CHAPTER 4

Care Planning: A Component of the Patient Care Process

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THE PATIENT CARE PROCESS

The *patient care process* for pharmacists is a systematic and comprehensive method that is employed to identify, solve, and prevent drug therapy problems.[1] A drug therapy problem is "any undesirable event experienced by a patient which involves, or is suspected to involve, drug therapy and that interferes with achieving the desired goals of therapy."[1] The patient care process includes three essential elements: 1) assessment of the patient's drug-related needs; 2) creation of a care plan to meet those needs; and 3) follow-up evaluation to determine whether positive outcomes were achieved. Consequently, development of a patient care plan is only one component of the overall patient care process. Before developing a patient-specific care plan, it is important for the clinician to have an understanding of the comprehensive nature of the patient care process. This process offers a logical and consistent framework that can be most useful in care planning and serves as the framework for this chapter.

ASSESSMENT OF DRUG-RELATED NEEDS

The first step in assessment is to identify the patient's drug-related needs by collecting, organizing, and integrating pertinent patient, drug, and disease information. In the patient care process, as with all direct patient care services, the patient is the primary source of information. This involves asking patients what they *want* (expectations) and what they *don't want* (concerns) and determining how well they understand their drug therapies. For example, the clinician may ask, "How may I help you today?" or "What concerns do you have that I may address for you today?" In addition to speaking with the patient, data can also be obtained from: 1) family members or caretakers when appropriate; 2) the patient's current and past medical records; and 3) discussions with other health care providers. The types of information that may be relevant are described below.[1,2]

Patient Information

- Demographics and background information: age, gender, race, height, weight.
- Social history: living arrangements, occupation, special needs (e.g., physical abilities, cultural traits, drug administration devices).
- Family history: relevant health histories of parents and siblings.
- Insurance/administrative information: name of health plan, primary care physician.

Disease Information

- Past medical history.
- Current medical problems.
- History of present illness.
- Pertinent information from the review of systems, physical examination, laboratory results, x-ray/imaging results.
- Medical diagnoses.

Drug Information

- Allergies, side effects (include the name of the medication and the reaction that occurred).
- Current prescription medications:
  - ✓ How the medication was prescribed.
  - ✓ How the patient is actually taking the medication.
  - ✓ Effectiveness and side effects of current medications.
  - ✓ Questions or concerns about current medications.
- Current nonprescription medications, vitamins, dietary supplements, and other alternative/complementary therapies.
- Past prescription and nonprescription medications (i.e., those discontinued within the past 6 months).

The information obtained is then organized, analyzed, and integrated to: 1) determine whether the patient's drug therapy is appropriate, effective, safe, and convenient for the patient; 2) identify drug therapy problems that may interfere with goals of therapy; and 3) identify potential drug therapy problems that require prevention. One method of organizing and integrating this information with appropriate pharmacotherapeutic knowledge has been described as the Pharmacotherapy Workup© (copyright 2003, the Peters Institute of Pharmaceutical Care).[1]

Drug therapy problems are uncovered through careful assessment of the patient, drug, and disease information to determine the appropriateness of each medication regimen. This process involves a logical sequence of steps. It begins with evaluating each medication regimen for appropriateness of indication; then optimizing the drug and dosage regimen to ensure maximum effectiveness; and finally, individualizing drug therapy to make it as safe as possible for the patient. After completing these three steps, the practitioner considers other issues such as cost, compliance, and convenience.

Drug therapy problems can be placed into distinct categories, as summarized below. See Table 4-1 for a useful checklist that can be used in actual practice situations.[1]

1. *Inappropriate indication* for drug use
   a. The patient requires additional drug therapy.
   b. The patient is taking unnecessary drug therapy.
2. *Ineffective* drug therapy
   a. The patient is taking a drug that is not effective for his/her situation.
   b. The medication dose is too low.

TABLE 4-1 Drug Therapy Problems to Be Resolved or Prevented

Assessment	Drug Therapy Problem
Indication	**Unnecessary drug therapy**
	No medical indication
	Duplicate therapy
	Nondrug therapy indicated
	Treating avoidable adverse drug reaction
	Addictive/recreational use
	Needs additional drug therapy
	Untreated condition
	Preventive/prophylactic
	Synergistic/potentiating
Effectiveness	**Needs different drug product**
	More effective drug available
	Condition refractory to drug
	Dosage form inappropriate
	Not effective for condition
	Dosage too low
	Wrong dose
	Frequency too long
	Duration too short
	Drug interaction
	Incorrect administration
Safety	**Adverse drug reaction**
	Undesirable effect
	Unsafe drug for patient
	Drug interaction
	Dose administered or changed too rapidly
	Allergic reaction
	Contraindications present
	Dosage too high
	Wrong dose
	Frequency too short
	Duration too long
	Drug interaction
	Incorrect administration
Compliance	**Nonadherence**
	Directions not understood
	Patient prefers not to take
	Patient forgets to take
	Drug product too expensive
	Cannot swallow or administer
	Drug product not available

Adapted with permission from Cipolle RJ, Strand LM, Morley PC. Pharmaceutical Care Practice: A Clinician's Guide, 2nd ed. New York, McGraw-Hill, 2004:168.

3. *Unsafe* drug therapy
   a. The patient is experiencing an adverse drug reaction.
   b. The medication dose is too high.
4. Inappropriate *adherence* or *compliance*
   a. The patient is unable or unwilling to take the medication as prescribed.

A drug therapy problem can be resolved or prevented only when the cause of the problem is clearly understood. Therefore, it is necessary to identify and categorize both the drug therapy problem and its cause (Table 4-2).[1]

CREATION OF A PATIENT CARE PLAN

Care plan development is a cooperative effort that should involve the patient as an active participant. It may also involve an interdisciplinary team of care providers and the patient's family. Care planning involves establishing therapeutic goals and determining appropriate interventions to:

1. Resolve all existing drug therapy problems.

TABLE 4-2 Causes of Drug Therapy Problems

Drug Therapy Problem	Possible Causes of Drug Therapy Problems
Unnecessary drug therapy	No valid medication indication for the drug at this time.
	Multiple drug products are used when only single-drug therapy is required.
	The condition is better treated with nondrug therapy.
	Drug therapy is used to treat an avoidable adverse drug reaction associated with another medication.
	The medical problem is caused by drug abuse, alcohol use, or smoking.
Need for additional drug therapy	A medical condition exists that requires initiation of new drug therapy.
	Preventive therapy is needed to reduce the risk of developing a new condition.
	A medical condition requires combination therapy to achieve synergism or additive effects.
Ineffective drug	The drug is not the most effective one for the medical problem.
	The drug product is not effective for the medical condition.
	The condition is refractory to the drug product being used.
	The dosage form is inappropriate.
Dosage too low	The dose is too low to produce the desired outcome.
	The dosage interval is too infrequent.
	A drug interaction reduces the amount of active drug available.
	The duration of therapy is too short.
Adverse drug reaction	The drug product causes an undesirable reaction that is not dose-related.
	A safer drug is needed because of patient risk factors.
	A drug interaction causes an undesirable reaction that is not dose-related.
	The regimen was administered or changed too rapidly.
	The product causes an allergic reaction.
	The drug is contraindicated because of patient risk factors.
Dosage too high	The dose is too high for the patient.
	The dosing frequency is too short. The duration of therapy is too long.
	A drug interaction causes a toxic reaction to the drug product.
	The dose was administered too rapidly.
Noncompliance	The patient does not understand the instructions.
	The patient prefers not to take the medication.
	The patient forgets to take the medication.
	Drug product is too expensive.
	The patient cannot swallow or self-administer the medication properly.
	The drug product is not available for the patient.

