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### EDUCATIONAL OBJECTIVES

**GOAL:** To educate the community pharmacy team about oral anticancer medications

**After participating in this activity, pharmacists will be able to:**

- > Discuss patient and system barriers to care with oral anticancer medications
- > Outline the pharmacist's role in the interdisciplinary team as it contributes to therapy outcomes of oral anticancer medications
- > Describe proper handling and disposal of oral anticancer medications
- > List common counseling points for patients receiving oral anticancer medications

**After participating in this activity, pharmacy technicians will be able to:**

- > Recall ways to help patients with barriers associated with oral anticancer medications
- > List the goals of patient education and adherence counseling
- > Describe when to refer patients to the pharmacist for counseling or advice



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# The role of the community pharmacy team in assisting patients receiving oral anticancer medications

Lisa M. Holle, PharmD, BCOP, FHOPA

ASSOCIATE CLINICAL PROFESSOR, DEPARTMENT OF PHARMACY PRACTICE, UNIVERSITY OF CONNECTICUT SCHOOL OF PHARMACY, STORRS, CONN., AND ASSISTANT PROFESSOR, DEPARTMENT OF MEDICINE, UNIVERSITY OF CONNECTICUT SCHOOL OF MEDICINE, FARMINGTON, CONN.

## Abstract

*Oral anticancer medications are commonly used in the treatment of cancer. Although they offer patients many advantages over traditional intravenous anticancer therapy, challenges exist because the patient and caregiver must be well educated so that the patient achieves the best cancer outcome and safety risks are reduced. While the oncology healthcare team plays a critical role in providing education and monitoring of patients on oral anticancer medications, the community pharmacy team can assist them when needed to facilitate the patient in achieving optimal outcomes. A thorough understanding of the patient and system barriers with these medications, proper administration and adherence, drug and food interactions, safe handling and disposal, and patient education is needed by the community pharmacy team to ensure their collaborative role in caring for patients with cancer.*

### FACULTY: LISA M. HOLLE, PHARM.D, BCOP, FHOPA

Dr. Holle is an associate clinical professor, Department of Pharmacy Practice, University of Connecticut School of Pharmacy, Storrs, Conn., and an assistant professor, Department of Medicine, University of Connecticut School of Medicine, Farmington, Conn.

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CONTINUED ON PAGE 60 >

&lt; CONTINUED FROM PAGE 59

## Introduction

The use of oral anticancer medications in the treatment of cancer has increased over the last decade. Over 50 oral anticancer medications are on the market in the United States, and it is estimated that more than 25% of all anticancer agents in development are oral formulations (**Table 1**).<sup>1-3</sup> Common cancers such as breast, colorectal, liver, lung, pancreatic, and prostate cancers, as well as less common cancers such as multiple myeloma and chronic myelogenous leukemia are often treated with at least 1 oral anticancer medication either alone or in combination with other oral anticancer agents or traditional intravenous (IV) anticancer therapy.

Oral anticancer medications offer many advantages. These medications are administered at home by the patient or by the caregiver, eliminating the need for clinic visits or hospitalization for IV administration, which reduces the amount of healthcare professional time spent on preparation, dispensing, administration, and monitoring of anticancer therapy and allows the patient to have a more normal daily routine.<sup>4-6</sup> Additionally, these medications—many of them newer targeted therapies—tend to have fewer acute side effects than IV chemotherapy, providing patients with a better quality of life.<sup>6,7</sup> Despite these advantages, oral anticancer medications have challenges, especially the need for strict medication adherence to achieve the full effect of the anticancer medication, a responsibility carried by the patient and/or caregiver. In some cases, the anticancer medications have complex schedules, which can be difficult for the patient to follow without appropriate education and healthcare provider support. Furthermore, the patient is responsible for identifying and reporting side effects between clinic visits such that optimal management can be provided. This too requires a thorough understanding of the potential side effects and management of these drugs. Many oral anticancer agents are associated with drug–drug and drug–food interactions and/or require special handling, storage, and disposal methods.

Finally, barriers to acquisition of oral anticancer agents and their high costs can be burdensome to patients.

Although most oral anticancer agents are dispensed through specialty pharmacies, not all are. Many cancer centers also have pharmacists and/or nurses who provide comprehensive oral anticancer therapy programs that provide initial and follow-up education and monitoring, but again, not all do.<sup>8-15</sup> Because the community pharmacy team is often seeing the patient more frequently for dispensing of other medications and providing counseling and recommendations on over-the-counter (OTC) medications, it is vital for them to also be knowledgeable about patient and system barriers to use, importance of proper administration and adherence, drug and food interactions, proper handling and disposal, and educating the patient on proper monitoring of side effects. This article uses patient cases to illustrate the role of the community pharmacy team in assisting patients receiving oral anticancer medications.

for treatment of their disease. Some, such as injectables, will be administered in a cancer center clinic, whereas others will be administered by the patient. In the case of patient WF, he will receive denosumab in his cancer center clinic or oncologist's office and the leuprolide injection either at that time with denosumab or at his urologist's office. Abiraterone acetate will be dispensed from a specialty pharmacy (onsite, local, or mail order) or an in-office dispensing service (physician's office or cancer center) and prednisone will be dispensed from his local retail pharmacy or an in-office dispensing service. With potentially 4 different healthcare settings in which this patient will receive anticancer medications, fragmentation of care is likely. Therefore, it is of utmost importance for everyone on the healthcare team to work together to facilitate care.

