Managing Community-Acquired Pneumonia and Aspiration Pneumonia in Adults

The chart below is based on the 2019 guideline for the management of community-acquired pneumonia in adults from the American Thoracic Society (ATS)/Infectious Diseases Society of America (IDSA).[1] Antibiotic dosing is provided for **adults**. The second chart below provides answers to common questions about aspiration pneumonia.

Community-Acquired Pneumonia Treatment Basics
• The **need for hospitalization** should be based on clinical judgment plus results of a validated prognostic tool.[1] Use of the PSI is recommended over CURB-65.[1] PSI is better than the CURB-65 at identifying patients who can safely be treated as outpatients, but CURB-65 is easier to use.[1] PSI may underestimate severity in younger patients.[1] The PSI is available at https://www.mdcalc.com/psi-port-score-pneumonia-severity-index-cap and the CURB-65 is available at https://www.mdcalc.com/curb-65-score-pneumonia-severity.
• Patients with **severe pneumonia** are typically those requiring intensive/critical care. See **footnote b** for guideline criteria for severe pneumonia.
• Patients with CAP should be treated with antibiotics **for at least five days** (**seven days** for MRSA or *Pseudomonas*).[1] Antibiotics should not be stopped **until the patient is clinically stable**.[1] This means abnormalities in vitals (heart rate, blood pressure, respiratory rate, oxygen saturation, body temperature) and cognition have resolved, and the patient is eating.[1]
• The most common **bacterial causes** of community-acquired pneumonia in outpatients are *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Mycoplasma pneumoniae*, *Staphylococcus aureus*, *Legionella* species, *Chlamydia pneumoniae*, and *Moraxella catarrhalis*.[1]
• It is suggested that anaerobic coverage not be routinely added in cases of **aspiration pneumonia** unless lung abscess or empyema is suspected.[1] Our chart below covering aspiration pneumonia has more considerations.
• **Blood culture** yield is low in patients with nonsevere CAP.[1] Blood cultures are not recommended in outpatients, and it is suggested that they not be routinely done in the hospital setting in nonsevere CAP.[1] Blood cultures are recommended in severe CAP, and in patients being treated empirically for, or previously infected with, *Pseudomonas aeruginosa* or MRSA, or who had been hospitalized and received parenteral antibiotics within the prior 90 days.[1]
• **Sputum gram stain and culture** is recommended in severe CAP, in patients being treated empirically for, or previously infected with, *Pseudomonas aeruginosa* or MRSA, and perhaps in those hospitalized and treated with antibiotics within the prior 90 days.[1] Collection of lower respiratory tract secretions for *Legionella* culture or nucleic acid amplification testing is suggested in severe CAP.[1]
• **Urine antigen testing** for *Pneumococcus* and *Legionella* is suggested in severe CAP.[1] *Legionella* testing is also suggested if epidemiology indicates exposure (e.g., travel or overnight stay in a healthcare facility in the previous 14 days; outbreak).[1,2]
• If **influenza** is circulating in the community, testing with a rapid molecular assay (preferred over an antigen test) is suggested.[1] Coverage for influenza is suggested for outpatients who test positive, and is recommended for inpatients who test positive.[1]
• **Procalcitonin** is not recommended to determine need for initial, empiric antibiotic treatment (**see footnote g**).[1]
• Guidelines suggest not using **corticosteroids routinely** for severe CAP.[1] See **footnote f** for newer data and situations where they might be considered.

Patient Characteristics (see footnote a)	**Outpatient Oral Antibiotic Regimen (see footnote a)**

Previously healthy without comorbidities (see below) and without risk factors for *Pseudomonas aeruginosa* or MRSA (e.g., prior respiratory isolation of MRSA or *Pseudomonas aeruginosa*, or hospitalization and receipt of parenteral antibiotics within the 90 days prior. See **footnote d** for additional risk factors).	• Amoxicillin 1 g TID (high dose targets resistant *Streptococcus pneumoniae*[3])
	OR
	• Macrolide (if local pneumococcal resistance is <25% [resistance is >30% in most of US])
	  • Azithromycin 500 mg x 1, then 250 mg once daily, or
	  • Clarithromycin 500 mg BID or 1,000 mg once daily (extended-release)
	OR
	• Doxycycline 100 mg BID (less data) (consider a loading dose of 200 mg)
	
	Note: patients with risk factors for MRSA or *Pseudomonas* are not commonly managed as outpatients, but if they are, they will need coverage for these pathogens as well.

With comorbidities:
• Heart disease
• Lung disease
• Liver disease
• Kidney disease
• Diabetes
• Alcoholism
• Cancer
• Asplenia
 	
Regimens for patients with comorbidities target resistant *Streptococcus pneumoniae*, atypicals, beta-lactamase-producing *Haemophilus influenzae* and *Moraxella catarrhalis*, enteric gram negatives, and methicillin-susceptible *Staphylococcus aureus*.
	Beta-lactam
	• Amoxicillin/clavulanate (500 mg/125 mg TID or 875 mg/125 mg BID, 2,000 mg/125 mg BID)
	OR
	• Cephalosporin (cefpodoxime 200 mg BID or cefuroxime axetil 500 mg BID)
	PLUS
	Macrolide
	  • Azithromycin 500 mg x 1, then 250 mg once daily, or
	  • Clarithromycin 500 mg BID or 1,000 mg once daily (extended-release)
	OR
	Doxycycline 100 mg BID (less data) (consider a loading dose of 200 mg)
	
	OR
	
	Monotherapy with a respiratory quinolone: levofloxacin 750 mg once daily, moxifloxacin 400 mg once daily, gemifloxacin 320 mg once daily (US), delafloxacin 450 mg orally every 12 h[5] (US; new indication post-guideline publication[5]). Consider adverse effects.
	
	Note: patients with risk factors for MRSA or Pseudomonas are not commonly managed as outpatients, but if they are, they will need coverage for these pathogens as well.

a. If the patient has recently received (i.e., within the past 90 days) an antibiotic, pick an option from a different class.[1,3] Dosing is for oral tablets/capsules for **adults** with normal kidney/liver function. Based on ATS/IDSA guideline unless otherwise referenced. Information may differ from product labeling. Most antibiotics available generically, at lower cost. Brand only available for gemifloxacin (*Factive*, US).

