Appendix 2

SOPS OF COBAS INTEGRA 400

Daily startup

1-Checking the begin of day report .

2-Loading clearners, diluents and ISE solution .

3-Loadihg and mixing cassettes (Reagents) .

4-Checking resources .

5-Performing service actions .

6-Loading calibrators and control .

7-Creating orders .

8-Loading samples on board .

9-Starting processing .

10-Validating results .

11-Printing the final report .

CHAPTER ONE

1.INTRODUCTIN

CHAPTER TWO

2. LITERATURE REVIEW

CHAPTER THREE

3. MATERIALS AND METHODS

CHAPTER FOUR

4. RESULS

CHAPTER FIVE

5. DISCUSSION

CHAPTER SIX

6. CHONCLUSION AND RECOMMENDATIONS

REFERENCES

400 700 800

Uric Acid

Order information

COBAS INTEGRA® 500 Tests Cat. No. 20756296 Indicates analyzer(s) on which cassette can be used
Uric Acid System-ID 07 5629 6
Calibrator f.a.s. 10 × 3 mL Cat. No. 10759350
System-ID 07 3718 6
Precinorm® U 20 × 5 mL Cat. No. 10171743
System-ID 07 7997 0
Precipath® U 20 × 5 mL Cat. No. 10171778
System-ID 07 7998 9
Precinorm® U plus 10 × 3 mL Cat. No. 12149435
INTEGRA
400/
400 plus
INTEGRA/
INTEGRA
700
INTEGRA
800
□ □ □
System-ID 07 7999 7
Precipath® U plus 10 × 3 mL Cat. No. 12149443
System-ID 07 8000 6
COBAS INTEGRA 150 Tests Cat. No. 20764337
Cleaner Cassette System-ID 07 6433 7

Intended use

The cassette COBAS INTEGRA Uric Acid (UA) contains an in vitro diagnostic reagent system intended for use on COBAS INTEGRA systems for the quantitative determination of the uric acid concentration in serum, plasma, and urine. This method sheet describes the application for serum, plasma (test UA, 0-029), and urine (test UAU, 0-129).

Summary[1]

Uric acid is themajor end product of purinemetabolism and is one of the components of the nonprotein nitrogen fraction in plasma. Most uric acid formation occurs in the liver and is derived either from ingested or endogenous nucleoproteins. Approximately half of the total uric acid in the body is eliminated daily by urinary excretion and destruction in the intestinal tract.
Numerous disease states and physiological conditions are associated with alterations in serum uric acid concentrations. Increased levels are more frequent. Serum uric acid levels are characteristically elevated in gout, a disorder involving either uric acid synthesis or excretion.
Other common etiologies of hyperuricemia include renal dysfunction, ketoacidosis, glucose-6-phosphate deficiency, and Lesch-Nyhan syndrome. Decreased uric acid levels have been described in renal tubular absorption defects, Hodgkin's disease, bronchogenic carcinoma, severe hepatocellular disease, and xanthinuria.

Test principle[2,3,4]

Enzymatic colorimetric test with uricase and 4-aminoantipyrine. In the initial step uric acid is oxidized in a reaction catalyzed by uricase. The hydrogen peroxide formed reacts with N-ethyl-N-(2-hydroxy-3-sulfopropyl)-m-toluidine (TOOS) and 4-amino-antipyrine (4-AAP) in the presence of peroxidase (POD) and forms a red quinoneimine dye.

Uricase

Uric acid + 2 H_2O +O_2 allantoin + CO_2 + H_2O_2

POD

2 H_2O_2 + 4-AAP + TOOS quinoneimine dye + 4 H_2O

The color intensity of the quinoneimine formed is directly proportional to the uric acid concentration and is determined by measuring the increase in absorbance at 520 nm.
The addition of ascorbate oxidase prevents interference by ascorbic acid.

Reagents - working solutions

R1 Uricase in vial A (liquid).
R2 Ascorbate oxidase in vial B (liquid).

