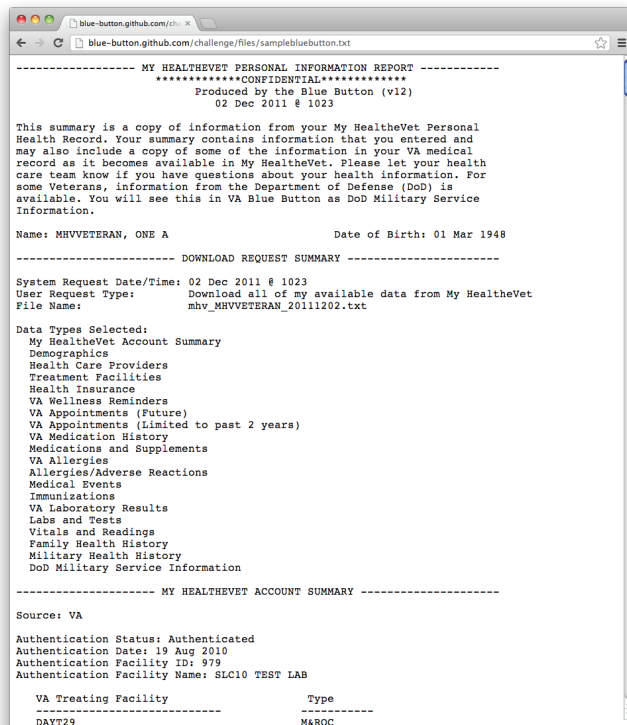


Health Design Challenge: Reinventing the Patient Medical Record

THE PROBLEM

Electronic Medical Records (EMR) are often difficult to read by a patient. Lack of adequate hierarchies and visual cues make it difficult for readers to understand the content without having to learn how to read the record. Current health issues of importance are often not highlighted, leaving the patient overwhelmed with information.



Sample data from Blue Button

OUR SOLUTION

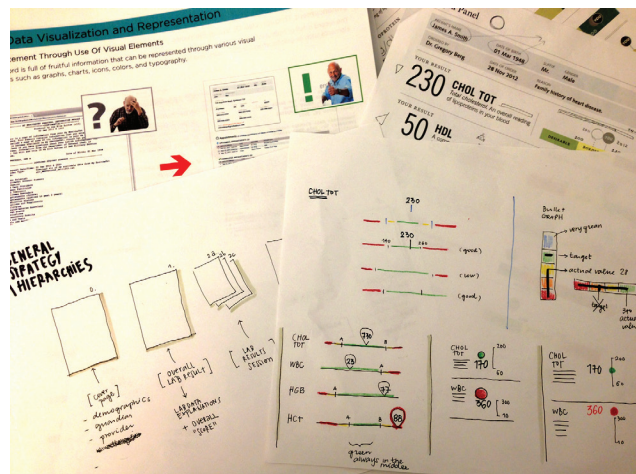
For this design challenge, the Parsons Institute for Information Mapping (PIIM) approached the problem from both a “macro” and “micro” perspective. We started by conceptualizing the domain of the medical record as a whole. Utilizing the fields and sections found in the Continuity of Care Document, we reorganized the structure of the information to better clarify and highlight data of vital importance to the patient. Working with our Medical Informatics Specialist, each lab result was thoroughly investigated and redesigned using preferred elements for typography, color, and graphs. The result is a medical record that is easy to understand and discuss with a primary care provider. The design also puts medical information in reach for those who may have limited English proficiency or low literacy.

Based on the description of target audience, this medical record is designed with the following in mind:

1. Written medical information is simplified;
2. The designs visual cues highlight important information through iconography and graphs;
3. The record compatible with a variety of devices (desktops, mobile devices, tablets) and is functional in both color and black and white print.

DESIGN EXPLORATIONS

Overall visual concepts are explored further at the end of this document and detail additional styles and iconography sets.



YOUR PROFILE

Ellen Ross



DATE OF BIRTH
7 December 1972

GENDER
Female

MARITAL STATUS
Married

PHONE
415-555-1229

ADDRESS
17 Daws Road
Portland OR 97006

ETHNICITY
Asian

LANGUAGE SPOKEN
English

GUARDIAN

SISTER
Martha Shan

PHONE
415-555-1229

ADDRESS
1357 Amber Drive
Beaverton OR 97006

PROVIDER

**Ashby Medical
Center**

PHONE
415-555-1229

ADDRESS
1002 Healthcare DR
Portland OR 97266

IMPORTANT NOTES



Allergies

You have 8 known allergies.

