The Medical Record

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LEARNING OBJECTIVES

- Explain the importance of being proficient in navigating a patient's medical record.
- Outline the general components of a patient medical record.
- Describe paper-based and electronic medical records.
- Describe a systematic method for collecting information from a patient's medical record for the purpose of developing an assessment and plan.
- Identify and define key pharmacy-related components within a patient's medical history and physical examination.
- Synthesize patient information to develop a comprehensive problem list, including drug-related problems.

KEY TERMS

- Drug-related problems
- History and physical (H&P)
- Problem list

INTRODUCTION

As pharmacists continue to increase their involvement in patient care activities, their ability to navigate the often murky waters of the medical record becomes even more crucial. Locating vital pieces of information is critical to developing an appropriate assessment and plan for the individual patient. Additionally, collecting

this data in a systematic way will permit the pharmacist to then synthesize it and create a comprehensive list of healthcare needs and considerations for the patient, regardless of the practice setting.

IMPORTANCE OF PROFICIENCY IN NAVIGATING THE PATIENT'S MEDICAL RECORD

It can be extremely overwhelming to think about the vast quantities of medical information every person has accumulated over a lifetime. Even the amount of documentation required during a hospital stay can be quite lengthy, which can make it difficult to locate specific data critical to drug therapy selection and assessment of patient response. Compounding these issues is the fact that every institution and clinic has a different method for organizing patients' medical information.

Because most encounters with patients occur over more than one point in time, the use of a medical record facilitates the documentation of all data collected over time. In both the hospital and clinic settings, the medical record takes the form of a patient chart composed of printed materials in a folder or binder (paper-based chart) or within a computer system (electronic medical record), or a combination of the two. Regardless of the system used by an institution or clinic, the general order of the medical record is similar, as shown in **Table 2.1**. Depending upon the individual patient's characteristics, the inpatient medical record can be quite lengthy, especially when there are numerous comorbidities or complications that require a long hospitalization. Similarly, the outpatient medical record can become extensive when a patient has had numerous encounters with the practitioner over many years' time. Developing familiarity with where to find vital pieces of information makes the development of an assessment and plan more efficient and effective. The first step is understanding the contents contained within each component of the medical record.

COMPONENTS OF A PATIENT'S MEDICAL RECORD

The medical record can be dissected into five primary components, including the medical history (often known as the **history and physical**, or **H&P**), laboratory and diagnostic test results, the problem list, clinical notes, and treatment notes.[1,2] Subheadings for each component are located in Table 2.1. It is important to note that although physicians and other prescribers may use this format as a method for their documentation pharmacists may use different formats for their own records.

TABLE 2.1   Components of a Patient's Medical Record

Medical history (also known as history and physical, or H&P)

- Patient demographics
- Chief complaint (CC)
- History of present illness (HPI)
- Past medical history (PMH)
- Family history (FH)
- Social history (SH)
- Allergies
- Medication history
- Review of systems (ROS)
- Physical examination (PE)

Laboratory test results

Diagnostic test results

Problem list

Clinical notes

- Progress notes
- Consultation notes
- Off-service notes/transfer notes
- Discharge summary

Treatment notes

- Medication orders
- Surgical procedure documentation
- Radiation treatments
- Notes from ancillary practitioners

Medical History

The medical history, or H&P, includes the following components:

- **Patient demographics.** This section includes the patient's name, birth date, address, phone number, gender, race, and marital status and the name of the attending physician. This section may also include the patient's insurance information, pharmacy name and phone number, and religious preference.
- **Chief complaint (CC).** The chief complaint is the primary reason the patient is presenting for care. Often expressed using the patient's own words, it includes the symptoms the patient is currently experiencing. At times the CC is not really a "complaint" at all; the patient may be presenting to the pharmacy to have a prescription filled or may be coming to the clinic for an annual physical exam.
- **History of present illness (HPI).** The history of present illness expands upon the CC, filling in the details regarding the issue at hand. The HPI is typically documented in chronological order, describing the patient's symptoms in detail as well as documenting related information regarding previous treatment for the CC, previous diagnostic test results, and pertinent family and social history. Additionally, pertinent negative findings are located in the HPI; these include symptoms the patient is not currently experiencing that provide more information on the case (e.g., a patient presenting with vomiting who notes that he does not have abdominal discomfort).
- **Past medical history (PMH).** The past medical history includes a list of past and current medical conditions. Past surgical history (PSH) is often included within the PMH, as are previous hospitalizations, trauma, and obstetrical history (for female patients).
- **Family history (FH).** The family history includes descriptions of the age, status (dead or alive), and presence or absence of chronic medical conditions in the patient's parents, siblings, and children.
- **Social history (SH).** This section includes a large amount of information regarding the patient's lifestyle and personal characteristics, including the patient's use of alcohol, tobacco, and illicit drug use, each documented as type, amount, frequency, and duration of use. The social history also includes descriptions of the patient's dietary habits, exercise routine, and use of caffeine as well as years of education, occupation, marital status, number of children, sexual practices and preferences, military history, and current living conditions.

- **Allergies**. Although some H&Ps include allergy information in a general "medication history" section, many medical records provide a separate heading to denote any history of allergic reactions a patient has had to medications, foods, vaccines, stings, and contrast media, as well as what type of hypersensitivity reaction occurs when a patient is exposed to the agent, including rash, hives, or anaphylaxis.
- **Medication history.** Information regarding the patient's current medication list may be found in several areas of the inpatient chart, including a resident's initial H&P, the medication reconciliation form, and nursing intake notes. Reviewing each of these areas may be necessary to gather a complete list of current medications (prescription, nonprescription, and complementary and alternative medicines), dosages, frequency of administration, duration of therapy, reason for taking, and adherence.
- **Review of systems (ROS).** The review of systems portion of the H&P provides information regarding the subjective feelings, or symptoms, the patient is experiencing. Conducted in head-to-toe order, positive findings and pertinent negative responses are documented overall and for each organ system. This information is in addition to those ROS located within the CC and the HPI. The usual order of ROS is provided in **Table 2.2**.
- **Physical examination (PE).** The physical examination contains objective information obtained from the practitioner's examination of the patient. As mentioned previously, subjective information is typically excluded from the PE, allowing for inclusion of information gathered by the practitioner upon observing and touching the patient. Like the ROS, the PE is documented in a head-to-toe format, permitting straightforward review of all organ systems. One of the most common sequences is listed in **Table 2.3**.

