

Le et al Implementation of an intervention aimed at deprescribing benzodiazepines in a large U.S. healthcare system using patient education materials: a pre-post observational study with a control group

Supplementary Materials

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Appendix I: Calculations for Valium Equivalent Daily Dose**Valium Equivalency Table**

Medication	VCF	Example (mg)	Equivalency (mg)
Alprazolam (Xanax)	10.00	1.0	10
Chlordiazepoxide (Libri..	0.50	20.0	10
Clobazam (Onfi)	0.50	20.0	10
Clonazepam (Klonopin)	20.00	0.5	10
Clorazepate (Tranxene)	20.00	0.5	10
Diazepam (Valium)	1.00	10.0	10
Estazolam	5.00	2.0	10
Flurazepam (Dalmane)	0.33	30.0	10
Lorazepam (Ativan)	5.00	2.0	10
Oxazepam (Serax)	0.33	30.0	10
Quazepam (Doral)	0.66	15.0	10
Temazepam (Restoril)	0.50	20.0	10
Triazolam (Halcion)	20.00	0.5	10

Appendix II: Email used to recruit primary care physicians for the intervention used in QI Pilots I & II

----- Email 1 -----

Dear Dr XX:

As part of our benzodiazepine initiatives, we are piloting an evidence-based, patient-facing intervention that has been shown to be very effective in prompting older adult patients to have deprescribing conversations with their primary care physicians that resulted in significant reductions in benzodiazepine use.

- The intervention consists of mailing patients an educational brochure outlining the harms of benzodiazepines and information about our tapering program. We have included here an article about the original intervention.
- As many of you have noted, initiating discussions about deprescribing is difficult and we hope that by sending this letter, it will save you time by activating patients and prompting them to initiate these discussions.
- We have selected a handful of your patients for whom we met with you or emailed you to discuss strategies for reducing their benzo doses.
- We will be sending patients:
 - The EMPOWER brochure, which has been tested across multiple health systems
 - Benzo patient education developed at Cedars
 - A letter suggesting that they schedule a visit with you to discuss their benzo/sedative-hypnotic prescription
- Dr. [Cedars-Sinai Psychiatrist] and [Cedars-Sinai Pharmacist] are available for curbside consults if you need assistance with tapering or dose changes.
- Please let us know if you would prefer that we not contact a specific patient on the list below:

PASTE PATIENT NAMES HERE

Many thanks,

Pharmacy Department

Appendix III: Letter from primary care physicians used in QI Pilots I and II

< Pt_First_ & Middle_Nm> <Pt_Last_Nm>
<Street_Addr_L1> <Street_Addr_L2>
<City>, <State> <Zip>

Dear Patient,

At Cedars-Sinai, your health and safety are our top priority. My records indicate that you have been taking <Benzo Name> for some time now. Recently, doctors have become concerned about this type of medicine when taken over long periods. The FDA is now requiring the boxed warning be updated for all benzodiazepine medicines to include warnings about the risks of abuse, misuse, addiction, physical dependence and withdrawal reactions.

Research shows that the body can build up a tolerance to these pills, and over time the medicine no longer works properly. These pills can also lead to harmful side effects—including falls, memory issues, heightened anxiety, sleep problems and addiction.

I am writing to ask you to consider cutting down on your dose of these pills and possibly stop taking them in the future. Please do not stop or change the way you are taking this medicine without talking to me first. Stopping or cutting back on this medication can be uncomfortable and could be dangerous. The best way to do this is to work together.

If you decide to work with me to limit or stop taking this medication, I will give you a personalized plan to keep you comfortable and safe with strategies such as:

- Gradually lowering the number of pills you take
- Gradually lowering the strength (dose) of the pills
- Changing to a different medicine
- Taking the pills only when you feel they are absolutely necessary

I'm including some materials that can help you learn more about the risks of these medications. My practice also has a special program focused on helping patients slowly reduce these medications.

If you would like to talk to me about this plan, I would be very pleased to see you in my office or through a video visit. Please contact my office through My CS-Link™ or by phone at <Phone> to schedule an appointment.

Sincerely,

<PCP Signature> and the Pharmacy Team

Appendix IV: Educational flyer developed at the health system used in QI Pilots I and II



What are Benzodiazepines?

