Agency for Healthcare Research and Quality
Advancing Excellewnce in Health Care

Duke University

Context-Aware Knowledge Delivery into Electronic Health Records

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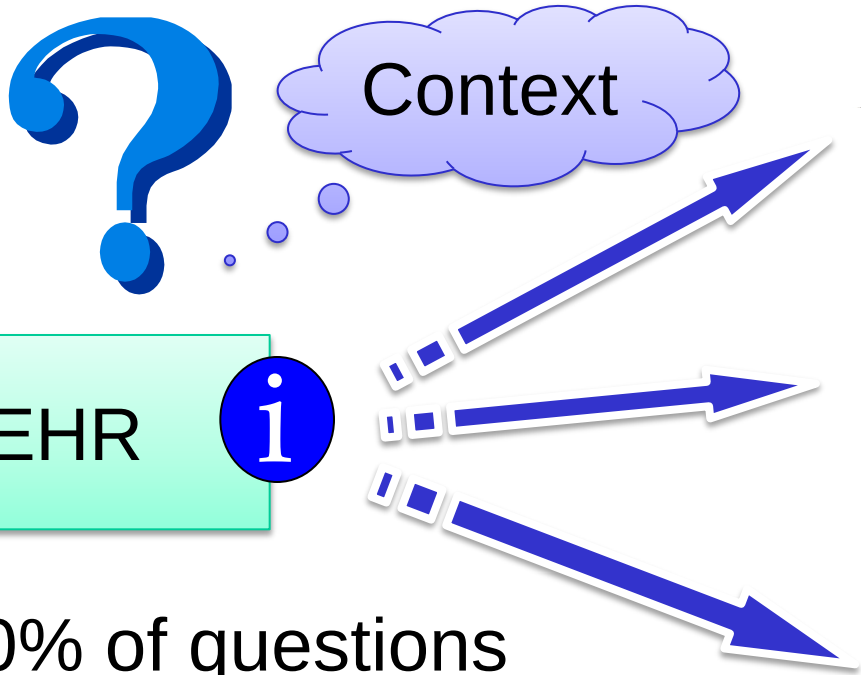
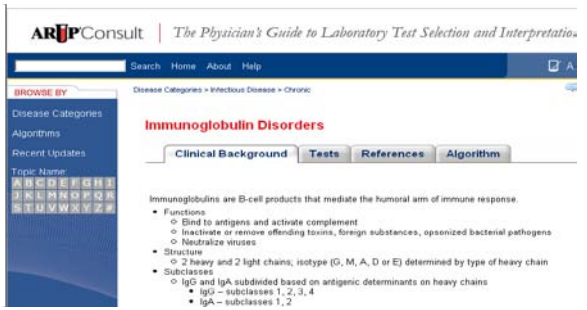
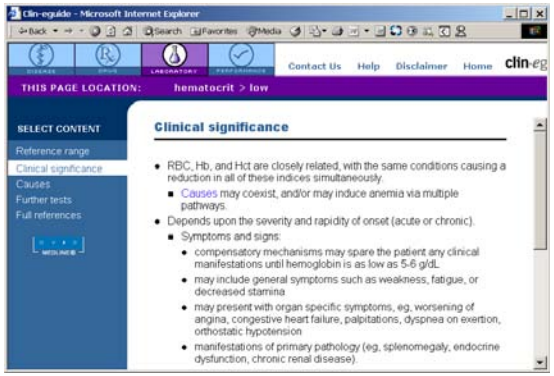
June 3rd, 2010

