



SOUTH DAKOTA
CARDIOVASCULAR
COLLABORATIVE

Quality Improvement Resource Guide

APPENDICES

Assess and determine adult patient's stage of HF

Risk Factors for HF PresentRisk Factors for HF Not Present

Guideline does not apply

American Heart Association (AHA) STAGE A
Asymptomatic Patients at High Risk for HF

Patient has no symptoms or structural heart disease but is defined as high risk due to the following conditions:

- Hypertension
- Diabetes mellitus
- Ischemic heart disease
- Obesity
- Metabolic syndrome
- Family history of cardiomyopathy
- Exposure to cytotoxic drugs
- Obstructive sleep apnea (OSA)

Therapy for AHA STAGE A

- Provide patient with maximum medical therapy:
- Hypertension (*Hypertension Guideline*)
 - Diabetes (*Diabetes Guideline*)
 - Lipid disorders
 - Control metabolic syndrome

- Provide patient education (**TABLE A / TABLE B**):
- Encourage to exercise regularly
 - Smoking cessation
 - Achieve normal body weight
 - Avoid illicit drugs and alcohol in excess

Structural heart disease

AHA STAGE B
Asymptomatic Patients with Left Ventricular Dysfunction

Patient found to have left ventricular dysfunction from previous myocardial infarction (MI), left ventricular hypertrophy (LVH) with low ejection fraction (EF), asymptomatic valvular disease or other cause.

Therapy for AHA STAGE B

Provide patient with all measures listed under **Therapy for STAGE A**.

In appropriate patients, the use of angiotensin converting enzyme inhibitor (ACE-I)/angiotensin receptor blockers (ARB) (**TABLE C**) and/or beta-blockers (**TABLE E**) should be considered.

Screen for depression/anxiety, consider Behavioral Health referral.

Development of symptoms of HF

AHA STAGE C
Patients with Known HF or Symptoms Suspicious of HF

Non-emergent patients with new symptoms suspicious for HF, with or without a past history of HF. This does include patients with known structural heart disease.

Therapy for AHA STAGE C

Provide patient with all measures listed under **Therapy for STAGE A**.

Refer to Page 2 of HF Guideline

Refractory symptoms of HF at rest

AHA STAGE D
Refractory Symptoms of HF at Rest

Refractory HF requiring specialized interventions including patients who have marked symptoms at rest despite maximal medical therapy (i.e. those who are recurrently hospitalized or cannot be safely discharged from the hospital without specialized interventions.)

Therapy for AHA STAGE D

Refer to Cardiologist

AT RISK OF HEART FAILURE

HEART FAILURE

Adult (Age ≥ 18) Heart Failure (HF) Guideline

AHA STAGE C: Assess Patient with Known HF or Symptoms Suspicious of HF

- Unrelieved shortness of breath with exertion or at rest
- Unexplained fatigue
- Orthopnea
- Paroxysmal nocturnal dyspnea
- Peripheral edema
- Decreased exercise capacity
- Weight gain of > 5lbs in one week
- Chest pain or tightness
- Palpitations
- Dizziness/lightheadedness/syncope

Patient Examination

Patient examination should include the following:

- Evaluation of jugular venous distention
- Palpation of cardiac apex and precordium
- Assessment for gallops or murmurs
- Assessment of cardiac rhythm
- Pulmonary examination for evidence of rales or effusion
- Abdominal examination for hepatomegaly or ascites
- Peripheral pulses
- Evidence of edema

Stable Patient

Obtain the following laboratory tests and diagnostic studies:

- CBC
- UA
- Serum electrolytes
- Calcium
- Magnesium
- BUN
- SCr
- Glucose/lipid profile
- Liver enzymes
- TSH
- BNP
- Chest Xray
- EKG

Unstable Patient

Patients who are clinically unstable should be immediately referred for emergency management and admitted if necessary

Echocardiogram

EF < 40%

Refer to Cardiologist

EF 40-49%

Initiate therapies

EF ≥ 50%

Initiate therapies

Initiate Therapies

- Initiate non-pharmacologic therapies (**TABLE A / TABLE B**)
- Initiate pharmacologic therapy beginning with ACEI/ARB (**TABLE C**) and/or beta-blocker (**TABLE D**)
- Add diuretic for evidence of volume overload (**TABLE E**)
- Consider aldosterone antagonist therapy (spironolactone) for refractory symptoms when ACEI/ARB, beta-blockers and diuretic therapy have been maximized/optimized (**TABLE H**)
- If EF < 35% after three months of maximal medical therapy, electrophysiology referral is indicated for sudden cardiac death risk evaluation and potential interventions
- If EF remains < 40% and still symptoms worsen, recommend changing ACEI/ARB to ARNI (Entresto)
- For comments regarding ivabradine (Corlanor), see "Clinical Pearls" section

Stress Testing and/or Cardiology Referral IS Indicated

Initiate Therapies

- Initiate non-pharmacologic therapies (**TABLE A / TABLE B**)
- Initiate pharmacologic therapy beginning with ACEI/ARB (**TABLE C**), ARNI (**TABLE D**) and/or beta-blocker (**TABLE E**)
- Add diuretic for evidence of volume overload (**TABLE G**)

Failure to Respond

Refer to Cardiologist

Stress Testing and/or Cardiology Referral IS Indicated

Initiate Therapies

- **Focus of treatment should be vigorous blood pressure control** (see *Hypertension Guideline*)
- Utilize ACEI/ARB (**TABLE C**), ARNI (**TABLE D**), beta-blockers (**TABLE E**) or diuretic (**TABLE G**) based upon blood pressure and volume status

TABLE A: Non-pharmacologic Management in Patients with HF

- Dietary instruction regarding sodium intake for all patients. Instruction on diabetes, dyslipidemia or severe obesity in selected patients.
- Dietary restriction of sodium 2-3g for all patients with HF.
- Restriction of daily fluid intake < 2L in severe hyponatremia (< 130 mEq/L). Consider in all patients with difficult to control fluid retention despite high dose diuretics and low sodium diet.
- Recommend daily multivitamins in patients with diet restrictions; evaluation for specific vitamin/nutrient deficiencies is rarely necessary.
- Document naturoceutical products. Avoid products containing ephedra (ma huang), ephedrine, or its metabolites (increased mortality and morbidity). Avoid products with significant drug interactions with digoxin, vasodilators, beta blockers, antiarrhythmic drugs and anticoagulants.