NAME	SEVERITY	REACTION
Bee Stings	Severe	Anaphylactic Shock
Dogs/pets	Severe	Anaphylactic Shock
Peanuts	Severe	Anaphylactic Shock
Penicilin	Moderate to severe	Shortness of breath
Codeine	Moderate	Hives
Latex	Moderate	Hives
Shellfish	Moderate	Hives
Soy	Moderate	Hives



Immunizations

You have 2 upcoming immunizations.

NAME	DUE BY
Influenza Virus Vaccine	Dec 2013
TYPE AND DOSE Intramuscular injection	
VALUE / UNIT 50 / mcg	
EDUCATION / INSTRUCTIONS Possible flu-like symptoms for 3 days	

NAME	DUE BY
Tetanus and Diphtheria Toxoids	Jan 2013
TYPE AND DOSE Intramuscular injection	
VALUE / UNIT 50 / mcg	
EDUCATION / INSTRUCTIONS Mild pain or soreness in the local area	



Plan of Care

You have 3 recommendations from your doctor.

NAME	PLANNED DATE	INSTRUCTIONS
Office consultation	1 DEC 2012	
Chest X-ray	15 DEC 2012	
Sputum Culture	8 JAN 2013	

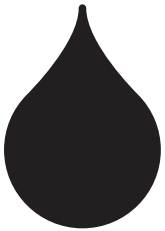


Lipid Panel

A Lipid Panel measures different parts of cholesterol in your blood. High cholesterol can lead to heart disease, so it is important to discuss abnormal test results with your healthcare provider.

YOUR RESULTS

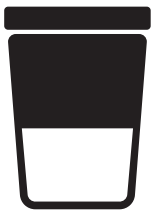
- CHOL TOT
- HDL
- LDL
- TRIG
- NON-HDL



Complete Blood Count

A Complete Blood Count is one of the most common blood tests. It is used as a measure of your overall health and can help your healthcare provider detect problems like anemia and infection.

- RBC
- WBC
- HGB
- HCT
- PLT
- MCV
- HGB A1C



Urinalysis

A Urinalysis evaluates a sample of your urine, and is used to detect problems with your kidneys, urinary tract infections, and diabetes. Urinalysis alone usually does not result in a medical diagnosis.

- Color
- Order
- Turbidity
- Specific Gravity
- Acidity/PH
- Glucose
- Ketones
- Leukoesterase
- Protein
- Bilirubin
- RBC
- Casts
- Crystals
- Bacteria
- Parasites
- Nitrites



Pap Smear

A Pap Smear is a screening test for cervical cancer in women. A swab from your cervix — the lower part of your uterus — is tested for abnormal cells.

- RBC

KEYS: ● Poor ● Borderline ● Normal ● Good

LAB RESULTS

♥ Lipid Panel

PATIENT'S NAME
Ellen Ross

DATE OF BIRTH
7 Dec 1972

ISSUED DATE
30 Nov 2012

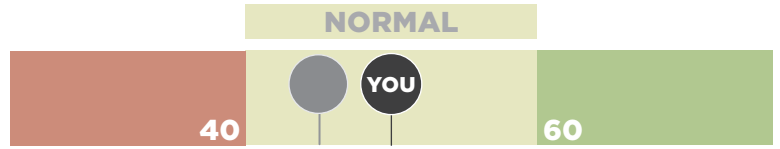
CHOL TOT: TOTAL CHOLESTEROL

230 mg/dL
BORDERLINE HIGH
An overall reading of lipid particles in your blood.



HDL: HIGH DENSITY LIPOPROTEIN

50 mg/dL
NORMAL
Known as the "good" cholesterol — higher is better.



LDL: LOW DENSITY LIPOPROTEIN

170 mg/dL
POOR
Known as the "bad" cholesterol — lower is better.



TRIG: TRIGLYCERIDES

80 mg/dL
GOOD
The chemical form of most fats found in foods.

