University of Michigan Medical School
Family Medicine M2 Clerkship
Student Profile

Full Name: _____

Nickname or name you prefer to be called: _____

Street Address: _____

City, Zip: _____

Telephone: _____

Pager Number: _____

Email address: _____

Personal/Social:

Name Spouse/Partner: _____
(if applicable)
Home Town: _____
(if applicable)

Names and Ages of Children (if applicable):

_____

_____

Hobbies/Non-Professional Interests: _____

_____

In Case of Emergency, please contact: _____

Do you have any physical limitations or medical problems about which your preceptor should be aware? ☐ **YES** ☐ **NO**

If yes, please specify:_____

Educational Background:

Institution, graduation year, degree, major:

Undergraduate: _____

Graduate:_____

Clinical Background:

1. List the clerkships you have completed:

   _____

   _____

   _____

2. What other types of clinical/ambulatory care experiences have you had?

   _____

   _____

   _____

Medical Interests:

1. What aspects of medicine do you find most interesting or appealing? Why?

2. What aspects of medicine do you find least interesting or appealing? Why?

3. What are your major career interests? (Primary care? Subspecialty? Undecided?)

Other Information: (Information about you and your previous experience that might be of interest to your preceptor)

PLEASE GIVE THIS TO YOUR PRECEPTOR FOR THE TWO OF YOU TO REVIEW AS YOU BEGIN YOUR CLERKSHIP.

University of Michigan Medical School
Department of Family Medicine

MEMORANDUM

TO: All Faculty, Preceptors, and Residents

FROM: Joel Heidelbaugh, M.D.

RE: Mid-Clerkship Feedback Form and Direct Observation Checklist

The Family Medicine Clerkship provides an ideal opportunity for the development of the problem-oriented skills required for caring for patients in the ambulatory setting. To facilitate this, we are asking preceptors to directly observe students in the performance of history-taking and physical examination skills, and to provide feedback with suggestions for improvement. This exercise is designed to be an educational rather than an evaluative exercise. Instructions are listed below and a checklist for documentation and feedback is attached.

Instructions for Mid-Clerkship Feedback
A faculty member who has worked with the student at least twice must meet with the student by the second Wednesday of the clerkship period to conduct a mid- clerkship feedback session. Please review each component of the form and give it to the student. It is the responsibility of the student to return the signed form to the clerkship staff by the end of the second week of the clerkship.

Written comments should include a notation of deficiencies (if any) with a summary of strengths in performance. These should be reviewed with the student while giving timely verbal feedback to be most useful in facilitating their learning process**.**

Instructions for Direct Observation Checklist
Using the form on the back of the Mid-Clerkship Feedback Form, please observe the student taking a complete or partial history, conducting a complete or partial exam, providing prevention counseling to a patient or parent/family member, and making an oral case presentation to you. You may observe this with one patient or across several different patients. It is highly appropriate to observe only brief components of an interaction and we do not expect you to observe a complete history and physical being conducted by the student - it is not necessary to complete the entire form.

Please mark off the appropriate items on the Direct Observation Checklist for each component of the interaction(s) and provide comments whenever possible indicating strengths and areas for improvement. These should be reviewed with the student while providing timely verbal feedback to be most useful in facilitating their learning process.

This activity is intended primarily for providing formative feedback, not for inclusion within the final grade.

University of Michigan
Clinical Trunk Family Medicine Rotation
Mid-Clerkship Feedback Form

Student Name: _____

Period/Date: _____

Site: _____

Preceptor: _____

FACULTY
Please comment on student **Strengths** and **Needs Improvement** for the items below. Discuss your comments with the student and return the form to the student.

STUDENT
It is your responsibility to schedule a time to discuss this feedback with your preceptor. Then you need to return it to the clerkship coordinator in Ann Arbor by the end of the second week of the clerkship.

Skill/Area	Strengths	Needs Improvement
Gather a coherent history.		
Conduct focused physical exam		
Write notes accurately reflecting visits		
Fund of knowledge		
Use of medical evidence/resources		
Work habits/professionalism		
Oral presentation skills		
Other Comments:		

Signature of Student: _____

Signature of Faculty: _____

Please return to Andrea Murawa, Clerkship Coordinator, by the end of week 2 of the Clerkship.
Email baxtera @umich.edu

University of Michigan
Clinical Trunk - Family Medicine Rotation
Direct Observation Checklist

Scale for History, Exam, Student-Patient Interaction: **Done NI (Needs Improvement) Not Done**

Scale for Oral Case Presentation: **S (Satisfactory) U (Unsatisfactory)**

Oral Case Presentation	**S**		**U**	**Comments**
Overall presentation				

History (all or part)	**Done**	**NI**	**Not Done**	**Comments**
Chief Complaint				
HPI (focused vs. expanded)				
Began with open-ended questions				
Asked appropriate directed questions				
Obtained pertinent PMHx/PSHx				
Obtained pertinent Fam Hx				
Obtained pertinent Soc Hx				
Performed medication reconciliation				

Exam (all or part)	**Done**	**NI**	**Not Done**	**Comments**
Vital signs				
Skin				
HEENT				
Neck				
Lungs				
Heart/Pulses				
Breasts/Pelvic/Genital				
Abdomen/Rectal				
Extremities				
Neurologic				
Musculoskeletal				

Communication Skills	**Done**	**NI**	**Not Done**	**Comments**
Introduction/Establish rapport				
Professional approach				
Establishes clear goals with patient				
Convey plan (as appropriate)*****				
Answer questions (as appropriate)*****				
Conduct prevention counseling				

*****At a level appropriate for patient understanding

Additional Comments:

Signature of Student: _____

Signature(s) of Faculty: _____

Required Clinical Experiences (RCE) and Aquifer Family Medicine (AFM) Cases

Required Clinical Experiences (RCE) and Patient Encounter Documentation
Each student needs to use the RCE system to document completion of six **required clinical experiences** and to log at least 60 patient encounters during family medicine.

You will need to provide patient name, age, and gender for each patient encounter that you document in RCE. You will need to type in the diagnosis or procedure that you experience into the free text box, labeled as "Other (if not listed above)" in the documentation system (diabetes, hypertension, pelvic exam, joint injection, etc.). You need to document **at least 60** patient encounters.

- **What Counts as an "Encounter?"**
  - Performing a History
  - Performing a Physical Exam
  - Performing a Procedure
  - Observing an Attending or Resident performing a History
  - Observing an Attending or Resident performing a Physical Exam
  - Observing an Attending or Resident performing a Procedure
  - Assisting an Attending or Resident performing a Procedure
  - You may log a patient more than once if you see the patient more than once during the clerkship.

Required Clinical Experiences (RCE)
During your family medicine clerkship, you are required to see and document at least one patient encounter in each of the following six RCE categories:

1. Musculoskeletal or Back Pain
2. Hypertension
3. Health Maintenance Examination (of any age or gender, which could include a well-child/adolescent exam)
4. Diabetes mellitus
5. Dermatologic Symptom
6. Gastrointestinal Symptom

If you have not completed this requirement by the end of the second week of the clerkship, you must contact your preceptor, who will work with you to ensure that you see a patient in each of the RCE categories. If your preceptor is not able to do so by the end of the third week of the clerkship, you must complete one or more of the relevant Aquifer Family Medicine (AFM) Cases in that category before you take your shelf exam at the end of the clerkship.

Required Clinical Experiences (RCE) and Aquifer Family Medicine (AFM) Cases

	Required Clinical Experience	**Alternate Experience**
1	Musculoskeletal or Back Pain	AFM Case 4, 10, 11, or 25 or Clerkship PowerPoint and handout
2	Hypertension	AFM Case 8
3	Health Maintenance Examination (of any age or gender, which could include a well-child/adolescent exam)	AFM Case 1, 2, 8 or Pediatrics Case 2, 3, 5, or 6
4	Diabetes mellitus	AFM Case 7
5	Dermatologic Symptom	AFM Case 16 or Clerkship PowerPoint
6	Gastrointestinal Symptom	AFM Case, 20, or 24

The Family Medicine Aquifer Cases are part of a comprehensive Internet-based learning program designed for use by second-year medical students during their family medicine clerkship. 40 cases are available through the Aquifer system. Specific cases are available for use to remedy gaps in the RCE as outlined above. You may also choose to work through other cases as a way to learn more about the common conditions encountered in a family medicine setting.

You should register TODAY! The website is https://umich-md.meduapp.com

A link to Aquifer is also provided on Canvas.

- Select "Support" along the top. Then click the Logging In/Register tab on the left margin.
- **YOU MUST USE YOUR INSTITUTIONAL EMAIL ADDRESS**.
- You will receive an email w/a link to confirm your registration.
- If you have already registered in the system to use the cases on your surgery, pediatrics, or internal medicine clerkship, there is no need to register again. Use your same password to access Aquifer Family Medicine.

University of Michigan
Clinical Trunk – Family Medicine Rotation
Community Agency Report

Instructors: Matthew Zimmer, LMSW
Amy Hansen, LMSW
Katherine Lehmann, LMSW

Goals and Objectives

1. Develop knowledge of available community resources and agencies including:
    a. Purpose
    b. population served
    c. services provided
    d. effectiveness
    e. limitations
2. Discuss how you observed effective utilization of community resources/agencies during your family medicine clerkship
3. Reflect upon your observations of how community resources/agencies could better be utilized at the site where you spent your clinical time or within the community in general

At the end of the clerkship, there will be a debriefing session during which each of you will make a brief presentation regarding what you have learned about community resources/agencies during your family medicine clerkship. You will also be asked to turn in the brief report you wrote up to summarize what you learned.

Some of you will be at sites with social workers working as part of the team. Others will be at sites where staff will work with patients to identify community resources. Physicians or other clinicians will make referrals to agencies. Many of you will be at sites where patients will live in more than one county so that the services available to them will differ according to county of residence as well as income level or other demographics.

Activities
Complete at least two of the following activities in completing your report

1. If there is a social worker (or another staff who functions as a resource to connect patients to community resources) at your site, you can choose to interview that person to find out what his/her role is in helping provide care to the patients at that site. Identify one or more patients with specific issues that would benefit from being linked/connected to community resources. Find out what you can about the agency providing the services that would be relevant to those patients. There might be pamphlets or handouts at the site or there might be a link on the Internet. Learn as much as you can about that resource/agency.

University of Michigan
Clinical Trunk – Family Medicine Rotation
Community Agency Report

2. Ideal examples could include identifying a patient with a newly diagnosed disease like Type 2 diabetes and go to a health education class, or seeing a pregnant patient and attending a prenatal class. If examples like these are not feasible, you could see a patient with a similar problem and then seek out what options would be available to that patient and summarize how the patient might go about accessing those resources.

3. Chelsea, Dexter, and Manchester are communities which are part of the 5 Healthy Towns Foundation (5HF). Read background information on the 5HF and describe how some patients you saw could have benefitted from these services. Or perhaps, you find out during an interaction with the patient or a family physician at your site that a patient is already involved in activities associated with 5HF. Summarize how this worked out (or could work out in the future). You do not have to be assigned to Chelsea or Dexter or Manchester to select this option as you could read about resources available via the 5HF which would be relevant to patients living and working in many other communities.

4. As you interact with patients, be intentional in learning what county they live in as at most of the sites, patients you encounter will reside in more than one county and community resources will often vary from county to county. Pick a specific area like prenatal care or food banks or substance abuse or other thematic areas of interest to you and explore how access to these resources do or do not vary from one county to another.

How do you do what you need to do to fulfill the overall goals of this assignment?

During your first couple of days at your site, get a sense of these general characteristics.

a) Is there a social worker there on a regular basis? Or someone else serving in the role of helping connect patients to community resources?

b) Are there pamphlets or brochures or other written materials that are available in the waiting room or exam rooms or in other locations that direct patients where to go for additional assistance in addressing their health care needs.

Notes

- As you see patients; if the family physician or other health care providers at your site give materials to the patients or direct them to someone else at the site to do so. And as you see patients, note if there are recurring themes or common diagnoses of interest to you that you might want to learn more about in terms of what community resources/agencies might exist to help patients with those concerns.
- The goal is for this assignment to be as closely linked to actual patients and/or problems you encounter at your sites.

University of Michigan
Clinical Trunk – Family Medicine Rotation
Community Agency Report

Below is a list of agencies and resources with links to their websites or a PDF summarizing their services. These are all located in southeastern Michigan, primarily in the greater Washtenaw County region. For those of you assigned to sites outside the immediate Washtenaw County region, you will be able to use these as examples of what to look for in the community to which you are assigned for your clinical site.

Agency Links

Ann Arbor Center for Independent Living
https://www.annarborcil.org/

Arbor Hospice
https://www.arborhospice.org/

Dawn Farm
https://www.dawnfarm.org/

Faith in Action
https://faithinaction.org/

First Steps of Washtenaw County
https://www.washtenawsuccessby6.org/index.php/first-steps-ann-arbor

FirstStep – Domestic Violence
https://www.firststep-mi.org/

Five Healthy Towns (5H)
https://www.5healthytowns.org/

Home of New Vision
https://homeofnewvision.org/

Maternal Infant Health Program – Ann Arbor
https://homecare.med.umich.edu/Maternal-Infant-Health-Program

Ozone House
https://ozonehouse.org/

National Kidney Foundation
https://www.kidney.org/

Planned Parenthood Michigan
https://www.plannedparenthood.org/planned-parenthood-michigan

Safe House Center
https://www.safehousecenter.org/

St. Louis Center
https://stlouiscenter.org/

Turner Resource Center
https://medicine.umich.edu/dept/geriatrics-center/community-programs/turner-senior-resource-center

University of Michigan Visiting Care
https://homecare.med.umich.edu/

Resource Links

Barrier Busters
https://www.washtenaw.org/588/Barrier-Busters

Community Agencies and Transition Planning Resources
https://washtenawisd.org/sites/default/files/Community%20Agencies%20Information.pdf

Friends in Deed
https://www.friendsindeedmi.org/

Senior Resource Directory for Washtenaw County
https://csswashtenaw.org/wp-content/uploads/2020/03/2020-Senior-Resource-Directory-REV2-021720.pdf

Washtenaw County Assistance Programs
https://www.needhelppayingbills.com/html/washtenaw_county_assistance_pr.html

Women's Health Resource Center: Community

- http://careguides.med.umich.edu/womens-health-resource-center-community-resource-guide

Department of Family Medicine
Clinical Trunk Rotation
Community Agency Report Form

Name:_____ **Date:**_____

Please complete and turn in at the end of the clerkship. You will also use this as you present what you learned about community resources/agencies to the instructor(s) at your debriefing session.

1. What specific community resource or agency or type of patient need did you choose to explore in depth?

    a. What led you to choose to explore this resource/agency or area of patient need?

2. Discuss how you observed effective utilization of community resources/agencies during your family medicine clerkship. Provide a couple of specific examples below.

3. Reflect upon your observations of how community resources/agencies could better be utilized at the site where you spent your clinical time or within the community in general. Provide a couple of specific examples below.

You may also choose to bring pamphlets or handouts or other materials related to the focus of your presentation.

UNIVERSITY OF MICHIGAN MEDICAL SCHOOL
DEPARTMENT OF FAMILY MEDICINE

FAMILY MEDICINE CLERKSHIP

STUDENT MANUAL
2020 - 2021

University of Michigan
Department of Family Medicine
300 North Ingalls Building, NI4C06
Ann Arbor, MI 48109-5435
(734) 998-7138

http://medicine.umich.edu/dept/family-medicine/education/predoctoral-education

September 2020

Clerkship Description

The Family Medicine Clerkship is a required four-week clinical rotation for second-year medical students at the University of Michigan. The purpose of this clerkship is to expose each student to ambulatory family medicine in a community-based clinical setting. In addition, students will attend didactic teaching sessions which will present core concepts of family medicine and allow them to develop a knowledge base which will be reinforced through their clinical experiences in family medicine offices.

Family medicine encompasses the spectrum of medical care during a patient's life cycle. The student will be exposed to a wide range of clinical experiences, including but not limited to routine health maintenance exams for children and adults, evidence-based preventive medicine, acute care visits, prenatal care, office-based procedures, and chronic medical conditions within the paradigm of population management. Most importantly, the student will be exposed to the concept of primary care and the unique relationship that exists between the patients and their family physician in the patient-centered medical home model.

Clerkship Faculty and Staff

Clerkship Directors

Joel Heidelbaugh, M.D.
Clerkship Director
jheidel@umich.edu

Elizabeth Jones, MD
Clerkship Co-Director
elizjone@med.umich.edu

Clerkship Coordinator

Andrea Murawa
baxtera@umich.edu

Clerkship Staff

Sandra Genske
sgenske@umich.edu

Clerkship Education

Department of Family Medicine
300 North Ingalls Building, NI4C06
Ann Arbor, MI 48109-5435
Phone: (734) 998-7138

http://medicine.umich.edu/dept/family-medicine/education/predoctoral-education

General Information

The family medicine clerkship provides an opportunity for students to learn about the comprehensive diagnosis and management of patients with common undifferentiated problems, as well as provisions of chronic disease management. In addition, students will experience the key features of family medicine such as diagnosis and management in the ambulatory setting, continuity of care, caring for the whole patient, appreciation of the impact of social determinants of health on healthcare outcomes across populations, preventive medicine, and the team-based approach including involvement with community agencies. The clerkship experience will also provide opportunities for the students to improve their basic skills in doctor-patient communication, history-taking and physical examination, differential diagnosis formation, stepwise decision-making to yield a cogent therapeutic plan, and office-based procedures.

Family Medicine Clerkship Goals

At the end of the family medicine clerkship, each student should be able to:

- Discuss the principles of family medicine.
- Gather information, formulate differential diagnoses, and propose therapeutic plans for the initial evaluation and management of patients with common presentations.
- Manage follow-up visits with patients having one or more common chronic disease.
- Develop evidence-based health promotion/disease prevention plans for patients of any age or gender.
- Demonstrate competency in advanced elicitation of history, communication, physical examination, and critical thinking skills.
- Discuss the critical role of family physicians within any health care system.

Site Assignment

All students will be assigned to a family medicine site for their patient care activities. Students will be notified of their site assignment prior to starting the clerkship and will be provided with the following information: primary preceptor's name, phone number, address, and map. Some students will be assigned to sites outside the Ann Arbor/Washtenaw County area. Students may request community preceptor sites such as Holland, Kalamazoo, Marshall, and Petoskey but will not be placed at these sites unless specifically requested. Living accommodations for "outstate" areas are the responsibility of the student.

Orientation Session

Orientation and all clerkship didactic sessions will be done via Zoom. A Zoom link for each session will be sent to your Outlook calendar. During these sessions it is required that all videos are turned on for attendance purposes.

Textbook

1. Our required textbook used during the clerkship is **Case Files Family Medicine.** 5th Edition. Toy, Briscoe, Britton, Heidelbaugh, 2020. You can access the book at the following link. You may also purchase the book at Amazon.

   https://casefiles-mhmedical-com.proxy.lib.umich.edu/CaseTOC.aspx?gbosContainerID=250&categoryID=40973

2. Core clerkship topics and teaching sessions are addressed by chapters in this text and by chapters from a web-based resource described later **(please refer to the Handouts and Readings section.)**

Aquifer Family Medicine Cases

The Aquifer Family Medicine Cases are part of a comprehensive Internet-based learning program designed for use by second-year medical students during their family medicine clerkship. 40 cases are available through the Aquifer system.

Handouts and Readings

In addition to the textbook, each student receives a set of handouts and readings. These include chapters from other textbooks, articles, and faculty developed materials.

The U.S. Preventive Services Task Force **Guide to Preventive Services** is available as a web- based resource. The URL is provided in the Handouts and Readings Section.

Clerkship Schedule/Didactic Sessions

Students will learn the fundamentals of family medicine through a combination of clinical and classroom experiences. In general, students will spend 60% of the clerkship in patient care, 20% in clerkship sessions, 10% on clerkship assignments, and 10% in department conferences and the Friday seminars. Clerkship sessions include a series of presentations on core topics in family medicine as well as case discussions based on patients seen by the students during the clerkship.

Clinical Experience

The majority of the clerkship will be spent in patient care at the family medicine office to which you have been assigned. Students will see patients who have appointments at the site. The number of patients that the student will see is determined by his/her level of experience as well as by the office schedule and other constraints of the individual preceptors. By the end of the clerkship, the average student will see 4 to 6 patients per half-day.

Students are expected to see patients autonomously and obtain an initial history and physical as appropriate prior to discussion with the preceptor.
Students will review and discuss each patient with the supervising attending physician or

resident. You are required to document one visit per half day with a progress note in the medical chart and/or electronic medical record. Chart documentation will vary between the different sites, however, there is one basic rule to follow: Each office has a set of documentation standards which should be followed. Sometimes special forms are used, such as for health maintenance exams, well child visits and prenatal visits. If this does not apply to your patient encounter, you should use the standard S.O.A.P. format to document your visit (see medical records documentation).

***Other activities and opportunities are available to students on an elective basis, known as the **"excursion day"**. A list of options will be presented to students at the beginning of the clerkship, and although not required, each student is encouraged to choose an opportunity to see the breadth of family medicine outside of the outpatient clinic. These opportunities include hospital rounds, nursing home rounds, home visits, deliveries, and other "after hours" activities. There may also be opportunities for students to observe and assist during minor surgeries and procedures within the clinic setting.

Documentation of Patient Encounters/Required Clinical Experiences

Each student will be required to document a minimum of 60 patient encounters during the clerkship. Students should document 15-20 encounters per week using the documentation system provided by the medical school. Students must also document six required clinical experiences as described during the orientation session.

Attendance

Participation in all clerkship activities is essential to meeting the requirements for this clerkship. Unlike other clerkships, you cannot simply make up lost time by taking extra call or working over the weekend. You may have to work evening or Saturday clinics to make up missed patient care time. The schedule is arranged to maximize your clinical and educational experience.

If you do have to miss any time, for whatever reason, you should contact the Education Office in Ann Arbor (734-998-7138) and your primary preceptor's office to let them know where you are. If you miss required activities, you will have to make these up. Due to our short clerkship there is a little flexibility in the attendance policy.

Core Topics

Listed below are the core topics which will be covered during the clerkship. Some of these will be addressed during the didactic teaching sessions but others will be sufficiently common as to be inevitably encountered by the students during your clinical activities. There handouts related to some of these topics. There are suggested readings for many of these topics.

- Abdominal and pelvic pain
- Approach to children
- Approach to the elderly
- Asthma

- Chest pain
- Common skin problems
- Communication skills
- Community agencies and resources
- Contraception
- COPD (chronic obstructive pulmonary disease)
- Depression and anxiety
- Diabetes mellitus
- Doctor-patient relationship
- Family life cycle and genogram
- Headache
- Health maintenance exam
- Hypertension
- Immunizations
- Information Mastery
- Lifestyle issues/modification
- Low back pain
- Men's Health
- Musculoskeletal problems
- Prenatal care
- Prevention and screening
- Substance abuse
- Upper respiratory infections
- Vertigo/dizziness
- Women's Health

We suggest that you regularly review the patients that you document in the school's documentation system with the preceptor to try to ensure that you are exposed to a broad range of conditions.

Grading Policy and Evaluation

Clerkship grading is based on an assessment of the student's performance during the rotation. The following are used to determine the final grade:

1. **Clinical performance** **70%**
   Expressed as Z score to incorporate "hawk/dove" phenomenon
2. **Online NBME examination** **30%**
3. **Miscellaneous requirements**
   a. Participation in educational sessions
   b. Mid-Clerkship Feedback Form/Direct Observation Checklist
   c. Documentation of patient encounters/required clinical experiences
   d. Case discussions
   e. Community agency report

Clinical Performance
This component of the grade will be determined by the student's preceptor(s) at the clinical site to which the student has been assigned. When the student has worked with more than one preceptor, this portion of the grade will be based on the evaluations of all of his/her preceptors who had significant contact with the student.

Online Written Examination
All students will take the National Board of Medical Examiners (NBME) Family Medicine Subject Examination. This is a standardized, nationally-administered examination. It covers topics relevant to family medicine, including knowledge, principles and concepts that are learned in other clerkships. It will be administered on the final morning of the clerkship. Exam scores are generally available within three to five days.

Final Grade
Results of student performance on all of these evaluations are combined to determine a final grade. A Z score is used to determine final clinical grade to allow for "hawk/dove" phenomenon. A final grade is sent to the medical school's Registrar's Office electronically. Other grading and feedback materials are kept on file electronically for students to review if they have questions about their grades.

Failure on the online examination will result in a grade of "I/A" and remediation of the "I/A" by re-taking the examination regardless of the summary clinical grade.

Failure in the clinical component will result in a final grade of "Fail" regardless of exam performance.

Approximately 25-30% of students will receive Honors, 30-40% receive High Pass, and 30-35% receive a grade of Pass, consistent across clerkships. Upward grade adjustments may occur at the end of the year when reviewing the grades for the entire class year.

Concerns regarding documented unprofessional behavior will result in the lowering of your final grade.

Grievance Policy
If you have concerns about your final grade, please contact Dr. Heidelbaugh. If you have a grievance you will be directed to follow the grievance procedures outlined in the current version of the medical school's "Policies and Procedures for Medical Student Evaluation, Advancement, and Promotion."

Miscellaneous Requirements: Students are also required to complete other clerkship assignments.

a. Student attendance and participation in educational sessions is required.
b. Review the mid-clerkship feedback form with the preceptor and return the form to the clerkship coordinator, Andrea Murawa, by the end of the second week of the clerkship. Return the Direct Observation Checklist by the end of the clerkship.
c. Documentation of at least 60 patient encounters in the school's documentation system is required, as is documentation of the six required clinical experiences.
d. Present at least one patient during case discussion sessions.
e. Present and submit a community agency report.
f. Documentation of at least 60 patient encounters in the school's documentation system is required, as is documentation of the six required clinical experiences.
g. Present at least one patient during case discussion sessions.
h. Present and submit a community agency report.

Optional
Each student will receive a blank Student Profile during clerkship orientation. Complete this profile and give it to your preceptor when you meet him/her. This will help provide background information the preceptor can use to get to know you better and to coordinate your clinical experience.

Summary

The family medicine clerkship is designed to give you an introduction to the types of patients and problems commonly encountered in family medicine and other primary care settings. The clerkship activities include clinical, classroom, and self-directed learning activities to help you accomplish the goals of the clerkship and acquire knowledge and skills which you will be able to apply as part of your general education as a medical student.

Please do not hesitate to ask questions. You will be working in busy office practices with highly experienced physicians, nurses, other health care providers, and staff who are used to working with learners. If you have questions about the schedule, assignments, or other educational aspects of the clerkships contact Dr. Heidelbaugh or Andrea Murawa for clarification.

