

MITRE / FLUX NOTES **SELECTED CONCEPTS v14.1 (NOTE ASSISTANT + TEMPLATES)**
EDWIN CHOI, DANIEL REEVES, JUHAN SONIN, 25.MAY.2018



The following concepts explore the Flux Notes note assistant in more detail, framing the principles, types of assistance, and examples of error/reminder interactions. The second half of the concepts explore templating interactions when creating a new note.

INTRODUCTION

The note assistant is a feature within Flux Notes that will help guide the provider through the patient encounter, as well as help complete any data that's needed for note and encounter completion. The designs that are explored today should be in the context of the future self-documenting clinical encounter. These ideas should be part of building the infrastructure from which to expand to voice/conversational interactions.

NOTE ASSISTANT GUIDING PRINCIPLES

- The assistant is for encounter completion, not just note completion
- The assistant should not be limited to UI only (voice, chatbot, etc)
- The assistant is present, yet unobtrusive
- Provides assistance based on the providers workflow and mental model
- The assistant is not one specific and particular area of the application. It is a suite of interactions that provides completion guidance to the provider, pointing them to assistive content
- There is always the option for the user to ignore the assistant
- User can *request* more help from the assistant, rather than having it *imposed* upon them (opposite of clippy)
- The assistant should never *interrupt*; avoid the addition of alert fatigue
- Navigation is bite sized and does not overwhelm the user (think turbo-tax)
- Prioritize highest value assistant suggestions
- Whenever possible, show don't tell (visuals for tricky procedures, videos/ visualizations for patient education, etc)
- Allow the assistant to be a tool for the clinician (calculator to find BMI, etc)
- Use of text NLP and voice NLP to predict the most useful content for the user
- Note assistant should take into account patient values/preferences based on analysis of the patient record

TYPES OF ASSISTANCE

Assist with data capture

- Missing elements
 - Missing data required for proper billing
 - Missing data required for CQMs
 - Minimum elements required to complete note as specified by template
- Missing attributes within data elements

Assist with errors

- Clinical errors
 - Impossible values
 - Contraindications to prescribed treatments (to devices, Rx, patient preferences)
- Misspellings

Assist with next steps

- Clinician references
 - Clinical calculators/tools
 - Medical information references (UpToDate, MedlinePlus, AJCC staging, etc)
- Plan of care
 - Diagnostics (labs, imaging, etc)
 - Referrals
 - Medication regimens
- Resources
 - Patient education related media
 - Patient resources (communities, groups, etc)

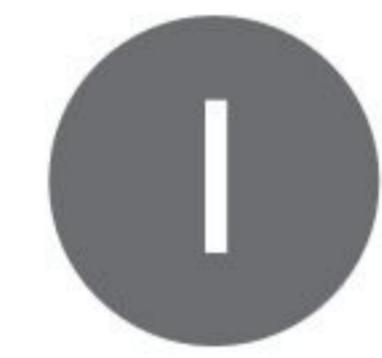
PRIORITIZATION OF NOTE ASSISTANT ELEMENTS BASED ON PLACE IN WORKFLOW

Start note using template

- “Turbo-tax” model or wizard
- Missing elements
 - Missing data required for proper billing
 - Missing data required for CQMs
 - Minimum elements required to complete note as specified by template
- Clinical errors
 - Impossible values
 - Contraindications to prescribed treatments (to devices, Rx, patient preferences)
- Misspellings
- Missing attributes within data elements
- Clinician references
 - Clinical calculators/tools
 - Medical information references (UpToDate, MedlinePlus, AJCC staging, etc)

Assist with next steps before finally signing note

- Missing data elements + attributes
- Plan of care
 - Diagnostics (labs, imaging, etc)
 - Referrals
 - Medication regimens
- Resources
 - Patient education related media
 - Patient resources (communities, groups, etc)



NOTE ASSISTANT REMINDERS



Dr. Jraker299 referred ms. Debra24 Hernandez98Aj due to pain in left breast. Dr. Jraker299 is ms. Debra24 Hernandez98Aj's primary care physician for 12 years.

Summary

Summary



Ms. Debra24 Hernandez98Aj is a 51-year-old menopausal non hispanic or latino woman with invasive ductal carcinoma of the breast, diagnosed on 13 January 2012. Her most recent status, recorded on 15 May 2017, is of worsening, disease progression based on pathology, imaging, and symptoms.

