

Calculating the stage of Renal Disease

When the “**Refresh Template/Check Labs**” button is depressed, the box next to “**MDRD**”, will be automatically checked. In order to use this in the calculation of the stage of renal disease, it is necessary to manually click in any of the boxes next to one of the other formulae and then recheck the box by the “**MDRD**” calculated GFR. Once this is done, it is possible to calculate the stage of renal disease as will be discussed below. (This action “loads” the computation of Stage of Renal Disease with the formula which will be used for the determination of the estimated GFR which will in turn be used to calculate the Stage of Renal Disease.)

The following is a screen shot of the Master Renal Template after the “**Refresh Template/Check Labs**” has been clicked. Notice the box next to “**MDRD**” is checked.

Chronic Renal Failure

[Assessment Guidelines](#) [Kidney Disease Summary](#)

Refresh Template / Check Labs

Patient

Sex Age

Hydration Assessment

Height	73.00	in	MS Strip	//	
Weight	185.01	lb	Alb/Creat	//	
BMI	24.44		Prot/Creat	//	
Body Fat	27.1	%	24Hr Urine Pro	//	
BMR	2332	cal/day	Sodium	145	01/06/2010
BEE	1723	cal/day	Potassium	4.4	01/06/2010
Waist	36.00	in	BUN	16	01/06/2010
Hips	42.00	in	Creatinine	.9	01/06/2010
Risk Ratio	.86		Chloride	107	01/06/2010
Blood Pressure	138 / 50 mmHg		HgbA1C	8.1	01/06/2010
Diabetes Mellitus	+ <input checked="" type="radio"/> - <input type="radio"/>		Fructosamine	//	
Diabetic Since (year)	1998		Glucose	124	01/06/2010
Metabolic Syndrome	+ <input checked="" type="radio"/> - <input type="radio"/>		HGB	11.8	01/06/2010
Hypertension Management			HCT	37.9	01/06/2010
Weight Management			Retic Count	//	
Lipids Management			B12	646.81	11/20/2009
<input type="button" value="Vitals Over Time"/>			Folic Acid	//	
			Serum Iron	35	11/20/2009
			IBC	374	11/20/2009
			Ferritin	63	11/20/2009
			EPO	79.90	12/11/2009
			Ionized Calcium	5.7	11/20/2008
			PTH	34	04/04/2007
			Phosphorous	4.3	03/14/2007
			Vitamin D	//	
			Calcitrol	//	
			Sed Rate	62	12/02/2009
			Prealbumin	20.40	01/06/2010

Est. Glomerular Filtration Rate

Predicted	84	%	<input type="radio"/>
MDRD	90	107.1	<input checked="" type="radio"/>
Jelliffe (double-click)			<input type="radio"/>
Cockcroft-Gault	101	120.2	<input type="radio"/>
Salazar & Corcoran	107	127.4	<input type="radio"/>
Schwartz			<input type="radio"/>

Urinalysis 01/06/2010

Ketones	Negative	URBC	5
Leukocytes	Negative	UEPI	
Nitrates	Negative	Bacteria	
Spec Grav	.000	Mucous	
Glucose	Normal	Casts	
Protein	100	Yeast	

24 Hr Urine Creatinine //

Cholesterol	126	12/10/2009
HDL	24	12/10/2009
LDL	44	12/10/2009
Triglycerides	287	12/10/2009

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Now it is important to place a check mark in the box beside any formula other than MDRD. See the following screen shot with a red circle around the check box beside the Jeffittee formula box.

Chronic Renal Failure

[Assessment Guidelines](#) [Kidney Disease Summary](#)