Active ingredients

Components Concentrations
R1 R2 Test

Phosphate 120 120 58 mol/L
4-Aminoantipyrine 0.66 0.25 mmol/L
N-ethyl-N-(2-hydroxy-2 0.8 mmol/L
3-sulfopropyl)-mtoluidine
Potassium hexacyano- 100 40 µmol/L
ferrate (II)
POD (horseradish) ≥100 ≥40 µkat/L (≥2.4 kU/L)
Uricase (microbial) ≥5 ≥2 µkat/L (≥120 kU/L)
Ascorbate oxidase ≥100 ≥8 µkat/L (≥0.5 kU/L)
(cucurbita)
pH 7.5 6.1 7.1
Both reagents contain non-reactive stabilizers.
Please see cassette label for reagent filling volumes.

Precautions and warnings

Pay attention to all precautions and warnings listed in Chapter 1, Introduction.

Reagent handling

Ready for use.

Substrates

400 700 800

Storage and stability

Shelf life at 2 to 8°C See expiration date on cassette
INTEGRA 400
On-board in use at 10 to 15°C 12 weeks
INTEGRA 700/800
On-board in use at 8°C 8 weeks

Specimen collection and preparation

Only the specimens listed below were tested and found acceptable.
Serum: Collect serum using standard sampling tubes.
Plasma: Li-heparin or EDTA plasma.
Urine: Assay urinary uric acid as soon as possible. Do not refrigerate. To prevent ureate precipitation in urine samples add sodium hydroxide to keep urine alkaline (pH >8.0). Urine samples are automatically prediluted 1:10 (1+9) with water by the instrument.
When processing samples in primary tubes, follow the instructions of the tube manufacturer.
Stability in *serum/plasma:*[5] 5 days at 4-8°C
6 months at -20°C
Stability in *urine:*[6]
(upon NaOH addition): 4 days at 20-25°C
Centrifuge samples containing precipitates before performing the assay.

Materials provided

See “Reagents - working solutions” section for reagents.

Materials required (but not provided)

COBAS INTEGRA Cleaner Cassette, Cat. No. 20764337, System-ID 07 6433 7.We recommend the use of extra wash cycles when certain test combinations are run together on COBAS INTEGRA systems. For information about test combinations requiring extra wash cycles, please refer to Chapter 1, Introduction, Part III.

Assay

For optimal performance of the assay follow the directions given in this document for the analyzer concerned. Refer to the appropriate operator manual for analyzer-specific assay instructions.

Application for serum, plasma and urine
INTEGRA 400 test definition

Measuring mode Absorbance
Abs. calculation mode Endpoint
Reaction direction Increase
Wavelength A/B 520/659 nm
Calc. first/last T0/69
Unit µmol/L
Serum, plasma
Reaction mode R1/R2-S
Test range 0-1500 µmol/L (0-25 mg/dL)
with postdilution 0-15 000 µmol/L (0-250 mg/dL)
Postdilution factor 10 recommended
Urine
Reaction mode D-R1/R2-S
Test range 0-15 000 µmol/L (0-250 mg/dL)
with postdilution 0-150 000 µmol/L (0-2500 mg/dL)

Predilution factor 10
Postdilution factor 10 recommended

Pipetting parameters

Serum, plasma, urine Diluent (H_2O)
R1 38 µL 40 µL
R2 20 µL
Sample 2 µL 20 µL
Total volume 120 µL

INTEGRA 700/800 test definition

Measuring mode Absorbance
Abs. calculation mode Endpoint
Reaction direction Increase
Wavelength A/B 520/659 nm
Calc. first/last T0/98
Unit µmol/L

Serum, plasma

Reaction mode R1-R2-S
Test range 0-1500 µmol/L (0-25 mg/dL)
with postdilution 0-15 000 µmol/L (0-250 mg/dL)
Postdilution factor 10 recommended

Urine

Reaction mode D-R1-R2-S
Test range 0-15 000 µmol/L (0-250 mg/dL)
with postdilution 0-150 000 µmol/L (0-2500 mg/dL)
Predilution factor 10
Postdilution factor 10 recommended