Some of the most common barriers to oral anticancer medications include cost, insurance requirements, and easy access. The cost of oral anticancer med-

“Although most patients will have insurance to cover a portion of the cost, the out-of-pocket expenses have also risen. From 2001 to 2011, the average per patient, per month out-of-pocket expense rose from \$200 to \$2100 for oral targeted anticancer medications.

## Patient and system barriers with oral anticancer medications

**WF is a 69-year-old man with metastatic castrate-resistant prostate cancer. His anticancer medication includes leuprolide 22.5 mg intramuscularly (IM) every 12 weeks, but he has recently developed new metastatic lesions in the lumbar spine. He will continue on leuprolide but will now begin abiraterone acetate 1000 mg by mouth once daily, prednisone 5 mg twice daily, and denosumab 120 mg subcutaneously every 28 days.**

It is not uncommon for patients with cancer to receive multiple medications

ications has grown exponentially. Newly marketed oral anticancer medications range from \$6000 to \$12,000 monthly.<sup>16</sup> Although most patients will have insurance to cover a portion of the cost, the out-of-pocket expenses have also risen. From 2001 to 2011, the average per patient, per month out-of-pocket expense rose from \$200 to \$2100 for oral targeted anticancer medications.<sup>17</sup>

The type of insurance coverage depends on the anticancer medication. Traditional infusion chemotherapy and any injectable anticancer medication administered in a physician's office

## ROLE OF THE COMMUNITY PHARMACY TEAM IN ASSISTING

or cancer center is covered under the patient's medical insurance. For example, in Medicare patients, Medicare Part B insurance would pay for the injectable medications. Few oral anticancer medications are covered under medical insurance, however, that is, only those with an available IV formulation. Oral anticancer medications instead are billed through the patient's prescription drug insurance. For Medicare patients, this would be Medicare Part D. Furthermore, payers are often managing the high costs of these oral anticancer medications by limiting dispensing through specialty or mail-order pharmacies and placing oral anticancer medications in cost-sharing tiers with variable copay expectations for patients. Numerous reports of patients and families going into debt or cutting back on essential items (eg, groceries and utilities) to cover costs of therapy exist.<sup>18</sup> Utilizing manufacturer- or foundation-sponsored prescription assistance programs may be helpful to patients who are unable to afford their out-of-pocket expenses. The federal anti-kickback statute, however, prevents Medicare beneficiaries from benefiting from manufacturer-sponsored coupons or patient assistance.<sup>1</sup> Many insurers will also require prior authorization before a prescription can be filled, which may delay when the patient receives their medication and require additional healthcare resources.<sup>19</sup>

Depending on the patient's insurance and, in some cases,

## PAUSE AND PONDER

**A colorectal cancer patient arrives in your pharmacy with a prescription for capecitabine. What handling precautions should be considered when preparing the prescription for dispensing?**

the manufacturer, the oral anticancer medication may only be available from a specialty or mail-order pharmacy. Although these pharmacies often strive to provide overall disease management and education/telephone consults, they are often limited by lack of access to a patient's medical record and healthcare team.<sup>1</sup> Significant delays in time to therapy start often occur (1–2 weeks) with use of specialty pharmacies as a result of lost prescriptions, clarifications, prior authorization requirements, and the ability to connect with a patient to retrieve appropriate information for dispensing. Additionally, the cancer

team members and patients are frequently required to spend a significant amount of time and administrative resources to coordinate care.<sup>1,19</sup> Often, oral anticancer medications are excluded from hospital formularies and are costly, making transitions of care problematic and requiring coordination from all healthcare team members.<sup>20</sup>

The community pharmacy team can play an important role when it comes to patient and system barriers. They may assist the patient or healthcare team with obtaining prior authorizations, facilitating prompt receipt of the medication, and identifying possi-

**TABLE 1**  
**Available Oral Anticancer Medications**

| ANTICANCER MEDICATION | MEDICATION CLASS | SPECIFIC FOOD INSTRUCTIONS        |
|-----------------------|------------------|-----------------------------------|
| ABIRATERONE ACETATE   | Hormonal         | Empty stomach                     |
| AFATINIB              | Targeted         | Empty stomach                     |
| ALECTINIB             | Targeted         | With food                         |
| ALTRETAMINE           | Antineoplastic   | With food                         |
| ANASTRAZOLE           | Hormonal         |                                   |
| BEXAROTENE            | Targeted         | With food, avoid grapefruit       |
| BICALUTAMIDE          | Hormonal         |                                   |
| BOSUTINIB             | Targeted         | With food, avoid grapefruit       |
| BUSULFAN              | Antineoplastic   |                                   |
| CABOZANTINIB          | Targeted         | Empty stomach                     |
| CAPECITABINE          | Antineoplastic   | With food                         |
| CERITINIB             | Targeted         | Empty stomach                     |
| CHLORAMBUCIL          | Antineoplastic   | Empty stomach                     |
| COBIMETINIB           | Targeted         |                                   |
| CRIZOTINIB            | Targeted         |                                   |
| CYCLOPHOSPHAMIDE      | Antineoplastic   | With food, avoid grapefruit       |
| DABRAFENIB            | Targeted         | Empty stomach                     |
| DASATINIB             | Targeted         |                                   |
| ENZALUTAMIDE          | Hormonal         |                                   |
| ERLOTINIB             | Targeted         | Empty stomach                     |
| ESTRAMUSTINE          | Antineoplastic   | Empty stomach                     |
| ETOPOSIDE             | Antineoplastic   | Empty stomach                     |
| EXEMESTANE            | Hormonal         | With food, avoid grapefruit       |
| EVEROLIMUS            | Targeted         | Consistently with or without food |
| FLUDARABINE           | Antineoplastic   |                                   |
| FLUTAMIDE             | Hormonal         |                                   |
| IBRUTINIB             | Targeted         |                                   |
| IDELALISIB            | Targeted         |                                   |
| IMATINIB              | Targeted         | With food, avoid grapefruit       |
| IXAZOMIB              | Targeted         | Empty stomach                     |
| LAPATINIB             | Targeted         | Empty stomach                     |
| LENALIDOMIDE          | Targeted         |                                   |
| LENVATINIB            | Targeted         |                                   |
| LETROZOLE             | Hormonal         |                                   |