Timeline

Medication

Allergies

Labs

Social

Disease status

Follow-up

10 April 2018

Dr. Free2 Will

Dana Farber Cancer Institute

 Close**B** *I* U

Invasive ductal carci... > disease status

[View timeline](#)

2 Assessment

I believe Ms. Ortiz is a good candidate for #enrollment #PA

I assess #staging #T0. She

 Search shortcuts

Templates

Snippets

Suggested

Context

Node size

#N0

#N1mi

#N1

#N2

#N3

Metastasis

#M0

#M1

Invasive ductal car...

#disease status

#toxicity

#ER

#PR

#HER2

@HPI

She underwent a lumpectomy. She underwent a sentinel lymph node biopsy on 20 September 2012 which revealed infiltrating poorly differentiated ductal carcinoma, stage IV, estrogen receptor 0, etc.

diagnostic mammogram on 4 October 2013 revealed a 2 cm mass in the right breast at 7 o'clock and an

[Remove unfilled elements and sign](#) Remove note



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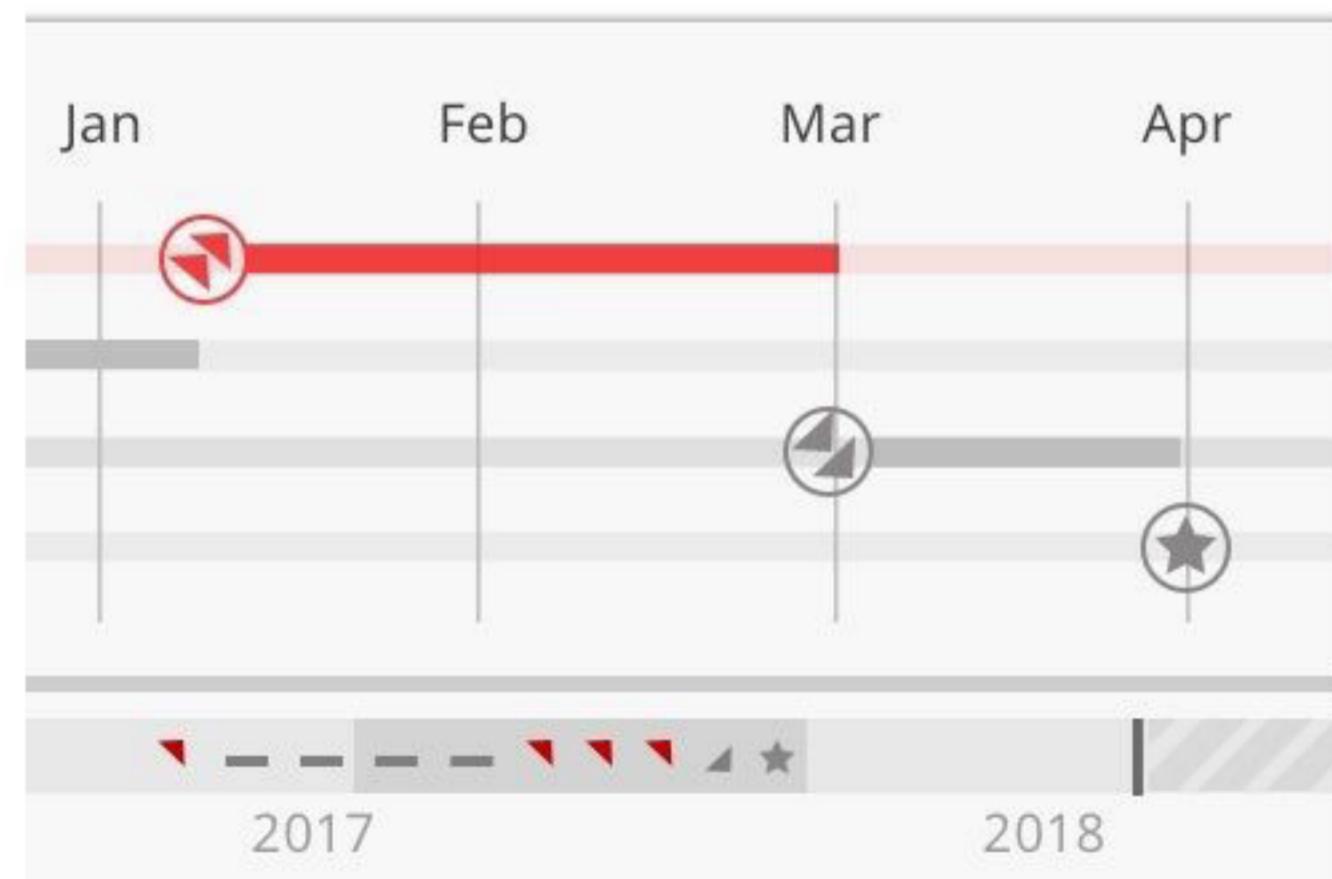
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Disease status