Pipetting parameters

Serum, plasma, urine Diluent (H_2O)
R1 38 µL 40 µL
R2 20 µL
Sample 2 µL 20 µL
Total volume 120 µL

Calibration

Calibrator Calibrator f.a.s.
Use deionized water as zero calibrator.
Calibration mode Linear regression
Calibration replicate Duplicate recommended
Calibration interval Each cassette (INTEGRA 700/800)
Each cassette and every 6 weeks (INTEGRA 400)
Traceability: This method has been standardized against ID-MS[a,7]
a) Isotope Dilution Mass Spectrometry

Quality control

Quality control serum, plasma Precinorm U or Precinorm U plus
Precipath U or Precipath U plus
Quality control urine Quantitative urine controls are recommended for routine quality control.
Control interval 24 hours recommended
Control sequence User defined
Control after calibration Recommended

Substrates

400 700 800

Calculation

COBAS INTEGRA analyzers automatically calculate the analyte concentration of each sample. For more details please refer to Chapter 7, Data Analysis, User Manual (COBAS INTEGRA 700), or toData analysis in the onlineHelp (COBAS INTEGRA 400/800).
Conversion factor: µmol/L × 0.0168 = mg/dL

Limitations - interference

Criterion: Recovery within ±10% of initial value.

Serum, plasma

Hemolysis No significant interference up to a hemoglobin level of 0.31 mmol/L (5.0 g/L).
Icterus No significant interference up to a bilirubin level of 85 µmol/L (5 mg/dL).
Lipemia No significant interference.
Drugs Of the drugs tested in vitro, methyldopa and noramidopyrine cause artificially low uric acid values at the tested drug level. Refer to Chapter 1, Introduction for a list of tested drugs and their concentration.

Other Physiological ascorbic acid concentrations do not interfere with the test. Ascorbic acid levels higher than 170 µmol/L (3.0 mg/dL) decrease the apparent uric acid concentration significantly.
In very rare cases gammopathy, in particular type IgM (Waldenström's macroglobulinemia), may cause unreliable results.
For diagnostic purposes, the results should always be assessed in conjunction with the patient's medical history, clinical examination and other findings.

Expected values

Serum, plasma[8]
Females <340 µmol/L (<5.7 mg/dL)
Males (≤65 y) <420 µmol/L (<7.0 mg/dL)
Males (>65 y) <500 µmol/L (<8.4 mg/dL)
Urine (reference range according to Krieg and Colombo)[9,10]
1st morning urine 2200-5475 µmol/L (37-92 mg/dL)
24 h urine 1200-5900 µmol/d (200-1000 mg/d)
corresponding to 773-3986 µmol/L[b] (13-67 mg/dL)
b) Calculated from a urine volume of 1.5 L/24 h
Urine (reference range according to Tietz)[5]
Average diet 250-750mg/24 hours
Low purine diet
Females <400 mg/24 hours
Males <480 mg/24 hours
High purine diet <1000 mg/24 hours
Each laboratory should investigate the transferability of the expected values to its own patient population and if necessary determine its own reference ranges.

Specific performance data for serum and plasma[7]

Representative performance data on the COBAS INTEGRA analyzers are given below. Results obtained in individual laboratories may differ.

Precision

Reproducibility was determined using human samples and controls in an internal protocol (within run n = 20, between run n = 20). The following results were obtained.

	Level 1	Level 2
Mean	340 µmol/L (5.7 mg/dL)	635 µmol/L (10.7 mg/dL)
CV within run	0.65%	0.5%
CV between run	2.1%	1.9%

Analytical sensitivity (lower detection limit)

4.71 µmol/L (0.079 mg/dL)
The detection limit represents the lowest measurable analyte level that can be distinguished from zero. It is calculated as the value lying three standard deviations above that of a zero sample (zero sample + 3 SD, within run precision, n = 30).

Method comparison

Uric acid values for human serum and plasma samples obtained on COBAS INTEGRA 700 with the cassette COBAS INTEGRA Uric Acid were compared to those determined with commercially available reagents for uric acid on COBAS MIRA and an alternative manufacturer's clinical chemistry system. Samples were measured in duplicate. Sample size (n) represents all replicates. Values ranged from 69 to 824 µmol/L (1.2 to 13.8 mg/dL).

