



Optimizing Medication Therapy: Identifying and Assessing Prescribing Cascades

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Disclosure Statement

- I do not have relevant financial relationships to disclose with ineligible companies.
- The contents of this presentation represent the views of the presenter and do not represent the views of the Department of Veterans Affairs or the United States Government.



Learning Objectives

1. Define and differentiate the various types of prescribing cascades
2. Assess whether a prescribing cascade represents appropriate or potentially inappropriate therapy





Pre-Test Question #1

A patient with rheumatoid arthritis is prescribed methotrexate. Folic acid is added to prevent folate deficiency.

This is an example of:

- (A) Intentional prescribing cascade
- (B) Prophylactic prescribing cascade
- (C) Appropriate prescribing cascade
- (D) All of the above



Pre-Test Question #2

A patient develops a dry cough after starting lisinopril and is prescribed an antitussive.

This is an example of:

- (A) Appropriate prescribing cascade
- (B) Inappropriate prescribing cascade
- (C) Prophylactic prescribing cascade
- (D) Therapeutic prescribing cascade

What is a prescribing cascade?

A prescribing cascade occurs when a medication is prescribed to address an adverse drug reaction (ADR) caused by another medication.

Intentional Versus Unintentional Prescribing Cascades

Intentional:

- ADR is **recognized**
- Second drug is intentionally used to manage such ADR

Example:

Opioid → Constipation → Laxative

Unintentional:

- ADR is **misinterpreted** as a new medical condition
- Second drug is prescribed without first considering the relevance of the precipitating drug

Example:

NSAID* → High Blood Pressure →
Antihypertensive

*Nonsteroidal anti-inflammatory drug

Appropriate Versus Inappropriate Prescribing Cascades

Appropriate:

- Precipitating Drug + Second Drug → positive benefit-risk balance
- **Potential Benefits > Risks**
- Always intentional
- Considers patient's goals of care

Example:

Using a **proton pump inhibitor** to prevent gastric bleeding in a patient with **high bleeding risk** requiring **long-term NSAID** therapy.

Inappropriate:

- **Potential Risks > Benefits**
- More suitable alternatives are available

Example:

Calcium Channel Blocker → Peripheral Edema → Loop Diuretic

This is an inappropriate prescribing cascade, as **switching to an alternative medication could prevent the ADR.**

Necessary Prescribing Cascade

Necessary:

- Relative benefit is so great that **not prescribing the second drug would constitute undertreatment**
- All necessary prescribing cascades are appropriate

Example:

Loop diuretic → Hypokalemia → Potassium supplement

A patient with **heart failure** is prescribed a **diuretic** (e.g., furosemide) to manage fluid retention. The diuretic causes **hypokalemia**, so a **potassium supplement is prescribed** to prevent arrhythmias.

The distinction between an appropriate and necessary prescribing cascade depends on the extent to which the benefits outweigh the risks.

Prophylactic Versus Therapeutic Prescribing Cascades

Prophylactic:

- Use of a second drug to **prevent** an ADR from another drug

Example:

Antibiotic → Imbalance in gut microbiome → Probiotic

A **probiotic** is prescribed to a patient taking an **antibiotic** to **prevent** disruption of the gut microbiome.

Therapeutic:

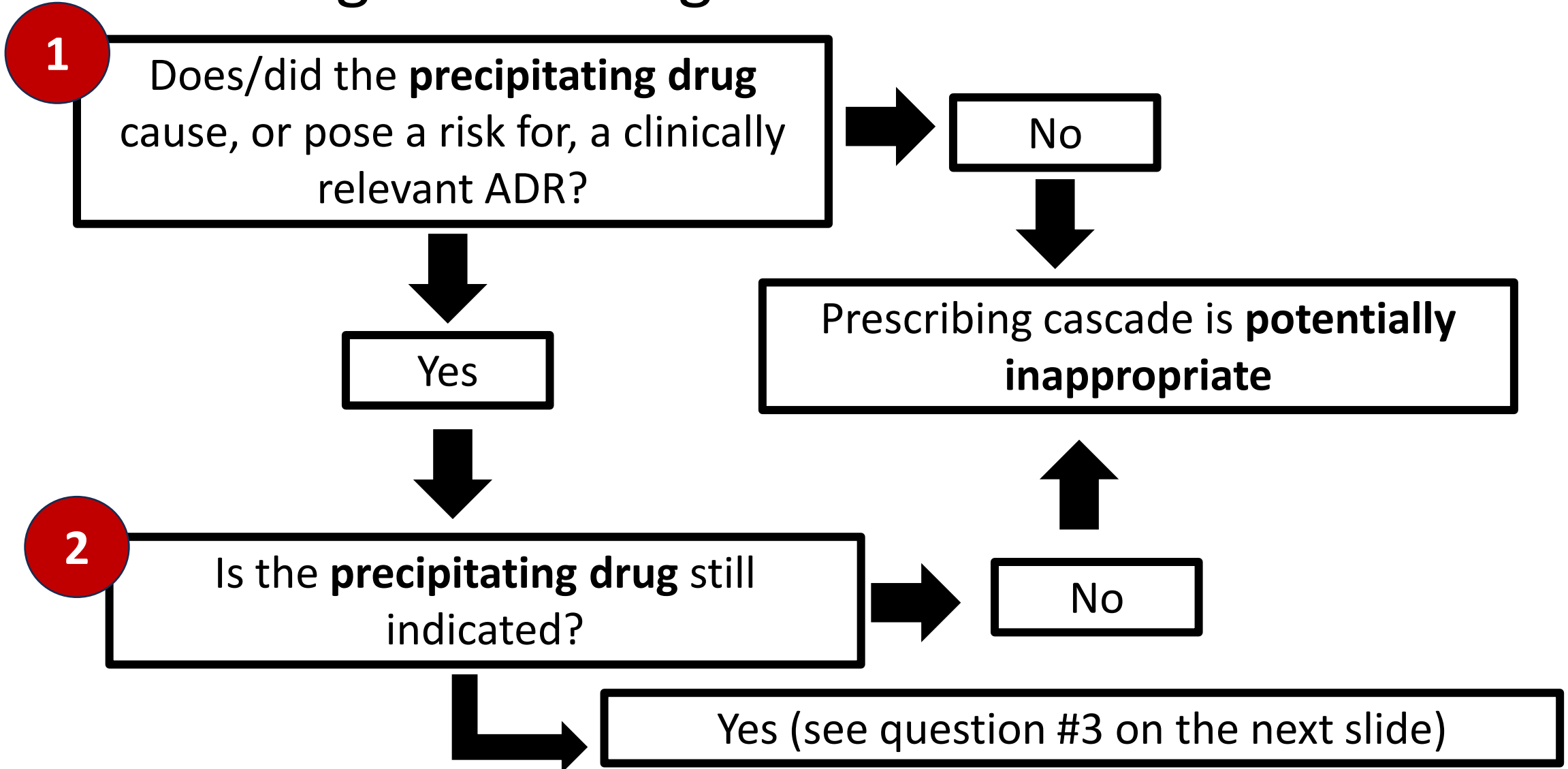
- Use of a second drug to **treat** an ADR that has already occurred

Example:

Chemotherapy → Neutropenia → Granulocyte-colony stimulating factor

A patient on **chemotherapy** develops **neutropenia** and a **granulocyte-colony stimulating factor** is prescribed to treat such ADR.

Assessing Prescribing Cascades

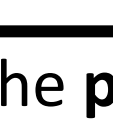
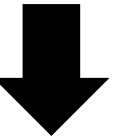
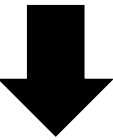


Assessing Prescribing Cascades

3

Can a treatment adjustment of the precipitating drug prevent the ADR?

Yes



No

Prescribing cascade is **potentially inappropriate**

Yes

4

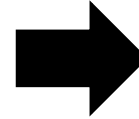
Can switching the **precipitating drug** prevent the ADR?

No (see question #5 on the next slide)

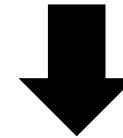
Assessing Prescribing Cascades

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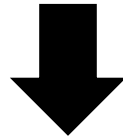
Can the **second drug** have a beneficial effect on the ADR?