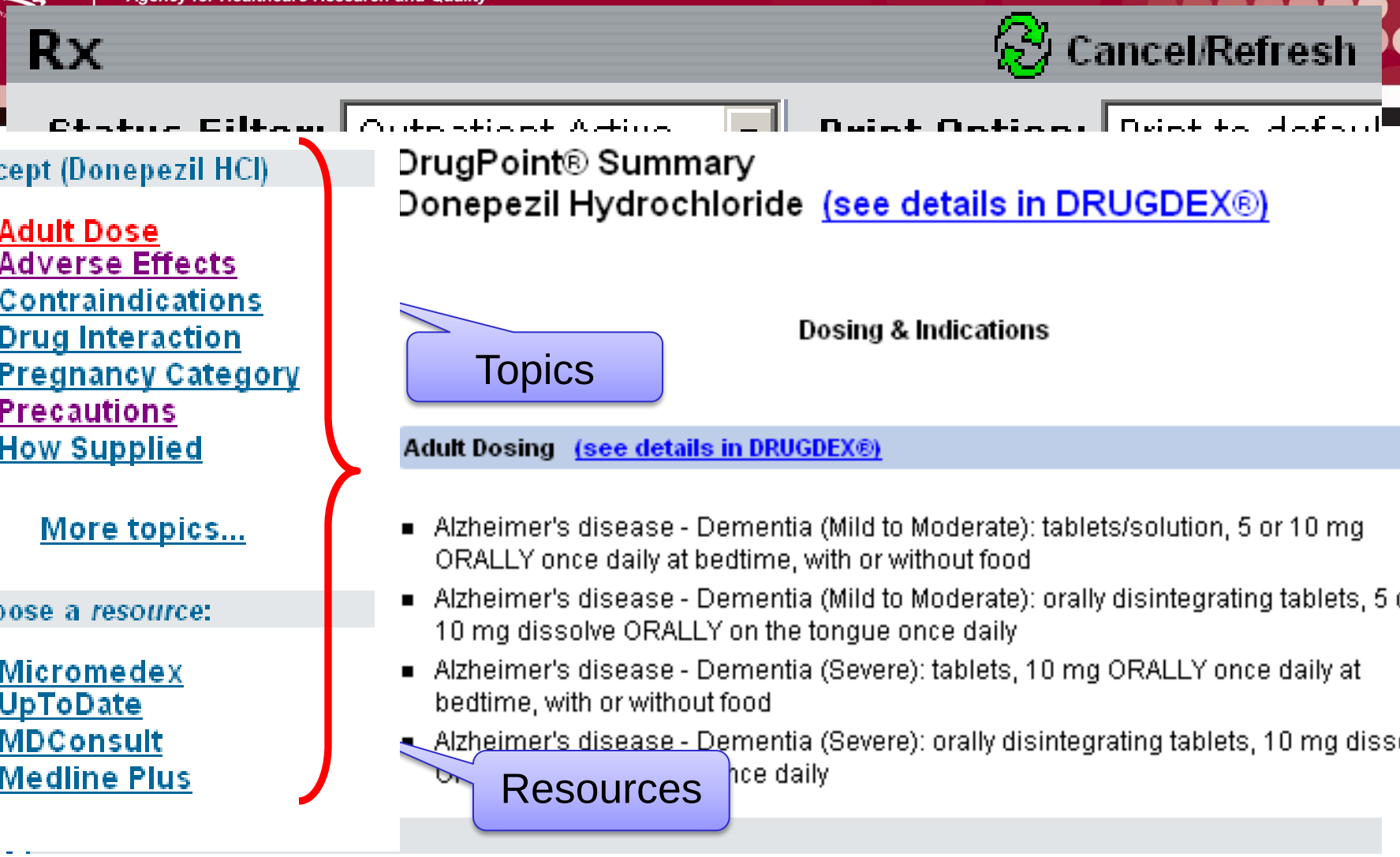
2 questions out of every
3 patients seen (Covell, 1985)



> 50% of questions
left unanswered (Ely, 2005)