Refresh Template / Check Labs

Patient

Sex Age

Hydration Assessment

Height	<input type="text" value="73.00"/>	in	MS Strip	<input type="text" value=""/>	<input type="text" value="//"/>
Weight	<input type="text" value="185.0"/>	lb	Alb/Creat	<input type="text" value=""/>	<input type="text" value="//"/>
BMI	<input type="text" value="24.44"/>		Prot/Creat	<input type="text" value=""/>	<input type="text" value="//"/>
Body Fat	<input type="text" value="27.1"/>	%	24Hr Urine Pro	<input type="text" value=""/>	<input type="text" value="//"/>
BMR	<input type="text" value="2332"/>	cal/day	Sodium	<input type="text" value="145"/>	<input type="text" value="01/06/2010"/>
BEE	<input type="text" value="1723"/>	cal/day	Potassium	<input type="text" value="4.4"/>	<input type="text" value="01/06/2010"/>
Waist	<input type="text" value="36.00"/>	in	BUN	<input type="text" value="16"/>	<input type="text" value="01/06/2010"/>
Hips	<input type="text" value="42.00"/>	in	Creatinine	<input type="text" value=".9"/>	<input type="text" value="01/06/2010"/>
Risk Ratio	<input type="text" value=".86"/>		Chloride	<input type="text" value="107"/>	<input type="text" value="01/06/2010"/>
Blood Pressure			HgbA1C	<input type="text" value="8.1"/>	<input type="text" value="01/06/2010"/>
<input type="text" value="138"/>	/	<input type="text" value="50"/>	Fructosamine	<input type="text" value=""/>	<input type="text" value="//"/>
			Glucose	<input type="text" value="124"/>	<input type="text" value="01/06/2010"/>
			HGB	<input type="text" value="11.8"/>	<input type="text" value="01/06/2010"/>
Diabetes Mellitus			HCT	<input type="text" value="37.9"/>	<input type="text" value="01/06/2010"/>
+ <input type="radio"/> - <input type="radio"/>			Retic Count	<input type="text" value=""/>	<input type="text" value="//"/>
Diabetic Since (year) <input type="text" value="1998"/>			B12	<input type="text" value="646.8"/>	<input type="text" value="11/20/2009"/>
Metabolic Syndrome			Folic Acid	<input type="text" value=""/>	<input type="text" value="//"/>
+ <input type="radio"/> - <input type="radio"/>			Serum Iron	<input type="text" value="35"/>	<input type="text" value="11/20/2009"/>
Hypertension Management			IBC	<input type="text" value="374"/>	<input type="text" value="11/20/2009"/>
Weight Management			Ferritin	<input type="text" value="63"/>	<input type="text" value="11/20/2009"/>
Lipids Management			EPO	<input type="text" value="79.90"/>	<input type="text" value="12/11/2009"/>
<input type="button" value="Vitals Over Time"/>			Ionized Calcium	<input type="text" value="5.7"/>	<input type="text" value="11/20/2008"/>
			PTH	<input type="text" value="34"/>	<input type="text" value="04/04/2007"/>
			Phosphorous	<input type="text" value="4.3"/>	<input type="text" value="03/14/2007"/>
			Vitamin D	<input type="text" value=""/>	<input type="text" value="//"/>
			Calcitrol	<input type="text" value=""/>	<input type="text" value="//"/>
			Sed Rate	<input type="text" value="62"/>	<input type="text" value="12/02/2009"/>
			Prealbumin	<input type="text" value="20.40"/>	<input type="text" value="01/06/2010"/>

Est. Glomerular Filtration Rate

Predicted	<input type="text" value="84"/>	%	<input type="radio"/>	Use?
MDRD	<input type="text" value="90"/>	<input type="text" value="107.1"/>	<input checked="" type="radio"/>	
Jelliffe (double-click)	<input type="text" value=""/>	<input type="text" value=""/>	<input type="radio"/>	
Cockcroft-Gault	<input type="text" value="101"/>	<input type="text" value="120.2"/>	<input type="radio"/>	
Salazar & Corcoran	<input type="text" value="107"/>	<input type="text" value="127.4"/>	<input type="radio"/>	
Schwartz	<input type="text" value=""/>	<input type="text" value=""/>	<input type="radio"/>	

Urinalysis

Ketones	<input type="text" value="Negative"/>	UWBC	<input type="text" value="5"/>
Leukocytes	<input type="text" value="Negative"/>	URBC	<input type="text" value="1"/>
Nitrates	<input type="text" value="Negative"/>	UEPI	<input type="text" value=""/>
Spec Grav	<input type="text" value=".000"/>	Bacteria	<input type="text" value=""/>
Glucose	<input type="text" value="Normal"/>	Mucous	<input type="text" value=""/>
Protein	<input type="text" value="100"/>	Casts	<input type="text" value=""/>
		Yeast	<input type="text" value=""/>

24 Hr Urine Creatinine

Cholesterol	<input type="text" value="126"/>	<input type="text" value="12/10/2009"/>
HDL	<input type="text" value="24"/>	<input type="text" value="12/10/2009"/>
LDL	<input type="text" value="44"/>	<input type="text" value="12/10/2009"/>
Triglycerides	<input type="text" value="287"/>	<input type="text" value="12/10/2009"/>

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Now, you must manually return the check mark to the box by “MDRD.” This process “loads” the equation for the calculation of the Stage of Renal Disease. If you miss this step, you will be told that you have to answer all questions and you will have to come back to this point and take this step before proceeding.