CONTINUED 62 &gt;

**TABLE 1** Available Oral Anticancer Medications *continued*

| ANTICANCER MEDICATION | MEDICATION CLASS | SPECIFIC FOOD INSTRUCTIONS                           |
|-----------------------|------------------|--|
| LOMUSTINE             | Antineoplastic   | Empty stomach  |
| MELPHALAN             | Antineoplastic   | Empty stomach  |
| 6-MERCAPTOPYRINE      | Antineoplastic   | Empty stomach  |
| METHOTREXATE          | Antineoplastic   | Empty stomach  |
| NILOTINIB             | Targeted         | Empty stomach  |
| NILUTAMIDE            | Hormonal         |  |
| OLAPARIB              | Targeted         | Avoid Seville oranges and grapefruit                 |
| OSIMERTINIB           | Targeted         |  |
| PALBOCICLIB           | Targeted         | With food  |
| PANOBINOSTAT          | Targeted         | Avoid star fruit, pomegranate, and grapefruit        |
| PAZOPANIB             | Targeted         | Empty stomach  |
| POMALIDOMIDE          | Targeted         | Empty stomach  |
| PONATINIB             | Targeted         |  |
| PROCARBAZINE          | Antineoplastic   | Avoid tyramine-containing foods                      |
| REGORAFENIB           | Targeted         | With low-fat breakfast (<30 g fat), avoid grapefruit |
| RUXOLITINIB           | Targeted         |  |
| SONIDEGIB             | Targeted         | Empty stomach  |
| SORAFENIB             | Targeted         | Empty stomach  |
| SUNITINIB             | Targeted         |  |
| TAMOXIFEN             | Hormonal         |  |
| TEMOZOLOMIDE          | Antineoplastic   | Empty stomach  |
| THALIDOMIDE           | Targeted         | Empty stomach  |
| THIOGUANINE           | Antineoplastic   |  |
| TOPOTECAN             | Antineoplastic   |  |
| TRAMETINIB            | Targeted         | Empty stomach  |
| TRETINOIN             | Targeted         | With food  |
| TRIFLURIDINE/TIPRACIL | Antineoplastic   | With food  |
| VANDETANIB            | Targeted         |  |
| VEMURAFENIB           | Targeted         |  |
| VENETOCLAX            | Targeted         | With food and water, avoid grapefruit                |
| VISMODEGIB            | Targeted         |  |
| VORINOSTAT            | Targeted         | With food  |

ble cost-saving programs through foundations or, if eligible, manufacturer-sponsored programs. If the patient is required to receive their oral anticancer medication from a specialty or in-office dispensing service, the pharmacy team should still make every effort to evaluate potential drug–drug or drug–food interactions when they are dispensing other medications. This will require knowledge of what other medications the patient may be receiving from specialty pharmacies and/or the patient’s provider.

### Administration of and adherence to oral anticancer medications

*KS is a 62-year-old woman who was recently diagnosed with estrogen- and progesterone-receptor positive and human epidermal growth factor receptor 2 (HER2)-negative metastatic breast cancer. She has been prescribed palbociclib 125 mg once daily on days 1–21 (then 1 week off) and letrozole 2.5 mg by mouth daily (continuous dosing) every 28 days.*

One of the most important aspects of oral anticancer medications is ensuring the patient takes their medication as prescribed to provide the maximal cancer benefit and minimize side effects. As demonstrated by this patient, oral anticancer medications are not necessarily given on a continual basis. Several oral anticancer medications are given continuously for a period of time, such as 1 to 3 weeks, and then the patient is provided a time (eg, 1 week) without the medication to minimize toxicity. This can be complicated for patients to remember, particularly if they are taking another medication on a continual basis, such as this case patient’s letrozole.

Adherence to medications is also critical. Reported adherence to oral anticancer medications in the literature ranges from 46% to 100%.<sup>21,22</sup> Although oral anticancer medications are generally associated with fewer side effects than IV chemotherapy, side effects are still among the most common reasons for nonadherence. Other reasons include lack of support from family and friends, forgetting to take the medication, long treatment duration, complex regimens, and cost.<sup>22,23</sup> Consequences of nonadherence in cancer include disease progression, lower quality of life, and increased healthcare costs.<sup>22</sup> For most patients, complete adherence is unlikely unless they have multidisciplinary support.

Thus, the community pharmacy team can play an important role in reinforcing and/or providing the patient with appropriate patient education and tools for proper administration and adherence monitoring. For patient KS, for example, a calendar illustrating the complex dosing schedule for palbociclib and letrozole would be helpful. Manufacturers often have patient materials (eg, a patient dosing calendar) that may be downloadable and useful during the patient education session. Offering continued support to facilitate adherence is also important. Educating the patient on appropriate resources for facilitating adherence, such as pill boxes or electronic reminder or schedule applications or devices, could be beneficial, particularly if the patient is having difficulty with adherence. Most important is communicating with the patient before each refill to assess the patient’s adherence.

## ROLE OF THE COMMUNITY PHARMACY TEAM IN ASSISTING

It can be difficult given the busy workload of community pharmacy teams, but some simple questions can be asked to begin the discussion (**Table 2**).

