THE ENVIRONMENTAL IMPACT OF MEDICATION & THE ROLE OF THE PHARMACY TECHNICIAN IN WASTE MITIGATION

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Presenter Personal Disclosure

- I have the following relationships with commercial interests:
  - Funding (Honoraria) : Canada's Drug Agency (CDA)-Canadian Drug Expert Committee (CDEC) Member
  - Other (Employment):
    - Bow Valley College – School of Health and Wellness, Pharmacy technician program - Instructor
    - University of Calgary, Cummings School of Medicine – Pharmacy resource for curriculum development

- Speaking Fees for current program:
  - I have received a speaker's fee from PTSA for this learning activity

OBJECTIVES

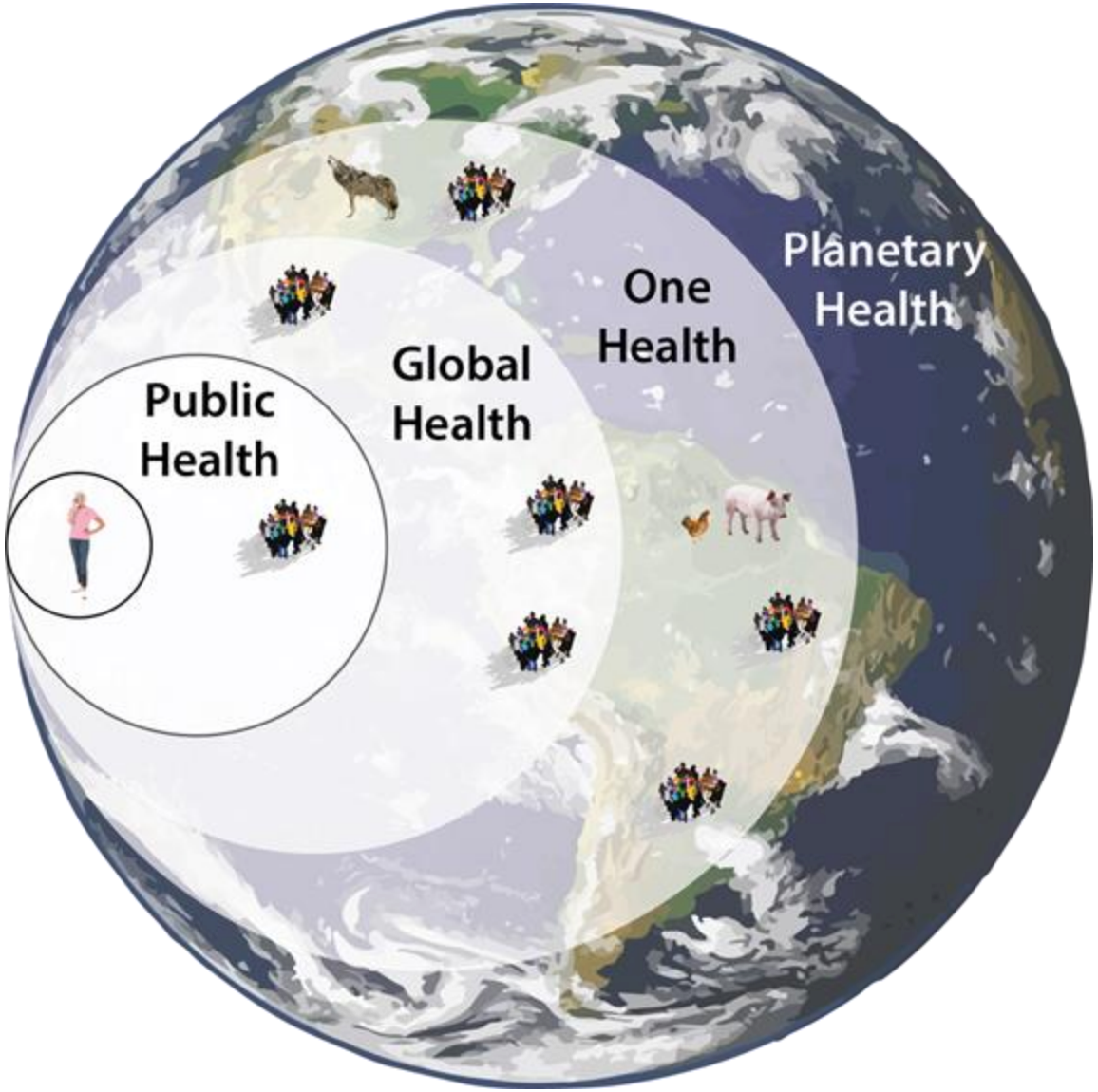
- Discuss the impact pharmacy practice has on the environment
    - Including medication disposal and other pharmaceutical related waste
- Discuss the role of the pharmacy technician and pharmacy team in mitigating these risks
- Generate ideas and strategies to mitigate waste in your practice setting
- Discuss Quality Improvement in Pharmacy
- Identify one or two actionable items that can be implemented at your practice within the next 6 months