Rx
Cancel/Refresh
Aricept (Donepezil HCl)
Adult Dose
Adverse Effects
Contraindications
Drug Interaction
Pregnancy Category
Precautions
How Supplied
More topics...
Choose a resource:
Micromedex
UpToDate
MDConsult
Medline Plus
DrugPoint® Summary
Donepezil Hydrochloride (see details in DRUGDEX®)
Dosing & Indications
Adult Dosing (see details in DRUGDEX®)
Alzheimer's disease - Dementia (Mild to Moderate): tablets/solution, 5 or 10 mg ORALLY once daily at bedtime, with or without food
Alzheimer's disease - Dementia (Mild to Moderate): orally disintegrating tablets, 5 or 10 mg dissolve ORALLY on the tongue once daily
Alzheimer's disease - Dementia (Severe): tablets, 10 mg ORALLY once daily at bedtime, with or without food
Topics
Resources

Preliminary work

INFOBUTTONS

n-eguide Guideline: hematocrit; low

dated: Feb 12, 2009

ference range
nical significance
uses
ther tests
thors
des
l references

Clinical significance

Overview

- Hematocrit (Hct) is a measure of blood volume occupied by red blood cells (RBC).
  - Indirectly measures red blood cell mass.
- Hct, erythrocytes, and blood hemoglobin are closely related, with the same conditions causing decreas simultaneously.

Interpretation

- Hct, erythrocytes, and Hb should be interpreted together.
  - In general, Hct is used to evaluate high numbers of RBC (polycythemia) and Hb is used to evaluate l (anemia).
- Anemia is categorized as:
  - increased RBC destruction (eg, hemolysis, acute or chronic blood loss)
    - Reticulocyte index is >2% indicating adequate bone marrow response to anemia.
  - decreased RBC production (eg, iron deficiency, folate deficiency).
    - Reticulocyte index is <2% indicating inadequate bone marrow response to anemia.
- Factors causing spuriously decreased levels include:
  - recumbent position (5% lower values)
  - age 2-4 months (see reference ranges for normal values by age)

Azithromycin
Female
81 years
User: MD
Order entry

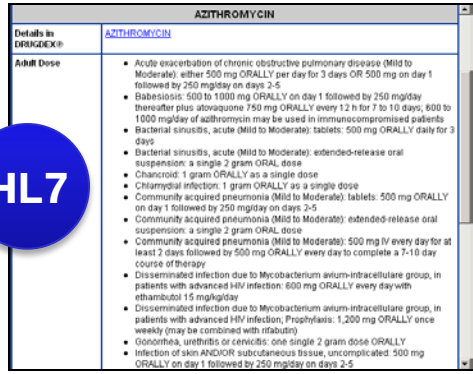
Electronic Health Record

i

HL7

Infobutton Manager

HL7


AZITHROMYCIN

Details in DRUGDEX®: AZITHROMYCIN

Adult Dose

- Acute exacerbation of chronic obstructive pulmonary disease (Mild to Moderate): either 500 mg ORALLY per day for 3 days OR 500 mg on day 1 followed by 250 mg/day on days 2-5
- Babesiosis: 500 to 1000 mg ORALLY on day 1 followed by 250 mg/day thereafter plus atovaquone 750 mg ORALLY every 12 h for 7 to 10 days; 600 to 1000 mg/day of azithromycin may be used in immunocompromised patients
- Bacterial sinusitis, acute (Mild to Moderate): tablets: 500 mg ORALLY daily for 3 days
- Bacterial sinusitis, acute (Mild to Moderate): extended-release oral suspension: a single 2 gram ORAL dose
- Chancroid: 1 gram ORALLY as a single dose
- Chlamydial infection: 1 gram ORALLY as a single dose
- Community acquired pneumonia (Mild to Moderate): tablets: 500 mg ORALLY on day 1 followed by 250 mg/day on days 2-5
- Community acquired pneumonia (Mild to Moderate): extended-release oral suspension: a single 2 gram ORAL dose
- Community acquired pneumonia (Mild to Moderate): 500 mg IV every day for at least 2 days followed by 500 mg ORALLY every day to complete a 7-10 day course of therapy
- Disseminated infection due to Mycobacterium avium-intracellulare group, in patients with advanced HIV infection: 600 mg ORALLY every day with ethambutol 15 mg/kg/day
- Disseminated infection due to Mycobacterium avium-intracellulare group, in patients with advanced HIV infection; Prophylaxis: 1,200 mg ORALLY once weekly (may be combined with rifabutin)
- Gonorrhea, urethritis or cervicitis: one single 2 gram dose ORALLY
- Infection of skin AND/OR subcutaneous tissue, uncomplicated: 500 mg ORALLY on day 1 followed by 250 mg/day on days 2-5


Overview
Adult Dose
Pediatric Dose
Contraindications
Adverse Effects

More topics...