Family Medicine Clerkship Session Objectives, 2020-2021

Session Title	**Clerkship Orientation/Introduction to Family Medicine**
Course title:	M2 Family Medicine Clerkship
Responsible Faculty Member (s):	Joel J. Heidelbaugh, MD
Contact Hours	1
Instructional Method Type:	Lecture

This presentation is given at the very beginning of our 4-week clerkship rotation. It outlines the goals and objectives of the clerkship for the students with respect to their role in the outpatient setting. A brief history of the specialty is given, dating from the original paradigm of the "general practitioner" to the current day family physician and its many diverse roles. Specific attention is given to the role of the family physician in the healthcare system, ranging from predominantly outpatient care to inpatient and obstetrical/surgical/ER/ICU care, and focus on opportunities for developing a specialized niche through fellowship training (e.g. sports medicine, women's health, academics, palliative and hospice care, etc.). Current data is highlighted that outlines the most common diagnoses encountered in family medicine, foreshadowing what students are expected to see during this rotation. Trends in supply and demand of primary care versus specialty care physicians are also discussed.

Session Learning Objectives

By the end of this session, students are expected to:

1. Define the evolution of the specialty of family medicine up to present day status, with acknowledgement that family medicine and primary care are in great demand but continue to be in decline with respect to student interest and recruitment
2. Understand the role of the family physician in the healthcare system at large, with specific focus on acute and chronic care relative to population management, cost-effective and evidence-based provisions of care, and the diverse roles and specialized niches that family physicians possess
3. Conceptualize what a common day in the practice of a family physician is comprised of, understanding the wide variety and depth of our specialty
4. Recognize the importance of the value of preventive medicine in achieving and maintaining good health and well-being, not only to prevent chronic diseases, but also to minimize preventable healthcare expenditures

Session Title	**Dermatology – Common Skin Problems**
Course title:	M2 Family Medicine Clerkship
Responsible Faculty Member (s):	Joel J. Heidelbaugh, MD
Contact Hours	1.5
Instructional Method Type:	Lecture

This lecture is comprised of a vast compendium of slides highlighting many common skin disorders encountered in family medicine. Epidemiology of dermatologic conditions, both in general and with relation to specific disorders, is discussed. Students are taught how to identify and characterize various skin conditions using descriptive terms (e.g. macular, papular, vesicular, etc.) and how to formulate a differential diagnosis based upon such characteristics. Common skin conditions discussed are divided into categories of common rashes, infections and infestations, subcutaneous/cutaneous lesions, and atypical versus neoplastic lesions. Treatment options for each condition are discussed, with specific

Family Medicine Clerkship Session Objectives, 2020-2021

focus on when a rash or lesion should be biopsied, and when a patient should be referred to dermatology for further evaluation. Epidemiology, identification, and preliminary triage of potentially cancerous skin lesions are highlighted.

Session Learning Objectives

By the end of this session, students are expected to:

1. Utilize dermatologic terms in developing a differential diagnosis for commonly encountered skin conditions in family medicine
2. Understand common treatment options of various dermatologic conditions
3. Determine indications for lesion biopsy and/or referral to dermatology for further evaluation

Session Title	**Musculoskeletal Overview – Approach to the Musculoskeletal Exam**
Course title:	M2 Family Medicine Clerkship
Responsible Faculty Member (s):	Robert Kiningham, MD
Contact Hours	1.5
Instructional Method Type:	Lecture, Demonstration

Session Learning Objectives

By the end of the session, students are expected to:

1. Identify the important information to obtain when interviewing a patient with a musculoskeletal problem.
2. Realize the importance of determining the patient's baseline functioning and goals in formulating a treatment plan for musculoskeletal problems.
3. Appreciate the factors that perpetuate chronic musculoskeletal problems, and the importance of addressing these factors in the treatment plan.
4. Understand the basic principles and techniques of the musculoskeletal exam.
5. Apply a structured approach to the examination of joint complexes.

Session Title	**Musculoskeletal - Examination of the knee**
Course title:	M2 Family Medicine Clerkship
Responsible Faculty Member (s):	Amy Miller, MD
Contact Hours	1.5
Instructional Method Type:	Lecture, Demonstration

Session Learning Objectives

By the end of the session students are expected to:

1. Identify relevant knee anatomy and typical presentations or mechanisms of common knee injuries/conditions.
2. Take a complete focused history in a patient with a knee complaint.
3. Conduct a thorough exam on a patient with a knee complaint.
4. Determine appropriate use of radiological studies to assist in the evaluation of a patient with knee complaints.

Family Medicine Clerkship Session Objectives, 2020-2021

Session Title	**Preventive Health Lecture**
Course title:	M2 Family Medicine Clerkship
Responsible Faculty Member (s):	Elizabeth Jones, MD
Contact Hours	1.5
Instructional Method Type:	Lecture

Health promotion is an essential component of every person's health care. Family physicians provide health promotion to all patients regardless of life stage or gender. Family physicians provide health promotion in at least three ways – during office visits for health promotion, during office visits for another purpose, and outside of office visits in other health care settings such as extended care facilities and hospitals and partnerships with community agencies or public health officials. Important characteristics of preventive care provided by family physicians include being evidence-based, individualized, opportunistic and prioritized (1).

Session Learning Objectives

At the end of this session, students will be able to

1. define primary, secondary, and tertiary prevention, USPSTF levels of evidence (MK-sm, PBLI-ca)
2. analyze one preventive health measure recommendation (MK-dm, PBLI-ca, CTD-ps)
3. apply this knowledge in order to present analysis of findings to peers (C-ch)

Session Title	**Acute, Chronic, and General Case Discussions**
Course title:	M2 Family Medicine Clerkship
Responsible Faculty Member (s):	Joel J. Heidelbaugh, MD, Eric P. Skye, MD, Jean Wong, MD,
Contact Hours	2.0
Instructional Method Type:	Case-based Instruction/Learning

Each student is randomly assigned to one of three groups (acute, chronic or general cases) and expected to present the details of a case that they encountered during the clerkship to the small group and facilitate a discussion.

Acute case discussions are presented initially as a chief complaint (e.g. a 58-year-old male presents with chest pain), then the group asks the student presenter details about the patient's history. The primary focus in this exercise is to develop skills in forming a differential diagnosis that allows students to direct their line of questioning. Pertinent physical examination information is given, then students are asked to finalize their differential diagnosis. Based upon a preliminary differential diagnosis list, students are then asked to plan a reasonable therapeutic workup. The student who is presenting the case offers direction to the other students with regard to what is reasonable versus potentially unnecessary, then offers a resolution to the case on the workup that was actually performed, as well as any known test results and follow-up.

Chronic case discussions are presented initially also with a chief complaint (e.g. 64-year-old male with long-standing Type 2 diabetes mellitus and hypertension), yet the focus is predominantly aimed at a group discussion on how to manage chronic diseases. Evidence-based guideline review (institutional, specialty organization, etc.) and primary literature review is incorporated. Specific detail toward guideline goals (e.g. HBA1C < 7.0%) for each chronic disease presented is discussed, as well as discussion of pay-for-performance initiatives and motivational interviewing relative to each case.

Family Medicine Clerkship Session Objectives, 2020-2021

General case discussions allow students to choose either an acute case or chronic case, and presentations follow the guidelines above.

Session Learning Objectives

By the end of these three sessions, students are expected to:

1. Develop skills to present a detailed acute or chronic medical case in a logical and organized fashion
2. Develop skills in formulating a differential diagnosis and cogent therapeutic care plan
3. Improve understanding of how to implement evidence-based guidelines in acute and chronic disease management
4. Discuss challenging barriers encountered during patient encounters that impact health outcomes (e.g. psychosocial issues, insurance issues, compliance issues, etc.)
5. Improve ability to lead a small group discussion

Session Title	**Acute Low Back Pain**
Course title:	M2 Family Medicine Clerkship
Responsible Faculty Member (s):	Pamela Rockwell, D.O.
Contact Hours	.75
Instructional Method Type:	Lecture, Demonstration

Session Learning Objectives

By the end of this session, students are expected to:

1. Define common etiologies of acute low back pain.
2. Perform a complete history in working up a patient with low back pain.
3. Recognize the “red flags” which may present in the evaluation of a patient with low back pain and what their importance is.
4. Perform a thorough physical exam on the patient with acute low back pain.
5. Recite the evidence-based recommendations regarding how to treat acute low back pain.

Session Title	**Vaccines**
Course title:	M2 Family Medicine Clerkship
Responsible Faculty Member (s):	Pamela Rockwell, D.O.
Contact Hours	.1.25
Instructional Method Type:	Lecture, Demonstration

Session Title	**Contraception**
Course title:	M2 Family Medicine Clerkship
Responsible Faculty Member (s):	Pamela Rockwell, DO
Contact Hours	.75
Instructional Method Type:	Lecture

Session Learning Objectives:

By the end of this session, students are expected to:

Describe all the common forms of contraception available to women, including seeing and handling these contraceptives.

1. Explain the use of hormonal contraceptives and how they work
2. Describe how to better select various forms of contraception in accordance with what may work best with individual patients
3. Understand the common side effects seen in patients on contraceptives and understand some of the common clinical scenarios encountered in the family medicine office when problems occur in women using contraceptives.
4. Identify the medical conditions which may warrant the use of hormonal contraceptives
5. Understand HPV (human papilloma virus) and how it affects women and men

Session Title	**Community Agency Visit Debriefing**
Course title:	M2 Family Medicine Clerkship
Responsible Faculty Member (s):	Amy Hansen, LMSW, Katherine Lehmann, MSW, Matthew Zimmer, MSW
Contact Hours	1.5
Instructional Method Type:	Case-based Instruction/Learning

Session Learning Objectives:

By the end of this session, students are expected to:

1. Have an understanding why community based programs are so important in the total health care of their patients
2. Have information on a variety of programs that are available in the community, throughout the state and throughout the country
3. Understand when it would be helpful to refer a patient to a community program and why
4. Understand how to make a referral to a community program
5. Develop an appreciation for difficulties many people face that interfere with getting health care or being able to follow through on a treatment program
6. Recognize the burden that substance abuse, extremely dysfunctional families, mental health issues, the working poor and those in extreme poverty put on our health system and why it is so costly to everyone

Family Medicine Clerkship Goals

At the end of the family medicine clerkship, each student should be able to:

- Discuss the principles of family medicine.
- Gather information, formulate differential diagnoses, and propose plans for the initial evaluation and management of patients with common presentations.
- Manage follow-up visits with patients having one or more common chronic disease.
- Develop evidence-based health promotion/disease prevention plans for patients of any age or gender.
- Demonstrate competency in advanced elicitation of history, communication, physical examination, and critical thinking skills.
- Demonstrate competency in advanced elicitation of history, communication, physical examination, and critical thinking skills.
- Discuss the critical role of family physicians within any health care system.

F**amily Medicine Clerkship Learning Objectives**

1. **Biopsychosocial Model**

   Patient-centered communication skills

   - Demonstrate an empathic response to patients using active listening skills.
   - Demonstrate the ability to set a collaborative agenda with the patient during any patient encounter.
   - Demonstrate the ability to elicit, prioritize, and attend to the patient's specific concerns.
   - Review patient's history, physical examination, and test results using terminology that the patient can understand.
   - Clarify information obtained by a patient from popular media, friends and family, or the Internet.
   - Validate a patient's feelings by naming emotions and expressing empathy
   - Effectively incorporate psychological issues into patient discussions and care planning.
   - Use empathy and active listening skills to improve patient adherence to medications and lifestyle changes.
   - Explain treatment plans for prevention and management of acute and chronic conditions to the patients.
   - Reflect on personal frustrations and the patient's situation to better understand why patients do not adhere to offered recommendations or plans.

Psychosocial awareness:

- Explain why physicians have difficulty in situations such as patients' requests for disability documentation, non-adherence, and chronic narcotic use.
- Describe the influence of psychosocial factors on a patient's ability to provide a history and carry out a treatment plan.

Patient education:

- Describe mechanisms to improve adherence to and understanding of screening recommendations.
- Provide patient education tools that account for literacy and cultural factors (e.g., a handout on how to read nutrition labels.)
- Describe the patient education protocols for core chronic illnesses at their assigned clerkship sites.
- Identify resources in a local practice community that support positive health outcomes for diverse patients and families.
- Promote the use of support groups and other community resources to assist patients with mental health needs.
- Identify and distribute current resources for patients with substance abuse problems at their clinic sites (e.g., lists of treatment referral centers, self-help groups, substance abuse counselors, etc.)

2. Comprehensive Care

Information gathering and assessment:

- Apply critical appraisal skills to assess the validity of resources.
- Formulate clinical questions important to patient management.
- Conduct an appropriate and comprehensive literature search to effectively answer clinical questions.
- Apply evidence-based medicine (EBM) to determine a cost-effective use of diagnostic imaging in the evaluation of core, acute presentations.
- Demonstrate ability to discriminate between high and low-quality evidence when searching the medical literature.
- Utilize high-quality Internet sites as resources for use in caring for patients with core conditions.
- Curate a set of high quality mobile apps for quick reference when delivering patient care.

Lifelong learning:

- Demonstrate an appropriate level of meta-cognitive skills to assess and remediate one's own learning needs.
- Describe an individualized, evidence-based process on how to keep current with preventive services recommendations.
- Create an evolving set of learning goals and measures of success for those goals that address areas for improvement.

3. Contextual Care

Person in context of family:

- Conduct an encounter that includes patient and families in the development of screening and treatment plans.
- Demonstrate caring and respect when interacting with patients and their families even when confronted with atypical or emotionally charged behaviors.
- Demonstrate interpersonal and communication skills that result in effective information exchange between patients of all ages and their families.

Person in context of community:

- Incorporate knowledge of local community factors that affect the health of patients into daily patient care.
- Demonstrate awareness of local, regional, and national health disparities and their impact on patient care.
- Practice interpersonal and communication skills that result in effective information exchange between patients of all ages and professionals from the other disciplines and other specialties.

Person in context of their culture:

- Communicate effectively with patients and families from diverse cultural backgrounds.
- Identify areas where a patient's cultural context can impact health through comprehension, cultural perspective, access and utilization of health care.
- Describe one's own cultural influences and biases as they impact one's ability to effectively deliver patient care.

4. Continuity of Care

Barriers to access:

- Define social determinants of health and their role in continuity of care.

- Describe the social determinants that can affect a patient's ability to access and utilize the health care system at multiple levels:
    - Individual patient barriers
    - Community barriers
    - Health care system barriers

5. **Coordination/Complexity of Care**

Team Approach:

- Describe the benefits of interdisciplinary health care teams in patient care (e.g., pharmacy, nursing, social work, and allied health).
- Demonstrate skills in effective teamwork (e.g., sharing information, solving clinical problems as a team, etc.).

Quality and Safety:

- Define clinical processes established to improve performance of a clinical site.

Complexity of Care:

- Identify diagnostic uncertainty and the role of multi-systemic influence on a patient's condition.
- Adapt to changing patient presentation and needs
- Utilize effective patient care management strategies in patient's presenting with complex conditions.
- Describe the use of health information technology to enhance care coordination.
- Summarize the importance of linking resources with patient and population needs.

Source: Society of Teachers of Family Medicine: National Clerkship Curriculum. Second Edition, 2018.

University of Michigan
Clinical Trunk - Family Medicine Rotation
Summary of Student Responsibilities and Tasks

1. Review student manual and materials.

2. Attend and participate in all clerkship educational sessions.

3. Identify patients to present during the case discussions.

4. Attend at least 24 scheduled patient care sessions.

5. Write progress notes on patients you see in the office.

6. Accompany your preceptor to an "after hours" activity.
    a. (i.e. home visit, delivery, hospital rounds).

7. Document a minimum of 60 patient encounters using the school's documentation system.

8. Document six required clinical experiences in the school's documentation system.

9. Return your mid-clerkship feedback form and direct observation checklist after they are completed by your preceptor.

10. Present and submit your Community Agency Report/Form.

11. Return your textbook at the end of the clerkship.

12. Take the NBME examination.

13. Complete clerkship classroom teaching evaluation forms and evaluate the clerkship and your preceptor using the online system.

Contact the Education Office, 734-998-7138, if you have questions or concerns.

University of Michigan
Clinical Trunk - Family Medicine Rotation
Summary of Preceptor Responsibilities and Tasks

1. Review preceptor manual materials and student information packet.

2. Discuss expectations with student at beginning of clerkship and frequently throughout the clerkship - students will often report that they are not given specific expectations. This includes a goal of 60 patient encounters of which 5 should be virtual care (if applicable).

3. Orient students to your site and support staff, offering opportunities for them to work with team members to learn the patient centered medical home model of care.

4. Observe students taking histories, performing physicals, and giving assessments and plans and complete the direct observation form - completion of the entire form is NOT required as it is often not possible or feasible to observe a student in all areas.

5. Give students meaningful feedback daily and ensure that they are receptive of the feedback - students will often report that they do not receive feedback.

6. Review and critique student progress notes - the goal is 1 progress note per half day session, the expectation should not be for more than 1 but students may do more than 1 if they desire.

7. Conduct a mid-clerkship debriefing to discuss progress, concerns, and other issues and complete and return the mid-clerkship feedback form.

8. Encourage students to accompany you or your colleagues in an “excursion” visit outside of the clinic (see list of options).

9. Help students identify patients for their assigned case discussions (see preceptor manual).

10. Conduct final debriefing to discuss progress, concerns, and summative evaluation.

11. Evaluate students using the on-line grading system or complete.

Contact the Education Office, 734-998-7138, if you have questions or concerns, especially early on in the clerkship if appropriate.

REQUIREMENTS

CASE DISCUSSIONS
REQUIRED READINGS

September 2020

CASE DISCUSSIONS

Each student will present a brief patient case (~15 minutes) within one of the following categories. The purpose of the case presentations is for the group to discuss the relevant points of each case in detail, facilitated by a faculty preceptor. These sessions are designed to be interactive, as the majority of the information regarding each case should be obtained by the case presenter's peers. While handouts are not needed for these discussions (and patient confidentiality should be protected), case presenters should know all pertinent details of each case to be presented. Presenters should be well acquainted with the case history, physical findings, genogram, lab and radiographic results, and treatments and outcomes (if known). If you have access to copies of EKG tracings, radiographs, photos, or other relevant materials you could bring one copy to pass around the table.

Note: Special attention will be given to the role of the family physician within the healthcare system at large, the appropriateness of specialty referral, evidence-based guidelines, and cost-effective provisions of care. The concepts of the patient-centered medical home, population management, role of accountable care organizations, and quality metrics should be discussed in each case, where applicable. Be prepared to teach your classmates. Review of pertinent diagnostic and treatment guidelines by each presenter is strongly encouraged**.**

ACUTE CASES

Group A

Presenters will identify one case of a patient who presents with an acute problem or complaint (not for a routine follow-up visit pertaining to a chronic problem – see below) that requires a detailed evaluation and a diagnostic workup. Prior to the presentation, you will need to make some short notes on the case. Your presentation should include the presenting history, pertinent examination findings, any laboratory or radiographic investigations, and the initial management plan for the patient. The focus of the discussion will be to solicit group questioning on the differential diagnosis and therapeutic planning strategies for each case and on how these may differ in patients seen in primary care compared with other settings.

Do not share your case in advance with other students

CHRONIC CASES

Group B

Presenters will identify one case of a patient who is being followed for a chronic disease (e.g. hypertension, diabetes, asthma, chronic pain, coronary artery disease, chronic obstructive pulmonary disease, GERD, etc. – there are many possibilities here…). Prior to the presentation, you will need to make some short notes on the case. Your presentation should include a summary of the history and focus predominantly on the management of the case, including note of any agencies involved in the care or support of the patient as well as arrangements for follow-up of the patient. The focus of the discussion will be on the management of the complexities of the chronic disease and its impact on the life of the patient and his/her family, within the construct of the principles of population management – **the goal should NOT be differential diagnosis.**

Discuss your topic(s) with the other students within this group to prevent overlap
(READ: not everyone should present a case on diabetes management)

GENERAL CASES

Group C

Presenters will identify one case that can fit into either the acute or chronic case discussion category as above. Any patient is appropriate to present during this session.

REQUIRED CLERKSHIP READINGS

Students are **required** to read the following six chapters from the **Guide to Clinical Preventive Services** before the session on prevention and screening.

Students are encouraged to read other chapters in this web-based resource that are relevant to patients that you see during the clerkship.

Current Methods of the U.S. Preventive Services Task Force: A Review of the Process

1. Aspirin/NSAIDS for prevention of Colorectal Cancer
2. Screening for Lead Levels in Childhood and Pregnancy
3. Dementia (Alzheimer's Disease) Screening
4. Screening for Breast Cancer
5. Screening for Prostate Cancer
6. Family Violence: Screening

Additional Readings

Clerkship URL List

How to Decide Whether a Clinical Practice Guideline is Trustworthy

The Patient-Centered Medical Home: A Brief Educational Agenda for Teachers of Family Medicine

American Academy of Family Physicians

Medscape

September 2020

University of Michigan Clinic Trunk Policies and Procedures
https://medstudents.medicine.umich.edu/umms-bulletin

AAFP Health Maintenance and Counseling Topic list, PDF and Clinical Preventive Services Recommendations
https://www.aafp.org/afp/topicModules/viewTopicModule.htm?topicModuleId=64
https://www.aafp.org/dam/AAFP/documents/journals/afp/USPSTFHealthCareSchedule2019.pdf
https://www.aafp.org/family-physician/patient-care/clinical-recommendations/aafp-cps.html

Prevention
General/home page: http://www.ahrq.gov/professionals/clinicians-providers/

Clinical Task Force book: https://www.ahrq.gov/professionals/clinicians-providers/guidelines-recommendations/guide/index.html

Sections for students to read:

Background:
http://www.ahrq.gov/professionals/clinicians-providers/index.html

Screening for Lead Levels in Childhood & Pregnancy
http://healthit.ahrq.gov/health-it-tools-and-resources/pediatric-rules-and-reminders/lead-age-2-years-due-screening

Dementia (Alzheimer's Disease): Screening
http://archive.ahrq.gov/news/press/pr2003/dementpr.htm

Bladder Cancer
https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/bladder-cancer-in-adults-screening

Breast Cancer:
https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/breast-cancer-screening1

Lung Cancer
https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/lung-cancer-screening

https://shouldiscreen.com/English/home

Prostate Cancer:
http://www.ahrq.gov/clinic/uspstf/uspsprca.htm

Healthy People 2010
http://www.healthypeople.gov/

Dermatology
http://www.visualdxhealth.com/diseaseList.htm

Osteoporosis
https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/osteoporosis-screening

UMHS Guidelines for Clinical Care
Acute low back pain:
http://www.med.umich.edu/1info/FHP/practiceguides/back.html

Pediatric Growth Charts:
http://www.cdc.gov/growthcharts

How to Decide Whether a Clinical Practice Guideline Is Trustworthy

David F. Ransohoff, MD
Michael Pignone, MD, MPH
Harold C. Sox, MD

THE PROLIFERATION OF PRACTICE GUIDELINES AND RECENT controversies about cancer screening guidelines highlight the need to decide which guidelines are trustworthy. Cancer screening guidelines exemplify the challenge of public trust in guidelines. A firestorm of controversy (created in part by news media, professional organizations, disease advocacy groups, and politicians) surrounds discussions of screening for prostate cancer (should screening be routinely recommended, discussed, or discouraged?), breast cancer (should screening start at age 40 or 50 years?), and colon cancer (is colonoscopy preferred or are any of several test strategies acceptable?). Trust is important because guidelines set the de facto standard for medical practice and therefore influence clinical decisions about individual patients, practice measures, insurance coverage, and reimbursement.

The question of trust is important enough that Congress in 2008 charged the Institute of Medicine (IOM) of the National Academies with developing standards for objective, scientifically valid, and consistent approaches to developing practice guidelines.[1] Measurement of adherence to such standards could provide an indication of trustworthiness, which could help users decide which of several conflicting guidelines to adopt. In a recent evaluation of 114 randomly chosen guidelines, researchers found poor adherence to the IOM standards, raising questions about the best approach to use guidelines as a benchmark of excellent care.[2]

Concerns About the Process of Developing Practice Guidelines

The public should trust practice guidelines only if the recommendations accurately reflect the underlying evidence about benefits and harms to individual patients. Therefore, the first requirement for earning trust is a rigorous process for assembling, evaluating, and summarizing the evidence. This requirement is satisfied by performing a systematic review and assessing the quality and strength of the body of evidence. This process requires clinical epidemiological skills and a substantial investment of resources.

The second requirement is a process for deciding, based on evidence, which of the possible clinical strategies offers the most favorable balance of harms and benefits and should therefore become recommended practice.[3] Because benefits and harms are often measured in different units, quantitative estimation of net benefit is necessarily subjective and therefore potentially influenced by financial or intellectual conflicts of interest. Because objective methods to estimate net effect at a population or individual patient level are still in an early stage of development,[3] a guideline development panel that is free from conflicts of interest provides the best safeguard against bias.

Guideline panels have taken different approaches to ensure methodological rigor and manage conflict of interest, thereby placing the public and practicing clinicians in a vulnerable position; by 2008, more than 350 groups had created several thousand practice guidelines.[4] This chaotic practice guidelines scene led to the Congressionally mandated IOM study.[1]

The IOM Committee's Work

The IOM committee built on the work of others. Since 2003, the Appraisal of Guidelines, Research and Evaluation (AGREE) system had been the most widely accepted set of standards for rating the quality of the process of guideline development.[1,5] The IOM committee took a more comprehensive view of guideline development, summarizing its recommendations as 8 standards (BOX). The IOM included items that AGREE omitted: updating guidelines, external review and public comment, the funding of guideline development, and the interplay of the guideline group with the team developing the systematic review of pertinent evidence. Most importantly, the IOM recommendations on managing conflict of interest were more extensive and much stronger than the AGREE standards. Of equal importance, while AGREE specified a systematic search of the literature, the IOM committee set a higher standard by specifying a systematic review, which is a more rigorous and better standardized approach to characterizing a body of evidence.[6] Taken as a whole, the IOM recommendations are an important step forward. The American Cancer Society has adopted similar standards to direct its guidelines process,[7] a hopeful sign that guidelines developers may move toward a set of common practices that strengthen trustworthiness.

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Box. A Summary of the Institute of Medicine (IOM) Standards for Trustworthiness

1. **Transparent process:** The processes by which a clinical practice guideline is developed and funded should be described transparently.
2. **Conflicts of interest:** Potential guideline development group members should declare conflicts. None, or at most a small minority, should have conflicts, including services from which a clinician derives a substantial proportion of income. The chair and co-chair should not have conflicts. Eliminate financial ties that create conflicts.
3. **Guideline development group composition:** The group should be composed of methods experts, clinicians, representatives of stakeholders, and affected populations.
4. **Systematic reviews:** Essential to the process, systematic reviews must meet the IOM's methodological standards.
5. **Evidence quality and recommendation strength:** Explain the reasoning behind each recommendation, summarize evidence for benefits and harms, characterize the quality and quantity of relevant evidence and the role of subjective judgments. Rate the level of evidence and the strength of the recommendation. Describe differences of opinion about recommendations.
6. **Articulating recommendations:** Describe the action recommended by the guideline and when it should be used; wording should facilitate measurement of adherence.
7. **External review:** Essential to the process, external review should include a full spectrum of stakeholders, reviewers not identified by name, explain all changes done in response to reviewers, and post for public comment.
8. **Updating:** Document the dates of the guideline, systematic review, and planned update; monitor the literature and update the guideline when new evidence suggests the need for change.

