

Chemotherapy Ordering Management System (COMS)

User Manual

Version 1.2



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Department of Veterans Affairs

Revision History

[illegible]

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Introduction

The Chemotherapy Ordering Management System (COMS) application enhances the clinical environment and safety for oncology patients through development and implementation of an automated ordering and management process available within the Veterans Health Administration (VHA) clinical practice setting. The application satisfies the unique needs of chemotherapy ordering and standardizes capabilities to meet direct entry of chemotherapy orders consistent with oncology practice. COMS interfaces and interacts with existing applicable VHA health care systems, modules and processes within Computerized Patient Record System (CPRS) and Veterans Health Information Systems and Technology Architecture (VistA) databases. COMS is a web-based application consisting of Hypertext Precursor (PHP), Java Script, Simple Object Access Protocol (SOAP), and Representational state transfer (REST) web services.

History

The VHA has one of the largest cancer populations in the country; it is also the fastest growing group of patients within the VHA. A uniquely high-risk and high-complexity domain of health care, Oncology has not been effectively implemented within the existing VHA Electronic Health Record primarily due to the lack of functionality required for the specialty. This creates a clinical environment with minimal standardization and limited direct order entry of chemotherapy. VHA's oncology processes are a mix of paper-based and computer-based practices, presenting potential error, adverse events, and inefficiencies. For these reasons, the VHA Office of Health Information (OHI) Patient Safety Workgroup rated this issue as having a high level of patient safety risk. Accordingly, an initiative within VHA's Innovations Program sought to enhance the clinical environment and safety for oncology patients through development of the COMS application as part of VHA's Strategic Incubation.

VHA provides oncology services at a multitude of different locations by integrated oncology care teams consisting of, but not limited to, a physician, pharmacist, and nurse. Teams typically provide care on an outpatient basis, although some patients may require hospitalization. The COMS application supports oncology healthcare teams in ordering, preparing, and documenting the administration of chemotherapy. It consists of a general application interface and several modules – Chemotherapy Template Order Source, Order Entry Management, Flow Sheet, Nursing Documentation and End of Treatment Summary – that serve a specific purpose and provide functionality to support users in executing their roles and responsibilities in the treatment process. COMS also offers exportability of chemotherapy templates to further facilitate VHA-wide standardization of chemotherapy regimens.

Application Overview

COMS accommodates local facility policies for clinical preferences/processes and implements several VA defined system-wide protocols. These protocols include a national set of chemotherapy order templates, standardization of the calculation method for medication dosage and dose rounding, and a standard documentation format for chemotherapy treatment plans, administration, and summaries. COMS creates and manages chemotherapy templates; clears and places medication orders in VistA; enables nursing documentation; displays a temporal flow sheet for relevant clinical data, medications administered, and user assessment of response to treatment; and creates a treatment summary for the current healthcare team, referring/primary care providers, and other clinical and support staff. The COMS application fulfills legal/professional requirements, fosters Joint Commission compliance and enhances patient safety with documentation ultimately stored in VA's electronic health record.

This guide instructs users on COMS application functionality, navigation of the application, and effective use of COMS to record and reflect treatment provided to oncology patients. COMS consists of five clinical modules: Chemotherapy Template Order Source (CTOS), Order Entry Management (OEM), Nursing Documentation (ND), Flow Sheet (FS), and End of Treatment Summary (EoTS) plus miscellaneous functionality.

The CTOS module permits the oncology provider to download a chemotherapy regimen template from a central library and modify it for local use. It also enables authorized users to create original, new templates or create a template from an existing one. The CTOS module affords flexibility to enable the user to assign a user-friendly template name. These templates may be applied to a particular patient record to generate an order sheet for the regimen and used throughout the remaining modules of the COMS application. During the process of applying a template to a patient, the oncology provider has the opportunity to identify the effective date; select the body weight and body surface area formula to use for medication dosage calculations; categorize the regimen for the patient as curative or palliative care; indicate whether the patient/regimen are part of a clinical trial and specify the name of the clinical trial, if applicable; identify patient amputation(s); and document the current performance status of the patient.

The OEM module permits the oncology provider to prescribe or modify an order for pre-therapy, therapy, and post-therapy medications from any template currently applied to a specific patient. Oncology providers utilize the OEM module to tailor templates – currently applied to patients based on diagnosis and other considerations – as a prescription for an appropriate course of therapy to meet chemotherapy treatment goals. For any future administration date within the prescribed regimen, oncology providers may edit medication dosages after the initial order and change the administration date. The OEM module also facilitates and documents communication among the oncology provider, pharmacist, and nurse as it relates to modifying the patient’s medication order and any subsequently required provider approval for changes to the original order while it progresses from “ordered” through “administered” status. Altogether, the OEM module enables oncology providers to tailor pre-therapy, therapy, and post-therapy medications for each individual patient and facilitates treatment plan communication and coordination among the healthcare team.

The ND module supports oncology nursing with six activity-specific panels to convey information previously obtained and to facilitate the documentation of new information relevant to medication administration and oncology care. The oncology nurse may view relevant historic and current clinical data, record the provision of chemotherapy, and document nursing assessments of the patient since the previous administration and throughout the current treatment. The ND module provides the capability to annotate overall regimen and administration day specific information, including vital signs, symptom assessments and infusion reactions. It also facilitates documenting the administration of the regimen’s prescribed medications with functionality to verify and modify pre-populated data from the OEM module for medication administered. The ND module enables the nurse to document administration dates and start/stop times, verify patient identity and medication dosing, and annotate discharge instructions provided to the patient. Relevant entries within the ND module are automatically populated into the Flow Sheet and may be included in the End of Treatment Summary.

The FS module offers a snapshot of care with an efficient display of relevant information and patient-centered documentation of chemotherapy administration. The healthcare team may view relevant clinical data, the disease response/patient reaction to the chemotherapy, pertinent laboratory results, and an overview of administered medications. Organized in administration day columns, the FS module displays pre-therapy, therapy, and post-therapy information for medications and dosages administered to the specific patient. The COMS application eliminates dual entry by retrieving this documentation from the ND module. The FS module also supports direct entry of disease response, toxicity side effects, and other annotations with free text comments for any administration day within the regimen. The healthcare team

may view the FS module throughout the regimen and the provider is presented relevant FS module information while generating the End of Treatment Summary.

The capstone module of the COMS application is the End of Treatment Summary. The EoTS module supports the oncology provider creation, and healthcare team viewing, of the summary of care rendered and results achieved throughout the specified treatment regimen. The EoTS module also enables the provider to stop a treatment regimen. Following the conclusion or discontinuation of a regimen and its applied template, the provider typically generates the treatment summary. To aid in generation of the summary report, the EoTS module retrieves relevant information from various COMS modules and pre-populates several sections of the treatment summary for provider consideration when preparing the narrative of disease response and toxicity side effects in the provider report section. It also supports an overall provider report with free text entry to communicate patient and regimen specific assessment to the current and future healthcare team. The EoTS module enhances documentation and communication by facilitating the generation and viewing of oncology regimen treatment summaries for the current healthcare team, referring/primary care providers, and other clinical and support staff.

COMS miscellaneous functionality is the underpinning that supports the five clinical modules and general application performance. Not specifically associated with any particular module, COMS miscellaneous functionality is integral to overall application effectiveness. Through patient specific functionality, users are provided general and historic information from VistA and various COMS modules. General functionality enables coordination and monitoring of provider orders from the point of order, through clearing of the order, through finalizing and dispensing medications, to administration of the prescribed medications. Extensive administrative functionality enables COMS administrators to setup and maintain the application's database contents, accessibility, and interoperability while tailoring COMS to accommodate local facility policies for administrative and clinical preferences and processes. COMS miscellaneous functionality also facilitates the setup and configuration of the application.

User Roles

COMS roles include Provider, Pharmacist, Nurse, and Administrator. Each role has specific purpose, function, and associated permissions within the application. Figure 1 below shows the Read and Write privileges for each role.

	Role			
	Provider	Pharmacist	Nurse	Administrator
Chemotherapy Template Order Source	R,W	R	R	R
Order Entry Management	R,W	R,W	R	R
Flow Sheet	R,W	R	R,W	R
Nursing Documentation	R	R	R,W	R
End of Treatment Summary	R,W	R	R	R
COMS Administration	R	R	R	R,W

Read – R, Write – W, Special Write – S

Figure 1: COMS Role-Based Permissions.

Provider

Within the CTOS module, the oncology provider reviews/revises chemotherapy regimen templates and applies selected templates to each individual patient. For each template, the oncology provider will determine pre-therapy/therapy/post-therapy medications, dosages and parameters for dosing, routes of administration, and sequencing; indicate type of cancer, emetogenic level, febrile neutropenia risk, and reference for each regimen; specify the total number of cycles, number of days, and administration days within each cycle; identify each template source as a national template, local template, or “my” template; and save templates with a user-friendly name correlated to a COMS-generated standard naming convention template name. The oncology provider may also review and modify templates currently applied to a specific patient then save the new template for future application to other patients.

Within the OEM module, the oncology provider reviews/revises chemotherapy regimen order sheets for individual patients. For each administration day order, the OEM module facilitates communication among the provider, nurse, and pharmacist to clear the patient for chemotherapy and finalize the order for preparation, dispensing, and administration. Throughout the regimen, the oncology provider may also review and modify performance status to reflect the patient’s daily living abilities.

Prescribing chemotherapy regimens and directing the provision of oncology services, oncology providers set the course for information contained within the Flow Sheet module. The provider-applied template information of regimen and cycle identification complement the administration day and date within the

Flow Sheet's Chemotherapy/Biotherapy header. Provider annotation of the patient's performance status is displayed in the Flow Sheet. The provider may also record the disease response to the individualized treatment plan and document toxicity side effects and other comments. As the regimen progresses, the annotations of oncology providers are displayed within the FS module.

Discontinuing a regimen and generating the executive summary of oncology care rendered during that treatment regimen, oncology providers fulfill the primary role in the EoTS module. To initiate a treatment summary within the EoTS module, the oncology provider indicates the reason for generating the report. The provider then reviews pertinent, pre-populated information – patient and regimen details, type of cancer(s) and amputation(s), regimen initial and final vital signs, body surface area factors and values, clinical trial information, allergies, performance status, and medication administration details – assembled from multiple COMS modules, VistA, and CPRS. After reviewing patient disease response and toxicity side effects documentation, the provider authors the narrative for an overall provider report. The provider concludes the End of Treatment Summary with specification of follow-up appointments and saving the treatment summary for members of the current and future healthcare team to view.

The oncology provider is the critical human link to facilitate the interoperable environment among VistA, CPRS, and COMS. Oncology provider actions within the CTOS, OEM, FS, and EoTS modules serve as the foundation to forge the desired clinical environment for standardization, direct order entry of chemotherapy, and documentation of care throughout the treatment regimen. Within the interoperable environment, a more complete spectrum of the provision of oncology services – ordering chemotherapy, administering prescribed medications and providing patient care, and assessing patient reactions and disease response to treatment – is created to support the healthcare team. Further, this standardized and interoperable environment facilitates appropriate documentation of oncology services within VA's electronic health record for the healthcare team, referring/primary care providers, and other clinical and support staff.

Pharmacist

As a key participant on the healthcare team, oncology pharmacists are involved with OEM module actions and benefit from its communication and coordination. For each administration day order, the OEM module facilitates communication among the provider, nurse, and pharmacist to clear the patient for chemotherapy and finalize the order for preparation, dispensing, and administration. In accordance with local facility policies and procedures, pharmacists may clear the patient, calculate the medication dosage within rounding rules parameters, and finalize the order for pharmacy preparation and dispensing. Throughout the regimen, the oncology pharmacist may review the status of the order as part of the individualized patient treatment regimen.

The pharmacist contributes to OEM module dialogue among the healthcare team. The individual and collective actions of the oncology provider, nurse, and pharmacist directly influence the patient's prognosis. With the FS module, pharmacists may view provider annotations for disease response, toxicity side effects, and other comments. Within the construct of standardization and direct order entry of chemotherapy, the collective actions of oncology providers and nurses foster the desired clinical environment with pharmacists accessing the FS module for the dynamic snapshot of the patient's

treatment. As authorized COMS users, pharmacists on the current and future healthcare team may view the completed treatment summary through the EoTS module. Pharmacists benefit from the standardized and interoperable environment between COMS and VistA/CPRS through facilitated communication and documentation of healthcare within VA's electronic health record.

Nurse

Oncology nurses participate in OEM module actions and benefit from its communication and coordination. For each administration day order, the OEM module facilitates communication among the provider, nurse, and pharmacist to clear the patient for chemotherapy and finalize the order for preparation, dispensing, and administration. In accordance with local facility policies and procedures, oncology nurses may clear the patient order for ultimate administration of the prescribed medication to the patient. Throughout the regimen, the oncology nurse may review the status of the order as part of the individualized regimen in preparation for administering the chemotherapy to the patient.

The nurse contributes to OEM module dialogue among the healthcare team. The individual and collective actions of the oncology provider, nurse, and pharmacist directly influence the patient's prognosis. Accordingly, their actions within the OEM module serve as the foundation to forge the desired clinical environment within the construct of standardization and direct order entry of chemotherapy. The healthcare team utilizes this standardized and interoperable environment between COMS and VistA/CPRS to facilitate customizing and coordinating chemotherapy orders in COMS for administration and documentation of healthcare within VA's electronic health record.

As the primary healthcare professionals interacting with patients in the administration of medications and providing hands-on treatment, oncology nurses fulfill the central role for ND module actions. Within the ND module, the oncology nurse reviews existing patient documentation and orders; verifies patient identification and medication dosages; annotates assessments and treatments; and provides the majority of documentation for medication administration and overall provision of medical care. For each administration day and non-administration days where the patient presents for care, nurses utilize the ND module to record granular documentation of patient care and reaction to that treatment. Documenting nursing activities through the ND module, oncology nurses are the critical human link to facilitate oncology services documentation of chemotherapy administration within VA's expansive healthcare enterprise. Oncology nurse actions within the ND module serve as the annotation capstone of the desired clinical environment within the construct of standardization and direct order entry of chemotherapy. The oncology nurse utilizes this standardized and interoperable environment between COMS and VistA/CPRS to facilitate appropriate documentation of healthcare within VA's electronic health record.