Patient Characteristics (see footnote c)	Inpatient Antibiotic Regimen (see footnote c)
Nonsevere pneumonia without risk factors for Pseudomonas aeruginosa or MRSA (e.g., prior respiratory isolation of MRSA or Pseudomonas aeruginosa, or hospitalization and receipt of parenteral antibiotics within the 90 days prior. **See footnote d** for additional risk factors.)	**Beta-lactam** • Ampicillin/sulbactam (1.5 to 3 g every 6 h) OR • Cephalosporin (cefotaxime 1 to 2 g every 8 h, ceftriaxone 1 to 2 g once daily, or ceftaroline 600 mg every 12 h [US]) **PLUS** **Macrolide** • Azithromycin 500 mg once daily, or • Clarithromycin 500 mg BID OR **Doxycycline** 100 mg BID (less data) **OR** **Monotherapy with a respiratory quinolone**: levofloxacin 750 mg once daily, moxifloxacin 400 mg once daily, or delafloxacin 300 mg IV every 12 h[5] (US; new indication post-guideline publication[5]). Evidence favors beta-lactam/macrolide combination. Consider adverse effects.
Severe pneumonia without risk factors for Pseudomonas aeruginosa or MRSA (e.g., prior respiratory isolation of MRSA or Pseudomonas aeruginosa, or hospitalization and receipt of parenteral antibiotics within the 90 days prior. **See footnote d** for additional risk factors.)	Beta-lactam plus a macrolide, or a beta-lactam plus a respiratory quinolone. Dosing as above. Use of HCAP criteria (e.g., nursing home residence, recent hospitalization) should no longer be used to broaden coverage for resistant organisms (e.g., MRSA, resistant gram negatives), and use of this term is no longer recommended.[1,4]
Prior respiratory isolation of MRSA, or hospitalization and parenteral antibiotics within 90 days prior and locally validated risk factors for MRSA. **See footnote d** for additional risk factors. MRSA coverage generally not needed if nasal swab is negative, especially for nonsevere CAP. If positive, cover pending culture results.	**Prior respiratory MRSA isolation: add** MRSA coverage* to above inpatient regimen and use cultures/nasal PCR to guide need for continuation/discontinuation of MRSA coverage. **Recent hospitalization and parenteral antibiotics and locally validated risk factors for MRSA (see footnote e)** • **Severe** pneumonia: **add** MRSA coverage* to above inpatient regimen and use cultures/nasal PCR to guide need for continuation/discontinuation of MRSA coverage. • **Nonsevere: add** MRSA coverage* to above inpatient regimen only if cultures or PCR are positive. ***MRSA coverage** = linezolid 600 mg BID, or vancomycin 15 mg/kg every 12 h with dose adjusted per levels.

Patient Characteristics (see footnote c)	Inpatient Antibiotic Regimen (see footnote c)
Prior respiratory isolation of Pseudomonas aeruginosa, or hospitalization and parenteral antibiotics within 90 days prior and locally validated risk factors for Pseudomonas aeruginosa. **See footnote d** for additional risk factors to consider.	**Prior respiratory Pseudomonas aeruginosa isolation**: change beta-lactam in above inpatient regimen to one with pseudomonal coverage,** and use cultures/nasal PCR to guide need for continuation/discontinuation of pseudomonal coverage. **Recent hospitalization and parenteral antibiotics and locally validated risk factors for Pseudomonas aeruginosa** (see footnote e) • **Severe** pneumonia: change beta-lactam in above inpatient regimen to one with pseudomonal coverage** and use culture to guide need for continuation/discontinuation of pseudomonal coverage. • **Nonsevere**: change beta-lactam in above inpatient regimen to one with pseudomonal coverage** only if culture-positive. ****Pseudomonal coverage** = piperacillin/tazobactam 4.5 g every 6 h, cefepime 2 g every 8 h, ceftazidime 2 g every 8 h, imipenem 500 mg every 6 h, meropenem 1 g every 8 h, aztreonam 2 g every 8 h

b. ATS/IDSA guideline criteria for **severe pneumonia**: septic shock with need for vasopressors, respiratory failure requiring mechanical ventilation, or three or more minor criteria: respiratory rate ≥30 breaths/min., PaO2/FiO2 ratio ≤250, multilobar infiltrates, confusion or disorientation, BUN ≥20 mg/dL, white blood cell count <4,000 cells/mm^3 (not due to chemo), platelets <100,000/mm^3, core temperature <36°C, hypotension requiring aggressive fluid resuscitation.[1]

c. If the patient has recently received (i.e., within the past 90 days) an antibiotic, pick an option from a different class.[1,3] Dosing is for adults with normal kidney/liver function. Based on ATS/IDSA guideline unless otherwise referenced. Information may differ from product labeling. Most antibiotics available generically, at lower cost. Brand only available for ceftaroline (*Teflaro* [US]).

d. **Examples of additional risk factors to consider:** COPD with bronchiectasis, chronic kidney disease, antibiotic use within the past 30 to 60 days, tube feeding, nursing home residence.[7,11] Nursing home residence is not consistently a risk factor.[7]

e. **"Local validation"** means using local data to determine the prevalence of MRSA and *Pseudomonas* patients with CAP and identifying risk factors for infection locally (e.g., at your local hospital). If local data are unavailable and empiric coverage for MRSA or *Pseudomonas* is instituted on the basis of published risk factors (e.g., footnote d), continue or deescalate the regimen based on culture results.[1]

f. Role of **corticosteroids**. Corticosteroids can be considered in refractory septic shock, patients on high-flow supplemental oxygen, a pneumonia severity score over 130, and for steroid-responsive comorbidities (e.g., COPD, asthma, autoimmune disease, etc).[1,12] Corticosteroids may reduce mortality in severe CAP (NNT = 18), although mortality benefit is not consistent across studies.[1,8] Another, larger study showed reduction in mortality with early initiation of hydrocortisone in one in 17 ICU patients (N = 795).[12] Corticosteroids may reduce time to clinical stability and length of stay by about one day, and reduce the need for mechanical ventilation.[6,9] More study is needed to identify which subgroups benefit the most (e.g., patients with high inflammatory response).[10] Consider corticosteroids for patients who are clinically unstable or not responding to treatment, and perhaps those with elevated markers of inflammation (e.g., C-reactive protein).[6,9,10]

g. Empiric antibiotics should be started if CAP is clinically suspected and radiographically confirmed, regardless of **procalcitonin** level; new evidence suggests that sensitivity is inadequate to determine when initial antibiotic therapy can be safely deferred in this setting.[1]

