

The Department of Laboratory Medicine and Pathology at Mayo Clinic initiated a study to determine stability of analytes under different preservative conditions. This reference chart, built from that study, will enable you to select either temperature conditions or preservatives to maximize the number of tests that can be performed on a single 24-hour collection.

Note: See the Test Catalog for test-specific collection requirements.

				Transport Temperature											
		Temperature Preservation			50%			6M	6M				Ambient (Plain)		
					Acetic	Boric		Hydrochloric	Nitric	Sodium			Internal		
Published Test Name	Test ID	Ambient	Refrigerate	Frozen	Acid	Acid	Urea	Acid	Acid	Carbonate	Thymol	Toluene	Only	External Refrig preferred ≤ 28 days	Internal
Aldosterone, 24 Hour, Urine	ALDU	ОК	ОК	ОК	Preferred	OK	No	No	No	No	No	No	ОК	Frozen OK \leq 28 days Ambient with preservative OK \leq 14 days	Ambient OK
Aldosterone with Sodium, 24 Hour, Urine	ALDNA	ОК	ОК	ОК	Preferred	ОК	No	No	No	No	No	No	OK	Refrig preferred \leq 14 days Frozen OK \leq 14 days Ambient with preservative OK \leq 7 days	Ambient OK
Alpha-1-Microglobulin, 24 Hour, Urine	A1M24	ОК	Preferred	ОК	OK	ОК	No	No	No	No	ОК	No	ОК	Refrig preferred \leq 7 days Frozen OK \leq 7 days Ambient OK \leq 7 days	Ambient OK
Aluminum, 24 Hour, Urine	ALU	ОК	Preferred	ОК	OK	No	No	ОК	ОК	No	No	ОК	ОК	Refrig preferred \leq 28 days Frozen OK \leq 28 days Ambient OK \leq 28 days	Ambient OK
Ammonium, 24 Hour, Urine	АММО	No	ОК	ОК	No	No	Preferred	No	No	No	No	No	No	Refrig preferred \leq 14 days Frozen OK \leq 14 days Ambient OK \leq 72 hours	Ambient OK
Arsenic with Reflex, 24 Hour, Urine	ASU24	ОК	Preferred	ОК	OK	No	No	ОК	ОК	No	No	No	ОК	Refrig preferred \leq 28 days Frozen OK \leq 28 days Ambient OK \leq 72 hours	Ambient OK
Arsenic Fractionation, 24 Hour, Urine	ASFR	ОК	Preferred	ОК	ОК	No	No	ОК	ОК	No	No	No	ОК	Refrig preferred \leq 28 days Frozen OK \leq 28 days Ambient OK \leq 72 hours	Ambient OK
Arylsulfatase A, 24 Hour, Urine	ARSU	No	Required	No	No	No	No	No	No	No	No	No	No	Refrig preferred ≤ 14 days Frozen NO Ambient NO	Ambient OK
Cadmium, 24 Hour, Urine	CDU	ОК	Preferred	ОК	ОК	No	No	ОК	ОК	No	No	No	ОК	Refrig preferred \leq 28 days Frozen OK \leq 28 days Ambient OK \leq 28 days	Ambient OK
Calcium, 24 Hour, Urine	CALU	ОК	Preferred	ОК	ОК	ОК	ОК	ОК	ОК	No	ОК	No	ОК	Refrig preferred \leq 14 days Frozen OK \leq 14 days Ambient OK \leq 72 hours	Ambient OK
Catecholamine Fractionation, Free, 24 Hour, Urine	CATU	No	ОК	ОК	Preferred	ОК	No	ОК	OK	No	No	No	No	Refrig preferred \leq 7 days Frozen OK \leq 14 days Ambient with preservative OK \leq 7 days	Ambient OK
Chloride, 24 Hour, Urine	CLU	ОК	Preferred	ОК	ОК	ОК	ОК	No	No	No	ОК	No	ОК	Refrig preferred \leq 14 days Frozen OK \leq 14 days Ambient NO	Ambient OK
Chromium, 24 Hour, Urine	CRU	ОК	Preferred	ОК	No	No	No	No	No	No	No	No	ОК	Refrig preferred \leq 28 days Frozen OK \leq 28 days Ambient OK \leq 28 days	Ambient OK

Urine Preservatives—Collection and Transportation for 24-Hour Urine Specimens (continued)

