

Development of a Chemotherapy Ordering Management System

**Department of Veterans Affairs (VA)
Strategic Incubation Initiative**

Use Case for Flow Sheet Module v.1.4



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By

dbITpro
38 Wintergreen Avenue
Brick, NJ 08723

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1.0 Flow Sheet

1.1 Brief Description

The primary Chemotherapy Ordering Management System (COMS) module providing communication and an up-to-the-minute view of the oncology care provided to a patient is Flow Sheet (FS). The FS module offers a snapshot of care for the healthcare team to view relevant clinical data, the disease response/patient reaction to the chemotherapy, pertinent laboratory results, and an overview of administered medications. Through direct entry of information and display of specific information from the Nursing Documentation (ND) module, the FS module 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 Chemotherapy Template Order Source (CTOS) module, customized in Order Entry Management (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. 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 the Computerized Patient Record System (CPRS). In this manner, FS 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 first 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. The six most common scenarios encountered within the FS module are the primary focus of this Flow Sheet Use Case and are detailed in section 5.

1.2 Use Case Diagram

Common FS module scenarios involving a snapshot view of the provision of oncology services to the patient within the individualized patient treatment plans are as follows:

- Scenario 1 – Review Chemotherapy/Biotherapy Information
- Scenario 2 – Review Performance Status and Weight for Specific Dates
- Scenario 3 – Annotate Disease Response, Toxicity/Side Effects, and Other Comments
- Scenario 4 – View Disease Response, Toxicity/Side Effects, and Other Comments
- Scenario 5 – View Laboratory Results
- Scenario 6 – Review Medication Administration Details

These scenarios are detailed in section 5 and depicted graphically in the Use Case diagram shown in **Figure 1** on the next page.