Aspiration Pneumonia	
Question	**Answer/Pertinent Information**
What is aspiration pneumonia?	• Aspiration pneumonia is a lung infection caused by large-volume inhalation of pathologically-colonized oropharyngeal or upper GI secretions. Think of aspiration pneumonia as part of the pneumonia spectrum including community-acquired pneumonia, and hospital-acquired pneumonia, rather than its own entity.[13] • Microaspiration (small-volume aspiration) of oropharyngeal secretions is normal, especially during sleep. However, microaspiration is involved in the pathogenesis of most pneumonias.[13] • Aspiration pneumonia is DIFFERENT from chemical pneumonitis from aspiration.[13] o Chemical pneumonitis from aspiration leads to **inflammation** due to aspiration of irritating acidic gastric contents.[13] This inflammation can lead to a sudden onset (almost immediate) of symptoms that can easily be confused with pneumonia (e.g., fever, cough, elevated white blood cell count, wheezing, tachycardia).[13,14] Chemical pneumonitis can also appear like acute respiratory distress syndrome (ARDS) with bronchospasms and frothy sputum with bilateral patchy infiltrates on chest x-ray.[15] o Aspiration pneumonia is a **secondary infection** that develops over a few days due to the combination of aspirated microorganisms and damaged lung tissue.[13,14] Infiltrates on chest x-ray may not be seen early in cases of pneumonia.[13] • Aspiration pneumonia is linked to a higher mortality rate (29.4%) compared to community-acquired pneumonia (11.6%).[13]
What are **risk factors** for aspiration pneumonia?	• Patients with multiple risk factors for large-volume aspiration are at increased risk for aspiration pneumonia and death.[13] These risk factors include:[13,15,16] o alcohol use o poor dentition (increases bacterial load, not necessarily risk of aspiration) o dysphagia and gastroesophageal reflux o head, neck, and esophageal cancer o esophageal strictures o chronic obstructive pulmonary disease (COPD) o seizures o degenerative neurologic disease (e.g., multiple sclerosis, Parkinson's disease; dementia) o impaired consciousness o enteral feeding (especially if associated with impaired gastric motility, poor cough reflex, and altered mental status)
How do **chest x-rays** help diagnose aspiration pneumonia?	• Aspiration pneumonia is difficult to diagnose and differentiate from other aspiration syndromes, community-acquired pneumonia, and hospital-acquired pneumonia.[13] • Chest x-rays, along with clinical history, are used to diagnose aspiration pneumonia.[13] • Infiltrates on chest x-ray seen in gravity-dependent locations can be a clue that a patient with pneumonia has an aspiration pneumonia.[13] o Aspiration from a supine position leads to infiltrates in the superior lower lobe or posterior upper lobes.[13] o Aspiration from an upright position leads to infiltrates in the basal segments of the lower lobes.[13]

Aspiration Pneumonia	
Question	**Answer/Pertinent Information**
What role do **proton pump inhibitors** play in aspiration pneumonia?	• PPIs reduce gastric acid and have the potential to promote an environment more favorable for bacterial growth in secretions that may be aspirated.[15] • It is not known if PPIs increase the risk of aspiration pneumonia. However, PPIs seem to **reduce** the risk of chemical pneumonitis.[13,15] • See our chart, *Proton Pump Inhibitors: Appropriate Use and Safety Concerns*, for how PPIs impact pneumonias.
What **microorganisms** are typically responsible for aspiration pneumonia?	• The bacteria most often involved in aspiration pneumonia appear to be similar to the bacteria involved in non-aspiration pneumonias.[13] o Bacteria associated with **community-acquired cases of aspiration pneumonia** are commonly *Streptococcus pneumoniae*, *Staphylococcus aureus*, *Haemophilus influenzae*, and Enterobacteriaceae.[13] o Bacteria associated with **hospital-acquired cases of aspiration pneumonia** are commonly gram-negative organisms, including *Pseudomonas aeruginosa*.[13] • It was previously thought (i.e., in the 1970s) that anaerobes (alone or in combination with aerobes) were involved in a large number of cases of aspiration pneumonia (45% to 48%).[13,14,17] Common anaerobes include *Bacteroides*, *Peptostreptococcus*, *Porphyromonas*, *Prevotella melaninogenica*, and *Fusobacterium* species.[15]
When should therapy be **started** after aspiration?	• Follow hospital protocols for when to initiate antibiotics with suspected pneumonias. • If it is not clear if a patient has chemical pneumonitis versus aspiration pneumonia after an acute episode of aspiration:[13] o Can consider waiting about 48 hours before starting antibiotics in patients who display mild to moderate symptoms if the chest x-ray is clear. o Can consider empirically starting antibiotics in patients with severe symptoms. Re-evaluate the need for continued antibiotics in two to three days based on clinical course and chest x-ray.

Aspiration Pneumonia	
Question	**Answer/Pertinent Information**
Which **antibiotics** are most appropriate for suspected aspiration pneumonia?	• Choice of antibiotics will depend on where the pneumonia developed (e.g., community, hospital, long-term care facility), risk factors for resistant infections, and the likelihood that anaerobes are involved.[13] • There are limited data to guide anaerobic coverage when treating pneumonia.[17] Avoid empirically covering for anaerobes in most patients with suspected aspiration pneumonia (including pneumonia patients with aspiration risks) as they may not improve clinical outcomes.[13,17] Instead, choose antibiotics based on hospital protocols for CAP, HAP, and VAP. Consider initially covering for anaerobes in patients with: o risk factors for aspiration AND highest risk for an anaerobic infection (e.g., severe gum disease or poor dentition).[13] o foul smelling sputum or drainage from an abscess or empyema.[17] **Antibiotic Selection** • Most beta-lactam/beta-lactamase inhibitor combos (e.g., piperacillin/tazobactam), carbapenems, and some fluoroquinolones (e.g., moxifloxacin), already cover many anaerobes.[13,15,18,19] (Note ceftazidime/avibactam and levofloxacin, a common formulary fluoroquinolone, should not be used for anaerobic coverage.) In addition, antibiotics used to treat CAP, HAP, or VAP can be changed to an antibiotic that covers typical CAP pathogens and anaerobes. For example, beta-lactams can be changed to ampicillin/sulbactam or amoxicillin/clavulanate.[19] • Note that data using metronidazole to treat pneumonias are very limited. However, if adding specific anaerobic coverage to existing therapy, consider metronidazole over clindamycin. **Metronidazole** has good oral bioavailability (>90%), covers anaerobes from both "**above and below the belt,**" and has a lower risk of *C. difficile* infections compared to clindamycin.[20] **Clindamycin** also has good oral bioavailability (~90%), has a higher risk of *C. difficile* infections, and only covers gram-positive organisms and anaerobes from "above the belt."[21] o If using metronidazole, be sure to combine with a beta-lactam. Metronidazole lacks coverage of organisms commonly associated with pneumonia, such as gram-positive bacteria (e.g., *S. pneumoniae*).[16,19] • Can consider a **fluoroquinolone** (e.g., moxifloxacin [covers anaerobes], levofloxacin plus metronidazole if covering for anaerobes), in patients with a severe penicillin allergy. Also, see our chart, *Managing Beta-Lactam Allergies*, when considering a beta-lactam in a patient who reports a penicillin allergy. **Assessment and Follow-up** • Promote antibiotic stewardship and adjust antibiotic therapy based on culture and sensitivity results. o Sputum cultures are easy to get (noninvasive) and inexpensive, but are often inconclusive. However, they can be used to guide therapy when organisms are able to be identified.[14] • In addition, follow hospital protocols to convert patients to oral therapy once stable, clinically improving, and able to take things by mouth. For example, patients on an intravenous beta-lactam (e.g., ampicillin/sulbactam) can usually be converted to oral amoxicillin/clavulanate.[22]

