UpToDate

Understanding Clinical Decision Support

Janet Broome - Sales Manager, UK, Ireland and Italy
Introduction

- Why Point of Care/Clinical Decision Support
- What is UpToDate - Features and Benefits
- Research Studies
- Myths and Misconceptions
- UpToDate in the UK
- WIIFM - UpToDate and NHS Library Services
Why CDS? Doctors Have Clinical Questions

Unanswered clinical questions impact patient management decisions

Approximately 2 out of 3 clinical encounters generate a question

Physicians have approximately 11 clinical questions a day

40% of questions get answered

Many Clinical Questions Go Unanswered

Answering all clinical questions could change 5 to 8 patient management decisions each day.
Where do Clinicians go when they have questions?

Recent HSJ Webinar impact of CDS on Patient Safety - Dr Peter Williams - St Helen’s and Knowsley

Interviews with 15 Junior Doctors

- Ask a colleague
- Internet - Dr Google
- Use Local Trust Guidelines
- NICE Guidelines
- Use Oxford Handbooks
- Question - what are your Junior Doctors and Consultants using to answer clinical questions?
Features of CDS systems that are correlated with improving patient care*

- Integrated into the workflow
- Electronic based
- Provide decision support at the time and location of care rather than prior to or after the patient encounter
- Provides recommendations for care, not just assessments

Features of CDS

• Comprehensive
• Evidence Based
• Easy to Use
• Trusted
What is UpToDate?

- The oldest and most established CDS System (22 years)
- Electronic Evidence-Based Clinical Decision Support System written by Physicians for Clinicians and Healthcare professionals to:
  - answer clinical questions - quickly and accurately
  - improve clinical knowledge
  - improve patient care
What Is UpToDate?

- **CDS widely used around the Globe**
  - 700,000+ clinicians in 158 countries use UpToDate to improve care
  - 90% of academic medical centers in US, 95% in Benelux, 95% in Germany, 86% in Japan
  - Part of clinical workflows in over 25,000 institutions and practices worldwide
  - Over 100 hospitals in the UK

- **Depth and breadth**
  - 5,100+ authors, editors and peer reviewers from 51 countries (250 of these are based in the UK)
  - 50 physician editors on staff
  - 10K topics over 20+ specialties, 9K evidenced-based, graded recommendations
  - 20 million topics accessed each month
  - Editorial independence
Ease of Use

UpToDate®

New Search | Patient Info | What's New | Calculators | CME | My Account

New Search:

Search in another language

Drug Interactions
Graded Summaries and Treatment Recommendations

- Grade System is an international system
- UpToDate has been working with Gordon Guyatt - McMaster University since 2000
- We are part of the Grade Working Group (Grading of Recommendations Assessment, Development and Evaluation)
- Graded Recommendations have been part of UTD since 2005
Graded Recommendation

9,000 Graded Recommendations in UpToDate

Management of hypertension in pregnant and postpartum women

TOPIC OUTLINE

INTRODUCTION
GENERAL APPROACH
- Antihypertensive therapy
  - Options
    - Methyl dopa
    - Beta blockers
    - Calcium channel blockers
    - Hydralazine
    - Thiazide diuretics
    - Clonidine
  - Drugs to avoid in pregnancy
    - ACE inhibitors, ARBs, direct renin inhibitors

SUMMARY & RECOMMENDATIONS

INDICATIONS FOR ANTIHYPERTENSIVE THERAPY

- We suggest avoiding antihypertensive therapy for mild to moderate hypertension associated with preeclampsia (Grade 2B). There are no proven benefits to mother or fetus, other than reduction in risk of severe maternal hypertension, and we are concerned about potential adverse fetal effects. (See General approach above and Indications for antihypertensive therapy above.)

