinine test versus the expected values of the whole blood samples is provided in **Table 5.**

Table 5: Regression summary for the creatinine test in the i-STAT Crea cartridge on the i-STAT 1 analyzer

Test	Units	Reportable Range	Range Tested	Slope	Intercept	R^2
Creatinine	mg/dL	0.2 – 20.0	0.14 – 22.92	0.999	0.024	0.999

c. Traceability, Calibration and Reference Range

i. Traceability and Calibration

Creatinine values assigned to i-STAT System controls and calibration verification materials are traceable to the U.S. National Institute of Standards and Technology (NIST) standard reference material SRM967.

The i-STAT controls and calibration verification materials are validated for use only with the *i-STAT System* and assigned values may not be commutable with other methods.

ii. Reference Range

The reference range for the i-STAT Creatinine test in the *i-STAT Crea* cartridge is based on literature reference and is listed in **Table 6** below.

Table 6: Reference range

Test	Units	Reportable Range	Reference Range	
			Arterial	Venous
Creatinine	mg/dL	0.2 – 20.0	0.6 – 1.3 [1]	
	µmol/L	18-1768	53-115	

[1] Burtis, C. A., Ashwood, E. R., and Bruns, D. E. (2006) *Tietz Textbook of Clinical Chemistry and Molecular Diagnostics*, 4th Ed. St. Louis, MO: Elsevier Saunders.

d. Detection Limit

i. Limit of Quantitation (LoQ)

The study was based on the CLSI EP17-A2: *Evaluation of Detection Capability for Clinical Laboratory Measurement Procedures; Approved Guideline – Second Edition*. The LoQ of the i-STAT Creatinine test in the *i-STAT Crea* cartridge was evaluated on the *i-STAT 1* analyzer using two (2) *i-STAT Crea* cartridge lots, and whole blood that was altered to a low creatinine level. The LoQ for the i-STAT Creatinine test was determined to be at or below the lower limit of the reportable range as shown in **Table 7**.

Table 7: Summary of LoQ result for the creatinine test in the i-STAT Crea cartridge on the i-STAT 1 analyzer

Test	Units	Lower limit of the reportable range	LoQ
Creatinine	mg/dL	0.2	0.13

ii. Limit of Blank and Detection (LoB/LoD)

The study was based on CLSI EP17-A2: *Evaluation of Detection Capability for Clinical Laboratory Measurement Procedures; Approved Guideline – Second Edition*. The LoB and LoD of the i-STAT Creatinine test in the *i-STAT Crea* cartridge were evaluated with the *i-STAT 1* analyzer using two (2) *i-STAT Crea* cartridge lots. Whole blood was altered to achieve a blank creatinine level for LoB testing and two (2) low creatinine levels for LoD testing. The LoB and LoD were determined based on the maximal LoB or LoD value obtained for each lot tested. The determined LoB and LoD for the i-STAT Creatinine test on the *i-STAT 1* analyzer are shown in the **Table 8** below.

Table 8: Summary of LoB and LoD results for the creatinine test in the i-STAT Crea cartridge on the i-STAT 1 analyzer			
Test	**Units**	**LoB**	**LoD**
Creatinine	mg/dL	0.07	0.12

e. Analytical Specificity

i. *Interference*

The interference performance of the i-STAT Creatinine test in the *i-STAT Crea* cartridge with the *i-STAT 1 System* was evaluated using whole blood samples based on CLSI EP07-ED3: *Interference Testing in Clinical Chemistry, Third Edition*. The effect of each substance was evaluated by comparing the performance of a control sample, spiked with blank solvent solution, with the test results from a test sample spiked with the potentially interfering substance at the toxic/pathological concentration recommended in CLSI EP37-ED1: *Supplemental Tables for Interference Testing in Clinical Chemistry, First Edition*, as applicable.