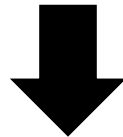
No



Prescribing cascade is **potentially inappropriate**

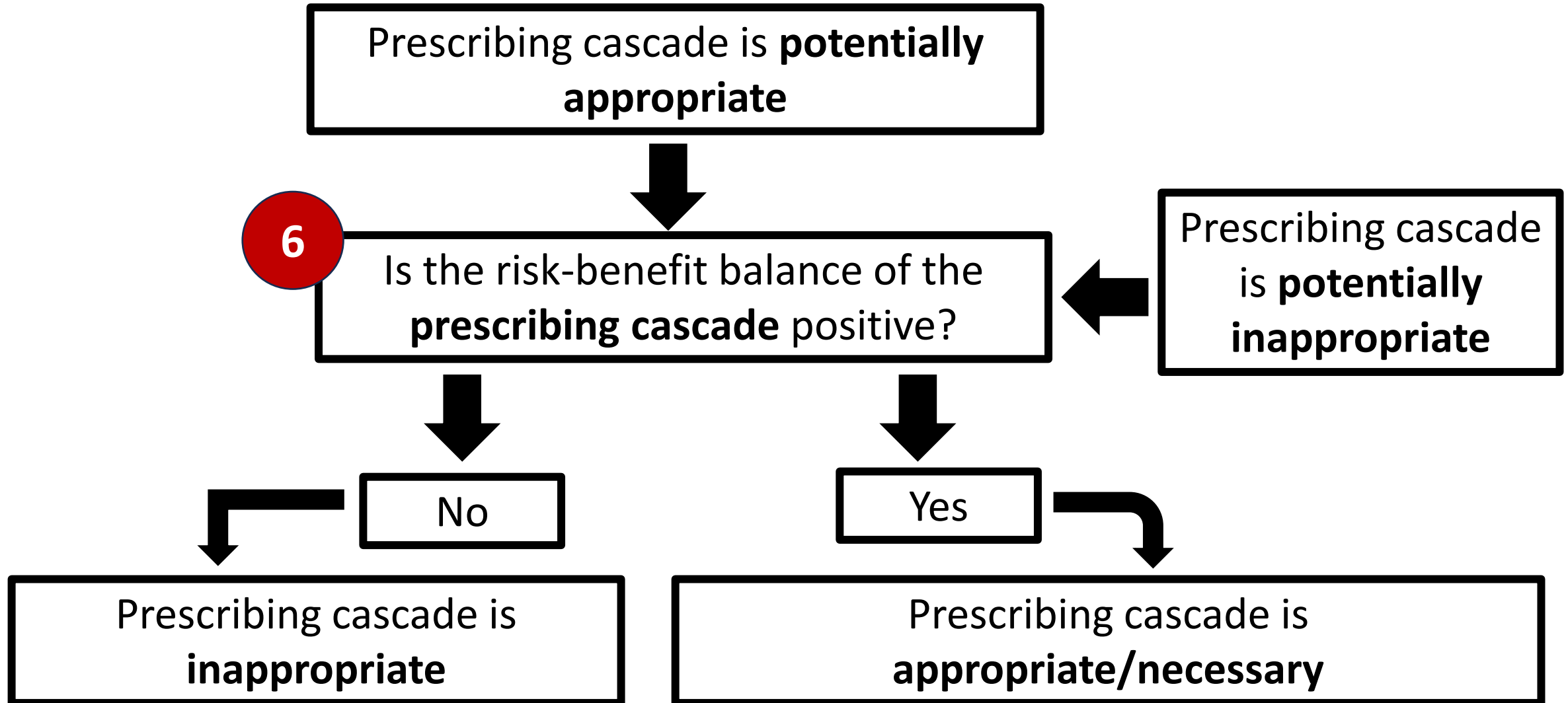


Yes



Prescribing cascade is **potentially appropriate**

Assessing Prescribing Cascades



Key Takeaways

- Prescribing cascades can be classified as **intentional, unintentional, appropriate, inappropriate, necessary, prophylactic, or therapeutic.**
- Classification of the prescribing cascades depend on the **intent** and **risk-benefit balance.**
- Determining inappropriate from appropriate or necessary prescribing cascades **prevents unnecessary medications** and the perpetuation of **further ADRs.**



Post-Test Question #1

A patient with rheumatoid arthritis is prescribed methotrexate. Folic acid is added to prevent folate deficiency.

This is an example of:

- (A) Intentional prescribing cascade
- (B) Prophylactic prescribing cascade
- (C) Appropriate prescribing cascade
- (D) All of the above



Post-Test Question #1

A patient with rheumatoid arthritis is prescribed methotrexate. Folic acid is added to prevent folate deficiency.

This is an example of:

- (A) Intentional prescribing cascade (explanation: folate deficiency is a known ADR of methotrexate and thus folic acid is intentionally prescribed to mitigate such ADR)
- (B) Prophylactic prescribing cascade (explanation: in this case, folic acid is used to prevent folate deficiency from methotrexate)
- (C) Appropriate prescribing cascade (explanation: the benefits of the prescribing cascade outweigh the risks; the use of folic acid to prevent an ADR from methotrexate is beneficial for the patient undergoing treatment for rheumatoid arthritis)
- (D) All of the above

Post-Test Question #2

A patient develops a dry cough after starting lisinopril and is prescribed an antitussive.

This is an example of:

- (A) Appropriate prescribing cascade
- (B) Inappropriate prescribing cascade
- (C) Prophylactic prescribing cascade
- (D) Therapeutic prescribing cascade





Post-Test Question #2

A patient develops a dry cough after starting lisinopril and is prescribed an antitussive.

This is an example of:

- (A) Appropriate prescribing cascade (explanation: the use of the second drug, that is, an antitussive, does not provide a beneficial effect on the ADR)
- (B) Inappropriate prescribing cascade (explanation: switching the precipitating drug can prevent the ADR)
- (C) Prophylactic prescribing cascade (explanation: a cough has already occurred, and an antitussive would not be used to prevent cough caused by lisinopril)
- (D) Therapeutic prescribing cascade (explanation: coughing caused by lisinopril is due to bradykinin and thus an antitussive would not be therapeutically appropriate)

References

- Adrien O, Mohammad AK, Hugtenburg JG, et al. Prescribing Cascades with Recommendations to Prevent or Reverse Them: A Systematic Review. *Drugs Aging*. 2023;40(12):1085-1100. doi:10.1007/s40266-023-01072-y
- Dreischulte T, Shahid F, Muth C, Schmiedl S, Haefeli WE. Prescribing Cascades: How to Detect Them, Prevent Them, and Use Them Appropriately. *Dtsch Arztebl Int*. 2022;119(44):745-752. doi:10.3238/arztebl.m2022.0306





Thank you!