


**My EHR has Decision Support.
That means I don't have to think.
Right?**

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Objectives

- ▶ Define clinical decision support
 - ▶ Understand the types of clinical decision support
 - ▶ Understand how a clinical decision support system (CDSS) can impact clinical care
- 


What is clinical decision support?



Clinical Decision Support Systems (CDSS)

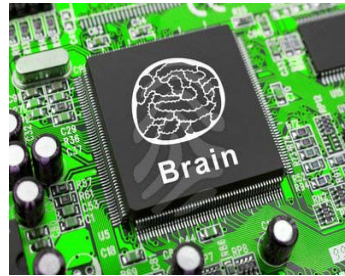
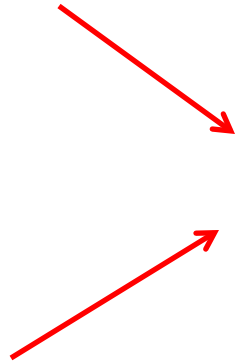
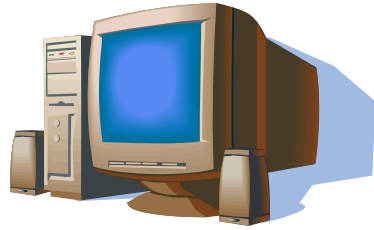
- ▶ Any tool that provides clinical evidence at the point of care within a health care professional's workflow
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Clinical Decision Support Systems (CDSS)


- ▶ An active knowledge system which uses two or more items of patient data to generate case-specific advice
- 

Clinical Decision Support Systems (CDSS)

- ▶ Software designed to directly aid clinical decision making where characteristics of individual patients are matched to a knowledge database which generates patient specific recommendations that are presented to clinicians



Types of CDSS

- ▶ Knowledge
 - ▶ Trending/Tracking
 - ▶ Directed Care
 - ▶ Recommendations
 - ▶ Reminders
 - ▶ Alerts
- 

Types of CDSS – Knowledge

- ▶ Calculators
 - BMI
 - BSA
 - Creatinine Clearance
 - Dosing
 - Opioid Converter
- ▶ Digital Medical Resources
 - IConsult
 - UpToDate
 - DynaMed
 - Micromedex
- ▶ Differential Diagnosis Programs
 - Diagnosis Pro

Body Mass Index Calculator

Body Mass Index (BMI) Calculator

Determines if your weight is in proportion to your height based on Federal guidelines released by the National Heart, Lung, and Blood Institute. The BMI is helpful in determining health risks and appropriate interventions. Write down your BMI or print this page for future reference. The normal range is 19-25 for females and 20-25 for males.

Height Inches ▼

Weight Lbs ▼

Body Mass Index Calculator

ce - DMF DEPARTMENT - Training Environment CERTB - USER E.

Home Schedule In Basket Chart Encounter Telephone Call Triage Call

Strombom, Annika

Code: None Allergies: No ... Attend Prov: EDAMAME, C Infection: None
Weight: 145 lb (65.772 kg) BMI: 23.41 kg/... Isolation: None Language: English

← →

← Facesheet

BMI: 23.41 kg/m² is calculated based on [Weight: 65.8 kg as of 9/29/11 11:00 AM][Height: 168 cm as of 9/29/11 11:00 AM]

Patient Summary

Digital Medical Resource

New Search:

postpartum hemorrhage

postpartum hemorrhage

Drug Interactions

Overview of postpartum hemorrhage

TOPIC OUTLINE

INTRODUCTION

INCIDENCE

DEFINITION AND DIAGNOSIS

• Differential diagnosis

ETIOLOGY AND RISK FACTORS

- Atony
- Trauma
- Coagulation defects
- Risk factors

PLANNING AND PREVENTION

COMPLICATIONS

MANAGEMENT

- Approach and tools

SECONDARY POSTPARTUM

HEMORRHAGE

TREATMENT OF POSTPARTUM

ANEMIA

RECURRENCE

SUMMARY AND

Overview of postpartum hemorrhage

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[Disclosures](#)

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INTRODUCTION — Postpartum hemorrhage (PPH) is an obstetrical emergency that can follow vaginal or cesarean delivery. It is a major cause of maternal morbidity, and one of the top three causes of maternal mortality in both high and low per capita income countries, although the absolute risk of death is much lower in high income countries (1 in 100,000 versus 1 in 1000 births in low income countries) [1]. Furthermore, hemorrhage is the leading cause of admission to the intensive care unit and the most preventable cause of maternal mortality.

INCIDENCE — The incidence of PPH varies widely, depending upon the criteria used to define the disorder. A reasonable estimate is 1 to 5 percent of deliveries [1,2]. An analysis of population-based data from the United States National Inpatient Sample for the years 1994-2006 found that the discharge diagnosis of PPH increased 26 percent over this period (from 2.3 to 2.6 percent) [3]. Uterine atony was the most common cause of PPH and accounted for most of the increase. The proportion of women diagnosed with uterine atony increased from 1.6 to 2.4 percent over the same interval.