Adapted with permission from Cipolle RJ, Strand LM, Morley PC. Pharmaceutical Care Practice: A Clinician's Guide, 2nd ed. New York, McGraw-Hill, 2004:178–179.

2. Achieve the goals of therapy intended for each active medical problem.
3. Prevent future drug therapy problems that have a potential to develop.

Although care plans have been a standard component of the practice of other health professionals (e.g., nurses, physical therapists, respiratory therapists) for many years, there is still no standard, widely accepted method of care planning in pharmacy. In 1995, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) made pharmaceutical care planning a requirement for accreditation in all settings that it accredits. This requirement mandates that pharmaceutical care planning be included in the overall plan of care for the patient.[3] Implementation of a systematic care planning process serves to organize the pharmacist's practice, to communicate activities to other health care professionals, and to provide a record of drug therapy interventions in the event that questions arise regarding the standard of care provided to a patient.

It cannot be overemphasized that a plan of care is not merely a document; rather, it is a systematic, ongoing process of planning, action, and documentation. It is a dynamic instrument that reflects the continuing care that is modified according to the patient's changing needs.[4] The most essential element to remember is that the needs of the patient drive the plan, regardless of the care-planning format used. In short, the plan must be tailored to the needs of each unique patient. All care providers and the patient should agree on the care plan because each participant has a responsibility for implementing a portion of the plan. In the ambulatory care setting, the patient often assumes much of the responsibility for plan implementation.

Organization of a care plan is important, and each medical problem should be addressed separately and in its entirety so that the drug therapy problems associated with each condition and the plans for intervention are logically organized and implemented. The elements of a care plan include:

- *Medical condition:* List the disease state for which the patient has drug-related needs.
- *Drug therapy problems:* State the drug therapy problems by including the patient's problem or condition, the drug therapy involved, and the association between the drug(s) and the patient's condition(s).
- *Goals of therapy:* State the goals in the future tense. Goals should be realistic, measurable and/or observable, specific, and associated with a definite time frame.
- *Interventions:* In collaboration with the patient, the practitioner develops and prioritizes a list of activities to address the patient's drug-related needs. The patient's input is important because the plan should adequately address the patient's unique concerns, needs, and preferences. The list of activities may be stated in the past, present, or future tense. Include the recommendations made to the patient, the caregiver on the patient's behalf, or to the prescriber to resolve (or prevent) the patient's drug therapy problems.
- *Follow-up plan:* Determine when the patient should return for follow-up and what will occur at that subsequent visit.

An example of how each of these components might be incorporated into a care plan is given in the following case vignette:

Patrick Murphy is a 73-year-old man who underwent coronary artery bypass grafting 2 months ago and was started on simvastatin 10 mg by mouth (po) once daily 6 weeks ago for dyslipidemia. The results of this week's fasting lipid profile revealed total cholesterol 230 milligrams/deciliter (mg/dL), low density lipoprotein (LDL) cholesterol 141 mg/dL, high density lipoprotein cholesterol 45 mg/dL, and triglycerides 220 mg/dL. He continues to smoke 1.5 packs of cigarettes per day.

- *Medical condition:* Dyslipidemia.
- *Drug therapy problems:* Dyslipidemia treated with an inadequate dose of a lipid-lowering agent.
- *Goals of therapy:* The patient's LDL cholesterol will be lowered to <100 mg/dL within 6 weeks. (Note: Because the patient has known coronary artery disease, his goal LDL cholesterol is <100 mg/dL.[5])
- *Interventions:* The maximum dose of simvastatin is 80 mg, so the dose should be increased in an attempt to achieve the target LDL level. Increase simvastatin to 20 mg po once daily; #30 dispensed. Reviewed possible side effects of simvastatin with patient (constipation, rare muscle weakness) and monitored for liver injury (serum alanine aminotransferase measurements). Recommended that the patient consider stopping smoking—advised to keep a log of smoking habits, including number of cigarettes, time of day, and trigger events.
- *Follow-up plan:* Patient will return to clinic in 6 weeks for a repeat fasting lipid profile, questioning about potential adverse effects, and discussion of a plan for smoking cessation.

FOLLOW-UP EVALUATION

The purpose of a follow-up evaluation is to evaluate the positive and negative impact of the care plan on the patient, to uncover new drug therapy problems, and to take appropriate action to address new problems or adjust previous therapies as needed. Follow-up evaluation requires direct contact with the patient to obtain feedback about the benefits of therapy achieved, the occurrence of problems such as side effects, and patient concerns about the treatment. Additionally, relevant data are gathered from current clinical assessments, laboratory tests, radiographs, and other procedures. The practitioner evaluates and documents the patient's progress in achieving the goals of therapy.

The evaluation involves comparing goals of therapy with the patient's current status. Cipolle, Strand, and Morley developed terminology to describe the patient's status, the medical conditions, and the comparative evaluation of that status with the previously determined therapeutic goals.[1] These terms also describe the actions taken as a result of the follow-up evaluation:

Status	Definition
Resolved	Therapeutic goals achieved for the acute condition, discontinue therapy
Stable	Therapeutic goals achieved, continue the same therapy for chronic disease management
Improved	Progress is being made in achieving goals, continue the same therapy because more time is required to assess the full benefit of therapy
Partial improvement	Progress is being made, but minor adjustments in therapy are required to fully achieve the therapeutic goals before the next assessment
Unimproved	Little or no progress has been made, but continue the same therapy to allow additional time for benefit to be observed
Worsened	A decline in health is observed despite an adequate duration using the optimal drug; modify drug therapy (e.g., increase the dose of the current medication, add a second agent with additive or synergistic effects)
Failure	Therapeutic goals have not been achieved despite an adequate dose and duration of therapy; discontinue current medication(s) and start new therapy
Expired	The patient died while receiving drug therapy; document possible contributing factors, especially if they may be drug related

Example: If the patient Mr. Murphy described above returns in 6 weeks with a repeat fasting LDL cholesterol of 120 mg/dL without complaints of side effects, the outcome status of this patient would be partial improvement. Another adjustment in therapy is indicated to further reduce his LDL cholesterol (e.g., increase the simvastatin dose to 40 mg po once daily).

EXAMPLE OF CARE PLAN DOCUMENTATION

Each step in the patient care process must be documented. Documentation should take place on an ongoing basis to provide an updated record of the patient's current and changing needs, care activities in response to those needs, the patient's progress, and plans for future care and follow-up evaluation. This document provides a means for communication among health care providers and is now required for accreditation by JCAHO. What JCAHO

requires is not merely a list of the patient's current medications but a document that reflects the systematic and dynamic process of patient care. The example provided in Fig. 4-1 is intended to demonstrate to students how a care plan might be created.