A substance was identified as an interferent if the difference in means (or medians) between the control and test samples was outside of the acceptance criteria. For any identified interferent, a dose-response study was performed to determine the degree of interference as a function of the substance concentration. **Table 9** contains the lists of potentially interfering substances tested and the interference results for the *i-STAT Crea* cartridge.

Table 9: Potentially interfering substances and test concentrations for the creatinine test in the i-STAT Crea cartridge on the i-STAT 1 analyzer				
Substance [1]	**Substance Concentration**		**Interference (Yes/No)**	**Comments**
	mmol/L (unless specified)	**mg/dL (unless specified)**		
Acetaldehyde[2]	0.045	0.2	No	
Acetaminophen	1.03	15.6	No	
Acetyl Cysteine (N-Acetyl-Cysteine)	0.92	15.0	No	
Ascorbic Acid (L-Ascorbic Acid)	0.298	5.25	No	
β-Hydroxybutyric Acid[2]	6.0	62.46	No	
Bicarbonate[2]	35.0	294.0	No	
Bilirubin, Conjugated	0.475	40	No	
Bilirubin, Unconjugated	0.684	40	No	
Bromide[2] (Lithium Bromide)	2.5	21.7	No	Refer to comment below
	37.5	325.7	Yes	Use another method. Refer to comment below.

[1] The compound tested to evaluate the interfering substance is presented in parenthesis.
[2] The test concentration for this substance is not included in CLSI guideline EP37 1st edition.

Table 9: Potentially interfering substances and test concentrations for the creatinine test in the i-STAT Crea cartridge on the i-STAT 1 analyzer				
Substance [1]	**Substance Concentration**		**Interference (Yes/No)**	**Comments**
	mmol/L (unless specified)	**mg/dL (unless specified)**		
Calcium (Calcium Chloride)	5.0	20	No	
Cefoxitin	15500 µmol/L	697	No	
Creatine[2]	0.382	5.01	No	
Dopamine (Dopamine Hydrochloride)	4.06 µmol/L	0.0621	No	
Formaldehyde[2]	0.133	0.399	No	
Glycolic Acid[2]	10.0	76.05	Yes	Decreased results at >4.9 mmol/L. Refer to comment below.
Hemoglobin[3]	10 g/L	1000	Yes	Decreased results at >8 g/L
Hydroxyurea	0.405	3.08	Yes	Increased results at >0.02 mmol/L
Intralipid 20%	N/A	3527	No	
Lactate (Lithium Lactate)	10	90	No	
Methyldopa	107 µmol/L	2.25	No	
Nithiodote[2] (Sodium Thiosulfate)	16.7	264.0	Yes	Increased results at >14.5 mmol/L
pH	8.0 pH units	N/A	No	
Pyruvate (Lithium Pyruvate)	0.570	5	No	
Salicylate (Lithium Salicylate)	0.207	2.86	No	
Triglyceride	16.94	1500	No	
Uric Acid	1.4	23.5	No	

Relevant comments regarding interference of bromide, glycolic acid, hydroxyurea, and nithiodote are noted below:

- Bromide has been tested at two levels: a toxic level of 37.5 mmol/L and a therapeutic plasma concentration level of 2.5 mmol/L. The latter is the peak plasma concentration associated with halothane anesthesia, in which bromide is released. Abbott has not identified a therapeutic condition that would lead to levels consistent with 37.5 mmol/L. Bromide increases variability in the *i-STAT Crea* cartridge which leads to inconsistent results, Abbott recommends using another method for bromide concentration greater than 2.5 mmol/L.

[3] The test concentration denotes the quantity of free hemoglobin added to the whole blood test sample.