Chronic Renal Failure

[Assessment Guidelines](#) [Kidney Disease Summary](#)

Patient Sex: Age:

Refresh Template / Check Labs

Height	73.00	in	MS Strip		//
Weight	185.0	lb	Alb/Creat		//
BMI	24.44		Prot/Creat		//
Body Fat	27.1	%	24Hr Urine Pro		//
BMR	2332	cal/day	Sodium	145	01/06/2010
BEE	1723	cal/day	Potassium	4.4	01/06/2010
Waist	36.00	in	BUN	16	01/06/2010
Hips	42.00	in	Creatinine	.9	01/06/2010
Risk Ratio	.86		Chloride	107	01/06/2010
Blood Pressure			HgbA1C	8.1	01/06/2010
<input type="text" value="138"/>	/	<input type="text" value="50"/>	Fructosamine		//
			Glucose	124	01/06/2010
			HGB	11.8	01/06/2010
			HCT	37.9	01/06/2010
			Retic Count		//
Diabetes Mellitus			B12	646.8	11/20/2009
+ <input type="radio"/> - <input type="radio"/>			Folic Acid		//
Diabetic Since (year) <input type="text" value="1998"/>			Serum Iron	35	11/20/2009
Metabolic Syndrome			IBC	374	11/20/2009
+ <input type="radio"/> - <input type="radio"/>			Ferritin	63	11/20/2009
Hypertension Management			EPO	79.90	12/11/2009
Weight Management			Ionized Calcium	5.7	11/20/2008
Lipids Management			PTH	34	04/04/2007
<input type="button" value="Vitals Over Time"/>			Phosphorous	4.3	03/14/2007
			Vitamin D		//
			Calcitrol		//
			Sed Rate	62	12/02/2009
			Prealbumin	20.40	01/06/2010

Hydration Assessment

Serum Osmolality	311.5
Serum Osmolarity	304.1
Anion Gap	10.0
Osmolar Gap	

Est. Glomerular Filtration Rate

Predicted	84	%	Use?
MDRD	90	107.1	<input checked="" type="radio"/>
Jelliffe (double-click)			<input type="radio"/>
Cockcroft-Gault	101	120.2	<input type="radio"/>
Salazar & Corcoran	107	127.4	<input type="radio"/>
Schwartz			<input type="radio"/>

Urinalysis

Ketones	Negative	LMWBC	5
Leukocytes	Negative	URBC	1
Nitrates	Negative	UEPI	
Spec Grav	.000	Bacteria	
Glucose	Normal	Mucous	
Protein	100	Casts	
		Yeast	

24 Hr Urine Creatinine //

Cholesterol	126	12/10/2009
HDL	24	12/10/2009
LDL	44	12/10/2009
Triglycerides	287	12/10/2009

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An explanation of the other five formulae will be presented below, but **at this point, we will present the explanation of how to complete the evaluation of the stage of renal disease.**

After removing the check box from beside the MDRD, placing it next to any of the other five formulae and then returning it to the box next to MDRD, you must select the navigation button entitled “**Evaluation**” in the fourth column of the Master Renal template. It is outlined in red below.

Chronic Renal Failure

Assessment Guidelines Kidney Disease Summary

Refresh Template / Check Labs Hydration Assessment

Patient: [] [] Sex: M Age: 62

Height: 73.00 in Weight: 185.00 lb BMI: 24.44 Body Fat: 27.1 %

BMR: 2332 cal/day BEE: 1723 cal/day Waist: 36.00 in Hips: 42.00 in Risk Ratio: .86

Blood Pressure: 138 / 50 mmHg

Diabetes Mellitus: + - Diabetic Since (year): 1998

Metabolic Syndrome: + - Hypertension Management: Weight Management: Lipids Management: Vitals Over Time:

MS Strip		//
Alb/Creat		//
Prot/Creat		//
24Hr Urine Pro		//
Sodium	145	01/06/2010
Potassium	4.4	01/06/2010
BUN	16	01/06/2010
<u>Creatinine</u>	.9	01/06/2010
Chloride	107	01/06/2010
HgbA1C	8.1	01/06/2010
Fructosamine		//
Glucose	124	01/06/2010
HGB	11.8	01/06/2010
HCT	37.9	01/06/2010
Retic Count		//
B12	646.81	11/20/2009
Folic Acid		//
Serum Iron	35	11/20/2009
IBC	374	11/20/2009
Ferritin	63	11/20/2009
EPO	79.90	12/11/2009
Ionized Calcium	5.7	11/20/2008
PTH	34	04/04/2007
Phosphorous	4.3	03/14/2007
Vitamin D		//
Calcitrol		//
Sed Rate	62	12/02/2009
Prealbumin	20.40	01/06/2010

Hydration Assessment:

Serum Osmolality: 311.5 Serum Osmolarity: 304.1 Anion Gap: 10.0 Osmolar Gap: []

Est. Glomerular Filtration Rate:

Predicted	84	%	Use?
MDRD	90	107.1	<input type="radio"/>
Jelliffe (double-click)			<input checked="" type="radio"/>
Cockcroft-Gault	101	120.2	<input type="radio"/>
Salazar & Corcoran	107	127.4	<input type="radio"/>
Schwartz			<input type="radio"/>

Urinalysis:

01/06/2010	UWBC	5	
Ketones	Negative	URBC	1
Leukocytes	Negative	UEPI	
Nitrates	Negative	Bacteria	
Spec Grav	.000	Mucous	
Glucose	Normal	Casts	
Protein	100	Yeast	

24 Hr Urine Creatinine: [] []

Cholesterol: 126 12/10/2009 HDL: 24 12/10/2009 LDL: 44 12/10/2009 Triglycerides: 287 12/10/2009

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When the “**Evaluation**” button is depressed, the following template appears.

Evaluation of Chronic Renal Failure

Review of Systems
Decreased GFR
Return

Modifiable Risk Factors

- Anemia
- Cardiovascular disease
- Decreased nitric oxide
- Depression/poor mental health
- Diabetes
- Drug toxicity
- Dyslipidemia
- Elevated angiotensin II
- Elevated homocysteine
- Elevated/persistent proteinuria
- Hyperaldosteronism
- Hypertension
- Increased endothelin
- Infection/Inflammation

Non-modifiable Risk Factors

- Age
- Autoimmune diseases
- Ethnicity
(African-American, American Indian, Hispanic, Asian, Pacific Islander)
- Exposure (chemical/environmental)
- Family history of kidney disease
- Low birth weight
- Low income/education
- Neoplasm
- Recovery from acute kidney failure
- Reduction in kidney mass
- Renal transplant

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Classification of Risk Factors

Total	3	Modifiable	1	Class I	0	Class III
	0	Non-modifiable	0	Class II	1	Class IV

Stage of Kidney Disease

Stage 1

At the top of this template are two buttons:

- Review of Systems
- Decreased GFR

When the **Review of Systems** button is depressed a pop-up appears entitled **Chronic Renal Failure Signs and Symptoms**. This displays three classes of signs and symptoms of Chronic Renal disease.

- **Initial Symptoms,**
- **Later Symptoms and**
- **Additional Symptoms.**

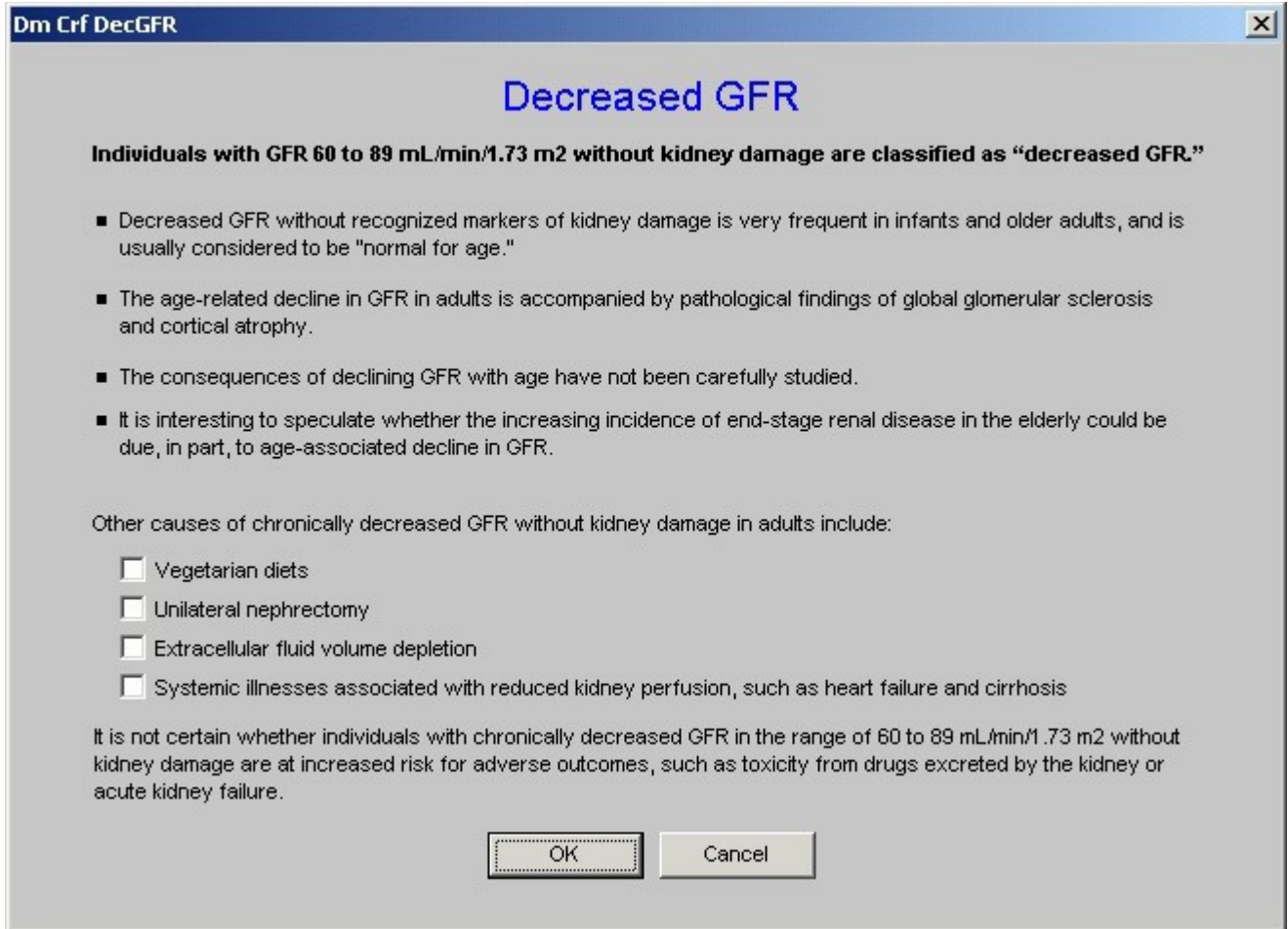
Dm Crf Ros [X]