TABLE B: Additional Therapies and Routine Health Maintenance

- CPAP in patients with sleep apnea (up to 50% of HF patients have sleep apnea)
- Supplemental oxygen not recommended in the absence of indication of underlying pulmonary disease. Evaluate for fluid retention of pulmonary disease if hypoxemic.
- Consider referral to Behavioral Health for difficulty with behavioral change and adherence
- Non-pharmacologic techniques for stress reduction
- Smoking cessation and limit alcohol to 2 drinks/day in men or 1 drink/day in women
- Pneumococcal and annual influenza vaccination
- Avoid NSAIDs

TABLE C: Angiotensin Converting Enzyme Inhibitors (ACEI) (First Line)

Patient Exclusion: allergy, angioedema, intolerable cough, hyperkalemia ($K \geq 5.0$) severe aortic stenosis, shock, symptomatic hypotension, bilateral renal artery stenosis, pregnancy, $SCr > 3$ mg/dl

Initial Dose	Titration Steps	Target Dose
Captopril: 6.25 mg three times daily	Captopril: 12.5 mg or 25 mg three times daily	Captopril: 50 mg three times daily
Enalapril: 2.5 mg twice daily	Enalapril: 5 mg twice daily	Enalapril: 10-20 mg twice daily
Lisinopril: 2.5-5 mg daily	Lisinopril: 5 mg daily, 10 mg daily	Lisinopril: 20-40 mg daily
Ramipril: 2.25 mg daily	Ramipril: 5 mg daily	Ramipril: 10 mg daily
Quinapril: 5 mg twice daily	Quinapril: 10 mg twice daily	Quinapril: 20 mg twice daily
Fosinopril: 5-10 mg daily	Fosinopril: 20 mg daily, 40 mg daily	Fosinopril: 20-40 mg daily

Angiotensin Receptor Blockers (ARB) (if ACE intolerant) (Second Line)

Patient Exclusion: hypersensitivity, shock, symptomatic hypotension, hyperkalemia, bilateral renal artery stenosis, pregnancy

Initial Dose	Titration Steps	Target Dose
Candesartan: 4-8 mg daily	Candesartan: 16 mg daily	Candesartan: 32 mg daily
Losartan: 25 -50 mg daily	Losartan: 50 mg daily, 100 mg daily	Losartan: 150 mg daily
Valsartan: 20 - 40 mg twice daily	Valsartan: 80 mg twice daily	Valsartan: 160 mg twice daily

ACEI/ARB Patient Monitoring:

- Patients who cannot achieve target dose should be maintained on highest tolerated dose
- Titration steps are generally at 2 week intervals
- Monitor Na, K, BUN/SCr at least biweekly while titrating
- ACEI inhibitor therapy should not be discontinued unless serum SCr level rises above 30% over baseline during the first two months after initiation of therapy or hyperkalemia develops
- Check weights frequently and monitor volume status, as diuretic requirements may be altered
- Notify provider if symptomatic hypotension (mild hypotension, SBP 80-90, may be acceptable if tolerated without significant symptoms)
- ACEI/ARB are Class D in pregnancy, but probably safe in lactating females

Adult (Age ≥ 18) Heart Failure (HF) Guideline

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TABLE D
Angiotensin – receptor/neprilysin inhibitor (ARNI)
***First line therapy if symptoms worsen on ACEI or ARB**

Patient Exclusion: Allergy, angioedema to ACEI or ARB, concomitant use of ACEI or Aliskiren, hyperkalemia > 5.0, symptomatic hypotension, pregnancy

Initial Dose	Titration Steps	Target Dose
Sacubitril/valsartan: 24/26 mg BID	49/51 mg BID	97/103 mg BID

ARNI Monitoring (see ACEI/ARB monitoring for comparison)

- Patients who can not achieve target dose, maintained on highest tolerated dose
- Titration every 2-4 weeks
- Monitor sodium, potassium, BUN/SCr one week after titration
- Check weights
- Notify provider
- Class D in pregnancy
- When changing from any ACEI to ARNI, stop taking ACEI and allow a 36 hour washout before starting ARNI
- When changing from any ARB to ARNI, stop taking ARB, and ARNI can be administered next scheduled dose
- Recommend changing from ACEI/ARB to ARNI if symptoms worsen

TABLE E
Beta Blockers

Patient Exclusion: cardiogenic shock, unstable or decompensated HF, symptomatic bradycardia, symptomatic hypotension, 2nd/3rd degree heart block without pacemaker, severe reactive airway

Initial Dose	Titration Steps	Target Dose
Carvedilol: 3.125 mg twice daily	Carvedilol: 6.25 mg twice daily, 12.5 mg twice daily	Carvedilol: 25 mg twice daily, 50 mg twice daily if weight > 85 kg
Metoprolol (sustained release): 12.5-25 mg daily	Metoprolol (sustained release): 50 mg daily, 100 mg daily, 150 mg daily	Metoprolol (sustained release): 200 mg daily

Beta-Blocker Patient Monitoring:

- Patients who cannot achieve target dose should be maintained on highest tolerated dose
- Titration steps are generally at 2 week periods
- Daily weights: Patient should compile daily weight log and notify if weight increase 3-5 or more pounds in 1 week
- Symptoms: Notify MD if symptomatic hypotension or bradycardia develops
- Blood pressure and heart rate; if SBP < 80 mmHg or HR < 55 bpm, assess carefully for signs of hypoperfusion
- Diuretic dosage: If volume overload develops, continue beta-blocker unless the following develops:
 - Cardiogenic shock
 - Symptomatic hypotension
 - Narrow pulse pressure
 - Cold, clammy skin
 - Rising BUN, serum SCr
- Use of only approved beta blocker in HF recommended
- Mild hypotension (SBP 80-90) may be acceptable if tolerated without significant symptoms

TABLE F
Vasodilators

- Vasodilators are used in combination with ACEI/ARB/ARNI or single therapy in patients with chronic kidney disease.
- The combination of hydralazine and isosorbide dinitrate is recommended to reduce morbidity and mortality for African American patients with a NYHA III to IV HF and EF < 40% despite optimal therapy with ACEI and beta blockers
- A combination of hydralazine and isosorbide dinitrate can be useful to reduce morbidity or mortality in patients with current or prior heart failure with reduced EF who cannot be given an ACEI or ARB because of drug intolerance, hypotension, or renal insufficiency

Initial Dose	Titration Steps	Target Dose
Hydralazine 25 mg TID	50-75 mg TID	75 mg TID
Isosorbide Dinitrate 10 mg TID	20-30 mg TID	40 mg TID