Disease status timeline

1 W | 1 M | 6 M | 1 Y



Follow-up

10 April 2018

Dr. Free2 Will

Dana Farber Cancer Institute

Close

B I U ≡ 1/3

Invasive ductal carci... > disease status

[View timeline](#)

2 Assessment

I believe Ms. Ortiz is a good candidate for #enrollment #PA

I assess #staging #T0. #disease status #Complete response #imaging. She |



Search shortcuts

Templates

Snippets

Suggested

Context

Reason

#Pathology

#Symptoms

#Physical exam

#Markers

Reference date

#reference date

As of date

#as of

Invasive ductal car...

#disease status

#toxicity

#ER

#PR

#HER2

@HPI

Summary

Timeline

Medication

Allergies

Labs

Social

Disease status

[Remove unfilled elements and sign](#)

Remove note



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Follow-up

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Close

Diabetic retinopathy > disease status

Support groups

Assessment

I have diagnosed Ms. Ortiz with diabetic retinopathy.



Search shortcuts

Templates

Snippets

Suggested

Context

Node size

#N0

#N1mi

#N1

#N2

#N3

Metastasis

#M0

#M1

Invasive ductal car...

#disease status

#toxicity

#ER

#PR

#HER2

@HPI

Remove unfilled elements and sign

Remove note



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Diabetic retinopathy > disease status

 Support groups

0 corrections

The Massachusetts diabetic association support group meets monthly.

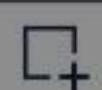
 Sign up ms. Debra24 Ignore

A visual comparing a normal eye with a diabetic retinopathy eye.

 View visualization Ignore

A well known patient education video showing the mechanism of diabetic retinopathy

 Play video (3 min) Ignore Remove unfilled elements and sign Remove note



Dr. Jraker299 referred ms. Debra24

Follow-up

Dr. Free2 Will

Close



0 corrections

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[Sign up ms. Debra24](#)

[Ignore](#)

A visual comparing a normal eye with a diabetic retinopathy eye.