Source: Abstracted by the authors from the IOM committee report.[1]

While the IOM committee provided a comprehensive set of standards, it imposed an impractical definition of trustworthiness. According to its report, "to be trustworthy, a clinical practice guideline should comply with proposed standards 1-8." This definition of trustworthiness sets a very high, inflexible standard: a guideline is trustworthy only if it meets all 8 standards. A close analysis of this definition reveals important difficulties. First, as summarized in the Box, most of the standards have several elements; must each element of a standard be present to declare that a guideline adheres to that standard, or would only 1 element be sufficient? Second, the decision to define trustworthiness as meeting all 8 standards—with anything less presumably constituting "untrustworthy"—does not meet the need for nuanced guidance in interpreting different degrees of adherence to a standard. Suppose that none of the guidelines scored an 8 of 8. How should a guideline user decide which guideline is the most trustworthy?

As noted earlier, a recent study showed poor adherence to the IOM's trustworthiness standards.[2] By the IOM committee's strict definition, none of the 114 guidelines were trustworthy. On this evidence, guideline users must choose between several imperfect guidelines. They will need a method to measure partial adherence to the IOM standards and their related subelements.

Future Work

The task of developing measures of trustworthiness is formidable but doable. First, identify a transparent, trustworthy process for developing a set of measures. Second, find reliable measures to express the degree of adherence to each standard, determine how to combine each individual element into a composite measure of adherence to an individual standard, and derive a total trustworthiness score, reflecting adherence to all standards and subelements. Third, recognize that the process of developing measures of trustworthiness is likely to be a work in progress, with stakeholders' comments and revision playing an important role. Fourth, identify an institutional home that can sustain the process of developing measures of trustworthiness. Fifth, develop a marketplace for trustworthy guidelines, one in which trustworthiness ratings of guidelines for a problem (eg, screening for cancer) are displayed alongside the recommendations.[4] As with readers of publications that evaluate consumer goods, many guidelines users will gravitate toward the most highly rated guidelines.

Guidelines, especially those that try to set limits, will always raise controversy. Clinicians, patients, and policy makers should insist upon a constructive dialog about the evidence and its translation into recommendations. An explicit, transparent process for evaluating adherence to the IOM committee's standards should elevate this conversation to a higher plane.

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Additional Contributions: The authors are members of the Institute of Medicine committee.

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The Patient-Centered Medical Home:

A Brief Educational Agenda for Teachers of Family Medicine

Jerry Kruse, MD, MSPH

(Fam Med 2013;45(2):132-6.)

In 2007 and 2008, STFM President John Rogers, MD, MPH, MEd, wrote a series of articles that outlined an educational agenda for the patient-centered medical home (PCMH).[1-6] Over the past 5 years, data compiled by the Patient Centered Primary Care Collaborative (PCPCC) have corroborated the historical evidence and added new evidence that the PCMH is a clinical model that improves health care outcomes and lowers health care costs.[7,8] All family medicine educators should have a clear understanding of the effective elements of the PCMH, and this knowledge should be transmitted to all of our learners, to our colleagues in other disciplines, to the leaders of our local institutions, and to legislators, regulators, members of the media, insurers, and business leaders. The educational agenda for the PCMH is broad, and I will address the current status of the agenda in this article.

A Brief History of the Effectiveness of the PCMH

The term "medical home" was coined by pediatricians in the late 1960s. The model used by this discipline coordinated health care services for children with chronic illnesses. In 2002, consultants for the Future of Family Medicine project encouraged family physicians to use clear language to identify their profession and practice. The consultants recommended that we call ourselves family physicians (not family practitioners), that we call our discipline family medicine (not family practice), that we call our practice the Personal Medical Home, and that we call our facility for ambulatory care the Family Medicine Center. In 2004 and 2005, a series of articles by Barbara Starfield, MD, MPH, articulated the elements of primary care practice that improve outcomes and lowers costs.[9,10] These essential elements are listed on the top portion of Figure 1 and subsequently became the foundational elements of the PCMH.

On September 28, 2006, Thomas Weida, MD, representing the American Academy of Family Physicians (AAFP), testified about the effectiveness of the Medical Home to the House Energy and Commerce Subcommittee on Health. This committee embraced the medical home concept as the basis for ongoing health care reform legislation. In March 2007, the AAFP, the American Academy of Pediatrics, the American College of Physicians, and the American Osteopathic Association produced *The Joint Principles of the Patient-Centered Medical Home*, a summary of which is found on the bottom portion of Figure 1. It was then that the term "patient-centered medical home" became the legislative definition for the type of primary care practice that improved outcomes and lowered system-wide costs. The Joint Principles incorporated the seven effective elements articulated by Starfield and visionary elements that emphasize the effective use of health information technology, evidence-based medicine, and care coordination. A critical appraisal of each of the bulleted points of the Joint Principles was published by Rosenthal.[11] The two documents produced by the Patient Centered Primary Care Collaborative have corroborated the effectiveness of the visionary elements advanced by the authors of the Joint Principles.[7,8]

Definition and Implementation of the PCMH

The top portion of Figure 1 shows the simplicity of the seven foundational elements of the PCMH. Implementation of these relatively simple concepts has proven to be a complex process. Family medicine educators must treat foundational principles of the PCMH much like the major elements of a strategic plan. The foundational principles of the PCMH should be known cold by all family medicine educators and should be used to guide us as we develop the educational environment and learning objectives for the PCMH in our local environments. When developing educational programs, we must not become enveloped by details that do not directly relate to foundational principles of the PCMH. Though certification agencies often include details outside the realm of the foundational principles, we must remain true to the foundational principles when assembling the PCMH and developing educational programs therein.

Educational Agenda for the Patient Centered Medical Home

1. Medical Student Education

Family medicine educators must assure that the principles of the PCMH are taught to medical students at all level of training, Year 1 through Year 4. We must develop new educational models to deliver the PCMH curriculum. In 2007, in response to the evidence from Starfield and the Joint Principles, the Department of Family and Community Medicine (FCM) at Southern Illinois University (SIU) School of Medicine changed the focus of the 6-week, Year 3 clerkship. The major educational emphasis of the clerkship changed from one that emphasized presenting complaints and care of acute and chronic illnesses to one that emphasized systems of care delivery and the PCMH model. Figure 1 is used as the major reference guide for students on this clerkship. Since the institution of this new model of clerkship training, the FCM clerkship has become the highest rated clerkship in the SIU system. Student scores on the Family Medicine National Board of Medical Examiners shelf test have not declined over this period of time.[12] For such a model to be successful, family medicine clerkship directors must identify clinical practices and preceptors who successfully model the foundational elements of the PCMH.

2. Residency Education

Family medicine resident physicians should practice in environments that use the foundational elements of the PCMH. Most of these experiences should be in practices that are dedicated to residency training, and others should be undertaken in an apprenticeship model in PCMH practices with physicians that provide one-on-one training for the family medicine resident physician. Needless to say, all family medicine resident physicians should master the material cited in this article.

3. Longitudinal PCMH Training Experiences

An excellent way to introduce the principles of effective primary care practice to medical students is through longitudinal experiences in exemplary PCMH practices as early as possible in medical school training. The development of a hierarchal curriculum in effective practice by usual sources of comprehensive longitudinal care will provide the student an appreciation for the effectiveness of such model.

4. Block Training in the PCMH

Longitudinal experiences in the PCMH are not enough for medical students. Block PCMH experiences provide educational experience considerably different than that provided in longitudinal training. It is my opinion that every medical student should have one or more block experiences in an exemplary PCMH for a sustained period of time, at least 4 weeks. The student must live and breathe the practice day to day to truly understand the meaning of first contact access, comprehensive care, patient-focused care over time, and coordinated care. Family medicine resident physicians should also have block experiences in which they live and breathe such exemplary practices.

5. Inter-Professional Education

If family physicians are to become adept at team-based and coordinated care, early inter-professional educational experiences are a necessity. The earlier such educational experiences occur in the student's training, the more likely the student is to incorporate coordinated team-based care in later practice. Students from a variety of disciplines – medical assistants, nursing students, nurse practitioner students, physician assistant students, pharmacy students, counselors, social workers, physicians—should have early training

Figure 1: The Patient-Centered Medical Home: Outline for the Southern Illinois University Family Medicine Clerkship

Characteristics of Practices of Personal Physicians Associated With Improved Health Outcomes and Equity and With Lower Costs [9,10]

The Four Essential Functions of Primary Care

1. **First Contact Access.** The degree to which patients seek advice and care first at the practice of the personal physician, except for medical catastrophes
2. **Patient-focused Care Over Time.** The degree to which the practice emphasizes patient-focused care, rather than disease-focused care, and longitudinal care, rather than episodic care
3. **Comprehensive Care.** The degree to which the personal physician provides a broad range of health services
4. **Coordinated (Integrated) Care.** The degree of integration of care among health professionals and staff, both within the patient-centered medical home and with outside organizations and consultants and the degree to which talents of all members of the team are used optimally

The Three Corollary Functions of Primary Care

5. **Family Orientation.** The degree to which medical services are provided to family members by the same personal physician
6. **Community Orientation.** The degree to which the practice assesses the needs of the community, designs interventions, and measures outcomes
7. **Cultural Competence.** The degree to which the biopsychosocial model is employed and health beliefs are addressed

Joint Principles of the PCMH

AOA, AAFP, AAP, and ACP Legislative Definition of the PCMH and Vision for the Practice of the Future

http://www.medicalhomeinfo.org/Joint%20Statement.pdf

- **Personal Physician**
- **Physician Directed Medical Practice**
- **Whole Person Orientation**
- **Coordinated and Integrated Care**
- **Quality and Safety Measures Evident**
  - **EBM and Clinical Decision Support**
  - **Voluntary CQI Processes**
  - **Patient's Expectation Met**
  - **HIT Used Appropriately**
  - **Voluntary Recognition Process**
- **Enhanced Access**
- **Appropriate Payment**

The four essential functions of primary care and the three corollary functions of primary care (together the seven foundational elements of primary care) have long been known to improve health care outcomes and lower cost. Recently, high-functioning data management systems and systems of care coordination, such as the elements listed under "Quality and Safety Measures Evident," have also been shown to improve outcomes and lower costs. Reports of the Patient Centered Primary Care Collaborative have provided this new data.[7,8]

experiences together in a PCMH setting. A progressive, inter-professional curriculum through training will give our medical students and resident physicians the best opportunity to "practice at the top of their training" and to allow those in other disciplines to do likewise.

6. Simulated Practice

Simulation in health care education is gaining in popularity and efficacy. Too often, simulation of team-based care in office and community settings is neglected. Family medicine educators should develop curricula that provide

simulated practice experience in community and primary care office-based settings.

7. Care Coordination
The PCMH must model appropriate care coordination. At the least, family medicine resident physicians should understand and should be able to supervise the following categories of care coordination: (1) Care coordination/case management oversight (project manager). This coordinator will have mastered the skills of the other three types of care coordinators below and will have skills in administration and team building, (2) Case management for the vulnerable, high-risk, high-cost patient (case manager). Patients in need of this level of care will be identified on a population basis and will require the services of an RN or social worker, (3) Care coordination for transitions of care (transition coordinator). Most transitions of care will occur between the hospital, the home, and the primary care office but also will include transitions to nursing homes and other living facilities. It is best that this care coordinator's office be located physically in the PCMH, (4) Longitudinal care coordinator for registry function (registry coordinator). This position will manage data, registries, visit summaries, pre-visit preparation, referral tracking, and meaningful use.

8. Mental Health Services
Co-location of mental health services under the roof of the PCMH has become increasingly popular in the United States and Canada. Comprehensive mental health services, which include counseling by social workers and licensed clinical professional counselors and periodic on-site consultations by psychiatrists, has proven beneficial as a component of the comprehensive care needed in the PCMH.

9. Information Technology and Health Information Exchange
All of our learners must be adept at using electronic medical records (EMRs) and interpreting data provided by EMRs. EMRs must give an advantage in the utilization of evidence-based medicine by providing point-of-service clinical decision support. The EMR must also provide rapid feedback of packaged information to the providers in a continuous quality improvement process. Family medicine educators should insist that utilization of this type of information technology leads to the granting of continuing medical education credit, enabling CME credit for utilization of point of service decision support and reinforcing CME credit for CQI processes.

10. Advocacy
Family medicine educators should advocate for activities that will promote the development of a pervasive network of PCMHs. We must collectively develop advocacy skills for payment reform and blended systems of payment, for new legislation related to the PCMH, and for systems of health information exchange.

11. Leadership Training
To date, required curricular elements for leadership training for medical students and family medicine resident physicians have been meager. Required leadership training experiences are needed for family physicians to direct inter-professional care and to lead health system reform, both vital to the development of effective and pervasive PCMHs.

12. Faculty Development
We must provide resources to train faculty members in leading change and in PCMH educational initiative. We await implementation of the Primary Care Faculty Development Initiative (PCFDI), an initiative developed jointly by HRSA, the American Board of Internal Medicine, the American Board of Pediatrics, and the American Board of Family Medicine as a pilot program designed to provide four interdisciplinary faculty teams in internal medicine, pediatrics, and family medicine an opportunity to engage in a collaborative learning experience that focuses on new models of health care delivery.

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American Academy of Family Physicians
Articles relevant to family medicine.
You many need to register for a FREE account.

https://www.aafp.org/home.html

Medscape
Daily updates on the latest news in family medicine.

http://www.medscape.com/familymedicine

ORIENTATION

1. Orientation to Family Medicine
2. What is Family Medicine
3. Virtual Visits FAQ

September 2020

ORIENTATION TO FAMILY MEDICINE
Practical Pointers to Help Make Outpatient Visit Run Smoothly

1. **Review Chart/Electronic Medical Record**
   Patient Name
   - Reason for this visit
   - Problem list
   - Medication list – Joint commission standard to update this at every site

   a) New Problem: think about what other information you might need (ie: cough? smoker?)
   b) Follow-up: Read previous notes/lab results/consultant letters etc.
   c) Health Maintenance: Take into account patient problems, age appropriate screening/advice re: behavioral change

2. **Knock and open door slowly in case pt. getting undressed or child behind the door**

3. **Introduce yourself**:
   - Name
   - Student doctor working with (provider's name) who will join you later

HISTORY
- Open ended: "Tell me about your concerns today" or
  Closed: "I see you are here for can you tell me about that:
- "Is there something else you would like to discuss?"
- Keep problem focused but be alert to related or other concerns.
  Only ROS that are related to problem are necessary.
- Also keep chronic problems/med etc. in mind which might have an impact.

PHYSICAL EXAM
- If necessary for patient to undress, step out of room.
- Keep focused on acute/chronic problem
- HME"s – even this is focused on problems and prevention and screening
- Explain what you're doing and keep movements smooth but firm
- **Always have preceptor present for breast/genitourinary/rectal exams**
- Ask preceptor to recheck/refine your exam whenever you want feedback.

ORAL PRESENTATION:
- How formal/broad will depend on preceptor, but follow usual order unless asked to do otherwise.
- If waiting for preceptor READ, go back and ask more questions, formulate

ASSESSMENT AND PLAN
- Mostly formulated by preceptor early on but late students do more of this. **Big** differences in style
- What is the working diagnosis, how certain?
- Further testing
- Treatment – recommendations and option
- Discussion of what to expect/side effects, etc.
- Follow-up – interval, warning signs
- Instructions – Written if more complex

WHAT IS FAMILY MEDICINE?

DEFINITIONS

General Practitioner
A physician trained before 1969 to give primary care to individuals regardless of age, gender or type of health problem. Training included four years of medical school and a one-year rotating hospital based internship.

Family Physician
A physician trained (after 1969) in the discipline of family medicine to provide care to patients and their ***families*** with a focus on their ***community.*** The care provided is ***continuing, comprehensive, coordinative, preventive,*** and delivered in a personalized manner to patients regardless of age, gender, presence of disease or organ system affected.

Family Medicine
An academic discipline which includes a body of knowledge, skills and attitudes that constitute the medical discipline and are necessary for a family physician to provide clinical care and conduct the research and educational activities which affect the delivery of primary care.

Primary Care
Emphasizes ***first-contact*** and assumes…***[continuing]*** responsibility for the patient in both health maintenance and therapy of illness. It is ***personal*** care involving a unique interaction and communication between the patient and the physician. It is ***comprehensive*** in scope and includes the overall ***coordination*** of the care of the patient's health problems, be they biological, behavioral or social...[including] appropriate use of consultants and community resources (AAFP Reporter)

Level of medical services which is community based as opposed to that of a consultant or specialist (secondary care) or use of hospital services (tertiary care). It includes the tasks of:

1) medical diagnosis and treatment
2) psychological assessment and management
3) personal support
4) communication of information about illness, prevention and health maintenance
5) maintenance of patients with chronic illness
6) prevention of disability and disease through detection, education, persuasion and preventive treatment.

Ambulatory Care
Personal health services rendered to individuals in an outpatient setting, at any time when they are not currently admitted to a hospital or health care institution.

WHAT IS FAMILY MEDICINE?

Medical Record Documentation

After a patient encounter in the clinic, you will be expected to document the visit in the patient's medical record. The organization of the medical record will vary depending on your site. It is a good idea to familiarize yourself with the layout of the medical record during your first visit to your preceptor's clinic. Follow that site's guidelines for documentation. In general, most visits will be documented with a "S.O.A.P." note (see below). However, many clinics use special forms/on-line templates for certain types of visits, including but not limited to the following: health maintenance exams, prenatal visits, well child visits. Be aware of your clinic's guidelines and you will save yourself extra work. This information should be reviewed with you at the beginning of your first week - by all means ASK if you have any questions.

S.O.A.P. notes

If you have completed other clinical rotations, you are probably already familiar with this form of documentation. In general, visits should be documented in the progress notes using this format, unless you are instructed otherwise. If you are hand writing notes, always use a black pen.

S: (Subjective)

This section describes the patient's complaint, or the reason for the visit. Use the patient's own words when appropriate. Use dates or "3 day history" rather than "last Friday." Any pertinent past medical history, medication use, etc. should be included here.

(Social History may be documented here)

O: (Objective)

This section describes physical examination findings. Document only relevant positive or negative findings. You should always include the patient's vital signs (temperature, blood pressure, etc.) at the beginning of this section, if relevant, then list examination findings in the standard format you have been taught.

A: (Assessment)

You should include the patient's diagnosis (obtained from the visit) in this section. If a patient has multiple diagnoses that were addressed at the visit, they should all be included in the assessment. This section should be written after you have discussed the case with your preceptor.

P: (Plan)

Outline the treatment plan for the patient. Be sure to include medications prescribed, tests ordered, and plans for future visits. This section should be written after you have discussed the case with your preceptor.

Note: It is often beneficial to combine the assessment and plan when multiple diagnoses/systems are addressed.

WHAT IS FAMILY MEDICINE?

Choose an interesting diagnosis, symptom, or treatment that you see in patient care and read more about it that night—this is one of the most effective methods to absorb and retain new information.

Prescription Writing

At your patient care site, you may be expected to write out prescriptions which will then be reviewed and co-signed by your preceptor. If you are not familiar with how to write a prescription, you may find it helpful to review this section prior to starting your clinical experience.

Prescription Requirements

1. Patient Information - usually just the patient's full name.

2. Medication name, dosage and type
    a. Medication name - may use the generic or trade name
    b. Dosage - most medications come in difference strengths, so you need to include the strength prescribed.
    c. Type - which form of the medication are you prescribing (capsule, suspension, rectal suppository, etc.)

3. Directions for taking medication
    a. Amount (number of pills, quantity of suspension, etc.)
    b. Route of administration (orally, rectally, intramuscular, etc.)
    c. Frequency (how many times per day the medication should be taken)

4. Quantity Dispensed - this should be written in numerical form and then the quantity should also be written out.

5. Number of Refills - this should never be left blank.

6. Date that the prescription was issued will automatically print.

7. Prescriber Information
    a. Physician signature
    b. Physician number (will automatically print on script)

WHAT IS FAMILY MEDICINE?

Sample Prescription

Name John Doe

Hydrochlorothiazide 25 mg

Sig: i tab po Q Day

Disp: 90 (thirty)

Refill: 3 times

Commonly used abbreviations

a.c.	before food or meals
bid	twice daily
c	with
cap	capsule
gm	gram
gtt.	drop
h	hour
hs	at bedtime
p	after
p.c.	after food or meals
p.o.	by mouth
p.r.	per rectum
prn	as needed
qh	every hour
qhs	every bedtime
qid	four times/day
q 4h	every 4 hours
s	without
stat	now
tab	tablet
tid	three times/day

Virtual Care in the Family Medicine Clerkship FAQ

Given the importance virtual visits will continue to play in the delivery of primary care, it is essential that our students are taught how to use this modality of care delivery. This document should help with logistics of working with and teaching students through virtual care. It includes recommended as well as alternative options.

Q: Will the student be on site?

A: This will depend upon individual clinic schedules.

- Recommended: Ideally if the session is virtual care only, students should work remotely in a HIPAA compliant space.
- Alternative: You could also offer students to work in your office with you for virtual visits assuming there is room for 6 feet minimum social distancing.

Q: Does my student have to be in the state of Michigan to participate in virtual visits?

A: No, but keep in mind that the patients do!

Q: How will we confirm with patients that they are okay with seeing a student?

A: Please have your medical assistants ask during the pre-visit phone calls and add it to the notes section of the visit on your schedule

Q: How do we conduct video visits with students?

A: We recommend utilizing the multiple providers function in MiChart video visit. Here, each party can go to the rooming tab and click Connect. If this causes the video visit to lag, we recommend having the student conduct the visit and then staff with the preceptor via another platform (e.g. Blue Jeans, phone call, etc.) and finish the video visit on your own.

Of note, there is no longer a limitation on how many people can participate in a video visit with the new Zoom application.

Helpful links included below:

Trainee Virtual Visit Workflow

Multiple Providers Video Visits Tip Sheet

Q: How do we conduct phone visits with students?

A: 2 options, neither recommended over other (depends on situation):.

- (1) Have the student call the patient and take the history. The student then precepts (via Bluejeans as below). You then 3-way call the patient back to finish the encounter. We recommend using Doximity for this as it will hide your cell phone number and replace with your clinic or UM hospital number. Students can also download the app and use your clinic number to mask their own numbers.*
- (2) Have a 3-way call with the student and patient. You then mute yourself and let the student obtain the history and then talk through the plan with both the student and patient.

Iphone

*In order to use Doximity for the 3-way call; the student should call you (or vice versa) first and then one of you call the patient through the Doximity and merge the calls into a 3-way call. Included below is an example of the merge icon on an iPhone. There are different versions on Android phones, but some will look similar and it should say something like “merge call” underneath the icon.

Q: How should feedback be given for virtual visits?

A:

- **Recommended**: We recommend having a Blue Jeans meeting open during the duration of the clinic session to provide feedback and education between patients. We recommend NOT using Zoom as you cannot start a Zoom meeting and conduct patient video visits at the same time. For simplicity, Blue Jeans will be a better platform.
    - We have created standing "meetings" with links provided along with the monthly medical student schedule. Each medical student at each site will have a designated link e.g. BW student 1, BW student 2, BW student 3. Whenever you are working with BW student 1, you simply click on the link for that student. This will eliminate the need to create meetings as opposed to Zoom. It will also limit technical challenges related to using Zoom for patient video visits and a personal Zoom meeting at the same time. The links are included at the end of this document for each clinic. There are enough links for each clinic for the maximum amount of students each site may have during any rotation.
    - **A good way to keep the links easily available is to add them as bookmarks to your internet browser**
    - *NOTE: if the meeting is inactive >30 minutes will automatically close on your device. You simply need to reconnect via same link.

- **Alternative option:** call each other via phone.
    - students can text, message on Skype for Business, or call preceptor.. Student and preceptor are not required to share personal phone numbers and can use Doximity Dialer to hide their number. Be aware that text messaging is not considered secure for communication of PHI.

- **Alternative option**: you may discuss patient and give feedback in the Zoom patient encounter.
    - *If you choose to give feedback through the Zoom patient encounter, **please make sure to place the patient in the waiting room** prior to any feedback, otherwise the patient will hear your conversation.

Q: How many patient encounters should students have per session?

A: The goal is for students to see as many patients as would be expected during a normal clinical session. The goal over the course of the rotation is 60 patient encounters.

Q: How should we contact the students so they know who to video visit/call?

A: If it is going to be an entirely virtual session, we recommend touching base with the student the day before you are scheduled to work with them via e-mail or phone to review schedules. The goal would be to touch base ahead of time to ease the workflow during your actual clinic time.

Q: This isn't working well, who should I contact to troubleshoot?

A: Start with Alex Belakovskiy (abelakov@med.umich.edu) or Beth Jones (elizjone@med.umich.edu) and we will figure out how to help. If needed, Joel Heidelbaugh is always available as well. Feel free to share best practices as we move forward to optimize this initiative.

Blue Jeans Links by Clinic

Briarwood

BW Student 1 https://bluejeans.com/990287390

BW Student 2 https://bluejeans.com/634289022

BW Student 3 https://bluejeans.com/274340245

BW Student 4 https://bluejeans.com/773321380

Chelsea

Chelsea Student 1 https://bluejeans.com/739882232

Chelsea Student 2 https://bluejeans.com/159129251

Chelsea Student 3 https://bluejeans.com/288851582

Chelsea Student 4 https://bluejeans.com/435123507

Dexter

Dexter Student 1 https://bluejeans.com/147784519

Dexter Student 2 https://bluejeans.com/679155436

Dexter Student 3 https://bluejeans.com/264762593

Domino Farms

DF Student 1 https://bluejeans.com/264762593

DF Student 2 https://bluejeans.com/758499060

DF Student 3 https://bluejeans.com/149123378

Livonia

Livonia Student 1 https://bluejeans.com/673511253

Livonia Student 2 https://bluejeans.com/270097607

Livonia Student 3 https://bluejeans.com/755332432

Ypsilanti

Ypsilanti Student 1 https://bluejeans.com/435123507

Ypsilanti Student 2 https://bluejeans.com/781276656

Ypsilanti Student 3 https://bluejeans.com/264566824

Lecture Handouts and Readings

Musculoskeletal

1. General/Shoulder
2. Knee Evaluation

Acute Low Back Pain

Contraception

Preventive Health Lecture

September 2020

DEPARTMENT
OF
FAMILY MEDICINE

MUSCULOSKELETAL
HANDOUTS

Robert Kiningham, M.A., M.D.
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Principles of the Musculoskeletal Exam

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I. History
   A. Presentation or chief complaint
      1. Pain
      2. Instability
      3. Stiffness
      4. Weakness
      5. Catching or locking
      6. Swelling
      7. Paresthesias
   B. History of current illness
      1. Onset
      2. Clinical course and influence of treatment
      3. Progression of the process
         a. Progressive
         b. Improving
         c. Up and down
      4. Current status of the problem
         a. Character and intensity
         b. How does it interfere with activities of daily living, work, and recreation?
      5. Problems or symptoms from other muscles or joints
      6. Systemic signs or symptoms (e.g., fever, night sweats, fatigue, etc)
   C. Past medical history
      1. Previous injuries or problems involving the same muscle group or joint
      2. Previous history of injury
      3. Previous surgeries
      4. Medical problems
         a. Rheumatologic diseases
         b. Endocrine disorders (e.g., diabetes mellitus, thyroid disease, osteoporosis)
         c. Medications
         d. Drug allergies
   D. Review of systems
      1. Problems or symptoms from other muscles or joints
      2. Systemic signs or symptoms (e.g., fever, night sweats, fatigue)
      3. Other signs or symptoms (e.g., swelling, shortness of breath, chest pain)
   E. Family history
   F. Social history

1. Job activity
2. Recreational activity and/or sports
3. Drug, ergogenic aide, and supplement use

G. Summary

1. Get enough information about the injury so that you can confidently classify it into one of four categories:
    a. Acute injury
    b. Chronic injury
    c. Acute on chronic injury
    d. Chronic on acute injury
2. Try to generate a hypothesis regarding "why now?"