- Glycolic acid may be present in patient samples as the primary toxic metabolite of ethylene glycol ingestion. Glycolic acid concentrations of approximately 3–10 mmol/L are consistent with clinically significant ethylene glycol exposure and may be associated with evolving metabolic acidosis. In a study of 35 patients who had ingested ethylene glycol, initial glycolic acid concentrations of 0 to 38 mmol/L corresponded to ethylene glycol levels of 0.97 – 130.6 mmol/L.[4]
- Hydroxyurea is a DNA synthesis inhibitor used in the treatment of sickle cell anemia, HIV infection, and various types of cancer. The malignancies that it is used to treat include melanoma, metastatic ovarian cancer, and chronic myelogenous leukemia. It is also used in the treatment of polycythemia vera, thrombocythemia, and psoriasis. At typical doses ranging from 500 mg to 2 g/day, concentrations of hydroxyurea in a patient's blood may be sustained at approximately 100 to 500 µmol/L. Higher concentrations may be observed soon after dosing or at higher therapeutic doses.
- Nithiodote (Sodium Thiosulfate) is indicated for the treatment of acute cyanide poisoning. The journal article titled "Falsely increased chloride and missed anion gap elevation during treatment with sodium thiosulfate" indicated that sodium thiosulfate could be used in the treatment of calciphylaxis indicating that "the highest concentration likely to be seen in plasma [is] after infusion of a 12.5 g dose of sodium thiosulfate pentahydrate. Assuming that the 12.5 g dose of sodium thiosulfate pentahydrate is distributed in a typical blood volume of 5 L with a hematocrit of 40%, the peak sodium thiosulfate plasma concentration expected is 16.7 mmol/L.[5]

ii. Other sensitivity studies

1) Oxygen Sensitivity

The effect of oxygen on the i-STAT Creatinine test in the *i-STAT Crea* cartridge with the *i-STAT 1 System* was evaluated with low and high oxygen levels using whole blood samples altered to four (4) creatinine levels across the test reportable range. Creatinine test performance at each creatinine level and at low, normal, and high oxygen conditions were compared. Performance was deemed equivalent if the 95% confidence interval (CI) of the difference in means (or medians) between performance at low, normal, and high oxygen conditions was within the acceptance criteria. The studies demonstrated that the *i-STAT* Creatinine test in the *i-STAT Crea* cartridge on the *i-STAT 1 System* is insensitive to oxygen changes between 24 and 605 mmHg with respect to oxygen changes between the low and high oxygen conditions, the low and normal oxygen conditions, as well as between the normal and high oxygen conditions.

2) Altitude

The performance of the i-STAT Creatinine test in the *i-STAT Crea* cartridge with the *i-STAT 1* analyzer at an altitude of approximately 10,000 feet above sea level was evaluated

[4] Porter, W. H., Crellin, M., Rutter, P. W., and Oeltgen, P. (2000) Interference by glycolic acid in the Beckman synchron method for lactate: a useful clue for unsuspected ethylene glycol intoxication. *Clin Chem*. **46**, 874-875

[5] Wendroth, S. M., Heady, T. N., Haverstick, D. M., Bachmann, L. M., Scott, M. G., Boyd, J. C., and Bruns, D. E. (2014) Falsely increased chloride and missed anion gap elevation during treatment with sodium thiosulfate. *Clin Chim Acta*. **431**, 77-79

using whole blood samples at creatinine levels across the reportable range. The creatinine results obtained from the *i-STAT Crea* cartridges tested within a hypobaric chamber simulating approximately 10,000 feet above sea level (test condition) were compared to the results obtained from the *i-STAT Crea* cartridges tested outside the chamber at sea level (control condition). Passing-Bablok regression analysis between the two (2) conditions was performed based on the CLSI EP09c-ED3: *Measurement Procedure Comparison and Bias Estimation using Patient Samples– Third Edition*. The results of the correlation coefficient and slope met acceptance criteria and demonstrate equivalent performance between the comparator sea level condition and the test condition of approximately 10,000 feet above sea level. The results are summarized in **Table 10** below.

Table 10: Summary of altitude study results				
Test	**Correlation Coefficient (r)**		**Slope**	
	r	**95% CI**	**Slope**	**95% CI**
Creatinine	1.00	0.997 to 0.999	1.009	1.000 to 1.021

B. Comparison Studies

a. Method Comparison

Method comparison for arterial, venous, and capillary whole blood specimens on the i-*STAT Crea* cartridge with the *i-STAT 1 System* was demonstrated in studies based on CLSI EP09c-ED3: *Measurement Procedure Comparison and Bias Estimation Using Patient Samples – Third Edition*.

