Pediatric Polypharmacy in the Care of Medically Complex Children

Virginia Keane, MD
Mount Washington Pediatric Hospital
Baltimore, Maryland
Disclosures
Why Me?

• Over 25 years of experience providing primary care and hospital care to children with special needs.
• Primary Care for over 300 medically complex children,
• In addition inpatient and consultative care for care coordination.
• My friend Dr. Richard Gorman asked me!
Objective

• To Familiarize you with some of the issues that you will encounter when prescribing for children with complex medical problems
• Share Practical Lessons
• Mostly outpatient/primary
• A little inpatient
What is Polypharmacy?

• Multiple Drugs
• Multiple drugs to treat a single condition
• Multiple drugs with the same mechanism of action
• Multiple Drugs with one or more that are not necessary.
The Literature In Pediatric Polypharmacy

- Not much
- Most Polypharmacy literature references the elderly
- Polypharmacy of psychotropic meds
- Quality/med reconciliation has gotten some attention
Data on Polypharmacy

• In the Elderly significant predictor of increased mortality and morbidity including hypoglycemia, fractures, impaired mobility, pneumonia and malnutrition. (1,2)
• Interventions can decrease polypharmacy, (3,4) but currently available studies do not link reduction of medications to improved quality of life or improved health outcomes.
• Pediatric data is harder to come by. Feudtner et al (5), 411 general and 52 children’s hospitals: large portion of children received 5+ drugs, more in children’s hospitals than general, no difference when adjusted for severity, lots of variability for same diagnosis, (asthma, appendectomy, seizures) 3-5 meds on day one, 3-9 on subsequent days
• Outpatient: Clavenna and Bonati review, found 128 utilization studies, 49 on psychopharmacology, 32 on antibiotics. Prescribing rates (drugs per child) ranged from .8 in Norway to 3.2 in the US, with peaks in preschool area.
• Well documented: polypharmacy on the increase in pediatric mental health
• Children with Complex Medical Conditions are more likely to have ed visits due to adverse drug events. Psychotropics 18%, abx12%, anticonvulsants 11% unclassified 13% (7)
Concerns : Polypharmacy in Pediatrics

• Morden et al, Pediatric Polypharmacy: Time to lock the medicine cabinet?
• Arch Ped Adol Med, 2012:166(1)91-92
• While medication combinations increase the risks of adverse effects, drugs are tested in isolation
• We don’t have data on what combinations may be harmful
• Lack of consensus on what is necessary

Little of this addresses the complex care population: children who are home on multiple medications and interventions, none of it tells you how to manage these children in the outpatient setting.
The Kids

Chronic lung disease, Ventilator, Short gut, Developmental delay, Gtube nissen, Seizures, Hypertonia

medications

- Fluticasone
- Albuterol/ipratropium
- Montelukast
- Loratadine
- Glycopyrrolate
- Lansoprazole
- Trimethoprim/sulfa
- Metronidazole
- Psyllium
- Leviteracetam
- Carbamazepine
- Baclofen
- Creams
- Vitamins
- Elemental formula
- Supplemental oxygen
Transitions: Hospital to Home

- **Case 1**: a two year old with a history of omphalocoele, recurrent sepsis, feeding disorder, gerd, s/p gtube and nissen, chronic lung disease and developmental delay was brought to clinic for follow up following an admission for diarrhea

- The resident DID call
  - Several dosage changes

- The Mom, who the residents described to me as “slow” is in tears: she says “I’m trying Dr Keane, but I just don’t know how to give the medicines in mgs, so I went back to just giving the old doses in mls”
Transitions: Hospital to Home

- Case 2: An 18 month old with anoxic brain injury, moaning constantly
- accompanied by mom, home nurse, hospice nurse coordinator, hospice social worker, child protection worker.
- 2 admissions since initial discharge, concern mom isn’t giving meds and feeds
- Mom admits: she can not keep up with the schedule which includes q 3 hour feeds, q 6, 8 and 12 hour meds that all start at different times.
Homes Are Not Hospitals! They Don’t Have Pharmacists!

- Parents, friends, lpns, are giving medications
- Medications are not premeasured
- Home folks can’t convert from mgs to mls
  - May not have the math skills
  - Dangerous if there is an error

  In this case it took me 25 minutes and a call to the pharmacy to confirm solution strengths, convert all the new doses to volumes that made sense( no hundredths of an ml!!)
Homes Are Not Hospitals! They Don’t Have Shift Workers!

*case 2: mom giving med or feed every 1-2 hours, setting up the continuous feed.
  nurse: ZZZZ

* three other children under 6 years old.
*With mom and the hospice nurse we reevaluated the schedule, Simplified!!
  – mom was giving three feeds and 2 sets meds over 16 hours
  – Nurse was giving meds, starting the continuous feed, and giving meds overnight
PCP Lessons

• Carefully review discharge medication plan, ideally PRIOR to discharge.
• Make sure doses are sensible for home administration
• Make sure the schedule makes sense
• Modify the schedule and med list to make life livable
Home To Hospital

- 23 children, 219 admissions
- Five info sources: Last admission (87%), Parents (52%), pharmacy (61%), PCP (43%), admit history (65%)
- Average of 5.3 medications per patient
- 39 of 182 admission medications orders were errors, the most common being Omissions (17/39)

Many tearful calls.
Primary Care Lessons

• Teach your patients to notify you when they are admitted.
• Contact the admitting doctor and review the medications ASAP
• Give your patients an updated medication list as often as possible.
• If they have home nursing have them carry their home nursing orders
Home Nursing

• Orders are often incorrect: tend to revert to prior dosing and frequencies

• Just because you make a prescription change and the nurse has the new med in the house doesn't mean it will be given: there must be an order.