Laboratory Test Results

Initial laboratory results are documented following the initial H&P. Most patients will have a basic metabolic panel and complete blood count (CBC) in addition to other parameters specific to their diagnosis and medical conditions, including, but not limited to, cardiac enzymes, serum drug concentrations, international normalized ratio (INR), liver function tests, and cultures of blood or other body fluids. Calculated values, such as anion gap and creatinine clearance, are also documented in this section.

Computer systems are commonly used to collect and manage laboratory test results. Occasionally, results may be printed and placed in the paper medical chart;

TABLE 2.2 Order and Contents of Review of Systems	
Body System	**Examples of Contents**
General	Overall feelings of wellness, weight gain or loss, fever, chills, night sweats, fatigue, weakness
Skin	Changes in color, dryness, hair loss, rashes, pruritis, bruising, bleeding
Head	Headaches, trauma, syncope
Eyes	Change in vision (blurry vision, double vision, floaters), trauma, use of corrective lenses
Ears	Change in hearing, tinnitus, vertigo, pain
Nose	Discharge, stuffiness, epistaxis
Mouth	Soreness, gum bleeding, issues with teeth
Throat	Difficulty swallowing, painful swallowing, change in voice
Neck	Pain, stiffness, swelling, lumps
Respiratory system	Shortness of breath, dyspnea, wheezing, cough (dry vs. productive), orthopnea, hemoptysis
Cardiovascular system	Chest pain, palpitations
Gastrointestinal system	Nausea, vomiting, constipation, diarrhea, abdominal pain, hematemesis, melena, hematochezia, jaundice
Genitourinary system	Urinary frequency, urgency, hesitancy, dysuria, hematuria, incontinence, pain
	Females: Vaginal discharge, discomfort, itching, character of menstrual periods, contraceptive method
	Males: Erectile dysfunction, lesions, contraceptive method
Nervous system	Seizures, tremors, weakness, altered sensations, difficulties in speech, incoordination
Musculoskeletal system	Pain, trauma, tenderness, swelling, decreased range of motion
Neuropsychiatric system	Changes in mood (anxiety, depression), changes in memory, difficulty sleeping, difficulty concentrating
Endocrine system	Polyuria, polydipsia, polyphagia, intolerance to heat or cold
Peripheral vascular system	Varicose veins, leg cramping, edema

TABLE 2.3   Sequence of the Physical Examination
• Vital signs
• General appearance
• Head, eyes, ears, nose, and throat (HEENT)
• Neck
• Chest (lungs and breasts)
• Heart
• Abdomen
• Genitourinary system
• Rectal examination
• Extremities
• Lymph nodes
• Neurologic examination
• Skin

however, the most current and complete results are usually located in a computer database. Additionally, practitioners' H&Ps may include documentation of initial lab results. However, it is important to view the actual results for oneself, because it is easy for an error in transcription to occur. Similarly, practitioners may omit some results from the H&P documentation for the sake of brevity; again, viewing actual results on a computer system will permit a complete review of data.

Diagnostic Test Results

Initial results of diagnostic testing are documented within the H&P as well. Such results may include electrocardiograms, echocardiograms, ultrasounds, computed tomography (CT) scans, magnetic resonance imaging (MRI) scans, x-rays, and so on. Because these tests require interpretation, often by a separate physician (e.g., radiologist, cardiologist), dictations of their results are often available on a computer system and/or may be printed for placement in the paper chart.

Problem List

The **problem list** notes, in decreasing order of priority, the issues that require management in the individual patient. The number one need on the list is the working diagnosis that matches the signs and symptoms with which the patient has presented. For example, a patient presenting with chest pain who is diagnosed with a ST segment elevation myocardial infarction will have "STEMI" listed as the healthcare need of highest priority on the list. Alternatively, a patient presenting to a community pharmacy with a prescription for an antihypertensive medication for newly diagnosed hypertension may have "initial treatment for HTN" as the number one need on the list. Subsequent healthcare needs or problems are listed in descending order of priority or severity; these typically include chronic medical conditions contained within the PMH, abuse of substances noted in the social history, drug-related problems identified with current or past medications, laboratory or diagnostic test abnormalities identified upon admission, and so on.

Numerous practitioners will document problem lists within the medical record. For an inpatient, the admitting practitioner, nurse, pharmacist, nutritionist, respiratory therapist, and physical therapist may each have their own prioritized list of needs within the chart, overlapping in some ways and unique in others. From these, it is possible to create a comprehensive list that addresses all of the issues at hand. For an outpatient, the attending practitioner may develop a list at the end of his or her note, addressing those issues of highest priority. For both inpatients and outpatients, practitioners will often document their plans for each need, including a differential diagnosis, treatments being considered or administered, and a plan for patient education.

Regardless of location, it is important to note that the problem list is *dynamic*. It can change from day to day for an inpatient or from visit to visit for an outpatient. This is anticipated because patients' diagnoses and individual characteristics can change quickly, especially in the acute setting. Later in this chapter we will review how to develop a comprehensive problem list that includes drug-related problems.