Chronic Renal Failure Symptoms & Signs

Initial Symptoms		Later Symptoms		Additional Symptoms			
-	+	-	+	-	+		
<input type="checkbox"/>	<input type="checkbox"/> Weight loss (unintentional)	<input type="checkbox"/>	<input type="checkbox"/> Tendency to bruise easily	<input checked="" type="checkbox"/>	<input type="checkbox"/> Confusion/Delirium	<input type="checkbox"/>	<input type="checkbox"/> Nocturia
<input checked="" type="checkbox"/>	<input type="checkbox"/> Nausea	<input checked="" type="checkbox"/>	<input type="checkbox"/> Tendency to bleed easily	<input type="checkbox"/>	<input type="checkbox"/> Blood in vomit	<input type="checkbox"/>	<input type="checkbox"/> Abnormally dark or light skin
<input checked="" type="checkbox"/>	<input type="checkbox"/> Vomiting	<input checked="" type="checkbox"/>	<input type="checkbox"/> Muscle cramps	<input type="checkbox"/>	<input type="checkbox"/> Melena	<input type="checkbox"/>	<input type="checkbox"/> Polydipsia
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Fatigue	<input type="checkbox"/>	<input type="checkbox"/> Muscle spasms	<input type="checkbox"/>	<input type="checkbox"/> Hematochezia	<input type="checkbox"/>	<input checked="" type="checkbox"/> High Blood Pressure
<input type="checkbox"/>	<input checked="" type="checkbox"/> Headache	<input type="checkbox"/>	<input type="checkbox"/> Polyuria	<input type="checkbox"/>	<input type="checkbox"/> Lethargy	<input type="checkbox"/>	<input type="checkbox"/> Loss of appetite
<input checked="" type="checkbox"/>	<input type="checkbox"/> Pruritus	<input type="checkbox"/>	<input type="checkbox"/> Oliguria	<input type="checkbox"/>	<input type="checkbox"/> Seizures	<input type="checkbox"/>	<input type="checkbox"/> Agitation
<input type="checkbox"/>	<input type="checkbox"/> Hiccups	<input type="checkbox"/>	<input type="checkbox"/> Drowsiness/Decreased alertness	<input checked="" type="checkbox"/>	<input type="checkbox"/> Coma	<input type="checkbox"/>	<input type="checkbox"/> Paleness
		<input checked="" type="checkbox"/>	<input type="checkbox"/> Numbness in extremities			<input type="checkbox"/>	<input type="checkbox"/> Nail abnormalities
						<input type="checkbox"/>	<input type="checkbox"/> Breath odor

The signs and symptoms which are captured elsewhere in the EMR are automatically checked off, others can be added.