A blank care plan form is also included at the end of this chapter for use by students who are completing the cases for this casebook (see Appendix A). Students may practice using this form when completing the case studies in this casebook. The vast amount of medical information available and the widespread computerization of patient records make the use of electronic pharmaceutical care records virtually mandatory. Consequently, use of this relatively simple hard-copy form should be considered only the first step in developing the student's ability to electronically organize and manage large volumes of complex medical information.

On the electronic resource *AccessPharmacy.com* (subscription required), care plans from the casebook can be completed electronically and e-mailed to course instructors for grading. The patient cases from this casebook are also available on *AccessPharmacy.com*, providing a seamless resource for creating and evaluating the patient care plans written by students.

Example Case Vignette: Donald Benferardo is a 64-year-old man with osteoarthritis currently treated with nabumetone. He has been diagnosed with hypertension based on the average of two blood pressure (BP) readings taken at three previous clinic visits.[6] *The hypertension is presently untreated. What information must be included in the patient's care plan?*

Patient Information

- *The patient's name* is essential to identify the patient to whom the record belongs. The name, Donald Benferardo, should be the first information placed on the chart. Although this guideline seems logical, it sometimes does not happen. When in a hurry, a care provider may grab a blank form and begin to make notes with the intention of placing the patient's personal information on it later, and in the midst of distractions, the name is not recorded.
- *Current address and phone number* are necessary for future contact and follow-up evaluation. The information should be complete (621 E. Greene Street, Washington, PA 15301), and the telephone number should include the area code (412-555-1950).
- *Insurance* information should include the name of the insurance plan and policy number (Metro United Health Plan #1234789) to ensure accurate billing of services.
- *Demographic* information including *age (birth date), gender, race, height, and weight* should be recorded for the purpose of individualizing drug therapy. Mr. Benferardo is a 64-year-old Caucasian man who is 5'11" tall and weighs 177 lbs. Include weight information in both pounds (lbs) and kilograms (kg). The equation for converting lbs to kg is as follows: weight in lbs/2.2 = weight in kg. Mr. Benferardo weighs 177 lbs or 80.4 kg (177/2.2 = 80.4). This information is used to determine the appropriate drug and dosage regimens for treatment. *Ideal body weight (IBW)* is necessary for calculating appropriate dosage for medications that do not distribute into fatty tissues. IBW is calculated as follows: For men, IBW = 50 kg + [2.3 × (height in inches above 5 feet)]. For women, IBW = 45.5 kg + [2.3 × (height in inches above 5 feet)]. For Mr. Benferardo, 50 kg + (2.3 × 11) = 75.3 kg.
- *Allergies and adverse drug reactions* should be documented with specific descriptions of the reactions that occurred. Reactions should be clearly identified as allergies or side effects. Mr. Benferardo has an allergic reaction to penicillin that resulted in hives. He also has experienced dyspepsia, a well-documented side effect of ibuprofen. This information is critical to avoiding patient harm. Allergies are distinct from side effects. An allergy is an immune-mediated reaction that often precludes future use of the medication except in rare cases in which the benefit of using the drug outweighs the risk of the reaction. However, a side effect may sometimes be self-limiting with continued use, or it may be successfully managed with adjustments in the dosage regimen or administration. For example, a drug that is taken once daily and causes drowsiness may be administered at bedtime. A drug that causes GI upset may be successfully managed by taking it with meals.
- *Tobacco/alcohol/substance use* information is important for appropriate drug selection, dosing calculation, and patient education. Include the name of the substance, the amount, and frequency, when possible. Mr. Benferardo occasionally smokes approximately 3 cigars each week and drinks 1 ounce of whiskey with each cigar. It is important to record pertinent negatives for substance use. For example, caffeine may increase BP acutely, although tolerance to this effect develops quickly. Nevertheless, caffeine use may be relevant to this patient and should be recorded. Alcohol and tobacco may affect the metabolism of certain drugs and potentiate or counteract the benefits of other drugs. For example, tobacco enhances the metabolism of theophylline. Therefore, smokers generally require higher doses of theophylline to achieve therapeutic benefits. Substances such as cocaine, caffeine, or tobacco may enhance the sympathomimetic effect of some drugs while counteracting the sympatholytic effects of others, such as some antihypertensive medications.
- *Medical conditions* should be listed to offer a general overview of the patient's medical problems. The care plan is also organized according to the medical condition whereby all drug therapy problems associated with each medical condition are addressed separately and in their entirety.

Medication Record

- The list of medications should include the date each was started; the indication for use; and the drug name, strength, and regimen that the patient is actually taking. The *actual* regimen may differ from the *prescribed* regimen because patients don't always take medications as directed. Assessment of therapy must be made based upon the actual therapy the patient is receiving. Mr. Benferardo is currently taking nabumetone two 750-mg tablets po daily. A stop date should be recorded for medications that have been discontinued.
- Relevant clinical impressions or comments can also be recorded, for example: "Discontinued ibuprofen secondary to dyspepsia that occurred even when taken with food." Also note the antihypertensive regimen, which was initiated with hydrochlorothiazide 25 mg po once daily and subsequently changed to triamterene/hydrochlorothiazide 37.5/25 mg po once daily. Atenolol 50 mg po once daily was added later because only partial improvement in hypertension was achieved with diuretic therapy.

Assessment, Plan, and Follow-Up Evaluation

This section of the patient's chart provides a record of therapeutic interventions and the patient's responses to them. Information is documented as events occur, providing a "flow chart" of the patient's progress to date. The historical information contained in this chart is important to incorporate in therapeutic decision making.

- *The Date* should be recorded in the far-left column to document when each encounter occurred. Mr. Benferardo's chart shows that he has been seen three times: on May 3, May 17, and May 31, 2008.

PHARMACEUTICAL CARE PATIENT RECORD

Patient Name: Donald Benferardo	**Gender:** M
Address: 621 E. Greene St., Washington PA 15301	**Race:** W
Telephone: 412-555-1950 **Age:** 64	**Actual Weight:** 177 lb (80 kg)
Insurance: Metro United Health Plan #1234789	**Ideal Weight:** 166 lb (75.3 kg)
Medical Conditions: Osteoarthritis left knee (stable)	**Allergies:** Penicillin → hives
Tobacco/Alcohol/Substance Use: Occasional cigar 3×/wk; EtOH 3×/wk; no caffeine	**Adverse Reactions:** Ibuprofen → dyspepsia

Medication Record

Start Date	Stop Date	Indication	Drug Name	Actual Strength	Regimen	Clinical Impressions
12/14/05		Osteoarthritis	Nabumetone	750 mg	2 tablet po once daily	Tolerating well minor knee pain
5/03/08	5/17/08	HTN	Hydrochlorothiazide	25 mg	1 tablet po once daily	5/17/08: D/C due to hypokalemia
5/17/08		HTN	Triamterene/ Hydrochlorothiazide	37.25/25 mg	1 tablet po once daily	5/31/08: K^+ WNL; HTN partially improved
5/31/08		HTN	Atenolol	50 mg	1 tablet po once daily	