- Vasodilator patient monitoring:
 - Titration every 2 weeks
 - BP Monitoring

**TABLE G:
Volume Overload – Loop Diuretic Dosing**

Signs: rales, JVP evaluation, positive hepato-jugular reflex, S3, sacral or lower extremity edema
Symptoms: dyspnea on exertion, PND, orthopnea, weight gain, abdominal bloating, decreased appetite, extremity swelling

Initial Dose	Maximum Dose
Furosemide: 40 mg once daily	Furosemide: 160-200 mg per day
Bumetanide: 1 mg once daily	Bumetanide: 4-8 mg per day
Torsemide: 10 mg once daily	Torsemide: 100-200 mg once daily
Diuretic Maintenance Dosing	Action
Weight returned to baseline (identifiable cause for weight increase, e.g. non-adherence)	Resume original dose
Weight returned to baseline, but patient failed original dose previously, or no known cause for weight increase	Continue at current increased dose
Weight returned to baseline, but required two or more diuretic titrations	Resume dose prior to last increase (down one titration level)
Symptoms improved but weight has not returned to baseline	Continue at current increased dose
Persistent symptoms with no change in weight	Continue next titration level
Persistent or worsening symptoms, and/or increase in weight, and/or history of frequent hospitalizations for volume overload	Consider adding metolazone, IV diuretic, or hospitalization. PO metolazone may be added in resistant cases for no more than 3 days, then reassess

Volume Overload – Loop Diuretic Dosing/Patient Monitoring:

- Indicated for fluid overload (edema, ascites, dyspnea, weight gain)
- Volume status and electrolytes must be closely monitored with adjustment or when on multiple diuretics; daily chronic use of metolazone should be avoided if possible
- Increasing administration frequency to 2 or even 3 times per day will provide more diuresis with less physiologic perturbation than larger single dose
- Determine from patient subjective diuretic effect when adjusting dosage. If good response noted, increase dose frequency. If no diuretic response noted, increase dose.
- Instruct patient on maintaining sodium-restrictive diet, and limiting fluid intake < 2 L/day when serum sodium <130 mEq/L
- Daily weights
- With recent adjustment of dose, electrolytes, BUN, SCr should be monitored (weekly with each titration)
- If worsening renal function occurs, patient re-evaluation is required
- Assess volume status on every visit; watch for hypovolemia/ over diuresis

Volume Overload – Metolazone Dosing

Initial Dose	Maximum Dose
Metolazone: 2.5 mg daily	Metolazone: 5 mg daily

Volume Overload – Metolazone Dosing/Patient Monitoring:

- Use only when volume overload refractory to maximal loop diuretic therapy
- May use daily initially for 3 days, but chronic daily use is discouraged. Target no more than every other day or 3 times per week.
- Metabolic derangements (hypokalemia, renal failure) may be substantial. Weekly Na, K, BUN/SCr should be monitored weekly initially, or after dosage titration, until stability assured.
- Risk of sudden volume shifts is significant. Monitor weights and blood pressure closely.

Adult (Age ≥ 18) Heart Failure (HF) Guideline

TABLE H: Aldosterone Antagonists

Initial Dose	Titration Steps	Target Dose
Spironolactone: 12.5 mg daily	Spironolactone: 25 mg daily	Spironolactone: 25 mg daily
Eplerenone: 25 mg daily	Eplerenone: 50 mg daily	Eplerenone: 50 mg daily

Aldosterone Antagonists Dosing/Patient Monitoring:

- Given complexity of therapy/monitoring, consider cardiology consultation prior to institution of therapy
- Metabolic effects and renal impact may be significant. Na, K, BUN/SCr should be monitored at 3 days, 1 week, 1 month, then at 3 months at initiation, or after dosage change.
- Therapy should be held for K > 5.0, rapidly rising SCr, or absolutely if SCr > 2.0 in women, 2.5 in men or eGFR < 30
- Monitor closely for fluid and hemodynamic shifts (weights, blood pressure)

American Heart Association and American College of Cardiology's Staging System

Stage	Definition
Stage A	At high risk for HF but without structural heart disease or symptoms of HF (pre-clinical)
Stage B	Structural heart disease but without signs or symptoms of HF
Stage C	Structural heart disease with prior or current symptoms of HF
Stage D	Refractory HF (heart failure) requiring specialized interventions

New York Heart Association (NYHA) Classification

Class	Patient Symptoms
Class I (Mild)	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, or dyspnea (shortness of breath).
Class II (Mild)	Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in fatigue, palpitation, or dyspnea.
Class III (Moderate)	Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes fatigue, palpitation, or dyspnea.
Class IV (Severe)	Unable to carry out any physical activity without discomfort. Symptoms of cardiac insufficiency at rest. If any physical activity is undertaken, discomfort is increased.

CLINICAL PEARLS

- Maximizing dosing of ACEI/ARB and beta-blocker dosing is important for long-term benefits, irrespective of blood pressure levels, and lower blood pressures (SBP 80-90) if asymptomatic or minimally symptomatic should not deter up-titration of medication dosing.**
- Ivabradine (Corlanor)**
 - Ivabradine may be considered to reduce HF hospitalization for NYHA class II-III patients with EF ≤ 35% who are taking maximum tolerated dose of beta blocker, are in sinus rhythm, with HR ≥ 70 bpm
- Regarding HF with preserved LV function (EF > 50%):**
 - No specific treatment has been shown to produce long term mortality benefit, and primary treatment should focus on vigorous blood pressure control, with use of diuretics as needed to control signs and symptoms of volume overload.
 - Ischemic heart disease may still be causal, and stress testing is indicated.
 - In the absence of ischemic heart disease or risk factors, consider hypertrophic (restrictive) cardiomyopathy and constrictive pericarditis.