We have no actual or potential conflict of interest in relation to this presentation…

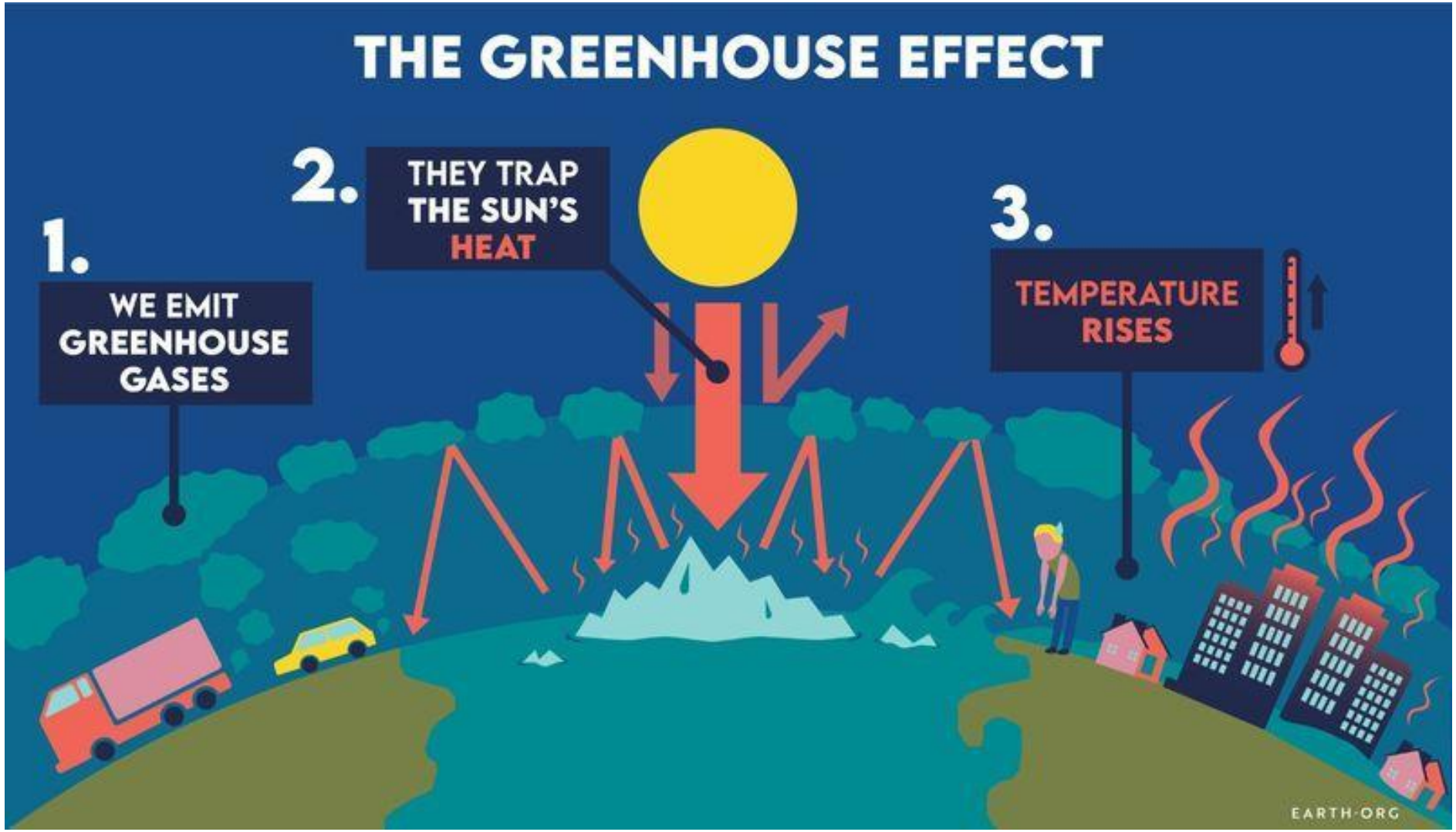
PLANETARY HEALTH: A NEW DISCIPLINE

- **Simplified:** “Planetary Health is the health of human civilization and the state of the natural systems on which it depends”