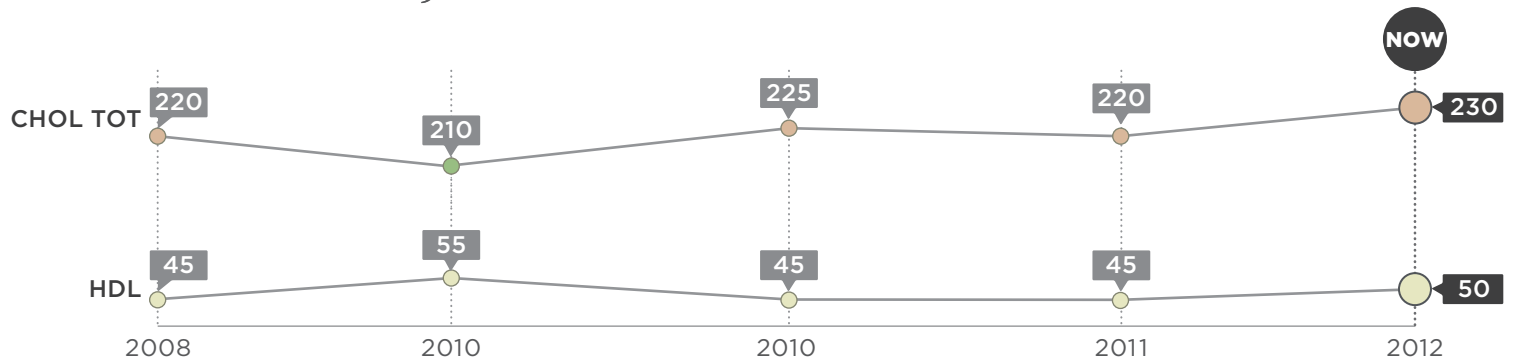


NON-HDL: NON-HIGH DENSITY LIPOPROTEIN

180 mg/dL
NORMAL
This is your total cholesterol minus your HDL, high density lipoprotein.



CHANGE OVER THE LAST 5 YEARS



NOTES

my doctor recommended regular exercise.

LAB RESULTS

Complete Blood Count

PATIENT'S NAME
Ellen Ross

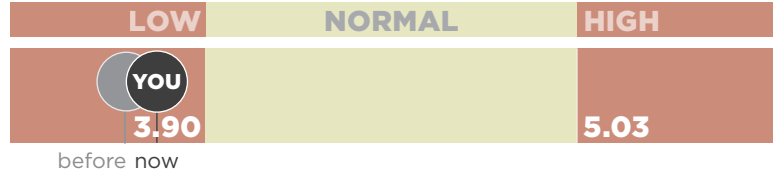
DATE OF BIRTH
7 Dec 1972

ISSUED DATE
30 Nov 2012

RBC: RED BLOOD CELL

3.7 M/uL
LOW

Red Blood Cell count is a component of a Complete Blood Count test.



WBC: WHITE BLOOD CELL

6 K/uL
NORMAL

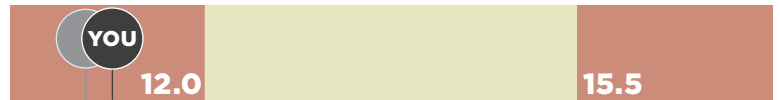
White blood cells are part of the body's immune system.



HGB: HEMOGLOBIN

11 g/dL
LOW

The hemoglobin test measures the oxygen carrying capacity of the blood.



HCT: HEMATOCRIT

34 %
LOW

Hematocrit is the percent of blood made up of red blood cells.



PLT: PLATELETS

180 K/uL
NORMAL

Platelets are cell fragments needed for normal blood clotting.



MVC: MEAN CORPUSCULAR VOLUME

93 fL
NORMAL

Mean Corpuscular Volume is the average size of a red blood cell.



HGB A1C: GLYCOSYLATED HEMOGLOBIN

6.2 %
HIGH

Hemoglobin A1C is used to diagnose and manage diabetes.



NOTES

IBUPROFEN 600MG TAB

SIDE A



SIDE B





DIRECTIONS / NOTES

1 tablet by mouth
4 times a day with food
every **4** hours



POSSIBLE SIDE EFFECTS

-  **Headache**
-  **Dizziness**

GET MEDICAL HELP IF
*Experiencing chest pain,
shortness of breath,
and rapid weight gain.*

REASON FOR MEDICATION
For treatment of
lower back pain.