### Drug and food interactions with oral anticancer medications

**MG is a 67-year-old man with metastatic colorectal cancer taking regorafenib 160 mg by mouth on days 1–21 every 28 days. He gets this filled at a mail-order specialty pharmacy but has come to your pharmacy today to get prescriptions from his primary care provider filled for clarithromycin, omeprazole, and amoxicillin for treatment of *Helicobacter pylori*.**

Drug and food interactions are common with oral anticancer medications

specific recommendations for use with acid-suppressing medications, such as histamine-2 receptor antagonists, proton pump inhibitors, and antacids.

Most retail pharmacy software systems have the ability to screen for harmful drug interactions. However, data show that pharmacists may often miss clinically significant drug interactions.<sup>26</sup> This may be because of alert fatigue from software and outdated software.<sup>26,27</sup> Pharmacists should be fully knowledgeable about drug interactions and should not rely solely on software systems alerts, particularly with oral anticancer medications. Product information will contain relevant drug–drug interactions that were discovered during product

toxicity. Therefore, some oral anticancer medications include instructions to be taken with food, whereas others are to be taken on an empty stomach (see **Table 1**). Some drugs may have interactions with calcium-containing foods or supplements and others with grapefruit. Finally, a few oral anticancer medications contain quantities of lactose as inactive ingredients, which may be problematic for those with lactose intolerance or allergies. Food interactions can be difficult to manage for patients because lifestyle changes may be required, and many of these patients also have multiple concomitant medications. These changes in lifestyle can adversely affect the likelihood of adherence, so this must be taken into consideration when developing education and recommendations. Similar to drug–drug interactions, drug–food interactions can be found in product information, drug software databases, and the aforementioned review article.<sup>25</sup>

For patient MG, both food and drug interactions are present. Coadministration of strong CYP3A4 inducers (eg, rifampin, St. John's wort) decreases the serum concentrations of regorafenib, whereas coadministration of CYP3A4 inhibitors (eg, clarithromycin, grapefruit juice) increases the serum concentration of regorafenib.<sup>28</sup> Because of this, it is suggested that use of strong CYP3A4 inducers and inhibitors be avoided.

Regorafenib also competitively inhibits other CYP450 enzymes and UGT. Therefore, determining if regorafenib interacts with other medications is also important. Concomitant warfarin and regorafenib therapy increases the risk of hemorrhage. For patients receiving both, vigilant monitoring of international normalized ratio (INR) is essential. Regorafenib is not associated with QTc prolongation, is not affected by acid suppression or calcium, and does not contain lactose. In this case, the patient's primary care provider will need to be informed of the interaction between clarithromycin and regorafenib, which may decrease the effectiveness of regorafenib. Alternative *H. pylori* regimens that could be

**TABLE 2**

### Example Questions Pharmacist Can Ask to Assess Patient's Adherence to Oral Anticancer Medications

***I know it is difficult to remember to take all your medications regularly. How often do you miss taking medication X?***

***Have you had to stop your medication X for any reason?***

***How often do you not take medication X?***

***When was the last time you took medication X?***

***Have you noticed any side effects from your medication?***

and are associated with enhanced treatment-related side effects because of their fairly narrow therapeutic index. In fact, 4% of deaths among cancer patients are caused by drug interactions, and this number is likely to increase with the fragmentation of care in cancer patients.<sup>24</sup> As with most medications, the cytochrome P450 (CYP450) enzyme class is the predominant substrate of oral anticancer medications. P-glycoprotein, breast cancer resistance protein, and uridine diphosphate glucuronyltransferase (UGT), however, are also minor or major substrates of these medications.<sup>25</sup> Additionally, many oral anticancer medications can affect the absorption of warfarin and/or prolong the QTc interval. Finally, acid suppression can also affect absorption rates, and thus several oral anticancer medications have

development. Additionally, drug–interaction software databases (eg, Lexicomp or Micromedex) that provide references and details of data can be useful in determining significance of a potential interaction as well as providing timely updates based on literature searches. Another good resource is a literature review of oral chemotherapy food and drug interactions published in 2014.<sup>25</sup> This article details drug–drug and drug–food approved oral anticancer medications at the time.

Drug–food interactions with oral anticancer medications are often just as potentially serious as some drug–drug interactions. Effects on absorption can significantly affect the maximum concentration and area-under-the-curve of oral anticancer medications, reducing effectiveness or increasing likelihood of

CONTINUED ON PAGE 64 ➤

&lt; CONTINUED FROM PAGE 63

recommended to the provider are omeprazole, bismuth salicylate, tetracycline, and metronidazole. None of these medications will interact with regorafenib.

Absorption of regorafenib is significantly affected by food, particularly fat content. Therefore, regorafenib must be taken with a low-fat meal. The manufacturer provides specific instructions for taking it with a low-fat breakfast (<30% fat) and actually provides some examples of such a meal (2 slices white toast with 1 tablespoon low-fat margarine and 1 tablespoon jelly and 8 ounces milk, or 1 cup cereal with 8 ounces skim milk, 1 slice white toast with jam, apple juice, and 1 cup coffee). For patients who have difficulty adhering to such regimens, a consultation with a nutritionist could be beneficial. In this case, it would be important for patient MG to be reminded of the need to use a low-fat meal for administration of the regorafenib. Because this medication is administered for 3 consecutive weeks with 1 week off, the case patient could eat a normal meal during the off week. He should also be instructed to avoid grapefruit products.