- We recommend treatment of severe hypertension (Grade 1B). The goal of treatment is to prevent maternal cerebrovascular complications. We initiate antihypertensive therapy in adult women at systolic pressures ≥150 mmHg and diastolic blood pressures ≥100 mmHg. We initiate treatment at a lower threshold in younger women whose baseline blood pressure was low, and in those with symptoms that may be attributable to elevated blood pressure (e.g., headache, visual disturbances, chest discomfort).
Two Parts to the Grade

Strength of the Recommendation

Grade 1B recommendation

A Grade 1B recommendation is a strong recommendation, and applies to most patients. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.

<table>
<thead>
<tr>
<th>Explanation:</th>
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<tr>
<td>A Grade 1B recommendation is a strong recommendation. It means that we believe that if you follow the recommendation, you will be doing more good than harm for most, if not all of your patients.</td>
</tr>
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</table>

Grade B means that the best estimates of the critical benefits and risks come from randomized, controlled trials with important limitations (e.g., inconsistent results, methodologic flaws, imprecise results, extrapolation from a different population or setting) or very strong evidence of some other form. Further research (if performed) is likely to have an impact on our confidence in the estimates of benefit and risk, and may change the estimates.

**Recommendation grades**
1. Strong recommendation: Benefits clearly outweigh the risks and burdens (or vice versa) for most, if not all, patients
2. Weak recommendation: Benefits and risks closely balanced and/or uncertain

**Evidence grades**
A. High-quality evidence: Consistent evidence from randomized trials, or overwhelming evidence of some other form
B. Moderate-quality evidence: Evidence from randomized trials with important limitations, or very strong evidence of some other form
C. Low-quality evidence: Evidence from observational studies, unsystematic clinical observations, or from randomized trials with serious flaws
Practice Changing Updates - What’s New

Practice Changing Updates

Authors
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David M Rind, MD

Disclosures
All topics are updated as new evidence becomes available and our peer review process is complete. Literature review current through: Dec 2013. | This topic last updated: Jan 14, 2014.

INTRODUCTION — This section highlights selected specific new recommendations and/or updates that we anticipate may change usual clinical practice. Practice Changing Updates focus on changes that may have significant and broad impact on practice, and therefore do not represent all updates that affect practice. These Practice Changing Updates, reflecting important changes to UpToDate over the past year, are presented chronologically, and are discussed in greater detail in the identified topic reviews.

GASTROENTEROLOGY AND HEPATOLOGY (DECEMBER 2013)
Sofosbuvir and simeprevir for genotype chronic 1 hepatitis C infection

- Most patients with chronic genotype 1 HCV infection who are candidates for and desire therapy should be treated with peginterferon, weight-based ribavirin, and a direct-acting antiviral (DAA). For these patients, we recommend the DAAs sofosbuvir or simeprevir rather than telaprevir or boceprevir (Grade 1B).
Management of hypertension in pregnant and postpartum women

INTRODUCTION

There are four major hypertensive disorders that occur in pregnant women:

- **Preeclampsia-eclampsia** — Preeclampsia refers to the syndrome of new onset of hypertension and either proteinuria or edema after 20 weeks of gestation in a previously normotensive woman [1]. Eclampsia is diagnosed when seizures have occurred.
Patient Information

• Over 1,500 Patient Information Topics
• Non-Clinical - (Basic)
• Clinical - (Beyond the Basics)
• Patient information topics are written by the same authors who write the topics - in some CDS systems patient information contradicts what is in the topic
• Patient information topics can be e-mailed out to patients
• Beyond the basics is used extensively in the Medical Schools to give a good overview of the condition
Graphics Database

• A Graphics Database of over 25,000 Graphics including tables, figures, images and videos
• These can be downloaded into PowerPoint and can be used in creating Course Packs and Training Materials
• Our authors personally select graphics to illustrate and support the topic findings
Eisenmenger’s syndrome anatomy and physiology

- Pulmonary arteriole
  - Medial hypertrophy
  - Intimal hyperplasia
  - Lumen

- Aorta
  - Right pulmonary artery
  - Left pulmonary artery
  - Pulmonary trunk
  - Left atrium
Editorial Process

