

COURSE TITLE: Managing Patients with Polypharmacy

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COURSE DESCRIPTION: Patients of all ages present to the dental setting with polypharmacy and polyherbacy. This program will review risk factors for polypharmacy, health risks associated with medication complexity, and strategies to improve collaborative care communications between patients and dental and medical providers to reduce the likelihood of medication errors. Specific populations for whom polypharmacy poses significant risks will be identified. Dental practice recommendations for managing affected individuals safely will be presented.

TEACHING METHODS: Lecture, Discussion

LEARNING OBJECTIVES:

Upon completion of this webinar, course participants will be able to:

1. Identify risk factors for polypharmacy and polyherbacy.
2. Describe health risks associated with medical complexity, including avoidable complications such as drug and herbal and dietary supplement interactions.
3. Discuss how normal physiological changes of aging influence drug prescribing behaviors.
4. Identify patient populations for whom polypharmacy poses significant risks.
5. Describe communication strategies for collaborative care to reduce medication errors.
6. Identify dental practice management considerations to safely treat medicated patients in the dental setting.

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What is polypharmacy?

No consensus definition: Use of multiple medications

Numerical counts are limited: “Many” versus “too many”?, Duration of therapy

Appropriate polypharmacy”

Optimizing medication use for patients with complex and/or multiple medical conditions

Prescribing is based on best evidence

Multimorbidity and Polypharmacy

Two or more co-occurring chronic health conditions

Common in older adults

Treatment is more difficult: multiple providers

Negative impact on health outcomes:

Decreased: quality of life, self-rated health, mobility, and functional ability

Increased: hospitalizations, physiological and psychological distress, use of health care resources, mortality, healthcare costs

One or more medicines may be used to treat each condition

Polypharmacy: mortality, falls, adverse drug reactions, increased length of stay in hospital readmission to hospital soon after discharge

Risk for ADEs and harm increases with increasing numbers of medications

Harm is associated with:

drug-drug, drug-HDS, drug-food interactions

drug-disease interactions

decreased renal and hepatic function

lower lean body mass

reduced hearing, vision, cognition and mobility

Masnoon N et al. What is polypharmacy? A systematic review of definitions. *BMC Geriatr.* 2017 Oct 10;17(1):230; Salive ME. Multimorbidity in older adults. *Epidemiol Rev.* 2013;1–9; Roughead EE et al. Multimorbidity, care complexity and prescribing for the elderly. *Aging Health.* 2011;7(5):695–70; Caughey GE et al. Comorbid chronic diseases, discordant impact on mortality in older people: a 14-year longitudinal population study. *J Epidemiol Community Health.* 2010;64(12):1036–1042; Marengoni A et al. Aging with multimorbidity: a systematic review of the literature. *Ageing Res Rev.* 2011;10(4):430–439.

Who is at greatest risk for complications of polypharmacy?

Those who are critically ill and/or frail

Individuals with multiple co-morbidities

Those with liver or kidney disease

Individuals with cognitive, sensory impairments

Patients going through multiple stages of transitional care

Appropriate Polypharmacy: clinically indicated, minimize risks, reduce harm

Inappropriate Polypharmacy: unnecessary medications, duplicate medications, drug interactions, harmful effects, medications to treat side effects of other medications

Bushardt RL et al. Simpson KN. Polypharmacy: misleading, but manageable. *Clin Interv Aging.* 2008;3(2):383–389; Chong J, Ang S. Polypharmacy in hospitalized older adults. *J Am Geriatr Soc.* 2010;58:162; Maggiore RJ, Gross CP, Hurria A. Polypharmacy in older adults with cancer. *Oncologist.* 2010;15(5):507–522; Ballentine NH. Polypharmacy in the elderly: maximizing benefit, minimizing harm. *Crit Care Nurs Q.* 2008;31(1):40–45; Cadogan C et al. Dispensing appropriate polypharmacy to older people in primary care: a qualitative, theory-based study of community pharmacists' perceptions and experiences. *Int J Pharm Pract.* 2015;23:32. doi: 10.1111/ijpp.12182.