### Safe handling and disposal of oral anticancer medications

***LV is a 58-year-old woman with advanced pancreatic cancer. She is receiving gemcitabine 1000 mg/m<sup>2</sup> IV on days 1, 8, and 15 at the cancer center and takes capecitabine 830 mg/m<sup>2</sup>/dose (3 500-mg tablets [1500 mg]) twice daily on days 1–21. The 4<sup>th</sup> week is off-treatment, and then another cycle starts on day 29.***

Oral anticancer medications can be hazardous and may pose a potential risk to those who are handling or disposing of any unused or expired medication.<sup>29</sup> Some oral anticancer medications are cytotoxic similar to traditional IV chemotherapy and could have carcinogenic, teratogenic, or reproductive toxicity, as well as organ toxicity at low doses.<sup>30</sup> Other oral anticancer medications, such as many of the targeted and hormonal anticancer medications, are not cytotoxic but can have teratogenic or embryogenic effects. Others can mimic properties of hazardous chemicals and can be directly toxic, ignitable,

“Consequences of nonadherence in cancer include disease progression, lower quality of life, and increased healthcare costs. For most patients, complete adherence is unlikely unless they have multidisciplinary support.

corrosive, or reactive. Therefore, understanding the proper storage, preparation and handling, administration, and disposal is necessary to minimize exposure to healthcare professionals, patients, caregivers, and the public. First, it is necessary to understand if an oral anticancer medication is a hazardous drug. The National Institute for Occupational Safety and Health (NIOSH) periodically publishes a list of antineoplastic and other hazardous drugs in healthcare settings.<sup>31</sup> The last version was published in 2014, with a proposed update in 2016 available online at: <http://www.cdc.gov/niosh/docket/review/docket233a/pdfs/proposed-additions-to-the-niosh-2016-hazardous-drugs-list-05-11-2015.pdf>. These documents provide a listing of drugs that are considered truly antineoplastic and thus have a reproductive risk, nonantineoplastic drugs that meet criteria for a hazardous drug, or drugs that carry a known reproductive risk to men and women. They also provide a listing of drugs with known manufacturer safe handling guidelines.

Oral anticancer medications that are considered hazardous should be stored separately from other medications, and caution should be used with preparing or handling the medications. Healthcare professionals should use personal protective equipment (eg, gown, double gloves, eye or respiratory protection, and use of ventilated engineering controlled environments) depending on the hazardous nature of the drug. The NIOSH publication provides guidance on the type of personal protective equipment that should be used when working with hazardous drugs. For example, when handling intact tablets or capsules, gloves should be used when touching the medication. Hands should be

thoroughly washed before and after glove administration.<sup>30</sup> As well, these medications should not be counted in a tablet counting tray that is used for other medications, and automatic-counting devices should not be used. If a tray is used for counting oral anticancer medications, it should be thoroughly cleaned between uses and reserved for hazardous medications only. Any disposable materials used during handling of hazardous oral anticancer medications should be disposed of as cytotoxic waste according to local waste disposal regulatory guidelines. Healthcare professionals who store and dispense oral anticancer medications should also have a written emergency plan in place in the event of accidental exposure or spill.

Healthcare professionals should provide the patient and caregivers information about appropriate storage, handling, administration, and disposal of the medication.<sup>30</sup> Caregivers who are pregnant or breastfeeding and children should not handle any oral anticancer medication that is cytotoxic (ie, cyclophosphamide) or is potentially teratogenic or embryogenic (ie, medications labeled as pregnancy category X). Similarly, human waste (urine, feces, vomit) of patients taking these medications or soiled linens should not be handled by pregnant and/or breastfeeding caregivers or children. If this cannot be avoided, protection such as gloves is recommended. Soiled linens should be washed separately from nonsoiled linens. Using separate adherence devices for oral anticancer medications and other medications is recommended to avoid contamination. Patients should also swallow hazardous oral anticancer medications whole and not cut or crush them. Finally, thorough hand wash-

## ROLE OF THE COMMUNITY PHARMACY TEAM IN ASSISTING

ing before and after administration of oral anticancer medications as well as after the patient uses the toilet or vomits is important.

Some patients will not use all of their oral anticancer medications either because they do not tolerate the medi-

skin occurs, wash thoroughly, and if contact with mucous membranes occurs, flush thoroughly with water.<sup>32</sup> As a community pharmacy team, a few things should be considered when dispensing this medication. Because it is considered cytotoxic, a separate counting tray should be

***pharmacy to your pharmacy. It appears he has not received much information about the medication yet.***

Patient education with oral anticancer medications is critical. Unlike traditional IV chemotherapy, the patient is now responsible for ensuring that

## PAUSE AND PONDER

**You approach a patient in your over-the-counter product area who is looking for advice for a rash he has developed since starting his new oral anticancer medication. What will you recommend to him?**

cation or because their disease has progressed. In some cases, the medication will become expired. Once the patient is no longer using the medication or it is expired, proper disposal should occur. If the oral anticancer medication is on the NIOSH hazardous drug list, it will need to be disposed of properly. These medications should never be flushed down the toilet or put in the trash because of potential exposure to the public. Many drug take-back programs do not allow acceptance of hazardous medications. Disposal really should occur at a facility that has a proper hazardous drug disposal system in place and complies with local regulations. In many cases, the cancer center or physician office will have a program in place to allow disposal of these medications. Therefore, the patient should be instructed to talk with their cancer provider to find out about the proper disposal.