Oncology nurses provide medication administration details for the FS module through import of their documentation within the ND module. The information automatically populated from ND module entries consists of administration specifics, including dose administered and dates/times of administration, for pre-therapy, therapy, and post-therapy medications. As the regimen progresses, the annotations of both oncology providers and nurses are displayed within the FS module. The oncology provider and nurse are essential human links to facilitate oncology services documentation within VA's extensive healthcare system. Within the construct of standardization and direct order entry of chemotherapy, the collective

actions of oncology providers and nurses foster the desired clinical environment with the FS module serving as the patient treatment dynamic snapshot visible to all members of the healthcare team. The oncology nurse may also view the treatment summary within the EoTS module as an executive summary of oncology care.

Administrator

Utilizing the five primary modules of COMS, all members of the healthcare team – oncology providers, nurses, and pharmacists – perform critical actions directly and indirectly associated with miscellaneous functionality within the application. This miscellaneous functionality is typically setup and managed by COMS administrators. COMS administrators perform essential tasks for the setup and maintenance of the application’s database contents, accessibility, and interoperability. Further, COMS administrators may incorporate local facility preferences into the application for the processing of workflow functionality/messaging and medication dose rounding rules with exclusions for medications not rounded,

Collectively, the healthcare team clinical users and COMS administrators facilitate the interoperable environment among VistA, CPRS, and COMS. The facilitated actions within the CTOS, OEM, ND, FS, and EoTS modules and the application’s complementary miscellaneous functionality create the desired clinical environment for standardization and direct order entry of chemotherapy. Within the interoperable environment, a more complete spectrum of the provision of oncology services – ordering and finalizing chemotherapy, administering prescribed medications and providing patient care, and assessing patient reactions and disease response to treatment – is created to support the healthcare team. Further, this standardized and interoperable environment facilitates appropriate documentation of oncology services within VA’s electronic health record more closely aligned with that of primary care disciplines.

Module Functionality

The COMS application consists of five clinical modules – CTOS, OEM, ND, FS and EoTS – and miscellaneous administrative functionality. These modules and miscellaneous functionality are interrelated and collectively provide general application performance and overall operational effectiveness of the COMS application. Clinical functionality standardizes and facilitates actions to create and edit regimen templates, manage orders, document medication administration and patient care, automate flow sheet activities, and create and view end of treatment summaries.

Chemotherapy Template Order Source

The CTOS module permits the oncology provider to download a chemotherapy regimen template from a central library and modify it for local use. It also enables authorized users to create original, new templates or create a template from an existing one. User-created templates are available immediately for local use and ultimately for national use upon review and inclusion in the central library. Each template provides pre-therapy, therapy, and post-therapy information including recommended medications; dosages and parameters for dosing; total number of cycles; number of days and administration days within each cycle; and medical references. CTOS incorporates standardized template naming conventions, acceptable medical terminology and abbreviations, and other applicable medical guidelines to reflect the existing care practices. At any time, users may review clinical practice guidelines and references relevant to the template supporting the provision of chemotherapy for a specified treatment regimen.

The CTOS module also affords flexibility to enable the user to assign a user-friendly template name. These templates may be applied to a particular patient record to generate an order sheet for the regimen and used throughout the remaining modules of the COMS application. During the process of applying a template to a patient, the oncology provider has the opportunity to identify the effective date; select the body weight and body surface area formula to use for medication dosage calculations; categorize the regimen for the patient as curative or palliative care; indicate whether the patient/regimen are part of a clinical trial and specify the name of the clinical trial, if applicable; identify patient amputation(s); and document the current performance status of the patient. Although users may only apply one template to a patient at any given time, all templates previously applied to the patient remain available for view. Common CTOS actions involve creating/modifying a specific template for availability to use on any patient and applying/editing an existing template for use on a specific patient.

Template Authoring

Within the “Template Authoring” tab, oncology providers utilize the CTOS module of the COMS application to create a new template for local use. Oncology providers select the radio button to “Create New Template” then are required to identify the type of cancer and other template header information for cycle length, maximum number of cycles, emetogenic level, and febrile neutropenia risk percentage, as shown in Figure 2.

The screenshot displays the 'Chemotherapy Ordering Management System (COMS)' interface. At the top, a navigation bar includes tabs for 'Patient', 'Orders', 'Template Authoring' (which is active), 'Messages', and 'Admin'. Below the navigation bar, a message reads 'Welcome Programmer, All Roles -- [Help](#)'. The main content area is titled 'What do you want to do?:' and contains two radio buttons: 'Select Existing Template' and 'Create New Template' (which is selected). Below this, a note states 'Fields with a * are required fields'. The form includes several input fields: 'Select a type of cancer *' (a dropdown menu), 'Disease Stage:' (a dropdown menu), 'Max Cycles *' (a text input field), 'Cycle Length *' (a dropdown menu), 'Emetogenic Level *' (a dropdown menu), and 'Febrile Neutropenia Risk:' (a text input field followed by a '%' symbol).

Figure 2: Header Section for Create New Template

Immediately after the template header section, the oncology provider will specify the pre-therapy and therapy medications for the regimen. These sections contain information for overall instructions for the pre-therapy/therapy medications and each individual medication with specifics such as drug name; dosage amount; administration days; medication instructions; route of administration; and administration time, fluid type, fluid volume, flow rate, and infusion time for intravenous preparations. The pre-therapy and therapy sections of the template are shown in Figure 3.

Pre Therapy

Instructions: Administer IV medications in Normal Saline

Drug Regimen

Sequence	Admin Day(s)	Admin Time	Drug	Dosage Amount	Units	Route	Fluid/ Volume	Flow Rate	Infusion Time	Fluid/ Type	Instructions
1	1		DEXAMETHASONE..	20	mg	Oral	0				Take on chemotherapy days
			-- OR --								
2	1		DIPHENHYDRAMINE..	50	mg	Oral	0				Take on chemotherapy days
			-- OR --								
3	1		RANITIDINE TAB	50	mg	Oral	0				Take on chemotherapy days
			-- OR --								

Add Drug

Remove Drug

Edit Drug

Therapy

Instructions: Use non-PVC containers for final dilution and 0.22 filter and tubing sets for administration

Drug Regimen

Sequence	Admin Day(s)	Admin Time	Drug	Dosage Amount	Units	Route	Fluid/ Volume	Flow Rate	Infusion Time	Fluid/ Type	Instructions
1	1	9:00 AM	PACLITAXEL INJ,...	200	mg/m2	IVPB	500	167	3 hrs / 0 min	Norm..	Administer in 500ml Normal Saline, D5W, or..

Add Drug

Add Non-Formulary Drug

Remove Drug

Edit Drug

Figure 3: Template Pre-Therapy and Therapy Sections

Similarly, the post-therapy section of the template enables oncology providers to specify medication details for post-therapy treatment. Immediately afterwards, the template footer enables oncology providers to document a reference for template creation and specify a user-friendly name for the template that correlates to the COMS-generated, standard naming convention template name. The post-therapy and template footer sections are shown in Figure 4.

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Post Therapy

Instructions: For nausea/vomiting

Drug Regimen

Sequence	Admin Day(s)	Admin Time	Drug	Dosage Amount	Units	Route	Fluid/ Volume	Flow Rate	Infusion Time	Fluid/ Type	Instructions
1	1		PROCHLORPERAZIN...	10	mg	Oral	0				Take 2 tablets (10mg total) by mouth every s...
-- OR --											

Add Drug

Remove Drug

Edit Drug

References

Reference	Reference Link
-----------	----------------

Add Reference

Remove Reference

Edit Reference

Chemotherapy Regimen Name:

2012-3-0001-ABCD-PACLITAXEL INJ, CONC 200-20120730

Generated

Template Name:

Optional

Save Template

Clear Template

[Help](#)
[Logout](#)

Figure 4: Template Post-Therapy and Footer Sections

Oncology providers may also modify an existing template within the CTOS module of the COMS application. Any template within COMS – regardless of the template source (e.g. National, Local, or My Template) – may be modified for local facility use. Within the “Template Authoring” tab, oncology providers select the radio button “Select Existing Template” then identify the template source, type of cancer, and specific template to modify. After COMS loads the template for editing, the provider may review and modify the template. The editing process begins with the template header as shown in Figure 5. During the modification, oncology providers may change any information within the template header, pre-therapy/therapy/post-therapy sections, or the template footer. Providers should update the reference or provide a new reference to support the changes in the chemotherapy regimen and provide a different user-friendly template name to distinguish it from the source template.

Chemotherapy Ordering Management System (COMS)

Welcome Programmer, All Roles -- [Help](#)

Patient

Orders

Template Authoring

Messages

Admin

What do you want to do?: ☒ Select Existing Template ☐ Create New Template

Fields with a * are required fields

Search:

Search

Select a Template Source:

My Templates

Show All Templates

Select a type of cancer *:

Lung Cancer, Non-Small Cell

Disease Stage:

Select a Template:

NSCLC - Single Agent Paclitaxel

Max Cycles *:

4

Cycle Length *:

3

Weeks

Emotegenic Level *:

Low

Febrile Neutropenia Risk:

5

%

Figure 5: Header Section for Select Existing Template

Apply a Template to a Patient and Generate Orders

To apply an existing template to a specific patient, the oncology provider must first select the patient from the database. During the patient selection process, providers may also review vital signs historical information for the selected patient. COMS offers three alternative methods for patient selection – using the patient identifier (i.e. first letter of patient’s last name and last four digits of patient’s social security number) and selecting the “Query CPRS for Patient” link; using the patient identifier and pressing the Enter key; and entering a range of administration dates to search for the specific patient and selecting the “Select Patient by Administration Date(s) link. Oncology providers accomplish patient selection through the “Patient” tab, as shown in Figure 6.

The screenshot shows the 'Patient Selection' tab in the COMS interface. At the top, there's a navigation bar with 'Patient', 'Orders', 'Template Authoring', 'Messages', and 'Admin'. Below this, the 'Patient Selection' panel contains two search methods: 'Enter a range of Administration Dates to search - From: 09/23/2012 To: []' with a link 'Select Patient by Administration Date(s)', and 'OR Enter Patient Identification (SSN) to query CPRS: []' with a link 'Query CPRS for Patient'. A note box states: '(Note: For testing purposes, there are hundreds of patients available between 0010 and 0603. To search for a patient, use the spelling of the number for a last name and the number. For example: FiveHundredTwenty, Patient would be f0520 or OneHundredThirty, Patient would be o0130)'. A 'Help Logout' link is at the bottom right.

Figure 6: Patient Tab for Patient Selection

After patient selection, oncology providers may review specific patient information through the expandable/collapsible panels of Patient Information, Treatment Regimens & Summaries, Patient History, and Laboratory Information, as shown in Figures 7 and 8.

The screenshot shows the 'Patient Information' panel for 'PATIENT FOURHUNDRED'. It features four expandable/collapsible panels: 'Patient Information', 'Treatment Regimens & Summaries (3 Records)', 'Patient History (111 Records)', and 'Laboratory Information (No Records Available)'. Below these are tabs for 'Chemotherapy Template Order Source', 'Order Entry Management', 'Nursing Documentation', and 'Flowsheet'. A section titled 'What do you want to do?:' has two radio buttons: 'Select from Templates currently applied to this patient' (selected) and 'Select an existing standard template'. A 'Help Logout' link is at the bottom right.

Figure 7: Collapsed Patient-specific Information Panels

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Welcome Programmer, All Roles -- [Help](#)

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Patient Selection

Patient Information for - PATIENT FOURHUNDRED

Patient Information

Gender:	M	Age:	77	Amputee:	Left Foot
BSA Weight Method:	Actual Weight	BSA Method:	DuBois	BSA:	1.9 Calculate BSA Show Calculations
Template:	2012-3-0001-ABCD-PACLITAXEL INJ, CONC 200-20120731 NSCLC - Paclitaxel for UAT Open Template in Chemotherapy Template Order Source (CTOS) Tab...				
Regimen Status:	On-Going - Admin Day	Regimen Start Date:	08/10/2012	Regimen End Date:	11/02/2012
Type(s) of Cancer:					
Allergies:	Name	Type	Comment		
Clinical Trial:	NOT a clinical trial				

Treatment Regimens & Summaries (3 Records)

	Template Name	Start Date	End Date		
Current Template:	NSCLC - Paclitaxel for UAT	08/10/2012	11/02/2012	Show Details	Stop Treatment
Historical Template:	NSCLC - Paclitaxel for UAT	07/31/2012	08/03/2012	Show Details	Show End of Treatment Summary
Historical Template:	NSCLC - Paclitaxel for UAT	08/06/2012		Show Details	Generate End of Treatment Summary

Patient History (111 Records)

[Vital Statistics](#)

Date	Temp	Pulse	BP	Resp	Pain	SP O ₂	PS	Height in Inches	Weight in lbs.	BSA			
										Weight Form.	Weight in KG	Method	BSA
09/23/2012	98.4	76	146/84	12	4		0	70	172	Actual Weight		DuBois	1.9 m ²

Figure 8: Expanded Patient-specific Information Panels

After reviewing the patient-specific information panels, oncology providers may then apply a selected template to the patient and generate an order. From the “Chemotherapy Template Order Source” tab, a prescribing provider will select the “Select an Existing Standard Template” radio button, select a template source from the pull-down menu, select the type of cancer from the pull-down menu, and select the desired template, as shown in Figure 9.