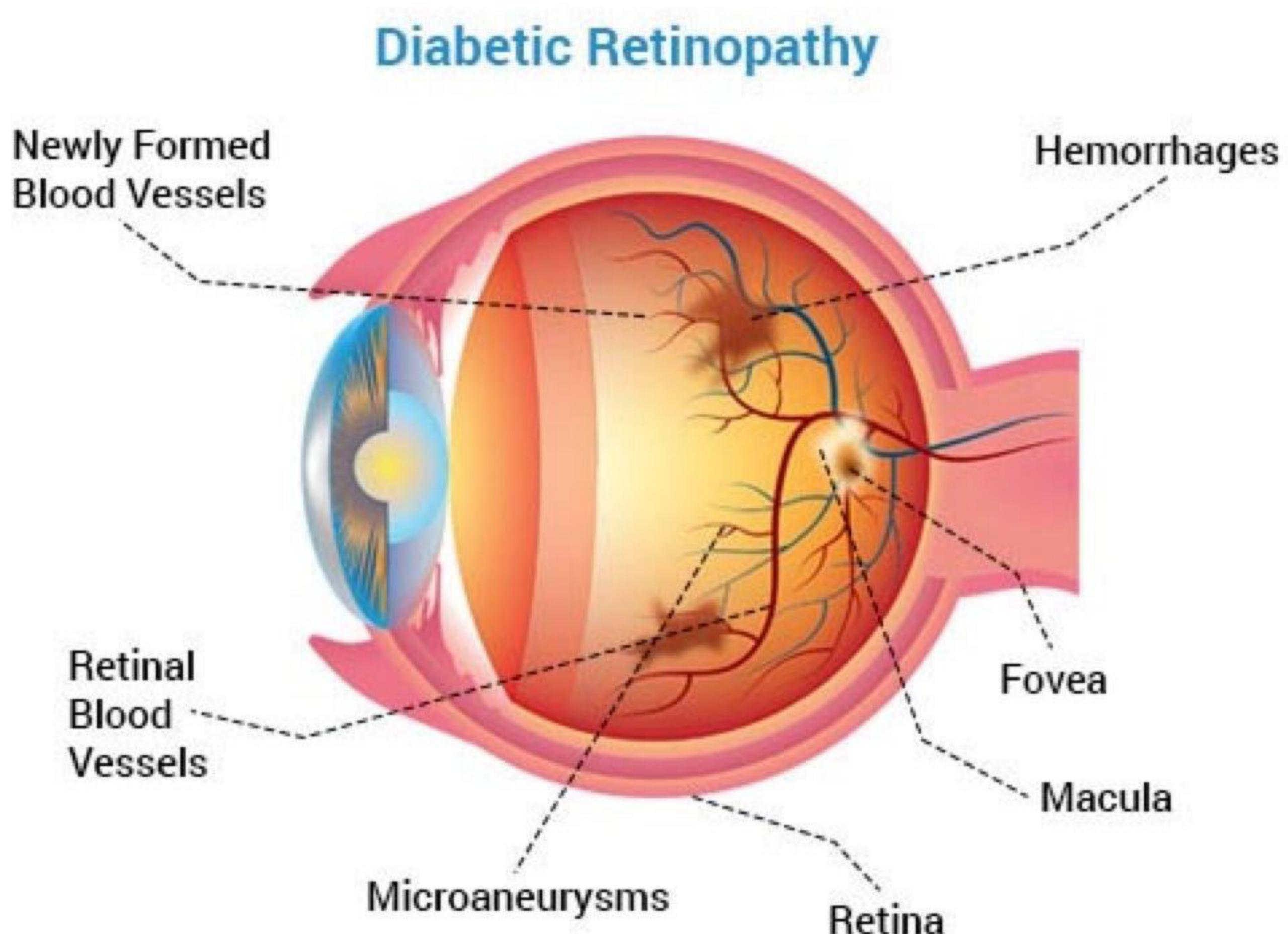
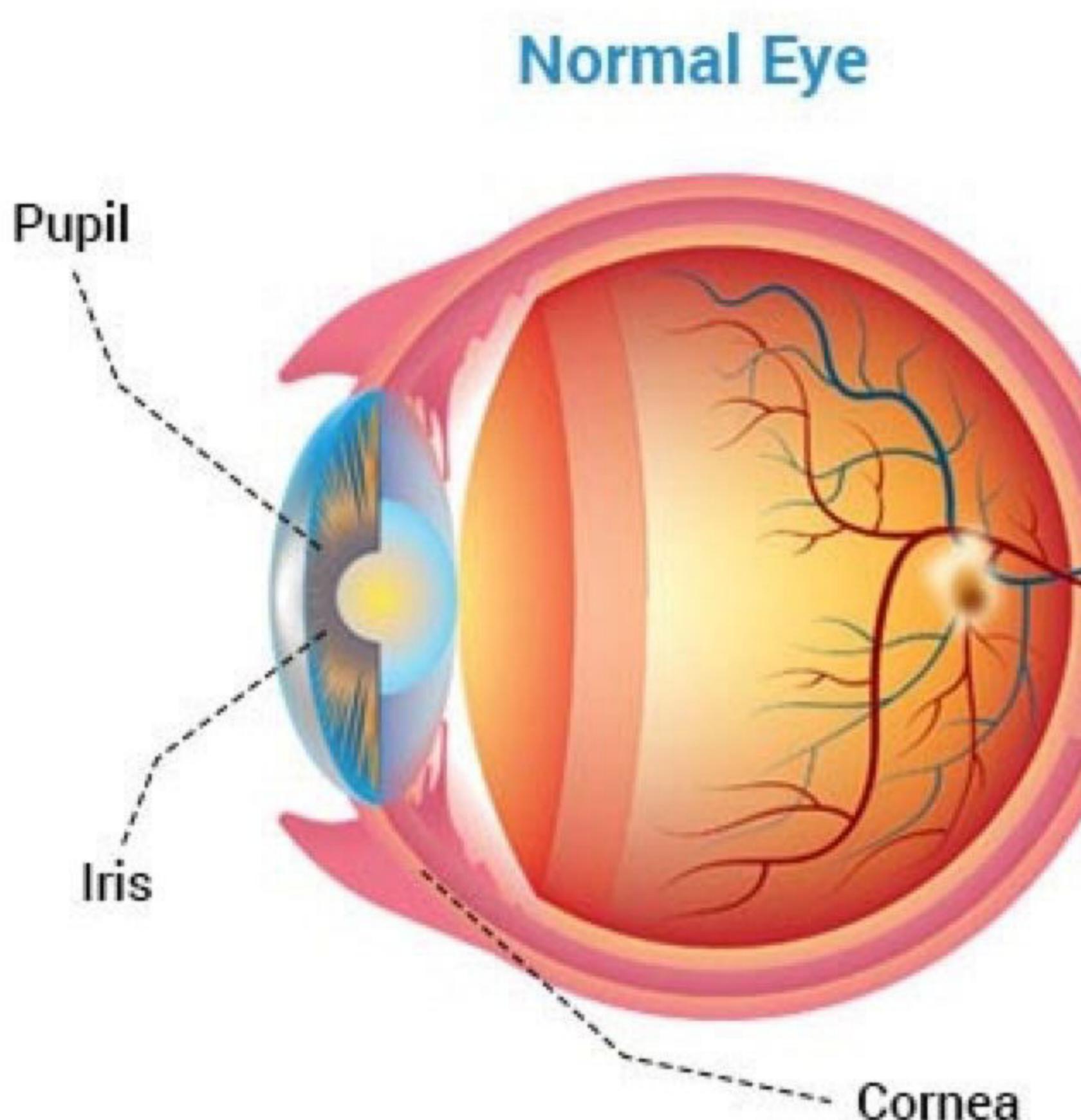
[View visualization](#)