In the case of patient LV, she is receiving 1 oral anticancer medication, capecitabine. Capecitabine is categorized as antineoplastic medication and pregnancy category D in the NIOSH hazardous drug list.<sup>31</sup> The manufacturer also provides specific instructions in the packaging regarding handling of the medication. It specifies that: care should be exercised in handling; tablets should not be cut or crushed; proper handling and disposal should be considered; any unused product should be disposed of in accordance to local requirements; and if contact with

used. The pharmacy technician should thoroughly wash their hands before donning gloves and cleaning the tray. The tray should also be cleaned after counting, and the disposable gloves and materials should be placed in a hazardous waste container. The technician should then wash their hands again. If the technician is pregnant or breastfeeding, she should not be required to count or handle the medication.

When dispensing capecitabine to patient LV, the pharmacist should explain why it is important to store this medication separately if using a pill box, and that she should administer it to herself rather than asking a caregiver (if possible) to avoid unnecessary exposure. If she does have someone helping her, that caregiver should wear gloves when handling any waste (eg, vomit) or the capecitabine. Finally, she should be instructed to not flush or put her capecitabine in the trash and contact her cancer center if she has any leftover capecitabine to learn about proper disposal unless her pharmacy offers disposal of hazardous medications.

### **Patient education with oral anticancer medications**

***BW is a 45-year-old man with metastatic non-small-cell lung cancer that is anaplastic lymphoma kinase (ALK) positive. He is otherwise healthy. He is about to begin crizotinib 250 mg by mouth twice daily. He is picking up his prescription, which was delivered from the mail-order***

the medication is taken appropriately and reporting any side effects promptly to the healthcare provider. Educating before the start of treatment and during treatment is an essential part of assisting patients with adherence and ensuring the best outcomes, which means maximizing cancer treatment outcomes and preventing or mitigating side effects. Ideally, this education would be provided by a pharmacist or nurse trained in oncology pharmacy or nursing. Some cancer practices, however, do not have these programs in place. The goal of patient education is to provide the patient with the tools they need to adhere to their prescribed oral anticancer medication regimen.

To assist patients with adherence, education about administration, importance of adherence, whether to take with or without food or other important drug-food interactions, possible drug-drug interactions, the plan for missed doses, and any concurrent cancer treatment or supportive care medications is important. Additionally, providing the patient with information about common side effects and their management, as well as the process for obtaining refills and reducing out-of-pocket costs, is essential for proper adherence. Many of these issues have been discussed previously, but a few are highlighted here.

Patients need to know what to do if they forget to take a dose of their oral

CONTINUED ON PAGE 66 >

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anticancer medication. Missing a dose could result in less-than-optimal cancer outcomes, particularly if it occurs frequently. Conversely, doubling doses can result in toxicity. Generally, for oral anticancer medications administered once or twice daily, a missed dose can be administered within 6 hours of the normal dosing time. If it is more than 6 hours, the dose should be skipped. Typically, it is not recommended to repeat a dose if vomiting occurs after administration. Consulting the package insert is recommended.

Because many oral anticancer medications are dispensed by specialty pharmacies and mailed directly to the patient's home, local retail pharmacy, or physician's office, it is important for patients to understand their specialty pharmacy's process for refills. Often, this will require planning ahead to order refills early enough to ensure these are received before patients run out of their medication. Providing this information can prevent interruptions in therapy.

Oral anticancer medications have side effects that are often unique to their drug category. Some of these side effects can be severe and require continual monitoring. For example, some oral anticancer medications may cause hypertension, QTc prolongation, myelosuppression, hepatotoxicity, or laboratory abnormalities (eg, hypokalemia) and may require frequent monitoring. Other common side effects include nausea/vomiting, diarrhea, mouth sores, and skin rash. Understanding how to manage side effects and when to inform the healthcare team about them is just as essential. Patients may begin to accept side effects as part of treatment and "over-adhere" to the regimen by continuing despite the side effects or self-treating with OTC medications/supplements. This can be detrimental, resulting in worsening side effects, hospitalization, and increased costs. Many practices have begun to have regular oral anticancer medication follow-up

programs to facilitate communication between patient visits to assess for side effects, reinforce side-effect management and adherence, and answer questions. Despite this, initial and continual education can be beneficial. Similarly, caution should be used in recommending OTC medications, supplements, and remedies for self-treatment. The community pharmacy team should be aware of the potential risks of inappropriate self-treatment and refer the patient to their oncology team for evaluation and recommended treatment.

One fairly unique counseling point for many oral anticancer medications that are teratogenic includes contraception recommendations. Recommendations may include use of contraception during use of the oral anticancer medication or for a specified period following last dose, and may include both men and women or only women. Specific guidance on contraception can be found in the package insert and should be discussed with each patient of child-bearing potential.

In the case of patient BW, not only should he be counseled on all of the required pharmacist counseling points, but emphasis should be placed on factors that will assist with adherence and provide safety to him and his family. He should be instructed to take crizotinib by mouth, with or without food, twice daily (~12 hours apart to maximize continual drug concentrations).<sup>33</sup> Crizotinib is metabolized by CYP3A. Therefore, he should be counseled about avoiding grapefruit and grapefruit juice. If he misses a dose, he can be instructed to take the next dose unless that dose is due within 6 hours (according to package insert). If he vomits after taking crizotinib, he should wait and take the next dose at the regularly scheduled time, because some absorption may have occurred. The patient should be informed of the process for refilling the crizotinib. Some specialty pharmacies will contact the patient within 2 weeks

before the next refill is due, whereas others require patient or healthcare provider to provide that information.