Choose a *resource*:

Micromedex
UpToDate
MDConsult
Medline Plus

Micromedex
Adult Dose
Azithromycin
Female
81 years

TEST, JUDY **Room:** **DOB:** 05/06/1976 **Age:** 31Y **Sex:** F

Problems

Filter: Active Problems

Hereditary Nephritis

- [x] Overview

Choose a resource:

- [x] Genetics Home Reference (GHR)
- Gene Reviews
- UpToDate
- MDConsult
- PubMed

Have you found the answer to your question?

- Yes
- No

What impact has the content had on your patient care decision?

- Reinforced previous decision
- Changed my decision
- Did not affect my decision

Submit Feedback

Genetics Home Reference

Your Guide to Understanding Genetic Conditions

About | Site Map | Contact Us

Search

A service of the U.S. National Library of Medicine®

Home | Conditions | Genes | Chromosomes | Handbook | Glossary | Resources

Genetic Conditions >

Alport syndrome

Print version

On this page: Description | Genetic changes | Inheritance | Treatment | Additional information | Other names | Glossary definitions

- Related Genes
- References
- Quick links to this topic

NIH Publications
National Institutes of Health

MedlinePlus
Health information

Educational resources
Information pages

Patient support
For patients and families

Reviewed February 2006

What is Alport syndrome?

Alport syndrome is a genetic condition characterized by the progressive loss of kidney function and hearing. Alport syndrome can also affect the eyes. The presence of blood in the urine (hematuria) is almost always found in this condition. Many people with Alport syndrome also exhibit high levels of protein in their urine (proteinuria). As this condition progresses, the kidneys become less able to function properly and kidney failure results. Hearing loss is a common feature of Alport syndrome, but the abnormalities in the eyes seldom lead to loss of vision.

Diabetes Mellitus, Type 2

- Overview
- Diagnosis
- Etiology
- Prognosis
- Therapy
- Patient education

Choose a resource

- IHC Care Process Models
- UpToDate
- Clineguide
- MDConsult
- PubMed

Have you found the answer to your question?

- Yes
- No

What impact has the content had on your patient care decision?

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MD CONSULT

Intermountain Health Care, I

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Home | Books | Journals | The Clinics | Patient Education | Drugs | Guidelines | Images | News | CME

Search Patient Education for Diabetes Mellitus Search

You are here: Home > Patient Education > Diabetes Mellitus: Type 2

Email to Colleague | Print Versi

Diabetes Mellitus: Type 2

What is type 2 diabetes mellitus?

Type 2 diabetes is a disorder that happens when your body does not make enough insulin or is unable to use insulin properly. The inability to use your insulin is called insulin resistance. This problem with insulin causes the level of sugar in your blood to become abnormally high.

Custom Header

Intermountain Health Care, Inc.

Generic Edition
Physicians Division
36 South State Street #2100
Salt Lake City, Utah 84111
000-000-0000