Double Dosing

Most common medication error: taking or giving a double dose

Why does this happen? Distraction, Caregivers

Risk reduction strategies: Have a plan, Pill sorters, Set an alarm, Log usage

Serious risks: antihypertensives, drugs for diabetes, drugs for ADHD, pain medications

Poison Control. National Capital Poison Center. Medication errors – Double dosing. Twice as much: not twice as good. Available at: <https://www.poison.org/articles/medication-errors-double-dosing>

Medication Reminder apps

Health app (iPhones)

Medisafe (free, iOS, Android)

Dosecast: My Pill Reminder (free/pain, iOS, Android)

Mango Health (free, iOS, Android)

EveryDose (free, iOS, Android)

My Therapy Pill Reminder (free, iOS, Android)

Medications (free, iOS, Apple Watch)

Duplicate Medications

Same drug: brand and generic name

Prescription strength and OTC strength: pain relievers, GI medications

Drugs that produce the same effect, but at different dosages/potencies: opioids, SSRIs, St. John's wort

Same drug in different product formulations: acetaminophen in combination opioid products and OTC products

Different Dosages on Alternating Days

Used to achieve target blood levels for optimal symptom control, minimize adverse effects, or avoid toxicity

Examples:

Warfarin

Statins to lower cholesterol

Lithium for bipolar disorder

Corticosteroids for autoimmune disease

Strategy to improve compliance:

If each tablet has the same dose, but number of tablets varies (higher or lower dose):

Even number of tablets on even numbered days of the month

Odd number of tablets on odd numbered days of the month

Steven J. Kingsbury, M.D., Ph.D., Megan M. Leahy, Pharm.D., Helping patients keep track of alternating-dose regimens, *American Journal of Health-System Pharmacy*, Volume 63, Issue 6, 15 March 2006, Page 504, <https://doi.org/10.2146/ajhp050441>. Available at: <https://academic.oup.com/ajhp/article/63/6/504/5134677>

Drug Interactions

When 2 or more drugs are taken at the same time by a patient, the resultant effects may often be different from the effects produced by each drug when given alone

When an interaction occurs:

The net drug response may result from enhancement of the effects of one or the other drug

The development of new effects that are not observed with the drug alone

The inhibition of the effect of one drug by another

Four types of Interaction Effects

Additive Effect: $2+2=4$

Synergistic Effect: $2+2=20$

Potentiating Effect: $0+2=10$

Antagonistic Effect: $2+2=1$

Four Basic Mechanisms of Drug Interactions

Drugs having similar effects: Additive, synergistic, potentiation

Absorption effects: Altered pH, binding of drugs in stomach

Displacement from plasma proteins: More active “free” drug in circulation

Metabolism effects: Altered CYP enzymes = induction, inhibition

Screening and Assessing Risk for Harm

Age: Children

Many drugs must be given to children in doses that are smaller than the adult dose

Children have increased skin and mucous membrane permeability, which allows drugs to be absorbed more quickly and more easily

OTC doses are determined by the manufacturer

Dosing is based on the weight of the child

Calculate dose according to body weight, age and total body surface area

Typically, OTC meds = children receive half of the adult dose

Age: Geriatrics

Less binding capacity (decreased plasma proteins), less metabolism (decreased liver function) and decreased renal function allow for normal doses of drug to act at overdose levels in the geriatric patient

Give lower dose

Pathological State

Liver diseases = in most cases, drug metabolism is reduced due to diminished function of the cytochrome P-450 system; dosing must be reduced

Renal diseases = results in renal impairment of drug excretion; dosing must be modified on the basis of renal clearance values of the drug

Beers Criteria

Lists of medications that pose potential risks outweighing potential benefits for people 65 and older

Five main categories:

1. potentially inappropriate medications in older adults;
2. potentially inappropriate medications to avoid in older adults with certain conditions;
3. medications to be used with considerable caution in older adults;
4. medication combinations that may lead to harmful interactions; and
5. a list of medications that should be avoided or dosed differently for those with poor renal function

STOPP/START

STOPP (Screening Tool of Older Person's Prescriptions)/START (Screening Tool to Alert doctors to Right Treatment)

Potentially inappropriate prescribing (STOPP); Potential prescribing omissions (START)

STOPP criteria medications = significantly associated with Adverse Drug Events (ADEs)

STOPP identifies **five high-risk medication classes significantly associated with ADEs:**

- proton-pump inhibitors (PPIs)
- benzodiazepines (BZDs)
- NSAIDs
- nonselective beta blockers
- tricyclic antidepressants

When applied within 72 hours of hospital admission, ADEs were significantly reduced, along with reducing the average length of stay by three days in older patients hospitalized with unselected acute illnesses.