DEFINITION AND DIAGNOSIS — PPH is best defined and diagnosed clinically as excessive bleeding that makes the patient symptomatic (eg, lightheadedness, weakness, palpitations, diaphoresis, restlessness, confusion, air hunger, syncope) and/or results in signs of hypovolemia (eg, hypotension, tachycardia, oliguria, low oxygen saturation [<95 percent]) (table 1). Vaginal bleeding is usually noted, but may not be present in cases where hemorrhage is related to abdominal bleeding from a cesarean delivery or a broad ligament hematoma after a sulcus laceration. A

Types of CDSS – Trending/Tracking

- ▶ Flow sheets
 - Vital Signs
 - I & O
- ▶ Graphs
 - Serial labs
- ▶ Reports
 - Several timed variables
 - Glucose/insulin
 - Anticoagulant
 - Heparin/PTT
 - Coumadin/PT/INR

Cardiac Accordion

Cardiac Accordion [09/10/11 0000 - 09/10/11 1759] in 2hr interval

Today   Yesterday 0000 - Yesterday 1759  

[15 min](#) [1 Hr](#) [4 Hrs](#) [8 Hrs](#) [24 Hrs](#)

Date:	09/10									
	2 Hour:	00-02	02-04	04-06	06-08	08-10	10-12	12-14	14-16	16-18
Vitals										
Temperature			97.6 (36.4)			98 (36.7)		98 (36.7)		
Pulse			51	48	51		46	60		
Blood Pressure			133/66	117/53	111/47			108/51		
Respirations			18	16	18			16		
Oxygen Saturation			96	95	94			94		
Oxygen Therapy			Room air	Room air	Room air			Room air	Room air	
Cardiac Assessment										
Rhythm					apical pulse irregu...			apical pulse irregu...		
ECG Rhythm				sinus bradycardia	atrial fibrillation			atrial fibrillation		
Frequency/Ectopy				rare						
Labs										
Digoxin Level				2.6						
Medications										
warfarin Tab(mg)									4	
Intake										
Oral Intake								360 mL		360 mL
Diet Percentage								100%		100%
Output										
Urine Output							350 mL			850 mL
Last BM					09/09/11					


Types of CDSS – Directed Care

- ▶ Ordersets
 - Best practice
 - Formulary
 - Inclusion and exclusion criteria
- ▶ Protocols
 - Consistent care
- ▶ Pathways
 - Consistent care beyond day one
 - Drive toward discharge
- ▶ Sequencing of Activities/Buttons
 - Guidance through workflow
- ▶ Presentation of lab results within medication orders

Types of CDSS – Recommendations

- ▶ Bring clinical selections to the clinician
 - Most frequently ordered tests/meds
 - Ordersets based on problem list

Types of CDSS – Reminders

- ▶ Vaccines
 - Influenza
 - Pneumococcal
 - ▶ Screening procedures
 - Colonoscopy
 - Pap
 - Mammogram
 - ▶ Monitoring
 - HbA1C
 - ▶ Overdue Results
- 

Vaccine and Procedure Reminder

Test, Bpatrinity Age: 81 y.o. DOB: 1/1/1930 Allergies: Not on File INS: (None) myAYULMC: Inactive
Sex: F MRN: 9950319 PCP: (None) Research:

Snapshot Report: Snapshot

Demographics
Bpatrinity Test
81 year old female
Comm Pref. None

Problem List
None

Health Maintenance Late Due Soon Hold

Topic	Due	Most Recent Outreach
Colonoscopy	1/1/1980	
Herpes Zoster Vaccine	1/1/1990	

Reminders and Results
None

Care Team and Communications
Referring Provider
No referring provider set
PCPs
No PCP set
Other Patient Care Team Members Relationship
None
Visit Treatment Team Relationship
None
Recipients of Past Communications
None

My Last Outpatient Progress Note
You have written no Outpatient Progress Notes for this patient

Allergies [Mark as Reviewed](#)
Not on File
Never Reviewed

Medications [Long-Term](#)
zoster vaccine live, PF, (ZOSTAVAX) 19,400 unit injection

Immunizations/Injections
None

Significant History/Details
Smoking: Never Assessed
Smokeless Tobacco: Unknown
Alcohol: Not on File
No open orders

Specialty Comments [Report](#) [Show All](#) [Edit](#)
No comments regarding your specialty


Family Comments [Edit](#)
None

Overdue Results

 Overdue Results (16)

P	I	Test	Dt Overdue	Status
		MRI ABDOMEN WITH AND WITHOUT IV CONTRAST	09/20/2011	New
		DEXA BONE DENSITY SPINE AND HIPS	09/20/2011	New
		MRI ABDOMEN WITH IV CONTRAST	09/19/2011	New
		MRI ABDOMEN WITH AND WITHOUT IV CONTRAST	09/19/2011	New
		US ABDOMEN COMPLETE	09/18/2011	New
		MRI ABDOMEN WITH IV CONTRAST	09/18/2011	New
		MRI ABDOMEN WITH IV CONTRAST	09/18/2011	New
		MRI ABDOMEN WITH IV CONTRAST	09/17/2011	New
		US ABDOMEN COMPLETE	09/17/2011	New
		XR SHOULDER INTERNAL AND EXTERNAL BILATERAL	09/11/2011	New
		US ABDOMEN COMPLETE	09/11/2011	New
		MRI ABDOMEN WITH AND WITHOUT IV CONTRAST	09/11/2011	New
		MRI ABDOMEN WITH AND WITHOUT IV CONTRAST	09/11/2011	New
		DEXA BONE DENSITY RIGHT HIP	09/10/2011	New