Common side effects with crizotinib include vision disorders (blurred vision, light flashes, floaters), nausea/vomiting, diarrhea, edema, constipation, fatigue, elevated liver function tests, decreased appetite, and upper respiratory infections. Although less common, neutropenia can occur. Patient BW should be informed to alert his cancer care team about the onset of vision disorders, gastrointestinal symptoms, edema, or cough, fever, or other signs of infection at their onset, because these may need to be evaluated and/or treated quickly to avoid complications. Because of the risk of neutropenia in patients taking crizotinib, and thus likelihood of a life-threatening infection, the patient should not routinely take an antipyretic for pain or fever. Finally, this case patient needs to be aware of the embryo-fetal toxicity that can occur with crizotinib. If he and/or his female partner is of reproductive potential, he should be aware that he needs to use effective contraception during and for 90 days following his last dose of crizotinib.

## Conclusion

Oral anticancer medications offer an advancement in the treatment of cancer and can provide convenience and improved quality of life for patients. Adherence and safety issues, however, can be a concern. Comprehensive patient education is key to proper adherence and outcomes. The community pharmacy team can play an important role in the care of cancer patients receiving oral anticancer medications, regardless of whether they dispense them. They can reinforce patient education and identify potential medication-related problems, referring the patient to the cancer care team when needed and ultimately improving patient outcomes.

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## ROLE OF THE COMMUNITY PHARMACY TEAM IN ASSISTING

## FOR PHARMACISTS

**1. Which of the following statements is true about the cost and payment for oral anticancer medications?**

- a. Medicare Part B will cover cost of all oral anticancer medications.
- b. The out-of-pocket costs for oral anticancer medications can be more than \$2000 per month.
- c. Newly marketed oral anticancer medications typically cost \$100 to \$5000 per month.
- d. Payers limit high costs by requiring dispensing from patient's retail pharmacy.

**2. Patient barriers to receiving oral anticancer medications include:**

- a. Cost
- b. Insurance requirements
- c. Easy access
- d. All of the above

**3. Which of the following statements is true regarding insurance coverage for oral anticancer medications?**

- a. Medicare patients are ineligible for manufacturer coupons.
- b. Manufacturer- or foundation-sponsored prescription assistance programs are only for Medicare patients.
- c. Most oral anticancer medications are billed through medical insurance (eg, Medicare Part B).
- d. Copays are minimal for patients receiving oral anticancer medications.

**4. Cancer care team members may need to assist with which of the following tasks when a patient starts a new oral anticancer medication?**

- a. Prior authorization
- b. Transition from hospital to clinic
- c. Refills
- d. All of the above

**5. Which of the following statements is true about access to oral anticancer medications?**

- a. Dispensing is available through specialty, in-office, and retail pharmacies.
- b. Delays in starting therapy longer than 1 week are uncommon.
- c. Coordination of care is needed to prevent delays in therapy.
- d. Out-of-pocket costs are minimal with new laws.

**6. The community pharmacy team can play an important role in minimizing barriers to oral anticancer medications for patients receiving their medications at a cancer center that has an oral anticancer medication program. They may assist the patient with all of the following except:**

- a. Assisting with identifying eligible patient

assistance programs

- b. Ensuring the patient understands how to obtain refills
- c. Performing drug-drug interaction checks
- d. Providing comprehensive oral anticancer medication monitoring

**7. A 35-year-old woman with metastatic ovarian cancer is beginning olaparib 400 mg by mouth twice daily. She picks up her prescription mailed from the specialty pharmacy along with a prescription for prochlorperazine from your pharmacy. You counsel her to take the olaparib:**

- a. On an empty stomach
- b. With or without food but avoid Seville oranges and grapefruit
- c. With a low-fat breakfast
- d. With food but avoid tyramine-containing foods

**8. Community pharmacists may assist the interdisciplinary team in improving overall cancer outcomes by promoting adherence. Which of the following statements is true about adherence to oral anticancer medications?**

- a. High cost is the most common reason for nonadherence.
- b. A consequence of nonadherence is disease progression.
- c. Complete adherence is likely in most cancer patients.
- d. Adherence should only be assessed by cancer care team.

**9. Patient self-treatment of side effects of oral anticancer medications can lead to all of the following except:**

- a. Overadherence
- b. Worsening side effects
- c. Decreased costs
- d. Hospitalizations

**10. A breast cancer patient picks up her renewal of palbociclib and brings a box of omeprazole to the counter for purchase. What should you do before completing the dispensing and transaction?**

- a. Assess whether the patient has new gastrointestinal symptoms and is self-treating a potential side effect of palbociclib
- b. Perform a drug-drug interaction check because some acid-suppressing medications can affect absorption rates of oral anticancer medications
- c. Assess adherence to palbociclib by asking how often she takes her palbociclib
- d. All of the above

**11. You now are preparing a capecitabine prescription for dispensing and are very busy. Which of the following statements is correct?**

- a. Wash hands and use a separate counting tray
- b. Wash hands, don gloves, and use a separate counting tray
- c. Wash hands, don gloves, and use an automatic counting machine
- d. Wash hands and use automatic counting machine

**12. Which of the following organizations has a publication that lists hazardous drugs?**

- a. American Society of Health-System Pharmacists (ASHP)
- b. Institute for Safe Medicine Practices (ISMP)
- c. National Institute for Occupational Safety and Health (NIOSH)
- d. Occupational Safety and Health Administration (OSHA)

**13. An unused hazardous oral anticancer medication like capecitabine should be disposed of by:**

- a. Placing in the trash
- b. Flushing down the toilet
- c. Taking to a drug take-back program
- d. Following instructions of the patient's cancer care provider

**14. A young daughter of 1 of your patients comes to the pharmacy to pick up her mother's oral cyclophosphamide. Which of the following statements is accurate about handling cyclophosphamide?**

- a. If the daughter is pregnant, the avoidance of administration of cyclophosphamide to her mother is unnecessary.
- b. A separate pill box is not needed for the cyclophosphamide.
- c. Cyclophosphamide can be crushed if her mother has trouble swallowing it.
- d. Hand washing is recommended before and after administration.