REFERENCES

- 2016 ACC/AHA/HFSA Focused Update on New Pharmacological Therapy for Heart Failure: An Update of the 2013 ACCF/AHA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Failure Society of America. (2016). *Circulation*,134(13). doi:10.1161/cir.0000000000000435
- Pinkerman C, Sander P, Breeding JE, Brink D, Curtis R, Hayes R, Ojha A, Pandita D, Raikar S, Setterlund L, Sule O, Turner A. Institute for Clinical Systems Improvement. Heart Failure in Adults. Updated July 2013.
- Yancy, C., Jessup, M., Bozkurt, B., et al (2013, June 5). ACCF/AHA practice guideline for the management of heart failure: A report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Circulation* (online). doi: 10.1161/CIR.0b013e31829e8776

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Clinical support staff check Blood Pressure at each visit per Blood Pressure Measurement Standard

EVALUATION AND TREATMENT



Used for all Blacks (even if Diabetic or mixed race) & Female without Diabetes

- Visit every two weeks until controlled
- Dose/medication adjustment at every visit until controlled
- Controlled defined as BP to goal on all readings, including in clinic value
- Assess for non-adherence/medication understanding at each visit
- If home blood pressures are controlled, but clinic blood pressures are not, consider ambulatory blood pressure monitoring

Other HANDOUTS as Needed

- Controlling High Blood Pressure
- Manage Stress with a Healthy Lifestyle
- Walking for Fitness
- Low-Salt Choices
- Tips for Quitting Smoking
- Coping with Smoking Withdrawal

Visit & Treatment Schedule

1	<ul style="list-style-type: none"> ○ Start HCTZ 12.5mg daily in morning • Give HCTZ handout
2	<ul style="list-style-type: none"> ○ BMP Today ○ If not to goal, increase HCTZ to 25mg daily in morning
3	<ul style="list-style-type: none"> ○ BMP today ○ If not to goal, add amlodipine 5mg daily in evening • Give amlodipine handout
4	<ul style="list-style-type: none"> ○ If not to goal, increase amlodipine to 10mg daily in evening
5	<ul style="list-style-type: none"> ○ If not to goal, add lisinopril 10mg daily • Give lisinopril handout
6	<ul style="list-style-type: none"> ○ BMP Today ○ If not to goal, increase lisinopril to 10mg twice daily ○ If cough has developed, discontinue lisinopril, switch to losartan 25mg daily • Give losartan handout
7	<ul style="list-style-type: none"> ○ BMP Today ○ If not to goal, increase lisinopril to 20mg twice daily ○ If using losartan and not controlled, increase to 50mg daily
8	<ul style="list-style-type: none"> ○ BMP Today ○ If not to goal, consider further evaluation for underlying cause of resistant hypertension • SEE SIDEBAR
9	<ul style="list-style-type: none"> ○ If not to goal, start Metoprolol XL 50mg daily ○ Do not initiate Metoprolol XL if: <ul style="list-style-type: none"> ▪ Patient has short gut or feeding tube (use non-XL formulation of beta blocker) ▪ Patient has heart rate of <60 • Give Metoprolol handout
10	<ul style="list-style-type: none"> ○ If not to goal, increase Metoprolol XL to 100mg daily ○ Do not increase if heart rate is <60
11	<ul style="list-style-type: none"> ○ If not to goal, increase Metoprolol XL to 200mg daily ○ Do not increase if heart rate is <60
12	<ul style="list-style-type: none"> ○ If not to goal, referral to hypertension specialty clinic or nephrology depending on local resources

Further evaluation of resistant hypertension

- If PCP is an APP, then APP will touch base with a doctor regarding the patient and the direction to proceed with evaluation/treatment.

Provider(s) should consider:

- 1) Further evaluation for secondary causes:
 - a. Laboratory Studies including
 - TSH
 - PTH (if baseline Ca [prior to starting HCTZ] > 10.7)
 - Renin (done in AM)
 - Aldosterone
 - b. Imaging with Renal Ultrasound with doppler
 - c. Sleep Apnea evaluation
- 2) Other Contributing Factors
 - a. Consider non-adherence or medication confusion
 - Obtain dispensing history from Pharmacy
 - Ask patient to bring in pill bottles & explain what they are taking & when
 - b. Considering interfering agents (NSAIDs, allergy medications)
 - c. Review alcohol, nicotine, recreational drug usage
 - d. Evaluate for depression
 - e. Evaluation for patient activation or engagement
 - f. Diet/exercise patterns
- 3) Medication adjustment
 - a. Consider change of HCTZ to Chlorthalidone if HCTZ does not seem to be achieving 24 hour coverage
- 4) Referral to
 - a. Behavioral health regarding activation
 - b. Designated hypertension specialist (HTN clinic, nephrology, etc., depending on local resources)
 - c. Dietician

Used for all Diabetics (except Blacks) and all Men (except Blacks)

- Visit every two weeks until controlled
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- Controlled defined as BP to goal on all readings, including in clinic value
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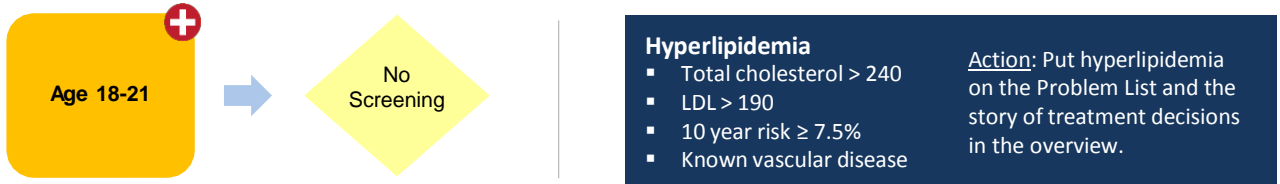
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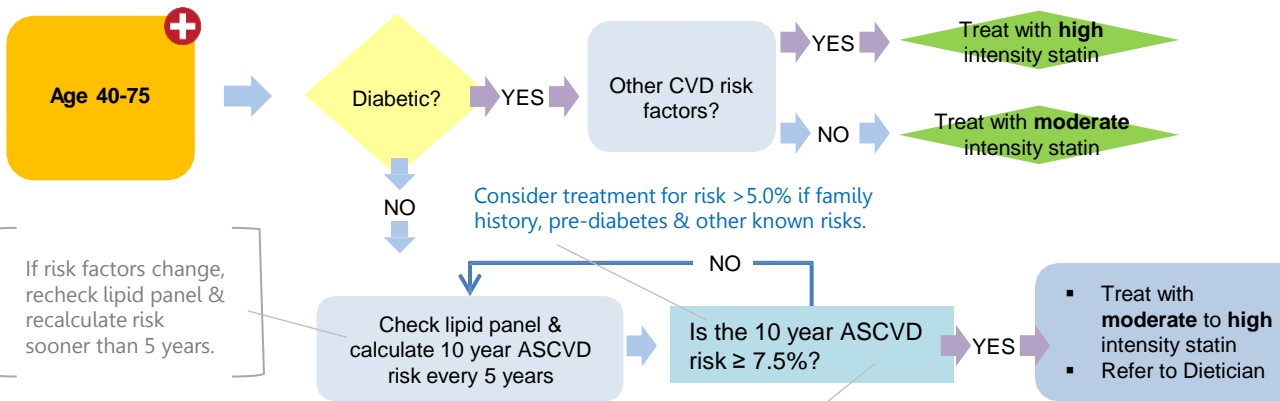
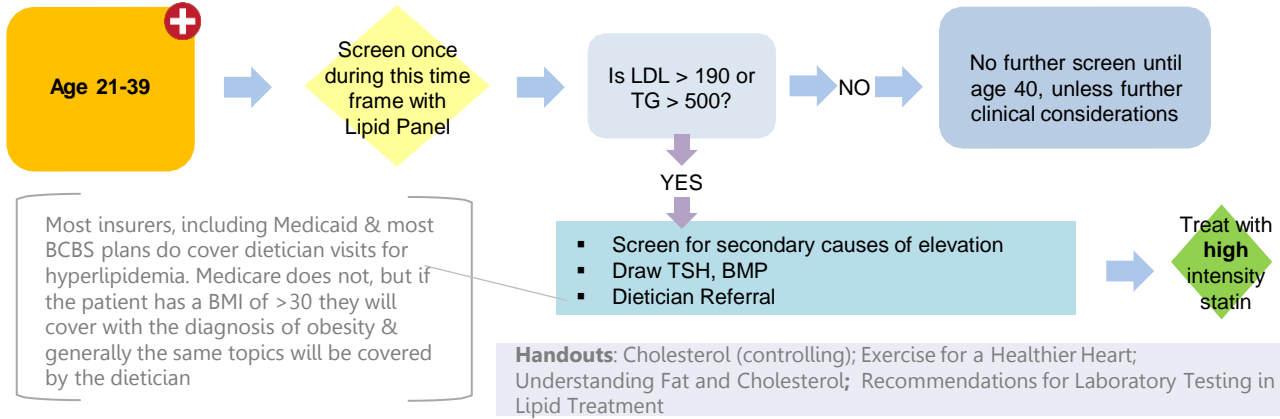
References