Clinical Notes

The inpatient paper chart often gets thick with the many types of clinical notes written by the numerous practitioners caring for the patient. The resident and attending physician will write daily progress notes that document an updated and abbreviated H&P, problem list, and plan. Other specialists (e.g., cardiologist, gastroenterologist) will also document their findings in daily progress notes following their initial consultation notes. For example, a patient with a history of atrial fibrillation and coronary

artery disease may have a cardiologist following his case; the impressions of this specialist are communicated to the patient care team via daily progress notes focusing on the patient's cardiac issues.

Nurses maintain their own clinical notes within the computer system or on a bedside chart. Often these include documentation of vital signs, pain assessments, patient activities (e.g., out of bed to chair, bathroom visits), and quantity of fluid a patient ingests and excretes (e.g., ins and outs). Additionally, if there is a change in care, such as movement from the intensive care unit (ICU) to the general medical floor, transfer notes are written by the physicians and nurses to smooth the transition between care teams. Similarly, if a practitioner is no longer going to care for a patient, for example, due to a vacation or time away from the hospital, he or she will write an off-service note to assist the successor practitioner in the transition of care. All of these notes are useful summaries of the diagnostic methods used and treatment provided prior to the occurrence of the transfer.

Lastly, a discharge summary provides a snapshot of the patient's hospital course, including a healthcare needs list and treatments provided, as well as a plan for future follow-up and a list of discharge medications. This is combined with discharge paperwork from the nursing and pharmacy staff that includes educational information provided to the patient, such as medication leaflets and postdischarge instructions (e.g., wound care directions, date of follow-up appointment with primary care physician).

Outpatient medical records typically include notes from all office visits. Additionally, any clinical notes from hospitalizations are often copied and placed in the paper chart or are scanned and placed in the electronic medical record to permit continuity of care.

Treatment Notes

Treatment notes are utilized most frequently in the inpatient setting. Treatment notes include medication orders, medication administration records (MARs), documentation of surgical procedures, and documentation of services such as radiation therapy, physical therapy, occupational therapy, respiratory therapy, and nutrition. All of these areas of the chart are important to review, because each provides details regarding the execution of the patient's treatment plan. Medication orders can be transcribed by the practitioner onto a paper order form; these can then be faxed, scanned, or copied and sent to the pharmacy for processing and filling. Alternatively, the practitioner may enter the medication orders directly into the computer system using computerized prescriber order entry (CPOE, discussed below); the orders are then reviewed and

processed by the pharmacist. The orders section of the chart may also contain orders from other practitioners, including physical and occupational therapists, respiratory therapists, and nutritionists. Rationale for these orders can be found in the treatment notes section for each of these practitioners. This provides insight as to the patient's entire problem list, because these practitioners play important roles in managing various healthcare needs on the individual patient's list.

Medication administration by nurses and other practitioners (e.g., respiratory therapists, physical therapists) is documented via MARs. These can be paper-based or electronic (eMAR) and permit one to view the dates and times of all medications administered to the patient as well as documentation of missing or refused doses.

Electronic and Paper-Based Data Collection Systems

Records of patient information, including the official medical record, can exist in either electronic or paper-based formats, or a combination of both. Regardless of the format an institution is using, the types of patient data and documentation available typically include the components that have been described previously in this chapter. As technology continues to advance in the healthcare arena, the capabilities of electronic medical record formats continue to expand, including providing improved accessibility of patient data via handheld mobile devices.

Electronic medical record systems vary by vendor and institution and can include the components described previously. As with paper-based formats, the Health Insurance Portability and Accountability Act (HIPAA) Security Rule encompasses protected health information stored in electronic formats; this requires healthcare organizations to ensure the confidentiality and security of this information.[3] CPOE technology allows the provider to enter an order for a patient; the order can then be viewed and confirmed in the same or a related electronic system. For example, a physician could input a medication order for a specific patient into an electronic system and then the order could be communicated electronically to the pharmacist. **Figure 2.1** shows an example of a computer screenshot from current CPOE technology. With this system, each of the patient's providers can view the patient's current medications, as well as any discontinued medications. This process may help to reduce or eliminate errors that are associated with paper-based systems, including errors attributable to poor provider handwriting.[4] Additionally, decision-support tools embedded within the electronic system may offer additional assistance to providers. Often, the computerized system that houses the CPOE includes additional files within a patient's medical record to support electronic filing of dictated patient care notes, radiologic and laboratory data, and more. An example of
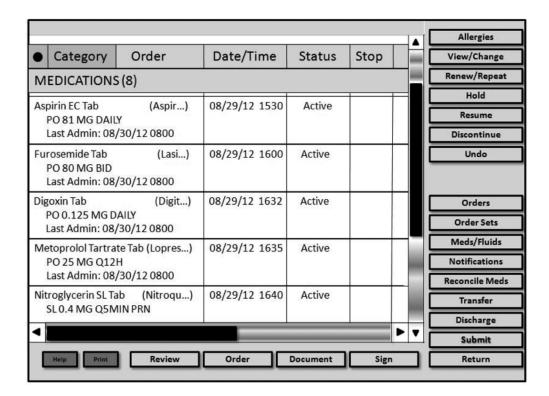
●	Category	Order	Date/Time	Status	Stop	
	MEDICATIONS (8)					
	Aspirin EC Tab (Aspir...) PO 81 MG DAILY Last Admin: 08/30/12 0800		08/29/12 1530	Active		
	Furosemide Tab (Lasi...) PO 80 MG BID Last Admin: 08/30/12 0800		08/29/12 1600	Active		
	Digoxin Tab (Digit...) PO 0.125 MG DAILY Last Admin: 08/30/12 0800		08/29/12 1632	Active		
	Metoprolol Tartrate Tab (Lopres...) PO 25 MG Q12H Last Admin: 08/30/12 0800		08/29/12 1635	Active		
	Nitroglycerin SL Tab (Nitroqu...) SL 0.4 MG Q5MIN PRN		08/29/12 1640	Active		

Side buttons: Allergies | View/Change | Renew/Repeat | Hold | Resume | Discontinue | Undo | Orders | Order Sets | Meds/Fluids | Notifications | Reconcile Meds | Transfer | Discharge | Submit | Return

Bottom buttons: Help | Print | Review | Order | Document | Sign

FIGURE 2.1   Example of a computerized prescriber order entry (CPOE) system.

electronic laboratory result data is shown in **Figure 2.2**. It is important to note that although an institution may utilize an electronic system, not all of the data available in that institution may be recorded electronically; data that are only recorded in paper format despite the presence of an electronic system should be identified.