  - Rockefeller Foundation–Lancet Commission on Planetary Health 2015



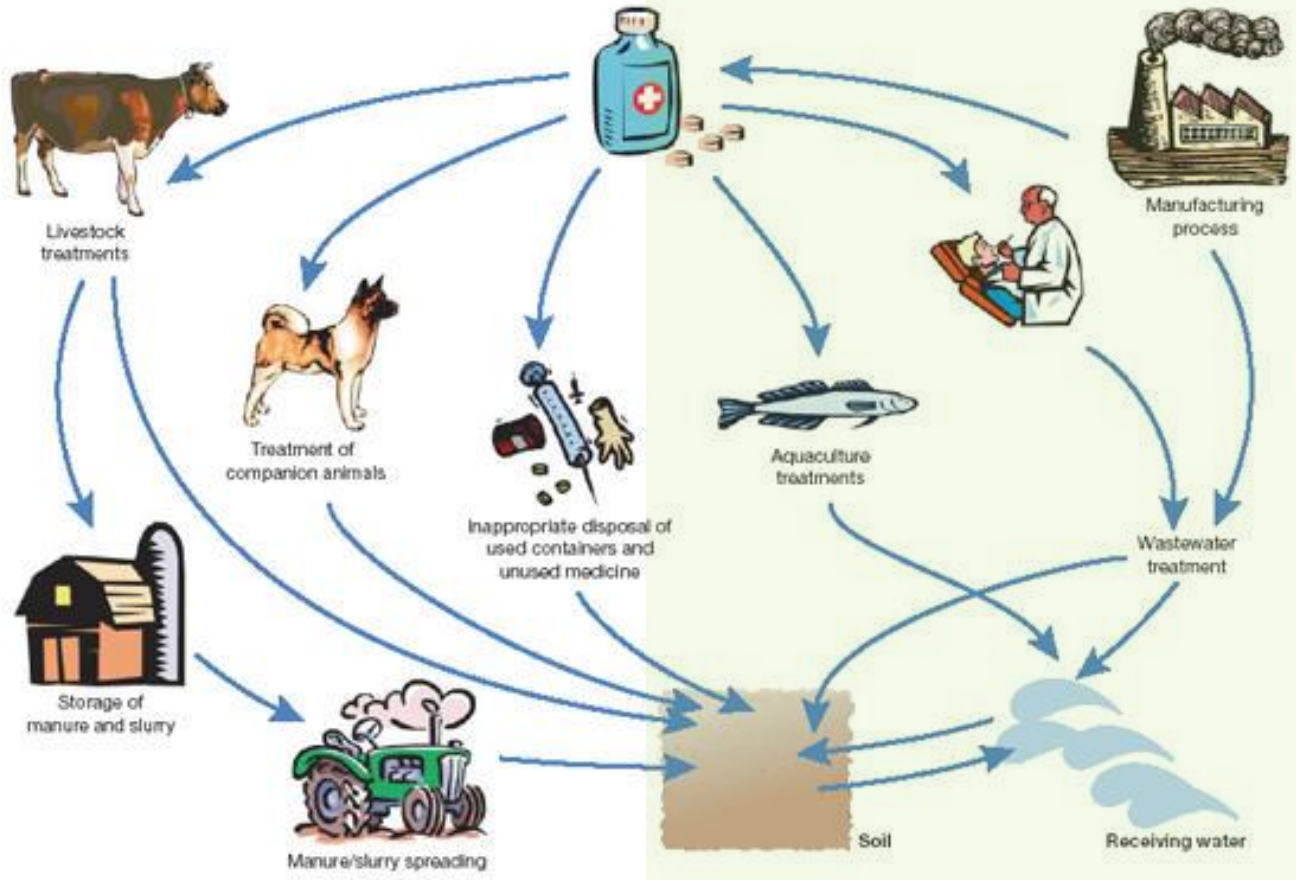
Forbes.com



WHAT IS OUR CONTRIBUTION?

- In Canada, 4.6% of total greenhouse gas (GHG) emissions are attributable to our health care system.
  - Public hospitals (22%),
  - Prescribed drugs (21%) or 1.2% of total GHG!
  - Physician services (13%).

- In primary care (UK)
  - 50% of GHG emissions come from Medications
    - 13% comes from pressurized metered dose inhalers (pMDI)



The many ways medication impacts our environment

- Manufacturing
- Distribution (transport, packaging)
- Devices used for delivery (IV, gloves, pill vials)
- Disposal
  - Drug Waste, expired meds
  - Excretion into our waterways and soil
- Veterinary use
  - Companion animals
  - Livestock treatment

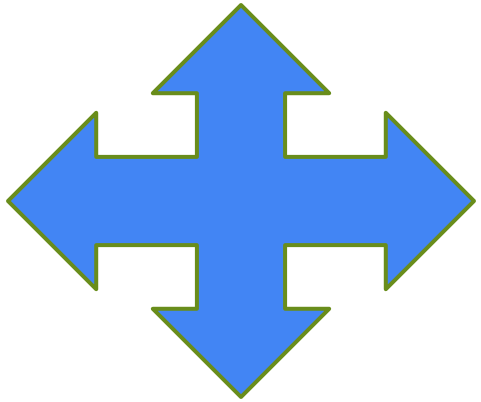
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1299201/

Climate **Mitigation** Within Pharmacy

Medication Use (Anaesthetic Gases + Inhalers)

- Substitute medication with lower carbon footprint
- Deprescribing and avoiding over diagnosis
- Recycling products that have not left the distribution chain (i.e. hospital pharmacy)
- Appropriate disposal of medication

Sustainable Procurement AND reducing plastic



Building/Materials & Energy

- Adjusting temperature (2° up in summer and 2° down in winter
- Use less – i.e., lights, water, paper

Operations Processes (within pharmacies) AND reducing plastic

ARE THERE MEDICATIONS THAT HAVE LOWER CARBON FOOTPRINT?

IV vs PO

- IV is usually delivered in single use product (increased packaging waste)
- May contain more than patient needs (often must be discarded if full vial not used)
- Administration and delivery of medication (IV tubing, syringes, vial or bag),
- Sterile compounding or repackaging (reconstitution, etc)

UK's NHS found that the IV ciprofloxacin **"60x higher carbon footprint than tablet"**

ANESTHETIC GASES

Ranked climate impacts: **desflurane > nitrous oxide > isoflurane > sevoflurane**

- Desflurane **15 times higher GHG than sevoflurane (2540 GWP_{100} vs 144)**
- N_20 – low potency for clinical effects requiring higher concentrations – also issue with storage

MDI vs DPI

- Hydrofluorocarbon propellants are 370 to 3,300 times more potent as GHG than CO_2!
  - 1 MDI (100 puffs) = approx. 300 car KM!