1. James PA, Oparil S, Carter BL, et al. 2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC 8). *JAMA*. 2014;311(5):507-520. doi:10.1001/jama.2013.284427

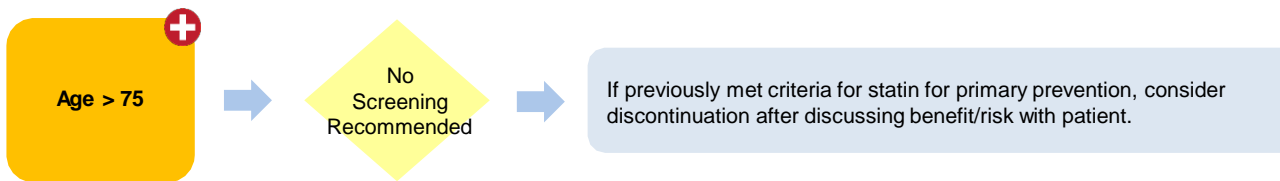
Primary Prevention – No Known Vascular Disease



(+) This symbol means Nurses can place these screening orders per nursing treatment protocol



As age approaches 75, many patients will have risk > 7.5%. As always, a discussion of risk/benefit ratio of medications is appropriate.

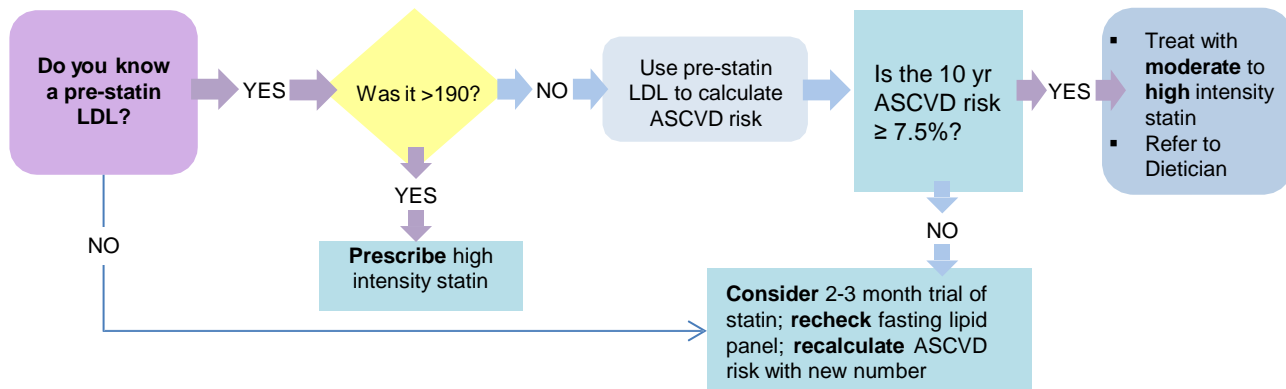


Secondary Causes for Hyperlipidemia Most Commonly Encountered in Clinical Practice (see references)

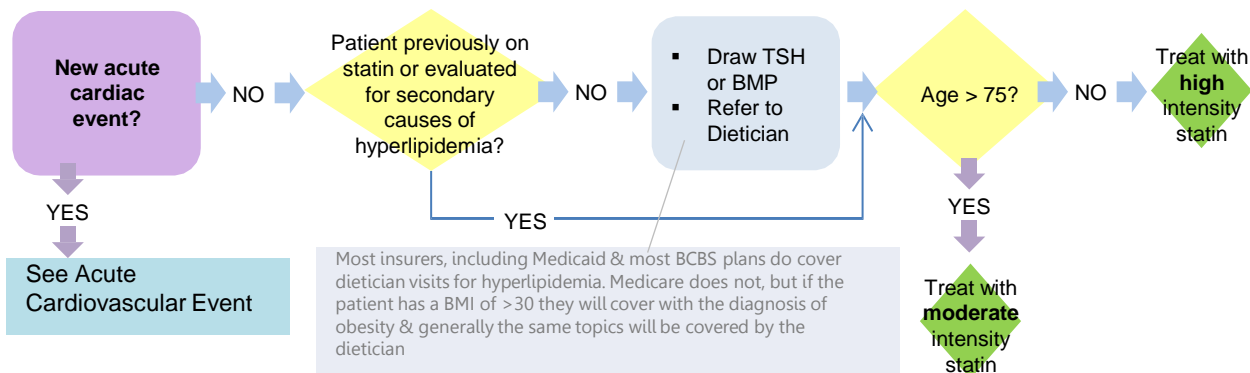
Secondary Cause	Elevated LDL-C	Elevated Triglycerides
Diet	Saturated or trans fats, weight gain, anorexia	Weight gain, very low-fat diets, high intake of refined carbohydrates, excessive alcohol intake
Drugs	Diuretics, cyclosporine, glucocorticoids, amiodarone	Oral estrogens, glucocorticoids, bile acid sequestrants, protease inhibitors, retinoic acid, anabolic steroids, sirolimus, rilaxifene, tamoxifen, beta blockers (not carvedilol), thiazides
Disease	Biliary obstruction, nephrotic syndrome	Nephrotic syndrome, chronic renal failure, lipodystrophies
Disorders & altered states of metabolism	Hypothyroidism, obesity, pregnancy	Diabetes (poorly controlled), hypothyroidism, obesity, pregnancy