• UpToDate has a rigorous editorial three tier process
• Author, Editor and Section Editors
• We use a blind peer review process
• Always list who has authored the topic

Management of hypertension in pregnant and postpartum women

Author
Phyllis August, MD, MPH

Section Editors
Charles J Lockwood, MD
George L Bakris, MD

Deputy Editor
Vanessa A Barss, MD
Editorial Process

- Our 5,100 authors, editors worldwide review over 450 high impact factor titles and open access titles synthesize the findings, and write original topics
- Many topics have 60 plus reviewed articles
- As standard for each topic we review BMJ, Lancet, NEJM and JAMA and specialist titles for the specialty
- Link to UpToDate Reviewed Journals
- http://www.uptodate.com/home/journals-reviewed-uptodate
• 140 Medical Calculators which can be searched or browsed

Calculator: DVT probability: Wells score system

Clinical Findings
- □ Paralysis, paresis or recent orthopedic casting of lower extremity (1 point)
- □ Recently bedridden (more than 3 days) or major surgery within past 4 weeks (1 point)
- □ Localized tenderness in deep vein system (1 point)
- □ Swelling of entire leg (1 point)
- □ Calf swelling 3 cm greater than other leg (measured 10 cm below the tibial tuberosity) (1 point)
- □ Pitting edema greater in the symptomatic leg (1 point)
- □ Collateral non varicose superficial veins (1 point)
- □ Active cancer or cancer treated within 6 months (1 point)
- □ Alternative diagnosis more likely than DVT (Baker's cyst, cellulitis, muscle damage, superficial venous thrombosis, post phlebitic syndrome, inguinal lymphadenopathy, i
Drug Interactions Database

Analyses the drug interactions prescribed drugs, over the counter drugs and herbal medicines

Lexicomp® Lexi-Interact™

Lookup
Enter item name to lookup.

Analyze Now List

☑ Aspirin
☑ Green Tea
☑ Lipitor

Display complete list of interactions for an individual item by clicking item name.
Add another item(s) [Lookup] to Analyze for potential interactions between items in the list.
Remove item from the list by clicking the check mark next to the item name.

Lexi-Comp Online™ Interaction Analysis

Customize Analysis

Only interactions at or above the selected risk rating will be displayed. A –
View interaction detail by clicking on link.

Aspirin
[D] Green Tea (Herbs (Anticoagulant/Antiplatelet Properties))

Green Tea
[D] Aspirin (Salicylates)

Lipitor (AtorvaSTATin)
No interactions identified with others in the selection list.

Date January 17, 2014

Disclaimer Readers are advised that decisions regarding drug therapy must be based on the independent judgment of the treating physician, in light of the individual patient's clinical circumstances, and the unique treatment needs and preferences of the individual patient.

Wolters Kluwer Health
Selected International Guidelines

- Include Selected International Guidelines

Management of hypertension in pregnant and postpartum women

RECOMMENDATIONS OF SELECTED NATIONAL AND INTERNATIONAL SOCIETIES

- The Society of Obstetricians and Gynaecologists of Canada (SOGC) guideline recommends anti-hypertensive treatment for new onset systolic blood pressure >110 mmHg or diastolic blood pressure >110 mmHg, with goal blood pressure <160/110 mmHg [39]. For women with chronic hypertension without co-morbid conditions, antihypertensive drug therapy should be used to keep systolic blood pressure at 130 to 150 mmHg and diastolic blood pressure at 80 to 90 mmHg.

- The National Institute for Health and Clinical Excellence (NICE) recommends that for pregnant women with uncomplicated chronic hypertension, blood pressure lower than 150/100 mmHg [40]. In women with gestational hypertension or preeclampsia, treatment is initiated at blood pressure: with the goal of systolic blood pressures <150 mmHg and diastolic blood pressures of 80 to 100 mmHg. They also recommend use of low dose; from 12 weeks of gestation to reduce the risk of preeclampsia. (See “Prevention of preeclampsia” section on “Approach to therapy”.)

