

# QDx Instacheck™ Cystatin C

## INTENDED USE

QDx Instacheck™ Cystatin C along with QDx Instacheck™ Reader is a fluorescence Immunoassay (FIA) for the quantitative determination of cystatin C in human serum/plasma. It is useful as an aid in management and monitoring of renal disease.

## INTRODUCTION

The level of serum cystatin C has been proposed as a simple, accurate, and rapid endogenous marker of glomerular filtration rate (GFR) in research and clinical practice. The measurement of serum cystatin C may detect mild to moderate decrease in GFR that are not evident with the serum creatinine measurement.

In kidney transplant patients, cystatin C was reported to be more sensitive than serum creatinine for detecting decreases in GFR and delayed graft function, offering an opportunity for timely intervention.

## PRINCIPLE

The test uses a sandwich immunodetection method; the detector recombinant proteins in the buffer bind to antibodies in the sample, forming recombinant protein-antibody complexes, and these migrate onto the nitrocellulose matrix to be captured by other immobilized-antigens on the test strip.

The more antibodies in the sample, the more recombinant protein-antibody complexes are formed. This then leads to stronger intensity of the fluorescence signal, which is processed by QDx Instacheck™ Reader to produce cystatin C concentration in the sample.

## COMPONENTS AND REAGENTS

QDx Instacheck™ Cystatin C consists of 'Cartridges', 'Detection Buffer Tubes' and an 'ID chip'.

- The cartridge contains a test strip, the membrane which has anti human cystatin C at the test line, with chicken IgY at the control line.
- Each cartridge is individually sealed in an aluminum foil pouch containing of a desiccant. 25 sealed cartridges are packed in a box which also contains an ID chip.
- The detection buffer contains anti human cystatin C-fluorescence conjugate, anti chicken IgY-fluorescence conjugate, bovine serum albumin (BSA) as a stabilizer and sodium azide as a preservative in phosphate buffered saline.
- The detection buffer is pre-dispensed in a tube. 25 detection buffer tubes are packaged in a box and further packed in a Styrofoam box with ice-packs for shipping.

## WARNINGS AND PRECAUTIONS

- For *in vitro* diagnostic use only.
- Carefully follow the instructions and procedures described in this 'Instruction for use'.
- Use only fresh samples and avoid direct sunlight.
- Lot numbers of all the test components (Cartridge, ID chip and detection buffer) must agree each other.
- Do not interchange the test components between different lots or use the test components after the expiration date, either of which might yield misleading test result(s).
- Do not reuse. A detection buffer tube should be used for processing one sample only. So should a cartridge.
- The cartridge should remain sealed in its original pouch before use. Do not use the cartridge, if is damaged or already opened.
- Frozen sample should be thawed only once. For shipping, samples must be packed in accordance with the regulations. Sample with

severe hemolytic and hyperlipidemia cannot be used and should be recollected.

- Just before use, allow the cartridge, detection buffer and sample to be at room temperature for approximately 30 minutes.
- QDx Instacheck™ Cystatin C as well as the QDx Instacheck™ Reader should be used away from vibration and/or magnetic field. During normal usage, it can be noted the QDx Instacheck™ Reader may produce minor vibration.
- Used detection buffer tubes, pipette tips and cartridges should be handled carefully and discarded by an appropriate method in accordance with relevant local regulations.
- An exposure to larger quantities of sodium azide may cause certain health issues like convulsions, low blood pressure and heart rate, loss of consciousness, lung injury and respiratory failure.
- QDx Instacheck™ Cystatin C will provide accurate and reliable results subject to the following conditions.
  - QDx Instacheck™ Cystatin C should be used only in conjunction QDx Instacheck™ Reader.
  - Any anticoagulants other than EDTA, sodium citrate should be avoided.

## STORAGE AND STABILITY

- The cartridge is stable for 20 months (while sealed in an aluminum foil pouch) if stored at 4-30 °C.
- The detection buffer pre-dispensed in a tube is stable for 20 months if stored at 2-8 °C.
- After the cartridge pouch is opened, the test should be performed immediately.

## LIMITATIONS OF THE TEST SYSTEM

- The test may yield false positive result(s) due to the cross-reactions and/or non-specific adhesion of certain sample components to the capture/detector antibodies.
- The test may yield false negative result. The non-responsiveness of the antigen to the antibodies is most common where the epitope is masked by some unknown components, so as not to be detected or captured by the antibodies. The instability or degradation of the antigen with time and/or temperature may cause the false negative as it makes antigen unrecognizable by the antibodies.
- Other factors may interfere with the test and cause erroneous results, such as technical/procedural errors, degradation of the test components/reagents or presence of interfering substances in the test samples.
- Any clinical diagnosis based on the test result must be supported by a comprehensive judgment of the concerned physician including clinical symptoms and other relevant test results.