MDI has 20 to 30x higher carbon footprint than equivalent DPI!

THE 3 “R” OF THE PHARMACY WORLD
REDUCE • REUSE • RECYCLE

REDUCE or Deprescribe

Biggest contributor to carbon emissions from pharmaceuticals is the energy source used for production!

- Reduce the number of medications prescribed = not committing the planet to producing that medication
- Each drug needs to be extracted, transported, manufactured, packaged, shipped, distributed and ultimately disposed of (included waste/excretion)

REUSE

Is that medication really expired?

- Expiry dates may be too soon!
- Only drug known to have harmful effects after expiry is tetracycline
- Properly stored retain most of their efficacy for many years beyond their “expiry date”
- Stability/sterility vs chemical instability
- Arbitrary testing dates chosen by manufacturer (i.e., 1 yr, 2 yr, 6 months, 1 month)
    - Consider longer term studies mandated for manufacturers

RECYCLE

For meds that have not entered the patient’s supply (i.e., hospital delivery of meds but pt did not use) should be returned for reuse not disposed of

- Initially thought not worth the cost of paying employee to sort but study out of Fraser Health disputes this!

RISKS OF INAPPROPRIATE MEDICATION DISPOSAL

Sources

- Effluents from pharmaceutical manufacturing
- Drugs excreted in human waste (and animal)
- Drugs disposed of in usual refuse (water, landfills, etc.)

Risks/Harms

- Pollution of water ways of remote First Nations communities in Canada
- Ecological effects of pharmaceutical pollution in our waterways, aquatic species and food chain
    - 10% of medication found to pose potential environmental risk
        - Hormones, antibiotics, analgesics, antidepressants, antineoplastics, NSAIDs biggest culprets

WHAT DO WE KNOW ABOUT ADHERENCE?