In addition to maintaining the patient's permanent record, inpatient systems may record medications as they are administered to the patient, thereby maintaining an interactive patient eMAR. **Figure 2.3** presents a screenshot of a sample eMAR. In the outpatient setting, similar technologies can facilitate sharing of patient and electronic transfers of medication prescription requests. For example, prescription requests, along with supportive data, may be transferred electronically to a pharmacy. Limitations to implementation of such software in healthcare institutions tend to include cost, workflow support, training, and organizational factors.[5] Paper-based records should offer the same data recorded as the electronic medical record.

Patients are permitted to receive copies of their medical records, but the procedures for this must be set forth by the healthcare institution in accordance with state
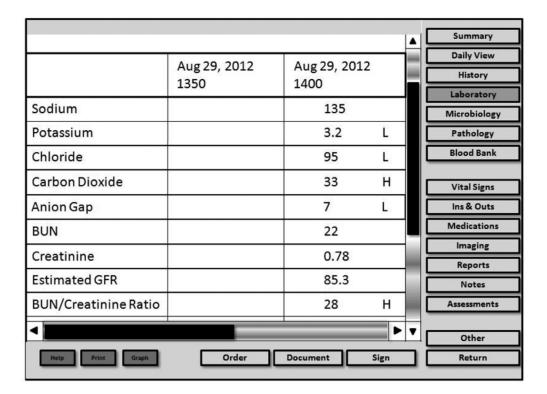
	Aug 29, 2012 1350	Aug 29, 2012 1400	
Sodium		135	
Potassium		3.2	L
Chloride		95	L
Carbon Dioxide		33	H
Anion Gap		7	L
BUN		22	
Creatinine		0.78	
Estimated GFR		85.3	
BUN/Creatinine Ratio		28	H

Summary
Daily View
History
Laboratory
Microbiology
Pathology
Blood Bank

Vital Signs
Ins & Outs
Medications
Imaging
Reports
Notes
Assessments

Other
Return

Help   Print   Graph   Order   Document   Sign

FIGURE 2.2   Example of laboratory data stored in an electronic system.

and federal law. Typically, patients can review their medical record in the medical records department of the institution or receive results of laboratory and diagnostic testing from their physician.[3]

Pharmacists can follow a number of steps to prevent improper disclosure of medical information, thereby preventing legal consequences and fines:

- Providers should keep clipboards and folders containing patient information with them at all times and/or in a secure area (e.g., in a locked file in the pharmacy department).
- Providers should follow the institution's policies for retaining and discarding health information. This may involve storage of information in locked cabinets and shredding materials when they are no longer needed.
- Providers should sign off of the computer system when they are finished using it. Applications with patient information should never be left open, even if the provider just gets up for a minute to answer a phone or to use the restroom.
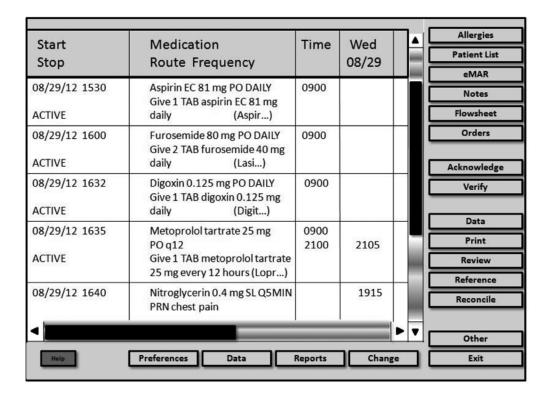
Start Stop	Medication Route Frequency	Time	Wed 08/29
08/29/12 1530 ACTIVE	Aspirin EC 81 mg PO DAILY Give 1 TAB aspirin EC 81 mg daily (Aspir...)	0900	
08/29/12 1600 ACTIVE	Furosemide 80 mg PO DAILY Give 2 TAB furosemide 40 mg daily (Lasi...)	0900	
08/29/12 1632 ACTIVE	Digoxin 0.125 mg PO DAILY Give 1 TAB digoxin 0.125 mg daily (Digit...)	0900	
08/29/12 1635 ACTIVE	Metoprolol tartrate 25 mg PO q12 Give 1 TAB metoprolol tartrate 25 mg every 12 hours (Lopr...)	0900 2100	2105
08/29/12 1640	Nitroglycerin 0.4 mg SL Q5MIN PRN chest pain		1915

Side buttons: Allergies, Patient List, eMAR, Notes, Flowsheet, Orders, Acknowledge, Verify, Data, Print, Review, Reference, Reconcile, Other, Exit

Bottom buttons: Help, Preferences, Data, Reports, Change

FIGURE 2.3   Example of an electronic medication administration record (eMAR).

SYSTEMATIC APPROACH TO DATA COLLECTION

Considering the often large amount of data available in the patient's medical record, pharmacists must use a systematic approach to review patient data. This process involves reviewing pertinent and timely components of the patient's medical record, the MAR, and other relevant data, and then compiling this data. Data may be transcribed onto a written or electronic data collection form and can be used by the pharmacist to maintain an accurate, consistent, and organized view of the patient for the purposes of developing a focused pharmacy-related assessment and plan of care.