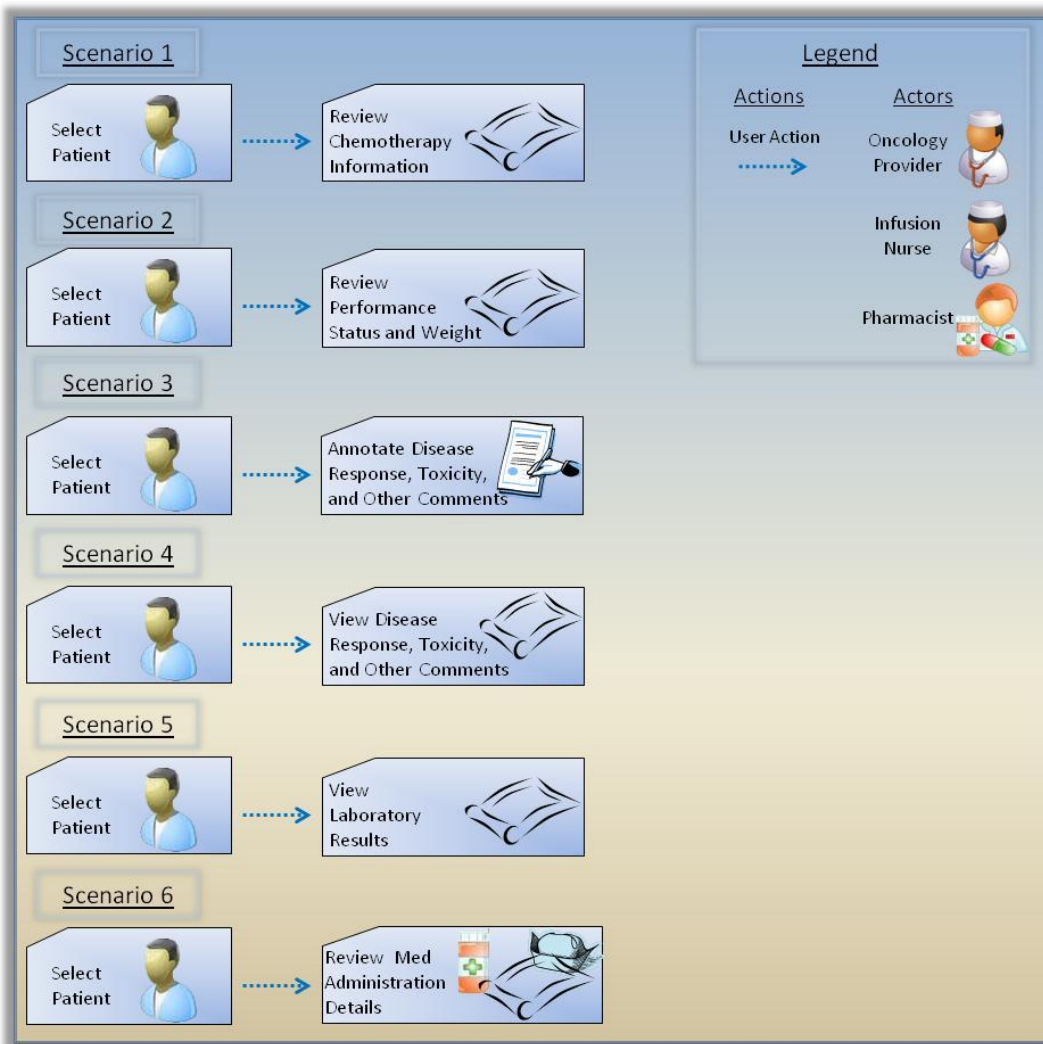


Figure 1 – COMS Flow Sheet Use Case Diagram

1.3 Background

Within the COMS application, the FS module provides an efficient display of patient-centered documentation of chemotherapy administration for central viewing of the healthcare team. Using a grid format with text entry and automatically populated fields, the FS module serves as the oncology services communication centerpiece for relevant information regarding the provision of chemotherapy, disease response, and the patient's reaction to an active treatment regimen. Through FS module functionality, the healthcare team may view information for administration days throughout the regimen and provide and/or view disease response, toxicity/side effects, and other comments.

The FS module retrieves, organizes, and displays information from CPRS and various COMS modules for insight into relevant clinical data, disease response and patient reaction to the chemotherapy, pertinent laboratory results, and an overview of administered medications. Altogether, this functionality fosters efficient communication throughout the treatment regimen to enhance patient safety and VA's

electronic health record of Veterans Health Information Systems and Technology Architecture (Vista) and CPRS. The FS module complements Vista/CPRS for the healthcare team to obtain a deep understanding of patient treatment, insight into the progression of the prescribed individualized regimen, and up-to-date snapshot of the status of the disease response and patient reactions to treatment.

Leveraging information within other COMS modules and CPRS, the FS module enables the healthcare team to readily view relevant clinical information and patient response to administration of the regimen's chemotherapy agents and supporting medications. Through the FS module, COMS automates and enhances documentation and communication for oncology care activities. It supports oncology services through a collaborative, patient-focused application and interoperability with VA legacy healthcare systems of Vista and CPRS. The FS module specifically provides a communication medium with a snapshot of care that also progressively builds towards the regimen's End of Treatment Summary for the current and gaining healthcare team.

1.4 Stakeholders

COMS stakeholders include oncology patients, those involved with management of the contract, the clinical healthcare team, and the dbITpro development team. For the FS module, the clinical healthcare team – comprised of oncology providers, nurses, and pharmacists – account for the most involved and concerned stakeholders, as shown in **Figure 2**.