	COBAS MIRA	Alternative system
Sample size (n)	240	240
Corr. coefficient (r)	0.990	0.996
(r_S)	0.991	0.994
Lin. regression	$y = 1.00x + 1.0$ µmol/L	$y = 1.04x - 24$ µmol/L
Passing Bablok	$y = 1.00x + 0.8$ µmol/L	$y = 1.04x - 24$ µmol/L

Specific performance data for urine[7]

Representative performance data on the COBAS INTEGRA analyzers are given below. Results obtained in individual laboratories may differ.

Precision

Reproducibility was determined using human samples and controls in an internal protocol (within run n = 20, between run n = 20). The following results were obtained.

	Level 1	Level 2
Mean	1.64 mmol/L (27.6 mg/dL)	3.86 mmol/L (64.8 mg/dL)

CV within run 1.0% 0.67%
CV between run 1.7% 1.2%

Analytical sensitivity (lower detection limit)

0.095 mmol/L (1.6 mg/dL)
The detection limit represents the lowest measurable analyte level that can be distinguished from zero. It is calculated as the value lying three standard deviations above that of a zero sample (zero sample + 3 SD, within run precision, n = 30).

Method comparison

Uric acid values for human urine samples obtained on COBAS INTEGRA 700 with the cassette COBAS INTEGRA Uric Acid were compared to those determined with a commercially available reagent for uric acid on an alternative manufacturer's clinical chemistry system. Samples were measured in duplicate. Sample size (n) represents all replicates.
Values ranged from 0.20 to 3.68 mmol/L (3.36 to 61.8 mg/dL).
Alternative system
Sample size (n) 136
Corr. coefficient (r) 0.995
(r_S) 0.993
Lin. regression $y = 1.15x - 0.09$mmol/L
Passing Bablok $y = 1.15x - 0.08$mmol/L

Substrates

400 700 800

References

1. Rock RC, Walker WG, Jennings CD. Nitrogen metabolites and renal function. In: Tietz NW, ed. Fundamentals of Clinical Chemistry. 3rd ed. Philadelphia:WB Saunders 1987:669-704.
2. Barham D, Trinder P. An improved colour reagent for the determination of blood glucose by the oxidase system. Analyst 1972;97:142-145.
3. Fossati P, Prencipe L, Berti G. Use of 3,5-dichloro-2-hydroxybenzenesulfonic acid/4-aminophenazone chromogenic system in direct enzymic assay of uric acid in serum and urine. Clin Chem 1980;26:227-231.
4. Tamaoku K, Ueno K, Akiura K, Ohkura Y. New water-soluble hydrogen donors for the enzymatic photometric determination of hydrogen peroxide. II. N-ethyl-N-(2-hydroxy-3-sulfo-propyl)aniline derivatives Chem Pharm Bull 1982;30:2492-2497.
5. Tietz NW. Clinical Guide to Laboratory Tests, 3rd ed. Philadelphia, PA: WB Saunders 1995:624-626.
6. GuderWG, Narayanan S,Wisser H, Zawta B. List of Analytes; Pre-analytical Variables. Brochure in: Samples: From the Patient to the Laboratory. Darmstadt: GIT Verlag 1996.
7. Data on file at Roche Diagnostics.
8. Heil W, Koberstein R, Zawta B. Reference Ranges for Adults and Children, Pre-Analytical Considerations. 6th ed. 1999 (Published by Roche Diagnostics).
9. Krieg M et al. Vergleichende quantitative Analytik klinisch-chemischer Kenngrößen im 24-Stunden-Urin und Morgenurin. J Clin Chem Clin Biochem 1986;24:863-869.
10. Colombo JP, ed. Klinisch-chemische Urindiagnostik. Rotkreuz: LABOLIFE-Verlagsgemeinschaft 1194:180.