The next button on the **Evaluation** template is entitled “**Decreased GFR**”. When that button is activated, the following pop-up appears. It gives a **definition of Decrease GFR in the absence of renal disease** and also **the causes of decreased GFR in the absence of renal disease**



Beneath the above two buttons on the **Evaluation Template** are three columns which display **Modifiable Risk Factors** and **Non-modifiable Risk Factors** for Renal Disease. Those factors which are captured elsewhere in the EMR are automatically documented. The provider can mark others which apply.

Evaluation of Chronic Renal Failure

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Modifiable Risk Factors

- | | |
|--|---|
| <input type="checkbox"/> Anemia | <input type="checkbox"/> Lack of awareness |
| <input type="checkbox"/> Cardiovascular disease | <input type="checkbox"/> Lower urinary tract obstruction |
| <input type="checkbox"/> Decreased nitric oxide | <input type="checkbox"/> Menopause |
| <input type="checkbox"/> Depression/poor mental health | <input type="checkbox"/> Nutrition (high protein/high phosphate diet) |
| <input checked="" type="checkbox"/> Diabetes | <input type="checkbox"/> Oxidative stress |
| <input type="checkbox"/> Drug toxicity | <input type="checkbox"/> Poor glycemic control in diabetes |
| <input checked="" type="checkbox"/> Dyslipidemia | <input type="checkbox"/> Poor physical functioning |
| <input type="checkbox"/> Elevated angiotensin II | <input type="checkbox"/> Smoking |
| <input type="checkbox"/> Elevated homocysteine | <input type="checkbox"/> Systemic infections |
| <input type="checkbox"/> Elevated/persistent proteinuria | <input type="checkbox"/> Thrombogenic factors |
| <input type="checkbox"/> Hyperaldosteronism | <input type="checkbox"/> Uremic toxins |
| <input checked="" type="checkbox"/> Hypertension | <input type="checkbox"/> Urinary stones |
| <input type="checkbox"/> Increased endothelin | <input type="checkbox"/> Urinary tract infections |
| <input type="checkbox"/> Infection/Inflammation | <input type="checkbox"/> Vocational disability |

Non-modifiable Risk Factors

- | |
|---|
| <input type="checkbox"/> Age |
| <input type="checkbox"/> Autoimmune diseases |
| <input type="checkbox"/> Ethnicity
(African-American, American Indian,
Hispanic, Asian, Pacific Islander) |
| <input type="checkbox"/> Exposure (chemical/environmental) |
| <input type="checkbox"/> Family history of kidney disease |
| <input type="checkbox"/> Low birth weight |
| <input type="checkbox"/> Low income/education |
| <input type="checkbox"/> Neoplasm |
| <input type="checkbox"/> Recovery from acute kidney failure |
| <input type="checkbox"/> Reduction in kidney mass |
| <input type="checkbox"/> Renal transplant |

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Classification of Risk Factors

Stage of Kidney Disease

Total

3 Modifiable

0 Non-modifiable

1

Class I

0

Class II

0

Class III

1

Class IV

Stage 1

To complete the process of calculating the stage of Chronic Renal Disease, click the button entitled **Total**. This will do the following:

1. Cause the **Risk Factors** to be totaled into a **Modifiable and Non-Modifiable** box and
2. Cause the Risk Factors to be totaled into one of **Four Classes of Risk Factors** entitled Class I, Class II, Class III, Class IV.

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<p>Modifiable Risk Factors</p> <input type="checkbox"/> Anemia <input type="checkbox"/> Cardiovascular disease <input type="checkbox"/> Decreased nitric oxide <input type="checkbox"/> Depression/poor mental health <input checked="" type="checkbox"/> Diabetes <input type="checkbox"/> Drug toxicity <input checked="" type="checkbox"/> Dyslipidemia <input type="checkbox"/> Elevated angiotensin II <input type="checkbox"/> Elevated homocysteine <input type="checkbox"/> Elevated/persistent proteinuria <input type="checkbox"/> Hyperaldosteronism <input checked="" type="checkbox"/> Hypertension <input type="checkbox"/> Increased endothelin <input type="checkbox"/> Infection/Inflammation	<input type="checkbox"/> Lack of awareness <input type="checkbox"/> Lower urinary tract obstruction <input type="checkbox"/> Menopause <input type="checkbox"/> Nutrition (high protein/high phosphate diet) <input type="checkbox"/> Oxidative stress <input type="checkbox"/> Poor glycemic control in diabetes <input type="checkbox"/> Poor physical functioning <input type="checkbox"/> Smoking <input type="checkbox"/> Systemic infections <input type="checkbox"/> Thrombogenic factors <input type="checkbox"/> Uremic toxins <input type="checkbox"/> Urinary stones <input type="checkbox"/> Urinary tract infections <input type="checkbox"/> Vocational disability	<p>Non-modifiable Risk Factors</p> <input type="checkbox"/> Age <input type="checkbox"/> Autoimmune diseases <input type="checkbox"/> Ethnicity <small>(African-American, American Indian, Hispanic, Asian, Pacific Islander)</small> <input type="checkbox"/> Exposure (chemical/environmental) <input type="checkbox"/> Family history of kidney disease <input type="checkbox"/> Low birth weight <input type="checkbox"/> Low income/education <input type="checkbox"/> Neoplasm <input type="checkbox"/> Recovery from acute kidney failure <input type="checkbox"/> Reduction in kidney mass <input type="checkbox"/> Renal transplant
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Total