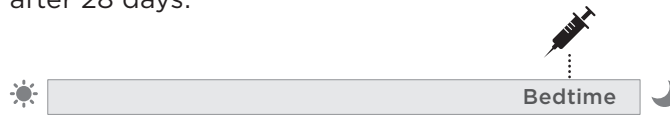
INSULIN, GLARGINE, HUMAN 100 UNT/ML INJ

APPEARANCE






DIRECTIONS / NOTES

1 injection at bedtime
Inject 10 ml vial under the skin as directed for
28 days inject 25 units under the skin at bedtime
do not mix with other insulins/discard open vials
after 28 days.



POSSIBLE SIDE EFFECTS

-  **Headache**
-  **Fatigue**
-  **Nausea**

GET MEDICAL HELP IF
*Experiencing itching skin,
wheezing, and fast heart rate.*

REASON FOR MEDICATION
Reduce blood pressure.

TERAZOSIN HCL 2MG CAPSULE

SIDE A

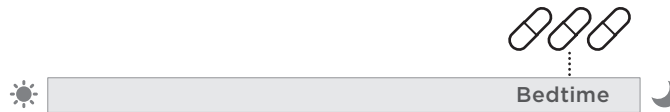


SIDE B








DIRECTIONS / NOTES

3 capsules before bed



POSSIBLE SIDE EFFECTS

-  **Dizziness**
-  **Headache**
-  **Constipation**
-  **Loss of appetite**
-  **Fatigue**

REASON FOR MEDICATION
For treatment of
symptoms of an
enlarged prostate.

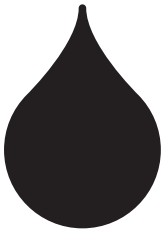


Lipid Panel

A Lipid Panel measures different parts of cholesterol in your blood. High cholesterol can lead to heart disease, so it is important to discuss abnormal test results with your healthcare provider.

YOUR RESULTS

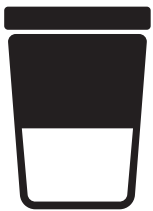
- CHOL TOT
- HDL
- LDL
- TRIG
- NON-HDL



Complete Blood Count

A Complete Blood Count is one of the most common blood tests. It is used as a measure of your overall health and can help your healthcare provider detect problems like anemia and infection.

- RBC
- WBC
- HGB
- HCT
- PLT
- MCV
- HGB A1C



Urinalysis

A Urinalysis evaluates a sample of your urine, and is used to detect problems with your kidneys, urinary tract infections, and diabetes. Urinalysis alone usually does not result in a medical diagnosis.

- | | |
|--|---|
| <input checked="" type="checkbox"/> Color | <input checked="" type="checkbox"/> Protein |
| <input checked="" type="checkbox"/> Order | <input checked="" type="checkbox"/> Bilirubin |
| <input checked="" type="checkbox"/> Turbidity | <input checked="" type="checkbox"/> RBC |
| <input checked="" type="checkbox"/> Specific Gravity | <input checked="" type="checkbox"/> Casts |
| <input checked="" type="checkbox"/> Acidity/PH | <input checked="" type="checkbox"/> Crystals |
| <input checked="" type="checkbox"/> Glucose | <input checked="" type="checkbox"/> Bacteria |
| <input checked="" type="checkbox"/> Ketones | <input checked="" type="checkbox"/> Parasites |
| <input checked="" type="checkbox"/> Leukoesterase | <input checked="" type="checkbox"/> Nitrites |



Pap Smear

A Pap Smear is a screening test for cervical cancer in women. A swab from your cervix — the lower part of your uterus — is tested for abnormal cells.

- RBC

KEYS: Poor Borderline Normal Good

LAB RESULTS

♥ Lipid Panel

PATIENT'S NAME
Ellen Ross

DATE OF BIRTH
7 Dec 1972

ISSUED DATE
30 Nov 2012

CHOL TOT: TOTAL CHOLESTEROL

230 mg/dL
BORDERLINE HIGH
An overall reading of lipid particles in your blood.