Name	Role	Organization	Phone	Email
Michael Kelley	Lead Innovator, Oncologist	Veterans Affairs	919.286.0411 ext 2199	Michael.Kelley6@va.gov
Janet Cogswell	Oncology Nurse	Veterans Affairs	973.676.1000 ext 1531	Janet.Cogswell@va.gov
Michele Johnson	Oncology Nurse	Veterans Affairs	432.926.1176 ext 2687	Michele.Johnson2@va.gov
Sean Keefe	Oncology Clinical Pharmacist	Veterans Affairs	816.861.4700 ext 57870	Sean.Keefe@va.gov
Steven Krasnow	Oncologist	Veterans Affairs		Steven.Krasnow@va.gov
Kourtney LaPlant	Oncology Clinical Pharmacist	Veterans Affairs	352.376.1611 ext 4428	Kourtney.Laplant@va.gov
Paige Louzon	Oncology Clinical Pharmacist	Veterans Affairs	352.376.1611 ext 4426	Paige.Louzon@va.gov
William Schubach	Oncologist	Veterans Affairs	206.764.2709	William.Schubach@va.gov
Jolynn Sessions	Oncology Clinical Pharmacist	Veterans Affairs	828.298.7911 ext 5192	Jolynn.Sessions@va.gov

Figure 2 – COMS Flow Sheet Stakeholders

1.5 Supporting Requirements

As a uniquely high-risk and high-complexity domain of health care, oncology requires significant documentation, communication, and coordination of treatment. Effective and efficient documentation requires fully interfaced support of all participating healthcare applications. Notably, this includes VistA, CPRS, and COMS to create a clinical environment that provides patient-centered documentation of medication administration and the provision of oncology services. This interoperable environment will capture automated annotations with discrete data points of relevant documentation for efficient display of information for the varying disciplines within the healthcare team. Accordingly, an interoperable environment among VistA, CPRS, and COMS is an essential supporting requirement for this Flow Sheet Use Case.

2.0 Actors

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 also displayed in the Flow Sheet along with the patient's recorded weight and relevant laboratory results. The provider may also record the disease response to the individualized treatment plan and document toxicity/side effects and other comments. Oncology nurses provide medication administration details 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 FS module displays the documentation of regimen specifics and medication administration details while supporting direct annotation of disease response and patient reaction to the regimen. 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 provider, nurse, and pharmacist members of the healthcare team. Utilizing this standardized and interoperable environment between COMS and VistA/CPRS, the healthcare team facilitates appropriate communication and documentation of healthcare within VA's electronic health record.

3.0 Supporting Use Case List

The Use Cases for the CTOS, OEM, and ND modules all support this Flow Sheet module Use Case. The actions described within the CTOS module Use Case scenarios provide the foundation for COMS

functionality and support ordering. Subsequent actions within the OEM module Use Case scenarios permit further tailoring of the individualized patient care plan. Documentation of medication administration and other nursing activities are described in the ND module Use Case. Altogether, these supporting Use Cases are required as iterative building blocks for this Flow Sheet module Use Case.

4.0 Preconditions

The FS module serves as a reflective snapshot repository for patient care actions taken within the CTOS, OEM, and ND modules. Accordingly, Flow Sheet Use Case scenarios build upon those expressed in the CTOS, OEM, and ND Use Case documents. In addition, the following are required to support the Flow Sheet Use Case scenarios detailed in section 5:

- An on-going regimen from an applied template is required to Review Chemotherapy/Biotherapy Information and Review Performance Status and Weight for Specific Dates
- An active regimen is also required to Annotate Disease Response, Toxicity/Side Effects, and Other Comments and similarly to View Disease Response, Toxicity/Side Effects, and Other Comments
- Availability of relevant laboratory test results is essential to View Laboratory Results
- Availability of documentation for prescribed pre-therapy/therapy/post-therapy medications administration is essential to Review Medication Administration Details for those respective treatment activities.