Data are often streamlined to make it easier to provide pharmaceutical care to the patient; however, the data must be comprehensive enough to ensure that the pharmacist maintains a complete understanding of the patient. Data may be focused on a single visit in the outpatient or urgent care setting or on a single day or visit during an inpatient hospital stay and then updated daily. A systematic data collection process can help the pharmacist stay organized from patient to patient, day to day.

Data collection methods may vary between pharmacists or clinical sites; however, they share the common goal of allowing a consistent review of a single patient or multiple patients at once. This approach usually involves the use of a paper-based or electronic form that has enough space to include all of the relevant material that the pharmacist may need to collect. These forms are often developed or tailored to meet the needs of a specific pharmacist with a designated set of patient care responsibilities and may be formatted to mirror the order in which the pharmacist will either collect or interpret the data.

The benefits of a systematic approach are numerous. First, it allows the pharmacist to routinely organize information pertinent to the pharmaceutical care of the patient in a consistent manner. Second, systematic data collection allows the pharmacist to maintain a process during which potential drug-related problems may be evaluated. Third, this approach allows for ease of patient care "pass-off" should the pharmacist transfer care of a patient to another pharmacist. Additionally, the pharmacist's collected data may become a resource for reporting on patient care during rounds, facilitating discussion with other healthcare practitioners, or documenting clinical interventions.

Initiating the Systematic Approach to Data Collection

A primary goal of systematically collecting data from the patient record should be to keep the process simple yet relevant and comprehensive enough for a pharmacist's needs. A key in this process is not to overcollect data because it is available, but to be sure that there is a use and a reason for each type of data being collected. Because this may become a routine activity as a part of patient care, efficiency and consistency in collection of data become important. For example, a pharmacist may have many patients under his or her immediate care and may need to review data on each of these patients.

Timing of patient data collection usually follows a three-point approach: a preencounter assessment, a mid-encounter assessment, and a postencounter assessment. Regardless of the setting, the role of the pharmacist in the preencounter assessment is often to gather data relevant to the care of the patient for a given task (e.g., clinic visit, patient care rounds), and this is typically conducted prior to meeting with the patient or provider team. Data can then be updated or augmented during the mid-assessment encounter with the patient based on additional findings or the patient interview. Finally, monitoring and follow-up of new or changed data should occur, and the data collection form updated accordingly in the postencounter assessment.

Types of Systematic Data Collection Forms

As discussed previously, data collection forms are often individualized to a given pharmacist or role in a clinical setting. An example of a data collection form is shown in **Figure 2.4**; however, this form serves only as a starting point to demonstrate that forms may be customized and include space for data. Individual forms will be tailored to meet the needs of the practitioner and will vary based on the practitioner or situation. Data on the form that is not within the scope of practice for the pharmacist to obtain may be collected from the medical record, as described previously.

Age:	Weight:	Height:	Allergies:
Chief complaint:			
History of present illness:			
Past medical history:			
Family history:		Social history:	
Home medication and dose:	Route:	Frequency:	Last dose (date/time):
Physical exam:			
ROS:			
Laboratory data and serum concentrations:			
Current medication and dose:	Route:	Frequency:	Indication:
Problem list:		Patient plan:	

FIGURE 2.4   Sample pharmacist data collection form.

Data collection forms are heavily influenced by the manner in which the pharmacist is likely to assess the patient; therefore, the format and data vary based on the type of practice setting or provider service. Several factors may play a guiding role in the decision to use a particular type of data collection form, including the clinical setting (e.g., inpatient or outpatient), the role of the patient care team (e.g., primary team or consult service), or the specific task presented to the pharmacist (e.g., assessment of a focused problem or a generalized workup of the patient). Regardless of the nuances among data collection forms, applying a systematic method of data collection from a patient's medical record is key to ensuring consistency in the approach, assessment, and plan for each patient.

PHARMACY-RELATED COMPONENTS OF THE PATIENT MEDICAL RECORD

A critical skill for the efficient pharmacist is to review the data with several key pharmacy-related aspects in mind; this will permit concise data collection while providing the pharmacist with adequate information to develop recommendations to optimize pharmacotherapy. Depending upon the patient care responsibilities of the individual pharmacist, the pertinent pharmacy-related components of a patient's chart may vary. For example, an infectious diseases clinical pharmacist may dive right into the chart to seek out antibiotic orders and laboratory data for serum drug concentrations and renal function assessments, whereas a cardiology pharmacy specialist may initially search for blood pressure values from the physical examination in order to assess the effectiveness of a patient's antihypertensive drug regimen. Regardless of specialty or focus, several general pharmacy-related components are contained within each portion of the medical record.

Medical History

The medical history (H&P) is a key area for identifying drug-related problems, which will be discussed at length in the final section of this chapter. Thus, the majority of information contained within the H&P is valuable in developing an assessment and plan for interventions to optimize pharmacotherapy. The pharmacist may find data lacking in some areas, which will require clarification via additional patient interviewing. For example, a patient's chart may indicate an allergy to penicillin, but the specific reaction not be identified. The pharmacist can then question the patient to obtain and document this important piece of information. Similarly, components of the medication history may not be complete. For example, the H&P may note a medication list without doses or frequency of administration. The pharmacist can question the patient

and even contact the patient's pharmacy to obtain this information for documentation in the chart and on the pharmacist's data collection form.