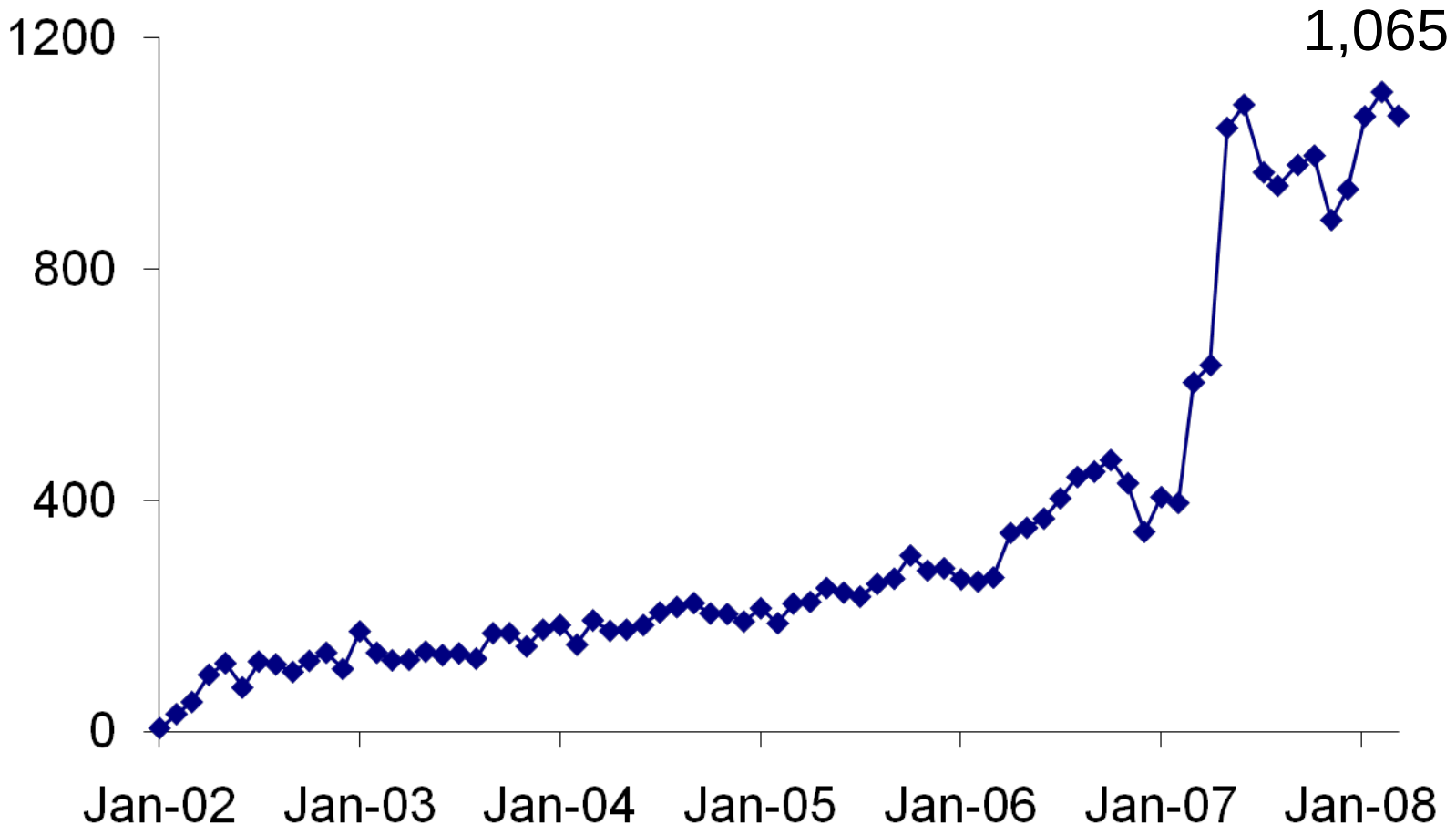
When you digest food, your body breaks down much of the food into sugar (glucose). Your blood carries the sugar to the cells of your body for energy. The pancreas gland makes insulin, which helps move the sugar from the bloodstream into the cells.

When your body does not have enough insulin or cannot use insulin properly, sugar cannot get into your cells. Sugar builds up in your blood. Too much sugar in your blood can cause many problems. These problems can be life-threatening if they are not treated. However, proper treatment can control your blood-sugar level.