O'Mahony D, O'Sullivan D, Byrne S, O'Connor MN, Ryan C, Gallagher P. STOPP/START criteria for potentially inappropriate prescribing in older people: version 2. *Age Ageing*. 2015 Mar;44(2):213-8.; Coggins MD. Medication Monitor: Deprescribing Improves Quality of Life. *Today's Geriatric Medicine*. 2015;10(4):8.

Why Are There More ADEs in Older Adults?

Polypharmacy

Multiple prescribers

Poor interprofessional communication

Pharmacy shopping

Physiologic changes

Difficulties with adherence

Confusion about drug regimens

Cognitive challenges

Drugs and Falls

Many drugs increase risk for falling:

- Antihypertensives Antiarrhythmics Anticholinergics
- Anticonvulsants Antidepressants Antihistamines
- Antipsychotics Benzodiazepines Sedative hypnotics
- Opioids Skeletal muscle relaxants Alcohol

Polyherbacy: Most Commonly Used Herbal Supplements in the U.S.

Echinacea (*Echinacea purpurea* and related species)

St. John's wort (*Hypericum perforatum*)

Ginkgo (*Ginkgo biloba*)

Garlic (*Allium sativum*)

Saw palmetto (*Serenoa repens*)

Ginseng (*Panax ginseng* or Asian ginseng) and *Panax quinquefolius* or American ginseng)

Goldenseal (*Hydrastis canadensis*)

Valerian (*Valeriana officinalis*)

Chamomile (*Matricaria recutita*)

Feverfew (*Tanacetum parthenium*)

Ginger (*Zingiber officinale*)

Evening primrose (*Oenothera biennis*)

Milk thistle (*Silybum marianum*)

Drug and Disease Considerations

Study of 10,480 adults

1 in 3 adults in the United States take both prescription drugs and dietary supplements

47% diagnosed with major medical conditions used both prescription medication and supplements:

asthma, arthritis, CHF, CHD, angina, MI, stroke, HTN, high cholesterol, emphysema, chronic bronchitis, cancer, weak bones, or liver, thyroid or kidney problems

Tsai HH, Lin HW, Simon Pickard A, Tsai HY, Mahady GB. Evaluation of documented drug interactions and contraindications associated with herbs and dietary supplements: a systematic literature review. *Int J Clin Pract.* 2012;66(11):1056-1078.

HDS products containing herbs were more likely to have documented interactions with medications and contraindications than vitamins, minerals and other types of dietary supplements.

Herbal interactions with prescription medications or other chemicals can:

interfere with how the drug may be broken down in the body

enhance side effects of prescription medications

block the intended therapeutic effect of a drug

Implications for Dental Practice: Who do we see with polypharmacy?

Cardiovascular disease

Diabetes

Autoimmune diseases

Organ transplant recipients

Cancer

HIV

Behavioral health disorders/mental illness/SUD

Respiratory disease

Gastrointestinal disorders

Strategies to Reduce Risk for Medication Errors

Annual comprehensive medical history: Know your patient population

Conduct a complete medication review at least once each year

Update medication list at every visit” Include patches, OTC, HDS

If you can't say it or spell it, you don't know enough about it = look it up!

When in doubt, check it out

Have access to current drug reference guides/databases

Ask patients about their:

medication compliance

response to medications administered at last visit

previous reactions to medications

Take vital signs at every visit

Treat the patient = not their devices

Be prepared for medical emergencies

Check for compatibility before issuing a prescription/recommending an OTC medication

Provide instructions for use with every medication

Drug interaction checker

Collaborative Practice

Medical consultations = Two-way communication

Request:

History of present illness

Health status

Current medication list with dosages

Laboratory tests

Share/inform medical colleagues:

Oral health status

Dental treatment needs

Planned care

Pharmacists are our friends!