## MATERIALS SUPPLIED

**REF** IFPC-23

### Components of QDx Instacheck™ Cystatin C

- |   |    |
|---|----|
| ■ Cartridge Box:                        |    |
| - Cartridges                            | 25 |
| - ID Chip                               | 1  |
| - Instruction For Use                   | 1  |
| ■ Box containing Detection Buffer Tubes |    |
| - Detection Buffer tubes                | 25 |

## MATERIALS REQUIRED BUT SUPPLIED ON DEMAND

Following items can be purchased separately from **QDx InstaCheck™ Cystatin C**. Please contact our sales division for more information.

- **QDx InstaCheck™ Reader** REF FPRR010
- Thermal Printer

## SAMPLE COLLECTION AND PROCESSING

The sample type for **QDx InstaCheck™ Cystatin C** is human serum/plasma.

- It is recommended to test the sample within 24 hours after collection.
- The serum or plasma should be separated from the clot by centrifugation within 3 hours after the collection of whole blood.
- Samples may be stored for up to two weeks at 2-8 °C prior to being tested. If testing will be delayed more than two weeks, samples should be frozen at -20 °C.
- Samples stored frozen at -20 °C for 3 months showed no performance difference.
- Once the sample was frozen, it should be used one time only for test, because repeated freezing and thawing can result in the change test values

## TEST SETUP

1. Check the components of **QDx InstaCheck™ Cystatin C**: Sealed Cartridge, Detection Buffer Tube and ID Chip.
2. Ensure that the lot number of the test cartridge matches with that of the ID chip as well as the detection buffer.
3. Keep the sealed cartridge (if stored in refrigerator) and detection buffer tube at room temperature for at least 30 minutes just prior to performing the test. Place the cartridge on a clean, dust-free and flat surface.
4. Turn on power supply of the **QDx InstaCheck™ Reader**.
5. Insert the ID chip into the 'ID Chip Port' of the **QDx InstaCheck™ Reader**.
6. Press 'Select' button on the **QDx InstaCheck™ Reader**.  
(Please refer to the '**QDx InstaCheck™ Reader Operation Manual**' for complete information and operating instructions.)

## TEST PROCEDURE

[Single mode]

1. Transfer 10 µL (human serum/plasma/control) of sample using a transfer pipette to a tube containing the detection buffer.
2. Close the lid of the detection buffer tube and mix the sample thoroughly by shaking it about 10 times. (The sample mixture must be used immediately.)
3. Pipette out 75 µL of a sample mixture and load it into the sample well on the cartridge.
4. For scanning the sample-loaded cartridge, insert it into the test cartridge holder of the **QDx InstaCheck™ Reader**. Ensure proper orientation of the test cartridge before pushing it all the way inside the cartridge holder. An arrow has been marked on the cartridge especially for this purpose.
5. Press 'Select' button on the **QDx InstaCheck™ Reader** to start the scanning process.
6. **QDx InstaCheck™ Reader** will start scanning the sample-loaded cartridge after 10 minutes.
7. Read the test result on the display screen of the **QDx InstaCheck™ Reader**.

[Multi mode]

1. Transfer 10 µL (human serum/plasma/control) of sample using a transfer pipette to a tube containing the detection buffer.
2. Close the lid of the detection buffer tube and mix the sample

thoroughly by shaking it about 10 times. (The sample mixture must be used immediately.)

3. Pipette out 75 µL of a sample mixture and load it into the sample well on the cartridge.
4. Leave the sample-loaded cartridge at room temperature for 10 minutes.
5. For scanning the sample-loaded cartridge, insert it into the test cartridge holder of the **QDx InstaCheck™ Reader**. Ensure proper orientation of the test cartridge before pushing it all the way inside the test cartridge holder. An arrow has been marked on the test cartridge especially for this purpose.
6. Press 'Select' button on the **QDx InstaCheck™ Reader** to start the scanning process.
7. **QDx InstaCheck™ Reader** will start scanning the sample-loaded test cartridge immediately.
8. Read the test result on the display screen of the **QDx InstaCheck™ Reader**.

## INTERPRETATION OF TEST RESULT

- **QDx InstaCheck™ Reader** calculates the test result automatically and displays cystatin C concentration of the test sample in terms of mg/L.