Classification of Risk Factors

3	Modifiable	1	Class I	0	Class III
0	Non-modifiable	0	Class II	1	Class IV

Stage of Kidney Disease

Stage 1

Above the Class I, II, III and IV Risk Classes totals is a button entitled **Classification of Risk Factors**. When this button is deployed the following pop-up with an explanation of the four classes appears.

Dm Crf Riskclass
✕

Classification of Risk Factors

Class I	Factors for which interventions have been proven to lower risk.
Class II	Factors for which interventions are likely to lower risk.
Class III	Factors for which modification may lower risk.
Class IV	Factors for which modification is not possible.

OK

Cancel

When the **Total** button is depressed on the Evaluation Template, the following pop-up appears which is entitled **Stage of Kidney Disease**.

Dm Crf Stagecalc X

Stage of Kidney Disease

To calculate the stage of kidney disease, answer the following three questions and click "Calculate."

1. Is kidney damage present in this patient? Yes No
 Kidney damage is defined as pathologic abnormalities or markers of damage, including abnormalities in blood or urine tests or imaging studies.

2. Does this patient have high blood pressure? Yes No
 High blood pressure is defined as >140/90 mmHg in adults and >90th percentile for height and weight in children.

3. Select the estimated glomerular filtration rate you would like to use for the determination of the stage of kidney disease.

Predicted	84	%	Use?	Cockcroft-Gault	101	120.2	Use?
MDRD	90	107.1	<input type="radio"/>	Salazar & Corcoran	107	127.4	<input type="radio"/>
Jelliffe			<input checked="" type="radio"/>	Schwartz			<input type="radio"/>

We are now only a step away from the calculation of the Stage of Renal Disease. So far, we are prepared for this process with the following steps:

1. Opening the **Chronic Renal Disease Master Template**.
2. Clicking the button entitled **Refresh Template/Check Lab**.
3. Clicking **one of the GFR formulae in stead of the MDRD** which has been automatically selected.
4. Clicking the box next to the **MDRD formula**
5. Clicking the Navigation button in the right hand column entitled **Evaluation**.
6. Clicking the **Total** button on the Evaluation Template

You are now ready to complete the process of calculating the State of Chronic Renal Disease.. The pop-up which appears when you deploy the **Total** button on the Evaluation template is entitled **Stage of Kidney Disease**.

Dm Crf Stagecalc [X]

Stage of Kidney Disease

To calculate the stage of kidney disease, answer the following three questions and click "Calculate."

1. Is kidney damage present in this patient? Yes No
 Kidney damage is defined as pathologic abnormalities or markers of damage, including abnormalities in blood or urine tests or imaging studies.

2. Does this patient have high blood pressure? Yes No
 High blood pressure is defined as >140/90 mmHg in adults and >90th percentile for height and weight in children.

3. Select the estimated glomerular filtration rate you would like to use for the determination of the stage of kidney disease.

	%	Use?		%	Use?
<u>Predicted</u> 84 % Use?		<input type="radio"/>	<u>Cockcroft-Gault</u> 101 120.2		<input type="radio"/>
<u>MDRD</u> 90 107.1 <input type="radio"/>		<input type="radio"/>	<u>Salazar & Corcoran</u> 107 127.4		<input type="radio"/>
<u>Jelliffe</u> <input checked="" type="radio"/>		<input checked="" type="radio"/>	<u>Schwartz</u> <input type="radio"/>		<input type="radio"/>

Beneath the title **Stage of Renal Disease** is the statement, “**To calculate the stage of kidney disease, answer the following three questions and click ‘calculate.’**” The three questions are:

1. **Is kidney damage present in this patient?** Following the this question is this explanation: Kidney damage is defined as pathologic abnormalities or makers of damage, including abnormalities in blood or urine tests or imaging studies. There are three conditions which allow you to answer “yes” to the question, “Is kidney damage present in this patient?”:
 - a. the presence of microalbuminuria,
 - b. a serum creatinine above 1.5 and/or
 - c. an abnormal renal ultrasound which indicates the presence of medical renal disease.