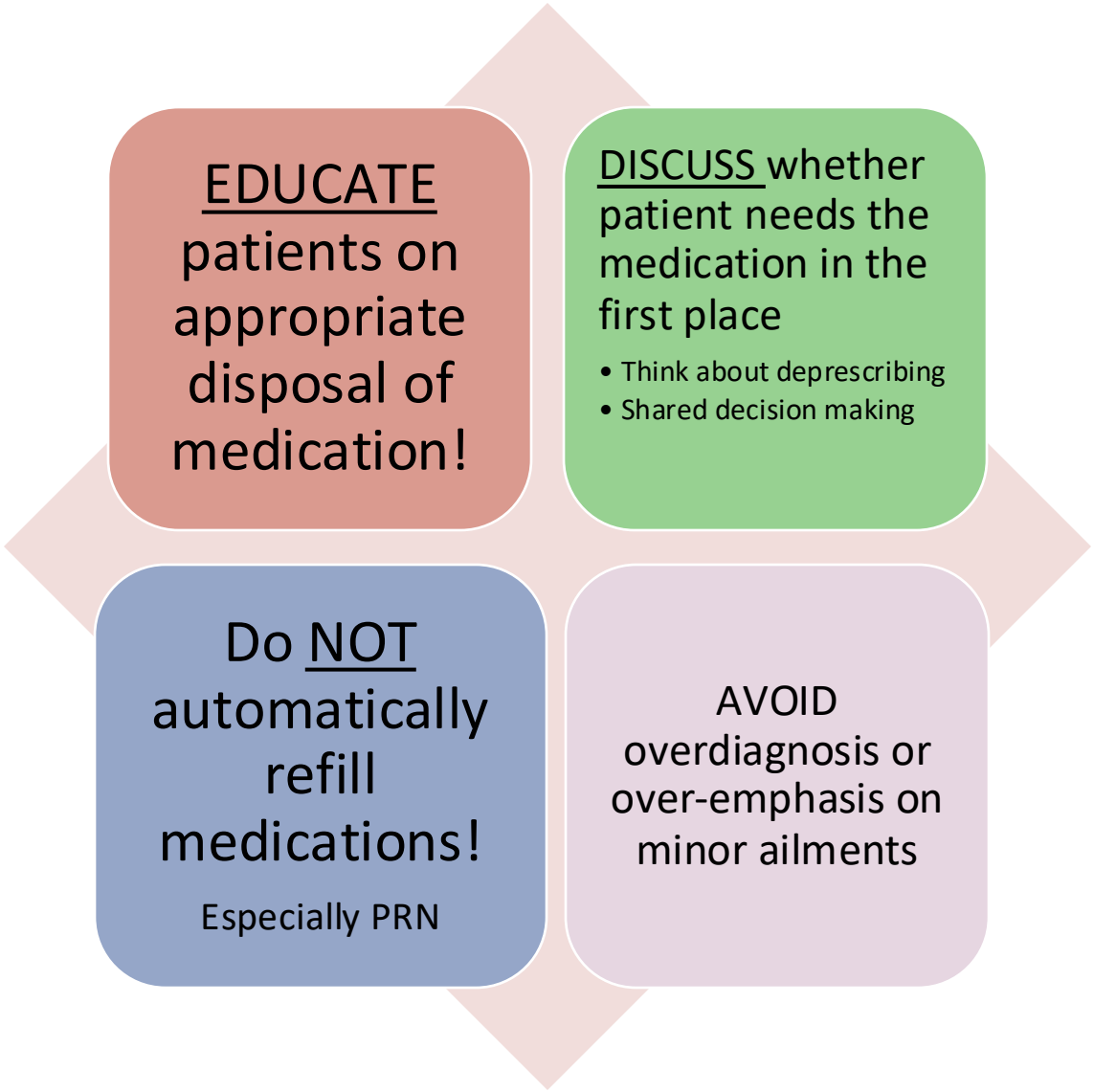
Patients take approx. 50 to 60 % of prescribed medication

Reasons

- Cost
- Misunderstanding
  - Why are they taking? How should it be working?
- Adverse effects
- Just “prefer not to take medication”

- Ask patient
  - “WHAT DO YOU KNOW ABOUT THIS MEDICATION”
  - “HOW IS THIS MEDICATION WORKING FOR YOU”
  - “WHAT MATTERS TO YOU?”
    - AKA shared decision making!

WHAT SHOULD WE DO ABOUT IT?



OPPORTUNITIES FOR PHARMACY

Reducing inappropriate medication use

- Evidence for use? Does pt understand risks/benefits
  - Potential to deprescribe
  - Minimizing # of med by using combo pills or long-acting formulations
    - daily, weekly, IUD vs OCP
- Avoid wasting when titrating doses
  - use the current supply before prescribing the next dose size

Appropriate disposable of medications

- Avoid entry into our waterways, soil
  - Consider not starting!
- Discuss appropriate disposal with patients
- Provide access to appropriate medication disposal programs to patients

automatically fill medication (especially for

- Opportunity to discuss how medication is working for patient
  - Side effects?
  - Not working? Deprescribe!
- Adherence rates for chronic conditions are 50 to 60%
  - if auto refilling, may result in surplus of meds that never get used, or end up in our waste system
- If not adherent ASK patient why?

Education

- Colleagues, Patients
- Health Care providers are one of the most trusted professions
- Our advise matters and can have a lasting impact

OTHER IDEAS?

- Reduce packaging
  - Including blister packing
- Management of drug supply and inventory
- “Greening” the pharmacy
- Biodegradable vials?
- Trial prescriptions
  - Allows patient to try medication in smaller quantity to ensure it is working
- Ensure pharmacy is educating patients and providing opportunity to dispose of medications properly!