Chemotherapy Ordering Management System (COMS)

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Patient Selection

Patient Information for - PATIENT FIVEHUNDREDSIXTY

[Patient Information](#) | [Treatment Regimens & Summaries \(No Records Available\)](#) | [Patient History \(2 Records\)](#) | [Laboratory Information \(No Records Available\)](#)

[Chemotherapy Template Order Source](#) | [Order Entry Management](#) | [Nursing Documentation](#) | [Flowsheet](#)

What do you want to do?: ☐ Select from Templates currently applied to this patient
☒ Select an existing standard template

Search:

Select a Template Source:

Select a type of cancer *: Disease Stage:

Select a Template:

- NSCLC - Paclitaxel for UAT
- NSCLC - Multiple Agents for Team 7 UAT
- 8NSCLC
- NSCLC - Single Agent Paclitaxel_IV_Pre-Therapy_Meds
- NSCLC - Single Agent Docetaxel
- NSCLC - Cisplatin and Vinorelbine
- NSCLC - Paclitaxel and Carboplatin
- NSCLC - Single Agent Paclitaxel

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Figure 9: Template Selection for Patient Treatment Regimen

After selecting the template for the patient treatment regimen, the oncology provider may view the template details, including pre-therapy, therapy, and post-therapy medication details. To apply the template to a patient, the prescribing provider will select the “Apply Template to Patient” button. The full template and apply template button are shown in Figure 10.

Select a Template: NSCLC - Single Agent Paclitaxel

CANCER CHEMOTHERAPY IV ORDER SHEET
 Max Number of Cycles: 4 Cycle Length: 3 Weeks
 Chemotherapy Regimen Name: 2012-3-0001-ABCD-PACLITAXEL INJ, CONC 200-20120730
 Emetogenic level: Low
 Febrile Neutropenia risk: 5 %
 Reference:

Pre Therapy
 Instructions: Administer IV medications in Normal Saline

Sequence #	Drug	Dose	Route	Administration Day
1	DEXAMETHASONE TAB	20 mg	Oral	1
	Fluid/Volume:		Infusion Time:	
Take on chemotherapy days				
2	DIPHENHYDRAMINE CAP, ORAL	50 mg	Oral	1
	Fluid/Volume:		Infusion Time:	
Take on chemotherapy days				
3	RANITIDINE TAB	50 mg	Oral	1
	Fluid/Volume:		Infusion Time:	
Take on chemotherapy days				

Therapy
 Instructions: Use non-PVC containers for final dilution and 0.22 filter and tubing sets for administration

Sequence #	Drug	Dose	Route	Administration Day
1	PACLITAXEL INJ, CONC	200 mg/m2	IVPB	1
	Fluid/Volume: 500		Infusion Time: 3 hrs / 0 min	
Administer in 500ml Normal Saline, D5W, or Ringers Solution				

Post Therapy
 Instructions: For nausea/vomiting

Sequence #	Drug	Dose	Route	Administration Day
1	DEXAMETHASONE TAB	20 mg	Oral	1
	Fluid/Volume:		Infusion Time:	
Take on chemotherapy days				
2	DIPHENHYDRAMINE CAP, ORAL	50 mg	Oral	1
	Fluid/Volume:		Infusion Time:	
Take on chemotherapy days				
3	RANITIDINE TAB	50 mg	Oral	1
	Fluid/Volume:		Infusion Time:	
Take on chemotherapy days				

Apply Template to Patient Edit Template

Figure 10: Regimen Details to Apply Template to Patient

With selection of the “Apply Template to Patient” button, the oncology provider will be prompted to provide specific information for effective date, weight to use (e.g. actual, ideal), body surface area (BSA) formula to use (e.g. DuBois, Mosteller), regimen goal (i.e. curative or palliative), clinical trial (if applicable), patient amputation(s), and current performance status of the patient, as shown in Figure 11. The action of applying a template to a patient generates the orders for pre-therapy, therapy, and post-therapy medications associated with the template.

Chemotherapy Template Order Source [Order Entry Management](#) [Nursing Documentation](#) [Flowsheet](#)

What do you want to do?: ☒ Select from Templates currently applied to this patient
☐ Select an existing standard template

Select a Template: NSCLC - Single Agent Paclitaxel

CANCER CHEMOTHERAPY IV ORDER SHEET
Max Number of Cycles: 4 Cycle Length: 3 Weeks
Chemotherapy Regimen Name: 2012-3-0001-ABCD-PACLITAXEL INJ, CONC 200-20120730
Emetogenic level: Low
Febrile Neutropenia risk: 5 %
Reference:

Pre Therapy
Instructions: Administer IV medications in Normal Saline

Sequence #	Drug	Dose	Route	Administration Day
1	DEXAMETHASONE TAB	20 mg	Oral	1
Fluid/Volume:		Infusion Time:		
Take on chemotherapy days				
2	DIPHENHYDRAMINE CAP, ORAL	50 mg	Oral	1
Fluid/Volume:		Infusion Time:		
Take on chemotherapy days				
3	RANITIDINE TAB	50 mg	Oral	1
Fluid/Volume:		Infusion Time:		
Take on chemotherapy days				

Therapy
Instructions: Use non-PVC containers for final dilution and 0.22 filter and tubing sets for administration

Sequence #	Drug	Dose	Route	Administration Day
1	PACLITAXEL INJ, CONC	200 mg/m2	IVPB	1
Fluid/Volume: 500		Infusion Time: 3 hrs / 0 min		
Administer in 500ml Normal Saline, D5W, or Ringers Solution				

Post Therapy
Instructions: For nausea/vomiting

Sequence #	Drug	Dose	Route	Administration Day
1	DEXAMETHASONE TAB	20 mg	Oral	1
Fluid/Volume:		Infusion Time:		
Take on chemotherapy days				
2	DIPHENHYDRAMINE CAP, ORAL	50 mg	Oral	1
Fluid/Volume:		Infusion Time:		
Take on chemotherapy days				
3	RANITIDINE TAB	50 mg	Oral	1
Fluid/Volume:		Infusion Time:		
Take on chemotherapy days				

[Apply Template to Patient](#) [Edit Template](#)

Figure 12: Regimen Details to Edit Template Applied to a Patient

View Template Previously Applied to a Patient

Any member of the healthcare team may view a template previously applied to a specific patient. The team member must first select a patient from the database, as noted in the “Apply a Template to a Patient and Generate Orders” section, via one of three alternative methodologies for patient selection. After patient selection, users may view a template previously applied to a patient by opening the “Treatment Regimens & Summaries” panel and selecting the “Show Details” link for the desired current template or historical template to view, as shown in Figure 13.

Chemotherapy Ordering Management System (COMS)

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Patient Selection ⌵

Patient Information for - PATIENT FOURHUNDRED

Patient Information ⌵

Treatment Regimens & Summaries (3 Records) ⌵

	Template Name	Start Date	End Date		
Current Template:	NSCLC - Paclitaxel for UAT	08/10/2012	11/02/2012	Show Details	Stop Treatment
Historical Template:	NSCLC - Paclitaxel for UAT	07/31/2012	08/03/2012	Show Details	Show End of Treatment Summary
Historical Template:	NSCLC - Paclitaxel for UAT	08/06/2012		Show Details	Generate End of Treatment Summary

Patient History (113 Records) ⌵

Laboratory Information (No Records Available) ⌵

[Chemotherapy Template Order Source](#)
[Order Entry Management](#)
[Nursing Documentation](#)
[Flowsheet](#)

What do you want to do?: ☒ Select from Templates currently applied to this patient
☐ Select an existing standard template

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Figure 13: Treatment Regimens & Summaries Panel

Order Entry Management

The OEM module permits the oncology provider to prescribe or modify an order for pre-therapy, therapy, and post-therapy medications from any template currently applied to a specific patient. When the provider applies a template via the Chemotherapy Template Order Source (CTOS) module, an order sheet is generated and sets in motion the individualized chemotherapy regimen for curative or palliative care of oncology patients. Oncology providers utilize the OEM module to tailor templates – currently applied to patients based on diagnosis and other considerations – as a prescription for an appropriate course of therapy to meet chemotherapy treatment goals.

While CTOS templates provide a general regimen for a specific diagnosis and establish the direction for treatment, the OEM module enables oncology providers to customize the medications within each template and order sheet for each individual patient. Primary instances of customization include modification to medication, dosages, or administration dates. The OEM module supports the oncology provider in tailoring applied template medications on any particular date of administration. For any future administration date within the prescribed regimen, oncology providers may edit medication dosages after the initial order and change the administration date.

The OEM module facilitates communication among the healthcare team as the medication orders progress from “ordered” through “administered” status.

- After the CTOS module records an “ordered” status, the order may be cleared in accordance with local facility policies/practices and then viewed by the pharmacist.
- Pharmacy modifications to the order – taking local facility medication dosage calculation rounding rules into consideration – are communicated to the provider or identified for provider re-signature, as local procedures warrant.

- Once “finalized” between the provider and pharmacist, orders are transmitted to VistA for pharmacy preparation. Cancelled orders are not transmitted to VistA.
- Following pharmacy preparation and dispensing of the medication, a nurse may administer it to the patient and record the order as “administered” in the ND module, Treatment panel.

This workflow – complemented by COMS messaging functionality – facilitates and documents dialogue among the oncology provider, pharmacy, and nursing staff as it relates to modifying the patient’s chemotherapy regimen order and any subsequently required provider approval for changes to the original order.

The OEM module also enables oncology providers to record the current performance status of the patient to reflect improvement or decline throughout the regimen. At any time, authorized healthcare team users may view medication dosages for orders and any associated BSA-based calculations for dosing. Rarely changed during a treatment regimen, body weight (e.g. actual, ideal) and selection of BSA calculation methodology (e.g. Dubois, Mosteller) may only be changed by applying a template through the CTOS module. Since many templates use specified body weight and BSA methodology to calculate chemotherapy medication dosages, this capability further enables oncology providers to convert generalized templates into individualized treatment plans for each specific patient throughout the regimen cycle.

Altogether, the OEM module enables oncology providers to tailor pre-therapy, therapy, and post-therapy medications for each individual patient and facilitates treatment plan communication and coordination among the healthcare team. Common OEM module actions include Calculating/Showing BSA Calculations; Selecting Administration Days to View, Edit Medication, or Edit Administration Date; Modify Patient Performance Status; Clear Medication Orders; and Finalize and Dispense Medication Orders.

Calculate Body Surface Area and Show Calculations

Any member of the healthcare team may select the COMS functionality to calculate a patient’s Body Surface Area (BSA) and show calculations. The team member must first select a patient from the database, as noted in the “Apply a Template to a Patient and Generate Orders” section, via one of three alternative methodologies for patient selection. After patient selection, users may calculate BSA and show calculations for the selected patient by opening the “Patient Information” panel and selecting the appropriate link in the BSA section, as shown in Figure 14.

Chemotherapy Ordering Management System (COMS)

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Patient Selection

Patient Information for - PATIENT FOURHUNDRED

Patient Information			
Gender:	M	Age:	77
BSA Weight Method:	Actual Weight	BSA Method:	DuBois
Amputee:	Left Foot		
BSA:	1.9	Calculate BSA	Show Calculations
Template:	2012-3-0001-ABCD-PACITAXEL INJ, CONC 200-20120731 NSCLC - Paclitaxel for UAT Open Template in Chemotherapy Template Order Source (CTOS) Tab.		
Regimen Status:	On-Going - Admin Day	Regimen Start Date:	08/10/2012
Regimen End Date:	11/02/2012		
Type(s) of Cancer:			
Allergies:	Name	Type	Comment
Clinical Trial:	NOT a clinical trial		

Treatment Regimens & Summaries (3 Records)

Patient History (113 Records)

Laboratory Information (No Records Available)

[Chemotherapy Template Order Source](#)
[Order Entry Management](#)
[Nursing Documentation](#)
[Flowsheet](#)

What do you want to do?: ☒ Select from Templates currently applied to this patient
☐ Select an existing standard template

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Figure 14: Patient Information Panel for Body Surface Area Actions

Select Administration Day to View, Edit Medication, or Edit Administration Date

Authorized users on the healthcare team may select an administration day to view, edit medication, or edit the administration date. After patient selection, users access the OEM module by selecting the “Order Entry Management” module tab. Users may then scroll through the administration dates or select a desired date from the “Select Admin Day to View” pull-down menu, as shown in Figure 15.

Chemotherapy Template Order Source				Order Entry Management	Nursing Documentation	Flowsheet
Order Entry Management (OEM) Information - for Patient: PATIENT FOURHUNDRED						
Regimen:	2012-3-0001-ABCD-PACLITAXEL INJ,CONC 200-20120731					
Description	NSCLC - Paclitaxel for UAT					
Treatment Start:	08/10/2012					
Treatment End:	11/02/2012					
Neutropenia Risk:	5%	Recommendation:	The 2005 Update Committee agreed unanimously that reduction in febrile neutropenia(FN) is an important clinical outcome that justifies the use of CSFs, regardless of impact on other factors, when the risk of FN is approximately 20% and no other equally effective regimen that does not require CSFs is available. Primary prophylaxis is recommended for the prevention of FN in patients who are at high risk based on age, medical history, disease characteristics, and myelotoxicity of the chemotherapy regimen. CSF use allows a modest to moderate increase in dose-density and/or dose-intensity of chemotherapy regimens. Dose-dense regimens should only be used within an appropriately designed clinical trial or if supported by convincing efficacy data. Prophylactic CSF for patients with diffuse aggressive lymphoma aged 65 years and older treated with curative chemotherapy (CHOP or more aggressive regimens) should be given to reduce the incidence of FN and infections. Current recommendations for the management of patients exposed to lethal doses of total body radiotherapy, but not doses high enough to lead to certain death due to injury to other organs, includes the prompt administration of CSF or pegylated G-CSF			
Emesis Risk:	Low	Recommendation:	ASCO No antiemetic administered routinely pre- or postchemotherapy. NCCN No routine prophylaxis; consider using antiemetics listed under primary prophylaxis as treatment.			
Goal	on all pre-disease performance without restriction Change Performance Status					
Performance Status	08/12/2012					
Select Admin Day to view: 08/13/2012						
Cycle 3 (of 4); Admin Day: 3 Date: 09/13/2012						
Pre Therapy Administer IV medications in Normal Saline						
Drug	Dosing				Administration Time	
DEXAMETHASONE INJ,SOLN (20 mg) <i>Administer on chemotherapy days</i>	Drug	Dose	Administration		8:00 AM	
	DEXAMETHASONE INJ,SOLN	20 mg	IVPB			
	Fluid Type	Fluid Volume	Flow Rate	Infusion Time		
	Normal Saline	50 ml	100 ml/hr	0 hrs / 30 min		
DIPHENHYDRAMINE CAP,ORAL (50 mg) <i>Take on chemotherapy days</i>	Drug	Dose	Administration			
	DIPHENHYDRAMINE	50 mg	Oral			

Figure 15: Select Administration Day to View

Once a future date of administration is selected and displayed, authorized users may edit any pre-therapy, therapy, or post-therapy medication listed or edit the administration date by selecting the appropriate “Edit” link, as shown in Figure 16.