Assessment, Plan, and Follow-Up Evaluation

Date	Medical Condition	Drug-Therapy Problem	Goal	Current Status	Interventions	Follow-Up Plan
5/3/08	HTN	Untreated HTN	Lower BP to 110–138/70–88 within 4 wks	Untreated (BP 160/104)	Start hydrochlorothiazide 25 mg po once daily × 4 wks	Return for BP check & serum K+ in 2 wks
5/17/08	HTN	Hypokalemia secondary to hydrochlorothiazide	K+ 3.5–5.0 mEq/L	Untreated (K+ 3.2 mEq/L)	Discontinue HCT Start triamterene/HCT 3.75/25 mg po once daily	Recheck K^+ in 2 wks
5/17/08	HTN	HTN inadequately treated with hydrochlorothiazide	BP 110–138/70–88	Partial improvement (BP 150/92)	Change to triamterene/HCT as above	Return in 2 wks for BP & K+ check
5/31/08	HTN	Hypokalemia requiring drug therapy	K+ 3.5–5.0 mEq/L	Stable (K+ 3.6 mEq/L)	Continue current therapy	Check symptoms of ↓K+ in 1 mo
5/31/08	HTN	HTN inadequately treated with hydrochlorothiazide	Same as above	Partial improvement (BP 146/92)	Add atenolol 50 mg po once daily × 4 wks	Return for BP check in 1 mo

FIGURE 4-1. Sample pharmaceutical care patient record. (BP, blood pressure; HTN, hypertension; WNL, within normal limits.)

- In the next column, *Medical Condition* specifies the medical diagnosis for which the medications are indicated. On May 3, Mr. Benferardo was diagnosed with hypertension; his subsequent visits also were for evaluation of hypertension.
- The *Drug Therapy Problem* is recorded in the next column to indicate the drug therapy problem(s) associated with each medical diagnosis. Each medical diagnosis may have one or more drug therapy problems associated with it. On May 3, Mr. Benferardo had one drug therapy problem—untreated hypertension. That is, he had an indication for drug therapy but was not receiving treatment. On May 17 and May 31, the dates were recorded twice because on these days he had two drug therapy problems that were being addressed. Each drug therapy problem should be recorded in a separate row. Although he had only one active diagnosis (hypertension), he had two drug therapy problems associated with that diagnosis as shown on May 17 and May 31. He had hypokalemia possibly secondary to hydrochlorothiazide and hypertension inadequately treated with hydrochlorothiazide.
- The *Goal* of therapy is recorded in the next column. Using the SMART acronym, therapy goals should be ***S**pecific, **M**easurable* (or observable), and ***A**chievable*. The goal should also be directly ***R**elated* to the drug therapy problem. In this case, the systolic BP goal should be less than 140 mm Hg with a diastolic pressure of less than 90 mm Hg. Treatment to lower levels may be useful if tolerated by the patient. For example, the clinician may establish an acceptable range of BP control, such as systolic BP between 110 and 138 mm Hg and diastolic BP between 70 and 88 mm Hg. The ***T**imeline* to achieve the goal should also be specified. For example, his BP should be reduced to within the indicated range within 4 weeks of therapy.
- The *Current Status* includes the patient's actual BP at each encounter. In this case, Mr. Benferardo's BP was 160/104 mm Hg on May 3 prior to starting drug therapy. Notice that his BP continues to decline with treatment. On May 17 and 31, his BPs were 150/92 and 146/92 mm Hg, respectively. The status on May 31 (4 weeks after treatment) is considered partially improved because the BP did decrease with treatment, but an adjustment in treatment is still required to achieve the BP goal.
- *Interventions* that were implemented must be recorded. The drug name, dose, route, frequency, and duration of therapy should be documented. On May 3, hydrochlorothiazide was started at a dose of 25 mg orally once a day. As you look down this column, you can see that the therapy was adjusted on May 17 and May 31. These interventions were made in response to the patient's BP as recorded in the previous column. By looking across the row, you can see the supportive evidence for the intervention: a clearly documented problem (hypertension) and the patient's status measured objectively (BP). Looking down the columns, one can see what interventions have been made and also how the patient has responded over time.
- The *Follow-Up Plan* specifies details of how the outcome of therapy will be assessed. This column should contain information about who will do what and when they will do it. The plan made on May 3 indicated that Mr. Benferardo was to return to the clinic in 2 weeks to have his BP and serum potassium level measured. This flow chart provides an easy way to see whether the patient is appearing for the follow-up visits. Mr. Benferardo did return for follow-up in 2 weeks (May 17) according to the plan. There should continue to be a follow-up plan as long as a person is receiving drug therapy. After the patient's condition is stabilized, the follow-up intervals may be much longer, such as every 6 months or once a year. However, the assessment, plan, and follow-up must continue for the duration of drug therapy. In this case, after Mr. Benferardo's BP is stabilized, he may be responsible for monitoring his own BP and assessing the side effects by self-monitoring while keeping a twice-yearly appointments for a more formal evaluation at the clinic. The patient's care plan remains active and represents the ongoing and dynamic process of providing pharmaceutical care.

Patient Summary

Based on the information documented in the care plan, the practitioner providing care to this patient and other health care professionals who have access to this information should be able to extract the following summary of this patient's past and present status regarding hypertension treatment and response.

Mr. Benferardo is a 64-year-old man diagnosed with osteoarthritis and hypertension. He was seen on May 3, 2008, at which time his BP was 160/104 mm Hg. His goal BP range was set as systolic BP of 110–138 mm Hg and diastolic BP of 70–88 mm Hg. This was the standard against which future BP measurements would be compared. He was started on hydrochlorothiazide 25 mg orally once daily for 2 weeks and was to return to clinic for a follow-up BP check and serum potassium level 2 weeks later. He returned according to the plan, but the BP reading of 152/98 indicated only a partial improvement. The BP reduction had not yet reached the goal level; it may take 4 weeks for the full effect of diuretic therapy to be manifested. Consequently, no adjustment in therapy was made pending an adequate trial of single-agent diuretic therapy. However, the low serum potassium value of 3.2 mEq/L (reference range 3.5–5.0 mEq/L) indicated hypokalemia that required treatment. Because the hypokalemia may have resulted from the thiazide diuretic, hydrochlorothiazide 25 mg was discontinued and a combination product containing triamterene 37.5 mg + hydrochlorothiazide 25 mg, 1 tablet orally once daily, was begun. He returned 2 weeks later as planned and his BP continued to show improvement (148/96 mm Hg), but it was not at the therapeutic goal that had been established 4 weeks earlier. This indicated partial improvement requiring further adjustment of his antihypertensive therapy. However, his potassium level had risen to within the normal range. Therefore, atenolol 50 mg orally once daily was added to the regimen. The patient was scheduled to return for a follow-up visit in 1 month.

CONCLUSIONS

Implementation of a care planning process is necessary for providing consistent pharmaceutical care and for documenting the outcomes of that care. It is also essential for obtaining compensation for care provided. Care planning captures past and current events occurring in a dynamic patient care process that is provided in response to changing patient needs. This process should be incorporated into the practice of each provider of pharmaceutical care, regardless of the practice setting.