Aspiration Pneumonia	
Question	**Answer/Pertinent Information**
How long should patients with aspiration pneumonia be treated?	• Treat most patients with aspiration pneumonia like you would for CAP (at least five days) or HAP and VAP (seven days total) [Evidence Level C].[3,13,23] Can consider longer durations of treatment for patients:[13] o who are not responding well to antibiotic therapy. o with necrotizing pneumonia (destruction of the underlying lung tissue, leading to multiple small, thin-walled cavities). o with lung abscesses. o with empyema (a collection of pus in the pleural cavity). • Expect patients with an abscess or empyema to require drainage in addition to antibiotic therapy.[13]
What **prevention strategies** can be used?	• Use the following to minimize post-operative chemical pneumonitis:[13] o Ensure patients fast for at least EIGHT hours, and avoid clear liquids for at least two hours, prior to surgery. o If possible, avoid using medications that increase risk of aspiration or interfere with swallowing (e.g., sedatives, antipsychotics). • Though data are not conclusive, can consider promoting oral intake with a mechanical soft diet with thickened liquids over pureed foods to reduce the risk of aspiration pneumonia in patients with dysphagia.[13,15] • When enteral feedings are needed, ensure patients are semirecumbent, not supine to reduce the risk of gastric aspiration.[13] • Follow hospital protocols for elevating the head of the bed in ventilated patients, to reduce the risk of aspiration.[15] • For patients with swallowing disorders, promote nutritional rehab with swallowing exercises and early mobilization.[13] • The data are weak to support oral hygiene in preventing aspiration pneumonia, but these efforts are unlikely to lead to harm.[13,15] Promote good oral hygiene (e.g., tooth brushing, cleaning dentures, gargling disinfectant solution, extraction of nonviable teeth).[15,16]

Abbreviations: BID = twice daily; BUN = blood urea nitrogen; CAP = community-acquired pneumonia; COPD = chronic obstructive pulmonary disease; GI = gastrointestinal; h = hour or hours; HAP = hospital-acquired pneumonia; HCAP = healthcare-associated pneumonia; ICU = intensive care unit; MRSA = methicillin-resistant *Staphylococcus aureus*; PaO2/FiO2 = arterial oxygen partial pressure/fractional inspired oxygen; PCR = polymerase chain reaction; PPI = proton pump inhibitor; PSI = pneumonia severity index; TID = three times daily; VAP = ventilator-associated pneumonia.

Users of this resource are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and internet links in this article were current as of the date of publication.

Levels of Evidence

In accordance with our goal of providing Evidence-Based information, we are citing the **LEVEL OF EVIDENCE** for the clinical recommendations we publish.

Level	Definition	Study Quality
A	Good-quality patient-oriented evidence.*	1. High-quality randomized controlled trial (RCT) 2. Systematic review (SR)/Meta-analysis of RCTs with consistent findings 3. All-or-none study
B	Inconsistent or limited-quality patient-oriented evidence.*	1. Lower-quality RCT 2. SR/Meta-analysis with low-quality clinical trials or of studies with inconsistent findings 3. Cohort study 4. Case control study
C	Consensus; usual practice; expert opinion; disease-oriented evidence (e.g., physiologic or surrogate endpoints); case series for studies of diagnosis, treatment, prevention, or screening.	

***Outcomes that matter to patients** (e.g., morbidity, mortality, symptom improvement, quality of life).

[Adapted from Ebell MH, Siwek J, Weiss BD, et al. Strength of recommendation taxonomy (SORT): a patient-centered approach to grading evidence in the medical literature. Am Fam Physician. 2004 Feb 1;69(3):548-56.
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Technician Tutorial:
Automated Dispensing Cabinets and Devices

The use of technology in pharmacies and healthcare in general has often been seen as a way to improve efficiency and patient safety. In fact, reports from safety groups continue to push for automation in sterile compounding and other pharmacy processes to reduce errors. Some of us might think of automated dispensing devices such as *Baker Cell* machines in community settings and cabinets (*Pyxis*, etc) in hospital settings as some of the earlier technology we encountered in pharmacy practice. Their use has expanded over time and functionality has improved in many ways. It's important to know the "ins and outs" of using these cabinets and devices properly in order to optimize their benefits while preventing errors and other issues. This tutorial focuses on practical tips for working with automated dispensing cabinets and devices.

What are automated dispensing cabinets used for in hospital settings?

In the most basic terms, automated dispensing cabinets, sometimes called ADCs for short (or automated dispensing machines [ADMs for short], or automated dispensing devices [ADDs for short]), provide compartments to securely store meds. There are different brands of cabinets, such as *AcuDose*, *Omnicell*, and *Pyxis*. Some hospitals use the cabinets to store controlled substances and meds (e.g., acetaminophen, injectable hydralazine or metoprolol, regular insulin) that might be needed urgently on a patient care unit. Other hospitals use the cabinets to store the majority of meds that patients on a patient care unit or in procedural areas need at any given time. (Note that these differences can impact other workflow in the pharmacy, such as whether a cart fill is necessary for dispensing meds to patients.) Cabinets may also be used in the pharmacy to securely store meds, such as controlled substances needed for prepping doses in an IV room.

Depending on the way a hospital uses cabinets, med stock may remain mostly static (i.e., the first example above, where mainly controlled substances are stored), or it may be very dynamic (i.e., the second example above, where most meds a patient is taking are stored). Changing the meds stocked in a cabinet will typically involve "loading" a med using the computer system and possibly removing a med that's not currently being used by a patient, to make room for a new med in a cabinet. For example, some pharmacies might periodically run reports and remove meds that haven't been used in a specified time period to make room for other needed meds.

Automated dispensing cabinets help with accountability of meds since they track activity such as restocking, inventorying, removal of doses, return of unused doses, etc. And they also help with security of meds in a non-physical sense, in that they may track activity by user. Users must sign in to access meds, such as with a password or a fingerprint scan.

The most common users of automated dispensing cabinets are nurses, accounting for about 80% of transactions. Pharmacy technicians are users, of course, since they're typically responsible for managing meds in cabinets, restocking them when a supply runs low, etc. Other users include pharmacists and possibly prescribers, such as anesthesia clinicians in an operating room setting.

There may be variation in the locations where automated dispensing cabinets are placed in hospitals, such as which patient care units have them. In addition, there are different kinds of drawers or compartments where meds can be placed. For example, controlled substances may be kept in compartments with locked lids, so that only one med in an open drawer can be accessed at a time. Certain non-controlled substances may be kept in an open-grid or matrix-type a drawer.

Some cabinets might be "profiled," which means that the system is connected to patient profiles of meds that have been ordered by a prescriber. Other cabinets might be non-profiled, meaning that a user can simply sign in and have open access to remove any med in the cabinet for a patient.