		Preservative Options								1	Transport Temperature				
		Temperature Preservation			50%			6M	6M				Ambient		
Published Test Name	Test ID	Ambient	Refrigerate	Frozen	Acetic Acid	Boric Acid	Diazolidinyi Urea	Hydrochloric Acid	Nitric Acid	Sodium Carbonate	Thymol	Toluene	(Plain) Internal Only	External	Internal
Citrate Excretion, 24 Hour, Urine	CITR	No	ОК	ОК	No	OK	Preferred	No	No	No	ОК	No	No	Refrig preferred \leq 14 days Frozen OK \leq 14 days Ambient NO	Ambient OK
Cobalt, 24 Hour, Urine	COU	ОК	Preferred	ОК	No	No	No	No	No	No	No	No	ОК	Refrig preferred \leq 28 days Frozen OK \leq 28 days Ambient OK \leq 28 days	Ambient OK
Copper, 24 Hour, Urine	CUU	ОК	Preferred	ОК	ОК	No	No	ОК	ОК	No	No	No	No	Refrig preferred \leq 28 days Frozen OK \leq 28 days Ambient OK \leq 28 days	Ambient OK
Cortisol/Cortisone, Free, 24 Hour, Urine	COCOU	No	ОК	ОК	ок	Preferred	No	No	No	No	No	No	No	Refrig preferred \leq 14 days Frozen OK \leq 28 days Ambient with preservative OK \leq 72 hours	Ambient OK
Cortisol, Free, 24 Hour, Urine	CORTU	No	ОК	ОК	OK	Preferred	No	No	No	No	No	No	No	$\begin{array}{l} \mbox{Refrig preferred} \leq 14 \mbox{ days} \\ \mbox{Frozen OK} \leq 28 \mbox{ days} \\ \mbox{Ambient with preservative} \\ \mbox{OK} \leq 7 \mbox{ days} \end{array}$	Ambient OK
Creatinine, 24 Hour, Urine	СТИ	ОК	Preferred	ОК	ОК	OK	ОК	ОК	ОК	ОК	OK	No	Preferred	Refrig preferred \leq 30 days Frozen OK \leq 30 days Ambient OK \leq 30 days	Ambient OK
Creatinine Clearance, Serum and 24 Hour Urine	CRCL	Preferred	ОК	ОК	ОК	OK	ОК	OK	ОК	ОК	ОК	No	Preferred	Refrig preferred Frozen OK Ambient OK	Ambient OK
Cystinuria Profile, Quantitative, 24 Hour, Urine	CYSQN	No	ОК	ОК	No	No	No	No	No	No	No	Preferred	No	Frozen preferred ≤ 70 days Refrig ≤ 14 days Ambient NO	Ambient OK
2, 3-Dinor-11 Beta-Prostaglandin F2 Alpha, Urine	23BPG	No	Preferred	ОК	ОК	OK	No	No	No	ОК	No	No	No	Refrig preferred \leq 14 days Frozen OK \leq 30 days Ambient OK \leq 8 hours	Ambient OK
Electrophoresis, Protein, 24 Hour, Urine	EPU PEU (internal)	ОК	Preferred	ОК	No	No	No	No	No	No	ОК	No	ОК	Refrig preferred \leq 14 days Frozen OK \leq 5 days Ambient OK \leq 72 hours	Ambient OK
Gadolinium, 24 Hour, Urine	GDU	ОК	Preferred	ОК	No	No	No	OK	ОК	No	No	ОК	ОК	Refrig preferred \leq 28 days Frozen OK \leq 28 days Ambient OK \leq 28 days	Ambient OK
Glucose, 24 Hour, Urine	GLUR	No	ОК	ОК	ОК	Preferred	No	OK	ОК	No	ОК	No	No	Refrig preferred \leq 7 days Frozen OK \leq 7 days Ambient NO	Ambient OK
Heavy Metals Screen, with Reflex, 24 Hour, Urine	HMU24	No	Preferred	ОК	ОК	No	No	ОК	No	No	No	ОК	No	Refrig preferred \leq 7 days Frozen OK \leq 7 days Ambient NO	Ambient OK
Homovanillic Acid (HVA), 24 Hour, Urine	HVA	No	No	No	Preferred	No	No	ОК	No	No	No	No	No	Refrig preferred \leq 28 days Frozen OK \leq 180 days Ambient NO	Ambient OK
5-Hydroxyindoleacetic Acid (5-HIAA), 24 Hour, Urine	HIAA	No	OK	ОК	Preferred	OK	No	OK	OK	ОК	ОК	ОК	No	Refrig preferred ≤ 56 days Frozen OK ≤ 365 days Ambient NO	Ambient OK