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Appendix A

Sample Pharmaceutical Care Patient Record for Creating a Care Plan

PHARMACEUTICAL CARE PATIENT RECORD			
Patient Name:		**Gender:**	
Address:		**Race:**	
Telephone:	**Age:**	**Actual Weight:**	
Insurance:		**Ideal Weight:**	
Medical Conditions:		**Allergies:**	
Tobacco/Alcohol/Substance Use:		**Adverse Reactions:**	

Medication Record

Start Date	Stop Date	Indication	Drug Name	Actual Strength	Regimen	Clinical Impressions

Assessment, Plan, and Follow-Up Evaluation

Date	Medical Condition	Drug-Therapy Problem	Goal	Current Status	Interventions	Follow-Up Plan

CHAPTER 5

Documentation of Pharmacotherapy Interventions

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If there is no documentation, then it didn't happen! This philosophy is the standard in all health care settings as physicians, nurses, respiratory therapists, physical therapists, social workers, and other health care providers generate and maintain detailed notes regarding the patient's situation and their efforts to achieve the best possible outcomes for the patient. Documentation chronologically outlines the care the patient received and serves as a form of communication among health care practitioners, an important element that contributes to the quality of care provided. Each practitioner involved knows what evaluation has occurred, what the plan for the patient's treatment is, and who will provide it. Furthermore, third-party payers require reasonable documentation from practitioners that assures that the services provided are consistent with the insurance coverage.[1] General components of documentation include:

- A complete and legible record;
- Documentation for each encounter with a rationale for the encounter, physical findings, prior test results, assessment, clinical impression (or diagnosis), and plan for care;
- Identified health risk factors, and an easily inferred rationale for ordering diagnostic tests or ancillary services; and
- The patient's progress, response to and changes in treatment, and revision of the original diagnosis/assessment.

Traditionally, this documentation was paper based. These records are often inaccessible at the point of patient care, not easily transferable or transportable, illegible, poorly organized, and often may be missing key information. Due to these limitations, many academic centers and health care systems have developed and implemented electronic medical records (EMRs). Further, *Crossing the Quality Chasm* was published in 2001 by the Institute of Medicine. This report identified the EMR as a key component to improve access to medical information, facilitate decision support and collection of data, and reduce medical errors.[2] The EMR may also assist in proper documentation, reduce clinical variation, and improve the provision of quality preventative and chronic care.[3–6]

PRINCIPLES OF DOCUMENTATION

Documentation in the record is required to record pertinent facts, findings, and observations about a patient's health history, including past and present illnesses, examinations, tests, treatments, and outcomes. Particularly in an era of evolution of electronic databases,[7] it also facilitates:

- The ability of providers to evaluate and plan the patient's immediate treatment and monitor his/her health care over time;
- Communication and continuity of care among providers involved in the patient's care;
- Accurate and timely claims review and payment;
- Appropriate utilization review and quality of care evaluations;
- Collection of data that may be useful for research and education; and
- Appropriate coding (i.e., CPT [Current Procedural Terminology] and ICD-10-CM [International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Clinical Modification], from the World Health Organization) for use on health insurance claim forms should be supported by documentation in the patient record.

Much of this documentation is derived from a systematic patient care process of evaluation that is standardized within each discipline. For example, physicians are taught to perform a history and physical examination based upon a standardized review of body systems and to document their results using a universally accepted, standardized, systematic process.

Several evaluation/documentation systems have been suggested for health care professionals. More than 30 years ago, the use of a Problem-Oriented Medical Record was proposed[8] and most, if not all, physicians, nurse practitioners, physician associates, and other health care practitioners have been taught to write progress notes using the Subjective, Objective, Assessment, Plan (SOAP) format. The example elements of SOAP are as follows:

S = Subjective: Chief complaint; history of present illness; why the patient is being seen;
O = Objective: Evaluation of the patient, which may include appearance, mood, affect, mental status;
A = Assessment: Analysis or conclusion about the patient's current status/behavior, evidence of progress, response to intervention or medication, and change in functional status;
P = Plan: Interventions or actions taken in response to assessment, collaboration with others, plan for the next session, change in diagnosis, and documentation that the patient was informed of changes in interventions or medications.

Institutional consultant notes often use an abbreviated version of the SOAP format. This abbreviated version usually includes Findings (i.e., subjective and objective information), Assessment (or Impression), and Diagnosis (or Recommendations). In most cases, the EMR has embraced many of the key components of the above formats. EMR documentation is tailored to documenting medical encounters and history and also to maximize billing by meeting requirements established by the federal Centers for Medicare & Medicaid Services. Traditionally this documentation has been performed by dictation and transcription. Most EMRs use templates to accept automated insertion of clinical data and fields with "copy and paste" capabilities, both of which facilitate documentation.

Historically, pharmacy has not had a corresponding standard approach to the evaluation and documentation of the patient's pharmacotherapy that is applicable to all types of pharmacy practice settings. Thus, pharmacy has not been as active as other disciplines in documenting its contributions to patient care.

EVOLUTION OF PHARMACIST-PROVIDED CARE AND THE IMPORTANCE OF DOCUMENTATION

Pharmacist-provided care has gone through a long evolutionary process that, like all evolutionary processes, continues to bring change. Early descriptors such as *clinical pharmacy* continue to hold meaning[9] but have also spawned terms such as *pharmaceutical care* and, most recently, *medication therapy management* (MTM).

PHARMACEUTICAL CARE

Pharmaceutical care uses a process through which a pharmacist cooperates with a patient and other health care professionals in designing, implementing, and monitoring a therapeutic plan that will produce specific therapeutic outcomes for the patient.[10] This process involves three major functions:

1. Identifying potential and actual drug-related problems.
2. Resolving actual drug-related problems.
3. Preventing potential drug-related problems.

These functions aid in the provision of patient care through the identification of medication-related problems, development of a pharmacotherapeutic plan to address the problems, and the ultimate resolution or prevention of those problems.

As described in **Chapter 1**, a systematic approach is used in this casebook to identify and resolve the medication-related problems of patients. The steps can be summarized as follows:

1. Identification of real or potential medication therapy problems.
2. Determination of desired therapeutic outcomes and therapeutic endpoints.
3. Determination of therapeutic alternatives.
4. Design of an optimal pharmacotherapeutic plan for the patient.
5. Identification of parameters to evaluate the outcome.
6. Provision of patient education.
7. Communication and implementation of the pharmacotherapeutic plan.

Step 7 is crucial; the tenets of pharmaceutical care suggest that pharmacists should document, at the very least, the actual or potential drug therapy problems identified, as well as the associated interventions that they desire to implement or have implemented. Pharmacists must adequately communicate their recommendations and actions to non-pharmacy health care practitioners (e.g., physicians, nurses), the patient or caregiver (e.g., parents), or other pharmacists. The goal is to provide a clear, concise record of the actual/potential problem,[11,12] the thought process that led the pharmacist to select an intervention, and the intervention itself. Additionally, the ability to receive remuneration for services provided also necessitates an acceptable documentation strategy.

MEDICATION THERAPY MANAGEMENT

Eleven national pharmacy organizations achieved consensus on a definition of MTM in July 2004.[13] MTM was defined as a distinct service or group of services that optimize therapeutic outcomes for individual patients. MTM services are independent of, but can occur in conjunction with, the provision of a medication product. MTM encompasses a broad range of professional activities and responsibilities within the scope of practice of the licensed pharmacist or other qualified health care providers. These services include but are not limited to the following, according to the individual needs of the patient:

1. Performing or obtaining necessary assessments of the patient's health status;
2. Formulating a medication treatment plan;
3. Selecting, initiating, modifying, or administering medication therapy;
4. Monitoring and evaluating the patient's response to therapy, including safety and effectiveness;
5. Performing a comprehensive medication review to identify, resolve, and prevent medication-related problems, including adverse drug events;
6. Documenting the care delivered and communicating essential information to the patient's other primary care providers;
7. Providing verbal education and training designed to enhance patient understanding and appropriate use of his/her medications;
8. Providing information, support services, and resources designed to enhance patient adherence with his/her therapeutic regimens;
9. Coordinating and integrating MTM services within the broader health care–management services being provided to the patient.