Cycle 4 (of 4); Admin Day: 1
Date: 10/02/2012 - [Change Admin Date](#)

Pre Therapy Administer IV medications in Normal Saline				
Drug	Dosing			Administration Time
DEXAMETHASONE INJ,SOLN (20 mg) Edit <i>Administer on chemotherapy days</i>	Drug	Dose	Administration	
	DEXAMETHASONE INJ,SOLN	20 mg	IVPB	
	Fluid Type	Fluid Volume	Flow Rate	Infusion Time
	Normal Saline	50 ml	100 ml/hr	0 hrs / 30 min
DIPHENHYDRAMINE CAP,ORAL (50 mg) Edit <i>Take on chemotherapy days</i>	Drug	Dose	Administration	
	DIPHENHYDRAMINE CAP,ORAL	50 mg	Oral	
	Fluid Type	Fluid Volume	Flow Rate	Infusion Time
	Normal Saline	50 ml	100 ml/hr	0 hrs / 30 min
RANITIDINE TAB (50 mg) Edit <i>Take on chemotherapy days</i>	Drug	Dose	Administration	
	RANITIDINE TAB	50 mg	Oral	
	Fluid Type	Fluid Volume	Flow Rate	Infusion Time
	Normal Saline	50 ml	100 ml/hr	0 hrs / 30 min

Therapy Use non-PVC containers for final dilution and 0.22 filter and tubing sets for administration				
Drug	Dosing			Administration Time
PACLITAXEL INJ,CONC (200 mg/m2) Edit <i>Administer in 500ml Normal Saline, D5W, or Ringers Solution</i>	Drug	Dose	Calculated Dose	Administration
	PACLITAXEL INJ,CONC	200 mg/m2	380 mg	IVPB
	Fluid Type	Fluid Volume	Flow Rate	Infusion Time
	Normal Saline	500 ml	167 ml/hr	3 hrs / 0 min

Post Therapy For nausea/vomiting				
Drug	Dosing			Administration Time
PROCHLORPERAZINE TAB (10 mg) Edit <i>Take 2 tablets (10mg total) by mouth every six hours as needed for nausea/vomiting</i>	Drug	Dose	Administration	
	PROCHLORPERAZINE TAB	10 mg	Oral	
	Fluid Type	Fluid Volume	Flow Rate	Infusion Time
	Normal Saline	50 ml	100 ml/hr	0 hrs / 30 min

Figure 16: Edit Medication or Administration Date

Modify Patient Performance Status

Oncology providers may modify the patient's performance status through COMS by assigning a different value from the Eastern Cooperative Oncology Group (ECOG) scale. After patient selection, users access the OEM module by selecting the "Order Entry Management" module tab. Authorized oncology provider users then select the "Change Performance Status" link to view the Regimen Performance Status pop-up screen with the ECOG scale and numeric values, as shown in Figure 17.

Chemotherapy Template Order Source		Order Entry Management	Nursing Documentation	Flowsheet
Order Entry Management (OEM) Information - for Patient: PATIENT FOURHUNDRED				
Regimen:	2012-3-0001-ABCD-PACLITAXEL INJ, CONC 200-20120731			
Description:	NSCLC - Paclitaxel for UAT			
Treatment Start:	08/10/2012			
Treatment End:	11/02/2012			
Neutropenia Risk:	5%	<div> Regimen Performance Status </div> <div> Select the Performance Status: <ul style="list-style-type: none"> <input type="radio"/> 0 - Fully active, able to carry on all pre-disease performance without restriction <input type="radio"/> 1 - Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g. light house work, office work <input type="radio"/> 2 - Ambulatory and capable of all selfcare but unable to carry out any work activities. Up and about more than 50% of waking hours <input type="radio"/> 3 - Capable of only limited selfcare, confined to bed or chair more than 50% of waking hours <input type="radio"/> 4 - Completely disabled. Cannot carry on any selfcare. Totally confined to bed or chair </div> <div> <input type="button" value="Save"/> <input type="button" value="Cancel"/> </div>		
Emesis Risk:	Low			
Goal:	Curative			
Performance Status:	0-Fully active, able to carry on all pre-disease performance without restriction Change Performance Status			

Figure 17: Change Performance Status

Clear Medication Orders

Following orders generation, the clearing of a patient to receive chemotherapy and subsequent clearing of the order is required for processing the order. As local facility policies and procedures permit, any member of the healthcare team may clear an order by utilizing the “Orders” tab. After selecting the “Orders” tab, authorized users are able to view all medication orders active within COMS. Users will select the medications for the desired patient and set the order status from “ordered” to “cleared” via the pull-down menu, as shown in Figure 18, then selecting the “update” button for that medication row.

Patient Orders Template Authoring Messages Admin											
Name	Admin Day	Type	Drug	Dosage	Units	Route	Fluid/ Volume	Flow Rate	Instructions	Order Status	Set Status
Admin Date: 09/23/2012											
FOURHUNDREDSIXTY PATIENT	1	Pre Therapy	DEXAMETHASO...	8	mg	Oral	0		take this first	Ordered	Update
FOURHUNDREDSIXTY PATIENT	1	Post Thera...	PROCHLORPER...	10	mg	Oral	0		OK	Ordered	Update
FOURHUNDREDSIXTY PATIENT	1	Therapy	TOPOTECAN INJ	1.96	mg	IVPB	100	200	OK	In-Coordination	Update
FOURHUNDRED PATIENT	3	Pre Therapy	DEXAMETHASO...	20	mg	IVPB	50	100	Administer on chem...	Cleared	Update
FOURHUNDRED PATIENT	3	Pre Therapy	DIPHENHYDRA...	50	mg	Oral	0		Take on chemothera...	Finalized	Update
FOURHUNDRED PATIENT	3	Pre Therapy	RANITIDINE TAB	50	mg	Oral	0		Take on chemothera...	Dispensed	Update
FOURHUNDRED PATIENT	3	Post Thera...	PROCHLORPER...	10	mg	Oral	0		Take 2 tablets (10m...	Administered	Update
FOURHUNDRED PATIENT	3	Therapy	PACLITAXEL INJ...	380	mg	IVPB	500	167	Administer in 500ml...	Cancelled	Update
FOURHUNDREDDONE PATIENT	10	Post Thera...	APREPITANT C...	80	mg	Oral	0		Patient to take by m...	Dispensed	Update
FOURHUNDREDDONE PATIENT	10	Post Thera...	DEXAMETHASO...	8	mg	Oral	0		Patient to take 2 ta...	Ordered	Update
FIVEHUNDREDSIXTY PATIENT	1	Pre Therapy	DEXAMETHASO...	20	mg	Oral	0		Take on chemothera...	Ordered	Update
FIVEHUNDREDSIXTY PATIENT	1	Pre Therapy	DIPHENHYDRA...	50	mg	Oral	0		Take on chemothera...	Ordered	Update
FIVEHUNDREDSIXTY PATIENT	1	Pre Therapy	RANITIDINE TAB	50	mg	Oral	0		Take on chemothera...	Ordered	Update
FIVEHUNDREDSIXTY PATIENT	1	Post Thera...	PROCHLORPER...	10	mg	Oral	0		Take 2 tablets (10m...	Ordered	Update
FIVEHUNDREDSIXTY PATIENT	1	Therapy	PACLITAXEL INJ...	392	mg	IVPB	500	167	Administer in 500ml...	Ordered	Update
Admin Date: 09/24/2012											
FOURHUNDREDSIXTY PATIENT	2	Pre Therapy	DEXAMETHASO...	8	mg	Oral	0		take this first	Ordered	Update
FOURHUNDREDSIXTY PATIENT	2	Post Thera...	PROCHLORPER...	10	mg	Oral	0		OK	Ordered	Update
FOURHUNDREDSIXTY PATIENT	2	Therapy	TOPOTECAN INJ	1.96	mg	IVPB	100	200	OK	Ordered	Update
FOURHUNDRED PATIENT	4	Pre Therapy	DEXAMETHASO...	20	mg	IVPB	50	100	Administer on chem...	Dispensed	Update
FOURHUNDRED PATIENT	4	Pre Therapy	DIPHENHYDRA...	50	mg	Oral	0		Take on chemothera...	Dispensed	Update
FOURHUNDRED PATIENT	4	Pre Therapy	RANITIDINE TAB	50	mg	Oral	0		Take on chemothera...	Dispensed	Update
FOURHUNDRED PATIENT	4	Post Thera...	PROCHLORPER...	10	mg	Oral	0		Take 2 tablets (10m...	Dispensed	Update

Refresh Edit

Help Logout

Figure 18: Clearing a Medication Order

Finalize and Dispense Medication Orders

After a member of the healthcare team clears an order, a pharmacist may view the order for further processing. Similar to the process to clear an order, pharmacists may finalize an order by selecting the medications for the desired patient from the “Orders” tab and setting the order status from “cleared” to “finalized” via the pull-down menu, as shown in Figure 19, then selecting the “update” button for that medication row.

Patient Orders Template Authoring Messages Admin											
Name	Admin Day	Type	Drug	Dosage	Units	Route	Fluid/ Volume	Flow Rate	Instructions	Order Status	Set Status
Admin Date: 09/23/2012											
FOURHUNDREDSIXTY PATIENT	1	Pre Therapy	DEXAMETHASO...	8	mg	Oral	0		take this first	Cleared	Update
FOURHUNDREDSIXTY PATIENT	1	Post Thera...	PROCHLORPER...	10	mg	Oral	0		OK	Ordered	Update
FOURHUNDREDSIXTY PATIENT	1	Therapy	TOPOTECAN INJ	1.96	mg	IVPB	100	200	OK	In-Coordination	Update
FOURHUNDRED PATIENT	3	Pre Therapy	DEXAMETHASO...	20	mg	IVPB	50	100	Administer on chem...	Cleared	Update
FOURHUNDRED PATIENT	3	Pre Therapy	DIPHENHYDRA...	50	mg	Oral	0		Take on chemothera...	Finalized	Update
FOURHUNDRED PATIENT	3	Pre Therapy	RANITIDINE TAB	50	mg	Oral	0		Take on chemothera...	Dispensed	Update
FOURHUNDRED PATIENT	3	Post Thera...	PROCHLORPER...	10	mg	Oral	0		Take 2 tablets (10m...	Administered	Update
FOURHUNDRED PATIENT	3	Therapy	PACLITAXEL INJ...	380	mg	IVPB	500	167	Administer in 500ml...	Cancelled	Update
FOURHUNDREDDONE PATIENT	10	Post Thera...	APREPITANT C...	80	mg	Oral	0		Patient to take by m...	Dispensed	Update
FOURHUNDREDDONE PATIENT	10	Post Thera...	DEXAMETHASO...	8	mg	Oral	0		Patient to take 2 ta...	Ordered	Update
FIVEHUNDREDSIXTY PATIENT	1	Pre Therapy	DEXAMETHASO...	20	mg	Oral	0		Take on chemothera...	Ordered	Update
FIVEHUNDREDSIXTY PATIENT	1	Pre Therapy	DIPHENHYDRA...	50	mg	Oral	0		Take on chemothera...	Ordered	Update
FIVEHUNDREDSIXTY PATIENT	1	Pre Therapy	RANITIDINE TAB	50	mg	Oral	0		Take on chemothera...	Ordered	Update
FIVEHUNDREDSIXTY PATIENT	1	Post Thera...	PROCHLORPER...	10	mg	Oral	0		Take 2 tablets (10m...	Ordered	Update
FIVEHUNDREDSIXTY PATIENT	1	Therapy	PACLITAXEL INJ...	392	mg	IVPB	500	167	Administer in 500ml...	Ordered	Update

Figure 19: Finalizing a Medication Order

Once the pharmacist finalizes an order, it will automatically pass to VistA for processing, preparation, and dispensing. When VistA processes the dispensing of an order, the order status within COMS is automatically set to “dispensed” and the medication detail will appear on the Treatment panel within the ND module.

Nursing Documentation

The ND module permits the oncology nurse to view relevant clinical data and document the provision of chemotherapy and nursing assessments of the patient since the previous administration and throughout the current treatment. These assessments may be entered into COMS – regardless of administration day or day of rest – for inclusion in the Flow Sheet and consideration for the EoTS report.

Following the CTOS module establishment of the regimen and OEM module customizing medications for each individual patient, the ND module facilitates the crucial role of documenting the administration of the regimen’s prescribed medications. Pre-populated data from dispensed medications serves as the foundation for recording medications administered with the attending nurse documenting doses administered, dates, start/stop times, patient and dose verification, symptom assessments, and infusion reactions.

The ND module supports oncology nurses with six activity-specific panels to convey information previously obtained and to facilitate the documentation of new information relevant to the administration of prescribed medications.

- **General Information** – Provides laboratory results and historic vital signs; enables the nurse to document patient verification (from two sources) and consent, patient teaching, dual verification of medication dosing, and vital signs obtained that day.