What are some rules of thumb for stocking meds in automated dispensing cabinets?

The way you stock meds in automated dispensing cabinets may impact the risk of med use issues and errors. The following are some important points to consider to help ensure safety.

Choose "par" levels carefully. Having too much of a drug in an automated dispensing cabinet can increase the risk of a nurse accidentally administering an overdose. However, not having enough can increase the risk of treatment delays due to frequent stock outs and the need to restock a cabinet. Follow your pharmacy's policies on setting par levels for meds in cabinets. Other considerations for par levels might include med cost, temporary drug shortages, etc.

Check expiration dates of meds. Follow your pharmacy's policies on not placing "short dated" meds in cabinets. For example, meds with an expiration date sooner than one or two months may be prohibited from being stocked in cabinets, due to the increased risk of expired meds being accidentally administered if they aren't used up or replaced before the expiration. When stocking a med in a cabinet, be sure to enter the actual expiration or beyond-use date of the shortest dated med of the bunch, and not an arbitrary value.

Also, be sure to follow your pharmacy's policies on identifying and removing expired meds from cabinets. For example, in some cases, expiration dates may need to be checked each time a compartment in an ADC is accessed by pharmacy staff.

As mentioned, using **extra security for controlled substances**, such as locked-lidded drawers or pockets, is important. Another extra security measure is setting "blind counts" for controlled substances. This means that the user must enter the counted number of capsules, tablets, vials, etc, rather than confirming an inventory that the cabinet displays. This helps catch discrepancies in counts. If an incorrect count is entered, a discrepancy is created in the computer system, with the user's name attached to it, and resolution of the discrepancy in a timely manner will be required.

Avoid unloading emergency meds in order to make space for routine meds a patient is taking. If possible, unload a non-emergency med that is not being used. For example, you should avoid removing injectable epinephrine from a machine to make space for cephalexin capsules.

Also, **be cognizant of where you place meds** with regard to convenience and safety. Avoid placing the most commonly used meds in the very back of a drawer or up high on a tall machine, to keep nurses from having to reach far for them. And avoid placing breakable meds such as vials in spots where they could easily fall out and break.

Try to **avoid restocking automated dispensing cabinets at common med administration times** in your hospital. This can create delays if nurses have to wait, and nurses may be tempted to grab extra doses and take other shortcuts to save time. Plus, it can be distracting for nurses and for you, which could lead to errors.

What strategies can reduce errors with meds dispensed from automated dispensing cabinets?

Strategies such as separation of look-alike/sound-alike meds can be used to prevent errors when meds are dispensed from automated dispensing cabinets. For example, placing hydrALAZINE beside hydrOXYzine in an open matrix drawer could increase the chance that a nurse will remove the wrong med to administer to a patient. Not only do these med names look similar, but they also come in overlapping strengths.

Typically, you will be able to determine the location of a med when you are first loading it into the machine. So, at this step, be cognizant of other meds that will surround the newly loaded med, including different doses of the same med. Also, check your pharmacy's policy on preventing errors with look-alike/sound-alike meds for additional guidance. These policies are required to be in place by The Joint Commission (US).

Another consideration is which type of compartment a med should be loaded in. For instance, high-alert meds such as insulin, or meds that are prone to diversion such as opioids, should not be loaded into compartments with open access, such as open matrix drawers. And whenever possible, individual doses of meds should be used to stock cabinets, rather than bulk or multidose containers.

Organize meds when setting up to restock cabinets before you even leave the pharmacy. For example, place each different product in a separate bag. If cabinets require barcode scanning prior to restocking, follow proper procedures and avoid workarounds, such as scanning one package multiple times if each package should be scanned. Try to avoid interruptions or distractions once you reach the cabinet and start restocking. (As mentioned, cabinets should generally not be restocked during common med administration times.) These measures can help prevent accidental misfills of meds that could lead to the wrong med being dispensed and administered.

Also, be sure to comply with your pharmacy's policies on having double checks of meds, especially high-alert meds such as heparin or insulin, prior to restocking automated dispensing cabinets.

Speak up about any issues that could lead to confusion, such as if the drug name on your pick list, the med label, and the cabinet display don't match. These should be standardized to help prevent mix-ups.

An additional measure to consider is watching out for packaging changes that could be confusing to nurses. Alert your admin to encourage communication with your nurse colleagues to prevent errors. One example is the labeling change of meds with ratio strengths, such as epinephrine and isoproterenol, to mg strengths. Also watch out for any look-alike packaging that could lead to errors. For example, *Cardene* (nicardipine [US only]) and *Nexterone* (amiodarone) premixed drips (US only) come in similar boxes, and the same size and type of IV bags.

Another important safety issue is the use of "overrides." This refers to a clinician removing a med without having an order for the med or without having the order for the med reviewed by a pharmacist. One of the problems with the override function is that problems such as duplicate therapy, patient allergies, or inappropriate dosing can be missed. Or the wrong med could be removed from the cabinet. This is why the use of overrides should be limited to situations where a delay could result in patient harm. For example, injectable epinephrine may be needed immediately if a patient has a serious allergic reaction, such as anaphylaxis, where their airways swell and breathing becomes difficult. In fact, hospitals typically have a list of meds that are allowed to be accessed on override, along with which patient care units and clinicians can access them. And in some cases, a system can be set up so that certain meds can't be removed from cabinets using override.

Last but not least, regularly observe the area where cabinets on your units are placed. Problems such as dim lighting or a tight or chaotic location could increase the risk of errors. Let your admin or medication safety officer know about any potential issues, so they can work with nursing colleagues to come up with a solution.

How do automated dispensing devices work in the community pharmacy setting?

In the community setting, automated dispensing devices work differently, but they have similar benefits as in the hospital setting. These include streamlining workflow and controlling inventory. The extent of benefits can depend on the type of device. Some devices (e.g., *Baker Cell* machines, *Kirby Lester 1*) simply count pills, while others (e.g., *Parata Max*, *ScriptPro*) also label prescription vials and track inventory. The more advanced devices are often referred to as robots.

Similar errors can occur with automated dispensing devices in the community setting as well, such as filling the devices with the wrong meds, incorrect strengths of meds, or expired meds.

What are some rules of thumb for using automated dispensing devices in the community setting?