Stage 2 Hypertension SBP ≥160 or DBP ≥100	■ **2-drug combinations** for most (usually thiazide-type diuretic and ACEI, ARB, BB, CCB, or combination)

Stage 2 Hypertension SBP ≥160 or DBP ≥100	ACEI, ARB, BB, CCB)

Infobutton users



Impact of Infobuttons

- Maviglia et al., 2006
  - Answers to 84% of questions
  - 15% of sessions: decision enhancement
- Del Fiol et al., 2008
  - Answers to 87% of questions
  - Average session time: 35 seconds
  - 62% of sessions: decision enhancement or learning
- Slow usage uptake in both studies

Limitations of Infobutton Approach to Knowledge Integration

Opportunities for use are limited by:

- Information need is recognized…
- …while using an EHR system…
- …an infobutton is available…
- …clinician believes it is worth to pursue an answer…
- …and the clinician decides to click.

K01 Career Development Project

CAN WE OVERCOME THE LIMITATIONS?

Career development components

- Mentored research
  - Eric Peterson, MD, MPH
  - David Lobach, MD, PhD
  - James Cimino, MD
- Duke Clinical Research Training Program
- Standards development at HL7

Research Plan

Design, develop, and evaluate alternate knowledge integration method

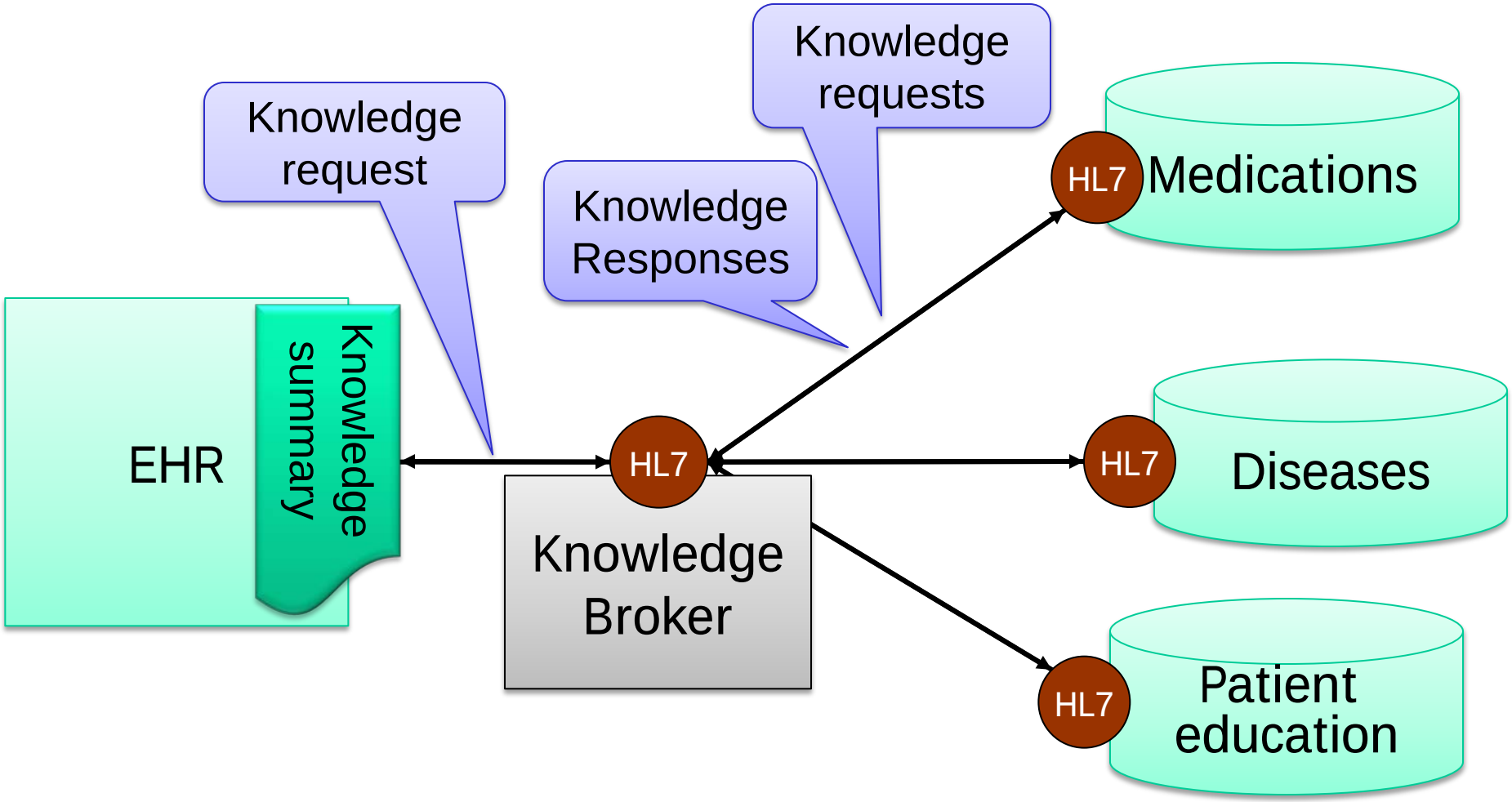
Aim1: Build knowledge base

- Systematic review of clinician knowledge needs
- Focus groups & in-depth interviews
- Chronic conditions and new models of care

Research Plan

- Aim 2: Develop infrastructure
  - Standards-based Web services
  - Open-source distribution model
- Aim 3: pilot implementation and evaluation at Medical Home site
  - Mixed-method observational study
  - Log analysis
  - Critical incident analysis

Knowledge Broker



Conditions

Hypertension choice of antihypertensive AHA/ACC guideline JNC7 guideline

Treatment in diabetes: blood pressure target < 120 mm Hg reduce nonfatal stroke compared to target < 140 mm Hg losartan and enalapril each associated with reduced retinopathy progression (N Engl J Med 2009 Jul 2) **details**

Diabetes diabetic nephropathy glycemic goals lipid-lowering insulin