- **Assessment** – Enables the nurse to document the Top 10 chemotherapy symptoms and clinical grading of those side effects plus any other symptom the patient has encountered since the previous administration.
- **IV Site** – Facilitates nurse documentation of the intravenous (IV) site access and appearance as well as verification of the patient’s brisk blood return before, during, and after treatment.
- **Treatment** – Enables the nurse to annotate the administration of pre-therapy, therapy, and post-therapy medications. These medications are pre-populated from the OEM module once orders are cleared for preparation and medications are dispensed by the pharmacy. In support of clinical practices and guidelines, “positive action” by the nurse is required to properly document medication administration within the Treatment panel.
- **Infusion Reactions** – Facilitates nurse documentation of three common chemotherapy infusion reactions (Extravasation, Cytokine-Release Syndrome, and Hypersensitivity/Anaphylaxis) and any other reaction to the administration of medications on the treatment day.
- **Discharge Instructions** – Facilitates communication as a reminder for the patient on the next administration day and scheduled laboratory tests; enables the nurse to record patient education topics and teaching methodology.

Altogether, the ND module enables oncology nurses to thoroughly document assessment, treatment, and instructions of individual patients. Common ND module actions include viewing the chemotherapy/biotherapy information and completing documentation on all six activity-based panels.

View Chemotherapy/Biotherapy Information

Oncology nurses may access the ND module for any specific patient. After patient selection as detailed in the “Apply a Template to a Patient and Generate Orders” section, nurses access the ND module by selecting the “Nursing Documentation” module tab. COMS defaults to display the General Information panel with a chemotherapy/biotherapy information header of regimen name, cycle, day, and date, as shown in Figure 20.

The screenshot displays the 'Nursing Documentation' (ND) module interface for a patient. At the top, there are four tabs: 'Chemotherapy Template Order Sourc', 'Order Entry Management', 'Nursing Documentation' (which is selected), and 'Flowsheet'. Below these tabs is a header section for 'Chemotherapy / Biotherapy' containing the following information: 'Regimen: NSCLC - Single Agent Paclitaxel', 'Cycle: 1', 'Day: 1', and 'Date: 09/23/2012'. Under the header, there are six tabs: 'General Information', 'Assessment', 'IV Site', 'Treatment', 'Infusion Reactions', and 'Discharge Instructions'. The 'General Information' tab is currently active. It contains a 'Laboratory Information' section with a dropdown arrow and a 'Patient Identification' section. The 'Patient Identification' section includes a checkbox labeled 'Patient identification verified with 2 information sources?:' with 'Yes' and 'No' radio buttons, a checkbox labeled 'Consent obtained?:' with 'Yes' and 'No' radio buttons, and a 'Comment:' text area.

Figure 20: ND Module Chemotherapy/Biotherapy Information

General Information Panel

After reviewing the chemotherapy/biotherapy information, nurses may continue scrolling down the ND module, General Information panel. This panel contains laboratory information imported from VistA/CPRS, a patient identification section to confirm the nurse verified the patient's identity from two sources and obtainment of patient consent, and a brief patient teaching section for documentation of educational assessment and review of the pre-procedure plan. The General Information panel also permits nurses to verify medication dosing with one or two authorized healthcare professionals. The panel also facilitates nursing documentation of the patient's vital signs, including temperature, height, weight, pulse, respirations, patient-assessed pain on the standardized 1 thru 10 scale, blood pressure, and peripheral oxygen saturation percentage. Upon entry of the patient's height/weight, COMS automatically calculates the BSA (in accordance with the weight and BSA calculation methodologies selected by the prescribing provider with application of the template). Nurses may select the "Show Calculations" link to view the BSA calculations performed for the displayed BSA value. Nurses may also view the patient's displayed gender and age in this section of the General Information panel. When nurses save the vital signs entries, they are automatically added to the "Vital Signs – Historical" table. Within this table, nurses may select any displayed BSA value to view the associated calculations. The General Information panel is shown in Figure 21.

General Information | Assessment | IV Site | Treatment | Infusion Reactions | Discharge Instructions

Laboratory Information

Patient Identification

Patient identification verified with 2 information sources?: Yes: ☐ No: ☐

Consent obtained?: Yes: ☐ No: ☐

Comment:

Patient Teaching

Education assessment complete?: Yes: ☐ No: ☐

Pre-procedure plan reviewed with patient/significant other, questions answered?: Yes: ☐ No: ☐

Dual Verification of Dosing

Sign to Verify

Sign to Verify

Vital Signs

Temp.: °F Pulse: BP: / Patient Gender: Male

Height: inches (cm) Resp: SP O₂ %: Age: 77

Weight: lbs (kg) Pain: BSA: Show [Calculations](#)

Save Cancel

Vital Signs - Historical

Date	Temp	Pulse	BP	Resp	Pain	SP O ₂	PS	Height in Inches	Weight in lbs.	BSA			
										Weight Form.	Weight in KG	Method	BSA
09/23/2012	98.4	76	146/84	12	4		0	70	172	Actual Weight	78	DuBois	1.96 m ²
09/23/2012	98.7	72	146/92	10	5		0		174	Actual Weight	79	DuBois	
09/23/2012	98.4	76	146/84	12	4		0	70	172	Actual Weight	78	DuBois	1.96 m ²
09/23/2012	98.7	72	146/92	10	5		0		174	Actual Weight	79	DuBois	
09/23/2012	98.4	76	146/84	12	4			70	172		172		
09/23/2012	98.7	72	146/92	10	5				174		174		

Figure 21: ND Module General Information Panel

Assessment Panel

The ND module, Assessment panel enables oncology nurses to document the Top 10 chemotherapy symptoms and provide clinical grading of those side effects plus any other symptom the patient has encountered since the previous administration. Nurses select the appropriate check box for the symptom then indicate the level utilizing Common Terminology Criteria for Adverse Events (CTCAE). For each assessment, nurses may enter free text comments to further qualify the assessment, as shown in Figure 22. Once saved, Assessment panel information becomes part of the patient's oncology record.

Pretreatment Assessment

Pretreatment Assessment of Adverse Events since last treatment:

☒ **Fatigue**
Level of Fatigue: 1. Fatigue relieved by rest
Comments: Free Text Comments Field

☐ **Anorexia**
☒ **Nausea**
Level of Nausea: 1. Loss of appetite without alteration in eating habits
2. Oral intake decreased without significant weight loss, dehydration or malnutrition
3. Inadequate oral caloric or fluid intake; tube feeding, TPN, or hospitalization indicated
Comments:

☐ **Vomiting**
☐ **Rash**
☐ **Insomnia**
☐ **Distress**
☐ **Diarrhea**
☐ **Dyspnea**
☐ **Neuropathy**
☐ **Other**

Figure 22: ND Module Assessment Panel

IV Site Panel

The ND module, IV Site panel facilitates nurse documentation of the intravenous (IV) site access, including the date accessed and the IV device, gauge, and location. Nurses may also document site appearance as being absent of symptoms, presenting pain, swelling, redness/Erythema, or disconnected altogether. Nurses may then document the brisk blood return before, during, and after treatment. Lastly, nurses may use the IV Site panel to provide free text comments to qualify the site appearance and qualify the brisk blood return assessments. Once saved, IV site panel information, shown in Figure 23, becomes part of the patient's oncology record.

The screenshot shows the 'IV Site' panel within the 'Chemotherapy Ordering Management System (COMS)'. The browser window title is 'Chemotherapy Ordering Management System (COMS) - Windows Internet Explorer'. The address bar shows 'https://coms-stg-qa.dailpro.com/index.php'. The page has a menu bar with 'File', 'Edit', 'View', 'Favorites', 'Tools', and 'Help'. Below the menu bar are 'Favorites', 'Suggested Sites', 'Web Slice Gallery', and 'Free Hotmail'. The main content area has a tabbed interface with 'General Information', 'Assessment', 'IV Site', 'Treatment', 'Infusion Reactions', and 'Discharge Instructions'. The 'IV Site' tab is active. It contains three main sections: 'IV Access' with fields for 'Date Accessed' (09/23/2012), 'Device' (Peripheral IV), 'Gauge' (22g), and 'Location' (Left Dorsal Proximal Forearm); 'Site Appearance' with checkboxes for 'Absence of symptoms', 'Pain', 'Swelling', 'Erythema', and 'Line Disconnected/Port De Accessed', and a 'Comments' text area; and 'Brisk blood return verified' with radio buttons for 'Yes' and 'No' for 'Pre treatment', 'During treatment', and 'Post treatment', and a 'Comments' text area. At the bottom are 'Save' and 'Cancel' buttons. The browser status bar shows 'Internet' and '125%' zoom.

Figure 23: ND Module IV Site Panel

Treatment Panel

The ND module, Treatment panel enables nurses to annotate the administration of pre-therapy, therapy, and post-therapy medications. COMS pre-populates these medications from the OEM module once orders are cleared for preparation and medications are dispensed by the pharmacy, as shown in Figure 24.

The screenshot displays the 'Treatment' tab of the ND Module. At the top, there are tabs for 'General Information', 'Assessment', 'IV Site', 'Treatment', 'Infusion Reactions', and 'Discharge Instructions'. Below these, a 'Treatment Complete' button is visible. The main section is titled 'Medication Given' and contains a table labeled 'Treatment Administered'. This table has columns for Medication, Dose, Units, Route, Start Time, End Time, Comments, and Signature. The table is divided into three sections: 'Pre Therapy', 'Therapy', and 'Post Therapy'. Each section lists medications with their respective doses and units, and includes a 'Sign to Verify' link in the Signature column. The 'Pre Therapy' section lists DEXAMETHASONE TAB (20 mg Oral), DIPHENHYDRAMINE C... (50 mg Oral), and RANITIDINE TAB (50 mg Oral). The 'Therapy' section lists PACLITAXEL INJ, CONC (392 mg IVPB). The 'Post Therapy' section lists PROCHLORPERAZINE... (10 mg Oral). Navigation arrows are present at the bottom of the table.

Medication	Dose	Units	Route	Start Time	End Time	Comments	Signature
Pre Therapy							
DEXAMETHASONE TAB	20	mg	Oral				Sign to Verify
DIPHENHYDRAMINE C...	50	mg	Oral				Sign to Verify
RANITIDINE TAB	50	mg	Oral				Sign to Verify
Therapy							
PACLITAXEL INJ, CONC	392	mg	IVPB				Sign to Verify
Post Therapy							
PROCHLORPERAZINE...	10	mg	Oral				Sign to Verify

Figure 24: ND Module Treatment Panel

In support of clinical practices and guidelines, “positive action” by the nurse is required for proper documentation of medication administration. Nurses are required to record the start/end times and may provide any free text comments for each medication detail. Using VistA access and verify codes, nurses verify the medication administration and associated documentation for the medication detail by signing the record, as shown in Figure 25.

The screenshot shows the 'Treatment Administered' table with the following data:

Medication	Dose	Units	Route	Start Time	End Time	Comments	Signature
IE TAB	20	mg	Oral	08:00 AM	08:00 AM	Patient took medication at home before arrival	1programmer - 09/23/2012 - 9:42 pm
INE C...	50	mg	Oral	08:00 AM	08:00 AM	Patient took medication at home before arrival	1programmer - 09/23/2012 - 9:43 pm
	50	mg	Oral	08:00 AM	08:00 AM		1programmer - 09/23/2012 - 9:44 pm
CONC	392	mg	IVPB	09:00 AM			In Process...
PY							
ZINE...	10	mg	Oral				

The 'Authenticate' dialog box contains the following text:

Fields with a * are required fields
 Access Code *:
 Verify Code *:

Buttons: Sign Record, Cancel

[Help](#) [Logout](#)

Figure 25: Authentication for Sign to Verify Medication Administration

After documentation of all medication details, nurses select the “Treatment Complete” button. When selecting the “Treatment Complete” button, nurses are required to confirm treatment completion, as shown in Figure 26. Upon confirmation, the documentation is saved and becomes part of the patient’s oncology record.

The screenshot shows the 'Treatment Administered' table with the following data:

Medication	Dose	Units	Route	Start Time	End Time	Comments	Signature
Pre Therapy							
DEXAMETHASONE TAB	20	mg	Oral	08:00 AM			
DIPHENHYDRAMINE C...	50	mg	Oral	08:00 AM			
RANITIDINE TAB	50	mg	Oral	08:00 AM			
Therapy							
PACLITAXEL INJ, CONC	392	mg	IVPB	09:00 AM			
Post Therapy							
PROCHLORPERAZINE...	10	mg	Oral	12:45 PM	12:45 PM		1programmer - 09/23/20

The 'Treatment Complete?' dialog box contains the following text:

Are you finished documenting administration of medications for this patient?

Buttons: Yes, No

Figure 26: Confirmation for Completing Treatment Documentation

Infusion Reactions Panel

The ND module, Infusion Reactions panel facilitates nurse documentation of three common chemotherapy infusion reactions. Through this panel, nurses record the presence of Extravasation, Cytokine-Release Syndrome, and Hypersensitivity/Anaphylaxis as infusion reactions to the chemotherapy administration. Nurses may check the appropriate box(es) to indicate the symptom and also enter numeric values for highest value of tachycardia and lowest values of hypotension, as shown in Figure 27. Once saved, the information in the Infusion Reactions panel becomes part of the patient's oncology record.

The screenshot displays the 'Infusion Reactions' panel within a software interface. At the top, there are tabs for 'General Information', 'Assessment', 'IV Site', 'Treatment', 'Infusion Reactions' (which is active), and 'Discharge Instructions'. The panel is divided into three main sections, each with a collapse/expand icon on the left.

- Extravasation:** Contains checkboxes for 'Topical heating applied', 'Topical cooling applied', 'Interventions', 'Antidotes', 'Measurements', 'Edema' (checked), 'Erythema' (checked), 'Discomfort with movement', and 'Other'.
- Cytokine-Release Syndrome:** Contains checkboxes for 'Fever', 'Chills', 'Rigors', 'Nausea', 'Hypotension', 'Tachycardia' (checked), 'Asthenia', 'Headache', 'Rash', 'Tongue and Laryngeal Edema', 'Dyspnea', and 'Other'. Below 'Tachycardia', there is a label '- Pulse:' followed by a text input field containing '142' and the text '(Highest value)'.
- Hypersensitivity or Anaphylaxis:** Contains checkboxes for 'Uneasiness or Agitation', 'Chest Tightness', 'Hypotension' (checked), 'Dyspnea', 'Wheezing', 'Urticaria', and 'Other'. Below 'Hypotension', there is a label '- Blood Pressure:' followed by two text input fields containing '100' and '55', and the text '(Lowest value)'.