Transport Temperature Preservative Options 50% 6M 6M Ambient **Temperature Preservation** Acetic Boric Diazolidinyl Hydrochloric Nitric Sodium (Plain) Published Test Name Test ID Ambient Refrigerate Frozen Acid Acid Acid Acid Carbonate Thymol Internal Only Urea Toluene External Internal Refrig preferred \leq 14 days Immunofixation, IFXU 0K Frozen $OK \le 5$ days Preferred 0K No No No No No No 0K No 0K Ambient OK 24 Hour. Urine Ambient $OK \le 72$ hours Refrig preferred \leq 7 days Immunoglobulin Total 0K < 72 < 72 hours TLCU Preferred 0K No Frozen $OK \le 20$ days Ambient OK No No No No No No No Light Chains, Urine OK hours Ambient $OK \leq 72$ hours Refrig preferred \leq 146 days lodine, 24 Hour, Urine UIOD **OK** Preferred OK **OK** No No No No No No No 0K Frozen OK \leq 146 davs Ambient OK Ambient $OK \le 146$ days Refrig preferred \leq 28 days Lead, 24 Hour, Urine PBU 0K Preferred 0K **OK** No No **OK OK** No No **OK** 0K Frozen $OK \le 28$ days Ambient OK Ambient $OK \le 28$ days Refrig preferred \leq 7 days Leukotriene E4. Urine LTE4 **OK** Preferred 0K **OK OK** No No No 0K 0K Frozen OK \leq 30 davs Ambient OK No No Ambient $OK \le 24$ hours Refrig preferred \leq 14 days Magnesium, 24 Hour, MAGU 0K Preferred 0K **OK** 0K OK **OK OK** No 0K No 0K Frozen OK \leq 14 days Ambient OK Urine Ambient $OK \leq 72$ hours Refrig preferred \leq 28 days Manganese, 24 Hour, MNU **OK** OK 0K Frozen OK ≤ 28 davs Preferred No No No No No No No No Ambient OK Urine Ambient $OK \le 7$ days Refrig preferred \leq 7 days 0K HGU **OK OK** OK Frozen $OK \le 7$ days Mercury, 24 Hour, Urine No Preferred OK No No No No No Ambient **OK** Ambient NO Refrig preferred \leq 7 days Metanephrines. OK Preferred Preferred Frozen $OK \le 14$ davs Fractionated, 24 Hour, METAF No **OK OK OK** OK OK Ambient OK No No No Ambient $OK \le 7$ days Urine Refrig preferred \leq 28 days 3-Methoxytyramine, **OK** OK OK Preferred Preferred **OK** 0K **OK** Frozen $OK \le 90$ davs 3MT No **OK** No Ambient OK No 24 Hour, Urine Ambient $OK \le 28$ days Refrig preferred ≤ 8 days N-Methylhistamine, NMHIN **OK** Preferred 0K **OK OK OK OK** 0K 0K Frozen OK \leq 14 davs No No No Ambient OK Urine Ambient $OK \le 24$ hours Refrig preferred \leq 14 days Monoclonal Protein MPSU 0K Preferred 0K No No No No No No OK No OK Frozen $OK \le 5$ days Ambient OK Study, 24 Hour, Urine Ambient $OK \le 72$ hours Refrig preferred \leq 28 days Nickel, 24 Hour, Urine NIU 0K Preferred 0K OK No No No **OK** No No No 0K Frozen OK \leq 28 davs Ambient OK Ambient OK ≤ 28 days Refrig preferred \leq 7 days Nitrogen, Total, 24 Hour, NITU 0K Preferred 0K **OK** No No **OK** No 0K 0K No 0K Frozen OK Ambient OK Urine Ambient $OK \le 7$ days Refrig preferred \leq 14 days Oxalate, 24 Hour, Urine OXU No 0K 0K No No Preferred No No No OK No No Frozen OK \leq 14 days Ambient OK Ambient NO Refrig preferred \leq 14 days Phosphorus, 24 Hour, POU 0K 0K OK 0K Frozen $OK \leq 14$ davs 0K Preferred OK 0K **OK** No No Preferred Ambient **OK** Urine Ambient $OK \le 7$ days

Urine Preservatives—Collection and Transportation for 24-Hour Urine Specimens (continued)