II. Physical exam

A. Overall format (Hawkins)

1. Initial impression
2. Inspection
3. Palpation
4. Range of motion
5. Neurological examination
6. Stability assessment
7. Special tests
8. Measurements
9. Vascularity
10. Gait analysis
11. General assessment

B. General approach (Cyriak)

1. Observation
2. Active range of motion
3. Passive range of motion
4. Resisted muscle testing
5. Special tests

C. **Observation**

1. General distress and disability
2. Functional assessment
3. Gross swelling and/or deformity
4. **Attitude**: Position in which the patient holds the involved part relative to the body, and the posture of the segment in that position.
5. **Alignment**
    a. Varus deformity: Distal segment is deviated toward the midline
    b. Valgus deformity: Distal segment is deviated away from the midline
6. Muscle bulk and contour
    a. Acute hypertrophy indicates muscle spasm
    b. Atrophy indicates neurologic deficiency or musculotendinous rupture

D. **Active range of motion**
    1. Observation of movement in the basic planes of movement
        a. Frontal plane: flexion and extension
        b. Coronal plane: abduction (away from the body) and adduction (toward the body)
        c. Transverse plane: internal and external rotation
    2. Note range of motion (compare sides) and amount of pain (and when the pain occurred)

E. **Passive range of motion**
    1. Patient relaxes the muscles completely while examiner moves the affected joint through the planes of motion
    2. Note range of motion and pain

F. **Resisted muscle testing**
    1. Resist patient's movement in the planes of movement – do not allow movement
    2. Position yourself at a mechanical advantage over the limb you are testing.
    3. Note pain and strength
        0 = no contraction felt
        1 = muscle can be felt to tighten but cannot produce movement
        2 = produces movement with gravity eliminated but cannot function against gravity
        3 = can raise against gravity
        4 = can raise against outside moderate resistance as well as against gravity
        5 = normal full strength

G. **Palpation**
    1. Assess for swelling
    2. Be systematic in palpating. Use bones and joint lines as frames of reference
    3. Identifying joint line pain is important

H. Special tests
    1. Includes tests for ligament integrity and joint stability
    2. Used primarily to confirm a diagnosis

COMMON MUSCULOSKELETAL PROBLEMS

Case Presentation

A 19-year-old female freshman runner presents with a 5 week history of bilateral anterior knee pain. She does not recall an acute injury. The pain is exacerbated by running hills, and over the past few weeks her knees ache during long car trips and with prolonged sitting in class. There is a small amount of knee swelling after work-outs. She denies any knee locking, but has experienced a few episodes of a "giving way" sensation while running, although she has not fallen down.

Knee Injuries

I. Patello-femoral stress syndrome

A. The most common source of knee pain. May affect up to 1 out of 4 individuals

- female athletes particularly susceptible

B. Proper biomechanics of patella during knee extension requires balance of lateral and medial forces

1. Lateral patellar movement controlled by:
   a. Anterior projection of lateral femoral condyle
   b. Static pull of medial retinaculum
   c. Dynamic medical pull of vastus medialis oblique (VMO)
2. Forces pulling patella laterally
   a. Lateral retinaculum
   b. Ilio-tibial band

C. Anatomic predispositions

1. Increased "Q-angle"
2. High riding patella ("patella alta") or low riding patella ("patella baja")
3. Small lateral femoral condyle
4. Shallow patellofemoral groove

D. Biomechanical predispositions

1. Weak medial quadriceps mechanism
2. Foot strike pronation
   - causes a compensatory internal rotation of the tibia and increases the rotatory stress absorbed by the peripatellar structures
3. Hamstring muscle tightness
   - causes increased flexion of the knee, thereby increasing patellofemoral compression during the stance phase of gait
4. Gastrocnemius muscle tightness
   - gastroc and/or hamstring tightness causes compensatory foot pronation
5. Ilio-tibial band tightness
6. Medial structure laxity
7. Hip adductor muscle weakness
   - VMO muscle fibers originate from the tendon of the adductor magnus. A strong adductor magnus gives the VMO an anchor from which to contract

E. Evaluation of patellar pain

1. History

a. Anterior knee pain around the patella.

b. Exacerbated by walking steps (especially going down), raising from squatting position, prolonged sitting with knee flexed.

c. "Pseudolocking" and "giving way" sensation

2. Physical exam

a. Peripatellar tenderness, especially medially.

b. Patellar apprehension test: Push patella laterally.

c. "Distal push" or "inhibition test"

d. Palpation of patellar tendon

1) Tenderness at origin - c/w patellar tendinitis

2) Tenderness at insertion onto tibial tuberosity - c/w Osgood-Schlatter's disease in the patient who is still growing.

e. Evaluation of ligaments and menisci

3. Radiographs

a. Standing AP
patellar position & height
symmetry of femoral condyles

b. Lateral (30^{O} of flexion)
patellar height: ratio of patella length to tendon should be 1:1.
Variation > 20% is abnormal

c. Axial view
height of femoral condyles
depth of sulcus between condyles
"sulcus angle"
orientation of patella between condyles
arthritic changes

F. Patellofemoral syndromes

1. Patellar dislocation
2. Patellar subluxation
3. Patellar stress syndromes
4. Symptomatic patella plica

G. Treatment

1. Physical therapy

a. Vastus medialis strengthening
straight leg raises
quad sets
closed chain exercises

b. Hip adductor strengthening
straight leg raises with femur externally rotated
"pillow squeezes"
resistance exercises

c. Stretching exercises to increase flexibility of hamstrings, gastrocnemius, ilio-tibial band

2. Cryotherapy
3. Non-steroidal anti-inflammatory medications (NSAIDs)
4. Patella stabilizing braces and taping
5. Surgery
   consider if no improvement after 6 months of physical therapy

II. Meniscal injuries

A. Symptoms

Swelling proportional to activities
Pain on rotary or flexion motion, particularly near extremes of flexion
Pain on joint line
Feeling of weakness and insecurity
Giving way
Locking
Generalized aching in knee joint itself
Popping, catching, or grinding

B. Signs

Effusion
Joint line tenderness (71%)
Locking

C. Provocative maneuvers

1. Full extension and flexion- jointline pain indicative of meriscal tear
2. McMurray test
   a. Forced internal and external rotary motion of tibia with full flexion and valgus-varus stress
   b. Pain with internal rotation = lateral tear
      Pain with external rotation = medial tear
   c. Report as: "negative"
      "positive for joint line pain"
      "positive for pain and a clunk"
3. Steinman's test
   a. Knee at 90^{o} of flexion, external and internal rotation
      -external rotation with medical joint line pain
      -interanl rotation with lateral joint line pain
   b. Joint line pain moves posteriorly with flexion and anteriorly with extension
4. Appley's compression and distraction tests
5. Anderson test

   Knee at 45^{o} of flexion, apply valgus stress as knee is flexed and varus stress as knee is extended

D. Diagnostic imaging

1. X-rays to rule out other disorders (especially osteochondral defects)
2. MRI
   a. A good exam is more sensitive for meniscal tears than an MRI exam
   b. Useful when there is an intermediate probability of meriscal tear

E. Treatment is symptom driven

1. Physical therapy
2. Arthroscopy

III. Patella tendon overuse injuries

A. Patella tendinitis ("Jumper's knee")
B. Osgood-Schlatter disease (tibial tuberosity)
C. Sinding-Larsen-Johansson disease (distal pole of patella)

IV. Lateral knee pain

Iliotibial band syndrome
Lateral meniscus tear
Lateral meniscal cyst
Lateral joint arthrosis
Lateral patellar facet syndrome
Lateral collateral ligament sprain
Biceps femoris tendinitis
Popliteal tendinitis

V. Medial knee pain

Medial meniscal tear
Medial collateral ligament sprain
Semimembranosus tendonitis
Pes anserine bursitis (sartorius, gracilus, semitendinosus insertion)

VI. Instability testing for ligamentous tears

A. Anterior cruciate tears

1. One plane anterior instability
   a. Lachman's test (20-30^{o} knee flexion)
   b. Anterior drawer test (90^{o} knee flexion)
2. Rotary instability tests
   a. Anteromedial rotary instability
      1) Anterior drawer in 25-30^{o} of external rotation
      2) Positive test implies disruption of posteromedial joint structures (MCL and posterior oblique fibers) as well as MCL
   b. Anterolateral rotary instability
      1) MacIntosh lateral pivot shift
         Lift internally rotated foot off table with knee extended. Flex the knee while applying valgus stress. Reduction in full extension with subluxation

at 5-10^{o} and sudden relocation at 30-40^{o} is positive test.

2) Losee's anterolateral subluxation test

   Knee and hip flexed to 45^{o} with tibia externally rotated. Slowly extend knee while applying valgus stress. Tibia goes from reduced position in flexion to sudden subluxation as it approaches extension to reduction in full extension.

3) Hughston's jerk test

   Start with leg at 45^{o} flexion of hip and 90^{o} flexion of knee. Hold tibia in internal rotation. Slowly extend the knee while applying valgus stress.

   Subluxation of the lateral tibial condyle on the femur occurs at about 20^{o} of flexion, with sudden relocation with further extension.

B. Posterior cruciate insufficiency

1. One-plane instability
   a. Posterior sag during extension
   b. Posterior drawer test at 90^{o} of flexion
2. Posterolateral instability
   a. External rotation recurvatum test
   b. Reverse pivot shift

      Start at 90^{o} of flexion, external rotation, aply valgus stress while extending knee

      Reduction of posterolateral subluxation occurs at about 30^{o}.
   c. Abduction (valgus) stress in full extension.

C. Lateral collateral ligament

1. Adduction (varus) stress with knee in full extension tests the LCL as well as the PCL and posterolateral capsule.

2. Adduction (varus) stress with knee flexed 20-30^{o} and tibia externally rotated relaxes the cruciate ligaments and isolates the LCL. The IT band lies over the center of the lateral joint line in this position.

D. Medial collateral ligament

1. Abduction (valgus) stress with knee in full extension tests the MCL as well as the posterior oblique ligament and the cruciate ligaments. 3+ opening indicates a PCL and MCL tear.
2. Abduction (valgus) stress with knee flexed 20-30^{o} and tibia externally rotated isolates the MCL.

Case Presentation

JS is a 46-year-old male who swims one mile a day 4 to 5 times a week. He complains of pain in the anterior aspect of his right shoulder over the past 4 weeks. He does not recall an acute injury. He first noticed the pain after his swim work-outs, but over the past few weeks it has been limiting his ability to finish his swims. The pain has also become more frequent in his daily activities, occurring with overhead activity or lifting of objects with a straight arm. During the past week, achiness in his shoulder has made it difficult to sleep at night.

Shoulder Rotator Cuff Injuries

I. Functional anatomy of shoulder girdle

A. 4 articulations

1. Sternoclavicular joint

   accommodates 30^{o} of clavicular elevation
2. Acromioclavicular joint

   accommodates 30^{o} of clavicular elevation
3. Glenohumeral joint
   a. Designed for mobility: radius of humeral head is 3 time the radius of glenoid fossa
   b. Motions
      Abduction/Adduction
      Flexion/Extension
      Internal/external rotation
      Translation
   c. Capsule extends from the glenoid fossa to anatomic neck of the humerus with an inferior redundancy
   d. Glenoid labrum
      1) Fibrocartilaginous rim that deepens the glenoid fossa
      2) Attachment for capsule and long head of biceps
4. Scapulothoracic articulation
   a. Scapular rotation about 60^{o}
   b. Scapular translation about 15 cm

B. Passive stabilizing mechanisms

1. Bony
   Glenoid is tilted posteriorly and humeral head is retroverted
2. Labrum
   Inferior glenohumeral ligament attaches to anteroinferior aspect of labrum
3. Ligaments
   a. Coracoacromial arch
   b. Glenohumeral ligaments
      Inferior glenohumeral ligament is primary restraint to anterior and inferior translation when arm abducted $>45^{o}$
   c. "Dynamic ligament": Passive elements of subscapularis muscle restrain anterior translation up to 90^{o} abduction

C. Dynamic stabilizing mechanisms

1. Maintain glenohumeral instant center of rotation
2. Force couples with rotator cuff muscles and scapular stabilizers
3. Muscles
   a. Rotator cuff
      Supraspinatus
      Infraspinatus
      Teres minor
      Subscapularis
   b. Major movers of humerus
      Latissimus dorsi
      Pectoralis major
      Deltoid
      Biceps brachi and triceps (long heads)
   c. Scapular stabilizers
      Trapezius
      Levator scapulae
      Rhomboids
      Serratus anterior

D. Nerves

Suprascapular (C4,5,6): Supraspinatus, Infraspinatus
Subscapular (C6,7): Teres major, Subscapularis
Axillary (C4,5,6): Deltoid, Teres minor
Musculocutaneous (C5,6,7): Coracobrachialis, Biceps brachii
Long thoracic (C5,6,7): Serratus anterior
Dorsal scapular (C4,5): Rhomboids, Levator scapulae

II. Pathomechanics of "impingement"

A. Scapulothoracic dysfunction
B. Rotator cuff dysfunction
C. Capsular dysfunction

III. Evaluation

A. History

1. Pain localized anteriorly and anterolaterally on the shoulder.
2. Exacerbated by overhead activities.
3. Often painful at night while in bed.

B. Physical exam

1. Assess active range of motion
   a. Observe scapular movement during shoulder abduction
   b. Apply's scratch tests
2. Assess passive range of motion
   a. Impingement signs:
      1) Pain at 90-110^{o} of passive abduction
      2) Anterior impingement with forward flexion

3) Pain with forward flexion and internal rotation while examiner applies downward pressure on the acromion.
    a) Cross flexion test for AC joint pain or posterior instability

3. Resisted muscle testing
    a. Rotator cuff strength testing
        1) Resisted internal and external rotation
        2) Supraspinatus testing ("Dump the cans" in 30^{o} of forward flexion)
    b. Abduction and adduction
    c. Speed's test for biceps tendinitis:
    Resisted shoulder flexion with the forearm supinated and the elbow extended.
4. Tests of glenohumeral stability and ligamentous laxity
    a. Apprehension test (Jobe's relocation test)

    Firmly externally rotate the 90^{o} abducted arm with the elbow flexed to 90^{o}. Place your hand behind the shoulder and apply force anteriorly. Then place your hand anteriorly over the proximal humerus and apply force posteriorly. Apprehension and pain with external rotation that is relieved by anterior support is a "positive" relocation test
    b. Anterior and posterior glide test.
    c. Long arm glenoid traction to look for a visible sulcus sign
    (depression anteriorly and laterally in the subacromial region)

C. Diagnostic imaging

1. Radiographs

a. AP views in internal and external rotation

True AP is a 40^{o} posterior oblique view to visualize glenoid

b. Axillary or scapular Y view (60^{o} anterior oblique)
Important to obtain a lateral view of some sort to assess glenohumeral alignment
c. Special views
    1) West Point axillary to demonstrate anteroinferior glenoid rim ("Bony Bankart lesion")
    2) Stryker notch view to better visualize the humeral head (Hill-Sachs lesion = compression fracture of posterior aspect of the humeral head)

2. Imaging the rotator cuff

a. Ultrasound
b. Shoulder arthrogram
c. MRI
High rate of "false positives"

IV. Differential diagnosis

Instability vs. rotator cuff tendinitis
Rotator cuff tear
Glenoid labrum tear
Adhesive capsulitis
Distal clavicle osteolysis
AC joint osteoarthritis
Calcific tendinitis
Biceps tendinitis
Cervical spondylosis
Suprascapular nerve compression
Infection

V. Treatment

A. Acute inflammation and pain

1. Ice
2. Non-steroidal anti-inflammatory medications
3. Subacromial bursa injection of lidocaine (or bupivacaine) and corticosteroid

B. Recovery phase

1. Range of motion exercises
2. Rotator cuff strengthening
   Avoid resisted external rotation in patients with glenohumeral instability
3. Strengthening of scapular stabilizers
4. Coordinated shoulder movements

C. Surgery

1. Indicated for rotator cuff tears in patients who desire full use of shoulder and are committed to extensive rehabilitation after surgery
2. Stabilization procedures have best results in patients with history of acute, traumatic dislocations
3. Most cases of “impingement” best treated with activity modification and muscle strengthening. Resection of acromion does not treat underlying problem in most cases.
4. Glenoid labral tear should be suspected in throwing athletes with persistent “dead arm”. Diagnosis often only made during arthroscopy

Case Presentation CC is a 38-year-old female recreational tennis player with a 3 week history of pain on the lateral aspect of her right elbow. The pain occurs while playing tennis, particulary with backhand strokes. She had been playing 3 to 4 times a week in a tennis league, but has had to reduce her playing time because of the pain. She recently developed elbow pain while carrying her briefcase at work and with other lifting activities.

Lateral epicondylits

I. Functional anatomy

A. Lateral epicondyle of the distal humerus is the origin of the extensor carpi radialis longus and brevis

B. Extensor carpi radialis brevis is under maximum tension when contracting while the forearm is pronated with the wrist flexed and ulnar deviated

C. Posterior interosseous nerve is the main motor branch of the radial nerve that passes between the 2 heads of the supinator under the "arcade of Frohse"

D. Wrist extensor strength should be 45-50% of flexor strength
- normally, wrist flexor strength > radial deviators > ulnar deviators > extensors. Supinator strength is normally > pronator strength.

II. Pathology and etiology of lateral epicondylitis

A. More recent studies have found that microtearing of the common extensor tendon with granulation and degenerative changes rather than a true tendinitis

B. Etiolgic factors

1. Prolonged repetitive use of wrist extensors
2. Sustained contraction of wrist extensors
3. Grip, eccentric loading, and impact
4. Other areas that have been implicated include:
   periostitis
   radiohumeral bursitis
   lateral ligament sprain
   inflammation of annular ligament
   posterior interosseous nerve entrapment
   cervical radiculopathy

III. Evaluation

A. History

1. Area of pain, exacerbating activities, timing of pain in relation to activities
2. Previous history of elbow or wrist pain
3. Recent change in frequency or intensity of activity requiring wrist stabilization, especially gripping and/or forceful pronation and supination
4. If involved in athletics, recent change in equipment (eg, tennis or racquetball racquet)

B. Physical exam

1. Local tenderness on lateral aspect of elbow at common extensor origin
2. Resisted wrist extension and radial deviation (with elbow extended) causes pain at extensor origin
3. Resisted middle finger extension causes pain
4. Passive wrist flexion and pronation causes pain at common extensor origin
5. Elbow should have full range of motion without pain

C. Radiographs

1. Ordinarily not needed
2. Consider in the skeletally immature patient
3. Consider if decreased range of motion of elbow, or pain with elbow movement

IV. Differential diagnosis

A. Lateral epicondylitis
B. C6 radiculopathy
C. Posterior interosseous nerve entrapment
D. In skeletally immature patient lateral epicondylar epiphyseal injure fragmentation of the capitellum (Panner's disease)
E. Elbow joint arthrosis

V. Treatment

A. Ice, nonsteroidal anti-inflammatory drugs, relative rest
B. Local injection of lidocaine (or bupivocaine) and a corticosteroid
C. Analysis of exacerbating activity
   1. In tennis, common contributing factors are
      - poor stroke technique, using arm instead of body
      - raquet grip that is too small or large
      - too high string tension
      - racquet that is too heavy or stiff
   2. In all cases, there is inadequate wrist extensor power, flexibility, and/or endurance for the demands of the activity
   3. Orthoses
      a. Forearm band (epicondylar splint)
      b. Wrist resting splint (volar splint in 20^{o} of extension)

D. Physical therapy

1. Local modalities to common extensor origin
2. Stretching of forearm muscles
3. Isometric, then isotonic and eccentric, strengthening of wrist extensors
4. Gradual return to activity
5. Surgery
   a) Release of fascia and common extensor origin is most common
   b) A procedure of last resort

Case Presentation SR is a 26-year-old male who injured his left ankle while playing volleyball 3 days ago. He remembers jumping and "turning his ankle over" when he landed. He had difficulty bearing weight after the injury, but continued to play the remainder of the game. A few hours later he had a great deal of swelling over the lateral aspect of his ankle. He went to the local ER where he was told he did not have a fracture and was placed in a posterior splint with instructions to use crutches for walking.

I. Ankle injuries

A. Functional anatomy

1. "Ankle joint" is actually 2 joints
    a. Talocrural joint
        1) Formed by the distal tibia, fibula, and the talus
        2) Hinged joint that allows dorsiflexion and plantar flexion
            b. Subtalar (talocalcaneal) joint
                1) Formed by talus, calcaneus, navicular, and cuboid
                2) Gliding and rotation produces inversion and eversion
                3) Posterior, anterior, and middle facets
                    a) Sinus tarsi is an opening just anterolateral to the posterior facet. The insertion for the: extensor digitorum brevis lateral talocalcaneal ligamentextensor retinaculum
                    b) Tarsal canal is a small area between the posterior and middle facets which houses the interosseus ligament and the artery of the tarsal canal
2. Ankle mortise
    a. Formed by the tibial and fibular components of the ankle which roof the talus
    b. Plafond = tibial portion of the mortise
3. Talus
    a. Head articulates with navicular bone
    b. Neck
    c. Body
        1) Lateral process articulates with posterior calcaneal facet distal fibula
        2) Posterior process: Formed by medial and lateral tubercles
            a) Flexor hallucis longus tendon runs in a groove between containing the tubercles
            b) Os trigonum
                1) Located just posterior to lateral tubercle
                2) Unfused accessory bone in 6.5% of adults
                3) Elongated lateral tubercle (Steeda's process) in 50% of adults
                4) Posterior impingement symptoms can be caused by a symptomatic os trigonum or a fracture of the lateral tubercle (Shepherd's fracture)
4. Supporting structures of ankle mortise
    a. Subtalar inversion limited by
    interosseous ligament
    peroneal tendons
    lateral ankle ligaments
    b. Subtalar eversion limited by
    deltoid ligament

posterior tibial tendon
anterior tibial tendon

5. Lateral ligament complex
   a. **Anterior talofibular ligament** passes anteriorly from anterior aspect of the lateral malleolus to the lateral talar articular facet
      1) Restrains anterior talar motion
      2) Highest strain in plantar flexion
   b. **Calcaneofibular ligament** lies nearly vertical from the inferior tip of the lateral malleolus across the subtalar joint to the lateral calcaneus
      1) Prevents excessive inversion
      2) Highest strain in dorsiflexion
   c. **Posterior talofibular ligament** courses transversely from the posterior aspect of the lateral malleolus to the posterior process of talus (lateral tubercle)
      1) Prevents posterior talar motion
      2) Highest strain in full dorsiflexion, lax in normal standing position
6. Medial collateral ankle ligament = **Deltoid ligament**
   a. Superficial portion goes from the medial malleolus to the navicular tuberosity, sustentacular tali, and talus
   b. Deep portion attaches to medial talus
   c. Provides medial stability and prevents excessive abduction and eversion of the ankle
7. Distal **tibiofibular articulation**
   a. 4 syndesmosis ligaments
      Anterior inferior tibiofubular ligament
      Posterior inferior tibiofibular ligament
      Transverse tibiofibular ligament
      Interosseus ligament (distal portion of interosseus membrane
   b. Classic injury described as eversion and external rotation, but more commonly disrupted during ankle inversion injuries

8. Tendons: 13 tendons cross the ankle joint
   a. Laterally: **Peroneal tendons**
      1) Function
         a) Major dynamic stabilizers of ankle
         b) Ankle eversion
      2) Peroneus brevis
         a) Inserts on the base of 5th metatarsal
         b) Everts subtalar joint
      3) Peroneus longus
         a) Runs across the foot to insert on the base of the 1st metatarsal
         b) Primary plantar flexor of first metatarsal-medial forefoot column
   b. Posteriorly
      Achilles tendon
   c. Medially: **Tarsal tunnel**
      1) Contains (anterior to posterior from medial malleolus)
      Tibialis posterior

Flexor digitorium longus
Posterior tibial artery, vein, and nerve
Flexor hallucis longus

2) Flexor retinaculum: Roof of tarsal tunnel
    a) Distally encompasses the abductor hallucis
    b) Confluent with plantar fascia distally
    c) Anteriorly
        1) **Tibialis anterior**

*Major dorsiflexor of ankle and foot, and decelerator of foot during heel strike

2) Others
    Extensor hallucis longus
    Extensor digitorum longus
    Peroneus tertius

B. Biomechanics of injury

1. Ankle joint is most stable in dorsiflexion - talus is locked between the tibia and fibula
2. Least stable in plantar flexion - the talus is more narrow posteriorly, and therefore there is less bony stability within the mortise when in plantar flexion
3. Inversion sprains constitute over 70% of all ankle injuries because of the relative weakness of the ligaments and the inherent instability when the ankle in inverted and plantar flexed
4. Accessory movements
    a. Plantarflexion
        1) Fibula moves medially, posteriorly, and inferiorly
        2) Anterior slide of the talus on the tibia
        3) Results in approximation of the inferior tibiofibular joint and the malleoli move closer together

    b. Dorsiflexion
        1) Fibula moves laterally, anteriorly, and superiorly
        2) Posterior slide of the talus on the tibia
        3) Results in spreading of the inferior tibiofibular joint and the malleoli separate

C. Evaluation

1. History

a. Mechanism of injury
b. Level of activity after the injury - could the patient bear weight?
c. Treatment after the injury
d. Previous ankle injuries

2. Physical exam

a. Inspection
    1) Swelling, bruising, deformities
    2) General assessment of foot biomechanicspes cavus vs. pes planus

b. Range of motion
   1) Dorsiflexion 10-20^{o} past right angle with leg
   2) Plantar flexion 30-40^{o} past neutral
   3) Inversion and eversion normal is two thirds more inversion than eversion

c. Palpation
   1) Have the patient point to the area of most pain
   2) Palpate other areas to assess for occult or coexisting injuries
      lateral ligament complex
      lateral and medial malleolus
      base of 5th metatarsal
      distal tibial-fibula articulation
      talus, cuboid, navicular bones
      deltoid ligament
      peroneal tendons
      Achilles tendon (Thompson test)
      proximal fibula

d. Specific diagnostic tests
   1) Anterior drawer test
      a) Assesses the integrity of the anterior talofibular ligament when done in slight plantar flexion
      b) Positive test
         Talus slides >3 mm more than uninjured ankle or absence of distinct endpoint
      c) Grading
         Grade I: stable
         Grade II: minimal anterior motion, firm endpoint
         Grade III: anterior motion with soft endpoint