Figure 27: ND Module Infusion Reactions Panel

Discharge Instructions Panel

The ND module, Discharge Instructions panel facilitates communication as a reminder for the patient. Nurses may record the next administration day for pre-therapy, therapy, and/or post-therapy medications and scheduled laboratory tests. This panel also enables the nurse to record patient education topics and teaching methodology, as shown in Figure 28. Once saved, the information in the Discharge Instructions panel becomes part of the patient's oncology record.

General Information | Assessment | IV Site | Treatment | Infusion Reactions | **Discharge Instructions**

Patient Education

Patient Education: Yes: ☐ No: ☐

Comments:

Follow up: Inpatient: ☐ Outpatient: ☒

Next Chemotherapy Appt.: 09/30/2012

Next Clinic Appt.: 09/30/2012

Laboratory Test(s) Scheduled

Discharge Instructions

☒ Patient was given Chemotherapy discharge instructions.

Select Instructions:

No Instructions available at this time

Comments:

Save Cancel

Figure 28: ND Module Discharge Instructions Panel

Flow Sheet

The FS module offers a snapshot of care for the healthcare team to view relevant clinical data, the disease response/patient reaction to chemotherapy administration, pertinent laboratory results, and an overview of administered medications. Through direct entry of information and display of specific information from the ND module, the Flow Sheet provides the healthcare team with an efficient display of relevant information and patient-centered documentation of chemotherapy administration.

The FS module supports direct entry of disease response, toxicity side effects, and other annotations. Authorized users may enter detailed, free text comments regarding the tumor response to the administered medications from the regimen prescribed in the CTOS module, customized in the OEM module, and administered as documented in the ND module. Fields dedicated to free text entry of toxicity side effects experienced by the patient during a particular administration day or cycle within the regimen provide insight into patient reaction to the chemotherapy agents. Users may also enter an uncategorized “other” comment to clearly communicate observations and recommendations. All members of the healthcare team may view disease response, toxicity side effects, and other comments within the FS module at any time throughout the regimen.

The COMS application retrieves and displays relevant laboratory results from VistA/CPRS. In this manner, the FS module supports rapid view of laboratory results within the context of the prescribed regimen, administered medications, and other significant clinical documentation. The FS module also automatically retrieves and presents pre-therapy, therapy, and post-therapy medication administration specifics from the ND module. With administration day columns, the FS module presents relevant information for medications and dosages administered to the specific patient. Eliminating dual entry, COMS directly populates this documentation from the Treatment panel within the ND module. Members of the healthcare team may view this overview as a snapshot of administered medications for each administration day throughout the regimen.

The FS module provides chemotherapy/biotherapy information similar to that presented for the ND module. The next section of the FS module enables user entry while the remaining four sections concisely display other information for the healthcare team.

- General – Provides date, patient performance status, and weight; enables entry and viewing of disease response, toxicity side effects, and other comments relevant to the patient’s treatment.
- Laboratory Results – Displays laboratory results relevant to the provision of oncology services; automatically populates from CPRS.
- Pre-Therapy – Presents specific pre-therapy medication administration details for each administration day; automatically populates from the Treatment panel within the ND module.
- Therapy – Displays specific administration details of prescribed chemotherapy agents for each administration day; automatically populates from the Treatment panel within the ND module.
- Post-Therapy – Presents specific post-therapy medication administration details for each administration day; automatically populates from the Treatment panel within the ND module.

Altogether, the FS module provides an efficient display of relevant information and patient-centered documentation of chemotherapy administration. Common FS module actions include Viewing Chemotherapy/Biotherapy Information; Reviewing Performance Status and Weight; Annotating and Viewing Disease Response, Toxicity Side Effects, and Other Comments; and Reviewing Medication Administration Details.

View Chemotherapy/Biotherapy and Laboratory Information

Members of the healthcare team may access the FS module for any specific patient. After patient selection as detailed in the “Apply a Template to a Patient and Generate Orders” section, team members access the FS module by selecting the “Flow Sheet” module tab. COMS will display the FS module with a chemotherapy/biotherapy information header of regimen name, cycle, day, and date, as shown in Figure 29.

Chemotherapy / Biotherapy			
Regimen:	Cycle:	Day:	Date:
NSCLC - Single Agent Paclitaxel	1	1	09/23/2012
Cycle 1, Day 1	Cycle 2, Day 1	Cycle 3, Day 1	Cycle 4, Day 1

Figure 29: FS Module Chemotherapy/Biotherapy Information

Review Performance Status and Weight for Specific Dates

After patient selection, members of the healthcare team may view Flow Sheet annotations for performance status and patient weight. COMS automatically imports these values from the OEM module and ND module, respectively, for each administration day. The Flow Sheet displays information in administration day columns, as shown in Figure 30.

The screenshot shows the 'Flowsheet' tab in the COMS interface. The patient's regimen is 'NSCLC - Single Agent Paclitaxel', Cycle 1, Day 1, dated 09/23/2012. The table below shows performance status and weight for four administration days.

	Cycle 1, Day 1	Cycle 2, Day 1	Cycle 3, Day 1	Cycle 4, Day 1
01 General				
Date	09/23/2012	10/14/2012	11/04/2012	11/25/2012
Performance Status				
Weight (lbs)	174			
Disease Response	Write			
Toxicity Side Effects	Write			
Other	Write			

Figure 30: FS Module General Information

Annotate Disease Response, Toxicity/Side Effects, and Other Comments

Within the FS module, oncology providers may provide Disease Response, Toxicity Side Effects, and Other comments for the current administration day. When providers select the “Write” link for the desired comment category, COMS presents a free text entry pop-up form, as shown in Figure 31. After providers type comments and select save, the entry is saved and a “Read” link will replace the “Write” link for the appropriate entry category and administration date.

The screenshot shows the 'Flowsheet' tab with the same patient information as Figure 30. A 'Disease Response' pop-up form is open over the 'Disease Response' column for Cycle 1, Day 1. The form has a text entry field and 'Save' and 'Cancel' buttons.

	Cycle 1, Day 1	Cycle 2, Day 1	Cycle 3, Day 1	Cycle 4, Day 1
01 General				
Date	09/23/2012	10/14/2012	11/04/2012	11/25/2012
Performance Status				
Weight (lbs)	174			
Disease Response	Write			
Toxicity Side Effects	Write			
Other	Write			
02 Laboratory Results				
Unknown...				
03 Pre Therapy				
DEXAMETHASONE TAB	20 mg			
DIPHENHYDRAMINE CAP,...	50 mg			
RANITIDINE TAB	50 mg			
04 Therapy				
PACLITAXEL INJ, CONC	392 mg			
05 Post Therapy				
PROCHLORPERAZINE TAB	10 mg			

Figure 31: Annotate Disease Response, Toxicity Side Effects, and Other Comments

View Disease Response, Toxicity Side Effects, and Other Comments

After oncology providers type comments and select save, the annotation is available for viewing by all members of the healthcare team. Authorized healthcare team member users may view Disease Response, Toxicity Side Effects, and Other comments by selecting the “View” link for the appropriate category and administration date. COMS will then display the provider-entered text for the selected item to view, as shown in Figure 32.

Chemotherapy Template Order Source | Order Entry Management | **Nursing Documentation** | Flowsheet

Chemotherapy / Biotherapy

Regimen: NSCLC - Single Agent Paclitaxel Cycle: 1 Day: 1 Date: 09/23/2012

	Cycle 1, Day 1	Cycle 2, Day 1	Cycle 3, Day 1	Cycle 4, Day 1
01 General				
Date	09/23/2012	10/14/2012	11/04/2012	11/25/2012
Performance Status				
Weight (lbs)	174			
Disease Response	View			
Toxicity Side Effects	View			
Other	Write			
02 Laboratory Results				
Unknown...				
03 Pre Therapy				
DEXAMETHASONE TAB	20 mg			
DIPHENHYDRAMINE CAP,...	50 mg			
RANITIDINE TAB	50 mg			
04 Therapy				
PACLITAXEL INJ, CONC	392 mg			
05 Post Therapy				
PROCHLORPERAZINE TAB	10 mg			

Toxicity Side Effects
COMS User Guide - Flow Sheet Toxicity Side Effects Free Text Field
[OK](#)

[Help](#) [Logout](#)

Figure 32: View Disease Response, Toxicity Side Effects, and Other Comments

Review Medication Administration Details

After patient selection, members of the healthcare team may view Flow Sheet documentation of pre-therapy, therapy, and post-therapy medication administration details. COMS automatically imports these values from the ND module, Treatment panel once the nurse verifies administration of the medication and indicates treatment is complete. The FS module displays pre-therapy, therapy, and post-therapy medication administration details in administration day columns, as shown in Figure 33.

	Cycle 1, Day 1	Cycle 2, Day 1	Cycle 3, Day 1	Cycle 4, Day 1
01 General				
Date	09/23/2012	10/14/2012	11/04/2012	11/25/2012
Performance Status				
Weight (lbs)	174			
Disease Response	View			
Toxicity Side Effects	View			
Other	Write			
02 Laboratory Results				
Unknown...				
03 Pre Therapy				
DEXAMETHASONE TAB	20 mg			
DIPHENHYDRAMINE CAP,...	50 mg			
RANITIDINE TAB	50 mg			
04 Therapy				
PACLITAXEL INJ, CONC	392 mg			
05 Post Therapy				
PROCHLORPERAZINE TAB	10 mg			

Figure 33: Flow Sheet Medication Administration Details

End of Treatment Summary

The EoTS module supports the oncology provider creation, and healthcare team viewing, of the summary of care rendered and results achieved throughout the specified treatment regimen. The EoTS module also enables the provider to stop a treatment regimen. Following the conclusion or discontinuation of a regimen and its applied template, the provider typically generates the treatment summary. To aid in generation of the summary report, the EoTS module retrieves relevant information from various COMS modules and pre-populates several sections of the treatment summary for provider consideration when preparing the provider report narrative, including disease response and toxicity side effects from the FS module.

The EoTS module supports pre-population of patient and regimen details, type of cancer, vital signs data, body surface area information, clinical trial, allergy, performance status, and medications administered. Further retrieval from the FS module enables the provider to review healthcare team entries throughout the regimen regarding disease response and toxicity side effects for creation of the summation narrative and categorization of the disease response. The EoTS module also supports an overall provider report

with free text entry to communicate patient and regimen specific assessment to the current and future healthcare team.

The EoTS module treatment summary form provides five main sections to guide the provider through generation of the End of Treatment Summary.

- Pre-populated Components – Provides pre-populated data for patient and regimen details, type of cancer(s), amputation(s), initial and final vital signs information for the regimen, body surface area factors and values, clinical trial information, allergy, performance status, and medications administered to the patient throughout the regimen.
- Patient Disease Response – Enables the provider to review FS module entries for Patient Disease Response, categorize the disease response (complete response, partial response, minor response, progression, or stable), and create summation narrative in the provider report section.
- Toxicity Side Effects – Enables the provider to review FS module entries for Toxicity Side Effects and create summation narrative in the provider report section.
- Provider Report – Supports free text narrative for provider to enter patient and regimen specific overall assessment as a summary for the chemotherapy treatment, results, and/or prognosis.
- Follow-Up Appointments – Supports free text narrative for provider to enter information relevant to the patient’s follow-up appointments.

Altogether, the EoTS module facilitates stopping a treatment regimen and provides a chronological history of diagnosis, treatment, changes in treatment, disease response, and patient outcomes. Common EoTS module actions include Stop Treatment Regimen; Initiate an End of Treatment Summary; View Pre-populated Components of the EoTS; Review Patient Disease Response, Toxicity Side Effects, and Other Comments; Compose Provider Report and Specify Follow-up Appointments; and View a Completed End of Treatment Summary,

Stop Treatment Regimen

Oncology providers may stop the treatment regimen for their patient through the Treatment Regimens & Summaries panel. The provider must first select a patient from the database, as noted in the “Apply a Template to a Patient and Generate Orders” section, via one of three alternative methodologies for patient selection. After patient selection, the provider will expand the Treatment Regimens & Summaries panel to view the current and historical templates for the specified patients. To stop the treatment regimen, the provider may then select the “Stop Treatment” link for the current template, as shown in Figure 34.

Chemotherapy Ordering Management System (COMS)

Welcome Programmer, All Roles -- [Help](#)

[Patient](#) [Orders](#) [Template Authoring](#) [Messages](#) [Admin](#)

Patient Selection

Patient Information for - PATIENT FOURHUNDRED

Patient Information

Treatment Regimens & Summaries (3 Records)

	Template Name	Start Date	End Date		
Current Template:	NSCLC - Paclitaxel for UAT	08/10/2012	11/02/2012	Show Details	Stop Treatment
Historical Template:	NSCLC - Paclitaxel for UAT	07/31/2012	08/03/2012	Show Details	Show End of Treatment Summary
Historical Template:	NSCLC - Paclitaxel for UAT	08/06/2012		Show Details	Generate End of Treatment Summary

Figure 34: Stop Treatment Regimen

Initiate an End of Treatment Summary

After patient selection and stopping a treatment regimen, oncology providers may initiate an end of treatment summary. Within the Treatment Regimens & Summaries panel, the oncology provider will select the “Generate End of Treatment Summary” link to initiate the EoTS report. COMS will prompt the provider to identify the reason for generating the EoTS with radio buttons for Completed Prescribed Course, Treatment Change (with sub-options of Toxicity, Progression of the Disease, Patient Refusal, and Other (with free text field)), Patient Discontinuation (with sub-options of Patient Terminated Regimen, Patient Left VA System, and Other (with free text field)), and Other (for free text reason). The pop-up form with reasons for generating the EoTS is shown in Figure 35.