Heparinized arterial and venous whole blood specimens collected across multiple point of care sites were evaluated using *i-STAT Crea* cartridges on the *i-STAT 1* analyzer against whole blood specimens tested on a comparative method. Capillary whole blood specimens collected with heparinized capillary tubes across multiple point of care sites were evaluated using the first valid result from the i-STAT Crea cartridge on the i-STAT 1 analyzer against the mean venous whole blood result from the same subject on a comparative method. Additionally, two (2) capillary specimens were collected with heparinized capillary tubes across multiple point of care sites. One (1) tube was used to test in singlicate on the *i-STAT 1* analyzer and the other tube was used to test in singlicate on the comparative method.

The arterial, venous, and capillary data were pooled, and a Passing-Bablok linear regression analysis for creatinine was performed using the singlicate result from the *i-STAT C*rea cartridge versus the result from the comparative method and summarized in **Table 11** below. In the table, N is the number of specimens in the data set, and r is the correlation coefficient.

Table 11: Method comparison results for the creatinine test for the i-STAT Crea cartridge with i-STAT 1 System								
Test (units)	**Comparative Method**		**N**	**Slope**	**Intercept**	**r**	**Xmin**	**Xmax**
	Arterial/ Venous	**Capillary**						
Creatinine (mg/dL)	i-STAT CHEM8+	epoc Blood Analysis System (capillary) or i-STAT CHEM8+ (venous)	700	0.99	0.01	1.00	0.3	19.6

A Passing-Bablok linear regression analysis was also performed using the results of each sample type from the *i-STAT Crea* cartridge versus the comparative method results. Method comparison results for arterial, venous, and capillary whole blood specimens are shown in **Table 12**.

Table 12: Method comparison results for arterial, venous, and capillary specimens						
Test	**Sample Type**	**Comparative Method**	**N**	**Slope**	**Intercept**	**r**
Creatinine (mg/dL)	Arterial	i-STAT CHEM8+	364	0.98	0.01	1.00
	Venous	i-STAT CHEM8+	168	0.99	0.01	1.00
	Capillary	epoc Blood Analysis System (capillary) or i-STAT CHEM8+ (venous)	168	1.00	0.00	1.00

b. Matrix Comparison

A matrix comparison study was conducted following the recommendations in CLSI EP35: *Assessment of Equivalence or Suitability of Specimen Types for Medical Laboratory Measurement Procedures, First Edition* to evaluate the performance of the i-STAT Creatinine test in the *i-STAT Crea* cartridge on the *i-STAT 1 System* comparing whole blood specimens collected without anticoagulant (candidate specimen) to samples collected with balanced heparin or lithium heparin anticoagulant (primary specimen).

A total of 354 matched whole blood samples were tested which included native arterial (n=182) and native venous (n=155) specimens. Each specimen was tested in duplicate using two (2) *i-STAT Crea* cartridges with two (2) *i-STAT 1* analyzers. A Passing-Bablok linear regression analysis was performed using the first replicate result from the candidate (y-axis) versus the first replicate result from the primary specimen (x-axis). The regression analysis results are summarized in **Table 13**. In the table, N is the number of specimens in the data set, and r is the correlation coefficient.

Table 13: Matrix comparison results						
Test (units)	**N**	**Candidate Specimen Range (mg/dL)**	**Primary Specimen Range (mg/dL)**	**r**	**Slope**	**Intercept**
Creatinine (mg/dL)	354	0.3-19.2	0.3-18.6	1.00	1.00	0.00

8. Conclusion

The results of these studies demonstrate that performance of the i-STAT Creatinine test in the *i-STAT Crea* cartridge with the *i-STAT 1 System* is substantially equivalent to the predicate device.