Additionally, physical findings may be germane to assessing the patient's response to medications that are either missing or not documented in the chart. These require the pharmacist to perform the appropriate assessment technique to obtain and document the finding. For example, the physical examination of a patient who presents to the hospital with nausea and vomiting resulting from phenytoin toxicity should note the presence or absence of nystagmus, a finding associated with supratherapeutic serum concentrations of the drug. If this information is not found in the medical record, the pharmacist should perform the appropriate assessment (in this case, the H test to assess for nystagmus) and document the finding accordingly.

Throughout the H&P, the pharmacist can identify pertinent positive and negative components that are key to the development of an assessment and plan. This becomes especially important when gathering data from the HPI, ROS, and PE. The importance of pertinent positives can be easily rationalized, while pertinent negatives are not so obvious. For example, if the family history of a 39-year-old man presenting to the emergency department with a myocardial infarction indicates no family history of coronary artery disease, it is a pertinent negative fact to note on the data collection form, because it might be expected that someone in the patient's family would have preexisting cardiac disease. Another example would be a patient presenting with pneumonia who has no shortness of breath (SOB). The pharmacist should document "no SOB" in the ROS of this patient, because it is a pertinent finding for this patient. A large majority of the H&P is relevant to the pharmacist's data collection.

Laboratory and Diagnostic Test Results

In the lab section, pharmacists can focus on a number of pharmacy-related data points, including labs reflecting effects of disease states and medications on organ systems (e.g., serum creatinine, liver function tests, CBC, urinalysis), serum drug concentrations (e.g., vancomycin, phenytoin, digoxin), and cultures. Again, pertinent negative values are important to document, because some patients may have some unexpectedly normal labs (e.g., normal liver function tests in a patient with a history of liver disease). Diagnostic test results become important for the pharmacist to gather in order to understand the status of the patient's various healthcare needs. Again, normal results of diagnostic tests can be just as valuable as abnormal results (e.g., normal electrocardiogram in a patient with chest pain) and thus should be recorded by the pharmacist on the data collection form.

Clinical and Treatment Notes

As discussed previously, these areas contain a large amount of information. Many pieces of data here can be considered key pharmacy-related components, including:

- Updates to problem lists, including new or changed diagnoses
- Daily updates regarding the patient's ROS and PE, including daily vital signs, ins and outs, etc.
- Nursing notes, including updated vital signs, ins and outs, pain scores, reasons for refused or delayed medication administration, intravenous line site status, daily body weights, etc.
- Input from specialists regarding the status of various problems on the patient's list
- Prescriber rationale for changing a medication regimen, dosage, and/or duration
- MAR/eMAR, including confirmation that scheduled medications were administered, timing of medications (e.g., vancomycin, and aminoglycosides), timing of as needed medication administration (e.g., analgesics, antipyretics, sliding scale insulin), or fingerstick blood glucose results

NAVIGATING CHOPPY WATERS: WHAT TO DO IF INFORMATION IS MISSING AND/OR MISPLACED

One of the greatest challenges in gathering information from a patient's chart is actually locating all of the required data. It is critical to collect all pertinent information from the medical record in order to create a thorough and complete assessment, problem list, and plan for an individual patient. It can be frustrating to search the chart for a piece of information and not find it where it should likely be. Several issues can arise when navigating the choppy waters of the medical record.

Missing Details

Details are often missed during the documentation of the PMH. For example, a patient who is HIV positive should have the year of diagnosis and the most recent viral load and CD4 T-cell counts listed. The chart of a patient with diabetes, for example, should have the type of diabetes documented (i.e., type 1 or type 2) as well as any associated complications (e.g., diabetic retinopathy, neuropathy, nephropathy). If these clarifying details are missing, they can often be located in other areas of the chart, including H&Ps from previous admissions or visits, previous lab studies, and even from interviewing the patient.

Information in the Wrong Location on the Chart

Information may be located in the wrong section of the chart. This most commonly seems to occur with the review of systems and the physical exam. It is important to remember that the ROS is *not* the PE; inexperienced practitioners may inadvertently document a physical finding in the ROS section, or vice versa. For example, shortness of breath may be documented in the pulmonary part of the PE, when it should be located in the respiratory system part of the ROS, because it is a symptom subjectively perceived and reported by the patient. This occasionally occurs with FH and SH; inexperienced providers may place information regarding marital status in the FH section, for example. When navigating a patient's chart, the reader must be aware of the potential for misclassification of data and ensure that the data are properly placed on the data collection sheet.

Conflicting Information

Conflicting information may become an issue when multiple practitioners perform H&Ps on the same patient. For example, the PE performed by the medical student may note that the patient's breath sounds are clear to auscultation bilaterally, whereas the resident physician has documented rales and rhonchi in the left lower lobe of the lung. Clarification of conflicting information may require reviewing further information in the chart in addition to speaking with the team of practitioners taking care of the patient. Additionally, the pharmacist may interview the patient and perform a physical assessment of the patient to determine a resolution for the conflicting information.

Locating All of the Information

Occasionally, it may be difficult to obtain a patient's inpatient paper chart because it is being used by another practitioner or because it is sent with the patient when he or she leaves the medical floor for diagnostic testing (e.g., x-ray) or procedures (e.g., surgery). When this occurs, information gathering can begin with using the electronic medical record system to gather laboratory and dictated information. Any information that cannot be obtained in this manner can then be followed up on when the paper chart becomes available. Additionally, there may be a high demand for computer terminals on nursing floors or in a cramped ambulatory care clinic setting. Again, patience is key; it may be best to start with a review of the paper medical chart first and then review the electronic medical information once a computer becomes available. Alternatively, finding a separate, secure location with additional terminals, including

a different medical floor or a medical library, will permit review of electronic information in a timely manner. It may also be helpful to perform reviews of medical records at "off hours" on the patient care floor, such as very early or late times of the day or during resident physicians' mandatory conferences, because the demand for charts and computers is often lower at these times. Once gathered on a data collection sheet, the pharmacist can synthesize all of the key pieces of information in the medical chart to develop a comprehensive healthcare needs list.