Chemotherapy Ordering Management System (COMS)

End of Treatment Summary

End of Treatment Summary

Reason for generating End of Treatment Summary - Treatment Change

☐ Completed Prescribed Course

☒ Treatment Change

☐ Toxicity

☐ Progression of the Disease

☐ Patient Refusal

☐ Other

☐ Patient Discontinuation

☐ Other

Figure 35: Reason Options for Generating an End of Treatment Summary

During the process of identifying a reason for generating an End of Treatment Summary, COMS enables providers to recover from inadvertently selecting a radio button associated with an undesired or inaccurate reason. To change the reason, oncology providers may select the “Change” link located immediately after the displayed reason originally identified by the provider for generating the EoTS report. When providers select the “Change” link, as shown in Figure 36, COMS displays the EoTS Reason Options pop-up form for re-selection.

Chemotherapy Ordering Management System (COMS)

End of Treatment Summary

End of Treatment Summary

Reason for generating End of Treatment Summary - Completed Prescribed Course [Change](#)

Patient Information for - PATIENT FOURHUNDRED

Gender:	M	Age:	77	Amputee:	Left Foot
Template:	NSCLC - Paclitaxel for UAT -				
Regimen Status:	Ended	Regimen Start Date:	08/10/2012	Regimen End Date:	09/25/2012 (Original Scheduled End Date - 11/02/2012)

Figure 36: Change Reason for Generating an End of Treatment Summary

View Pre-Populated Components of an End of Treatment Summary

Oncology providers creating an EoTS report may view pre-populated components within the EoTS module. Specifically, COMS presents pre-populated data for patient and regimen details, type of cancer(s), amputation(s), initial and final vital signs information for the regimen, body surface area factors and values, clinical trial information, allergy, performance status, and medications administered to the patient throughout the regimen. Pre-populated components of the End of Treatment Summary are shown in Figure 37.

Chemotherapy Ordering Management System (COMS)

Welcome Programmer, All Roles - [Help](#)

End of Treatment Summary

Reason for generating End of Treatment Summary - Treatment Change - Toxicity [Change](#)

Patient Information for - PATIENT FIVEHUNDREDSIXTY

Gender: M	Age: 77	Amputee: None
Template: NSCLC - Single Agent Paclitaxel -		
Regimen Status: Ended	Regimen Start Date: 09/23/2012	Regimen End Date: 09/25/2012 (Original Scheduled End Date - 12/16/2012)

Type(s) of Cancer:

Allergies:

Name	Type	Comment
Clinical Trial: NOT a clinical trial		

Initial Vital Signs

Date Vitals Taken	Height	Weight	Blood Pressure	Temperature	Pain	Pulse	Respiration	SPO2	BSA Weight Method	BSA Weight	BSA Method	BSA
09/23/2012	70	172	146/84	98.4	4	76	12		Actual Weight	78	DuBois	
Performance Status:	0 - Fully active, able to carry on all pre-disease performance without restriction											

Final Vital Signs

Date Vitals Taken	Height	Weight	Blood Pressure	Temperature	Pain	Pulse	Respiration	SPO2	BSA Weight Method	BSA Weight	BSA Method	BSA
09/24/2012	70	172	146/84	98.4	4	76	12		Actual Weight	78	DuBois	1.96
Performance Status:	0 - Fully active, able to carry on all pre-disease performance without restriction											

Medication Administered

DEXAMETHASONE TAB		
Cycle 1, Day 1	09/23/2012	20 mg
DIPHENHYDRAMINE CAP,ORAL		
Cycle 1, Day 1	09/23/2012	50 mg
RANITIDINE TAB		
Cycle 1, Day 1	09/23/2012	50 mg
PACLITAXEL INJ,CONC		
Cycle 1, Day 1	09/23/2012	392 mg
PROCHLORPERAZINE TAB		
Cycle 1, Day 1	09/23/2012	10 mg

Figure 37: Pre-populated Components of an End of Treatment Summary

Review Patient Disease Response, Toxicity Side Effects, and Other Comments

Oncology providers creating an EoTS report may review patient disease response, toxicity side effects, and other comments as annotated on the Flow Sheet throughout the treatment regimen. Oncology providers may consider these items from the Flow Sheet, as shown in Figure 38.

Chemotherapy Ordering Management System (COMS)

Welcome Programmer, All Roles -- [Help](#)

End of Treatment Summary

End of Treatment Summary

Reason for generating End of Treatment Summary - Treatment Change - Toxicity [Change](#)

Patient Information for - PATIENT FIVEHUNDREDSIXTY

Gender:	M	Age:	77	Amputee:	None
Template:	NSCLC - Single Agent Paclitaxel -				
Regimen Status:	Ended	Regimen Start Date:	09/23/2012	Regimen End Date:	09/25/2012 (Original Scheduled End Date - 12/16/2012)

Patient Disease Response

Disease Response		
Cycle 1, Day 1	09/23/2012	Disease Response comments for 9/23/2012

Toxicity Side Effects

Toxicity Side Effects		
Cycle 1, Day 1	09/23/2012	COMS User Guide - Flow Sheet Toxicity Side Effects Free Text Field

Other Comments

Other	
No Other Comments Recorded	

Figure 38: Review of Flow Sheet Annotations for an End of Treatment Summary

Compose Provider Report and Specify Follow-up Appointments

Oncology providers creating an EoTS report will compose a provider report and may specify follow-up appointments for the selected patient. The EoTS module provides free text comment fields with formatting and expanding capability to accommodate lengthy narratives for these two sections. Figure 39 shows the provider report and follow-up appointment sections of the treatment summary form.

Chemotherapy Ordering Management System (COMS)

Welcome Programmer, All Roles -- [Help](#)

End of Treatment Summary

End of Treatment Summary

Reason for generating End of Treatment Summary - Treatment Change - Toxicity [Change](#)

Patient Information for - PATIENT FIVEHUNDREDSIXTY

Gender: M	Age: 77	Amputee: None
Template: NSCLC - Single Agent Paclitaxel -		
Regimen Status: Ended	Regimen Start Date: 09/23/2012	Regimen End Date: 09/25/2012 (Original Scheduled End Date - 12/16/2012)

Provider Report

Tahoma

Follow-Up Appointments

Tahoma

Save Cancel

Figure 39: Provider Report and Follow-up Appointments on End of Treatment Summary

View a Completed End of Treatment Summary

Members of the healthcare team may access the Treatment Regimens & Summaries panel to view a completed End of Treatment Summary. After patient selection as detailed in the “Apply a Template to a Patient and Generate Orders” section, team members access treatment summaries by expanding the Treatment Regimens & Summaries panel and selecting the “Show End of Treatment Summary” link for an historical template, as shown in Figure 40.

The screenshot displays the Chemotherapy Ordering Management System (COMS) interface. At the top, there is a header bar with the title "Chemotherapy Ordering Management System (COMS)" and a welcome message "Welcome Programmer, All Roles -- Help". Below the header, there are navigation tabs: "Patient", "Orders", "Template Authoring", "Messages", and "Admin". The "Patient" tab is selected, and the "Patient Selection" panel is expanded. Under "Patient Selection", there is a section for "Patient Information for - PATIENT FOURHUNDRED". This section includes a "Patient Information" panel and a "Treatment Regimens & Summaries" panel. The "Treatment Regimens & Summaries" panel shows a table with 3 records. The table has columns for "Template Name", "Start Date", "End Date", and two action links: "Show Details" and "Stop Treatment".

	Template Name	Start Date	End Date		
Current Template:	NSCLC - Paclitaxel for UAT	08/10/2012	11/02/2012	Show Details	Stop Treatment
Historical Template:	NSCLC - Paclitaxel for UAT	07/31/2012	08/03/2012	Show Details	Show End of Treatment Summary
Historical Template:	NSCLC - Paclitaxel for UAT	08/06/2012		Show Details	Generate End of Treatment Summary

Figure 40: Select an End of Treatment Summary to View

After the authorized healthcare team member selects the “Show End of Treatment Summary” link for the desired historical template, COMS will open a new screen to display the completed EoTS report. A completed End of Treatment Summary is depicted in Figure 41.

Chemotherapy Ordering Management System (COMS)

End of Treatment Summary

End of Treatment Summary

Reason for generating End of Treatment Summary Completed Prescribed Course

Patient Information for - PATIENT FOURHUNDRED

Gender:	M	Age:	77	Amputee:	Left Foot
Template:	NSCLC - Paclitaxel for UAT -				
Regimen Status:	Ended	Regimen Start Date:	07/31/2012	Regimen End Date:	08/03/2012
Type(s) of Cancer:					
Allergies:					
Clinical Trial:					

Initial Vital Signs

Date Vitals Taken	Height	Weight	Blood Pressure	Temperature	Pain	Pulse	Respiration	SPO2	BSA Weight Method	BSA Weight	BSA Method	BSA
[object Object]	70	172	146/84	98.4	4	76	12		Actual Weight	78	DuBois	
Performance Status:	3 - Capable of only limited selfcare, confined to bed or chair more than 50% of waking hours											

Final Vital Signs

Date Vitals Taken	Height	Weight	Blood Pressure	Temperature	Pain	Pulse	Respiration	SPO2	BSA Weight Method	BSA Weight	BSA Method	BSA
[object Object]	70	172	146/84	98.4	4	76	12		Actual Weight	78	DuBois	1.96
Performance Status:	1 - Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g. light house work, office work											

Medications

DEXAMETHASONE INJ,SOLN		
Cycle 1, Day 4	08/03/2012	20 mg
DIPHENHYDRAMINE CAP,ORAL		
Cycle 1, Day 4	08/03/2012	50 mg
RANITIDINE TAB		
Cycle 1, Day 4	08/03/2012	50 mg
PACLITAXEL INJ,CONC		
Cycle 1, Day 4	08/03/2012	392 mg
PROCHLORPERAZINE TAB		
Cycle 1, Day 4	08/03/2012	10 mg

Disease Response

Cycle 1, Day 4	08/03/2012	Qualitatively, the tumor appears to have decreased in size. Will obtain quantitative assessment after second full cycle of Paclitaxel therapy.
----------------	------------	--

Toxicity Response

Cycle 1, Day 4	08/03/2012	Patient erythema is decreasing in severity with Paclitaxel therapy. Please continue to monitor and report, as needed.
----------------	------------	---

Other Comments

Cycle 1, Day 4	08/03/2012	No Other Comments Recorded
----------------	------------	----------------------------

Provider Report

No Provider Report listed

Follow-Up Appointments

No Follow-Up Appointments listed

Close

Figure 41: Completed End of Treatment Summary

Miscellaneous Functionality

Within the COMS application, miscellaneous functionality through non-module sections provide broad support for the overall effectiveness of the CTOS, OEM, ND, FS, and EoTS modules individually and collectively. These five clinical modules of COMS are influenced by the application's miscellaneous functionality not specifically associated with these clinical modules, but integral and supportive of overall operational effectiveness. Miscellaneous functionality provides messaging and administration for the application. Messaging affects all members of the healthcare team utilizing COMS from order creation to medication administration. Extensive administrative functionality exists for COMS administrators to setup and maintain the application's database contents, accessibility, and interoperability while tailoring COMS support to accommodate local facility policies for administrative and clinical preferences and processes.

Altogether, miscellaneous functionality enables the application to support standardized direct order entry, healthcare team coordination, and documentation of chemotherapy treatment. Miscellaneous functionality actions include Messaging (with Reading and Responding to COMS Messages), Administration – with Managing COMS Database Lookups; Deleting Templates; Viewing, Adding, and Removing COMS Users; Viewing and Managing Active Workflows; Managing Medications Not Rounded; Setting and Managing Rounding Rules – and Configuration with Setting and Viewing COMS Global Variables.

Messaging

The Messages Tab within COMS serves as the communication hub for application messaging associated with medication changes that require provider notification or re-signature. Complementing automation of COMS, the application's communication throughout the treatment regimen enhances patient safety and bolsters Joint Commission compliance with documentation ultimately stored in VA's electronic health record comprised of VistA and CPRS.

Read and Respond to COMS Messages

The COMS application facilitates communication among the oncology healthcare team throughout the treatment regimen. Messages for team members are categorized as either informational or for action with the message prefix of “INFO” or “ACTION”, respectively. When healthcare team members open the “Messages” tab, relevant messages are listed and may be opened by selecting the “Open” link, as shown in Figure 42. The vast majority of messages are “INFO” and most “ACTION” messages are for oncology providers. Oncology providers who receive an “ACTION” message, may execute their action within the COMS message by selecting the appropriate action and/or approval.