Consensus algorithm issued by the ADA lists metformin as the initial drug therapy of choice for the management of type 2 diabetes mellitus. **details**

Medications

Enalapril contraindications patient education how supplied interactions

Dose

Adults: Initially, 2.5—5 mg PO once daily. In patients with hyponatremia, hypovolemia, moderate-severe CHF, renal dysfunction (ie., Scr > 1.6 mg/dl), or in those receiving diuretics, an initial dose of 2.5 mg is recommended. **details**

Side effects

agranulocytosis, anaphylactoid reactions, angioedema, aplastic anemia, azotemia, cholestasis, hepatic failure, hyperkalemia, hypotension, jaundice, neutropenia, orthostatic hypotension. **details**

Metformin contraindications patient education how supplied interactions

Dose:

Initially, 500 mg PO twice daily or 850 mg PO once daily, given with meals. Dosage increases should be made in increments of 500 mg weekly or 850 mg every 2 weeks, up to 2000 mg/day, given in divided doses. Patients can also be titrated from 500 mg PO twice daily to 850 mg PO twice daily after 2 weeks. Maximum is 2550 mg/day. **details**

Side effects

anemia, anorexia, diarrhea, dysgeusia, dyspepsia, flatulence, hypoglycemia, hypotension, lactic acidosis, malaise, metabolic acidosis, metallic taste, myalgia, nausea, vitamin B12 deficiency, vomiting, weight loss. **details**

Information needs systematic review (Aim 1)

- Research questions
  - Who, how often, what kind, in what context?
  - Are they being met, how, how often?
- Current status
  - PubMed search strategy – 8,860 citations
  - Abstract screening – 750 citations
- Likely to be the first systematic review on this topic

Contributions of knowledge integration

- Evidence of effectiveness, efficiency, and usefulness
  - Quick answers to most medication questions
  - Clinician self-reported positive impact
  - Increasing use trends
  - Widespread support among knowledge resources
- Challenge: higher use and adoption
  - Wide dissemination via open-source, standards-compliant Web service
  - Higher use through alternate integration approach

Thank you

Questions?

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