EVALUATION AND TREATMENT

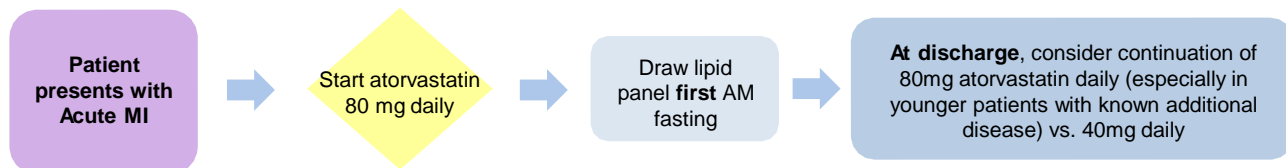
Primary prevention in non-diabetics already on a statin, but risk not previously calculated using ASCVD model & 2013 guidelines



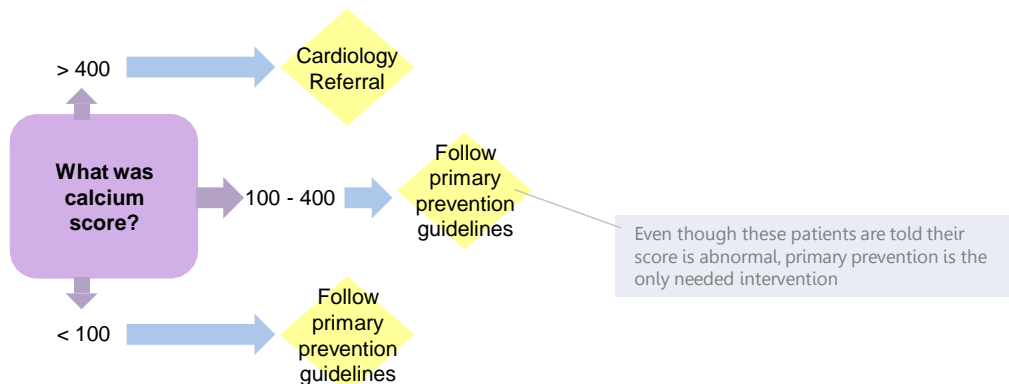
Secondary Prevention – All Vascular Disease: Cardiac, Stroke, Peripheral



Acute Cardiovascular Event



Positive Calcium Score



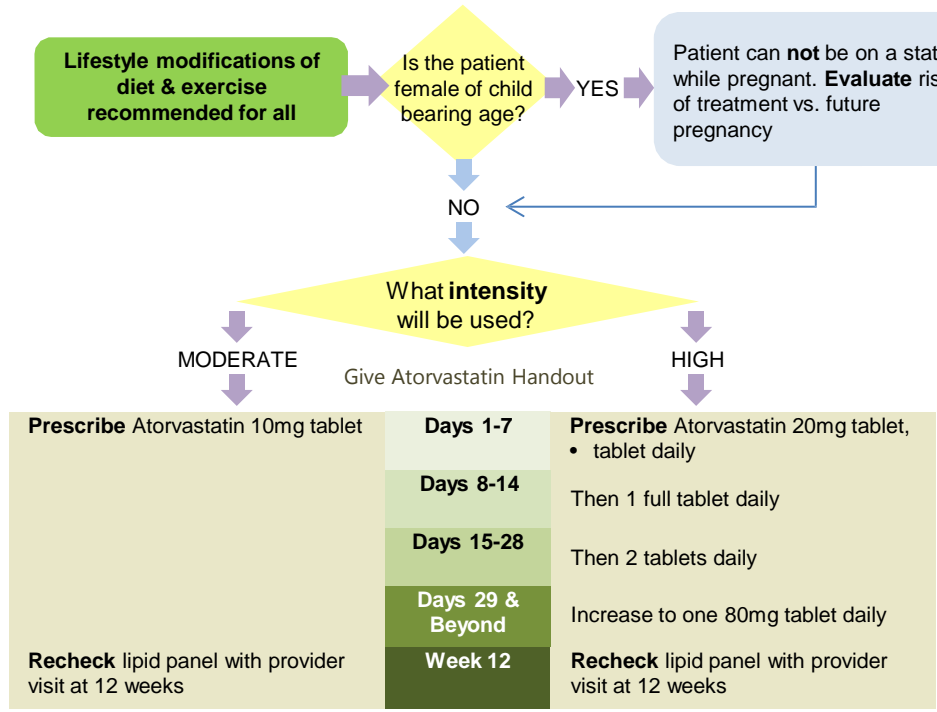
EVALUATION AND TREATMENT

Treatment of Lipids

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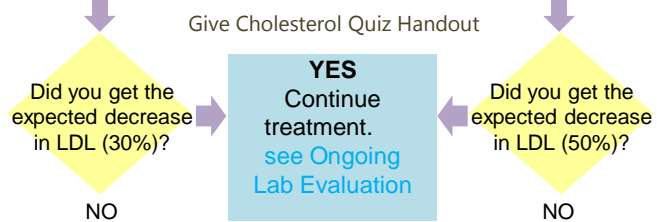
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Ongoing Laboratory Evaluation

- Lipid Panel 1x Annually
- ALT/AST only if symptoms of hepatic toxicity (unusual fatigue or weakness, loss of appetite, abdominal pain, dark colored urine, yellowing of skin or sclera)
- CK should only be done if myalgias

+ Nurses can help place lipid panel order every 12 months in stable dose med or 12 weeks after med or dose change.