It's easy to see how the same care must be taken when working with automated dispensing devices in the community setting as in the hospital setting. Here are some helpful tips:

- Use your own sign in or badge to access the device.
- Match the information on stock bottles with the information on the cell before filling it with medication. Check NDC (or DINs in Canada), keep a close eye on drug strengths and suffixes, and be extra careful with look-alike/sound-alike meds. Always scan bar codes as a double check.
- Follow pharmacy policies on meds that should not be placed in the automated dispensing device (e.g., hazardous meds, original container meds).
- Do a visual check to make sure the meds in the cell match the ones in the stock bottle, especially if you use multiple bottles to fill cells, return a med to stock, or are interrupted during this step.
- Follow your pharmacy's policy on having a double check when you refill a cell.
- Don't mix meds from different manufacturers in the same bin or cell. This can lead to patient confusion and throw off inventory counts.
- Make sure each cell or bin is properly labeled with the drug name, strength, NDC number (or DIN), and expiration date, and that bar codes on labels are readable.
- Avoid adding broken tablets, package inserts, cotton, or desiccants into cells.
- Follow your pharmacy's policy and the manufacturer's instructions for calibrating, cleaning, and maintaining automated dispensing devices.
- Consider doing "sample" counts weekly to check the accuracy of automated dispensing devices. Devices can miscount if they aren't calibrated correctly.
- For robots, make sure supplies such as labels and vials don't run out to avoid delays in the dispensing process.

What are discrepancies in automated dispensing cabinets and how should they be handled?

As mentioned, a discrepancy in an automated dispensing cabinet typically refers to a difference between the amount of a med in a drawer or compartment and the amount of the med that's SUPPOSED to be in the drawer or compartment according to computer inventory. For example, if a cabinet's inventory of immediate-release oxycodone 10 mg tabs is 23 tabs, but a nurse opens the drawer and finds 21 tabs, there's a negative discrepancy.

Discrepancies with non-controlled meds can happen when a nurse takes out more than one dose at a time for a patient or for multiple patients. This is a workaround that can increase the risk of errors, but most often, is not as critical to be resolved. On the other hand, a discrepancy with a controlled med is a very big deal and should be addressed as soon as it's discovered and before the end of the involved parties' shifts. Reasons for these discrepancies could range from a simple miscount to actual drug diversion, administration of an incorrect dose, etc.

What issues come up with operation of automated dispensing cabinets and devices and what are tips for addressing them?

Malfunctions with automated dispensing cabinets and devices are not uncommon. They can be very simple, such as a medication package sticking out of a cabinet drawer causing it to jam. On the other hand, malfunctions can be more complicated to resolve, and may require calling the vendor for assistance.

Be familiar with the steps required to troubleshoot problems with the type of automated dispensing cabinets in your hospital or automated dispensing device in your community pharmacy. Discourage measures such as kicking or shaking a machine. These can make the user feel better but do little to resolve the actual issue! Keep the vendor's phone number handy, in case you need to contact them on your shift. Having this information close by can help resolve problems quickly, minimizing the need for workarounds and workflow interruptions.

If there are updates to functionality of automated dispensing cabinets or devices, ensure that you are trained properly on these, and ready for them when they go live. They may be limited to a new safety feature, or the system may be upgraded completely. Even better, if you know that changes are coming, provide feedback to an appropriate person to help avoid unanticipated snags. Input from frontline staff can be very valuable; you may know details about workflow that would be critical to consider but may otherwise be overlooked.

What information can I get from an automated dispensing cabinet?

One benefit of automated dispensing cabinets is that they can provide records of activity. Here's an example of a practical application. Say there's a shortage of a particular med, and your administration has decided that it's most important to reserve doses of that med for pediatric patients. A report can be run to show which cabinets contain the med, and possibly how much of the med is in each cabinet. This is helpful because pharmacy staff can target these machines to remove the med from adult patient care units and redistribute it to pediatric units. Another example is if a med is recalled. A report can be run to see which cabinets have the med in stock, and efforts can be directed to those cabinets to check for recalled lots.

Functionality for running reports can vary between systems, so check with a pharmacist or an administrator if you need help learning what reports you can run, or are required to run, for your automated dispensing cabinets. A required report might be one that tracks the use of overrides by nurses, to make sure that the use of overrides was limited to appropriate situations such as emergencies and not routine administration of meds.

Cite this document as follows: **Technician Tutorial,** ***Automated Dispensing Cabinets and Devices. Pharmacist's Letter/Pharmacy Technician's Letter.*** **March 2023. [390382]**

--Continue to the next section for a "Cheat Sheet" for Automated Dispensing Cabinets and Devices--

"Cheat Sheet" for Automated Dispensing Cabinets and Devices

What are automated dispensing cabinets used for in hospital settings?

- Automated dispensing cabinets (ADCs), also referred to as machines (ADMs) or devices (ADDs), help provide secure storage to meds both outside and inside the pharmacy.

What are some rules of thumb for stocking meds in automated dispensing cabinets?

- Place reasonable quantities of meds in cabinets, so very frequent restocking isn't required, but also so an excess quantity is not available for administration to patients.
- Avoid placing meds that'll soon be out of date in cabinets in most cases. Enter actual expiration or beyond-use dates of meds when stocking cabinets, not an arbitrary value.
- Avoid placing controlled substances in compartments with open access, to help prevent diversion.
- Keep in mind that emergency meds may need to be kept in cabinets at all times. Avoid replacing these with non-emergent meds.
- When loading meds into a cabinet, be aware of potential issues such as look-alike/sound-alike drug names, or physical barriers such as placing fast movers on high shelves in a tower.
- Avoid restocking cabinets at common med administration times.

What strategies can reduce errors with meds dispensed from automated dispensing cabinets?

- Load meds into appropriate locations, such as by placing high-alert meds in compartments with locked lids as an extra safeguard.
- Prevent misfills of cabinets by keeping meds for restocking cabinets organized in the pharmacy, such as by placing different products in separate bags.
- Follow your pharmacy's policies for having meds that are meant for restocking a cabinet double checked before leaving the pharmacy.
- Check to be sure med names match on pick lists, med labels, and cabinet displays.
- Follow your pharmacy's policies that apply to overrides from cabinets.
- Report any potential issues about locations of cabinets, such as dim lighting or a chaotic area.

What are discrepancies in automated dispensing cabinets and how should they be handled?

- A discrepancy is when the physical count of a med does not match the computer count.
- Help ensure discrepancies are resolved in a timely manner, or reported to the appropriate person if they are not or cannot be resolved.

What issues come up with operation of automated dispensing cabinets and what are tips for addressing them?

- Malfunctions of cabinets are not uncommon. These can prevent meds from being removed, which could delay patient care.
- Cabinet malfunctions may be caused by something simple, such a jam in a drawer, or something more complicated requiring technical assistance from the vendor.
- Know how to troubleshoot cabinet issues. Have needed contact information on hand in case the vendor must be called to help resolve an issue.

[March 2023; 390382]

Technician Tutorial:
Mastering Medication Lists and Histories

There's a big focus on keeping track of the meds patients are supposed to be taking. Typically, a patient's **medication list** is a record they maintain for their own use and for communication with healthcare providers. A **medication history** typically refers to a compilation of the patient's current meds that's meant to be used by healthcare professionals. However, some people use the terms interchangeably, which is okay. The main point is that these lists and histories can help prevent problems like dosing or scheduling errors (e.g., taking a med twice a day that was prescribed to be taken once daily), duplicate therapy (e.g., not stopping a med that was supposed to be discontinued when a similar med was started), and continuing unneeded drug therapies (e.g., not stopping a med that was prescribed for treatment of a temporary condition). In fact, accurate medication lists and histories are necessary for medication reconciliation. "Med rec" includes reviewing a patient's meds at transitions of care (e.g., into and out of the hospital, from one hospital unit to another). It is known that med rec can help reduce problems with medications, improve patient safety, and ultimately reduce hospital readmissions.