Roche Diagnostics GmbH, D-68298 Mannheim
for USA: US Distributor:
Roche Diagnostics Corporation, Indianapolis, IN
US Customer Technical Support 1-800-428-2336

400 700 800

Creatinine Jaffé

Compensated Method for Serum and Plasma

Order information

COBAS INTEGRA® 700 Tests Cat. No. 20764345 Indicates analyzer(s) on which cassette can be used
Creatinine Jaffé System-ID 07 6434 5
Calibrator f.a.s. 12 × 3 mL Cat. No. 10759350
System-ID 07 3718 6
Precinorm® U 20 × 5 mL Cat. No. 10171743
System-ID 07 7997 0

Precipath® U 20 × 5 mL Cat. No. 10171778
System-ID 07 7998 9
Precinorm® U plus 10 × 3 mL Cat. No. 12149435
INTEGRA
400/
400 plus
INTEGRA/
INTEGRA
700
INTEGRA
800
□ □ □
System-ID 07 7999 7
Precipath® U plus 10 × 3 mL Cat. No. 12149443
System-ID 07 8000 6

Intended use

The cassette COBAS INTEGRA Creatinine Jaffé (CREAJ) contains an in vitro diagnostic reagent system intended for use on COBAS INTEGRA systems for the quantitative determination of the creatinine concentration in serum and plasma. This method sheet describes the applications for serum and plasma (compensated method[1]) (test CREJC, 0-433 on INTEGRA 400, 0-233 on INTEGRA 700/800).

Summary[2]

Serum creatinine is a waste product formed by the spontaneous dehydration of body creatine. Most of the body creatine is found in muscle tissue where it is present as creatine phosphate and serves as a high energy storage reservoir for conversion to adenosine triphosphate. The rate of creatinine formation is fairly constant with 1 to 2 percent of the body creatine being converted to creatinine every 24 hours.
Serum creatinine and urea levels are elevated in patients with renal malfunction, especially decreased glomerular filtration. In the early stages of kidney damage, the rise in the serum urea levels usually precedes the increase in serum creatinine. The advantage is offset by the fact that serum urea levels are affected by factors such as diet, degree of hydration and protein metabolism. Serum creatinine levels on the other hand tend to be constant and unaffected by factors affecting serum urea levels. Thus serum creatinine is a significantly more reliable renal function screening test than serum urea.
A considerably more sensitive test for measuring glomerular filtration is the creatinine clearance test. For this test a precisely timed urine collection (usually 24 hours) and a blood sample are needed.

Test principle

Buffered kinetic Jaffé reaction without deproteinization. Compensated for serum/plasma.[3,4,5]
In alkaline solution creatinine reacts with picrate to form a yellow-red adduct.
Alkaline pH
Creatinine + picric acid yellow-red complex
The rate of the dye formation (color intensity) is directly proportional to the creatinine concentration in the specimen. It is determined by measuring the increase in absorbance at 512 nm. Serum and plasma samples contain proteins which react non-specifically in the Jaffé method. For compensation of serum and plasma results, values are automatically corrected by -18 µmol/L (-0.2 mg/dL).

Reagents - working solutions

R1 Alkaline buffer in vial B (liquid).
R2 = SR Picric acid in vial C (liquid).

Active ingredients

Components	Concentrations	
R1	SR	Test
Potassium hydroxide	900	80 mmol/L
Phosphate	135	12 mmol/L
Picric acid	50	4.4 mmol/L
pH	≥13.5	6.5 13

Reagent SR contains a nonreactive buffer.
Please see cassette label for reagent filling volumes.

Precautions and warnings

Pay attention to all precautions and warnings listed in Chapter 1, Introduction.
This kit contains components classified as follows according

to the European Directive 88/379/EEC:
C
R1 contains potassium hydroxide 5% w/w.
Corrosive
R 35 Causes severe burns.
S 26-37/39-45 In case of contact with eyes rinse immediately with plenty of water and seek medical advice. In case of possible direct contact with the reagent, wear suitable gloves and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Contact phone: all countries: +49-621-7590,
USA: +1-800-428-2336

Reagent handling

Ready for use.