SYNTHESIZING PATIENT INFORMATION: DEVELOPING A PROBLEM LIST

Once a patient's information is gathered from all of the necessary sources, the pharmacist can create a comprehensive list of pharmacy-related healthcare needs that encompasses a patient's disease states, drug-related problems, and/or preventive measures. This problem list should be prioritized, with the most clinically significant issues listed first. For example, a male smoker presenting to the emergency department complaining of shortness of breath who is diagnosed with community-acquired pneumonia (CAP) should have pharmacy-related problems associated with "CAP" listed as the number one healthcare need on his list, while smoking cessation will be lower in priority on the list. Creation of this list can be challenging; however, with an organized systematic approach, it can be done efficiently and effectively.

Disease States

Often referred to as *medical problems*, the disease states a patient has should be included in the healthcare needs list. These are often derived from acute diagnoses, as in the case of a patient in the hospital setting, and from the PMH. Practitioners such as physicians, physician assistants, and nurse practitioners are the primary caregivers who diagnose and document these disease states in the medical record. Examples of disease states include hypertension, hyperlipidemia, otitis media, and CAP.

Drug-Related Problems

Drug-related problems (DRPs) are events or issues surrounding drug therapy that actually or may potentially interfere with a patient's ability to receive an optimal therapeutic outcome.[6] DRPs are separate entities from a patient's specific disease state. In practice, the pharmacist can help determine the presence of actual or potential DRPs. Any observed DRPs should be added to the patient's healthcare needs list and ultimately serve as the foundation for the pharmacist's assessment of the patient.

Each DRP can be considered as an overall problem, but may be expanded as specific problems are considered. Several DRPs have been described:[6–10]

- **Indication lacking a drug.** Each diagnosis or indication should be reviewed to determine the presence or absence of appropriate drug therapy, including synergistic or prophylactic drug therapy. Indications that need drug therapy, yet are lacking in any or complete therapy, should be evaluated further. An example of this DRP includes a patient with a history of coronary artery disease and hyperlipidemia who does not have any medications prescribed for hyperlipidemia. This DRP may also be observed in a patient with generalized anxiety disorder who has not received an antianxiety medication (e.g., a selective serotonin-reuptake inhibitor, benzodiazepine, etc.).
- **Indication with incorrect drug.** Each diagnosis or indication should be reviewed to determine if the therapy associated with it is effective or correct, not only with the drug itself, but also with the route of administration. Often, this DRP warrants reevaluation as a disease progresses, patient tolerance increases, or efficacy is not observed. An example of this type of DRP would be a patient treated with intravenous vancomycin for *Clostridium difficile* colitis. The route of administration for vancomycin for this indication should be oral, because the intravenous route is ineffective.
- **Wrong dosage**. This DRP incorporates a drug dose that may be too high or too low. Both instances can alter the efficacy and safety of a therapeutic agent and requires evaluation. Additionally, dose frequency and duration should be evaluated. For example, a patient who is HIV positive and who receives atazanavir 200 mg daily as a component of her antiretroviral drug regimen would have this DRP on her problem list, because this dose of atazanavir is too low.
- **Inappropriately receiving drug.** This DRP may alternately be described as the patient having problems with compliance or adherence to a particular medication or regimen. However, this DRP may also pertain to patient misunderstanding about how a specific drug should be taken or lack of availability of the agent, perhaps due to manufacturing availability issues or patient financial issues. An example of this DRP would be a patient who misses 2 weeks of his treatment regimen for hepatitis C infection due to not receiving it in the mail from his mail order pharmacy.
- **Adverse reaction to a drug.** Adverse drug reactions (ADRs) should be assessed. If an offending agent is found, it may be discontinued. For example, if a patient receiving ampicillin on the inpatient floor breaks out into a rash

following treatment initiation, she may be experiencing an ADR and should be appropriately evaluated.

- **Drug interaction.** Drug therapy should be evaluated as a whole for each patient, and the presence of potential or actual interactions with drug therapy should be considered and evaluated. This is especially important to assess when a patient is on medications with a high propensity for drug interactions, as in the case of a patient receiving rifampin for treatment of tuberculosis.

- **Drug lacking indication.** All drugs should be directly connected to a particular indication. If an indication is not present or is no longer present for a specific drug, the patient may need to be weaned off the agent or discontinue it. For example, a patient receiving hydrochlorothiazide who does not have hypertension on his problem list and who denies having high blood pressure should have this DRP documented on his problem list.

DRPs can vary in nature and often arise from the disease states present on the patient's problem list. It is easy to become overwhelmed when trying to identify all of the DRPs for an individual patient. Thus, following an organized, stepwise process is key to ensuring that all DRPs are identified and prioritized properly.[9] This organized approach is summarized in **Table 2.4**. Step 4 in Table 2.4 permits the pharmacist to quickly recognize if a DRP exists with a particular medication. If the answer to any of the first four questions is "no" or if the answer to the last question is "yes," further investigation to identify DRPs is necessary. Once all DRPs are identified, they can be prioritized and merged into the problem list with the patient's disease states.[10]

For example, consider the following patient encounter. An otherwise healthy patient arrives at the clinic after completing a trial of lifestyle changes for his recent diagnosis of hypertension. At this current visit, the patient's blood pressure remains elevated, and, along with the prescribing practitioner, the pharmacist agrees to help develop a medication plan for this patient. The pharmacist reviews all necessary data, including the patient's medical history, allergies, and contraindications, current hypertension guidelines, and appropriate drug information, and suggests to the prescriber that she initiate an antihypertensive medication at an appropriate starting dose and frequency. The pharmacist documents the patient's DRP as "indication lacking drug." Note that this is different from the physician-diagnosed medical problem, which would be "hypertension." At follow-up visits with this patient, the pharmacist will likely assess the patient for additional potential DRPs, including potential nonadherence, drug interactions, and the presence of adverse drug reactions. If any of these were observed at the follow-up visit, the pharmacist could work with the prescribing practitioner to prioritize existing DRPs and create a plan for each problem.

