

## CHEMOTHERAPY NOTE REDESIGN TO DECREASE USER BURDEN AND FACILITATE DATA RETRIEVAL

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## Hopkins Orders Profile

Research Focused

- 839 active Oncology studies
  - 446 therapeutic trials
  - 197 new investigator-initiated trials last year
- 115 clinical faculty, 66 APPs
- 10 service teams
- 4.5 wk/yr IP attending
- Median < 1 clinic day/week

Electronic chemotherapy order scope


- All facility-administered chemotherapy to treat malignancy are electronic orders
- 1452 total order sets
  - 1193 adult
    - 423 standard-of-care
    - 770 research
  - 259 pediatric
    - 146 standard-of-care
    - 113 research



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## Objectives




- Understand the history and explain the importance of using a chemotherapy treatment planning note
- Describe components of note templates that facilitate efficient and safe patient care
- Identify key features of the redesigned chemotherapy treatment plan note that meet the clinical and reporting need



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## Our Chemo Treatment note and EHR History

- History
  - Chemo note started 1999
  - Survived paper and 3 EHR systems
- Epic – staged go-live
- Beacon (Epic’s oncology module)



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## Johns Hopkins Health System

Sidney Kimmel Comprehensive Cancer Center  
2 academic and 1 community hospitals, 1 JH community physician site

Baltimore - Downtown Campus

- 82 adult, 20 pediatric oncology beds
- 4227 discharges/yr, 92% occupancy
- 184 infusion visits/day M – F + 25 Sat
- 339 blood and marrow transplants/yr (256 allo, 83 auto)
- 38 BMT IPOP visits/day + 7 leukemia HIPOP visits/day, 7 days/wk


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## Background – Hopkins Policy

**IV. RESPONSIBILITY**

A. Attending

- Documents the intended plan in a chemotherapy treatment note (which may be supplemented with a protocol schema or pediatric road map) in the electronic medical record.
  - The primary reason for documenting the chemotherapy treatment note is to provide the health care team a method to assure that the chemotherapy orders are consistent with the intended plan of care. A chemotherapy treatment note is required to initiate the chemotherapy orders. The chemotherapy treatment note will include the attending’s electronic signature, stamped with the date and time of approval, prior to chemotherapy dispensing. Modifications to the intended plan of care must be documented in the chemotherapy treatment note, including change in chemotherapy agents, schedule, and dose basis (e.g., mg/kg, mg/m<sup>2</sup>), along with the rationale for any changes. Example: dose modified due to hepatic dysfunction. A chemotherapy treatment note may cover multiple cycles of therapy and can be updated with dated entries documenting modifications. Chemotherapy treatment notes and modifications can be drafted by fellows, nurse practitioners, or other providers but must be signed by an attending physician.
  - For standard chemotherapy, the chemotherapy treatment note includes the title of the standard chemotherapy regimen (e.g., R-CHOP).
  - For individualized chemotherapy, the chemotherapy treatment note will include the indication for chemotherapy, the chemotherapy agent/regimen, the dose basis and schedule for each agent, the anticipated duration of the treatment, and a reference for the chemotherapy regimen (if applicable). For individualized chemotherapy, the treatment note (Beacon Treatment plan in Oncology) must be signed by two attending physicians who have determined that the plan is appropriate and acceptably safe for that patient.
  - For investigational chemotherapy, the protocol name, protocol number, and arm, phase, cohort, and/or dose level of medication, if applicable, should be indicated in the chemotherapy treatment note and the orders. Drugs and schedule are not required in the chemotherapy treatment note as this information is outlined in the study protocol and, when applicable, in the Investigational Drug Data Sheet.




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## Background – National Guidelines

- 1.5 Before the first administration of a new chemotherapy regimen, chart documentation is available that includes at least the following eight elements:
- 1.5.1 Pathologic confirmation or verification of initial diagnosis.
- 1.5.2 Initial cancer stage, or current cancer status.
- 1.5.3 Complete medical history and physical examination, including pregnancy status, as applicable.
- 1.5.4 Presence or absence of allergies and history of hypersensitivity reactions.
- 1.5.5 Assessment of the patient's and/or caregiver's comprehension of information regarding the disease and treatment plan.
- 1.5.6 Initial psychosocial assessment, with action taken when indicated.
- 1.5.7 The chemotherapy treatment plan, including, at a minimum, the patient diagnosis, drugs, doses, duration of treatment, and goals of therapy.
- 1.5.8 Planned frequency of office visits and patient monitoring that is appropriate for the individual chemotherapy agent(s).