The earliest evidence of kidney damage is the presence of protein in the urine. In the introduction to this tutorial, the National Kidney Foundation defines normal and abnormal **urinary albumin or protein excretion**

- Normal albumin excretion: <30 mg/24 hours
- Microalbuminuria: 20-200 µg/min or 30-300 mg/24 hour or in men urine albumin/creatinine 2.5-25 mg/mmol and in women urine albumin/creatinine 3.5-35 mg/mmol

- Macroalbuminuria (overt proteinuria): >300 mg/24 hour
- Nephrotic range proteinuria: >3 g/24 hour

(More definitive information on Proteinuria can be found in the explanation of the template entitled Proteinuria)

On the **Evaluation template** there are six buttons with educational information presented. The fourth button is entitled “Chronic Kidney Disease” and addresses the definition of Chronic Kidney disease. It states:

All individuals with GFR <60 mL/min/1.73 m² for 3 months are classified as having chronic kidney disease, irrespective of the presence or absence of kidney damage.

- Reduction in kidney function to this level or lower represents loss of half or more of the adult level of normal kidney function,
- This may be associated with a number of complications

All individuals with kidney damage are classified as having chronic kidney disease, irrespective of the level of GFR.

- The rationale for including individuals with GFR 60 mL/min/1.73 m² is that GFR may be sustained at normal or increased levels despite substantial kidney damage and
- Patients with kidney damage are at increased risk of the two major outcomes of chronic kidney disease: loss of kidney function and development of cardiovascular disease

Once you have answered the first question, “yes,” or “no,” you must answer the second question which is:

2. “Does the patient have high blood pressure.”

The definition is then given for the presence of high blood pressure; it is, “High blood pressure is defined as >140/90 in adults and >90 Percentile in height and weight in children.”

If the current blood pressure is elevated, the box indicating “yes” will be automatically selected but if the patient has high blood pressure which is controlled, you will need to manually check the box next to “yes.”

The third question will be automatically answered for you.

3. Select the estimated glomerular filtration rate you would like to use for the determination of the stage of kidney disease.

This will automatically default to the MDRD equation and does not need to be changed again.

Stage of Kidney Disease

To calculate the stage of kidney disease, answer the following three questions and click "Calculate."

1. Is kidney damage present in this patient? Yes No
Kidney damage is defined as pathologic abnormalities or markers of damage, including abnormalities in blood or urine tests or imaging studies.

2. Does this patient have high blood pressure? Yes No
High blood pressure is defined as >140/90 mmHg in adults and >90th percentile for height and weight in children.

3. Select the estimated glomerular filtration rate you would like to use for the determination of the stage of kidney disease.

		%	Use?		%	Use?
Predicted	84		<input type="radio"/>	Cockcroft-Gault	101	120.2 <input type="radio"/>
MDRD	90	107.1	<input type="radio"/>	Salazar & Corcoran	107	127.4 <input type="radio"/>
Jelliffe			<input checked="" type="radio"/>	Schwartz		<input type="radio"/>

Calculate Stage 1

OK Cancel

When you depress the "Calculate" button on the Stage of Renal Disease pop-up, **the Stage of Renal Disease will appear**. Some times, you will receive a message in an alert message which states:

"You MUST answer both questions 1 and 2 as well as select which value is to be used under 3."

If you have answered questions 1 and 2 and still receive this alert, you must then **go back to Chronic Renal Disease Master template and follow the steps which were described above** to change the box which was automatically checked beside the MDRD equation. The box must be checked next to another formula and then changed back to MDRD. This alerts the computer that this is the formula which is to be used to calculate the Stage of Chronic

Review of the Steps by which the Stage of Chronic Renal Disease is calculated

The steps to the calculation of the Stage of Renal Disease are as follows. Once learned, these steps take only a few seconds to complete.

- Open the **Chronic Renal Disease Master Template**.
- Click the button entitled **Refresh Template/Check Lab**.
- Click **one of the GFR formulae in stead of the MDRD** which has been automatically selected.
- Click the box next to the **MDRD formula**
- Click the **Navigation button** in the right hand column entitled **Evaluation**.
- Click the **Total** button on the Evaluation Template
- Answer questions 1 and 2 on the **Stage of Kidney Disease** Pop-up
- Click the button entitled **Calculate** on the Stage of Kidney Disease Pop-up

The **Stage of Kidney disease** will then be displayed and can be added to the ICD-9 Code list under Chronic Conditions and to the Acute Assessment. Any stage of kidney disease is an HCC Risk and needs annual evaluation.