In concert with this definition, patients, providers, payers, and health information technology system vendors have been encouraged to develop a documentation format that meets individual and customer needs.[14] This documentation format, while not a standard, can be useful in achieving the goals of the process. The white paper notes that the pharmacist is responsible for documenting services in a manner appropriate for evaluating patient progress and sufficient for billing purposes, and that the use of core documentation elements will help to create consistency in professional documentation and information sharing among members of the health care team, while facilitating practitioner, organization, or regional variations.[13] Documentation of MTM services includes the following information categories:

- Patient demographics.
- Known allergies, diseases, or conditions.
- A record of all medications, including prescription, nonprescription, herbal, and other dietary supplement products.
- Assessment of medication therapy problems and plans for resolution.
- Therapeutic monitoring performed.
- Interventions or referrals made.
- Education provided to the patient.
- Schedule and plan for follow-up appointment.
- Amount of time spent with the patient.
- Feedback provided to providers or patients.

While the precise format may not be critical at this point, standardization of documentation must and will evolve to provide for clarity in the history and plan, timely feedback, consistent follow-up, and enhanced continuity of care.

TRADITIONAL DOCUMENTATION FORMAT: SOAP NOTES

As noted above, in the SOAP note format subjective (S) and objective (O) data are recorded and then assessed (A) to formulate a plan (P). Subjective data include patient symptoms, things that may be observed about the patient, or information obtained about the patient. By its nature, subjective information is descriptive and generally cannot be confirmed by diagnostic tests or procedures. Much of the subjective information is obtained by speaking with the patient while obtaining the medical history, as described in **Chapter 1** (i.e., chief complaint, history of present illness, past medical history, family history, social history, medications, allergies, and review of systems). Important subjective information may also be obtained by direct interview with the patient after the initial medical history has been performed (e.g., a description of an adverse drug effect, rating of pain severity using standard scales).

A primary source of objective information (O) is the physical examination. Other relevant objective information includes laboratory values, serum drug concentrations (along with the target therapeutic range for each level), and the results of other diagnostic tests (e.g., electrocardiogram [ECG], x-rays, culture and sensitivity tests). Risk factors that may predispose the patient to a particular problem should also be considered for inclusion. The communication note should include only the pertinent positive and negative findings. Pertinent negative findings are signs and symptoms of the disease or problem that are not present in the particular patient being evaluated.

The assessment (A) section outlines what the practitioner thinks the patient's problem is, based upon the subjective and objective information acquired. This assessment often takes the form of a diagnosis or differential diagnosis. This portion of the SOAP note should include all of the reasons for the clinician's assessment. This helps other health care providers reading the note to understand how the clinician arrived at his or her particular assessment of the problem.

The plan (P) may include ordering additional diagnostic tests or initiating, revising, or discontinuing treatment. If the plan includes changes in pharmacotherapy, the rationale for the specific changes recommended should be described. The drug, dose, dosage form, schedule, route of administration, and duration of therapy should be included. The plan should be directed toward achieving a specific, measurable goal or endpoint, which should be clearly stated in the note. The plan should also outline the efficacy and toxicity parameters that will be used to determine whether the desired therapeutic outcome is being achieved and to detect or prevent drug-related adverse events. Ideally, information about the therapy that should be communicated to the patient should also be included in the plan. The plan should be reviewed and referred to in the note as often as necessary.

AN ALTERNATIVE APPROACH TO DOCUMENTING DRUG THERAPY PROBLEMS AND PLANS

There is a pharmacist equivalent of a physician's progress note in a systematized approach for the construction and maintenance of a record reflecting the pharmacist's contributions to care.[15] This process includes provisions for the identification and assessment of actual or potential medication-related problems, description of a therapeutic plan, and appropriate follow-up monitoring of the problems. Although there is no current uniform documentation system for the profession of pharmacy, students are encouraged to try this system as they learn to document patient interventions and compare its effectiveness with the SOAP format. In this system, problems that have been identified are addressed systematically in a pharmacist's note under the headings Findings, Assessment, Resolution, and Monitoring. The sections of the pharmacist's note can be easily recalled with the mnemonic F-A-R-M.

IDENTIFICATION OF DRUG THERAPY PROBLEMS

The first step in the construction of a FARM note is to clearly state the nature of the drug-related problem(s). Each problem in the FARM note should be addressed separately and assigned a sequential number. Understanding the types of problems that may occur facilitates identification of pharmacotherapy problems. Seven types of medication-related problems have been identified (see **Chapter 1**)[16]:

1. Unnecessary drug therapy
2. Needs additional drug therapy
3. Ineffective drug
4. Dosage too low
5. Adverse drug reaction
6. Dosage too high
7. Noncompliance

Use of a classification system such as this for the various types of medication-related problems offers at least two advantages. First, it presents a framework, applicable in any practice setting, to assure that the pharmacist has considered each possible type of problem. Second, categorization allows optimal data analysis and retrieval capabilities. Thus, problems as well as the interventions to resolve them can be stored in a standardized format in a computer. When an analysis of this information is needed at a later date, such as determining how much money was saved through an intervention, how outcomes were improved by the pharmacist, or how many problems of a certain type have occurred, the problems and interventions can be reviewed by groups rather than individually.

DOCUMENTATION OF FINDINGS

Each statement of a drug-related problem should be followed by documentation of the pertinent findings (F) indicating that the problem may (potential) or does (actual) exist. Information included in this section should include a summary of the pertinent information obtained after collection and thorough assessment of the available patient information. Demographic data that may be reported include a patient identifier (e.g., name, initials, or medical record number), age, race (if pertinent), and gender. As noted earlier under the section on SOAP notes, medical information included in the note should include both subjective and objective findings that indicate a drug-related problem.

ASSESSMENT OF PROBLEMS

The assessment (A) section of the FARM note includes the pharmacist's evaluation of the current situation (i.e., the nature, extent, type, and clinical significance of the problem). This part of the note should delineate the thought process that led to the conclusion that a problem did or did not exist and that an active intervention either was or was not necessary. If additional information is required to satisfactorily assess the problem and make recommendations, this data should be stated along with its source (e.g., the patient, pharmacist, physician). The severity or urgency of the problem should be indicated by stating whether the interventions that follow

should be made immediately or within 1 day, 1 week, 1 month, or longer. The desired therapeutic endpoint or outcome should be stated. This may include both short-term goals (e.g., lower blood pressure to <140/90 mm Hg in a patient with primary hypertension [therapeutic endpoint]) and long-term goals (e.g., prevent cardiovascular complications in that patient [therapeutic outcome]).