What are some other differences between medication lists and medication histories?

In addition to the slight differences mentioned above, **medication list** is a term that may be used more frequently in the community or outpatient setting, while the term **medication history** may be used more frequently in the hospital or inpatient setting. We'll stick with that convention here, although you may interchange the terms according to what's used in your practice setting.

What benefits do med lists and histories offer over info already available in clinicians' computer systems?

It may seem unnecessary for a patient to keep a comprehensive and current list of the medications they're taking since pharmacies and prescribers generally have lists in the form of patient profiles and such. In reality, clinicians' lists are not always complete, correct, or current, and they don't necessarily include all the nonprescription products a patient takes. Plus, patients may be taking meds differently than prescribed in some cases.

Likewise, a medication history that's gathered upon admission to a hospital pulls all the patient's medication information together into one place. This can help ensure that treatments for chronic conditions such as diabetes, heart failure, or high blood pressure are appropriate. As an added benefit, problems with a patient's home medication regimen may come to light during a hospitalization and can be addressed.

What are some tips for communicating with patients when gathering med info?

You may encounter patients in different settings when taking medication histories or gathering medication lists, including outpatient pharmacies, long-term care settings (e.g., nursing homes), and in several areas of the hospital, such as the emergency department, general medicine floors, or even critical care units. Here are some important rules of thumb to keep in mind for communicating with patients in any practice setting:

- Always introduce yourself, state your purpose, and let the patient/caregiver know what to expect. Here's an example: "Hi, my name is Jordan. I work in the pharmacy, and I'm here to get a list of the medications you take at home. I'll need to ask you some questions and it will take about 20 minutes."
- Don't forget to verify the patient's identity, such as by asking name and date of birth before starting.
- Make eye contact as appropriate.
- Speak clearly and not too fast. Many older patients have some degree of hearing loss and may be hesitant to ask you to repeat what you've already said. When communicating with older patients, it's more important to speak clearly and at an even pace than to speak loudly and slowly, which can be our tendency.

- Look for any info about whether a patient is hearing-impaired or doesn't speak English (or French, in Canada, if applicable) before meeting them. That way you can have necessary resources such as an interpreter ready.
- Access any available information about the patient's medications such as their profile or a list of discharge meds from their last admission. You can use this as a starting point to identify any potential issues (e.g., unclear directions) that'll need to be clarified during the interview. If you identify any discrepancies during the patient interview, note these as well.
- Refer to meds by brand or generic name, whichever the patient recognizes most easily.
- Ask open-ended questions whenever possible to get the best information. Patients will be able to answer "yes" or "no" questions even if they don't understand the question. For example, ask "What over-the-counter medications do you use?" rather than "Do you use any over-the-counter medications?" Or "How do you take this medication?" rather than "Do you take this medication twice daily?"
- If you don't understand a patient's response, ask questions to clarify rather than documenting unclear information.
- Avoid the use of medical jargon; it may confuse patients. For example, say "as needed" or "as necessary" instead of "PRN," "blood pressure" instead of "hypertension," and "twice a day" instead of "BID."
- When you're finished, let the patient know, ask if they have questions, and thank them for their time.

Keep in mind that there may be times when a patient is not able to participate in the medication history process. An example is a patient admitted in critical condition after a car accident, who's heavily sedated with medications. In this case, it's still important to get a med history. But you'll likely have to turn to sources other than the patient for information about what medications they take. You may need to look at their Rx bottles (if available), talk to a family member, or try to find out which pharmacy they use. Talking with the patient's nurse might be helpful to figure out where to start. Follow your pharmacy's policies and procedures as well and ensure that there's timely follow-up for finding out any missing information.

What is a "best possible" med list or history?

In your practice setting you'll probably have policies and procedures about what info to collect. You may have forms or a computer template to use. The following are general guidelines about the information that should be included in a patient's med list or history.

A complete med list or history has **all the medications a patient is taking**. This includes medications taken or used by any route: orally (e.g., capsules, liquids, tablets); topically (e.g., creams, ointments, transdermal patches); in the eyes or ears (e.g., drops, ointments); injected (e.g., heparin, insulin); inhaled (e.g., inhalers, nebulizers), and so on, This also includes meds from any source, including drug samples, mail order, outpatient infusion centers, specialty pharmacies, etc. Finally, it also includes products that don't require a prescription, such as supplements (e.g., glucosamine, fish oil), vitamins (e.g., multivitamins, vitamin C), and over-the-counter (OTC) medications (e.g., acetaminophen, ibuprofen, cough and cold preps).

Plenty of folks don't think of supplements, vitamins, and OTCs as "real" drugs. But they are. These products can have side effects that are sometimes serious. And they can cause drug interactions with each other and with Rx drugs. In fact, use of these meds might contribute to a hospital admission. An example is ginkgo biloba, which can increase bleeding risk with blood thinners (e.g., warfarin).

Don't forget to ask about immunization history. Patients who need vaccines, such as COVID-19, influenza, or pneumococcal, can get these while they're in the hospital. Asking about immunizations can also flag patients who need to receive vaccines in the outpatient setting.

You may need to ask if the patient uses any recreational drugs such as alcohol or marijuana. As with Rx meds and nonprescription products, record how much the patient uses and how often. For example, note two beers per day or weekly use of marijuana. This information may be important due to possible effects on meds and certain medical conditions. Smoking (or vaping) history is useful as well. Smoking cessation strategies can be recommended if appropriate. Also, smoking can interact with some medications. Ask these questions in a clinical and nonjudgmental manner.

What other details should be included on a med list or history?

For each medication a patient is taking, the **correct strength and regimen** (dose and dosing schedule) should be included. The **indication or reason for use** should also be included. For example: metoprolol tartrate 50 mg tablets, one by mouth, twice daily, for high blood pressure. This is sometimes referred to as a "complete pharmaceutical sentence."

The benefits to having this information include the fact that dosing errors might be caught. Errors can stem from different sources including a prescribing error, a pharmacy error, or a misunderstanding on the patient's part. For example, if a patient's list includes metoprolol tartrate 50 mg tablets, one by mouth four times a day, a pharmacist or prescriber would be able to question the regimen. (This med is typically given twice a day.)

The **date each medication was started (or stopped)** is also helpful. This can clarify whether a therapy is being duplicated. For example, if a patient gets switched from metoprolol tartrate 50 mg twice a day to metoprolol succinate 100 mg once a day, the stop date of the old regimen should be noted, and the new regimen should be added with the start date. Including both with no start or stop date could lead a clinician to believe the patient is taking double metoprolol therapy.