Preservative Options Transport Temperature Ambient **Temperature Preservation** 50% 6M 6M (Plain) Diazolidinyl Hydrochloric Nitric Acetic Boric Sodium Internal Ambient Refrigerate Frozen Published Test Name Test ID Acid Acid Urea Acid Acid Carbonate Thymol Toluene Only External Internal Refrig preferred \leq 7 days UPH24 OK OK 0K Frozen $OK \le 7$ davs Ambient OK pH, 24 Hour, Urine No No No Preferred No No No No No Ambient NO Frozen \leq 7 days Refrig OK Porphyrins, Quantitative, PQNU No No No No No No No No Required No No Refria NO Ambient NO No 24 Hour, Urine Ambient NO Protect from light Refrig preferred \leq 14 days Potassium, 24 Hour, Frozen OK \leq 14 days KUR 0K Preferred OK OK 0K OK **OK OK** 0K 0K Preferred No Ambient **OK** Urine Ambient $OK \le 7$ days Refrig preferred \leq 14 days Protein, Total, 12 Hour, 12PTU Frozen $OK \le 14$ days 0K Preferred 0K No 0K No No No No 0K No Preferred Ambient OK Urine Ambient OK ≤ 24 hours Refrig preferred \leq 14 days Protein, Total, 24 Hour, PTU OK **OK** 0K Frozen OK \leq 14 davs No Preferred No No No No No No Preferred Ambient OK Urine Ambient $OK \leq 24$ hours Refrig preferred \leq 7 days Retinol-Binding Protein. RBP24 0K 0K Frozen $OK \leq 7$ days Preferred No OK No No No No OK No Preferred Ambient OK 24 Hour. Urine Ambient NO Frozen preferred \leq 14 days Serotonin, 24 Hour, SERU **OK** Preferred OK Preferred No No No **OK** No No OK 0K Refrig $OK \le 7$ days Frozen OK Urine Ambient NO Refrig preferred \leq 14 days Sodium, 24 Hour, Urine NAU **OK** Preferred 0K OK **OK** OK **OK OK** No 0K No Preferred Frozen $OK \le 14$ days Ambient OK Ambient $OK \le 7$ days Refrig preferred \leq 14 days SULFU No OK **OK OK** No 0K 0K No No Frozen OK \leq 14 davs Sulfate, 24 Hour, Urine Preferred No No Ambient OK Ambient NO Refrig preferred \leq 14 days Supersaturation Profile, 0K SAT24 No 0K No No Preferred No No No No No No Frozen OK \leq 14 days Ambient OK 24 Hour. Urine Ambient NO Refrig preferred \leq 28 days TLU 0K **OK OK OK** OK Frozen OK \leq 28 days Thallium, 24 Hour, Urine 0K Preferred No No No No OK Ambient OK Ambient $OK \le 28$ days Refrig preferred \leq 14 days Urea, 24 Hour, Urine URAU No 0K 0K **OK** Preferred OK **OK OK** 0K 0K No No Frozen OK \leq 14 days Ambient OK Ambient NO Refrig preferred \leq 14 days Uric Acid, 24 Hour, Urine URCU No OK OK No Preferred **OK** No No OK 0K No No Frozen OK \leq 14 days Ambient OK Ambient NO Refrig preferred \leq 28 days VanillvImandelic Acid VMA No No No Preferred 0K No **OK OK** No No No No Frozen $OK \le 180$ days Ambient OK (VMA), 24 Hour, Urine Ambient NO Refrig preferred \leq 28 days Zinc, 24 Hour, Urine ZNU **OK** Preferred 0K **OK** No **OK OK** No OK 0K Frozen OK \leq 28 davs Ambient OK No No Ambient $OK \le 28$ days

Urine Preservatives—Collection and Transportation for 24-Hour Urine Specimens (continued)

Urine Preservatives—Collection and Transportation for 24-Hour Urine Specimens (continued)

Ambient	Room temperature (21–25 degrees C)							
Refrigerated	4–8 degrees C							
Frozen	-20 degrees C							
50% Acetic Acid	25 mL per 24-hour collection							
Boric Acid (crystals)	10 g per 24-hour collection							
Diazolidinyl Urea (250 g/L)	5 mL per 24-hour collection							
6M Hydrochloric Acid	30 mL per 24-hour collection							
6M Nitric Acid	15 mL per 24-hour collection							
Sodium Carbonate (crystals)	5 g per 24-hour collection							
Thymol (10% in isopropanol)	10 mL per 24-hour collection							
Toluene	30 mL per 24-hour collection							

The conditions and concentrations of urine preservatives are defined for 24-hour collections as follows:

Preservative and condition guidelines have been evaluated specifically for Mayo Clinic Laboratories assays. If you have questions regarding the use of preservatives, contact Mayo Clinic Laboratories at 800-533-1710 or 507-266-5700.