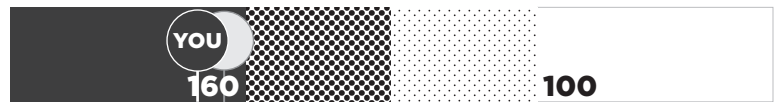
HDL: HIGH DENSITY LIPOPROTEIN

50 mg/dL
NORMAL
Known as the "good" cholesterol — higher is better.



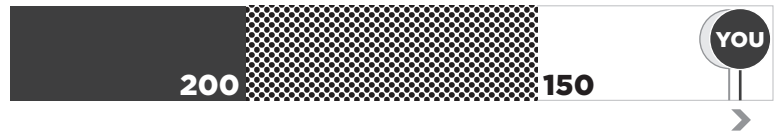
LDL: LOW DENSITY LIPOPROTEIN

170 mg/dL
POOR
Known as the "bad" cholesterol — lower is better.



TRIG: TRIGLYCERIDES

80 mg/dL
GOOD
The chemical form of most fats found in foods.

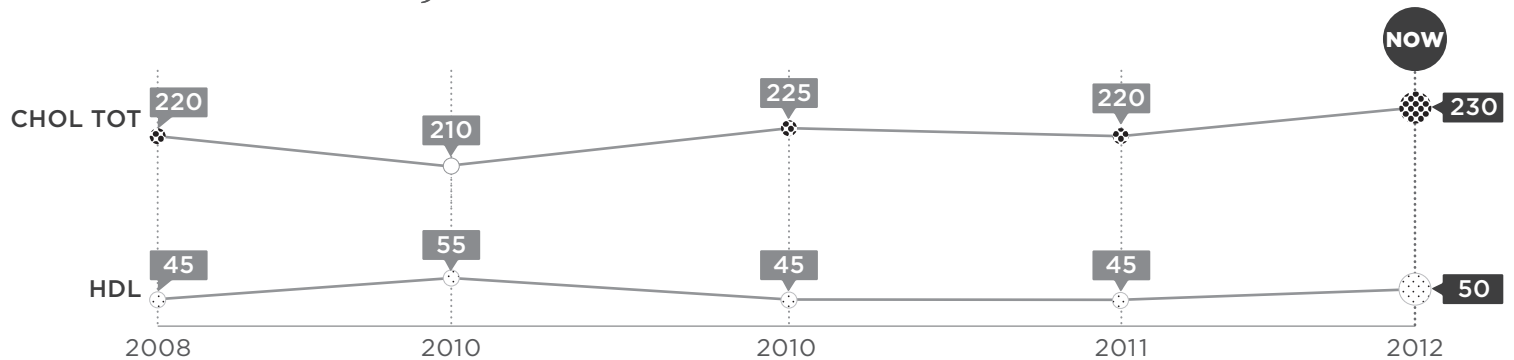


NON-HDL: NON-HIGH DENSITY LIPOPROTEIN

180 mg/dL
NORMAL
This is your total cholesterol minus your HDL, high density lipoprotein.



CHANGE OVER THE LAST 5 YEARS



NOTES

my doctor recommended regular exercise.

LAB RESULTS

Complete Blood Count

PATIENT'S NAME
Ellen Ross

DATE OF BIRTH
7 Dec 1972

ISSUED DATE
30 Nov 2012

RBC: RED BLOOD CELL

3.7 M/uL

LOW

Red Blood Cell count is a component of a Complete Blood Count test.



WBC: WHITE BLOOD CELL

6 K/uL

NORMAL

White blood cells are part of the body's immune system.



HGB: HEMOGLOBIN

11 g/dL

LOW

The hemoglobin test measures the oxygen carrying capacity of the blood.



HCT: HEMATOCRIT

34 %

LOW

Hematocrit is the percent of blood made up of red blood cells.



PLT: PLATELETS

180 K/uL

NORMAL

Platelets are cell fragments needed for normal blood clotting.



MVC: MEAN CORPUSCULAR VOLUME

93 fL

NORMAL

Mean Corpuscular Volume is the average size of a red blood cell.