• Now every visit with a CC patient I write nursing orders: copy to mom, copy to agency.
Transitions: Home to School

- Case: A child with a trach and a gtube on 8 medications is starting school. All of his meds are every 12 hours except for albuterol which is q 8 and prn. He has a private duty nurse. The school nurse insists that you complete detailed feeding and medication lists even though she only needs to give albuterol prn.
- She returns the orders three times for clarifications.
School

• Find out the district/state rules: do they really need everything? Will an order for what they will take in school and an AAP emergency form with med list do?

• See if you can do special needs schools en masse

• Keep an open, friendly relationship with the school nurses: they can effect the quality of your life
Compounding

• Problems: different hospitals, different pharmacies, different recipes!
• Not all community pharmacies will compound
• Some meds are available as commercial solutions or compounds
• Formularies shift and shortages “compound” the problems (yuck yuck)
PCP Lesson

• Become familiar with medications that are regularly compounded,
• Know which pharmacies in your community will compound. Independent vs chains
• Get to know a pharmacist, ideally the compounding pharmacist, at the pharmacies that provide this service.
• Be prepared to advocate for access to a compounding pharmacy if insurers don’t include them
• Have prior authorization process facilitated in your office
Refills and Deliveries

Whether you e-prescribe or paper prescribe you will eventually find that a patient on multiple drugs has multiple refill dates!

Families start to go nuts: calls and trips
Staff starts to go nuts: calls and faxes
You start to go nuts!
Lessons for Primary Care

• Write / refill as many medications as you can each refill opportunity and let your patient know.

• See if the pharmacy will work with you to coordinate a single refill date every 1-3 months (no success)

• FIND A PHARMACY THAT DELIVERS (most compounding pharmacies do)
Coordinating with Specialists

*Most patients with polypharmacy also suffer from polyphysician.

*Polyphysician-→Polydosing→Polyerrors
  if communication loops are not closed.

*Example:
  Complex care patient with home nursing has a seizure, taken to community hospital.
  The ER calls the neurologist: keppra increased.
  Pcp, not informed of the increase, receives the home nursing orders which include the old dose, signs them.
  One week later the patient has another seizure.
Coordinating with Specialists

• Have your patient contact you every time they have a dose change
• Ask the specialists to let you know if they make a dose change.
• Decide what meds you are willing and competent to manage: Synthroid/ Growth Hormone, lasix/sildenafil and digitalis, biologics, immune modulators,
• Agreements: what pcp can/will do.
• Shared EMRs may help or may confuse this issue
• Contact household caretakers: parent and nurses
Formula and Oxygen

• For CCMC formula is medicine.
• Weight gain is a hallmark of well being.
• Balance calories in, calories out, absorption and oxygenation
• With weight gain comes the growth of healthy tissue: Lung, gut, muscle
• Too often we see children who have not seen their specialists, have not had their oxygen or feeds adjusted
  – Unnecessarily on oxygen
  – No weight gain
  – Obese
Lessons for Primary Care

If a baby is not gaining weight he needs more calories.

If he is already getting 120-150 cals/kg something is wrong.

Not absorbing?

Consider non milk formula, partially hydolyzed formula or elemental formula

Short Gut?

May need His antibiotics adjusted: call the Gastroenterologist

Low Pulse Oximetry reading?

Increase his oxygen

If a Child on oxygen is gaining too quickly

Call the Pulmonologist,
Decrease the oxygen

Once he’s on room air if excess weight gain continues decrease his calories.
Pulmonary hypertension may be an exception

Or: Instead of all this calling make a contingency plan with the specialist so you can make the adjustments
Side Effects and Interactions

• Drugs with the same purpose: ie antiepileptics, anti hypertensives, laxatives, antibacterials antispasticity

• Drugs with the same mechanism of action: ie clonidine and guanfascine, lactulose and psyllium,

• Drugs that effect the metabolism or excretion of other drugs
Side Effects and Interactions

• If you have an emr with e-prescribing it will likely drive you CRAZY with all the warnings.
• If you don’t have an emr you have a few options
  – Call the pharmacist and ask them to check for interactions
  – Check in epocrates or micromedix
  – Check with your patient
Cutting Back

• Goal: make your child’s life as normal as possible: this may mean cutting back on meds.

• Some easy cuts
  – No seizures for a year? Do an eeg, and if normal let the neurolgist know you want to wean. They will often give you a schedule based on age, dose, and duration of treatment.
  – Most kids with gtubes and a nissen don’t need antacids.
  – Using formula with fiber may allow you to eliminate laxatives.
  – Preemies often rapidly outgrow their need for diuretics. Don’t be afraid to wean. You can always add it back.
How to Keep Up

• No one can not keep with all the new treatments in all the specialties!!
• So: I learn from my specialists: when a patient is put on a drug I'm unfamiliar with, I READ, then I will may use it for other patients
• This way I
  – Learn one drug at a time
  – Gradually increase my toolbox
Keeping Track

• EMRs will keep a medication history
• On paper I prefer a medication list that allows me to chart 4-6 changes per drug (a year)
• Write down adverse reactions, important interactions on a summary document
• If you give parents med lists have them keep the old ones: they come in handy!
Conclusions

• More and more children with complex medical needs are entering our communities and **THEY NEED YOU**

• By collaborating with specialists and pharmacists, schools and nurses

  every primary care pediatrician can take care of children with complex medical conditions and polypharmacy.
Thank You!