**15. Your pharmacy is now going to be stocking some oral anticancer medications. Which of the following precautions does your community pharmacy team not need to take?**

- a. Identify an alternative plan for handling medications that are hazardous if the technician staff is pregnant or breast-feeding
- b. Write a procedure for accidental spill or exposure to a hazardous medication
- c. Provide a separate counting tray for hazardous medication
- d. Provide a separate hand-washing station for employees who work with hazardous medications

**16. You receive a new prescription for imatinib 400 mg by mouth daily. As normal practice, you provide patient education when the patient picks up the medication. The patient says she only has a couple of**

## TEST QUESTIONS

minutes to talk. Which of the following is the most important thing to explain to the patient when she is picking up the medication?

- a. Cost of therapy
- b. Importance of adherence
- c. Intended use and expectation
- d. Type of dosage form

17. Eight days after starting erlotinib therapy, the patient calls to say he has a rash and asks what he can buy over the counter (OTC) to make it stop. The best next step is to:

- a. Recommend an OTC oral antihistamine
- b. Recommend an OTC emollient cream
- c. Explain the rash will subside in a few days
- d. Instruct the patient to call his cancer care team for further instruction

18. Which of the following counseling points

may assist best with adherence during the first cycle for a patient starting on trifluridine/tipiracil 35 mg/m<sup>2</sup> by mouth on days 1–5 and days 8–12 every 28 days for metastatic colorectal cancer?

- a. Providing a calendar showing the days to take the new medication
- b. Explaining to take trifluridine/tipiracil without food
- c. Assessing adherence before each refill
- d. Recommending placing trifluridine/tipiracil in his pill box containing other medications

19. Contraception is an important patient counseling point for patients receiving oral anticancer medications. Which of the following statements is true regarding contraception recommendations?

- a. Contraception is only needed during anticancer treatment.
- b. Only women will require contraception during anticancer treatment.

c. Package insert will provide specific information about contraception.

d. All oral anticancer medications are Pregnancy category X.

20. A 70-year-old woman taking crizotinib 250 mg twice daily for non-small-cell lung cancer calls the pharmacy at 10 am. She has just vomited after a coughing bout and is wondering whether she should re-take her morning dose of crizotinib, which she usually takes at 7 am. Which of the following responses is most correct?

- a. She should take another dose of crizotinib right away.
- b. She should wait to take another dose until her evening dose at 10 pm.
- c. She should call her oncology physician's office for a recommendation.
- d. She should go to the emergency room to determine the cause.

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## ROLE OF THE COMMUNITY PHARMACY TEAM IN ASSISTING

## FOR PHARMACY TECHNICIANS

**1. Community pharmacy technicians can assist patients with which of the barriers associated with a new oral anticancer medication?**

- a. Obtaining prior authorization
- b. Availability of manufacturer-sponsored coupons
- c. Understanding refill process
- d. All of the above

**2. Patient barriers to receiving oral anticancer medications include:**

- a. Cost
- b. Insurance requirements
- c. Easy access
- d. All of the above

**3. Which of the following statements is true regarding insurance coverage for oral anticancer medications?**

- a. Medicare patients are ineligible for manufacturer coupons.
- b. Manufacturer- or foundation-sponsored prescription assistance programs are only for Medicare patients.
- c. Most oral anticancer medications are billed through medical insurance (eg, Medicare Part B).
- d. Copays are minimal for patients receiving oral anticancer medications.

**4. The goal of patient education for oral anticancer medications is to:**

- a. Provide tools to the patient to adhere to their prescribed medication
- b. Ensure the patient understands information provided

c. Reinforce what the cancer care team has provided

d. All of the above

**5. A consequence of not adhering to the prescribed oral anticancer medication includes all of the following except:**

- a. Disease progression
- b. More side effects
- c. Higher healthcare costs
- d. Higher patient costs

**6. A 35-year-old woman with metastatic ovarian cancer is beginning olaparib 400 mg by mouth twice daily. She picks up her prescription mailed from the specialty pharmacy along with a prescription for prochlorperazine from your pharmacy. She asks you if the instructions tell her whether to take with food. Which of the following is the best response?**

- a. You explain that, yes, the instructions will provide that information.
- b. You refer her to the pharmacist who will provide the correct information about food interactions.
- c. You recommend that she call her cancer care team.
- d. You tell her it is okay to take with or without food but to avoid grapefruit and Seville oranges.

**7. You now are preparing a capecitabine prescription for dispensing and are very busy. Which of the following statements is correct?**

- a. Wash hands and use a separate counting tray

b. Wash hands, don gloves, and use a separate counting tray

c. Wash hands, don gloves, and use an automatic counting machine

d. Wash hands and use automatic counting machine

**8. Which of the following organizations has a publication that lists hazardous drugs:**

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- c. Explain the rash will subside in a few days
- d. Instruct the patient to call his cancer care team for further instruction

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## PAUSE AND PONDER

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**A lung cancer patient is picking up prescription for erlotinib that was mailed from the specialty pharmacy along with his warfarin prescription that he receives from your retail pharmacy. What considerations will you give before dispensing the medications to him?**

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“ Educating before the start of treatment and during treatment is an essential part of assisting patients with adherence and ensuring the best outcomes (maximizing cancer treatment outcomes and preventing or mitigating side effects).

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