If a patient tells you they've recently stopped or started a medication, ask them about the **reason for the change**. Examples of reasons that may be given include "because I started on a different medication and my doctor told me to stop taking it," "it gave me stomach upset," or "I couldn't afford it." This information will be very helpful for clinicians.

For hospital admission med histories, the **last time the patient took a dose of each medication** should be recorded if possible. This can help prevent doses of meds that are continued in-house from being given too early or late. For example, if a patient taking levofloxacin 500 mg once a day is admitted to the hospital mid-morning, it will be important to know if they already took a dose of levofloxacin since an admission med order would likely schedule a dose to be given the same day. This information can be critical when a med could have a negative impact on a patient's treatment. For instance, noting the last time a patient took a blood thinner (e.g., rivaroxaban) could be critical if the patient requires an urgent surgery; these meds could cause dangerous bleeding during surgery.

Physical characteristics of a medication, such as the **color, shape, and markings** on a tablet, can be a useful tool. For example, if a patient says they're taking *Synthroid* (levothyroxine) 250 mcg by mouth once daily (a relatively high dose) and you suspect they're taking *Synthroid* 25 mcg by mouth once daily, the tablet can be used as a double-check. The *Synthroid* 25 mcg tabs are orange. And a *Synthroid* 250 mcg dose would require that the patient take more than one tablet per dose, since *Synthroid* does not come in a strength of 250 mcg. Checking the patient's prescription bottles can be helpful as well. Keep in mind that physical characteristics of a med aren't foolproof; colors and shapes can change and be subjective.

A complete list of a patient's **allergies** should also be included on a med list or history. This includes drug allergies such as sulfa drugs, aspirin, and opioids; food allergies such as shellfish, eggs, and peanuts; and environmental allergies such as bee stings, medical tape, and latex. The patient's reactions should also be listed. Sometimes patients mistake reactions that are simply side effects such as nausea or sedation for actual allergies. These types of reactions aren't unimportant. A patient who throws up when he or she takes codeine

doesn't want to keep taking it. On the other hand, it's important that reactions that aren't true allergies don't prevent a clinician from providing the patient with a needed therapy, such as a particular antibiotic.

Any **adverse drug reactions** a patient is experiencing should be documented, in addition to any problems a patient is having taking their meds.

Other information that's good to have is **contact info for a patient's providers**. This is especially true if multiple providers are prescribing medications for the patient. Contact info for the patient's pharmacy or pharmacies can be included too.

What other steps are important in creating a med list or history?

As mentioned, policies and procedures in your practice setting will likely provide a framework for the process you'll follow in creating med lists and histories. One key component is that the information is gathered in a systematic fashion. For example, use a routine list of questions wherein each necessary piece of information is addressed. In addition, verifying a med history with a second reliable source might also be required in the hospital setting and is a good idea in outpatient settings too, especially to fill in any gaps. These sources may include a family member or caregiver (make sure there are no issues with HIPAA), the patient's community pharmacy, or the patient's prescriber. It's also likely that a pharmacist will be required to review the patient's medication history or list for correctness and to follow up on any potential issues.

In the hospital setting, follow proper procedures for contact with patients such as by using hand hygiene when you enter and exit the patient's room and by following any additional precautions such as wearing gloves and a gown when entering the room of a patient on contact isolation.

When should a patient's med list be updated?

Recommend that patients update their med lists at least **after every visit to a prescriber and after being discharged from the hospital**. This way changes can be incorporated as soon as they happen. When patients bring in new prescriptions or come in for other pharmacy service, help them add new medications along with the start date and cross off old ones, if necessary, along with adding the stop date.

How can patients use their med lists?

Recommend that patients keep their med lists handy in case of emergency. The med list should also be shown at every office visit, at the pharmacy, or on admission to the hospital. This can help prevent errors and keep all the patient's providers on the same page.

What's the best way for a patient to keep their med list?

A med list can be as simple as a **handwritten list** on a piece of paper. A med list can be stored as a **simple electronic document** (e.g., *Microsoft Word* document, PDF). The FDA has such a form at http://www.fda.gov/downloads/AboutFDA/ReportsManualsForms/Forms/UCM095018.pdf. This form provides very detailed instructions for patients. There are also a variety of **smartphone apps** (e.g., *My Meds*) for keeping medication lists. Some of these have handy features such as the capability of sharing the list with providers electronically.

Regardless of the mechanism, it's important for patients to ensure their med lists are complete, correct, and current.

Cite this document as follows: **Technician Tutorial, *Mastering Medication Lists and Histories. Pharmacist's Letter/Pharmacy Technician's Letter.* December 2022. [381283]**

--Continue to the next section for a "Cheat Sheet" for Mastering Medication Lists and Histories--

"Cheat Sheet" for Mastering Medication Lists and Histories

What's a difference between medication lists and medication histories?

- **Medication list** is a term used more frequently in the community or outpatient setting.
- The term **medication history** may be used more frequently in the hospital or inpatient setting.

What benefits do med lists and histories offer over info in clinicians' computer systems?

- Clinicians' lists are not always complete, correct, or current, and they may not include all nonprescription products a patient is taking.
- Patients may be taking meds differently than prescribed in some cases.

What are some tips for communicating with patients when gathering med info?

- Introduce yourself, state your purpose, and let the patient/caregiver know what to expect.
- Make eye contact as appropriate.
- Speak clearly and not too fast.
- Access any available information about the patient's medications, such as their profile or a list of discharge meds from their last admission, if possible. Use this list as a starting point.
- Refer to meds by brand or generic name, whichever the patient recognizes most easily.
- Ask open-ended questions. Patients will be able to answer "yes" or "no" questions even if they don't understand the question.
- If you don't understand a patient's response, ask questions to clarify.
- Don't use medical jargon; it may confuse patients.
- When you're finished, let the patient know, ask if they have questions, and thank them for their time.

What is a "best possible" med list or history?

- A complete med list or history has **all the medications a patient is taking**, by any route, from any source, whether or not they require a prescription.

What details should be included on a med list or history?

- For each medication a patient is taking, include the **strength and regimen** (dose and dosing schedule).
- The **indication or reason for use** should also be included.
- The **date each medication was started (or stopped)** is helpful.
- If a patient has recently stopped or started a med, ask them about the **reason for the change**.
- For hospital admission med histories, document the **last time the patient took a dose of each med**.
- A complete list of a patient's **allergies** should also be included.
- Any **adverse drug reactions** a patient is experiencing should be documented, in addition to any problems a patient is having taking their meds.
- Other information that's good to have is **contact info for a patient's providers**.

When should a patient's med list be updated?

- Recommend that patients update their med lists at least **after every visit to a prescriber and after being discharged from the hospital**.

[December 2022; 381283]