PROBLEM RESOLUTION

The resolution (R) section should reflect the actions proposed (or already performed) to resolve the drug-related problem based upon the preceding analysis. The note should convey that, after consideration of all appropriate therapeutic options, the option(s) considered to be the most beneficial was either carried out or suggested to someone else (e.g., the physician, patient, or caregiver). Recommendations may include nonpharmacologic therapy, such as dietary modification or assisting devices (e.g., canes, walkers); the rationale for this method of treatment should be described. If pharmacotherapy is recommended, a specific drug, dose, route, schedule, and duration of therapy should be specified. It is not sufficient to simply provide a list of choices for the prescriber. Importantly, the rationale for selecting the particular regimen(s) should be stated. It is reasonable to include alternative regimens that would be satisfactory if the patient is unable to complete treatment with the initial regimen because of adverse effects, allergy, cost, or other reasons. If patient education is recommended, the information that will be included in the session should be described. Conversely, if certain types of information will be withheld from the patient, the reasons for doing so should be stated. If no action is recommended or was taken, that should be documented as well. In this situation, the note serves as a record of the pharmacist's involvement in the patient's care. The pharmacist then has documentation that patient care activities were performed.

MONITORING FOR ENDPOINTS AND OUTCOMES

It is not enough, however, to only provide a clear, concise record of the nature of a problem, the assessment that led to the conclusion that a problem exists, and the selection of a plan for resolution of the problem. In the spirit of pharmaceutical care, the patient must not be abandoned after an intervention has been made. A plan for follow-up monitoring of the patient must be documented and adequately implemented. This process is likely to include questioning the patient, gathering laboratory data, and performing the ongoing physical assessments necessary to determine the effect of the plan that was implemented to assure that it results in an optimal outcome for the patient.

Monitoring parameters to assess efficacy generally include improvement in or resolution of the signs, symptoms, and laboratory abnormalities that were initially assessed. The monitoring parameters used to detect or prevent adverse reactions are determined by the most common and most serious events known to be associated with the therapeutic intervention. Potential adverse reactions should be precisely described along with the method of monitoring. For example, rather than stating "monitor for GI complaints," the recommendation may be to "question the patient about the presence of dyspepsia, diarrhea, or constipation." The frequency, duration, and target endpoint for each monitoring parameter should be identified. The points at which changes in the plan may be warranted should be included. For example, in the case of a patient with dyslipidemia, one may recommend to "obtain fasting high density lipoprotein, low density lipoprotein (LDL), total cholesterol, and triglycerides after 3 months of treatment. If the goal LDL of <100 mg/dL is not achieved with good compliance at 3 months, increase simvastatin to 40 mg by mouth (po) once daily. If goal LDL is achieved, maintain simvastatin 20 mg po once daily and repeat fasting lipoprotein profile annually."

SUMMARY

A SOAP or FARM progress note constructed in the manner described identifies each drug-related problem and states the pharmacist's Findings observed, an Assessment of the findings, the actual or proposed Resolution of the problem based upon the analysis, and the parameters and timing of follow-up Monitoring. Either form of note should provide a clear, concise record of process, activity, and projected follow-up. When written for each medication-related problem, these notes should provide data in a standardized, logical system.

Based upon recommendations from organizations such as the Institute of Medicine, Centers for Medicare & Medicaid Services, and those who focus on the provision of quality of care, EMRs will proliferate and may change the way pharmacists and other health care providers document encounters. Documentation may occur by transcription, voice recognition, or direct provider entry. Although the format of the documentation may not strictly follow the SOAP or FARM format, the common principles of documentation will remain.

SAMPLE CASE PRESENTATION

The following case presentation illustrates how such a system can be used in practice.

HISTORY OF PRESENT ILLNESS

Geraldine Johns is a 70-year-old woman seen Monday morning in clinic for her first visit. She has just moved to town to be near her son following the death of her husband. She has a history of atrial fibrillation, type 2 diabetes, COPD, mild heart failure, and is S/P MI 4 years ago. She lives alone and maintains a good level of activity and self care. Denies pain in legs upon walking. She is maintained on metformin 500 mg po BID, glyburide 10 mg po Q AM, famotidine 20 mg po daily, digoxin 0.125 mg po Q AM, warfarin 5 mg po Q AM, aspirin 81 mg po Q AM, furosemide 80 mg po BID, and metoprolol XL 100 mg po Q AM.

PHYSICAL EXAMINATION

VS

B/P 169/88, P 68 and regular, RR 13, T 99°F; Wt 100 lbs, Ht 5'2"

Skin

No rashes

Cardiac

No murmurs or rubs. (+) S_3 gallop; PMI in the 6th intercostal space 3 cm distal to the midclavicular line

Chest

Slight crackles at the right and left bases; no rales, e-to-a changes or tactile fremitus

Ext

1–2+ pedal edema bilaterally. ABI (ankle brachial index) = 1.02 (negative)

HEENT

Slight AV nicking, otherwise unremarkable

GI, GU, & Neuro

Unremarkable

Laboratory Values Are Unremarkable with the Following Exceptions

INR 3.5
Glucose 198 mg/dL
A_{1c} 11.3%
Serum creatinine 1.3 mg/dL
Digoxin level 1.0 ng/mL

Chest X-Ray

Some diffuse patchiness at the bases. Enlarged cardiac silhouette. Decreased density of the vertebrae consistent with mild osteoporosis.

ECG

Normal sinus rhythm

Medical Assessment

1. Mild to moderate heart failure with pedal edema and slight pulmonary edema on digoxin and metoprolol
2. Type 2 DM, not optimally controlled on metformin and glyburide
3. Hypertension not optimally managed on metoprolol and furosemide
4. Atrial fibrillation, currently controlled on digoxin and metoprolol
5. Possible moderate renal insufficiency; SCr 1.3, estimated CLcr = 28 mL/min (Cockcroft & Gault)
6. Possible dyslipidemia, as suggested by history of MI
7. Osteoporosis suggested by chest radiographs
8. COPD requiring no additional intervention at this time
9. S/P MI, on aspirin; lipid status unknown

CONSTRUCTION OF A SOAP OR FARM NOTE

Note: The Subjective and Objective findings of the SOAP note are combined into Findings for a FARM note. The Plan of the SOAP note is split into Recommendations/Resolution and Monitoring/Follow-Up in the FARM note.

Findings

Subjective 70-year-old woman recently moved here after the death of her husband. Patient complains of slight shortness of breath when walking up stairs and long distances. She voices no other complaints. She has a history of atrial fibrillation, type 2 diabetes, COPD, mild heart failure, and is S/P MI 4 years ago. She lives alone and maintains a good level of activity and self care. She is maintained on metformin 500 mg po BID, glyburide 10 mg po Q AM, famotidine 20 mg po daily, digoxin 0.125 mg po Q AM, warfarin 5 mg po Q AM, aspirin 81 mg po Q AM, furosemide 80 mg po BID, and metoprolol XL 100 mg po Q AM. She states that she takes her medications as prescribed, but she has some difficulty describing precisely how she takes them and is not quite certain what each medication does for her.