5.0 Use Case Scenarios

The intent of these Use Case scenarios is to walk the user through common process flows associated with the FS module and the provision of oncology services. Each scenario requires the selection of a specific patient. For Use Case scenario testing, patients will be assigned to each test team as follows:

Team	Use Case Patient	Patient Identifier
1	PATIENT FOURHUNDRED	F0400
2	PATIENT FOURHUNDREDFIFTEEN	F0415
3	PATIENT FOURHUNDREDTWENTYFIVE	F0425
4	PATIENT FOURHUNDREDFORTYFIVE	F0445
5	PATIENT FOURHUNDREDFIFTY	F0450
6	PATIENT FOURHUNDREDFIFTYTWO	F0452
7	PATIENT FOURHUNDREDFIFTYFIVE	F0455
8	PATIENT FOURHUNDREDSIXTY	F0460
9	PATIENT FIVEHUNDREDFIFTEEN	F0515
10	PATIENT FIVEHUNDREDFIFTY	F0550

Each scenario requires the selection of the test team's specific patient as follows:

Step	Action	COMS Reaction
1	From the Patient tab, enter the patient identifier for team's assigned patient in the Patient panel and click on the "Query CPRS for Patient" link	Displays "Please Click Here to Confirm This is the Patient You Want"
2	Select the link for team's assigned patient to confirm the patient	Presents patient information for team's assigned patient
3	Select/Open/Expand the "Patient Information" panel	Expands "Patient Information" panel
4	View patient gender, age, and amputation(s); Body Surface Area (BSA) weight method, BSA method, and BSA calculations; template information; regimen status; type(s) of cancer; allergies; and clinical trial information	Permits viewing of information
5	Select/Open/Expand the "Patient History" panel	Expands "Patient History" panel
6	View vital signs historical information (date taken, temperature, pulse, blood pressure respirations, pain level, oxygen saturation, performance status, height, weight, and four columns for BSA information of weight formula, body weight, BSA method, and calculated BSA)	In reverse chronological order, displays information as obtained from VistA, COMS OEM module, and COMS ND module/ General Information panel
	ALTERNATE	ALTERNATE
1	From the Patient tab, enter the patient identification for team's assigned patient in the Patient panel and press enter	Displays "Select Patient from CPRS" pull-down menu
2	Select the team's assigned patient from the pull-down menu	Presents patient information for team's assigned patient
3	Select/Open/Expand the "Patient Information" panel	Expands "Patient Information" panel
4	View patient gender, age, and amputation(s); Body Surface Area (BSA) weight method, BSA method, and BSA calculations; template information; regimen status; type(s) of cancer; allergies; and clinical trial information	Permits viewing of information
5	Select/Open/Expand the "Patient History" panel	Expands "Patient History" panel
6	View vital signs historical information (date taken, temperature, pulse, blood pressure respirations, pain level, oxygen saturation, performance status, height, weight, and four columns for BSA information of weight formula, body weight, BSA method, and calculated BSA)	In reverse chronological order, displays information as obtained from VistA, COMS OEM module, and COMS ND module/ General Information panel
	ALTERNATE	ALTERNATE
1	From the Patient tab, using the Enter a Range of Administration Dates to Search functionality and the default of today's date for the "from" range, select a future date from the pop-up calendar "to" range, and click on the "Select Patient by Administration Date(s)" link	Displays "Select Patient from CPRS" pull-down menu
2	Select team's assigned patient from the pull-down menu	Presents patient information for team's assigned patient
3	Select/Open/Expand the "Patient Information" panel	Expands "Patient Information" panel

Step	Action	COMS Reaction
		panel
4	View patient gender, age, and amputation(s); Body Surface Area (BSA) weight method, BSA method, and BSA calculations; template information; regimen status; type(s) of cancer; allergies; and clinical trial information	Permits viewing of information
5	Select/Open/Expand the “Patient History” panel	Expands “Patient History” panel
6	View vital signs historical information (date taken, temperature, pulse, blood pressure respirations, pain level, oxygen saturation, performance status, height, weight, and four columns for BSA information of weight formula, body weight, BSA method, and calculated BSA)	In reverse chronological order, displays information as obtained from VistA, COMS OEM module, and COMS ND module/ General Information panel
Step	Action	
7*	Proceed to Step 7 for each FS Module Use Case Scenario	

5.1 Scenario 1: Review Chemotherapy/Biotherapy Information

Step	Action	COMS Reaction
7*	Select/open the “Flow Sheet” module tab	Expands FS module
8	View Chemotherapy/Biotherapy information as the Flow Sheet header	Permits viewing of information for Regimen, Cycle, Day, and Date