Substrates

400 700 800

Storage and stability

Shelf life at 15 to 25°C See expiration date on cassette
INTEGRA 400
On-board in use at 10 to 15°C 8 weeks
INTEGRA 700/800
On-board in use at 8°C 8 weeks

Specimen collection and preparation[6]

Only the specimens listed below were tested and found acceptable.
Serum (free from lipemia): Collect serum using standard sampling tubes.
Plasma (free from lipemia): Li-heparin or EDTA plasma.
When processing samples in primary tubes, follow the instructions of the tube manufacturer.
Stability in *serum/plasma:* 7 days at 20-25°C
7 days at 4-8°C
3 months at -20°C
Centrifuge samples containing precipitates before performing the assay.

Materials provided

See "Reagents - working solutions" section for reagents.

Assay

For optimal performance of the assay follow the directions given in this document for the analyzer concerned. Refer to the appropriate operator manual for analyzer-specific assay instructions.

Applications for serum and plasma

INTEGRA 400 test definition

Measuring mode Absorbance
Abs. calculation mode Kinetic
Reaction direction Increase
Wavelength A/B 512/583 nm
Calc. first/last 40/49
Reaction mode R1-S-SR
Test range 36[a]-1300 µmol/L (0.4-15 mg/dL)
with postdilution 36-13 000 µmol/L (0.4-150 mg/dL)
Postdilution factor 10 recommended
Unit µmol/L
Compensation -18 µmol/L (-0.2 mg/dL)

a) Cumulative value of technical limit (18 µmol/L) and bias from compensation step (18 µmol/L).

Pipetting parameters

Diluent (H_2O)
R1 13 µL 71 µL
Sample 10 µL 20 µL
SR 13 µL 20 µL
Total volume 147 µL

INTEGRA 700/800 test definition

Measuring mode Absorbance
Abs. calculation mode Kinetic
Reaction direction Increase
Wavelength A/B 512/583 nm
Calc. first/last 55/70
Reaction mode R1-S-SR
Test range 36[b]-1300 µmol/L (0.4-15 mg/dL)
with postdilution 36-13 000 µmol/L (0.4-150 mg/dL)
Postdilution factor 10 recommended
Unit µmol/L

Compensation -18 µmol/L (-0.2 mg/dL)
b) Cumulative value of technical limit (18 µmol/L) and bias from compensation step (18 µmol/L).

Pipetting parameters

Diluent (H_2O)
R1 13 µL 41 µL
Sample 10 µL 30 µL
SR 13 µL 40 µL
Total volume 147 µL

Calibration

Calibrator Calibrator f.a.s.
Use deionized water as zero calibrator.
Calibration mode Linear regression
Calibration replicate Duplicate recommended
Calibration interval Each cassette and 7 days (INTEGRA 400), and as required following quality control procedures
Each lot (INTEGRA 700/800) and as required following quality control procedures
Traceability:[7] This method has been standardized against ID/MS.[c] For the USA, this method has been standardized against a primary reference material (SRM[d] 914).
c) Isotope Dilution Mass Spectrometry
d) Standard Reference Material

Quality control

Quality control serum, plasma Precinorm U or Precinorm U plus
Precipath U or Precipath U plus
Control interval 24 hours recommended
Control sequence User defined
Control after calibration Recommended

Calculation

COBAS INTEGRA analyzers automatically calculate the analyte concentration of each sample. For more details please refer to Chapter 7, Data Analysis, User Manual (COBAS INTEGRA 700), or toData analysis in the onlineHelp (COBAS INTEGRA400/800).
Conversion factor: µmol/L × 0.0113 = mg/dL

Limitations - interference

Criterion: Recovery in the creatinine decision range for adults (90 µmol/L in serum) within ±10% of initial value.
Hemolysis INTEGRA 400: No significant interference up to an H index of 800 (approximate hemoglobin concentration: 800 mg/dL or 497 µmol/L).
INTEGRA 700/800: No significant interference up to an H index of 400 (approximate hemoglobin concentration: 400 mg/dL or 248 µmol/L).
Do not use Creatinine Jaffé when testing for creatinine in hemolyzed samples from neonates, infants or adults with an HbF level of ≥60 mg/dL (INTEGRA 400) or ≥30 mg/dL (INTEGRA 700/800).
Icterus INTEGRA 400/700/800: No significant interference up to an I index of 5 (approximate conjugated and unconjugated bilirubin concentration: 5 mg/dL or 85 µmol/L).