Insufficient Response Evaluation - Assess for:

- Medication adherence
- Lifestyle change adherence
- Possible secondary causes of hyperlipidemia – at a minimum draw TSH if not already completed

Increase Atorvastatin to 20mg tablet
Recheck lipid panel at 8-12 weeks

Consider adding Ezetimibe 10mg

Give Ezetimibe Handout

If no response, refer to endocrinology or cardiology for use of newer injectable agents

Insufficient Response Evaluation - Assess for:

- Medication adherence
- Lifestyle change adherence
- Possible secondary causes of hyperlipidemia – at a minimum draw TSH if not already completed

Consider adding Ezetimibe 10mg

Give Ezetimibe Handout

If no response, refer to endocrinology or cardiology for use of newer injectable agents

Comments on Other Agents

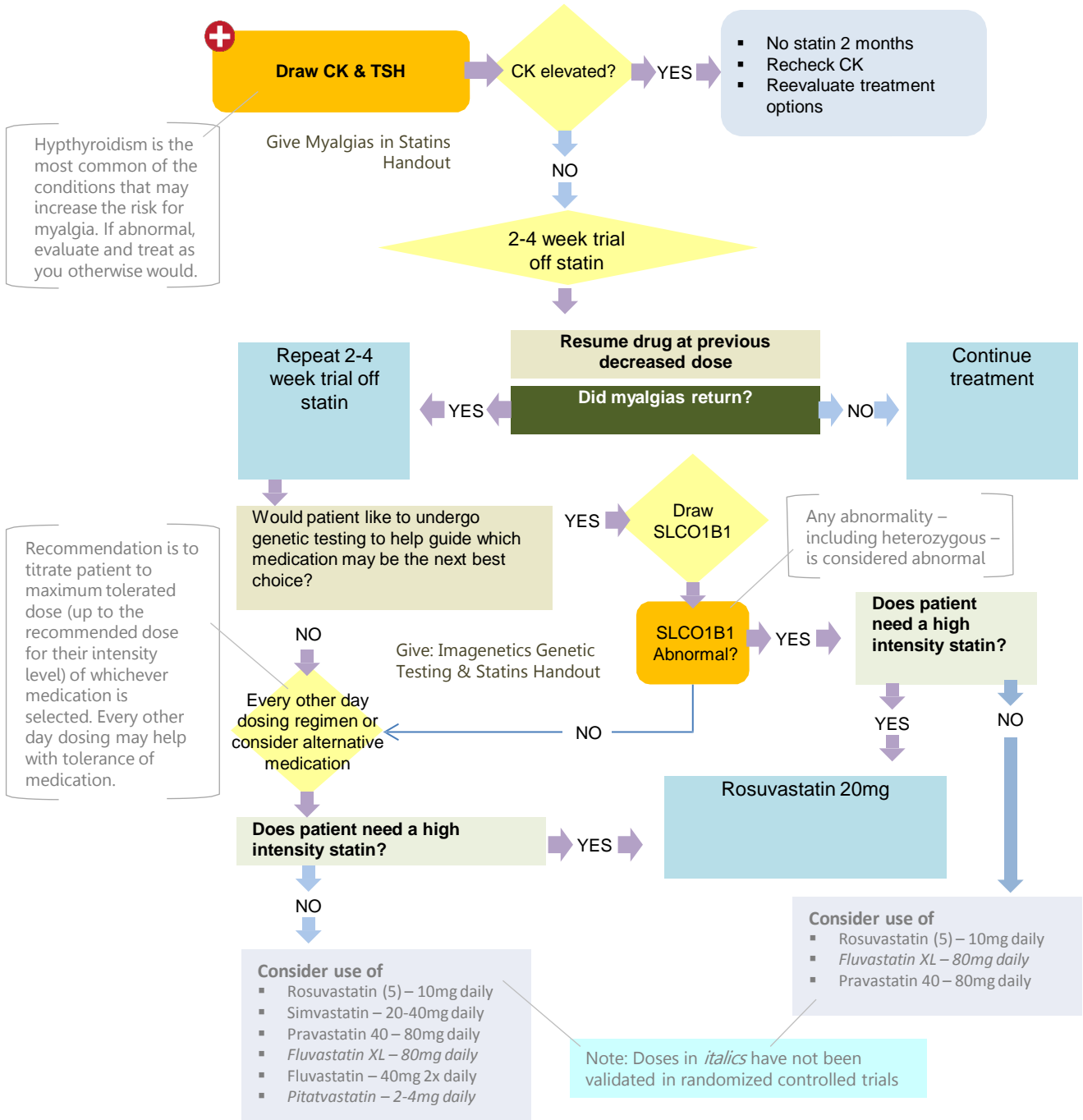
- Niacin:** If patient is on Niacin, this medication should be discontinued as it may increase death rate
- Gemfibrozil** or other fibrates
 - Increases risk of muscle toxicity
 - Can be used for prevention of pancreatitis in those with elevated TGs, but there is no evidence to support using it for cardiac prevention
- Ezetimibe** should not be used as mono-therapy unless no statin is tolerated. There is some evidence in secondary prevention literature that this may be of benefit.
- Cholestyramine:** Recommended only for pregnant women with extremely high LDL who are felt to need treatment during pregnancy
- Co-Enzyme Q10:** Debatable evidence for myalgia reduction with statin treatment
- Omega 3 Fatty Acids:** No current evidence as to cardiovascular benefit
- Vitamin E:** No current evidence as to cardiovascular benefit
- Red Yeast Rice:** No proven benefit.

Myalgia at any point in treatment

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Clinical Pearls

1. Grapefruit juice inhibits CYP3A4; however, daily consumption of eight ounces of grapefruit juice, or one-half of a grapefruit or less, is unlikely to increase the risk of an adverse interaction or muscle injury. (See *Concurrent Drug Therapy* above.)
2. There is no evidence that atorvastatin is better taken in the evening. It can be taken at any time of day.
3. **Hypothyroidism and other disorders** — Enhanced susceptibility to statin-associated myopathy occurs in patients with hypothyroidism, acute or chronic renal failure, and obstructive liver disease. In one hypothyroid patient, the myopathy resolved promptly after discontinuation of [pravastatin](#) and before initiation of thyroid hormone replacement [54], but in a second case the myopathy persisted until thyroid hormone was replaced [55]. These reports suggest that hypothyroidism may predispose to the development of statin-associated myopathy and that use of statins may "unmask" hypothyroid myopathy. (See "[Hypothyroid myopathy](#)".)

References

1. 2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults.
2. American Diabetes Association- Standards of Care in Diabetes—2015
3. Punzi L, Betterle C. Chronic autoimmune thyroiditis and rheumatic manifestations. *Joint Bone Spine* 2004; 71:275.
4. Bazzichi L, Rossi A, Giuliano T, et al. Association between thyroid autoimmunity and fibromyalgic disease severity. *Clin Rheumatol* 2007; 26:2115.