[Ignore](#)

A well known patient education video showing the mechanism of diabetic retinopathy

[Play video \(3 min\)](#)

[Ignore](#)



© TheDiabetesCouncil.com

undifferentiated ductal carcinoma,

stage IV, estrogen receptor 0, etc.

diagnostic mammogram on 4

October 2013 revealed a 2 cm mass

in the right breast at 7 o'clock and an

[Remove unfilled elements and sign](#)

Remove note

2

NOTE ASSISTANT: HIGH PRIORITY ERRORS



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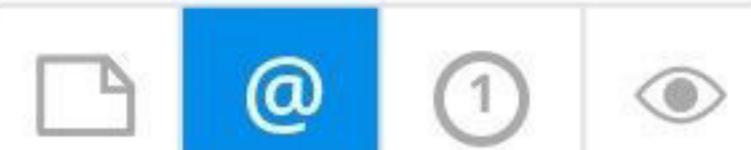
 Close |

Tamoxifen

Contraindication

1 Plan

Prescribe Tamoxifen 40 mg tablet, once daily,



Search shortcuts

Templates

Snippets

Suggested

Context

Dosage

#min

#average

#max

#...

Frequency

#qd

#tid

#qid

#...

 Remove unfilled elements and sign Remove note



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B I U ≡ 1
2
3

Tamoxifen

Contraindication

1 Plan

Prescribe Tamoxifen 40 mg tablet, once daily,

Prescribe Tamoxifen 40 mg tablet

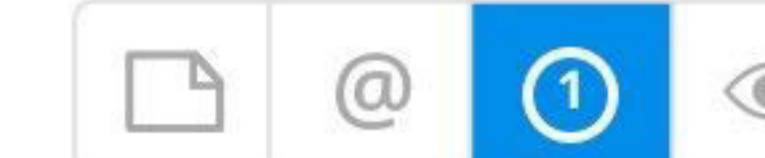
Patient has very low white blood cell count.
Contraindication with Tamoxifen.

Remove tamoxifen

Ignore

Remove unfilled elements and sign

Remove note



1 corrections

HIGH PRIORITY ERRORS

Correction based on Rx standards (overdosage, etc)

The screenshot shows a medical software interface with a toolbar at the top. The '1' icon in the toolbar is highlighted with a blue box and a cursor arrow pointing to it. Below the toolbar, the text '1 corrections' is displayed in red. The main area shows a prescription plan for 'Tamoxifen 90 mg tablet'. A tooltip message 'Overdose warning. 90 mg is 4 times the recommended dosage.' is overlaid on the text. Below this, a 'Did you mean:' dropdown menu lists '10 mg (min dosage)' and '20 mg (avg dosage)'. At the bottom of the interface, there is an 'Ignore' button.