Substrates

400 700 800

Lipemia (Intralipid) INTEGRA 400/700/800: No significant interference up to an L index of 250. There is poor correlation between the L index (corresponds to turbidity) and triglycerides concentration.
Other In very rare cases gammopathy, in particular type IgM (Waldenström's macroglobulinemia), may cause unreliable results.
Values <0.2 mg/dL (<18 µmol/L) or negative results are reported in rare cases in children <3 years and elderly patients. In such cases use the Creatinine plus test to assay the sample.

Estimation of the Glomerular Filtration Rate (GFR) on the basis of the Schwartz Formula can lead to an overestimation.[8]
For diagnostic purposes, the results should always be assessed in conjunction with the patient's medical history, clinical examination and other findings.

Expected values

Adults[9]
Females 44-80 µmol/L (0.50-0.90 mg/dL)
Males 62-106 µmol/L (0.70-1.20 mg/dL)
Children[10]
Neonates (premature) 25-91 µmol/L (0.29-1.04 mg/dL)
Neonates (full term) 21-75 µmol/L (0.24-0.85 mg/dL)
2-12 m 15-37 µmol/L (0.17-0.42 mg/dL)
1-<3 y 21-36 µmol/L (0.24-0.41 mg/dL)
3-<5 y 27-42 µmol/L (0.31-0.47 mg/dL)
5-<7 y 28-52 µmol/L (0.32-0.59 mg/dL)
7-<9 y 35-53 µmol/L (0.40-0.60 mg/dL)
9-<11 y 34-65 µmol/L (0.39-0.73 mg/dL)
11-<13 y 46-70 µmol/L (0.53-0.79 mg/dL)
13-<15 y 50-77 µmol/L (0.57-0.87 mg/dL)
Creatinine clearance for adults[11,12] 71-151 mL/min
Refer to reference 8 for a prospective study on creatinine clearance in children.[8]
Each laboratory should investigate the transferability of the expected values to its own patient population and if necessary determine its own reference ranges.

Specific performance data for serum and plasma[7]

Representative performance data on the COBAS INTEGRA analyzers are given below. Results obtained in individual laboratories may differ.

Precision

Reproducibility was determined using human samples and controls in an internal protocol (within run n = 21, between run n = 21). The following results were obtained.

	Level 1	Level 2
Mean	66.0 µmol/L (0.75 mg/dL)	330 µmol/L (3.73 mg/dL)
CV within run	3.1%	1.4%
Mean	65.6 µmol/L (0.74 mg/dL)	323 µmol/L (3.65 mg/dL)
CV between run	2.8%	1.3%

Analytical sensitivity (lower detection limit)

18 µmol/L (0.2 mg/dL)
The detection limit represents the lowest measurable analyte level that can be distinguished from zero. It is calculated on the basis of precision studies with human sera (between day, n = 10).

Method comparison

Creatinine values for human serum and plasma samples obtained on COBAS INTEGRA 700 with the cassette COBAS INTEGRA Creatinine Jaffé (compensated method) were compared to those determined with commercially available reagents for creatinine on COBAS INTEGRA 700 (Creatinine plus method).
Values ranged from 20.2 to 821 µmol/L (0.23 to 9.29 mg/dL).

	COBAS INTEGRA 700
Method	enzymatic
Sample size (n)	90
Corr. coefficient (r)	0.999
Lin. regression	$y = 1.03x - 1.81$ µmol/L
Passing Bablok	$y = 1.03x - 2.58$ µmol/L

References

1. Foster-Swanson A, Swartzenruber M, Roberts P et al. Reference Interval Studies on the Rate-Blanked Creatinine/Jaffé Method on BM/Hitachi Systems in Six U.S. Laboratories. Clin Chem 1994: Abstract No. 36.
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