HGB A1C: GLYCOSYLATED HEMOGLOBIN

6.2 %

HIGH

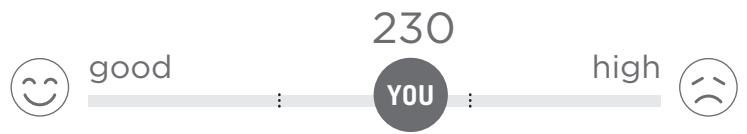
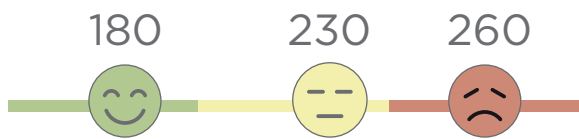
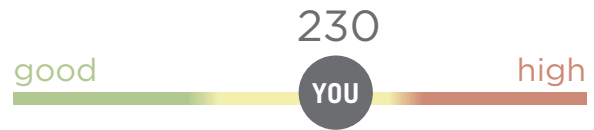
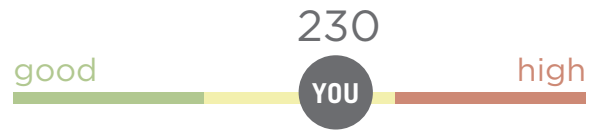
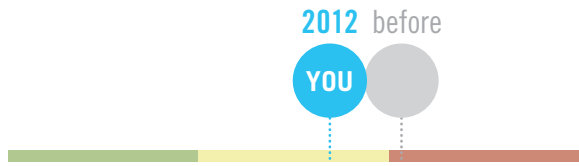
Hemoglobin A1C is used to diagnose and manage diabetes.



NOTES

Exploration of Graphs

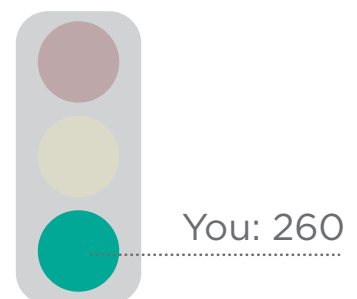
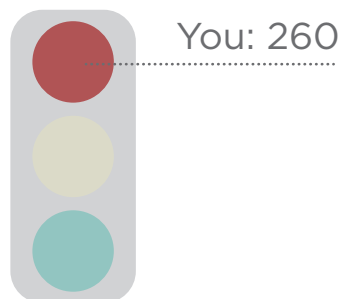
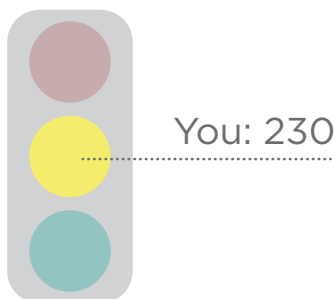
1. CONDENSED BAR GRAPH



2. GAUGE/DIAL



3. TRAFFIC LIGHT



Exploration of Medications display

MEDICATIONS

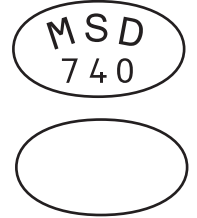
1. IMAGE



2. IMAGE + OVERLAY TEXT



3. ICON



INTAKE TIMELINE SOLUTIONS

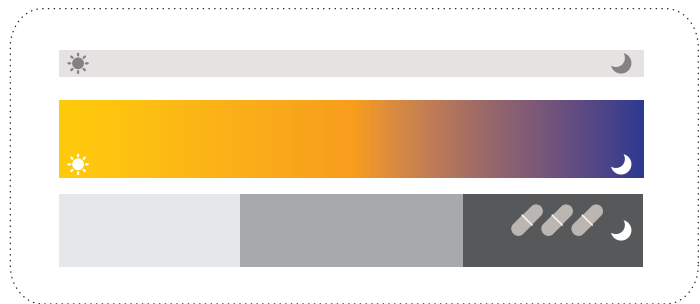
1. PLAIN TEXT

DIRECTIONS/NOTES

Take one tablet by mouth four times a day with food every 4 hours.

- ☀ 10:00AM 1 capsule with meal.
- ☀ 2:00PM 1 capsule with meal.
- 🌙 6:00PM 1 capsule with meal.
- 🌙 10:00PM 1 capsule with meal.

2. COLORIZED TIME SCALE



3. PLAIN TEXT VER.2

DIRECTION

🌙 6:00PM

3 capsules
before bed

4. TIME SCALE + ICONS

Take 3 capsules around each time frame



~8:00AM



~2:00PM



~8:00PM



~8:00AM



~2:00PM



~8:00PM

~8:00AM

~2:00PM

~8:00PM

The dotted line scale shows 24 hours.