Benzodiazepines are medications often prescribed to help ease anxiety and sleep problems.

What are some common benzodiazepines?

- Alprazolam (Xanax)
- Diazepam (Valium)
- Lorazepam (Ativan)
- Temazepam (Restoril)
- Clonazepam (Klonopin)

How are benzodiazepines prescribed?

When used for sleep problems or anxiety, benzodiazepines are only helpful for a short amount of time (between 2–4 weeks).

These medications are not meant to be used every day.

- After a few weeks, the brain gets used to the medication's effects, so the medication may not work as well as it did at first.
- Patients can still have concerning side effects even if they have been on these medications for a long time.

Benzodiazepines can have serious side effects and harmful long-term effects, even if you only take a small dose daily.

What are the risks of taking benzodiazepines?

- Feeling tired or drowsy
- Memory and thinking problems
- Depression, mood changes, irritability, anger
- Becoming dependent
- Breathing problems may get worse
- Pneumonia
- Car accidents
- You can be arrested for driving while impaired
- Unsteady walking
- Increased risk of falls, broken bones, or concussion
- Overdose—especially when combined with alcohol, strong pain medications (opioids) or street drugs
- Birth defects if taken during pregnancy

Are there special concerns for older adults taking benzodiazepines? Yes!

- Dementia
- Balance issues
- Memory problems
- Fractures (bone breaks)
- Greater risk of falls
- Drowsiness/feeling tired
- Difficulty thinking clearly
- Worsening depression
- Decreased quality of sleep
- Higher risk of getting into a car crash when driving
- Dangerous interactions with other medications (such as pain medications)

Does Cedars-Sinai have resources to help people lower the amount of benzodiazepines they are taking safely? Yes!

For more information on these resources, it is best to talk with your primary care physician or the doctor who is prescribing these medications for you.

How can I safely lower the amount of benzodiazepines I'm taking now?

- Do not stop taking benzodiazepines all at once. Talk to your doctor first if you're ready to make a change.
- Doctors, pharmacists or nurse practitioners can help you find the best way to lower your use of benzodiazepines.
- Some people can lower their dose over the course of a few weeks. Others may need more time, and it can take up to three or more months.
- Millions of people have succeeded in slowly cutting these medications out of their lives and finding other ways to help ease their sleep or anxiety problems.
- Talking to your doctor about your sleep problems or anxiety is the best way to learn about other treatment options that are available.



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Appendix V. Table A. Predicted probability of benzodiazepine discontinuation by EMPOWER intervention group in at 9 months compared to a non-randomized controlled group.

		P-value	95% Confidence Intervals
Predicted probability of BZD discontinuation			
Intervention	0.09	0.02	(0.01, 0.16)
Age	0	0.31	(0, 0)
Sex			
Female	Reference group		
Male	0.01	0.78	(-0.06, 0.08)
Frailty			
No	Reference group		
Yes	0.02	0.59	(-0.06, 0.1)
Number of Risk Factors			
1	Reference group		
2	-0.1	0.04	(-0.19, 0)
3	-0.14	0.01	(-0.24, -0.04)
Race			
White	Reference group		
Black	0.21	0.4	(-0.27, 0.69)
Asian	0.05	0.62	(-0.15, 0.25)
Other	-0.09	0.18	(-0.22, 0.04)
Unknown	-0.07	0.35	(-0.23, 0.08)
Marital Status			
Married/Significant Other	Reference group		
Divorced/Widowed	-0.08	0.05	(-0.16, 0)
Single	-0.04	0.39	(-0.14, 0.05)
Unknown	0.03	0.76	(-0.18, 0.24)
Ethnicity			
Non-Hispanic	Reference group		
Hispanic	0.18	0.15	(-0.07, 0.42)
Don't Know	0.11	0.13	(-0.03, 0.26)
Arthritis			
No	Reference group		
Yes	-0.02	0.73	(-0.12, 0.09)
Depression			
No	Reference group		
Yes	-0.02	0.71	(-0.15, 0.1)
Diabetes			
No	Reference group		
Yes	0.02	0.67	(-0.09, 0.13)
Falls			
No	Reference group		
Yes	-0.11	0.33	(-0.32, 0.11)
Pain Diagnosis			
No	Reference group		
Yes	0.14	0.05	(0, 0.28)