1 Plan
Prescribe Tamoxifen 90 mg tablet, once daily,|

Tamoxifen 90 mg tablet
Overdose warning. 90 mg is 4 times the recommended dosage.
Did you mean:
10 mg (min dosage)
20 mg (avg dosage)
Ignore

Correction based on patient history (medical device)

The screenshot shows a medical software interface with a toolbar at the top. The '1' icon in the toolbar is highlighted with a blue box and a cursor arrow pointing to it. Below the toolbar, the text '1 corrections' is displayed in red. The main area shows a prescription plan for 'Prescribe MRI'. A tooltip message 'Contraindication. Patient has a pacemaker.' is overlaid on the text. Below this, there are two buttons: 'Remove MRI' and 'Ignore'.

1 Plan
Prescribe MRI. Patient has |

Prescribe MRI. Patient
Contraindication. Patient has a pacemaker.
Remove MRI
Ignore

Correction based on patient values/preferences

The screenshot shows a medical software interface with a toolbar at the top. The '1' icon in the toolbar is highlighted with a blue box and a cursor arrow pointing to it. Below the toolbar, the text '1 corrections' is displayed in red. The main area shows a prescription plan for 'Prescribe blood transfusion'. A tooltip message 'Patient is jehovas witness. Ingestion of blood is against patient values.' is overlaid on the text. Below this, there are two buttons: 'Remove transfusion' and 'Ignore'.

1 Plan
Prescribe blood transfusion. Patient has |

Prescribe blood transfusion. Patient
Patient is jehovas witness.
Ingestion of blood is
against patient values.
Remove transfusion
Ignore

3

NOTE ASSISTANT: ADDITIONAL EXPLORATIONS



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Summary

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Medication

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Labs

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Follow-up

10 April 2018

Dr. Free2 Will

Dana Farber Cancer Institute

Close

| Tamoxifen

1 Plan

Prescribe Tamoxifen 40 mg tablet, once daily,

1 corrections

Prescribe Tamoxifen 40 mg tablet

Patient has very low white blood cell count.
Contraindication with Tamoxifen.

Remove tamoxifen

Ignore

Remove unfilled elements and sign

Remove note



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Close

B I U

Tamoxifen

1 Plan

Prescribe Tamoxifen 40 mg tablet, once daily,



Search shortcuts

Templates

Snippets

Suggested

Context

Dosage

#min

#average

#max

#...

Frequency

#qd

#tid

#qid

#...

Remove unfilled elements and sign

Remove note



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Close

B I U | Tamoxifen

1 Plan

Prescribe Tamoxifen 40 mg tablet, once daily,

Patient has very low white blood cell count. Contraindication with Tamoxifen.

Ignore

Remove tamoxifen

Remove unfilled elements and sign



Search shortcuts

Templates

Snippets

Suggested

Context

Dosage

#min

#average

#max

#...

Frequency

#qd

#tid

#qid

#...

Remove note

4

TEMPLATE INITIALIZATION



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Dana Farber Cancer Institute

 Close

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 Remove unfilled elements and sign Search shortcuts

Templates

Snippets

Suggested

Context

progress note

op note

follow-up

consult note

procedure follow-up

 Remove note



Debra24
Hernandez98Aj

Date of birth
5 Apr 1966 (51)

Admin. sex
Female

Location

Boston, MA

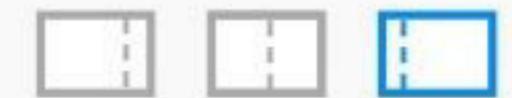
Workflow

Pre-encounter

Condition

Ductal carcinoma of the breast

View



 Debra24 search...



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Follow-up

10 April 2018

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 Close

B I U

REASON FOR VISIT

Follow-up consultation regarding a procedure related to **@condition**

HISTORY OF PRESENT ILLNESS

@HPI

PROCEDURE

The patient recently underwent @procedure on @dateof with @attending.

 Search shortcuts

Condition:

Invasive ductal carcinoma of breast

Fracture

 Cancel

 Remove unfilled elements and sign

 Remove note



Debra24
Hernandez98Aj

Date of birth
5 Apr 1966 (51)

Admin. sex
Female

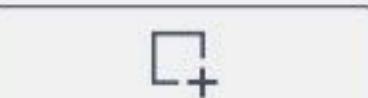
Location
Boston, MA

Workflow
Pre-encounter

Condition
Ductal carcinoma of the breast

View

 Debra24 search...