Getting started

EVALUATING YOUR SITE FOR OPPORTUNITIES

Form a GREEN team

- Can be small but mighty!
- Help share the work (and motivation)

Start small and manageable

- Look for small ways to make a big difference
- Build on wins
- Celebrate and share your successes

5 EVERYDAY ACTS TOWARDS SUSTAINABLE HEALTH

Use less

Use less water: Avoid leaving water running, shorter showers, was clothes less

Use less paper: print only what is needed (consider patient info – we provide electronically?)

Save energy

Adjust your thermostat at work

- Up 2 degrees in the summer and down 2 degrees in the winter

Use renewable resources whenever possible

Waste less

Freeze your food before it spoils

Repair what you have

Keep your electronics longer

Reuse

Buy preloved items (clothes, household items)

Have an office supply sharing day – new to you instead of disposing

Dispose properly

Correctly dispose of medication

Compost whenever possible

Key Principles of QI

Teams: QI involves teamwork.

Small scale: Change is tested on a small scale

Rapid tests: Change is tested rapidly, with a short turn-around time.

Simplicity: Measures and interventions are simple: they involve minimal steps and are easy to understand.

Persistence: If a change does not lead to the desired results, the team moves on to another test of change; if a change is successful, it is implemented more formally/broadly.

Systems thinking: QI views clinics as systems with many moving, interdependent parts.

DEVELOPING A PROJECT

Generate Ideas

Sharing and Collaborating

What are some of your ideas?

At your table – think about <u>two</u> projects you could start at your pharmacy or practice site within the next 6 months

EXAMPLE:
DRY POWDER INHALER (DPI)/METERED DOSE INHALER (MDI) QI PROJECT

Step 1:

- Staff education regarding MDI/DPI

Step 2

- Pt list of prescribed MDI within past 18 mo

Step 3A

- Pharmacist reviewed pts and deprescribed any inhaler prescribed ≥12 months

Step 3B

- Med student contacted pts to discuss MDI to DPI switch and reviewed environmental benefits
- If pt was interested, appt with pharmacist or physician made to discuss/assess/switch if appropriate

	Pre	Post	Change
Pts with MDI rx	248	122	**-50.8%**
# MDI prescribed	355	200	**-43.7%**
Total Carbon Cost of Inhalers of 1 year (tCO2e)	72.8	41	**-43.7%**
Car KM equivalents	300,242	169,151	**-131,091**

Next steps:

- review DPI inhaler data to compare reduction and sustainability
- Implement process in our other clinics

HOW ARE YOU GOING TO KNOW IT WORKED?

- What would you like to evaluate?
- What does improvement look like?
- How are you going to share your results?
- Next steps?

This is Quality Improvement (QI)

“HOW TO” GUIDE OF GETTING STARTED

Evaluate your practice site for potential greening opportunities or projects

- Consider building a green team
- Start with small and sustainable changes
- Evaluate and measure your change (QI works!)
- Celebrate your wins!

Share your findings and learnings!

Get involved in your national, local sustainable health organizations!

Support and encouragement from colleges is a great way to stay engaged

RESOURCES

deprescribing.org

CASCADES

Canadian Medication Appropriateness and Deprescribing Network

HEALTH PRODUCTS STEWARDSHIP ASSOCIATION

PEER PATIENTS EXPERIENCE EVIDENCE RESEARCH

Therapeutics Initiative
Better prescribing. Better health.
UBC THE UNIVERSITY OF BRITISH COLUMBIA

CAPhE

CAPE
Canadian Association of Physicians for the Environment
Association canadienne des médecins pour l'environnement
ACME

The Canadian Coalition for Green Health Care
Coalition canadienne pour un système de santé écologique

CANE ACIIE
Canadian Association of Nurses for the Environment
Association canadienne des infirmières et infirmiers pour l'environnement

THANK YOU

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