- The American College of Obstetricians and Gynecologists (ACOG) Task Force on Hypertension in Pregnancy recommends treatment of persisting hypertension when systolic pressure is ≥160 mmHg or diastolic pressure is ≥105 mmHg and suggests avoiding antihypertensive therapy in women with pressures below this level and no evidence of end-organ damage [1]. They suggest labetalol, nifedipine, or methyldopa as first-line therapy. They avoiding angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, renin inhibitors, and mineralocorticoid receptor antagonists. Th
CPD and UpToDate

• UHL used CME Reflection Page for CPD
## Stuart Glover Log for December 2012

**AMA PRA Category 1 Credit™**

(AAFP Prescribed credit, AAP credit, AAPA equivalent credit, ACEP credit, ACOG cognate credit, AOA Category 2-B credit, DFP-Austria, RCPSC, CPD-Ireland, SMG)

- Verify your log and indicate for each search how you applied the information to practice.
- Click SAVE when you are done.
- Search sets that are not complete are highlighted in green.
- You may return to this log at any time to complete additional credits.

<table>
<thead>
<tr>
<th>Date</th>
<th>Source</th>
<th>Search terms/Clinical question</th>
<th>Topic(s) Reviewed</th>
<th>I searched for information about (Please check your primary response)</th>
<th>How did you apply the information to your practice? (Please check your primary response)</th>
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<td>WEB (Leicester NHS Trust)</td>
<td>brian tumor children</td>
<td>Drug prescribing for older adults&lt;br&gt;Overview of the management of central nervous system tumors in children</td>
<td>☐ Clinical manifestations&lt;br&gt;☐ Diagnosis&lt;br&gt;☒ Treatment&lt;br&gt;☐ Prognosis&lt;br&gt;☐ Prevention&lt;br&gt;☐ Other</td>
<td>☐ This modified my plan&lt;br&gt;☒ This reinforced my plan&lt;br&gt;☐ I need more information</td>
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<td>Dec 14 2012 09:38:34AM GMT</td>
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<td>bronchiectasis</td>
<td>Clinical manifestations and diagnosis of bronchiectasis in adults&lt;br&gt;Clinical manifestations and diagnosis of bronchiectasis in adults&lt;br&gt;Treatment of bronchiectasis in adults</td>
<td>☒ Clinical manifestations&lt;br&gt;☐ Diagnosis&lt;br&gt;☐ Treatment&lt;br&gt;☐ Prognosis&lt;br&gt;☐ Prevention&lt;br&gt;☐ Other</td>
<td>☒ This modified my plan&lt;br&gt;☒ This reinforced my plan&lt;br&gt;☐ I need more information</td>
<td>0.5</td>
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Widespread, global usage of UpToDate has lead to it being most researched and studied CDS.

Over 30 studies
Investigators surveyed doctors at healthcare organizations in North West England which subscribe to UpToDate.

Respondents were asked to describe a scenario in which they had used UpToDate, and to identify benefits, if any, associated with that scenario.

More than 90% of the 239 respondents who had used UpToDate identified at least one benefit:

- UpToDate reduced treatment delays (57%)
- UpToDate meant they avoided unnecessary diagnostic tests (52%)
- UpToDate reduced delays in diagnosis (48%)
- UpToDate changed their treatment decision (39%)
- UpToDate reduced the time to discharge (28%)

Respondents to a 2012 subscriber survey in the UK shared the following:

- UpToDate helps prevent errors: 71%
- UpToDate has led to more appropriate diagnostic testing: 80%
- UpToDate has led to more efficient patient management: 84%
- UpToDate improves the quality of care I provide to my patients: 91%
Solucient (1) studied the impact of UpToDate on length of stay, patient complications and patient safety (2).