   2) Talar tilt test (inversion stress)
      a) Assesses anterior talofibular ligament when ankle is plantar flexed
      b) Assesses calcaneofibular ligament when ankle is in neutral or dorsiflexed
      c) Positive test
         Ankle opens > 25o
         or > 10^{o} difference between ankles
   3) Coronal drawer test ("Clunk" test)
      a) Grasp distal tibia and fibula just above the ankle with one hand while grasping the heel with the other hand. Move the heel medially and laterally with side-to-side repetitive motions to determine if there is any increased "play" in the coronal plane of the ankle (motion of talus and calcaneus). Compare to uninjured side.
      b) Assesses for syndesmosis injury
   4) Peroneal tendon subluxation or dislocation
      a) Palpate the peroneal tendons while the patient everts the ankle from an inverted position in dorsiflexion
      b) Feel for subluxation or dislocation of the peroneal tendons as they pass around the lateral malleolus

c) Peroneus longus testing
Patient everts the foot and resists dorsiflexion of 1st metatarsal

5) Posterior tibiales testing
Resisted inversion of foot with foot starting in eversion

a) Neurologic assessment
Decreased sensation in the first web space indicates injury to the cutaneous branch of the deep peroneal nerve

3. Radiographs

a. Standard views
Anteroposterior
Lateral

Mortise (foot internally rotated 15-20^{o})

b. Areas to assess on radiographs

1) Widening of the mortise (best seen on mortise view)
a) The space between the talar margin and medial malleolus and between the plafond and lateral malleolus should be equal
b) The distal tibiofibular joint space should not exceed 5 mm

2) Malleoli fractures
3) Calcaneal anterior process fractures
4) Lateral and posterior process fractures of the talus
5) Talar dome osteochondral fractures

a. If syndesmosis disruption is suspected, or there is a deltoid ligament injury, always visualize the entire tibia and fibula to r/o
b. Maisonneuve -type high fibular fracture
c. Ottawa ankle rules
In acute ankle injuries (presenting within 10 days of injury), an ankle radiographic series is only required if there is pain in the malleolar zone (distal 6 cm of tibia and fibula, and talus) and any of the following:
◊ Bone tenderness at posterior edge or tip of lateral malleolus
◊ Bone tenderness at posterior edge or tip of medial malleolus
◊ Inability to bear weight (4 steps) both immediately and in the office

D. Differential diagnosis: Ankle inversion injury

1. Lateral ankle sprain (85%)
2. Fractures
a) Avulsion of distal fibula most common
b) Avulsion of base of 5th metatarsal at insertion of peroneus brevis
c) Osteochondral fracture of talar dome
d) Talar neck, anterior process of calcaneus, cuboid
3. Syndesmosis ruptures
4. Peroneal tendon subluxation or dislocation
5. Achilles tendon injury

E. Syndesmosis ankle sprains

1. Mechanism of injury

a. External rotation with eversion ("pushed back on a planted foot") is classic mechanism
b. However, either internal or external rotation can cause the ankle mortise to widen

2. Physical exam

a. Swelling can be minimal
b. Difficulty bearing weight and rising up on toes
c. Tenderness over anterior inferior tibiofibular ligament that may extend proximally up the interosseus membrane
d. Dorsiflexion limited because of pain
e. Squeeze test squeeze the fibula and tibia together at midshaft will cause pain in syndesmosis area
f. External rotation stress test (Kleiger test) externally rotate ankle while stabilizing tibia and fibula with ankle in neutral position and kneee flexed 90^{o}
g. Always look for associated medial or lateral ligament injuries

3. Grading the sprain

Grade 1: Interstitial tears to ligaments without elongationor loss of stability
Grade 2: Partial tearing of ligaments with incomplete loss of stability
Grade 3: Complete rupture of ligaments with resulting instability

4. Diagnostic imaging

a. Most useful to distinguish grade 2 injuries, in which there is no widening of mortise or separation of tibia from fibula, from grade 3
b. Standard AP, lateral, and mortise views. Look for:
   1) Avulsion fracture of tibial tubercle
   2) Incongruence of tibial plafond and talar dome on lateral
   3) Heterotropic ossification can be seen as early as 4 weeks post-injury
   4) Synostosis
c. External rotation stress radiographs
   1) Widening of anterior tibial tubercle - fibula interval > 5 mm on mortise view
   2) Widening of posterior tibial tubercle - fibula interval > 5 mm on AP view is most diagnostic
d. Arthrogram will reveal leakage of contrast into distal tibiofibular syndesmosis in a grade 3 tear

5. Treatment

a. Grade 1: Aggressive functional rehab
b. Grade 2: Aggressive functional rehab
   May require crutches with partial weight bearing initially
c. Grade 3: Stabilize syndesmosis by cast immobilization or syndesmosis screws

6. Prognosis and complications

a. Recovery prolonged - at least twice that of uncomplicated lateral ligament sprains
b. Heterotropic ossification in the interosseus membrane in the absence of frank synostosis does not effect long term outcome

F. Treatment of lateral ankle inversion injuries

1. RICE (Rest, Ice, Compression, Elevation)
2. NSAIDs
3. Crutches

a. Use if patient cannot walk normally without pain
b. Instruct on proper use - always walk with heel-to-toe motion and use crutches to reduce weight bearing
c. Use of a functional brace will allow most patients to be off crutches within a few days

4. Functional bracing
   pneumatic compression braces
   lace-up braces
   semi-rigid support wraps
5. Early mobilization
   a. Non-weight bearing range of motion exercises (eg., "drawing the alphabet") should start as soon as possible
   b. Functional bracing should allow early weight bearing
6. Physical therapy
   a. Range of motion exercises
   b. Muscle strengthening
   c. Proprioception exercises
7. Surgery
   a. Rarely indicated acutely in the stable ankle
   b. May be appropriate for chronic functional instability
8. Orthopedic referral
   a. Unstable ankles with significant widening and abnormal laxity of ankle mortise
   b. Significantly displaced fractures
   c. Talar dome fractures (including OCD)
   d. Non-healing stress fractures
   e. Achilles tendon rupture
   f. Chronic ankle instability unresponsive to physical therapy
   g. Any condition with which you are uncomfortable or unfamiliar

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DEPARTMENT
OF
FAMILY MEDICINE

KNEE EVALUATION
HANDOUTS

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Knee Evaluation

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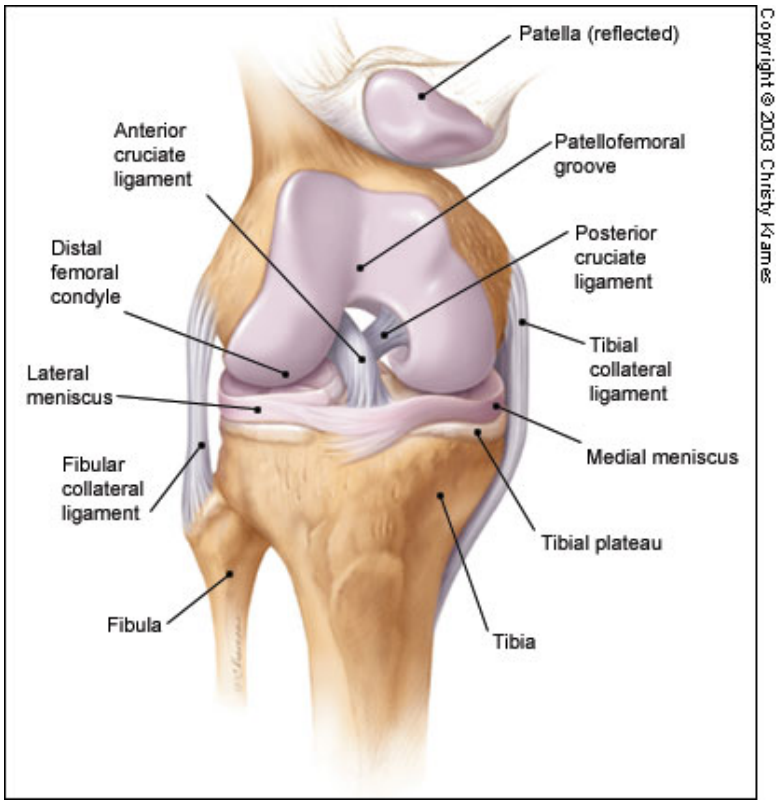
Knee Anatomy



I. Bony Anatomy

A. Joints

1. Tibiofemoral Joint – modified hinge joint
2. Patellofemoral Joint – modified plane joint
3. Proximal Tibiofibular Joint – plane synovial joint

B. Femoral Condylus

1. Primary motion is flexion and extension on its transverse axis
2. Secondary motion is axial rotation when the knee is flexed
3. Rolling and gliding form the basic motion

C. Tibial Plateau

1. Reciprocally curved surfaces separated by a blunt eminence with medial lateral spines extending anterior to posterior
2. The eminence is one of the factors preventing rotation in extension
3. The lateral tibial plateau is convex in the anteroposterior plane which allows the lateral femoral condyle to move further backwards and causes automatic internal tibial rotation with flexion

D. Patella

1. Sesamoid bone with two concave surfaces separated by a vertical ridge containing the thickest layer of cartilage in the body
2. Embedded in the extensor mechanism/patellar tendon increasing efficiency of extension by 1 ½ times holding the extensor mechanism away from the tibiofemoral joint
3. Functions as a guide for the quadriceps or patellar tendon, decreases friction of the quadriceps mechanism, controls capsular tension I the knee, acts as a bony shield for the cartilage of the femoral condyles and improves the aesthetic appearance of the knee

II. Ligaments

A. Anterior Cruciate Ligaments (ACL)

1. Three bands – anteromedial, posterolateral, and intermediate – run inferiorly, anteriorly, and medially from high on the back of the lateral intercondylar notch to just lateral to the medical tibial eminence
2. Its main functions are to prevent anterior movement of the tibia on the femur, to check lateral rotation of the tibia in flexion, and to a lesser extent, to check extension and hyperextension at the knee.
3. Tighter in full extension and looser in midflexion
4. Mechanisms of injury
   a. Loads applied when the ligaments are under maximum tension result in greatest strain
   b. Most injuries occur during jumping and cutting of cleats or skis
   c. Noncontact, deceleration – valgus- external rotation is a common mechanism of injury
   d. Forced hyperextension and deceleration 0 internal rotation another possible mechanism
   e. Tibial spine avulsions are associated with ACL tears in children<13 years old

B. Posterior Cruciate Ligament

1. A fan-shaped ligament that runs inferiorly, posteriorly, and laterally from the front of the medical intercondylar notch to just lateral to the posterior tibial plateau

2. The primary restraint to posterior tibial subluxation and a secondary restraint to medial instability
3. Mechanisms of injury
    a. Direct blow to the front of the tibia with the knee flexed (i.e., car dashboard) is the most frequent cause of PCL injuries
    b. Hyperflexion is a common mechanism during athletics

C. Medial Collateral Ligament

1. Attaches on the posterosuperior aspect of the medial femoral condyle and runs anteroinferiorly to the upper end of the tibia
2. Maximal tension at full extension, minimal between 25 and 80 degrees
3. Abduction stress increases tension at increasing degrees of flexion
4. Mechanisms of injury
    a. Noncontact valgus stress with or without external rotation
    b. Contact valgus stress with or without external rotation

D. Lateral Collateral Ligament

1. Attaches posterosuperiorly on the lateral femoral condyle and runs obliquely to attach anterior to the fibula styloid
2. Primary restraint to varus stress in extension
3. Adduction stress increases tension to peak at 70 degrees flexion
4. Structurally weakest of the four main ligaments but works in conjunction with the posterolateral corner to prevent varus and external rotation
5. Mechanisms of injury
    a. Contact varus stress
    b. Most LCL injuries are in combination with ACL or PCL injuries

E. Posterior Oblique Ligament

1. Attaches the posterior medial meniscus to the tibia and femur
2. Resists external rotation and restrains posterior drawer in internal rotation
3. Mechanism of injury – Contact to lateral lower thigh or upper tibia injures the posteromedial corner

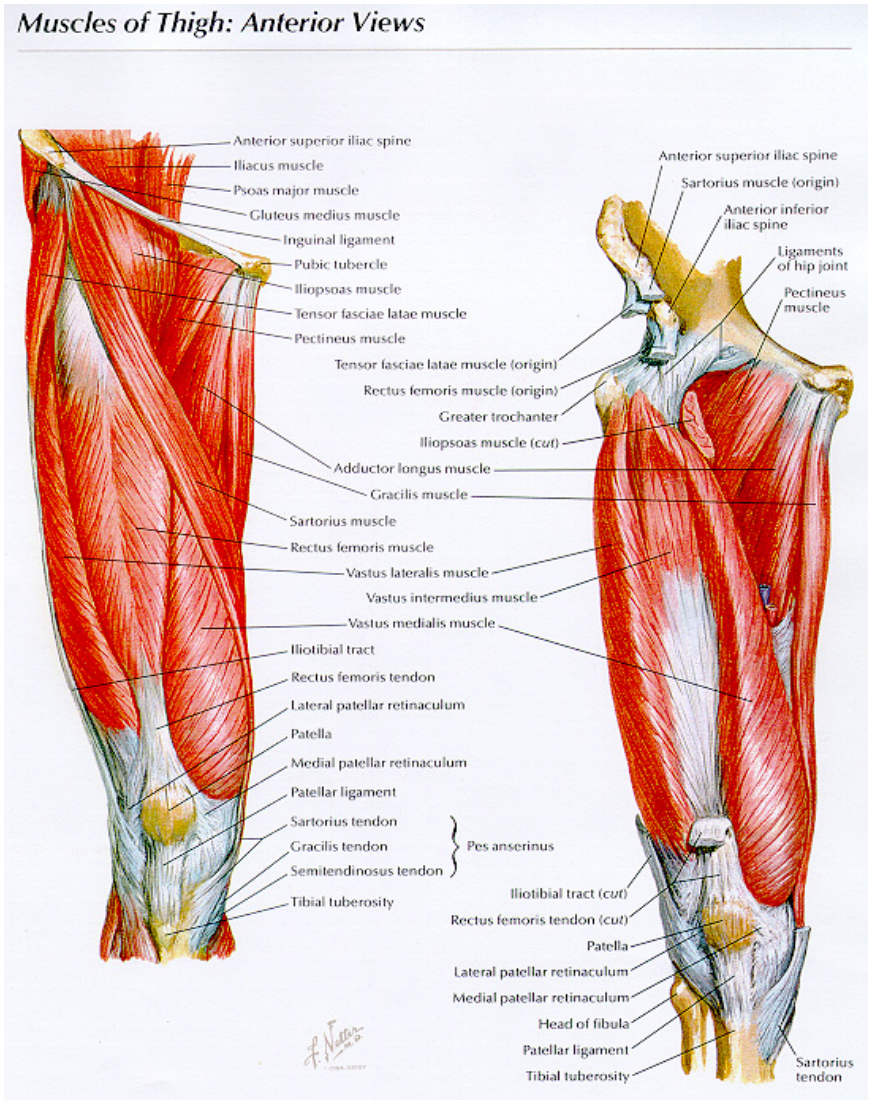
F. Arcuate Popliteal Ligament

1. Reinforcing ligament of the lateral side with injury resulting in posterolateral rotary instability
2. Attaches to the posterior horn of the lateral meniscus
3. Most important secondary restraint to posterior tibial subluxation
4. Mechanisms of injury
    a. Blow to the anteromedial tibia, which causes knee hyperextension is a mechanism for posterolateral corner tear
    b. Noncontact, hyperextension external rotation with varus force is a mechanism for posterolateral injury

III. Menisci

A. Medial is “C” shaped and thicker posteriorly than anteriorly while Lateral is “O” shaped and equal thickness throughout
B. Allows for load bearing joint stability and shock absorption
C. Avasular in their cartilaginous inner two thirds and partly vascular and fibrous in their outer one third
D. Held in place by the coronary ligaments attaching to the tibia
E. Mechanism of injury
    1. Combined valgus and external rotation, where the posterior horn of the medial meniscus is trapped by the posterior condyles
    2. Forced extension of the knee where one of the menisci fails to move forward with the femur

IV. Muscles



A. Quadriceps
B. Hamstrings
C. Iliotibial Tract (IT Band)
D. Pes Anserine
E. Mechanisms of injury – Usually from quick or explosive movement (strain/pull)

V. Anterior Soft Tissues

A. There are three synovial folds: suprapatellar, medial patellar, and lateral patellar
B. The medial fold is most likely of all to become symptomatic (plica syndrome)
C. The anterior fatpad is rich in small vessels and nerve endings
D. There are several bursae of note including the prepatellar and pes anserinus bursae, which lubricate areas of repetitive friction

Patient History

I. Age

A. Growth disorders such as Osgood Schlatter at younger age
B. Older patients may have degenerative issues

II. Occupation

A. Key to injury may be in details of the patient's occupation
B. Recreational activities or hobbies may be related to onset of symptoms

III. Inciting Trauma

A. May be obvious macrotrauma or overuse/microtrauma
B. Knee position and direction of forces contribute to the mechanism of injury which may give clues to type of injury sustained

IV. Timing of onset

A. Sudden vs. Gradual
B. Temporally related to specific incident or new activity

V. Nature of the symptoms

A. Pain
B. Swelling
C. Numbness
D. Weakness
E. Loss of function or motion

VI. Location symptoms

A. Location can help narrow the differential
B. More generalized symptoms may be part of a larger process

VII. Quality and quantity of symptoms

A. Amount of pain can help determine the potential severity of problem
B. Quality can sometimes help determine type of structure involved

VIII. Duration and frequency of symptoms

A. Constant vs. limited
B. Random and often vs. occasional and specific timing

IX. Exacerbating and relieving factors

A. Motions or activities
B. Therapeutic modalities
C. Medications

X. Prior history of similar presentation or injury in same location

XI. Clicking or pop

A. Clicking often described in patellofemoral issues
B. Pop can be indicative of an ACL injury

XII. Locking/catching or giving way

A. Locking or catching can be related to meniscal pathology
B. Giving way may suggest some sort of ligamentous instability

XIII. Swelling

A. Localized vs. more generalized (possible effusion)
B. Timing of swelling important in cases such as ACL tear

Observation

I. Anterior View Standing

A. Genu valgum – knock-knee
B. Genu varum – bowleg
C. Extension
D. Swelling/Ecchymosis
E. Patella position – “grasshopper eyes” or “Squinting patellae”

II. Lateral View Standing

A. Genu recurvatum – hyperextended
B. Patella alta or baja

III. Posterior view Standing

A. Similar positioning to anterior view
B. Posterior swelling

IV. Anterior and Lateral Views Sitting

A. Patella position
B. Obvious swellings
C. Osgood-Schlatter's changes
D. Tibial torsion

V. Gait

A. General changes in gait
B. Motion of patella

<u>Examination</u>

I. Palpation

A. Anterior with knee extended

1. Swelling or Effusion
2. Patella, patellar tendon, plica
3. Quadriceps musculature
4. MCL/LCL
5. Pes Anserinus
5. IT Band

B. Anterior with knee flexed

1. Medial and Lateral joint line
2. Tibial Plateau
3. Femoral Condyles

C. Posterior with slight flexion

1. Hamstring musculature
2. Gastrocnemius
3. Arcuate-popliteus complex
4. Baker's Cyst

II. Range of Motion

A. Active

1. Flexion – 135 degrees
2. Extension – 0 degrees
3. Medial rotation of tibia on femur – 20-30 degrees
4. Lateral rotation of the tibia on the femur – 30-40 degrees

B. Passive

1. Flexion, extension, medial and lateral rotation
2. Medial and lateral motion of patella

III. Strength Testing (5 point scale)

A. Flexion

1. Hamstring musculature L5 – S2
2. Grackles, Sartorial L2-3
3. Popliteus L4-S1
4. Gastrocnemius S1-2
5. Tensor Fascia Latae L4-5
6. Plantaris S1-2

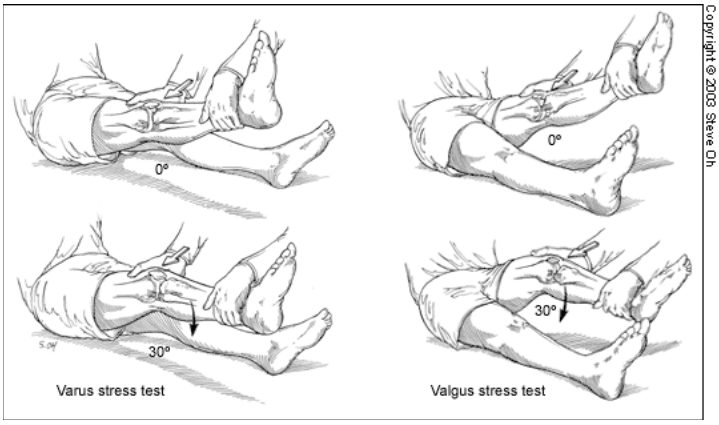
B. Extension

1. Quadriceps L2-4
2. Tensor Fasciae Latae L4-5

IV. Special testing

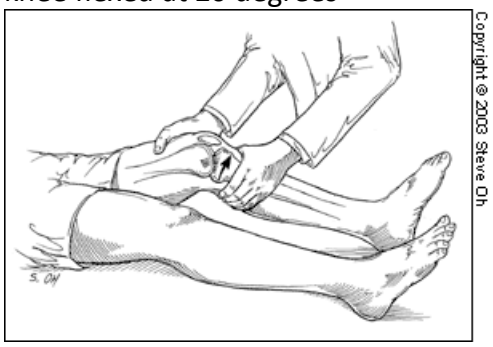
A. Collateral Ligaments

1. MCL – Valgus stress at 0 and 30 degrees (also see Anterior Drawer with ACL)
2. LCL – Varus stress at 0 and 30 degrees



B. Cruciate Ligaments

1. ACL
   a. Lachman – Lack of firm endpoint with anterior translation of tibia holding distal femur in one hand and proximal tibia in the other with knee flexed at 20 degrees

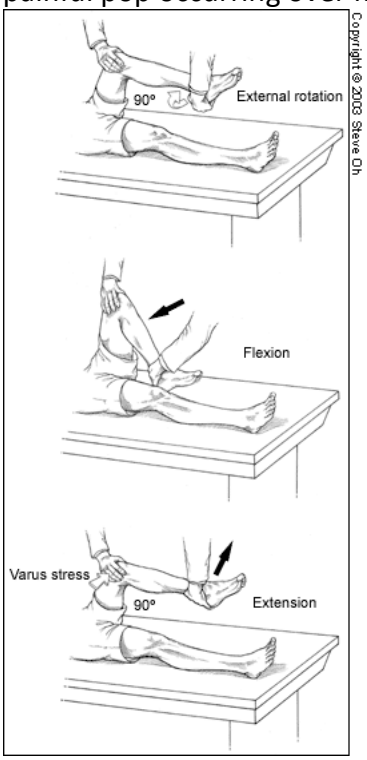


b. Anterior Drawer Test – Excessive translation of both tibial condyles when applying anterior pull to proximal tibia while patient supine and relaxed with hip at 45 degrees, knee at 90 degrees, and foot in neutral position (Can externally rotate foot looking for just anterior rotation of medial condyle to suggest MCL injury)
c. Pivot Shift – Patient supine and relaxed. Knee extended with foot and tibia internally rotated. Valgus applied at the knee and knee progressively flexed. Anterior subluxation of lateral tibial condyle seen and felt at 30 degrees which suddenly reduces with further flexion.

2. PCL
   a. Posterior Sag – Patient in anterior drawer position with tibia dropping or sagging back indicative of PCL tear
   b. Posterior Drawer – Same as anterior drawer with exception of looking for posterior translation with posterior force
   c. Godfrey (gravity) Test – Patient supine while examiner holds both legs while flexing the patient's hips and knees to 90 degrees. Posterior sag/instability for PCL tear

C. Meniscus

1. McMurray's test – Patient supine and relaxed. Flex knee maximally with external tibial rotation (medial) or internal tibial rotation (lateral). While maintaining rotation, bring knee into full extension. Positive test is painful pop occurring over medial joint line or lateral joint line.



2. Apley's compression test – Patient is in prone position. Knee flexed to 90 degrees with external tibial rotation (medial) or internal tibial rotation

(lateral). Apply axial compression to tibia while flexing and extending knee. Positive test is painful pop over medial joint line or lateral joint line

3. Bounce home test – Patient lies in supine position and the heel of the patient's foot is cupped in the examiner's hand. The patient's knee is completely flexed, and the knee is passively allowed to extend. If extension is not complete or if with sharp pain along joint line, may be meniscus tear.

D. Patellofemoral

1. Clarke's Sign (Patellar Grind Test) – Pain with contraction of quadriceps as the examiner presses down slightly proximal to the upper pole of the patella with the patient supine, relaxed and with extended knee
2. Active patellar grind test – Crepitus felt by the examiner as the patient extends the knee while seated with the knee in 90 degrees flexion
3. Apprehension/Hypermobility test – Pain, apprehension, or excessive motion with lateral displacement of the patella by the examiner as the patient is supine and relaxed with the knee slightly flexed

E. Others

1. Q angle - Angle defined as the angle between the quadriceps muscles and the patellar tendon representing the angle of the quadriceps muscle force. Obtained by drawing a line from ASIS to midpoint of patella and intersecting with a line from tibial tubercle through midpoint of patella. Normal angle for males is 13 degrees and for females is 18 degrees.
2. Leg length – Measurement from ASIS to medial or lateral malleolus

V. Diagnostic Imagine

A. X-rays

1. Ottawa rules – X-rays only necessary in acute knee injuries if the patient is great than or equal to 55 years of age or had isolated tenderness of the patella, tenderness at the head of the fibula, inability to flex the knee to 90 degrees, or an inability to walk four steps.
2. AP – weight bearing vs. non-weight bearing
3. Lateral
4. Skyline – used to evaluate the patellofemoral joint
5. Intercondylar Notch – Notch often smaller in women and may contribute to ACL injury.

B. CT – Allows more detailed bony evaluation

C. MRI – Can give better bony evaluation and very good evaluation of soft tissue structures.

D. Ultrasound – Good, detailed evaluation of soft tissue structures

Principles of the Musculoskeletal Exam

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I. History
   A. Presentation or chief complaint
      1. Pain
      2. Instability
      3. Stiffness
      4. Weakness
      5. Catching or locking
      6. Swelling
      7. Paresthesias
   B. History of current illness
      1. Onset
      2. Clinical course and influence of treatment
      3. Progression of the process
         a. Progressive
         b. Improving
         c. Up and down
      4. Current status of the problem
         a. Character and intensity
         b. How does it interfere with activities of daily living, work, and recreation?
      5. Problems or symptoms from other muscles or joints
      6. Systemic signs or symptoms (e.g., fever, night sweats, fatigue, etc)
   C. Past medical history
      1. Previous injuries or problems involving the same muscle group or joint
      2. Previous history of injury
      3. Previous surgeries
      4. Medical problems
         a. Rheumatologic diseases
         b. Endocrine disorders (e.g., diabetes mellitus, thyroid disease, osteoporosis)
         c. Medications
         d. Drug allergies
   D. Review of systems
      1. Problems or symptoms from other muscles or joints
      2. Systemic signs or symptoms (e.g., fever, night sweats, fatigue)
      3. Other signs or symptoms (e.g., swelling, shortness of breath, chest pain)
   E. Family history
   F. Social history

1. Job activity
2. Recreational activity and/or sports
3. Drug, ergogenic aide, and supplement use

G. Summary

1. Get enough information about the injury so that you can confidently classify it into one of four categories:
    a. Acute injury
    b. Chronic injury
    c. Acute on chronic injury
    d. Chronic on acute injury
2. Try to generate a hypothesis regarding "why now?"