Exploration of icons for side effects

ANXIETY



CONSTIPATION



DIZZINESS



DROWSINESS



FATIGUE



GAS



HEADACHE



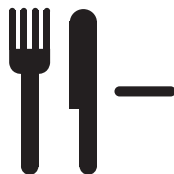
HEARING LOSS



INCREASED APPETITE



LOSS OF APPETITE



NAUSEA



PAIN



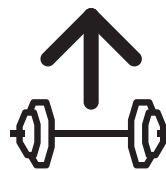
STOMACH PAIN



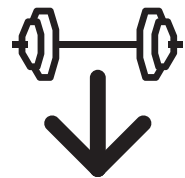
SUICIDALITY



WEIGHT GAIN



WEIGHT LOSS

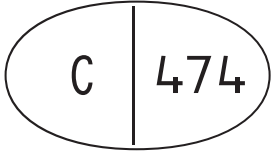


Exploration of Medications display

MEDICATIONS PANEL

METFORMIN HCL 1000MG TAB

SIDE A



DIRECTIONS/NOTES

Take one tablet by mouth twice a day with meals.

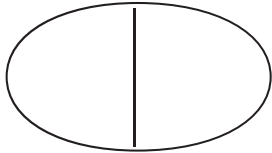
☀️ 10:00AM 1 tablet with meal.

🌙 6:00PM 1 tablet with meal.

POSSIBLE SIDE EFFECTS

headache
gas
muscle pain
dizziness
nausea

SIDE B



REASON FOR TAKING

Treat type 2 diabetes.

PRESCRIBER

Ashby Medical Center

ATC CODE

A10BD07

SIMVASTATIN 20 MG TAB

SIDE A



DIRECTIONS/NOTES

Take one tablet by mouth at bedtime.

🛏️ 1 tablet at bedtime.

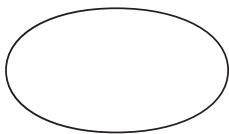
REASON FOR TAKING

Treat cholesterol level.

POSSIBLE SIDE EFFECTS



SIDE B



PRESCRIBER

Ashby Medical Center

ATC CODE

C10BX04

Exploration of Lab Results display

ALL NUMBERED TEXT ARE IN BLACK

YOUR RESULT

50

HDL

A component of total cholesterol, *high density lipoprotein* is called “the good cholesterol”



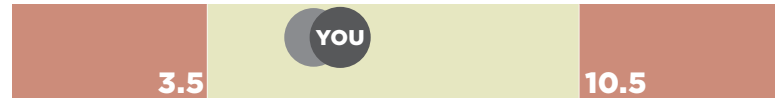
NORMAL AND ABNORMAL VALUES ARE IN THEIR RESPECTIVE COLORS.

WBC: WHITE BLOOD CELL

6

K/uL

White blood cells are part of the body's immune system.



HGB: HEMOGLOBIN

11

g/dL

The hemoglobin test measures the oxygen carrying capacity of the blood.



NORMAL VALUES ARE SET IN GREY, ABNORMAL VALUES IN COLOR.

WBC: WHITE BLOOD CELL

6

NORMAL

K/uL

White blood cells are part of the body's immune system.



HGB: HEMOGLOBIN

11

TOO HIGH

g/dL

The hemoglobin test measures the oxygen carrying capacity of the blood.



ABOUT US

Since 2008, the Parsons Institute for Information Mapping has been designing solutions for improving the clarity of medical information through better design. A research institute of The New School in New York City, PIIM specializes in creating knowledge through better design.

In 2012 PIIM announced plans for the first full GUI solution and prototype for the Patient-Centered Medical Home. The project will be released through the Open Source Electronic Health Record Agent (OSEHRA) initiative. Our staff consists of information designers, theorists, software programmers and medical informatics researchers. For more information about us or any of our open source products, please visit <http://piim.newschool.edu> or <http://piim.newschool.edu/healthboard>.

PIIM TEAM MEMBERS

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Jihoon Kang *Associate Director*

RESEARCHERS

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Sabrina Farhi *Media / Conference Planner*
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Giorgia Lupi *Politecnico di Milano / Density Design Lab*