Impact:
- Significantly shortens lengths of stay
- Significantly lowers complication rates
- Significantly lowers adverse outcome rates

(1) Solucient maintains the nation’s largest healthcare database, comprised of more than 26 million discharges per year from 2,900 hospitals.
(2) Bonis PA. Association of a clinical knowledge support system with improved patient safety, reduced complications and shorter length of stay among Medicare beneficiaries in acute care hospitals in the US. Int J Med Inform 2008; 77:745.
The more UpToDate is used the better the outcomes

UpToDate Usage Levels and Impact on Patient Complications, Patient Safety, and length of stay

Improvement in Risk Percent

- Complications
- Patient Safety
- Length of stay

UpToDate Topic Reviews Per Week

Int J Med Inform 2008;77:745
Researchers at Harvard University Find UpToDate Associated with Improved Outcomes

Use of UpToDate Associated with:

**Improved Quality**
*Every condition on Hospital Quality Alliance Metrics*

**Shorter Lengths of Stay**
*372,000 days over 1 year*

**Lower Mortality Rates**
*11,500 lives over 3 years*
Researchers at Singapore’s National University Hospital report that bedside use of UpToDate led to changes in patient care decisions more than one-third of the time.

The Total Economic Impact Of UpToDate’s Clinical Decision Support System For Healthcare Institutions

A Case Study Of Salford Royal NHS Foundation Trust
• Findings were ROI within first three months in terms of cost savings in terms of reduced diagnostic tests efficiencies

Table 1
UpToDate: One-Year, Risk-Adjusted Benefits, Costs, And ROI Summary

<table>
<thead>
<tr>
<th>ROI</th>
<th>Payback period</th>
<th>Total benefits</th>
<th>Total costs</th>
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<tr>
<td>402%</td>
<td>Within 3 months</td>
<td>£123,958</td>
<td>(£24,678)</td>
</tr>
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</table>

Source: Forrester Research, Inc.
Myths and Misconceptions

• We are not up-to-date
• Too American
• We do not support Nice Guidelines
• Drug Information
• Mobile app
Average time of updating of 60 topics (randomly selected) as of July 2011

Ranging from 3.5 to 29 months

- **DynaMed**: November 23, 2010
- **MICROMEDEX® 2.0**: November 17, 2010
- **BestPractice**: August 23, 2010
- **pier**: June 4, 2010
- **UpToDate**: April 2, 2010
- **eMedicine**: March 3, 2010
- **Essential Evidence PLUS**: December 6, 2009
- **ClinicalEvidence**: May 23, 2009
- **First CONSULT**: October 2, 2008
Continuous Publishing

- UpToDate implemented continuous publishing in 2012 - update 5 days a week
- Before that Practice Changing UpDates we updated immediately.
158 countries use UpToDate to improve care

Part of clinical workflows in over 25,000 institutions and practices worldwide

Over 100 hospitals in the UK

Have over 250 contributors from the UK

If you were to survey departments within your hospital - within their top 10 journals American journals would be cited.

Representation from UK Library and Clinical Communities
We support selected guidelines from international bodies
CAG has raised this with us
A number of Trusts use UTD to write their local guidelines in conjunction with NICE Guidelines
Drug Information

- Dosing is US
- This has been managed in over 100 Trusts by training
- We are working with a group of UK Customers at the moment on the feasibility of incorporating BNF into UpToDate
"One of my favorite things about using the UpToDate app is the access to Lexicomp, the Wolters Kluwer Health drug database. I had a patient the other day who was reporting a very unusual symptom that he was claiming was a side effect of an HIV medication he was on," she said. "I looked it up in our local BNF (British National Formulary) system and the information was very generic. I then looked it up on UpToDate and was able to show that in fact, he was right. UpToDate noted that 1-6% of patients experienced headaches while using this medication. With UpToDate, getting an answer was really quick and I was able to show the patient."