II. Physical exam

A. Overall format (Hawkins)

1. Initial impression
2. Inspection
3. Palpation
4. Range of motion
5. Neurological examination
6. Stability assessment
7. Special tests
8. Measurements
9. Vascularity
10. Gait analysis
11. General assessment

B. General approach (Cyriak)

1. Observation
2. Active range of motion
3. Passive range of motion
4. Resisted muscle testing
5. Special tests

C. **Observation**

1. General distress and disability
2. Functional assessment
3. Gross swelling and/or deformity
4. **Attitude**: Position in which the patient holds the involved part relative to the body, and the posture of the segment in that position.
5. **Alignment**
    a. Varus deformity: Distal segment is deviated toward the midline
    b. Valgus deformity: Distal segment is deviated away from the midline
6. Muscle bulk and contour
    a. Acute hypertrophy indicates muscle spasm
    b. Atrophy indicates neurologic deficiency or musculotendinous rupture

D. **Active range of motion**
    1. Observation of movement in the basic planes of movement
        a. Frontal plane: flexion and extension
        b. Coronal plane: abduction (away from the body) and adduction (toward the body)
        c. Transverse plane: internal and external rotation
    2. Note range of motion (compare sides) and amount of pain (and when the pain occurred)

E. **Passive range of motion**
    1. Patient relaxes the muscles completely while examiner moves the affected joint through the planes of motion
    2. Note range of motion and pain

F. **Resisted muscle testing**
    1. Resist patient's movement in the planes of movement – do not allow movement
    2. Position yourself at a mechanical advantage over the limb you are testing.
    3. Note pain and strength
        0 = no contraction felt
        1 = muscle can be felt to tighten but cannot produce movement
        2 = produces movement with gravity eliminated but cannot function against gravity
        3 = can raise against gravity
        4 = can raise against outside moderate resistance as well as against gravity
        5 = normal full strength

G. **Palpation**
    1. Assess for swelling
    2. Be systematic in palpating. Use bones and joint lines as frames of reference
    3. Identifying joint line pain is important

H. Special tests
    1. Includes tests for ligament integrity and joint stability
    2. Used primarily to confirm a diagnosis

DEPARTMENT
OF
FAMILY MEDICINE

LOW BACK PAIN
EXERCISES

From:
UMHS Guidelines for Clinical Care

University of Michigan
Hospitals and Health Centers

Acute Low Back Pain

What is low back pain?

Almost everyone has back pain at one time or another. The pain may be in the center of the back or to one side, or even move down the leg. Symptoms may also include pain in the back and the buttocks or legs, stiffness, limited motion and spasm.

What are the risk factors?

Risk factors for back pain include:

- Obesity
- Lack of exercise
- Heavy physical work
- Accidents
- Vibration (i.e., driving a truck),
- Smoking

Family history may add to the chance of having low back pain.
Being overweight may increase the risk for low back pain because of the added stress on the back.

How does it occur?

Spinal Disks (also called: **Intervertebral disks**) are stacked between the spine bones. When you walk or run, the disks act as shock absorbers and prevent the spine bones from bumping against one another.

We don't know a lot about what causes low back pain. Some likely causes include: pulled muscles, strained ligaments, tight joints or small tears in the spinal disks. The problem is that these tears and pulls don't show up well on x-rays.

Should I have an x-ray?

Most people with low-back pain do not need an x-ray. X-rays do not provide any useful information that has an effect on treatment. Your doctor may order x-rays or other studies if your specific symptoms indicate a need for these tests or if your back pain does not go away in 4-6 weeks.

What is the treatment?

The good news is that 90% of people with acute low back pain recover within 4 - 6 weeks.

Most treatment plans for low back pain include the following:

- **Staying active.** Lying in bed or cutting back on activity is not helpful. People get better faster if they stay active at home and work. Common exercise such as walking, swimming or riding a stationary bike can be helpful in many cases. Your doctor may limit your activity if your job or the sports you play are very physical.
- **Stretching.** Most patients with acute low back pain benefit from doing stretches 2-3 times daily. Hold the stretch for 20-30 seconds, take a break and do it again. If a stretch seems to make things worse, or if it causes pain to go down your leg, seek further advice from a healthcare provider or your doctor.
- **Ice packs.** (plastic bag with ice cubes and water, wrapped in a towel). Apply the ice pack for 20-30 minutes at a time. The pack will feel cold at first, but it may help to decrease pain, spasm and inflammation in the back. There's nothing wrong with trying heat if it works, but ice may be better.
- **Exercise.** Common aerobic and conditioning exercises, such as brisk walking, swimming or riding a stationary bicycle can be very helpful.
- **Medications.** If your doctor recommends medications, it is very important that you take them on a regular basis and not only when you hurt.

When should I call my doctor?

Call your doctor right away if you have:

- Trouble controlling your bladder or bowels
- Numbness or weakness in the feet legs, groin or rectal area
- Pain that gets worse or extends into your leg and below the knees
- Pain that limits your normal activities for more than 4 weeks
- Shooting pain down the leg

How do I rest my back?

Hold each of these positions for 5 minutes or longer. Start each exercise lying on your back.

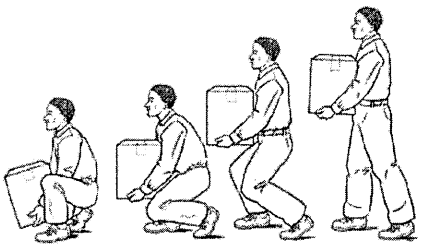
- Put pillows under your knees and bend your knees.
- Lie on a floor in front of a chair. Put a pillow under your neck, bend your knees to a 90-degree angle, and place your lower legs and feet on the chair.
- Bend your knees. Bring one knee up to your chest. Grab your thigh with your hand and hold it there. Repeat with the other knee. Bring both knees to your chest and hold. Grabbing your thigh rather than your lower leg prevents over-flexing your knee.

When can I return to my activity or sport?

Returning to activity or sport too soon may worsen your injury and could lead to lasting damage. When you can return to activities will depend on how soon your back gets better. The rate of recovery is not the same for all people. Some people recover in days, but for others it may take several weeks or months until their back is strong enough. As a general rule, the longer you have symptoms before you start treatment, the longer it will take to get better.

It is very important that you follow your doctor's advice about returning to activities. Your back must be fully recovered before returning to sports or strenuous activities. This means that you have the same range-of-motion you had before the injury and that you are able to run, jump and twist without pain. Your doctor will allow you to return to activities as soon as it is safe to do that.

What can I do to help prevent low back pain?



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The following tips may help to reduce the strain on your back:

- When you move a heavy object do not push it with your arms. Turn around and push it backwards. This shifts the strain from your back to your legs.
- When you lift a heavy object follow these instructions:
    - keep the object close to your body with your arms bent
    - bend your knees and hips
    - keep your back straight
    - do not lift heavy objects higher than your waist

  The stronger your legs are, the easier it will be to lift.
- Sit in straight back chairs. Hold your spine against the back of the chair when you sit.
- Do not sit in one place or in one position for a long time. Get up and stretch, walk about and change positions.
- When you sit in one spot for a long time, use a footrest for one foot. This will help to keep your back straight.
- When you drive sit close to the pedals and use your seat belt and a hard backrest or pillow.
- When you sleep or rest lie on your side and bend your knees. You can

also try putting a pillow between your knees.

- When you sleep on your back put a pillow under your knees.
- If you smoke, ask your doctor for help on how to quit. Smoking limits blood flow to the discs and muscles in your back and slows their healing.
- A regular exercise program will help your back and keep you healthy overall. Talk with your doctor before starting any exercise program. Also, see a professional trainer or a physical therapist for exercise advice that fits your specific needs.
    - For aerobic exercise such as walking, bicycling or swimming, start with low intensity exercise about 5 - 10 minutes of exercise a day, three days a week, and slowly work up to 30 minutes of exercise a day for five days a week. If you can't start with 5 - 10 minutes of exercise, do 2-3 minutes, or whatever you can.
    - Strength training is also good for your body and back. You can start with leg strengthening exercises that will help your back when it comes to lifting heavy objects. Use strength training machines if you can. Start with lighter weights, completing 10 to 15 repetitions before increasing the weight at your next workout. Keep in mind that stronger muscles will allow you to do more work and help reduce the risk of back injury.

DEPARTMENT
OF
FAMILY MEDICINE

CONTRACEPTION

HANDOUTS

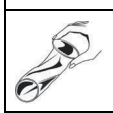
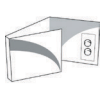
U.S. FOOD & DRUG ADMINISTRATION
www.fda.gov/birthcontrol

BIRTH CONTROL GUIDE

If you do not want to get pregnant, there are many birth control options to choose from. No one product is best for everyone. Some methods are more effective than others at preventing pregnancy. Check the pregnancy rates on this chart to get an idea of how effective the product is at preventing pregnancy. The pregnancy rates tell you the number of pregnancies expected per 100 women during the first year of typical use. Typical use shows how effective the different methods are during actual use (including sometimes using a method in a way that is not correct or not consistent). The only sure way to avoid pregnancy is not to have any sexual contact. Talk to your healthcare provider about the best method for you.

Most Effective

Least Effective

FDA-Approved Methods	Number of pregnancies expected (per 100 Women)*	Use	Some Risks or Side Effects* This chart does not list all of the risks and side effects for each product.
 Sterilization Surgery for Women	Less than 1	Onetime procedure. Permanent.	Pain Bleeding Infection or other complications after surgery
 Sterilization Implant for Women	Less than 1	Onetime procedure. Permanent.	Pain/ cramping Pelvic or back discomfort Vaginal bleeding
 Sterilization Surgery for Men	Less than 1	Onetime procedure. Permanent.	Pain Bleeding Infection
 IUD Copper	Less than 1	Inserted by a healthcare provider. Lasts up to 10 years.	Cramps Heavier, longer periods Spotting between periods
 IUD with Progestin	Less than 1	Inserted by a healthcare provider. Lasts up to 3-5 years, depending on the type.	Irregular bleeding No periods (amenorrhea) Abdominal/pelvic pain
 Implantable Rod	Less than 1	Inserted by a healthcare provider. Lasts up to 3 years.	Menstrual Changes Mood swings or depressed mood Weight gain Headache Acne
Shot/ Injection 	6	Need a shot every 3 months.	Loss of bone density Irregular bleeding/ Bleeding between periods Headaches Weight gain Nervousness Dizziness Abdominal discomfort
 Oral Contraceptives "The Pill" (Combined Pill)	9	Must swallow a pill every day.	Spotting/ bleeding between periods Nausea Breast tenderness Headache
 Oral Contraceptives "The Pill" (Extended/ Continuous Use Combined Pill)	9	Must swallow a pill every day.	Spotting/ bleeding between periods Nausea Breast tenderness Headache
 Oral Contraceptives "The Mini Pill" (Progestin Only)	9	Must swallow a pill at the same time every day.	Spotting/ bleeding between periods Nausea Breast tenderness Headache
 Patch	9	Put on a new patch each week for 3 weeks (21 total days). Don't put on a patch during the fourth week.	Spotting or bleeding between menstrual periods Nausea Stomach pain Breast tenderness Headache Skin irritation
 Vaginal Contraceptive Ring	9	Put the ring into the vagina yourself. Keep the ring in your vagina for 3 weeks and then take it out for one week.	Vaginal discharge, discomfort in the vagina, and mild irritation. Headache Mood changes Nausea Breast tenderness
 Diaphragm with Spermicide	12	Must use every time you have sex.	Irritation Allergic reactions Urinary tract infection
 Sponge with Spermicide	12-24	Must use every time you have sex.	Irritation
 Cervical Cap with Spermicide	17-23	Must use every time you have sex.	Irritation Allergic reactions Abnormal Pap test
 Male Condom	18	Must use every time you have sex. Provides protection against some STDs.	Irritation Allergic reactions
 Female Condom	21	Must use every time you have sex. Provides protection against some STDs.	Discomfort or pain during insertion or sex. Burning sensation, rash or itching
 Spermicide Alone	28	Must use every time you have sex.	Irritation Allergic reactions Urinary tract infection
OTHER CONTRACEPTION			
Emergency Contraceptives (EC): May be used if you did not use birth control or if your regular birth control fails (such as a condom breaks). It should not be used as a regular form of birth control. Emergency contraception prevents about 55 - 85% of predicted pregnancies.			
Levonorgestrel 1.5 mg (1 pill) Levonorgestrel .75 mg (2 pills) 	7 out of every 8 women who would have gotten pregnant will not become pregnant after taking this EC.	Swallow the pills as soon as possible within 3 days after having unprotected sex.	Menstrual changes Headache Nausea Dizziness Vomiting Breast pain Tiredness Lower stomach (abdominal) pain
Ulipristal Acetate 	6 or 7 out of every 10 women who would have gotten pregnant will not become pregnant after taking this EC.	Swallow the pills within 5 days after having unprotected sex.	Headache Nausea Abdominal pain Menstrual pain Tiredness Dizziness

*For more information on the chance of getting pregnant while using a method or on the risks of a specific product, please check the product label or Trussell, J. (2011). "Contraceptive failure in the United States." Contraception 83(5):397-404.

Summary Chart of U.S. Medical Eligibility Criteria for Contraceptive Use

Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion

Condition	Sub-Condition	Cu-IUD		LNG-IUD		Implant		DMPA		POP		CHC	
		I	C	I	C	I	C	I	C	I	C	I	C
Age		Menarche to <20 yrs:**2**		Menarche to <20 yrs:**2**		Menarche to <18 yrs:**1**		Menarche to <18 yrs:**2**		Menarche to <18 yrs:**1**		Menarche to <40 yrs:**1**	
		≥20 yrs:**1**		≥20 yrs:**1**		18-45 yrs:**1**		18-45 yrs:**1**		18-45 yrs:**1**		≥40 yrs:**2**	
						>45 yrs:**1**		>45 yrs:**2**		>45 yrs:**1**			
Anatomical abnormalities	a) Distorted uterine cavity	**4**		**4**									
	b) Other abnormalities	**2**		**2**									
Anemias	a) Thalassemia	**2**		**1**		**1**		**1**		**1**		**1**	
	b) Sickle cell disease‡	**2**		**1**		**1**		**1**		**1**		**2**	
	c) Iron-deficiency anemia	**2**		**1**		**1**		**1**		**1**		**1**	
Benign ovarian tumors	(*including cysts*)	**1**		**1**		**1**		**1**		**1**		**1**	
Breast disease	a) Undiagnosed mass	**1**		**2**		**2***		**2***		**2***		**2***	
	b) Benign breast disease	**1**		**1**		**1**		**1**		**1**		**1**	
	c) Family history of cancer	**1**		**1**		**1**		**1**		**1**		**1**	
	d) Breast cancer‡												
	i) Current	**1**		**4**		**4**		**4**		**4**		**4**	
	ii) Past and no evidence of current disease for 5 years	**1**		**3**		**3**		**3**		**3**		**3**	
Breastfeeding	a) <21 days postpartum					**2***		**2***		**2***		**4***	
	b) 21 to <30 days postpartum												
	i) With other risk factors for VTE					**2***		**2***		**2***		**3***	
	ii) Without other risk factors for VTE					**2***		**2***		**2***		**3***	
	c) 30-42 days postpartum												
	i) With other risk factors for VTE					**1***		**1***		**1***		**3***	
	ii) Without other risk factors for VTE					**1***		**1***		**1***		**2***	
	d) >42 days postpartum					**1***		**1***		**1***		**2***	
Cervical cancer	Awaiting treatment	**4**	**2**	**4**	**2**	**2**		**2**		**1**		**2**	
Cervical ectropion		**1**		**1**		**1**		**1**		**1**		**1**	
Cervical intraepithelial neoplasia		**1**		**2**		**2**		**2**		**1**		**2**	
Cirrhosis	a) Mild (*compensated*)	**1**		**1**		**1**		**1**		**1**		**1**	
	b) Severe‡ (*decompensated*)	**1**		**3**		**3**		**3**		**3**		**4**	
Cystic fibrosis‡		**1***		**1***		**1***		**2***		**1***		**1***	
Deep venous thrombosis (DVT)/Pulmonary embolism (PE)	a) History of DVT/PE, not receiving anticoagulant therapy												
	i) Higher risk for recurrent DVT/PE	**1**		**2**		**2**		**2**		**2**		**4**	
	ii) Lower risk for recurrent DVT/PE	**1**		**2**		**2**		**2**		**2**		**3**	
	b) Acute DVT/PE	**2**		**2**		**2**		**2**		**2**		**4**	
	c) DVT/PE and established anticoagulant therapy for at least 3 months												
	i) Higher risk for recurrent DVT/PE	**2**		**2**		**2**		**2**		**2**		**4***	
	ii) Lower risk for recurrent DVT/PE	**2**		**2**		**2**		**2**		**2**		**3***	
	d) Family history (*first-degree relatives*)	**1**		**1**		**1**		**1**		**1**		**2**	
	e) Major surgery												
	i) With prolonged immobilization	**1**		**2**		**2**		**2**		**2**		**4**	
	ii) Without prolonged immobilization	**1**		**1**		**1**		**1**		**1**		**2**	
	f) Minor surgery without immobilization	**1**		**1**		**1**		**1**		**1**		**1**	
Depressive disorders		**1***		**1***		**1***		**1***		**1***		**1***	

Condition	Sub-Condition	Cu-IUD		LNG-IUD		Implant		DMPA		POP		CHC	
		I	C	I	C	I	C	I	C	I	C	I	C
Diabetes	a) History of gestational disease	**1**		**1**		**1**		**1**		**1**		**1**	
	b) Nonvascular disease												
	i) Non-insulin dependent	**1**		**2**		**2**		**2**		**2**		**2**	
	ii) Insulin dependent	**1**		**2**		**2**		**2**		**2**		**2**	
	c) Nephropathy/retinopathy/neuropathy‡	**1**		**2**		**2**		**3**		**2**		**3/4***	
	d) Other vascular disease or diabetes of >20 years' duration‡	**1**		**2**		**2**		**3**		**2**		**3/4***	
Dysmenorrhea	Severe	**2**		**1**		**1**		**1**		**1**		**1**	
Endometrial cancer‡		**4**	**2**	**4**	**2**	**1**		**1**		**1**		**1**	
Endometrial hyperplasia		**1**		**1**		**1**		**1**		**1**		**1**	
Endometriosis		**2**		**1**		**1**		**1**		**1**		**1**	
Epilepsy‡	(*see also Drug Interactions*)	**1**		**1**		**1***		**1***		**1***		**1***	
Gallbladder disease	a) Symptomatic												
	i) Treated by cholecystectomy	**1**		**2**		**2**		**2**		**2**		**2**	
	ii) Medically treated	**1**		**2**		**2**		**2**		**2**		**3**	
	iii) Current	**1**		**2**		**2**		**2**		**2**		**3**	
	b) Asymptomatic	**1**		**2**		**2**		**2**		**2**		**2**	
Gestational trophoblastic disease‡	a) Suspected GTD (immediate postevacuation)												
	i) Uterine size first trimester	**1***		**1***		**1***		**1***		**1***		**1***	
	ii) Uterine size second trimester	**2***		**2***		**1***		**1***		**1***		**1***	
	b) Confirmed GTD												
	i) Undetectable/non-pregnant ß-hCG levels	**1***	**1***	**1***	**1***	**1***		**1***		**1***		**1***	
	ii) Decreasing ß-hCG levels	**2***	**1***	**2***	**1***	**1***		**1***		**1***		**1***	
	iii) Persistently elevated ß-hCG levels or malignant disease, with no evidence or suspicion of intrauterine disease	**2***	**1***	**2***	**1***	**1***		**1***		**1***		**1***	
	iv) Persistently elevated ß-hCG levels or malignant disease, with evidence or suspicion of intrauterine disease	**4***	**2***	**4***	**2***	**1***		**1***		**1***		**1***	
Headaches	a) Nonmigraine (mild or severe)	**1**		**1**		**1**		**1**		**1**		**1***	
	b) Migraine												
	i) Without aura (includes menstrual migraine)	**1**		**1**		**1**		**1**		**1**		**2***	
	ii) With aura	**1**		**1**		**1**		**1**		**1**		**4***	
History of bariatric surgery‡	a) Restrictive procedures	**1**		**1**		**1**		**1**		**1**		**1**	
	b) Malabsorptive procedures	**1**		**1**		**1**		**1**		**3**		COCs: **3** P/R: **1**	
History of cholestasis	a) Pregnancy related	**1**		**1**		**1**		**1**		**1**		**2**	
	b) Past COC related	**1**		**2**		**2**		**2**		**2**		**3**	
History of high blood pressure during pregnancy		**1**		**1**		**1**		**1**		**1**		**2**	
History of Pelvic surgery		**1**		**1**		**1**		**1**		**1**		**1**	
HIV	a) High risk for HIV	**2**	**2**	**2**	**2**	**1**		**2***		**1**		**1**	
	b) HIV infection					**1***		**1***		**1***		**1***	
	i) Clinically well receiving ARV therapy	**1**	**1**	**1**	**1**	If on treatment, see Drug Interactions							
	ii) Not clinically well or not receiving ARV therapy‡	**2**	**1**	**2**	**1**	If on treatment, see Drug Interactions							

Key:

1 No restriction (method can be used)	**3 Theoretical or proven risks usually outweigh the advantages**
2 Advantages generally outweigh theoretical or proven risks	**4 Unacceptable health risk (method not to be used)**

Abbreviations: C=continuation of contraceptive method; CHC=combined hormonal contraception (pill, patch, and, ring); COC=combined oral contraceptive; Cu-IUD=copper-containing intrauterine device; DMPA = depot medroxyprogesterone acetate; I=initiation of contraceptive method; LNG-IUD=levonorgestrel-releasing intrauterine device; NA=not applicable; POP=progestin-only pill; P/R=patch/ring ‡ Condition that exposes a woman to increased risk as a result of pregnancy. *Please see the complete guidance for a clarification to this classification: www.cdc.gov/reproductivehealth/unintendedpregnancy/USMEC.htm.

Summary Chart of U.S. Medical Eligibility Criteria for Contraceptive Use

Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion

Condition	Sub-Condition	Cu-IUD		LNG-IUD		Implant		DMPA		POP		CHC	
		I	C	I	C	I	C	I	C	I	C	I	C
Hypertension	a) Adequately controlled hypertension	1*		1*		1*		2*		1*		3*	
	b) Elevated blood pressure levels (*properly taken measurements*)												
	i) Systolic 140-159 or diastolic 90-99	1*		1*		1*		2*		1*		3*	
	ii) Systolic ≥160 or diastolic ≥100‡	1*		2*		2*		3*		2*		4*	
	c) Vascular disease	1*		2*		2*		3*		2*		4*	
Inflammatory bowel disease	(*Ulcerative colitis, Crohn's disease*)	1		1		1		2		2		2/3*	
Ischemic heart disease‡	Current and history of	1		2	3	2	3	3		2	3	4	
Known thrombogenic mutations‡		1*		2*		2*		2*		2*		4*	
Liver tumors	a) Benign												
	i) Focal nodular hyperplasia	1		2		2		2		2		2	
	ii) Hepatocellular adenoma‡	1		3		3		3		3		4	
	b) Malignant‡ (hepatoma)	1		3		3		3		3		4	
Malaria		1		1		1		1		1		1	
Multiple risk factors for atherosclerotic cardiovascular disease	(e.g., older age, smoking, diabetes, hypertension, low HDL, high LDL, or high triglyceride levels)	1		2		2*		3*		2*		3/4*	
Multiple sclerosis	a) With prolonged immobility	1		1		1		2		1		3	
	b) Without prolonged immobility	1		1		1		2		1		1	
Obesity	a) Body mass index (BMI) ≥30 kg/m²	1		1		1		1		1		2	
	b) Menarche to <18 years and BMI ≥ 30 kg/m²	1		1		1		2		1		2	
Ovarian cancer‡		1		1		1		1		1		1	
Parity	a) Nulliparous	2		2		1		1		1		1	
	b) Parous	1		1		1		1		1		1	
Past ectopic pregnancy		1		1		1		1		2		1	
Pelvic inflammatory disease	a) Past												
	i) With subsequent pregnancy	1	1	1	1	1		1		1		1	
	ii) Without subsequent pregnancy	2	2	2	2	1		1		1		1	
	b) Current	4	2*	4	2*	1		1		1		1	
Peripartum cardiomyopathy‡	a) Normal or mildly impaired cardiac function												
	i) <6 months	2		2		1		1		1		4	
	ii) ≥6 months	2		2		1		1		1		3	
	b) Moderately or severely impaired cardiac function	2		2		2		2		2		4	
Postabortion	a) First trimester	1*		1*		1*		1*		1*		1*	
	b) Second trimester	2*		2*		1*		1*		1*		1*	
	c) Immediate postseptic abortion	4		4		1*		1*		1*		1*	
Postpartum (*nonbreastfeeding women*)	a) <21 days					1		1		1		4	
	b) 21 days to 42 days												
	i) With other risk factors for VTE					1		1		1		3*	
	ii) Without other risk factors for VTE					1		1		1		2	
	c) >42 days					1		1		1		1	
Postpartum (*in breastfeeding or non-breastfeeding women, including cesarean delivery*)	a) <10 minutes after delivery of the placenta												
	i) Breastfeeding	1*		2*									
	ii) Nonbreastfeeding	1*		1*									
	b) 10 minutes after delivery of the placenta to <4 weeks	2*		2*									
	c) ≥4 weeks	1*		1*									
	d) Postpartum sepsis	4		4									

Condition	Sub-Condition	Cu-IUD		LNG-IUD		Implant		DMPA		POP		CHC	
		I	C	I	C	I	C	I	C	I	C	I	C
Pregnancy		4*		4*		NA*		NA*		NA*		NA*	
Rheumatoid arthritis	a) On immunosuppressive therapy	2	1	2	1	1		2/3*		1		2	
	b) Not on immunosuppressive therapy	1		1		1		2		1		2	
Schistosomiasis	a) Uncomplicated	1		1		1		1		1		1	
	b) Fibrosis of the liver‡	1		1		1		1		1		1	
Sexually transmitted diseases (STDs)	a) Current purulent cervicitis or chlamydial infection or gonococcal infection	4	2*	4	2*	1		1		1		1	
	b) Vaginitis (*including trichomonas vaginalis and bacterial vaginosis*)	2	2	2	2	1		1		1		1	
	c) Other factors relating to STDs	2*	2	2*	2	1		1		1		1	
Smoking	a) Age <35	1		1		1		1		1		2	
	b) Age ≥35, <15 cigarettes/day	1		1		1		1		1		3	
	c) Age ≥35, ≥15 cigarettes/day	1		1		1		1		1		4	
Solid organ transplantation‡	a) Complicated	3	2	3	2	2		2		2		4	
	b) Uncomplicated	2		2		2		2		2		2*	
Stroke‡	History of cerebrovascular accident	1		2		2	3	3		2	3	4	
Superficial venous disorders	a) Varicose veins	1		1		1		1		1		1	
	b) Superficial venous thrombosis (acute or history)	1		1		1		1		1		3*	
Systemic lupus erythematosus‡	a) Positive (or unknown) antiphospholipid antibodies	1*	1*	3*		3*		3*	3*	3*		4*	
	b) Severe thrombocytopenia	3*	2*	2*		2*		3*	2*	2*		2*	
	c) Immunosuppressive therapy	2*	1*	2*		2*		2*	2*	2*		2*	
	d) None of the above	1*	1*	2*		2*		2*	2*	2*		2*	
Thyroid disorders	Simple goiter/ hyperthyroid/hypothyroid	1		1		1		1		1		1	
Tuberculosis‡ (*see also Drug Interactions*)	a) Nonpelvic	1	1	1	1	1*		1*		1*		1*	
	b) Pelvic	4	3	4	3	1*		1*		1*		1*	
Unexplained vaginal bleeding	(suspicious for serious condition) before evaluation	4*	2*	4*	2*	3*		3*		2*		2*	
Uterine fibroids		2		2		1		1		1		1	
Valvular heart disease	a) Uncomplicated	1		1		1		1		1		2	
	b) Complicated‡	1		1		1		1		1		4	
Vaginal bleeding patterns	a) Irregular pattern without heavy bleeding	1		1	1	2		2		2		1	
	b) Heavy or prolonged bleeding	2*		1*	2*	2*		2*		2*		1*	
Viral hepatitis	a) Acute or flare	1		1		1		1		1		3/4*	2
	b) Carrier/Chronic	1		1		1		1		1		1	1
Drug Interactions													
Antiretroviral therapy All other ARV's are 1 or 2 for all methods.	Fosamprenavir (FPV)	1/2*	1*	1/2*	1*	2*		2*		2*		3*	
Anticonvulsant therapy	a) Certain anticonvulsants (phenytoin, carbamazepine, barbiturates, primidone, topiramate, oxcarbazepine)	1		1		2*		1*		3*		3*	
	b) Lamotrigine	1		1		1		1		1		3*	
Antimicrobial therapy	a) Broad spectrum antibiotics	1		1		1		1		1		1	
	b) Antifungals	1		1		1		1		1		1	
	c) Antiparasitics	1		1		1		1		1		1	
	d) Rifampin or rifabutin therapy	1		1		2*		1*		3*		3*	
SSRIs		1		1		1		1		1		1	
St. John's wort		1		1		2		1		2		2	

Updated in 2017. This summary sheet only contains a subset of the recommendations from the U.S. MEC. For complete guidance, see: http://www.cdc.gov/reproductivehealth/unintendedpregnancy/USMEC.htm. Most contraceptive methods do not protect against sexually transmitted diseases (STDs). Consistent and correct use of the male latex condom reduces the risk of STDs and HIV.