Objective

VS: BP 169/88, P 68 and regular, RR 13, T 99°F; Wt 100 lb, Ht 5'2"
Cardiac: S_3 gallop, PMI in the 6th intercostal space 3 cm distal to the midclavicular line
Chest: Slight crackles at the right and left bases
Extremities: 1–2+ pedal edema bilaterally, ABI negative
HEENT: Slight AV nicking, otherwise unremarkable
Medications:
- Metformin 500 mg po BID
- Glyburide 10 mg po Q AM
- Famotidine 20 mg po daily
- Digoxin 0.125 mg po Q AM
- Warfarin 5 mg po Q AM
- Aspirin 81 mg po Q AM
- Furosemide 80 mg po BID
- Metoprolol XL 100 mg po Q AM

Labs:
- INR 3.5
- Glucose 198 mg/dL
- A_{1c} 11.3%
- Serum creatinine 1.3 mg/dL
- Serum digoxin level 1.0 ng/mL

Chest X-Ray: Some diffuse patchiness at the bases. Enlarged cardiac silhouette. Decreased density of the vertebrae consistent with mild osteoporosis.
ECG: NSR

Assessment

1. Possible nonadherence/concordance and lack of knowledge about medications.
2. Mild to moderate heart failure as suggested by pedal edema, DOE, and cardiomegaly on chest x-ray. Maintained on a β-blocker and is not currently prescribed an ACE inhibitor.
3. Type 2 diabetes mellitus, not optimally controlled on metformin and glyburide; A_{1c} above goal of <7%. Not prescribed either an ACE inhibitor or an ARB for renal protective effects.
4. Hypertension, not optimally controlled on metoprolol, as suggested by increased BP, elevated serum creatinine, and AV nicking. The renal and ophthalmic findings are suggestive of significant, sustained hypertension. Repeated measurements will be necessary to confirm this assessment.
5. Atrial fibrillation
   a. Rate control: Rate currently under control with metoprolol and digoxin. No adjustment indicated.
   b. Anticoagulation: INR above target range of 2.0–3.0, without clinical complications at this time. No cause could be identified, although a change in diet associated with recent life events is suspected.
6. Possible moderate renal insufficiency as indicated by increased SCr. Renal dose adjustments may be necessary.
7. S/P MI on aspirin.
8. Possible dyslipidemia as suggested by history of MI.
9. R/O osteoporosis: Chest radiography suggestive of osteoporosis. Her petite frame and age are consistent with postmenopausal osteoporosis.

10. COPD: Mild DOE may suggest that the COPD is contributing to the heart failure symptoms. COPD appears to be an untreated indication.
11. Adverse medication effects: Although metoprolol may be considered appropriate for both the post-MI and CHF indications and is a β_1-selective β-blocker, its β_2-blocking properties (usually at higher doses) may contribute to worsening COPD and/or CHF due to bronchoconstriction, negative inotropic effects, or both.
12. Medication without indication (famotidine): On further questioning, the patient recalls being started on it while hospitalized for MI 4 years ago. She was given a prescription for it when she left the hospital. She has no complaints related to GERD or PUD. No need for famotidine can be identified.

Plan (Recommendations/Resolution)

1. Assess and reinforce adherence/concordance with recommended therapy. Educate on purpose of each medication.
2. Mild to moderate heart failure: Continue both the β-blocker metoprolol and digoxin, pending evaluation by the Cardiology Service to determine appropriateness. Suggest initiation of an ACE inhibitor at low doses and increasing furosemide to 100 mg po BID until her return next week because of persistent pedal and pulmonary edema. No added dietary salt. May consider adding spironolactone at next visit.
3. Type 2 diabetes mellitus:
   a. Medication: Suggest initiation of an ACEI (as above) per current ADA guidelines. Suggest changing glyburide 10 mg to glipizide XL 10 mg po daily to improve control and enhance compliance/concordance. Continue to follow blood glucose readings and, if indicated, may supplement glyburide with insulin lispro for elevated pre-meal BG, based upon an estimated insulin sensitivity of 1 unit per 30 to 40 mg/dL:

If blood glucose:	Give insulin lispro:
180 mg/dL	2 units
220	3 units
260	4 units
300	5 units
340	6 units, and test for urinary ketones. Call PCP if ketones are moderate or large.

   b. Diet: Suggest 3 meals and bedtime snack, with no concentrated carbohydrate (CHO) choices. Limit CHO intake per meal to 60 g; snacks 15–20 g CHO. No added salt. Check blood glucose AC and HS.
4. Hypertension: Suggest initiation of an ACEI (as above), started at low doses. If repeated measurements confirm the diagnosis of hypertension, they may be titrated to maintain blood pressure control. Blood pressure goal is <130/80 mm Hg in patients with diabetes. Currently, the patient is stage 2, ≥160/100 mm Hg.
5. Atrial fibrillation:
   a. Rate control: Suggest continuing metoprolol and digoxin unless Cardiology suggests otherwise. No adjustment indicated at this time.
   b. Anticoagulation: INR is above target range of 2.0–3.0. Recommend warfarin 2.5 mg today and then resume 5 mg po daily; dose to be adjusted as needed to maintain INR between 2.0 and 3.0.
6. Renal insufficiency: Suggest hydration regimen and repeat serum creatinine. No medication dosage adjustments are indicated currently.
7. S/P MI: Recommend continuation of aspirin 81 mg po Q AM. Suggest initiation of ACEI/ARB as noted above, and a statin (e.g., pravastatin 10 mg po at bedtime). Continue metoprolol, if acceptable to Cardiology.
8. Possible dyslipidemia: Treat based upon lipid panel; goal LDL is <100 mg/dL in patient with existing CAD or diabetes; this patient has both.
9. Possible osteoporosis: If DXA scan indicates osteoporosis, begin a bisphosphonate (e.g., alendronate 70 mg po weekly) and calcium 1,500 mg daily.
10. COPD: COPD appears to be an untreated indication. Suggest initiation of ipratropium 2 puffs QID.
11. Adverse medication effects: As noted above, will await Cardiology opinion on need for/appropriateness of β-blocker and digoxin to manage CHF.
12. Medication without indication: Suggest discontinuation of famotidine.

Monitoring/Follow-Up

1. RTC in 1 week.
2. Prior to RTC:
   a. Laboratory (slips given)
      i. Baseline electrolytes (K, Na, Ca, and Mg levels in light of unopposed furosemide therapy of unknown duration and use of digoxin) today
      ii. Serum creatinine today
      iii. Fasting lipid panel next week prior to RTC
      iv. INR next week prior to RTC
   b. DXA scan. Patient referred to Jones Pharmacy.
   c. Cardiology education. Appointment made with Dr. Welford's office.
3. Patient instructed to monitor blood glucose AC and HS and bring information on RTC.
4. Prescribed medication after this visit:
   a. Enalapril 5 mg po daily for CHF, hypertension, and type 2 DM
   b. Metformin 500 mg po BID for type 2 DM
   c. Glipizide XL 10 mg po daily for type 2 DM substituted for glyburide 10 mg po Q AM
   d. Lispro, as indicated
   e. Digoxin 0.125 mg po Q AM for CHF and rate control
   f. Furosemide 100 mg po BID for CHF
   g. Warfarin 5 mg po Q AM for S/P MI and CVA prevention
   h. Aspirin 81 mg po daily for S/P MI
   i. Metoprolol XL 100 mg po Q AM for S/P MI and rate control
   j. Pravastatin 10 mg po at bedtime for hyperlipidemia
   k. Ipratropium 2 puffs QID for COPD, and
   l. D/C Famotidine 20 mg po BID.

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