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10 April 2018

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 Close

B I U 

Invasive ductal carcinoma of the breast



 Search shortcuts

Condition:
Invasive ductal carc...

Procedure:

Mammography

Core needle biopsy of breast

Another procedure that happened

yet another procedure

 Cancel

 Remove unfilled elements and sign

 Remove note



Debra24
Hernandez98Aj

Date of birth
5 Apr 1966 (51)

Admin. sex
Female

Location

Boston, MA

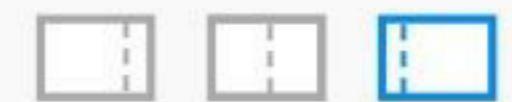
Workflow

Pre-encounter

Condition

Ductal carcinoma of the breast

View



 Debra24 search...



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Close

B **I** **U**

Invasive ductal carcinoma of the breast



 Search shortcuts

Condition:
Invasive ductal carc...

Procedure:
Mammography

REASON FOR VISIT

Follow-up consultation regarding a procedure related to *Invasive ductal carcinoma of the breast*.

HISTORY OF PRESENT ILLNESS

Here is the full history of present illness for invasive ductal carcinoma of the breast, with all the structured data.

PROCEDURE

The patient recently underwent mammography on Feb 12, 2018 with Dr. Needlebrow.

Confirm

Cancel

Remove unfilled elements and sign

Remove note



Debra24

Hernandez98Aj

Date of birth

5 Apr 1966 (51)

Admin. sex

Female

Location

Boston, MA

Workflow

Pre-encounter

Condition

Ductal carcinoma of the breast

View



Debra24 search...



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**B I U**

mammography

REASON FOR VISIT

Follow-up consultation regarding a procedure related to Invasive ductal carcinoma of the breast.

HISTORY OF PRESENT ILLNESS

Here is the full history of present illness for invasive ductal carcinoma of the breast, with all the structured data.

PROCEDURE

The patient recently underwent mammography on Feb 12, 2018 with Dr. Needlebrow.



Search shortcuts

Templates

Snippets

Suggested

Context

mammography

#result

@dateof

@attending

Invasive ductal car...

#disease status

#toxicity

#ER

#PR

#HER2

@HPI



Remove note

Remove unfilled elements and sign

5

INITIAL COLLABORATIVE IDEAS

INTRODUCTION

The Collaborative view will provide a platform for clinician and patient to discuss results, images, treatment plans, and health topics. It will present in a large format, with strong annotation, collaborative, and export capabilities. It will also help with language and communication barriers by providing print and translation service.

Following are some initial ideas for functionalities and design to begin the conversation and exploration.

POSSIBLE COLLABORATIVE PLATFORM FUNCTIONALITIES

- Identification and description of symptoms
- Discussion of lifestyle and health determinants
- Diagnosis education and tracking
- Medication schedules, education, and discussion
- Home treatment routines (diet changes, exercises, etc.)
- Medical treatment plans such as procedures: timeline and education
- Laboratory result visualization, comparison, and education
- Imaging results sharing, comparison, and education



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Admin. sex
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Location

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Workflow

Pre-encounter ▾

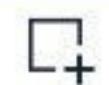
Condition

Ductal carcinoma of breast ▾

View



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Search shortcuts

Remove unfilled elements and sign

Remove note



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Female

Location
Boston, MA

View



 Debra24 search...

TREATMENT

Overview

 Medications

 Home Procedures

 Diet

 Procedures

Send

Print

 Close

Symptoms

Timeline

Health

Lab Results

Imaging

Treatment

Education

TREATMENT
OVERVIEW
VIZ

English

Language 1

Language 2

Language 3

Language 4





Debra24
Hernandez98A

Date of birth: 5 Apr 1966 (51)
Admin. sex: Female
Location: Boston, MA

Toggle collaborative view

View



 Debra24 search...