5.2 Scenario 2: Review Performance Status and Weight for Specific Dates

Step	Action	COMS Reaction
7*	Select/open the “Flow Sheet” module tab (only required if not continued from previous scenario)	Expands FS module
8	View General information of Performance Status and Weight in first section of Flow Sheet	Permits viewing of information in grid format with cycle/day columns and specific data rows

5.3 Scenario 3: Annotate Disease Response, Toxicity/Side Effects, and Other Comments

Step	Action	COMS Reaction
7*	Select/open the “Flow Sheet” module tab (only required if not continued from previous scenario)	Expands FS module
8a	Select “Write” link for Disease Response (fourth row) for a particular cycle/day	Opens window for text entry
8b	Type comments for Disease Response	Permits entry and displays text
8c	Save Disease Response comments	Saves entry, closes text window, and displays “View” link in grid cell for Disease Response on the cycle/day entered

Step	Action	COMS Reaction
9a	Select “Write” link for Toxicity/Side Effects (fifth row) for a particular cycle/day	Opens window for text entry
9b	Type comments for Toxicity/Side Effects	Permits entry and displays text
9c	Save Toxicity/Side Effects comments	Saves entry, closes text window, and displays “View” link in grid cell for Toxicity/Side Effects on the cycle/day entered
10a	Select “Write” link for Other comments (sixth/final row of General section) for a particular cycle/day	Opens window for text entry
10b	Type comments for Other	Permits entry and displays text
10c	Save Other comments	Saves entry, closes text window, and displays “View” link in grid cell for Other on the cycle/day entered

5.4 Scenario 4: View Disease Response, Toxicity/Side Effects, and Other Comments

Step	Action	COMS Reaction
7*	Select/open the “Flow Sheet” module tab (only required if not continued from previous scenario)	Expands FS module
8a	Select “View” link for Disease Response (fourth row) for a particular cycle/day	Opens window for viewing entered comments
8b	View comments for Disease Response	Displays previously entered text
8c	Close Disease Response comments	Closes comments window
9a	Select “View” link for Toxicity/Side Effects (fifth row) for a particular cycle/day	Opens window for viewing entered comments
9b	View comments for Toxicity/Side Effects	Displays previously entered text
9c	Close Toxicity/Side Effects comments	Closes comments window
10a	Select “View” link for Other comments (sixth/final row of General section) for a particular cycle/day	Opens window for viewing entered comments
10b	View comments for Other	Displays previously entered text
10c	Close Other comments	Closes comments window

5.5 Scenario 5: View Laboratory Results

Step	Action	COMS Reaction
7*	Select/Open/Expand the “Laboratory Information” panel	Expands “Laboratory Information” panel and presents relevant laboratory results for the patient
	ALTERNATE	ALTERNATE
7*	Select/open the “Flow Sheet” module tab (only required if not continued from previous scenario)	Expands FS module
8	View Laboratory Results as second section of Flow Sheet	Permits viewing of Laboratory

Step	Action	COMS Reaction
		Results; specific results are contained in rows across date columns for each cycle and day of the regimen

5.6 Scenario 6: Review Medication Administration Details

Step	Action	COMS Reaction
7*	Select/open the “Flow Sheet” module tab (only required if not continued from previous scenario)	Expands FS module
8	View Pre-Therapy medications as third section of Flow Sheet	Permits viewing of details for administration of Pre-Therapy medications; displays details in medication-specific rows across date columns for each cycle/day of the regimen
9	View Therapy medications as third section of Flow Sheet	Permits viewing of details for administration of Therapy medications; displays details in medication-specific rows across date columns for each cycle/day of the regimen
10	View Post-Therapy medications as third section of Flow Sheet	Permits viewing of details for administration of Post-Therapy medications; displays details in medication-specific rows across date columns for each cycle/day of the regimen