TABLE 2.4   Steps to Recognizing DRPs

1. Know what the DRPs are. It may be helpful to keep a list in front of you until you feel more comfortable with them.

2. Gather patient data from the H&P and notes. Use an organized data collection sheet for recording all information required, including a draft of the patient's problem list.

3. Isolate each problem on the problem list and identify the medications being administered for each problem. Creating a table like that shown below may be helpful:

Problem List (in descending order of priority)	Medications Patient Is Receiving for Each Problem (drug, dose, route of administration, frequency)

   A drug information resource may assist with this step.

4. Screen each medication on the patient's list with the following questions:

   • Is it the right drug for the indication?

   • Is it the right dose?

   • Is the drug working?

   • Is the patient taking the drug appropriately?

   • Is the drug causing ADRs or drug interactions?

   If the answer to any of the first four questions is "no," or if the answer to the last question is "yes," further investigation to identify DRPs is necessary.

5. Once all the DRPs are identified, they can be integrated into the overall problem list prioritized in order of most clinically significant to least clinically significant.

Source: Kane MP, Briceland LL, Hamilton RA. Solving drug-related problems. *US Pharm*. 1995;20:55–74.

Preventive Measures

Healthcare professionals additionally take action to prevent illness. This often takes the form of health maintenance actions, such as administration of routine immunizations (e.g., influenza, pneumococcal), and patient education, such as smoking cessation counseling. Also included in this category are prophylactic measures against acute illness, including deep vein thrombosis prophylaxis and stress ulcer prophylaxis, each of

which may be necessary in at-risk hospitalized patients. Oftentimes, these preventive measures are lower in priority than most of the disease states and DRPs on a patient's problem list; however, it is important that they are included.

CASE STUDY

Consider the following case study and the pharmacist's development of an appropriate problem list.

CC: "I am so dizzy and confused!"

HPI: ZZ, a 40-year-old man, is brought to the emergency department by his wife on a December morning. ZZ complains of increasing dizziness, lethargy, and confusion over the past 3 days. He also describes diplopia for the past day. ZZ's wife notes that ZZ can barely walk in a straight line.

PMH: Seizure d/o x 15 years, HTN

FH: NC

SH: Does not smoke, no ETOH use, lives at home with wife, works in construction operating a bulldozer

ALL: PCN (hives)

Meds PTA: Phenytoin 300 mg PO 3 times daily; HCTZ 25 mg PO daily; ibuprofen 800 mg PO 6 times daily as needed for headaches

ROS: + for dizziness, confusion, lethargy, diplopia, nausea; – for vomiting, diarrhea

PE:

VS: 110/70, 98.5, 99, 14, 67 inches tall, 60 kg

HEENT: PERRLA, + nystagmus, MMM

Neck: Supple, no JVD, no LAD

Lungs: CTA bilaterally

Heart: S1S2, no m/r/g

Abd: NTND, + BS

Neuro: + Romberg, A&O x 1, CN assessment not performed due to patient's inability to follow directions

Rectal: Deferred

LAB: Na 138; K 3.7; Cl 100; CO_2 25; BUN 10; SCr 1.1; Glu 94; AST 19; ALT 20; Tbili 1.0; albumin 4.0; phenytoin 35 mg/L; CBC: pending

TABLE 2.5	**Problem List**	
Priority	**Problem List**	**Type of Problem**
1	Adverse drug reaction to phenytoin secondary to supratherapeutic serum concentration	Drug-related problem (adverse drug reaction/wrong dosage)
2	Seizure disorder	Disease state
3	Overdosage of ibuprofen for headache	Drug-related problem (wrong dosage)
4	Hypertension	Disease state
5	Influenza immunization	Preventative measure

Based on the pertinent information from the H&P and reviewing the information closely for DRPs using the method described in Table 2.4, the pharmacist caring for ZZ has developed a problem list documented in order of priority from most clinically significant to less clinically significant (**Table 2.5**).

CHAPTER SUMMARY

Although it is easy to become overwhelmed by the voluminous amount of information available in the patient's medical record, it is important to gain perspective on the components of the medical record, whether it is available electronically, on paper, or both. It is important to develop a strategy for collecting data and identifying the pieces of information that are critical to the creation of a problem list. Additionally, the step-wise approach to developing a problem list that includes the drug-related problems presented in this chapter will allow you to efficiently prioritize the issues that impact your patient. This can then be taken to the next level through provision of pharmacotherapeutic recommendations to the prescriber in order to optimize drug therapy and outcomes.

Take-Home Messages

- It is critical to develop a systematic approach to gathering and documenting patient information from written and electronic medical records. Becoming comfortable with a consistent data review format will assist in efficient data gathering.

- As you become more and more familiar with the key pharmacy-related components of the medical history and physical examination, you will find it easier to navigate the chart to obtain the information you need.
- Be sure to follow an organized method for identifying each of your patient's problems. Utilizing the steps to recognize drug-related problems will allow you to easily identify issues that should be noted on your patient's problem list, in addition to their medical problems and potential preventative measures.

REVIEW QUESTIONS

1. What are some challenges that arise when searching for information in the medical record?
2. What is the difference between clinical notes and treatment notes?
3. What are some ways that information can be systematically collected from a patient's medical record for the purposes of developing an assessment and plan?
4. What are key pieces of information that should be gathered from the H&P in order to identify drug-related problems?
5. What are some ways in which drug-related problems are utilized to create a pharmacist-driven problem list?

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