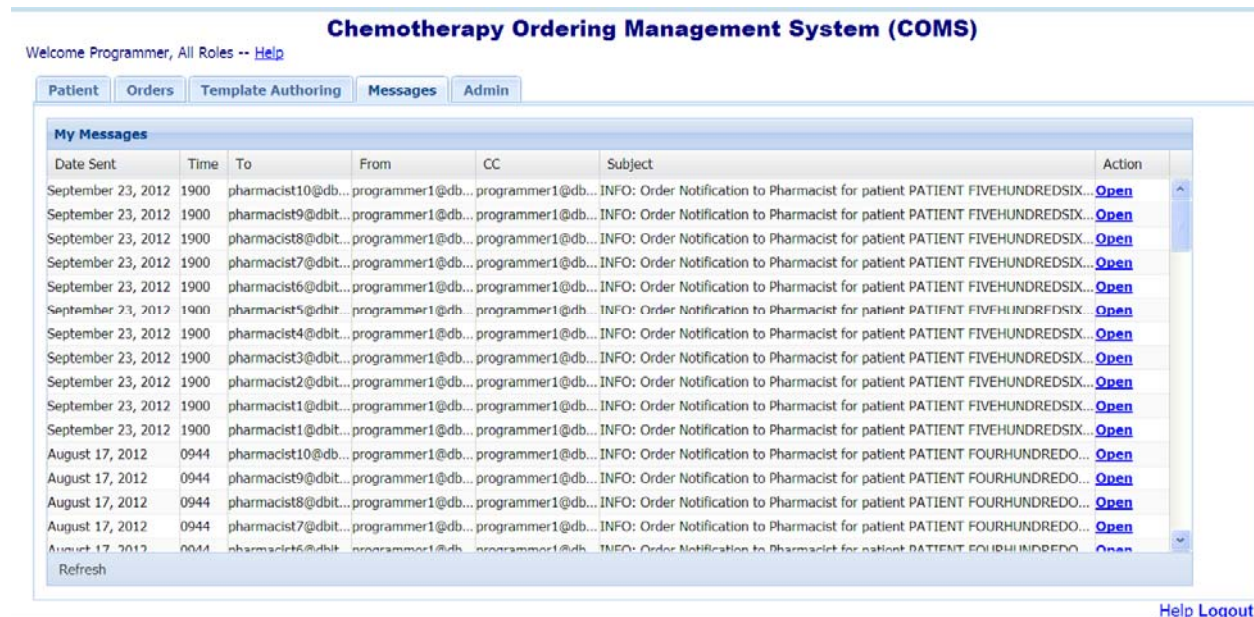


Figure 42: COMS Messaging

Administration

Authorized users – typically restricted to COMS administrators – may access COMS administration functionality through the Admin Tab. This non-module section serves as a robust core for administrative functionality to support database setup, maintenance, and interoperability; manage user access and workflow mechanisms; and incorporate facility policies for medication rounding and dosing verification.

Manage COMS Database Lookups

The COMS application database contains numerous data grouped in related categories termed “lookup types”. To manage the lookup type, COMS administrators access the Admin Tab and “Add Lookups” sub-tab. Administrators use the pull-down menu to select the lookup type, as shown in Figure 43.

Chemotherapy Ordering Management System (COMS)

Welcome Programmer, All Roles -- [Help](#)

Admin

Add LookUps Delete Template Global Variables COMS Users Active Workflows Medications Not Rounded Rounding Rules

Select Lookup Type: **FluidType**

Enter Lookup Name: Enter Lookup Description:

Current Selected Lookup PatientAmputations

Lookup Name: Lookup Description:

Edit Lookup Remove Lookup

Save Cancel

COMS Prototype, 0.1, June, 18, 2012
Page last modified - 09 July 2012

[Help](#) [Logout](#)

Figure 43: Selecting a Lookup Type

Once the lookup type is selected from the pull-down menu, administrators may add, edit, or remove/delete the lookup type from the application database, as shown in Figure 44. After the administrator initiates and confirms removal action, users may not access the lookup until added again to the database.

Chemotherapy Ordering Management System (COMS)

Welcome Programmer, All Roles -- [Help](#)

Admin

Add LookUps Delete Template Global Variables COMS Users Active Workflows Medications Not Rounded Rounding Rules

Select Lookup Type: **FluidType**

Enter Lookup Name: Enter Lookup Description:

Current Selected Lookup Type Data

Lookup Name	Lookup Description
Ringer's Lactate	
Normal Saline	
D5W	

Edit Lookup Remove Lookup

Save Cancel

[Help](#) [Logout](#)

Figure 44: Managing a COMS Database Lookup

Delete Templates

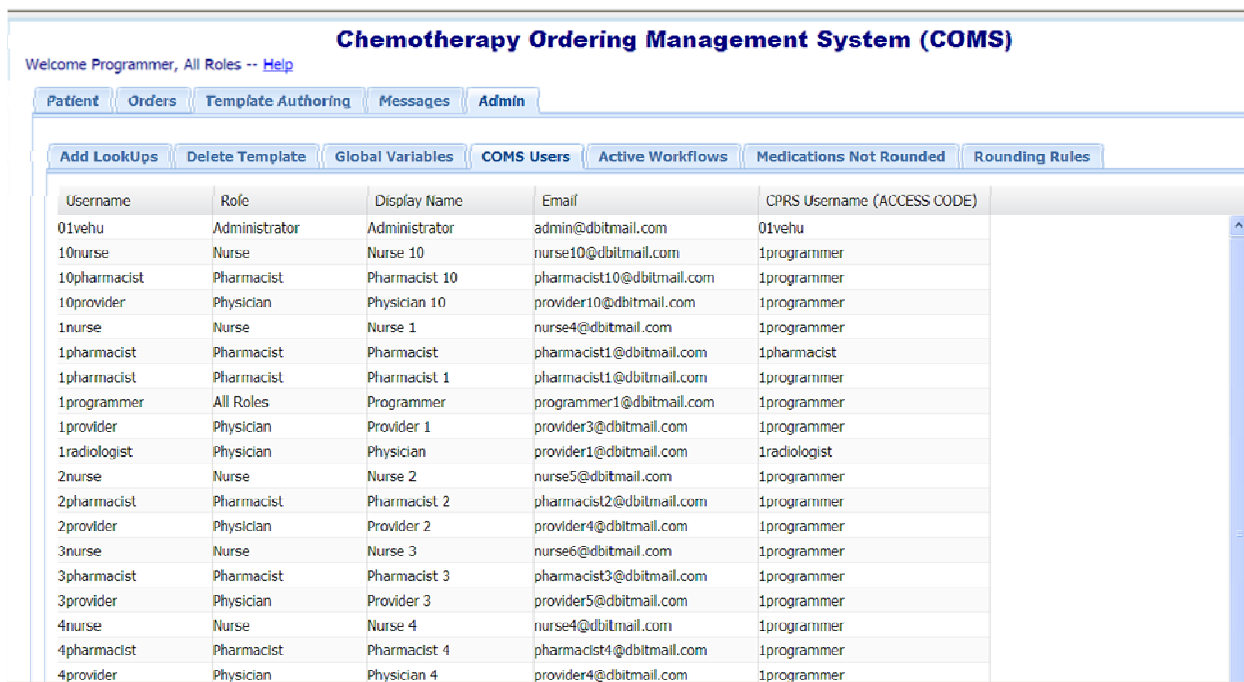
Similar to managing COMS database lookups, COMS administrators access the Admin Tab and “Delete Template” sub-tab to delete templates from the application. Administrators use the “Select a Type of Cancer” pull-down menu to select the type of cancer then use the subsequent pull-down menu to select the desired template for deletion. After the administrator initiates and confirms deletion action, users may not access the template for a patient treatment regimen or for modification to create another template. Figure 45 displays the COMS functionality to delete a template.



Figure 45: Delete COMS Template

View, Add, or Remove COMS Users

COMS administrators may also view, add, or remove COMS users from the application database. Administrators access the Admin Tab and “COMS Users” sub-tab to manage COMS users, as shown in Figure 46. After the administrator initiates and confirms removal action of a specific COMS user, the user may not access the application until again added to the database and granted access permissions.



Username	Role	Display Name	Email	CPRS Username (ACCESS CODE)
01vehu	Administrator	Administrator	admin@dbitmail.com	01vehu
10nurse	Nurse	Nurse 10	nurse10@dbitmail.com	1programmer
10pharmacist	Pharmacist	Pharmacist 10	pharmacist10@dbitmail.com	1programmer
10provider	Physician	Physician 10	provider10@dbitmail.com	1programmer
1nurse	Nurse	Nurse 1	nurse4@dbitmail.com	1programmer
1pharmacist	Pharmacist	Pharmacist	pharmacist1@dbitmail.com	1pharmacist
1pharmacist	Pharmacist	Pharmacist 1	pharmacist1@dbitmail.com	1programmer
1programmer	All Roles	Programmer	programmer1@dbitmail.com	1programmer
1provider	Physician	Provider 1	provider3@dbitmail.com	1programmer
1radiologist	Physician	Physician	provider1@dbitmail.com	1radiologist
2nurse	Nurse	Nurse 2	nurse5@dbitmail.com	1programmer
2pharmacist	Pharmacist	Pharmacist 2	pharmacist2@dbitmail.com	1programmer
2provider	Physician	Provider 2	provider4@dbitmail.com	1programmer
3nurse	Nurse	Nurse 3	nurse6@dbitmail.com	1programmer
3pharmacist	Pharmacist	Pharmacist 3	pharmacist3@dbitmail.com	1programmer
3provider	Physician	Provider 3	provider5@dbitmail.com	1programmer
4nurse	Nurse	Nurse 4	nurse4@dbitmail.com	1programmer
4pharmacist	Pharmacist	Pharmacist 4	pharmacist4@dbitmail.com	1programmer
4provider	Physician	Physician 4	provider4@dbitmail.com	1programmer

Figure 46: Manage COMS Users

View and Manage Active Workflows

Similar to other COMS administrative functionality, COMS administrators access the Admin Tab and “Active Workflows” sub-tab to view and manage the application’s active workflows. Administrators may add a workflow or select an existing one for edit or removal. The COMS application utilizes active workflows in COMS messaging to communicate the reason for medication changes. In accordance with local facility guidelines and preferences, the workflow may initiate either an “INFO” or “ACTION” message for the healthcare team. After the administrator initiates and confirms deletion action, users may not access the workflow until again added to the database. Figure 47 displays the COMS functionality to view and manage active workflows.

Workflow Name	Reason	Body	Active
Cancelled	Notification	Your order for this patient has been cancelled.	1
Change Administration...	Approval of Change	The administration time for this medication has been changed for this patient. Please review the Order...	1
Change in Patient-spe...	Approval of Change	Changes in Patient-specific Parameters has prompted this order to be changed. Please review the Ord...	1
Change Route of Adm...	Approval of Change	The route for this medication has been changed for this patient. Please review the Order Entry Manag...	1
Change Sequencing	Approval of Change	The sequencing for this medication has been changed for this patient. Please review the Order Entry M...	1
Dose rounding	Communication	The dose for this medication has been rounded for this patient. Please review the Orders tab or the Or...	1
Drug Shortage	Approval of Change	Currently there is a drug shortage for this medication. Please choose another medication for this patient.	1
Fluid/Volume Change	Communication		1
Non-formulary	Approval of Change	This is a Non-Formulary medication that will be used for this order. Please review the Order Entry Man...	1
Order Change Notifica...	Approval of Change	The Order that was placed for this patient has been changed. Please review those changes using the...	1
Orders Generated, Re...	Notification	This message is notify you that the patient in this subject will be receiving chemotherapy treatment an...	1
Policy/Protocol	Approval of Change	Based on local Policy and/or Protocol, this medication has been changed for this patient.	1

Figure 47: Manage COMS Workflows

Manage Medications Not Rounded

COMS administrators access the Admin Tab and “Medications Not Rounded” sub-tab to manage medications that should not be rounded during dosage calculations. Administrators may add a medication to the list to exclude it from the facility’s rounding rules or remove a medication to allow it to be rounded within the facility’s established rounding parameters. The COMS application utilizes the medications not rounded list during the dosage calculation and order finalization processes. COMS administrators typically consider the “Medication Not Rounded” and “Rounding Rules” sub-tabs in tandem to ensure the COMS application properly reflects and enacts local facility guidelines and preferences for dosage calculations. Figure 48 displays the COMS functionality to manage medications not rounded.

Name	Non-Rounding Applied
ABACAVIR SOLN, ORAL	1

Figure 48: Manage Medications Not Rounded

Set and Manage Rounding Rules

COMS administrators access the Admin Tab and “Rounding Rules” sub-tab to manage the rounding process of medications during dosage calculations. With a default setting of “No Rounding” and other options of “5%” and “10%”, COMS Administrators may specify the facility’s preference for dose rounding of medication dosages. The COMS application utilizes the rounding rules setting during the dosage calculation and order finalization processes. As noted in the previous section, COMS Administrators typically consider the “Medication Not Rounded” and “Rounding Rules” sub-tabs in tandem to ensure the COMS application properly reflects and enacts local facility guidelines and preferences for dosage calculations. Figure 49 displays the COMS functionality to set and manage rounding rules for the facility.

The screenshot shows the 'Chemotherapy Ordering Management System (COMS)' interface. At the top, it says 'Welcome Programmer, All Roles -- Help'. Below this is a navigation bar with tabs: Patient, Orders, Template Authoring, Messages, and Admin. The 'Admin' tab is selected, and within it, the 'Rounding Rules' sub-tab is active. The sub-tab contains a section titled 'Select Rounding Percentage:' with three radio button options: 'No rounding' (selected), '5%', and '10%'. Below the options, a note states: 'Rounding Rules are applied based on the percentage specified when the Pharmacist finalizes an Order Entry Management Record'. At the bottom right of the sub-tab are 'Save' and 'Cancel' buttons. A 'Help Logout' link is visible in the bottom right corner of the main window.

Figure 49: Set and Manage Medication Rounding Rules

Configuration

Configuration of the COMS application is discussed in significant detail in the COMS Installation Guide and other specifics are provided in the COMS Technical Manual. Beyond those specifics, COMS administrators are also required to set COMS global variables within the application to identify the location-specific site code and domain for connectivity with other COMS applications.

Set and View COMS Global Variables

COMS administrators access the Admin Tab and “Global Variables” sub-tab to set and view the global variables of the facility’s COMS application. Adding the correct COMS application site code and domain is critical to enable connectivity with other COMS applications for the import of template, reference, and patient information. COMS administrators set the application’s global variables via free text entry of the site code and domain, as shown in Figure 50.

The screenshot shows the 'Chemotherapy Ordering Management System (COMS)' interface. At the top, it says 'Welcome Programmer, All Roles -- Help'. Below this is a navigation bar with tabs: Patient, Orders, Template Authoring, Messages, and Admin. The 'Admin' tab is selected, and within it, the 'Global Variables' sub-tab is active. The sub-tab contains a table with two columns: 'Site Code' and 'Domain'. The 'Site Code' column has the value '355' and the 'Domain' column has the value 'coms-uat.dbitpro.com'. At the bottom right of the sub-tab are 'Save' and 'Cancel' buttons. A 'Help Logout' link is visible in the bottom right corner of the main window.

Figure 50: Configure COMS Global Variables