- ASCO ONS Guidelines updated in 2016 outline requirements for documentation of chemotherapy treatment plan
  - From Standards – Domain 1



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## The beauty of redundancy



- Probability of failure of two independent systems:  $p_1 * p_2 = 1\% * 1\% = 0.01\%$

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## Theory of safety


- Two ways to make a system safer:
  - Reduce the number of steps
  - Provide an independent check

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## How the Chemo treatment note promotes safety


- Reduce steps:
  - Never build an individualized plan from scratch!
  - For instance: Copy plan from one disease group as a template to be used for another disease group.
- Provide an independent check:
  - 2<sup>nd</sup> attending signs an individualized note
  - 2 pharmacists check every dose, comparing orders to note
  - 2 RNs check every dose, comparing order to note




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## The agony of complexity

- Probability of failure of a series of n steps:

$$1 - (1 - p)^n$$



Probability of failure of a single step	Number of steps	Probability of system failure
1%	10	10%
1%	20	18%
1%	40	33%
2%	20	33%




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## How the Chemotherapy Note Facilitates Safe and Efficient Care

- Attending intent is captured independent from orders
- Serves as single source of truth to check orders
- Basis for policy change to allow APP to sign chemo orders independently



**Big win: Time to think!**




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### Challenge: Before Electronic Chemo Orders in EHR


Issues with 1<sup>st</sup> Version of Chemo Note in Epic (before Beacon):

- SmartText in Chemo Note type
- Signature routing and tracking issues
- Modifications difficult
- Not included in downtime print
- No discrete data

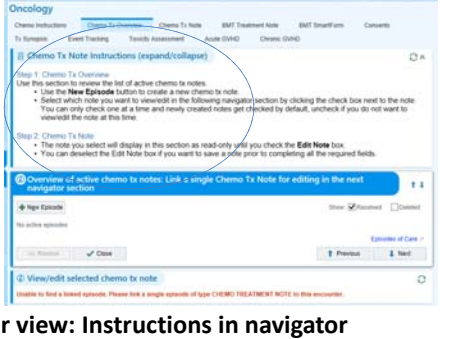


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### Easy usability for entry



Prescriber view: Instructions in navigator



Oncoology

Chemo Instructions | Chemo Tx Notes | SMT Treatment Note | SMT SmartForm | Consents

To: Episodes | Agent Tracking | Toxicity Assessment | Active (SAND) | Chemo (SAND)

Chemo Tx Note Instructions (expand/collapse)

Step 1: Chemo Tx Overview

Use this section to review the list of active chemo tx notes.

- Use the **New Episode** button to create a new chemo tx note.
- Select which notes you want to view/edit in the following navigator section by clicking the check box next to the note. You can only check one at a time and newly created notes get checked by default, uncheck if you do not want to view/edit the note at this time.

Step 2: Chemo Tx Note

The note you select will display in this section as read-only until you check the **Edit Note** box.

- You can deselect the Edit Note box if you want to save a note prior to completing all the required fields.

Overview of active chemo tx notes. Link a single Chemo Tx Note for editing in the next navigator section.

View Episodes

No active episodes

Show:  All  Deleted

Previous Next

View/edit selected chemo tx note

Unable to find a linked episode. Please link a single episode of type CHEMO TREATMENT NOTE in this encounter.

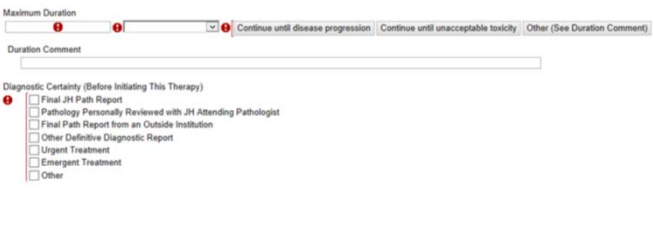
### How often is the Chemo Note used?