Appendix D

POLICY/PROCEDURE: Quality-Clinic			POLICY #:
DEVELOPED/REVISED BY:	DATE: 1/2018	REVIEWED/REVISED:	REV/REV:
DISTRIBTION: Clinic	REV/REV:	REV/REV:	REV/REV:

GOALS:

To provide high quality patient care through systematic, ongoing monitoring, thereby identifying problems or potential problems with that care or with individual competence and through the evaluation of the data collected, track sources of the difficulties and effect resolutions.

RESPONSIBILITY:

The Administrator shall be responsible for the implementation of the QAPI in the department. There shall be a designated quality assurance person in the department to help the supervisor carry out the implementation and functions of the Clinic QAPI program.

SCOPE OF PATIENT SERVICES:

The Clinic Department will provide services to all patients who have been recommended by a medical staff, consulting, or other qualified physician to have such tests performed.

FUNCTIONS:

The functions of the Clinic Department will be to:

1. To design effective mechanisms for identification, assessment, resolution, evaluation and performance improvement of nursing practice.
2. Providers will adhere to Government quality regulations (MACRA,ACO).
3. To develop effective systems for the documentation and dissemination of quality assessment and performance improvement activity findings to appropriate persons and /or committees.
4. To enhance skills and knowledge of health care through performance improvement and educational opportunities.
5. To minimize potential for malpractice and liability claims.

ACTION:

Clinic staff will perform a continual assessment of performance with implementation of solutions, assessment of the effectiveness of the solutions, and evaluations to determine what can be done better. If a problem is identified, an analysis of the cause will follow and action will be

This policy was developed as a guide for the delivery of health services and is not intended to define the standard of care. This policy should be used as a guide for the delivery of service, although hospital personnel may deviate from this guide to provide appropriate individualized care.

taken to correct the problem with a follow-up to determine the effectiveness of the action. Any problem that cannot be resolved within the department shall be referred to the Administrator or QAPI Coordinator.

REPORTING:

The Clinic shall submit a report of its Quality Assessment and Performance Improvement Activities to the QAPI Coordinator on a scheduled basis or as indicated. This will consist of the results of monitoring, identification of problems based on an analysis of the results, steps taken to correct the problem and whether the problem was corrected.

PROGRAM EVALUATION:

The Clinic shall review their entire Quality Assessment/Performance Improvement Program on an scheduled basis for effectiveness, assessment of critical indicators, effective checking to ensure problems are not lost or ignored and sustained elimination or reduction of problems. The use of findings from the QAPI programs may be used in the individual clinical competence of its employees.

This policy was developed as a guide for the delivery of health services and is not intended to define the standard of care. This policy should be used as a guide for the delivery of service, although hospital personnel may deviate from this guide to provide appropriate individualized care.

Appendix E

POLICY/PROCEDURE: Quality-Quality Assessment Performance Improvement			POLICY #:
DEVELOPED/REVISED BY:	DATE: 12/17	REVIEWED/REVISED:	REV/REV:
DISTRIBUTION: Facility Wide	REV/REV:	REV/REV:	REV/REV:

GOALS:

The Patient Care Quality Assessment / Performance Improvement (QAPI) Program at Hospital is a part of the hospital wide QAPI program. The goal of the plan is to develop and establish a well defined, organized patient care service QAPI program designed to enhance patient care and assess appropriate allocation of healthcare resources through ongoing objective assessment of important aspects of patient care and the performance improvement of identified problems.

OBJECTIVES:

1. To assess the delivery of inpatient, surgical services, outpatient and emergency room care at an optimally achievable level of quality in a safe and cost-effective manner.
2. To design effective mechanisms for identification, assessment, resolution, evaluation and performance improvement of nursing practice.
3. To identify, assess and resolve problems in patient care areas.
4. To include in the quality assessment and performance improvement of the patient care departments, the review that nursing care practices and professional competency are routinely and reliably evaluated.
5. To develop effective systems for the documentation and dissemination of quality assessment and performance improvement activity findings to appropriate persons and / or committees.
6. To enhance skills and knowledge of nursing staff through performance improvement and educational opportunities.
7. To minimize potential for malpractice and liability claims.

MAJOR ASPECTS OF CARE:

1. To identify important or potential problems or related concerns in the care of patients.
2. To assess objectively the cause and scope of problems / concerns, including the determination of priorities for both investigating and solving problems.
3. To implement by appropriate individuals, or through designating mechanisms, decisions

or actions designed to reduce or eliminate identified problems.

4. To monitor activities designed to assess and improve desirable results that have been achieved and sustained.
5. To document and reasonably substantiate the effectiveness of the overall program to enhance patient care and assess and improve sound clinical performance.
6. To monitor discharge planning for continuity of care for the patient during the post hospital phase.

Patient Care

QAPI

Page 2

RESPONSIBILITY:

The Director of Nursing will appoint nursing staff to research and report on a specific quality assessment indicator needing improvement. The staff member(s) will give the completed report to the Director of Nursing.

Other responsibilities will include, but are not limited to:

1. Reviewing proposed monitoring activities to prevent unnecessary duplication, avoid conflicts within and outside the nursing department and assist in the identification of potential multi-disciplinary studies.
2. Facilitating and coordinating nursing monitoring activities.
3. Assisting in generating and coordinating ideas for monitoring activities.
4. Coordinating a schedule of monitoring activities based on their impact to patient care.
5. Assisting in the selection / development of criteria for monitoring activities.
6. Accounting for the completion of objectives of the Patient Care Quality Assessment / Performance Improvement Program.

ACTION:

Once a problem is identified, an analysis of the cause will follow and action will be taken to correct the problem with a follow up to determine the effectiveness and performance improvement of the action. Actions shall result in the sustained alleviation or elimination of the problem. Any problem that cannot be resolved within the department shall be referred to the Administrator or QAPI Coordinator.

REPORTING:

The Nursing Department shall submit a report of its Quality Assessment and Performance Improvement Activities to the QAPI Coordinator on a yearly basis. This will consist of the results of monitoring, identification of problems based on an analysis of the results, steps taken to correct the problem and whether the problem was corrected.

MEETINGS:

At the nursing staff meeting, the nursing staff members will report to the general nursing staff any outcomes of studies which may benefit or change any existing policies / protocols.

Patient care

QAPI

Page 3

PROGRAM EVALUATION:

The Director of Nursing shall review the entire Quality Assessment / Performance Improvement Program on an annual basis for effectiveness, assessment of critical indicators, effective checking to ensure problems are not lost or ignored and sustained elimination or reduction of problems. The use of findings from the QAPI program may be used in the individual clinical competence of its employees.