TREATMENT

Overview

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Select among subtopics

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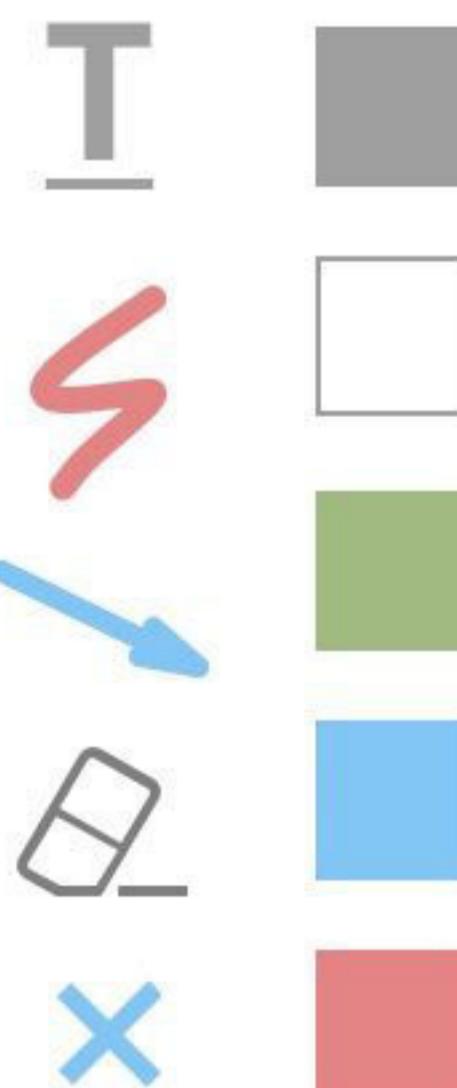
Top level collaborative functionalities.
Elements similar to mini-map, functions as a selector.

TREATMENT OVERVIEW VIZ

Translation services

English
Language 1
Language 2
Language 3
Language 4

Markup tools



Send or print the work area

Send

Print

 Close

 Return to clinician view



Debra24
Hernandez98A

Date of birth: 5 Apr 1966 (51)
Admin. sex: Female
Location: Boston, MA

View



 Debra24 search...

TREATMENT

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Health

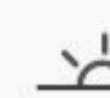
Lab Results

Imaging

Treatment

Education

Schedule for Wednesday, 21 Feb 2018

 Morning 6am - 12pm

 Letrazole

Take 1 tablet with breakfast, daily until 12 May, 2018

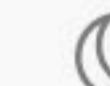
 Aromasin

Take 1 tablet after breakfast, daily until 28 July, 2018

 Afternoon 12pm - 5pm

 Aromasin

Take 1 tablet after lunch, every Wed and Thurs until 20 Jun, 2018

 Night 5pm - 6am

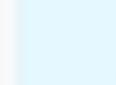
 Tamoxifen

Take 1 tablet with dinner, daily until 20 May, 2018

 Coumadin

Take 1 tablet an hour before sleeping, daily until 25 May, 2018

< Week of 19 Feb - 25 Feb, 2018 >

Mon	Tues	Wed	Thurs	Fri	Sat	Sun
	 	 	 	 	 	 
						
	 	 	 	 	 	 

English

Language 1

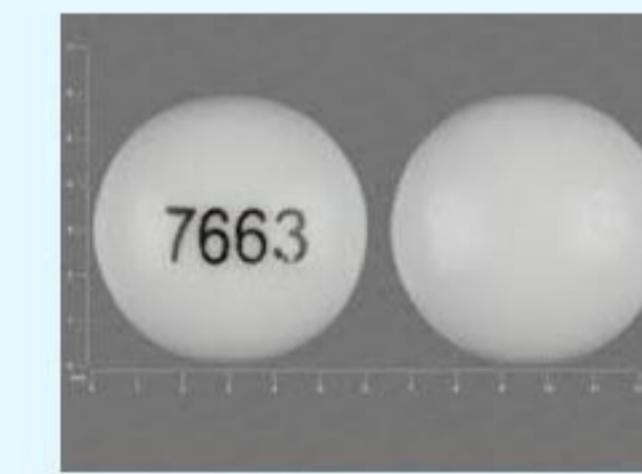
Language 2

Language 3

Language 4

Aromasin

Exemestane, sold under the brand name Aromasin among others, is a medication used to treat breast cancer. It is a member of the class of antiestrogens known as aromatase inhibitors.



Who prescribed it and when?

Dr. Chan prescribed Aromasin on 13 Jun, 2017.

How often and how many times do I need to refill it?

You will need to refill every 3 weeks until 20 Jun, 2018.

For more information see the [Medication Information](#) in Education.

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