- For EVERY dose of chemo
  - 2 independent checks by pharmacists
  - 2 independent checks by nurses
- July 2018 = 4464 doses of IV chemo
  - Main campus (adult + peds, inpatient + outpatient) + satellite outpatient
- Chemo Note accessed **17,856** times/mo

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### Capture discrete data

- At initiation



Maximum Duration

Duration Comment

Diagnostic Certainty (Before Initiating This Therapy)


- Final JH Path Report
- Pathology Personally Reviewed with JH Attending Pathologist
- Final Path Report from an Outside Institution
- Other Definitive Diagnostic Report
- Urgent Treatment
- Emergent Treatment
- Other

### Chemotherapy Note - Redesigned

- History – 2 versions with redesign
  - Version 1 with chemo module go-live (Dec 2015 & July 2016)
  - Version 2 with double upgrade to v. 2017
- Design Goals
  - Easy usability for entry
  - Unambiguous note content and signature tracking
  - Framework to track all modifications to plan over time
  - Facilitate review by all user roles at each step of ordering, dispensing, and administration
  - Capture up-to-date content in BCA reports

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### Tabulate modifications



Modifications. Please scroll to the right. For dose modifications, specify the agent with the new dose basis, AND specify what percentage of the original dose you intend to deliver. For example, "50% original dose." Please do NOT specify modifications relative to the most recent dose, to avoid confusion in the event of serial dose modifications.

Date	Print in BC (Cycle, Day)	Scope	Type of Change	Specify agent with new dose AND % of Original dose	Rationale	Drafted by (name/role)

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## Individualized Treatment

- Encourage modification of approved chemo orders

**Initiation**

Treatment Type: Standard Research **Individualized**

Copied from a standard Beacon protocol?

Yes, with no changes  Yes with dose reductions and/or drug omission ONLY  Yes, with dose increases and/or additions  No

Indication

Beacon Protocol (PRL) Title (keyword search) - Please enter all treatments planned for this line of therapy

Individualized Regimen Name

### FOLFOX

Created 5/22/18 by Keith McIntyre, CRNP  
 Treatment Type: Standard  
 Beacon Protocol (PRL) Title: SCC0214 INFUSION CAPOXID/CAUPLATIN, LEUCOVORIN, BOLUS FLUOROURACIL, AND 46-HOUR CONTINUOUS INFUSION FLUOROURACIL FOR GASTROINTESTINAL MALIGNANCIES

Indication: History of stage III colon cancer

Diagnostic Certainty (Before therapy): Final JH Path Report

Cycle Length: 28 Days  
 Duration: Maximum 5 Cycles - Previously received 3 doses of CAPOX and was stopped due to toxicity

Date	Cycle	Day	Agent	Type of Change	From	To	Reason	Checked by
2/1/18	C1D1	All	Oxycodone	at 80% dose + 60 mg/24 hr on 1 and 15 every 28 days	Previous toxicity		Keith McIntyre, CRNP/GAGC	
2/1/18	C1D1	All	Fluorouracil	at 80% dose + 520 mg/m <sup>2</sup> IV on days 1 and 15 every 28 days	Previous toxicity		Keith McIntyre, CRNP/GAGC	
2/1/18	C1D1	All	Leucovorin	at 80% dose + 502 mg/m <sup>2</sup> as a continuous IV infusion over 46 hours on day 1 and 15 every 28 days	Previous toxicity		Keith McIntyre, CRNP/GAGC	

Current Status: **Approved**  
 Initially approved by Ana Maria Cristina De Jesus-Acosta, MD 1/22/2018 4:37 PM  
 Last approved by Ana Maria Cristina De Jesus-Acosta, MD 1/22/2018 4:37 PM  
 Last viewed by Keith McIntyre, CRNP

**Standard Chemo Treatment**

- Unambiguous note content
- Modifications table
- Signature tracking

## Enforce policy requirements for individualized treatment

Results [Open Pathology Order/Result Report](#)

**Individualized**

Draft Draft Complete Modified (pending attending approval) Approved Terminated

Last Viewed by: **First attending** (Termination Confirmed by Attending)

Time of Last Access: **Second attending**

Instant of Status Change: **Now**

Drafted by: \_\_\_\_\_

Initially Approved by: \_\_\_\_\_

### ipi Nivo for Metastatic Renal Cancer

Created 5/15/18 by Samuel Ray Demers, MD  
 Treatment Type: Individualized  
 Individualized Regimen Name: Individualized SCC014 Nivolumab and Ipilimumab for Metastatic Renal Cell Carcinoma

Indication: Metastatic Renal Cell Cancer

Diagnostic Certainty (Before therapy): Final JH Path Report

Cycle Length: Varies by Cycle. Every 3 weeks for first 4 cycles and then every 4 weeks for maintenance

Duration: Continue until disease progression. Continue until unacceptable toxicity