Dr Effrossyni Gkrania-Klotsas, infectious diseases consultant at Addenbrooke’s Hospital, Cambridge University Hospitals NHS Foundation Trust,
Mobile App

• UHL are our Beta Test Partner for the institutional mobile app (UTDA)
• We currently offer a mobile optimised version “app like” and designed for ward rounds
• Launching the Mobile App for institutions Q2 and your UTD account manager will be contacting you regarding an implementation plan
• Many Trusts are not mobile ready
• Have no mobile policy
• This is an opportunity for librarians to promote their skills and support
• Implemented in over 100 Trusts and Medical Schools
• Trusts are using us for CPD and Revalidation
• Support the QIPP Agenda
• Quality - Evidence Based
• Innovative - Ease of Use - clearly defined strategy for the deployment of mobile
• Productive - Associated with cost savings reducing length of hospital stays (Harvard Public Health Study)
• Prevention - Associated with prevention and improving Patient Safety and Care
• Being used in some Trusts to write local Trust Guidelines
UpToDate in the UK

- European Clinical Advisory Board
- Dr Paul Altmann - CCIO Oxford Universities NHS Trust
- Dr Michael Fisher - CCIO and Consultant Cardiologist - Royal Liverpool and Broadgreen
- Library Advisory Board
- Betsy Anagnostelis - UCL/Royal Free
- Sarah Sutton - UHL NHS Trust
As standard we implement all NHS customers with the NHS Evidence link resolver.

In December I completed a project to set-up all existing customers with the NHS Evidence Resolver.

Librarians have reported increased journal usage.

By bringing expensive full text to the POC it has exposed the library.

Enabled librarians to support an evidence-based collection development policy.

Saying “No” has been easier.

Increased Athens usage.
• Involvement in mobile strategies
• New opportunity to rebrand and promote services you offer
• Trusts librarians working with Medical Education writing e-learning using graphics and content from UTD
• Our very detailed usage statistics help identify areas for training development
UpToDate in the UK

- Electronic Health Record (EHR) System integration
Usage Statistics

Topic Reviews

Dec 29, 2013
Dec 22, 2013
Dec 15, 2013
Dec 08, 2013
Dec 01, 2013
Nov 24, 2013
Nov 17, 2013
Nov 10, 2013
Nov 03, 2013
Oct 27, 2013

250
200
150
100
50
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<th>Rank</th>
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<tr>
<td>1</td>
<td>General Surgery</td>
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<tr>
<td>2</td>
<td>Neurology</td>
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<td>3</td>
<td>Pediatrics</td>
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<td>Obstetrics, Gynecology and Women's Health</td>
<td>92</td>
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<td>5</td>
<td>Endocrinology and Diabetes</td>
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<td>6</td>
<td>Gastroenterology and Hepatology</td>
<td>78</td>
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<tr>
<td>7</td>
<td>Pulmonary, Critical Care, and Sleep Medicine</td>
<td>61</td>
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<td>8</td>
<td>Adult and Pediatric Emergency Medicine</td>
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<td>Infectious Diseases</td>
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<td>10</td>
<td>Nephrology and Hypertension</td>
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<td>UpToDate Confidential</td>
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<tr>
<td>1 Obstetrics, Gynecology and Women's Health</td>
<td>Overview of postpartum hemorrhage</td>
<td>13</td>
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<tr>
<td>2 General Surgery</td>
<td>Pressure ulcers: Epidemiology, pathogenesis, clinical manifestations</td>
<td>10</td>
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<tr>
<td>3 General Surgery</td>
<td>Treatment of pressure ulcers</td>
<td>10</td>
</tr>
<tr>
<td>4 Pediatrics</td>
<td>Bronchiolitis in infants and children: Treatment, outcome, and prevention</td>
<td>8</td>
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<tr>
<td>5 Obstetrics, Gynecology and Women's Health</td>
<td>Etiology, prenatal diagnosis, obstetrical management, and prevention</td>
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<td>Prevention of pressure ulcers</td>
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<tr>
<td>7 Gastroenterology and Hepatology</td>
<td>What's new in gastroenterology and hepatology</td>
<td>8</td>
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<td>8 Pediatrics</td>
<td>Overview of neonatal respiratory distress: Disorders of transition</td>
<td>7</td>
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<td>Pathology of bladder neoplasms</td>
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Thank you and Questions