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SECTION IV. Reproductive Health

97 Contraception

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KEY POINTS

- More than half of all pregnancies in the United States are unintentional, as are 92% of pregnancies in adolescents aged 15 to 19 years. Unintentional pregnancies occur because contraceptives are not used, because they are used sporadically or incorrectly, or due to failure of the contraceptive method despite proper use.
- Knowledge of contraceptive failure rates, risks, benefits, and acceptability allows the provider to "match" the contraceptive method to the needs and desires of the patient.
- Hormonal methods of birth control are the most commonly used reversible method; however, at 1 year, only about two-thirds of women continue their use.
- Long-acting reversible contraceptive (LARC) methods such as IUDs and implants can be used by women of all ages and are two of the most efficacious contraceptive methods available. An increase in use of LARC can be helpful in reducing unintended pregnancy.
- Condoms are the only method that offer some protection against sexually transmitted infections.
- Emergency contraception (postcoital contraception) is available as levonorgestrel 1.5 mg single dose; available as a nonprescription product and ulipristal a 30 mg single dose prescription medication. Levonorgestrel provides about a 75% reduction in risk of pregnancy while ulipristal reduces pregnancy risk by 85%. Ulipristal is more effective especially at >72 hours after unprotected intercourse.

I. Introduction. Contraception is an important topic to discuss with all sexually active men and women of childbearing age.

A. More than half of all pregnancies in the United States are unintentional, as are 92% of pregnancies in adolescents aged 15 to 19 years. Unintentional pregnancies occur because contraceptives are not used, because they are used sporadically or incorrectly, or due to failure of the contraceptive method despite proper use.

B. Numerous contraceptive options are available, so the choice of a particular option should take place after a review of the risk and benefits of all appropriate choices, and education on the option chosen so correct use is assured.

C. The only 100% effective method of birth control is abstinence. Correct use of any contraceptive device does not guarantee protection. Many women who experience unintended pregnancy use their selected methods consistently and properly; pregnancy rates also depend on the efficacy of the method in a typical user (see Table 97–1).

D. Long-acting reversible contraceptive (LARC) methods, primarily intrauterine devices (IUDs), are contributing to an increase in contraceptive effectiveness in the United States. The proportion of US women using the IUD and implant increased from 2.4% in 2002 to 8.5% in 2009, more than offsetting decreases in sterilization. These LARC methods require little intervention on the part of the user and do not interfere with sex.

II. Choosing a Birth Control Method. Consideration of the following factors will help patients make the best possible choices: accessibility, efficacy, safety, and acceptability. It is important to take the time also to educate patients about the risks and benefits of their birth control options. Studies have found that many women who begin using a contraceptive method stop using it within the first year of use. Less than half of women using spermicides alone, withdrawal, sponge, or condoms are still using them at 1 year; just over half continue use of Depo-Provera or diaphragms, and about two-thirds continue use of combined hormonal contraceptives. Rates of continued use are higher with IUDs and implants (78%–84%). Providing more complete information about the method may prevent discontinuation and can help women be knowledgeable about other options.

Desirable properties of contraceptives are a high rate of effectiveness, prolonged duration of action, reversibility for those desiring future fertility or permanence for those who

TABLE 97–1. CONTRACEPTIVE OPTIONS AVAILABLE IN THE UNITED STATES IN 2012

Method	Unintended Pregnancies with 1 yr of Use (%)		Noncontraceptive Benefits	Use with Breastfeeding
	Typical Use	Theoretical		
None	85	85	—	—
Spermicide	29	18	None	Yes
Withdrawal	27	4	None	Yes
Periodic abstinence (fertility awareness)	25	3–5	None	Yes
Diaphragm with spermicide	16	6	None	Yes
Female condom	21	5	Prevents STDs	Yes
Male condom	15	2	Prevents STDs	Yes
Oral contraceptive pills (OCPs)–combined and progestin-only	8	0.3	Regulation of menstrual cycle and dysmenorrhea, possible decrease in ovarian and endometrial cancer risk, acne	No
Contraceptive patch	8	0.3	Same as OCPs	No
Vaginal ring	8	0.3	Same as OCPs	No
Depo-Provera	3	0.3	Same as OCPs	Yes
Copper-containing IUD	0.8	0.6	None	Yes
Levonorgestrel IUD	0.2	0.2	Regulation of menstrual cycles and dysmenorrhea	Yes
Female sterilization	0.5	0.5	None	Yes
Male sterilization	0.15	0.10	None	Yes
Etonogestrel implant	0.05	0.05	Same as OCPs	Safety conditional

Source: Trussell J. Contraceptive efficacy. In Hatcher RA, Trussell J, Nelson AL, Cates W, Stewart FH, Kowal D, Policar M, eds. *Contraceptive Technology*. 20th rev ed. New York, NY: Ardent Media; 2011:827–1010; Herndon EJ, Zieman M. New contraceptive options. *Am Fam Physician*. 2004;69:853–860; Herndon EJ, Zieman M. *Improving Access to Quality Care in Family Planning: Medical Eligibility Criteria for Contraceptive Use*. 2nd ed. Geneva, Switzerland: Reproductive Health and Research, World Health Organization, 2000. http://whqlibdoc.who.int/publications/2004/9241562668.pdf. Accessed July 4, 2006; Speroff L, Fritz MA. *Clinical Gynecologic Endocrinology and Infertility*. 7th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2005.

wish to have no future fertility, privacy of use, protection against sexually transmitted infections (STIs), safety, and acceptable or minimal side effects. To support informed contraceptive decision-making, healthcare professionals should realize that a woman's view of a method's ease of use is more important than perceived efficacy, tolerability, health benefits, or risks.

A. Efficacy

1. **Theoretical efficacy rates** are defined as the rate of unintended pregnancies per 100 women estimated to occur during the first year of use of a given contraceptive method assuming correct and consistent use.
2. **Actual efficacy rates** reflect the actual rate of unintended pregnancies per 100 women during the first year of use of a given contraceptive method if they do not stop using the method for any other reason. The efficacy of a given contraceptive method is influenced by many factors including fertility, the frequency of intercourse, the ability of the patient to use the method properly, and the theoretical efficacy rate of the method.
3. **Safety concerns** include risks of morbidity and mortality as well as noncontraceptive safety benefits (see Table 97–2), such as protection from STIs or resolution of menstrual problems.
4. **Acceptability** of a method depends on a number of subjective factors:
   a. **Cost.** What is the out of pocket cost to the individual using the method? Cost will vary based on health insurance coverage, retail pricing of nonprescription

TABLE 97–2. NONCONTRACEPTIVE HEALTH BENEFITS OF CONTRACEPTIVE METHODS

Agent	Benefits
Combined hormonal contraceptives	Decreased dysmenorrhea Decreased menstrual blood loss and anemia Possible reduction of premenstrual syndrome (PMS) Decreased risk of ectopic pregnancy Decreased risk of endometrial and ovarian cancer Decreased risk of pelvic inflammatory disease Reduction of acne
Progesterone-only contraceptives	Decreased dysmenorrhea Amenorrhea May reduce dysfunctional uterine bleeding in women who are overweight Decreases risk of endometrial and ovarian cancer Decreases risk of pelvic inflammatory disease Can decrease the number/severity of crises in patients with sickle-cell anemia Can decrease frequency of seizures, does not interact with antiepileptic medications Reduces risk of uterine leiomyomata formation
Levonorgestrel IUD	Decreases menstrual blood loss Decreased dysmenorrhea
Male/female condom	Decreased risk of STI transmission including HIV

methods, and should consider time off work for surgical or irreversible methods.

b. Individual preferences. Does the patient have any ethical or religious concerns regarding the method? Do they have a preference based on frequency (or lack) of menstrual cycles or based on noncontraceptive benefits of a particular method?

c. Duration. How long after initiation of the method is it considered effective? For what duration can the method be used and be considered effective?

d. Reversibility. For reversible methods: after discontinuation how long until the patient is able to conceive? For permanent methods, is irreversibility desired?

e. Privacy. Does the method afford the patient enough privacy? This includes having to purchase a nonprescription contraceptive at a retail store, having to store the contraceptive in a private location, taking time to see a healthcare provider for an injection, the visibility of a subdermal implant, or even a scar from a surgical procedure.

f. Availability. Does the method require office visits, a prescription, or any other special situation to obtain?

g. Convenience. Is it easy to use the method when needed? Does it require an intentional action to apply or is it available when needed without additional effort?

B. Patient education. Providing clear instruction on proper use, expected side effects and how to minimize them, and potential risks of any contraceptive method is important. Pointing the patient to on-line educational resources such as www.womenshealth.gov can facilitate better understanding of options, side effects, and proper use.

III. Hormonal Contraception. This method works by suppressing ovulation and follicle maturation, thickening cervical mucus so that sperm are less effective, and making the endometrium less receptive to embryo implantation.

A. Oral contraception—combination of estrogen–progestin pills. This birth control method is used by an estimated 28% of reproductive-aged women and is the most popular form of reversible contraception in the United States. Oral contraceptives (OCs) contain different doses and two types of estrogen (ethinyl estradiol and mestranol, a prodrug converted to ethinyl estradiol) and different doses and types of progestin. Biphasic

TABLE 97–3. CHOOSING AMONG ORAL CONTRACEPTIVES (OCPs)

Patient Characteristics	Preferred Type of Oral Contraceptive	Generic Examples (Brand Name) Estrogen Content and Comments
Acne	Less androgenic activity pills: those containing third-generation progestins: norgestimate, desogestrel or drospirenone, or low-dose norethindrone	Norgestimate (Ortho Tri-Cyclen[a], Ortho-Cyclen, Sprintec); desogestrel (Desogen/Ortho-Cept, Apri, Mircette, Kariva, Ortho Tri-Cyclen Lo, Cyclessa); low-dose norethindrone (Ovcon 35, Brevicon, Modicon), norethindrone acetate (Estrostep[a]), drospirenone (Yaz, Beyaz, Yasmin, Safyral)
Nausea or breast tenderness when taking OCPs	Progestin-only or lower (20 mcg) estrogenic activity pills	Progestin-only: see above 20 mcg pills (Alesse, Loestrin 1/20, Aviane, Yaz)
No prior use of OCPs	Lower-dose pills minimize side effects	20 mcg pills, see above 30 mcg pills (Desogen, Ortho-Cept, Apri, Yasmin, Levlen, Levora, Loestrin 1.5/30, Lo/Ovral, Cryselle) 35 mcg pills (Ortho Novum 1/35, Ovcon 35, Demulen 1/35, Zovia 1/35E, Brevicon, Modicon, Neocon 0.5/35, Ortho-Cyclen, Sprintec, Norinyl 1+35, Necon 1/35, Tri-Norinyl, Ortho Novum 7/7/7)
Nursing women	Progestin-only pills will not interrupt milk supply	Norethindrone (Ovrette, Micronor)
Scanty or absent withdrawal bleeding	Build up endometrium	Increase estrogen dose or lower progestin dose/potency
Spotting/break-through bleeding (BTB)	Stabilize endometrium	Explore reasons for spotting: missing pills, erratic timing, drug interactions Reassure women that BTB is common during the first several month of OC use. Changing estrogen dose or type of progestin does not alter bleeding rates. Do not use progestin-only pills for women concerned about BTB (SOR B)
Use of rifampin, phenytoin, barbiturates or other liver enzyme-inducing medications	Use an alternative contraceptive (preferred; increased side effects of 50 mcg dose, uncertain contraceptive efficacy of higher estrogen dose) or increase estrogen to 50 mcg/tablet.	50 mcg pills (Ovral, Ovcon 50, Demulen, Ortho-Novum 1/50, Norinyl 1/50)

[a]FDA-approved for the treatment of acne.

and triphasic OCs contain different amounts of hormone throughout the menstrual cycle in an attempt to more closely mimic natural hormone production. However, there is insufficient evidence to support any clear benefit of multiphasic over monophasic formulations. Choosing among the many OCs can be done on the basis of characteristics of both the patient and the OC. See Table 97–3 for common characteristics and recommendations for use.

1. **Failure rate for typical use** is 9 pregnancies expected per 100 women per year; **correct use** <1 pregnancy per 100 women per year.
2. **Risks** include dizziness, nausea, breast tenderness, elevated blood pressure, thromboembolic disease, and change in menstruation and mood. It should be noted that the risk of deep vein thrombosis (DVT) or pulmonary embolus (PE) with any of these methods is significantly lower than that for pregnancy.
   a. **Contraindications.** For a complete list of conditions where the health risks likely outweigh the benefits of use or for which there are unacceptable health risks, the reader is referred to the Centers for Disease Control and Prevention at http://www.cdc.gov/reproductivehealth/UnintendedPregnancy/PDF/effectiveness_of_contraceptive_methods.pdf. OCs should not be used in the following cases:
      (1) Women older than 35 years who smoke more than 15 cigarettes per day.

(2) Women with cardiovascular problems, such as a history of thromboembolic disease or thrombogenic conditions, uncontrolled hypertension (>stage 2), cerebrovascular disease, and ischemic heart disease.

(3) Any woman who has migraine headaches with aura or any woman over age 35 years with migraine, due to an increased risk for stroke.

(4) Women <1 month postpartum because OCs can diminish breast milk production in the first month postpartum and increase risk for thromboembolic disease in the first 21 days postpartum. Progestin-only pills are acceptable. The American Academy of Pediatrics advises against the use of OCs as long as the woman is exclusively breastfeeding; women can begin OCs as soon as supplemental nutrition is part of the infant's diet.

(5) Known or suspected pregnancy is a contraindication; although these medications have no proven teratogenic potential, there is clearly no benefit for pregnant women.

(6) Women with other conditions including breast cancer, liver tumor, and cirrhosis of the liver.

3. **Benefits**
   a. **Reduction in risk of endometrial and ovarian cancers.** (SOR B)
   b. **More regular and less painful menstrual periods** with less bleeding and iron-deficiency anemia. Premenstrual syndrome may be less common and less severe in women using OCs, as are benign breast disease and benign ovarian cysts, endometriosis, acne, hirsutism, and anovulatory bleeding. (SOR B)
4. **Acceptability**
   a. **Convenience.** Must be taken daily.
   b. **Availability.** Current FDA regulations require a prescription.
5. **Extended use of combined OC pills**. Three agents are FDA approved for extended use. *Seasonale* and *Seasonique* contain 84 days of active tablets and seven placebo tablets, and *Lybrel* contains a full year of active tablets with no placebos. These agents are equally effective as more traditional monthly cycling, but have a greater risk for breakthrough bleeding during the first few months of use. Other monophasic combined OCs can be dosed for extended use, but are not FDA approved for this purpose. If doing so, typically, active tablets of three pill packs are used consecutively (63 tablets) followed by a 7-day placebo or no pill period.

B. Oral contraception—progestin-only pills. These medications contain only progestin and are most often used when combinations pills are contraindicated. They work by reducing and thickening cervical mucus, decreasing tubal motility and suppressing ovulation to prevent fertilization and by making the endometrium less receptive to embryo implantation. The only progestin-only pill available in the United States is norethindrone 0.35 mg, which is taken daily throughout the entire month with no week off for a menstrual period.

1. **Failure rate for typical use** is 9 pregnancies expected per 100 women per year; **correct use** <1 pregnancy per 100 women per year.
2. **Risks** include irregular bleeding, acne, and breast tenderness.
   a. **Contraindications.** This method should not be used in women with breast cancer. Known or suspected pregnancy, current DVT or PE, active hepatitis, severe cirrhosis, or benign/malignant liver tumors are also contraindications.
3. **Benefits include** the ability to use the methods during lactation, reduced risk of endometrial and ovarian cancers, and the fact that the progestin-only pill does not carry the cardiovascular and thromboembolic risks of combination OCs.
4. **Acceptability**
   a. **Convenience:** Must be taken daily. Due to relatively short duration of action and short half-life of medication, it must be taken at the same time every day for maximum efficacy. Because of compliance issues and increased rates of breakthrough bleeding compared with combined OCs, the progestin-only contraception pill is generally recommended only in breastfeeding women or for women who have a contraindication to estrogen use.
   b. **Availability.** Daily contraceptive agent requires a prescription. Progestin-based emergency contraceptive agents (see section III.G) are available as nonprescription products in the United States.

C. Injectable hormones. Depo-medroxyprogesterone acetate (Depo-Provera; DMPA) is a widely used contraceptive that is given as either a deep intramuscular injection of

150 mg or a subcutaneous injection of 104 mg every 12 weeks. The slower rate of absorption of the subcutaneous formulation allows for a lower dose of DMPA.

1. **Failure rate for typical use** is 6 pregnancies expected per 100 women per year; **correct use** <1 pregnancy/100 women/year.
2. **Risks include** irregular bleeding, weight gain, breast tenderness, headaches, and potentially delayed return of fertility (may be delayed as long as 10–18 months).
   a. **Contraindications.** This method should not be used in women with breast cancer or known or suspected pregnancy and used with caution in women at an increased risk for osteoporosis. There is considerable controversy over DMPA's effect on bone. Bone loss does occur and is greater with increasing duration of use. Most studies have shown that bone loss is reversible once a woman stops DMPA; however, especially in teenagers who have not reached their maximum bone density, clinical implications are unclear. Most experts agree that it is safe to use DMPA for over 2 years if it is the best contraceptive option available. All women on DMPA should be counseled about the potential risk of bone loss and should make sure to get adequate calcium and vitamin D intake. Prescribing oral estrogen supplementation may mitigate bone loss. There is insufficient evidence to support screening bone mineral density in long-term users.
3. **Benefits include amenorrhea** in addition to reduction in menorrhagia, dysmenorrhea, and iron-deficiency anemia. **Lactation is not adversely affected;** trace amounts are detectable in breast milk without apparent adverse effects to infants.
4. **Acceptability**
   a. **Convenience.** One injection every 3 months.
   b. **Availability.** Must have a prescription and access to a facility with the ability to administer the injection appropriately.

D. **Transdermal hormonal patch. Norelgestromin and ethinyl estradiol (Ortho Evra)** is a combination contraceptive that is provided in a transdermal system. Patches containing 6.00 mg norelgestromin and 0.75 mg ethinyl estradiol are placed on the skin of the buttocks, abdomen, upper torso, or upper outer arms weekly. Each patch releases 150 µg of norelgestromin and 20 µg of ethinyl estradiol daily. The patch functions similarly to combination OCs, but provides higher cumulative doses of estrogen, whereas pills have higher peak doses.

1. **Failure rate for typical use** is 9 pregnancies expected per 100 women per year; **correct use** <1 pregnancy per 100 women per year.
2. **Risks** are similar to combination OCs; however, the patch may be associated with an increased risk of blood clotting compared with OCs, based on early European studies. (SOR B) Some women experience skin irritation and/or difficulty with getting the patches to stick to the skin for an entire week.
   a. **Contraindications.** Same as those for combination OCs.
3. **Benefits** are the same as for OCs. The patch is more convenient in a transdermal route for some women.
4. **Acceptability** is enhanced over that of OCs because of the weekly transdermal route of administration.
   a. **Convenience.** The patch is applied once a week for 3 weeks. Patch is not worn during the fourth week, and women have a menstrual cycle during that week.
   b. **Availability:** Must have a prescription.

E. **Vaginal ring. A flexible silicone ring impregnated with etonogestrel and ethinyl estradiol (Nuvaring)** is another alternative route of administration for combination hormonal contraceptives. It delivers 0.120 mg of etonogestrel and 0.015 mg ethinyl estradiol daily. The ring is placed in the posterior fornix of the vagina; the exact position of the ring is not important for contraceptive function. Because of the "local" administration of hormones, lower doses can be used.

1. **Failure rate for typical use** is 9 pregnancies expected per 100 women per year; **correct use** <1 pregnancy per 100 women per year.
2. **Risks** include vaginal discharge and irritation; otherwise similar to combination OCs.
   a. **Contraindications** are the same as those for combination OCs.
3. **Benefits** are similar to those of OCs. May be associated with less prolonged bleeding or spotting.
4. **Acceptability.** It does not require daily administration and is a good choice for women who desire a lower dose of hormones.

a. **Convenience.** Inserted by the woman, the ring remains in place for 3 weeks and is then removed for 1 week. If out of place for more than 3 hours, an alternative method is required for 7 days after reinsertion.
b. **Availability.** Must have a prescription.

F. Subdermal Implant of etonogestrel is a long-term hormonal contraceptive available under the brand name "Nexplanon," which replaced the previous implant "Implanon." The implant is a 40 mm × 2 mm semirigid, radio-opaque plastic rod containing 68 mg of etonogestrel released over 3 years (initially 60–70 mcg per day, falling to 25–30 mcg per day at the end of the third year). As a progestin-only method, mechanisms of action are similar to those of the progestin-only contraceptive pill.

1. **Failure rate is <1** for both "typical" and "correct" use. There may be decreased contraceptive efficacy in obese women.
2. **Risks** include unscheduled bleeding, especially in the first 3 months of use which decreases during the first year. Other side effects are headache, weight gain, acne, and breast tenderness.
   a. **Contraindications.** Should not be used in women with breast cancer, a history of breast cancer, or known or suspected pregnancy.
3. **Benefits.** No action required for contraceptive efficacy once placed.
4. **Acceptability.** Because unscheduled bleeding is commonly experienced; however, the discontinuation rate does not appear to be higher for this method.
   a. **Convenience.** Must be placed by a physician via minor surgery. May remain in place for up to 3 years, and requires removal by a physician.
   b. **Availability.** Must have a prescription.

G. Postcoital contraceptives (emergency contraceptives). The hormones that make up the medication appear to inhibit ovulation if it has not occurred. Two formulations are available in the United States, "Plan B One-Step, Next Choice One-Step" and My Way (levonorgestrel 1.5 mg single dose), and "Ella" (ulipristal 30 mg single dose). In addition, OCs containing levonorgestrel or norgestrel can be used as an emergency contraceptive (Yuzpe regimen). When OCs are used as an emergency contraceptive, it is necessary to give two doses 12 hour apart. Each dose must contain the number of OC tablets needed to provide at least 100 mcg of ethinyl estradiol and at least 0.5 mg of levonorgestrel or 1 mg of norgestrel. The Yuzpe regimen is less effective than levonorgestrel or ulipristal and is associated with more side effects as it contains estrogen. However, it may be available as an option when the other agents are not.

1. **Failure rate. Best taken as soon after unprotected sex as possible for highest effectiveness.** About 75% reduction in risk of pregnancy for a single act of unprotected sex for levonorgestrel products and 85% for ulipristal. Ulipristal is more effective especially at >72 hours after unprotected intercourse.
2. **Risks** include nausea, vomiting, abdominal pain, fatigue, and headache. Ulipristal should not be administered more than once in a menstrual cycle due to lack of safety data. In addition, because it binds to progesterone receptors, ulipristal may affect the efficacy of OCs. Barrier contraceptives should be used in addition to the OC for the remainder of a cycle in which ulipristal has been taken.
   a. **Pregnancy.** No specific contraindications to its use. The levonorgestrel emergency contraceptives do not have an adverse fetal effect if inadvertent exposure occurs during early pregnancy. A pregnancy test should be obtained prior to use of ulipristal as it is not known if it will harm a fetus. **None of the emergency contraceptives disrupt an established pregnancy.**
3. **Benefits.** Only contraceptive available for emergency postcoital use.
4. **Acceptability**
   a. **Convenience.** Levonorgestrel should be taken within 72 hours of unprotected intercourse, but may be effective up to 120 hours after unprotected intercourse. Ulipristal should be taken within 120 hours of unprotected intercourse. The earlier these methods are used, the more effective. (SOR B)
   b. **Availability.** Levonorgestrel 1.5 mg (Plan B One-Step) has recently been approved by the FDA for over-the-counter sale to anyone regardless of age. Next Choice One-Step and My Way are only available to women over age 17 years without a prescription. Ulipristal is only available by prescription.
5. **Special note.** Clinicians should provide information on Emergency contraceptions (ECs) when prescribing a non–long-acting contraceptive. It is also important to discuss this method of contraception with female victims of sexual assault.

6. **Administration.** Levonorgestrel 1.5 mg and ulipristal are both administered as a single oral dose taken as soon after unprotected intercourse as possible. Women should be counseled to expect their menses within 3 weeks of taking emergency contraception; if not, they should obtain a pregnancy test.