- The cut-off (reference range)

Concentration of cystatin C in healthy individuals

Age range	Reference Range
18 - 50 years old	0.56 - 0.90 mg/L
51 - 70 years old	0.58 - 1.09 mg/L

- Concentration of cystatin C vs. GFR

Stage	cystatin C (mg/L)	GFR (ml/min/1.73m <sup>2</sup> )	State
Normal	0.52-0.91	≥ 90	Normal GFR
1	0.91-1.1	≥ 90	Kidney damage with normal
2	1.1-1.7	60-89	Mild Decrease
3	1.7-2.5	30-59	Moderate Decrease
4	2.5-4.0	15-29	Severe Decrease
5	> 4.0	< 15	ESRD (Kidney failure)

- Prognosis of CKD by GFR and albumin categories

Stage	GFR	Albuminuria categories		
		A1	A2	A3
		< 30 mg/L	30-300 mg/L	> 300 mg/L
1	≥90	Low risk	Medium risk	High risk
2	60-89			
3	45-59	Medium risk	High risk	Very high risk.
4	30-44	High risk		
5	15-29			
6	<15			

- Working range: 0.1-7.5 mg/L.

## QUALITY CONTROL

- Quality control tests should be performed as a part of the good testing practice to confirm the expected quality control results and validity of the assay as well as to ensure accuracy of the test results with clinical samples.
- A quality control test should be performed at regular intervals. Before testing a clinical sample using a new test lot, control reagents should be tested to confirm the test procedure, and to verify whether the test produces the expected quality control results. Quality control tests should also be performed whenever there is any question concerning the validity of the test results.
- Control reagents are not provided with **QDx InstaCheck™ Cystatin C**. For more information regarding obtaining the control reagents, contact the technical section at **Diasys Diagnostics India Private Limited**.
- **Internal Control:** **QDx InstaCheck™ Cystatin C** test has an in-built quality control indicator that satisfies the routine quality control requirements. This internal control test is performed automatically each time a clinical sample is tested. An invalid result from the internal control leads to display an error message on the **QDx InstaCheck™ Reader** indicating that the test should be repeated.

## PERFORMANCE CHARACTERISTICS

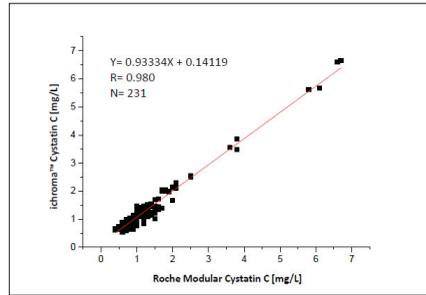
1. **Specificity:** There, in test samples, are biomolecules such as EDTA, urea, sodium citrate, D-glucose, heparin in higher concentration than their normal physiological levels. But this doesn't interfere with the **QDx InstaCheck™ Cystatin C** test measurements, nor occurs any significant cross-reactivity.

Interference	Concentration
EDTA	100 mg/ml
Urea	2 mg/ml
Sodium Citrate	22 mg/ml
D-Glucose	10 mg/ml
Heparin	10 KU/ml

2. **Prozone/Hook Effect:** No prozone/hook effect was observed with **QDx InstaCheck™ Cystatin C** at cystatin C concentrations less to 8 mg/L.
3. **Precision:** The intra-assay precision was calculated by one evaluator, who tested different concentration of control standard ten times each with three different lots of **QDx InstaCheck™ Cystatin C**. The inter-assay precision was confirmed by 3 different evaluators with 3 different lots, testing ten times each different concentration.

Cystatin C [mg/L]	Intra-assay		Inter-assay	
	Mean	CV (%)	Mean	CV (%)
0.5	0.48	3.11	0.48	2.66
1	0.99	1.38	0.98	3.18
2.5	2.35	1.84	2.32	3.04

4. **Comparability:** Cystatin C concentrations of 231 plasma samples were quantified independently with **QDx InstaCheck™ Cystatin C** and Roche Modular as per prescribed test procedures. Test results were compared and their comparability was investigated with linear regression and coefficient of correlation (R). Linear regression and coefficient of correlation between the two tests were  $Y=0.93334X + 0.14119$  and  $R = 0.980$  respectively.



## REFERENCES

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3. Abrahamson M, Olafsson I, Palsdottir A, Ulvback M, Lundwall A, Jansson O, et al. Structure and expression of the human cystatin C gene. Biochem J 1990; 268: 287-94.
4. Newman DJ: Cystatin C. Ann Clin Biochem 2002; 39: 89-104.
5. Kazama JJ, Kutsuwada K, Ataka K, Maruyama H, Gejyo F. Serum cystatin C reliably detects renal dysfunction in patients with various renal diseases. Nephron 2002; 91: 13-20.
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**Note:** Please refer to the table below to identify various symbols.

	Sufficient for <n> tests
	Read instruction for use
	Use by Date
	Batch code
	Catalog number
	Caution
	Manufacturer
	Authorized representative of the European Community
	In vitro diagnostic medical device
	Temperature limit
	Do not reuse
	This product fulfills the requirements of the Directive 98/79/EC on in vitro diagnostic medical devices



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