Types of CDSS –Alerts

- ▶ Drug–Allergy
 - ▶ Drug–Drug
 - ▶ Pregnancy/lactation
 - ▶ Dosage
 - ▶ Duplicate meds
 - ▶ Duplicate tests
- 

Alert for Zoster Vaccine

The screenshot displays the EpicCare EMR interface for a patient named Test, Bpatrinity. The patient's information includes Age 81 y.o., Sex F, DOB 1/1/1930, MRN 9950019, Allergies: Not on file (None), and Insurance: (None). The patient is currently inactive. The interface shows a visit on 9/21/2011 with Provider 01 Epiccare, MD for Procedure visit. The main content area displays the patient's chart, including Chief Complaint (None), Vital Signs (None Taken), and other vital signs (Never reviewed). A yellow alert box is prominently displayed, stating: "This patient meets criteria for the Zoster vaccine: immunocompetent patient, Age > 60 years. CONTRAINDICATIONS for vaccination include the following: 1) pregnancy, 2) immunosuppressed states including HIV, 3) certain malignancies and immunosuppressive therapies, 4) history of anaphylaxis to neomycin or gelatin. (HERPES ZOSTER VACCINE list satisfied: Not on file)." The alert provides options to "Add ICD Modifier: Patient is a non-candidate for Zoster Vaccination", "Override: HERPES ZOSTER VACCINE", "Postpone: HERPES ZOSTER VACCINE", and "Open SmartSet Herpes Zoster (Shingles) Immunization preview". The alert also includes "Accept" and "Cancel" buttons. The interface also shows sections for Progress Notes, SmartSets, Problem List, and Visit Diagnoses.

Best Practice Advisory – Close Up

BestPractice Advisory - Test,Bpatrinity

⚠ This patient meets criteria for the Zoster vaccine: Immunocompetent patient, Age > 60 years. CONTRAINDICATIONS for vaccination include the following: 1) pregnancy, 2) immunocompromised states including HIV, 3) certain malignancies and immunosuppressive therapies, 4) history of anaphylaxis to neomycin or gelatin.

(HERPES ZOSTER VACCINE last satisfied: Not on file)

- Add HM Modifier: Patient is a non-candidate for Zoster Vaccination
- ▶ [Override](#): HERPES ZOSTER VACCINE
- ▶ [Postpone](#): HERPES ZOSTER VACCINE
- Open SmartSet: Herpes Zoster (Shingles) Immunization [preview](#)


Accept

Cancel

BPA Opens to OrderSet


▼ **Immunization Order**


▶ **HERPES ZOSTER IMMUNIZATION** 3 of 3 selected

- zoster vaccine live, PF, (ZOSTAVAX) 19,400 unit injection
 0.65 ml injected subcutaneously in the deltoid, one time, Disp-1 Each, R-0, Print
- VARICELLA ZOSTER VACCINE SQ
 [Details](#)
- Need for prophylactic vaccination and inoculation against other specified disease [V05.8] [edit](#)

▼ **Additional SmartSet Orders** Add Order

Click the Add Order button to add an order in this section

 Associate Primary Dx New Dx Providers Next

 Pharmacy No Selected Pharmacy  Remove  Sign

⌘ Restore Close F9 ↑ Previous F7 ↓ Next F8

Do CDSS help?

So what?

Isn't the CDSS in each EHR the same?

Are all houses the same?



- ▶ Basic frame (no wiring)



- ▶ Electric wiring and sound system



- ▶ Basic electric wiring



- ▶ Electric wiring, sound, computer and security system

Its the same for EHRs



- ▶ Knowledge, Tracking



- ▶ Knowledge, Tracking, Directed Care, Alerts




- ▶ Knowledge, Tracking, Directed Care



- ▶ Knowledge, Tracking, Directed Care, Alerts, Reminders, Recommendation

Take Aways

- ▶ Not all EHRs are built the same
 - ▶ Know your CDSS
 - Ask questions
 - What does it do and NOT do?
 - ▶ READ and pay attention
 - ▶ If it doesn't make sense, tell someone – sometimes there is a bug
- 

Take Aways

- ▶ If you are building an EHR
 - Provide information rapidly, speed is everything
 - Provide information at POC and allow clinician to act on it
 - Simple is better
 - Don't interrupt workflow if you don't have to
 - Monitor the response to the CDSS
 - Ask for feedback and optimize
 - Maintain your database

**My EHR has Decision Support.
That means I better pay attention!**