Date	Cycle	Day	Agent	Type of Change	From	To	Reason	Checked by
5/15/18	Cycle 1	Day 1	Nivolumab	1 mg/kg IV				PIA-approved dose
5/15/18	Cycle 1	Day 1	Ipilimumab	3 mg/kg IV				PIA-approved dose

Current Status: **Approved**  
 Drafted by Samuel Ray Demers, MD 5/15/2018 4:58 PM  
 Initially approved by Emmanuel Sifianou Antonarakis, MD/MS 5/21/2018 12:01 PM  
 Modified by Samuel Ray Demers, MD 5/15/2018 4:58 PM  
 Last approved by Emmanuel Sifianou Antonarakis, MD/MS 5/21/2018 12:01 PM  
 Last viewed by Emmanuel Sifianou Antonarakis, MD/MS

**Sidebar Report**

**Individualized Chemo Treatment**

- Copied from SOC, applied to a different disease
- Ease of signature tracking

## Safety Culture

**COMMUNICATION**

**TEAMWORK**

**Teamwork**  
 pharmacists and nurses no longer need not police policy, very satisfying

**Communication**  
 Clear license to speak up and stop the process when the Treatment Plan orders do not match the Chemo Tx Note

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### Etoposide, Docetaxel, Cisplatin and Mitotane

Created 5/21/18 by Christian Frickel, MD  
 Treatment Type: Individualized  
 Individualized Regimen Name: Etoposide, Docetaxel, Cisplatin and Mitotane for Metastatic Adrenocortical Carcinoma

Indication: Metastatic adrenocortical carcinoma

Diagnostic Certainty (Before therapy): Final JH Path Report

Cycle Length: Varies by Cycle. Varies by Cycle every 3-4 weeks depending on count recovery

Agent	Dose	Units	Rate	Route	Schedule	Days
Etoposide	100	mg	mg	IV	Days 1 to 4	Days 1 to 4
Docetaxel	40	mg	mg	IV	Days 1 to 4	Days 1 to 4
Cisplatin	40	mg	mg	IV	Days 1 to 4	Days 1 to 4

Current Status: **Approved**  
 Drafted by Christian Frickel, MD 5/21/2018 2:02 PM  
 Modified by Christian Frickel, MD 5/21/2018 2:01 PM  
 Initially approved by Christian Frickel, MD 5/21/2018 2:01 PM  
 Last approved by Christian Frickel, MD 5/21/2018 12:12 PM  
 Last viewed by Christian Frickel, MD 5/21/2018 12:12 PM

**Sidebar Report**

**Individualized Chemo Treatment**

- General Template
- Table specifying drug, dose basis, route, schedule

## Human Factors Analysis

- Completed 8/2018
  - Observed/interviewed 3 providers, 4 pharmacists, 6 nurses
- Results
  - Chemo Treatment Note accessed with few clicks within seconds for all users (prescribers, pharmacists and nurses)
  - Most important information in the chemo treatment note is the attending's approval
  - Most efficient use with Treatment Plan Manager on the left (with history view) and chemo note report in sidebar

## Lessons Learned

- Prescribers request link between Treatment Plan and Treatment Note: Training doesn't explain importance of independent source of truth
- Requirement to link an episode to enter/edit note not intuitive
- No way to "delete" note entered in error without attending
- Complex script on form – needed better testing by role

The screenshot displays the OIS interface for a patient with metastatic colorectal cancer. The 'Treatment Plan Manager' on the left shows a plan for 'Day 18, Cycle 2' with various medications like FOLFOX and FOLFIRI. The 'History View' in the middle shows a list of previous treatment episodes. The 'Chemo Tx Note' on the right provides details for the current episode, including the regimen (FOLFOX for mCRC), diagnosis (Metastatic Colorectal Cancer), and current status (Approved).

## Burning Questions ???



### Contact Info:

- Allen Chen: [chenal@jhmi.edu](mailto:chenal@jhmi.edu)
- Barb Van de Castle: [bvande1@jhmi.edu](mailto:bvande1@jhmi.edu)
- Monica Wilt: [mstrick5@jhmi.edu](mailto:mstrick5@jhmi.edu)

## Outcome – ↓ General Template Use

- The total chemo note numbers:
  - Standard notes: 12,253
  - Research notes: 2,620
  - Individualized notes: 1,489
- Compare to individualized orders:
  - General Template: 270
  - Blank Template: 7

Safety win = few plans built from scratch