IV. Barrier Methods. These methods prevent conception by providing a mechanical barrier to sperm. Avoid using oil-based lubricants and medications (e.g., vaginal antifungals) because they can cause latex condoms to deteriorate. (SOR ⓒ) Polyurethane and plastic condoms are not adversely affected by non–water-based lubricants or vaginal antifungals.

A. Male condoms are made of latex, the cecum of lambs (skins), or polyurethane (for latex-sensitive individuals). Most condoms have a shelf-life of 5 years if stored properly in a cool place.

1. **Failure rate** is 18 pregnancies expected per 100 women per year. Condoms with lubrication and a receptacle end (to hold the ejaculate) are less likely to tear or split.
2. **Risks.** Irritation, allergic reactions, and unintended devise failure. Condoms with spermicidal lubrication are higher in cost, have a shorter shelf-life, and are associated with a greater risk of urinary tract infections among female partners.
   a. **Contraindications.** Latex condoms should not be used if one or both partners are allergic to latex.
3. **Benefits** include some (but not 100%) protection from STIs for latex and polyurethane condoms; skin condoms are too porous to provide this benefit.
4. **Acceptability.** Limited if a couple finds using condoms distracting or embarrassing.
   a. **Convenience.** Applied before intercourse, one time use.
   b. **Availability.** No prescription needed.

B. Female condom. This is made of polyurethane and provides coverage of the external genitalia and lines the vagina entirely. It can be inserted 6 hours before intercourse.

1. **Failure rate** is 21 pregnancies expected per 100 women per year.
2. **Risks.** Irritation and allergic reaction.
3. **Benefits.** Some protection from STI.
4. **Acceptability.**
   a. **Convenience.** Inserted before intercourse, one time use.
   b. **Availability.** No prescription needed, but it is more expensive than male condoms.

C. Diaphragms are dome-shaped, rubber cups with arching or coiled rims. This device is used in conjunction with spermicide applied to the inner cup and around the rim. Additional spermicide can be inserted before repeated intercourse.

1. **Failure rate** is 12 pregnancies expected per 100 women per year.
2. **Risks.** Irritation and urinary tract infection.
   a. **Contraindications.** A history of toxic shock syndrome.
3. **Benefits.** Possible protection against some STIs, reduced cervical cancer, and privacy of use.
4. **Acceptability**
   a. **Convenience.** Inserted up to 6 hours prior to intercourse and left in place at least 6 hours following intercourse. The diaphragm can be left in place for 24 hours with additional spermicide inserted vaginally for repeated intercourse. May be difficult for some women to insert easily.
   b. **Availability.** Must have a prescription and fitting managed by an experienced provider.

D. Cervical cap: Soft rubber cup with a round rim, which fits snugly around the cervix; used with spermicide.

1. **Failure rate** (number of pregnancies expected per 100 women per year): prentif Cap 17, FemCap 23.
2. **Risks** include irritation, abnormal Pap test, and toxic shock.
3. **Benefit.** Privacy.
4. **Acceptability.**
   a. **Convenience.** May be difficult to insert, can remain in place for 48 hours without reapplying spermicide for repeated intercourse.
   b. **Availability.** Must have a prescription and fitting managed by an experienced provider.

E. Sponge. One-size polyurethane foam single-use device containing spermicide. Mechanism of action includes physical blockage and absorption of sperm and spermicidal effect (see later).

1. **Failure rate for typical use** (number of pregnancies expected per 100 women per year): nulliparous women 12, parous women 24.
2. **Risks** include increased risk of vaginal infection, urinary tract infection, and toxic shock. The sponge should not be used by menstruating women (increased risk of toxic shock syndrome).
3. **Benefit.** Protection against some STIs lasts 24 hours including for multiple acts of intercourse and privacy of use.
4. **Acceptability**
   a. **Convenience.** Additional spermicide does not need to be added for additional act(s) of intercourse. The sponge should be removed within 24 hours and may be difficult to remove.
   b. **Availability.** No prescription needed.

V. Spermicide. These methods inactivate sperm by destroying the sperm cell membrane and interfering with motility. Spermicides are available in the form of gels, creams, foams, tablet, suppositories, and film.

A. Failure rate for typical use is 28 pregnancies expected per 100 women per year.
1. **Risks** include irritation, allergic reaction, and urinary tract infection. High rate of unintended pregnancy occurs when used as a solitary agent.
2. **Benefits.** Privacy of use. Best when used in combination with a barrier method such as condom, diaphragm, and cervical cap.
3. **Acceptability**
   a. **Convenience.** Inserted between 5 and 90 minutes before intercourse and usually left in place at least 6 to 8 hours later.
   b. **Availability.** No prescription needed.

VI. Intrauterine Devices. IUD use in the United States is on the rise as it is recognized as a highly effective, long-acting, and safe form of reversible contraception. The mechanism of action of IUDs is not entirely clear, but the foreign body effect of the IUD is thought to immobilize sperm and therefore prevent fertilization of ova. Levonorgestrel IUDs also create a thick cervical mucus and, in some women, inhibit ovulation. The common misperception that IUDs function by preventing fertilized ovum from implantation has not been proven. (SOR B)

There are three types of IUDs approved for use in the United States. All are T-shaped; the ParaGard T380A has copper wound around the base, and LNg20 Mirena and LNg14 Skyla are impregnated with levonorgestrel. All three have fine, nylon tails that hang through the cervix, which allows women to check for the presence of the IUD.

A. Failure rate is <1 pregnancy expected per 100 women per year.

B. Risks. Cramping, bleeding, and rarely (<1 in 1000) perforation of the uterus during placement. IUDs do not increase the risk of pelvic inflammatory disease.

C. Contraindications. Known anatomic uterine anomaly such as bicornuate uterus or large distorting fibroids or pregnancy. Abnormal bleeding should be investigated before placing an IUD.
1. Preexisting severe dysmenorrhea may become worse with the copper IUD and will likely improve with levonorgestrel IUDs. Use of a levonorgestrel IUD is not recommended in women who have had breast cancer.

D. Benefits. The levonorgestrel IUDs decrease the volume of menstrual blood and dysmenorrhea in symptomatic women. All IUDs are long acting and not coital dependent.

E. Acceptability
1. **Convenience.** Once in place, provides reliable long-term contraception (10 years for the copper T, 5 years for Mirena, and 3 years for Skyla). IUD string check by a provider is recommended 4 to 8 weeks after placement, and then annually.
2. **Availability.** Must have a provider with procedural experience in placing IUDs.

F. Special notes. Always read the manufacturer's instructions for the specific kind of IUD to be used. Both the insertion and the removal of an IUD are office procedures. A consent form should be signed and lot number of the device recorded. Pregnancy testing should be performed and documented as negative immediately prior to placement. In addition, age- and risk-appropriate testing for chlamydia and gonorrhea should be completed either before or at the time of IUD placement.
1. The IUD can be placed in both nulliparous and parous women dependent on depth of the uterine cavity.
2. One dose of a nonsteroidal anti-inflammatory drug is helpful to reduce discomfort from cramping if taken 1 hour prior to insertion or removal.

3. Insertion is easiest during menses because the cervix is slightly dilated, although the incidence of expulsion is slightly higher if the IUD is inserted at this time. Any time during the cycle is acceptable for insertion. The IUD may be removed at any time during the cycle.
4. Insertion can also be performed in the immediate postpartum period (10 minutes after the placenta is delivered) although expulsion rate with this timing is quite high (58%).
5. Leave a tail of at least 3 cm to allow the patient to check for expulsion of her IUD and to allow for later trimming if needed and easy removal. Let her feel the remnant of string so that she knows what to feel for monthly after her menses.
6. IUD removal is not required in the setting of STI. Treatment of the STI should be performed, and removal of the IUD only considered in the setting of more severe pelvic inflammatory disease. (SOR B)
7. There is an immediate return to fertility upon IUD removal. Hence, appropriate counseling regarding contraceptive options is recommended upon removal.
8. Placement of a copper IUD is an alternative, recognized method of emergency contraception. (SOR A) The copper IUD is extremely effective, more effective than the oral emergency contraceptives. Women using the copper IUD had pregnancy rates of 0.09% compared to women using an oral emergency contraceptive who had pregnancy rates of 1% to 2%. The IUD must be inserted within 5 days after unprotected intercourse.

VII. Natural Family Planning

A. Periodic abstinence depends on avoidance of intercourse during fertile days. Fertile days can be determined by many different methods. The Billings method of family planning relies on changes in cervical mucus. Other methods use the length of past menstrual cycles or a combination of basal body temperature and cervical mucus changes (symptothermal method). These methods rely heavily on motivated patients, but can enhance awareness of a woman's body and cycles. Other methods which have been described are the Creighton model NaProEducation system and the Standard Days Method. Abstinence is usually required for 6 to 9 days during the cycle. Some couples use barrier methods during the fertile time.

1. **Failure rate** is 24 pregnancies expected per 100 women per year.
2. **Risks**
   a. There are no contraindications to the use of natural family planning. The calendar method alone should not be used in women with irregular menstrual cycles (as in lactating or nearing menopause).
   b. Due to relatively higher rates of unintended pregnancy compared to other methods, the most significant risk of this method is unintended pregnancy.
3. **Benefits.** Self-knowledge of a woman's cycles, which can be helpful if desiring pregnancy as well. This information also enhances both partners' awareness and involvement in family planning.
4. **Acceptability.**
   a. **Convenience.** Requires frequent monitoring of body functions.
   b. **Availability.** Requires special instructions.
5. **Special notes**. Patient instructions are complex initially and take some time to master. A course with a trained instructor may be necessary. More information is available through American Pregnancy Association (http://americanpregnancy.org/preventingpregnancy/fertilityawarenessNFP.html), Couple to Couple League (http://www.ccli.org/nfp/), or Georgetown University Institute for Reproductive Health (http://irh.org/).

B. Lactation amenorrhea method (LAM) is based on the normal time of infertility after pregnancy. If a woman breastfeeds exclusively, the average length of infertility is 14 months. If a woman has given birth in the past 6 months, is exclusively breastfeeding (no solids, water, juice, or pacifier), and has not yet menstruated, she has approximately 98% effectiveness for breastfeeding alone. Increasing the time between feedings is the strongest factor leading to the return of fertility. Efficacy is limited to only those women who nurse exclusively on demand.

C. Coitus interruptus, or the withdrawal method, depends on withdrawal of the penis from the vagina before ejaculation occurs. Some ejaculate, however, is released before climax, and the failure rate is similar to the rate of pregnancy when using periodic abstinence or spermicide alone (Table 97–1).

VIII. Sterilization is a permanent form of birth control resulting from ligation/obstruction of the vas deferens in men (vasectomy) or ligation/obstruction of the fallopian tubes in women. It is the most prevalent form of birth control used in the United States.

A. Vasectomy. Sealing, tying, or cutting the vas deferens inhibiting sperm travel.

1. **Failure rate** is <1 pregnancy expected per 100 women per year.
2. **Risks.** Swelling, bruising, pain, and hematoma epididymitis. There is no increased risk for testicular or prostate cancer in men receiving a vasectomy. (SOR A)
3. **Benefits.** The safest and most effective method for couples in a stable, monogamous relationship with no desire for future fertility. Irreversibility. Since this method involves the male partner, it facilitates avoidance of hormonal agents for women with potential contraindications for their use or who experience adverse effects.
4. **Acceptability**
   a. **Convenience.** Outpatient surgical procedure.
   b. **Availability.** Widely available by trained physicians.

B. Sterilization implants. Small metallic implant (essure) placed into the fallopian tubes through a hysteroscopic procedure. The device causes scaring blocking fallopian tubes.

1. **Failure rate** is <1 pregnancy expected per 100 women per year.
2. **Risks.** Pain and ectopic pregnancy.
3. **Benefit.** Permanence.
4. **Acceptability**
   a. **Convenience.** Outpatient surgical procedure.
   b. **Availability.** Trained physician with appropriate facilities and equipment. May require a follow-up hysterosalpingogram to document successful blockage.

C. Transabdominal surgical sterilization. Fallopian tubes are blocked, so the egg and sperm cannot meet. This can be done in the immediate postpartum period prior to hospital discharge after a delivery, or at any time after 6 weeks postpartum.

1. **Failure rate** is <1 pregnancy expected per 100 women per year.
2. **Risks.** Pain bleeding, infection, surgical complications, and ectopic pregnancy.
3. **Benefit.** Permanence.
4. **Acceptability**
   a. **Convenience.** Operative procedure, often but not always performed laparoscopically.
   b. **Availability.** Surgical centers or hospitals with trained, credentialed surgeons with experience performing tubal ligations.

D. Special notes

1. Informed consent is critical for a surgical procedure and must describe the methods as irreversible, yet acknowledge a small risk of failure and pregnancy (possibly ectopic for the tubal ligation).
2. Because of the permanence of these methods, it is important for patients to think carefully about whether any change such as death or separation from a partner or from a child would make them regret the choice. A good question to ask is "If anything were to happen to your current spouse and children, would you want to have another child?"

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Greater Use Of Preventive Services In U.S. Health Care Could Save Lives At Little Or No Cost

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ABSTRACT There is broad debate over whether preventive health services save money or represent a good investment. This paper analyzes the estimated cost of adopting a package of twenty proven preventive services—including tobacco cessation screening, alcohol abuse screening, and daily aspirin use—against the estimated savings that could be generated. We find that greater use of proven clinical preventive services in the United States could avert the loss of more than two million life-years annually. What's more, increasing the use of these services from current levels to 90 percent in 2006 would result in total savings of $3.7 billion, or 0.2 percent of U.S. personal health care spending. These findings suggest that policy makers should pursue options that move the nation toward greater use of proven preventive services.

When is preventive medicine a good investment? Some experts have suggested that clinical preventive services—such as immunizations, screenings, and counseling—are worthwhile when they save more money than they cost. Others have suggested that the appropriate standard should instead be that prevention offer good "value" for the net dollars spent.[1–3] *Good value* can be defined as providing substantial health benefit per dollar spent net of any savings, without necessarily saving money.

The long-standing focus on prevention and its cost savings, rather than its value, has been challenged by recent analyses that question the potential for preventive services to deliver broad savings. For example, in a review of the cost-effectiveness literature on selected clinical preventive services, Louise Russell found that the evidence does not support the idea that prevention typically reduces medical costs, although it sometimes does.[4] Similarly, Joshua Cohen and colleagues warned against sweeping statements about savings through prevention and pointed to evidence indicating that the vast majority of clinical preventive services do not save money.[5] David Brown reported in the *Washington Post* that overall costs to the health care system typically go up when disease-preventing strategies are put into practice.[6]

Although these reviews reach the same general conclusion that some clinical preventive services save money but overall they may not, none focused on the specific services that evidence-based panels recommend. The pertinent question for policy makers who want to account for both the disease and money savings is whether those evidence-based clinical preventive services offer good value for the dollar.

Others have assessed the cost-effectiveness of various interventions. But to our knowledge, until now, no one has estimated the impact on overall population health, medical costs, and medical savings when a package of evidence-based preventive services is delivered to a targeted population. This paper attempts to do that.

Cost-effectiveness models were developed to support the work of the National Commission on Prevention Priorities.[7] Using these models, we estimated the life-years saved, and total medical costs and savings, that could have been

achieved in 2006 from increased use of twenty clinical preventive services with good evidence of effectiveness. We then compared the net costs to U.S. personal health care spending to provide a context for the level of investment required to achieve those health benefits.

Study Data And Methods

DATA SOURCES The evidence-based preventive services we examined were limited to those clinical services recommended for the general population by the U.S. Preventive Services Task Force or the Advisory Committee on Immunization Practices. The services were previously evaluated for the National Commission on Prevention Priorities.[7] They include the childhood immunization series, three adult immunizations, three counseling services, and thirteen screening services. The task force recommends only primary and secondary preventive services offered by primary care clinicians to asymptomatic people in clinical settings. The included services are described in more detail in Table 1 of the online Supplemental Appendix.[8]

The models developed for the National Commission on Prevention Priorities were carefully designed so that the results for each service could be compared to those for all other services. The data to estimate the models were obtained from structured literature reviews.[9]

ANALYSES We first calculated the total life-years that could have been saved per 10,000 people in the U.S. population in 2006 if each service had been delivered to the recommended population at recommended intervals in prior years. Likewise, we calculated the medical costs and savings per person-year of intervention.

We then multiplied the costs per person-year of intervention by the size of the target population in 2006 to compute the medical costs of using the services for the U.S. population. We multiplied the life-years and medical savings by the same population size to approximate the health benefits and medical savings that could have been realized in 2006, had the population in 2006 used the services in prior years. Total medical costs, along with net medical costs (costs minus savings), were then compared to 2006 U.S. personal health care spending.[10]

In this analysis, medical costs include the initial cost of the preventive service, such as screening or counseling, plus follow-up. Follow-up costs could include diagnostic testing; pharmacotherapy; and intensive interventions, such as for weight management. Savings include the expense of all care prevented by avoiding injury and disease or by treating at an earlier stage.

We excluded the value of a patient's time spent to receive preventive services and any productivity gains from reduced illness. We did not discount future costs and savings to their present value. This budgetary approach permits direct comparisons of the results to U.S. personal health care spending, but it differs from cost-effectiveness analyses. The net costs of each service thus cannot be compared to net costs produced by cost-effectiveness analysis models.

When we used this budgetary approach, the estimates of costs and savings reflect what the net impact on U.S. personal health care spending would have been in 2006 if this package of evidence-based clinical preventive services had been used by 90 percent of the population for which each service was recommended. We calculated both the total costs and savings of providing the total package of services to 90 percent of the recommended U.S. population, and the additional—or marginal—costs and savings of increasing the use of the package from existing rates up to 90 percent.[11] The estimate of additional net costs shows the difference that could have been made in 2006 U.S. personal health care spending had these services been more widely used. The estimate of total net costs shows the impact of services that were delivered plus the additional impact of undelivered services.

Likewise, we computed the total and additional effects of achieving a 90 percent utilization rate on years of life saved for the U.S. population. We measured the additional gains in life-years to approximate the number of people who could have been alive in 2006 if they had received preventive care. We also measured the total gains in life-years to approximate the number of people who were alive in 2006 because they had received preventive care plus those who could have been alive if they had done so.

We chose an upper bound of 90 percent utilization to reflect the fact that for virtually all services, there are contraindications for some portion of the target population. The risk-benefit ratio for preventive services is an individual decision based on medical history, among other factors. Not everyone will obtain preventive services even if the services are promoted and widely available. We assumed that the services would be offered to 90 percent of the target population with no refusals.

Additional methods details, with illustrations of how calculation issues were handled and a summary of limitations of the methods, are provided in the online Supplemental Appendix.[8]

Study Results

Life-years saved, medical costs, medical savings, and net costs for twenty clinical preventive ser-

vices are shown in Exhibit 1. Services that have the potential to save the most life-years are the childhood immunization series, smoking cessation advice and assistance, discussion of daily aspirin use to prevent cardiovascular disease, and breast and colorectal cancer screening.

Clinical preventive services that produce net medical savings from the budgetary perspective include the childhood immunization series, pneumococcal immunization for adults, discussion of daily aspirin use, smoking cessation advice and assistance, vision screening in older adults, alcohol screening and brief advice, and obesity screening.

INCREASING USE FROM ZERO We estimated the total cost of 90 percent utilization of the package of services by the U.S. population in 2006 to be $72.1 billion, or 4.1 percent of U.S. personal health care spending in 2006 (Exhibit 2). The total savings resulting from 90 percent utilization is $61.9 billion. The result then is a net cost of $10.2 billion, or 0.6 percent of U.S. personal health care spending in 2006.

INCREASING USE FROM CURRENT RATES In contrast, our calculated additional cost of increasing use of these services from current levels to 90 percent is less than the additional savings, resulting in a small negative net cost—or savings. The additional cost of increasing use to 90 percent is $18.3 billion, or 1.0 percent of U.S. personal health care spending in 2006. The savings resulting from increasing use rates is $21.9 billion, and the net cost is −$3.7 billion, or −0.2 percent of U.S. personal health care spending in 2006.

INFLUENTIAL SERVICES These cost savings from incremental improvements in use are the result of gaps in the current use of services that have the potential to save money. Three services contributed more than $1 billion each to the net additional medical savings: tobacco cessation screening and assistance; discussing daily aspirin use; and alcohol screening with brief counseling. These three services plus colorectal cancer screening each would have contributed more 100,000 years of life in 2006 had screening been increased to 90 percent.

Large changes in any single service do not alter the results. For example, doubling the cost of the service that adds the most to the 2006 additional cost of preventive care—colorectal cancer screening—would increase our estimates of total and net costs by only 0.25 percent of U.S. personal

EXHIBIT 1

Life-Years Saved, Costs, And Savings From Twenty Evidence-Based Clinical Preventive Services (2006 Dollars)

Clinical preventive service	Life-years saved per 10,000 people per year of intervention	Medical cost of service per person per year	Medical savings of service per person per year	Annual net medical costs per person per year
Childhood immunizations	1,233.1	$306	$573	−$267
Influenza immunization	23.8	28	20	8
Pneumococcal immunization	6.4	46	113	−67
Tetanus-diphtheria booster	0.1	4	0.2	4
Discuss daily aspirin use	63.0	21	87	−66
Discuss folic acid use	2.0	9	2	7
Smoking cessation advice and assistance	97.5	10	50	−40
Alcohol screening and brief counseling	7.0	9	20	−11
Breast cancer screening	45.0	64	3	61
Cervical cancer screening	2.1	49	8	41
Chlamydia screening	0.0	18	12	6
Cholesterol screening	27.8	128	24	104
Colorectal cancer screening	40.8	46	31	15
Depression screening	0.0	42	0	42
Hearing screening	0.0	23	0	23
Hypertension screening	10.7	79	50	29
Obesity screening	1.0	10	15	−5
Osteoporosis screening	1.5	90	19	71
Vision screening (adults)	2.1	5	22	−17
Vision screening (children)	0.0	14	0	14

SOURCE Authors' analyses; sources for data used in each model are available from the authors.

EXHIBIT 2

Total And Additional Life-Years Saved, Costs, And Savings From Twenty Evidence-Based Clinical Preventive Services (Millions Of 2006 Dollars)

	Total life-years saved[a]	Percent of personal health care spending[b]	Additional life-years saved[c]	Percent of personal health care spending[b]
Life-years saved	7,233,195	–	2,335,140	–
Cost	$72,114	4.1	$18,281	1.0
Savings	$61,927	3.5	$21,954	1.2
Net cost	$10,188	0.6	−$3,673	−0.2

SOURCE Authors' analyses; sources for data used in each model are available from the authors. **NOTE** Costs minus savings might not add up to net costs because of rounding. [a]Cost of 90 percent utilization of twenty clinical preventive services (see Exhibit 1). [b]Percentage of personal health care spending in 2006. [c]Cost of eliminating the difference between existing use rates and 90 percent use rates.

health care spending. Similarly, doubling the savings of the service that would produce the most additional savings—smoking cessation advice and assistance—would increase our estimates of savings and decrease our estimate of net costs by only 0.4 percent of U.S. personal health care spending.

Discussion

These findings with respect to increasing use from current rates to 90 percent suggest that investing in an evidence-based package of preventive services for the general population could produce more than two million additional years of life each year they are delivered. What's more, the increased costs of doing so would be recouped. Put differently, more than two million people would have been alive during 2006—or 780 people in a city of 100,000—if preventive care had been widely delivered in prior years, all without an increase in net cost.

LIMITATIONS These findings are not without limitations.[8] Our goal was to estimate the populationwide value and net medical costs of a package of evidence-based services. Because no single service drives these results, even a large error in measuring costs or use for a service would not affect the conclusions of this paper.

Despite several compilations of published cost-effectiveness ratios, there are no prior studies of the population impact of a wide range of primary and secondary preventive services to which we can directly compare our results. Richard Kahn and colleagues recently estimated the lifetime financial impact of a different set of services.[12] Despite a different scope of services and different methods, their findings would also translate into important health benefits costing only a very small portion of U.S. personal health care spending on an annualized basis.

Reviews and registries of published cost-effectiveness ratios have shown wide variation for clinical preventive services.[2,4–5,12–15] Similarly, our prior work found wide variation in cost-effectiveness ratios with six cost-saving services among them.[7] Our prior work differs from the analysis presented here because it employed a societal perspective to capture costs beyond the medical sector and because it discounted spending and benefits realized in future years to reflect their current value. The budgetary analysis used for this study might be expected to produce different results because only medical costs are included and future spending and benefits are not discounted. However, only one additional service was found to be cost saving in this budgetary analysis: screening for obesity. This service became cost saving because the value of patient time to engage in intensive interventions following a positive screen were excluded from the current analysis.

The budgetary analysis leaves out some important nonmedical savings, such as productivity gains and reduced costs of motor vehicle accidents and crime. Net savings would have been higher had these savings been included. They may be particularly important to some decision makers and could be included in cost and cost-effectiveness analysis from various perspectives.

SPENDING EFFECTS This analysis shows what could have occurred in a single year compared to current and past use. The cumulative effect of prior years' use provides a picture of the long-run potential value of an evidence-based package of preventive services. Going forward, the costs of increasing use will occur in more immediate years than the savings. Thus, in the short run, the impact on U.S. personal health care spending would be different.

Without factoring in any savings, the marginal delivery costs of achieving 90 percent use is 1 percent of U.S. personal health care spending (Exhibit 2). Therefore, with any realistic timetable for improving use rates, the short-run impact of increasing delivery rates would be a blip

in annual medical spending increases that have averaged 7 percent per year or more since the 1960s.

Whether scaled to annual spending for the nation, annual spending per person, or health plan spending per member per month, increased use would be a virtually undetectable portion of annual health care spending increases and in the long run would be cost-neutral, once savings are factored in, while providing health benefits.

NEED TO SPECIFY PREVENTIVE SERVICES As pointed out by others, preventive services are often lumped into one large, undifferentiated group.[3] There are certainly questionable preventive services for which there is not yet good evidence of effectiveness or cost-effectiveness. Payers and consumers should focus on reputable guidelines that are based on rigorous assessments of each service's effectiveness, such as those of the U.S. Preventive Services Task Force. Efforts to improve health could be further refined by first focusing on the most valuable evidence-based services.[7] Some services with high cost savings are poorly used at present. Of those, two have very large health impact—smoking cessation advice and assistance, and discussion of daily aspirin use. Meanwhile, two services have lesser, but still important, health impacts: alcohol screening with brief counseling, and pneumococcal immunization.

INCREASING USE FROM CURRENT RATES The opportunities for cost savings were greater with increasing use from current rates than they were with getting from zero use to current rates. This is because current use is relatively low for services that can produce high cost savings. This dynamic explains our seemingly contradictory estimates indicating that increasing all services from current use to 90 percent would result in cost savings while increasing use from zero to 90 percent would result in a small increase in U.S. personal health care spending.

CONCLUSION These findings are good news for purchasers and insurers. This evidence-based package of preventive services is essentially cost-neutral, while conferring large health benefits. That is also good news for patients. Payers and policy makers should support increased use of evidence-based preventive services for the right reasons and with reasonable expectations of their impact on health spending. Preventive services, as well as diagnostic and treatment services, should be judged by their effectiveness in improving health and the resources they consume to do so. Effective clinical preventive services can achieve the dual goals of improving the health of all Americans and making prudent use of scarce resources. ■

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