Management of side effects of antipsychotics

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Outline

• Antipsychotic side effect summary
• Critical side effect management
  – NMS
  – Cardiac side effects
  – Gastrointestinal side effects
  – Clozapine black box warnings
• Routine side effect management
  – Metabolic side effects
  – Motor side effects
  – Prolactin elevation
• The man-in-the-arena algorithm
Receptor profile and side effects

• Alpha-1
  – Hypotension: slow titration

• Dopamine-2
  – Dystonia: prophylactic anticholinergic
  – Akathisia, parkinsonism, tardive dyskinesia
  – Hyperprolactinemia

• Histamine-1
  – Sedation
  – Weight gain

• Muscarinic-1-5
  – Anticholinergic side effects including cognition

Stroup TS and Gray N. World Psychiatry. 2018;17(3):341-56. [Clinical Update]
Antipsychotic side effects – NMA

- [Efficacy]
- Side effects – TOP 3 (available in US)
  - Akathisia
    - Highest: lurasidone, haloperidol, cariprazine
    - Lowest: clozapine, quetiapine, olanzapine
  - Weight gain
    - Highest: olanzapine, iloperidone, quetiapine
    - Least: ziprasidone, lurasidone, aripiprazole
  - QTc prolongation
    - Highest: ziprasidone, iloperidone, asenapine
    - Lowest: lurasidone, brexpiprazole, cariprazine
  - Prolactin elevation
    - Highest: paliperidone, risperidone, haloperidol
    - Lowest: clozapine, aripiprazole, cariprazine
  - Sedation
    - Highest: clozapine, quetiapine, ziprasidone
    - Lowest: cariprazine, paliperidone, iloperidone
- Elderly more likely to experience short-term toxicity*

### Summary of antipsychotic side effects

<table>
<thead>
<tr>
<th>Antipsychotic</th>
<th>Weight gain</th>
<th>Somnolence</th>
<th>Akathisia</th>
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<tbody>
<tr>
<td>Aripiprazole</td>
<td>++</td>
<td>++</td>
<td>+++</td>
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<tr>
<td>Brexpiprazole</td>
<td>++</td>
<td>++</td>
<td>0</td>
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<tr>
<td>Cariprazine</td>
<td>++</td>
<td>0 (NNH 100)</td>
<td>+++</td>
</tr>
<tr>
<td>Risperidone</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
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<tr>
<td>Paliperidone</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Olanzapine</td>
<td>+++ (NNH 6)</td>
<td>+++ (NNH 7)</td>
<td>+</td>
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<tr>
<td>Quetiapine ER</td>
<td>+++</td>
<td>+++ (NNH 7)</td>
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<tr>
<td>Ziprasidone</td>
<td>+</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Asenapine</td>
<td>++</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>Iloperidone</td>
<td>+++</td>
<td>++</td>
<td>0</td>
</tr>
<tr>
<td>Lurasidone</td>
<td>+ (NNH 67)</td>
<td>+++</td>
<td>+++ (NNH 10)</td>
</tr>
</tbody>
</table>

**Anticholinergic:** olanzapine, quetiapine (could be adrenergic)

**Orthostatic hypotension:** risperidone/paliparidone, iloperidone

NNH = Number Needed to Harm

CRITICAL SIDE EFFECT MANAGEMENT
Neuroleptic malignant syndrome (NMS)

- Onset within 2 weeks of starting antipsychotic
- Tetrad
  - Fever
  - R rigidity: lead pipe rigidity, tremor, other
  - Mental status changes*: agitation, confusion
  - Autonomic instability: tachycardia; diaphoresis
- Elevated serum CK: >1000 IU/L
  - Leukocytosis, low iron (sensitive, not specific), myoglobinuria
- Differential diagnosis
  - Related disorders with fever/rigidity/dysautonomia
    - Serotonin syndrome
    - Malignant hyperthermia
    - Malignant catatonia
  - Other
    - CNS infection, systemic infection, seizures, drug intoxication (PCP), catatonia

Always consider forme fruste!

http://www.nmsis.org/
(Neuroleptic Malignant Syndrome Information Service)
Cardiac side effects – QTc prolongation

• QTc prolongation
  – Risk factor model: low potassium; long QTc syndrome

• Mechanism
  – hERG (human Ether-à-go-go-Related Gene)
    • Regulates potassium ion channel repolarization current
  – QTc prolongation increases risk for torsades de pointes

• Increased risk
  – Thioridazine: black box warning; 2D6; brand withdrawn
  – Pimozide: calcium channel blocker; 3A4 and 2D6; citalopram/escitalopram contraindicated
  – IV haloperidol (other risk factors!)
  – Ziprasidone
  – Iloperidone: similar to ziprasidone

Ziprasidone and QTc – a case study

• Modest effect
  – ZODIAC¹ and pre-and post-approval studies²
    • Average increase of QTc of 6 msec for each 100 ng/mL increase in ziprasidone blood levels
    • No signal for an increased risk of ziprasidone-associated cardiac death

• Clinical dilemma
  – Minimal evidence about real-world relevance³
  – Antipsychotics as component cause for development of torsades de pointes

ZODIAC=Ziprasidone Observational Study of Cardiac Outcomes
Gastrointestinal side effects

• Gastrointestinal hypomotility
  – Constipation, ileus, ischemic bowel disease
  – Constipation 30%

• National cohort study (Taiwan)
  – Constipation: quetiapine, clozapine
  – Ileus: high-potency antipsychotics, clozapine
  – Ischemic bowel disease

• Treatment
  – High index of suspicion
  – Prophylactic bowel regimens

Clozapine: 5 black box warnings

1. Agranulocytosis
2. Seizures
3. Myocarditis
4. Orthostatic hypotension (with syncope or cardiorespiratory arrest)
5. Increased mortality in elderly patients with dementia-related psychosis (class warning for all antipsychotics)
Clozapine-associated constipation

• FDA strengthens warning
• Untreated constipation can progress to serious bowel problems
• Risk increases with higher doses and with concomitant anticholinergics
• Clinician guidance
  – Evaluate bowel habits prior to clozapine
  – Monitor bowel function throughout treatment
  – Educate patients about constipation prevention
  – Consider prophylactic bowel treatment

Clozapine-associated myocarditis

• Clinical features
  – Non-specific!
• Highest risk period is four weeks\textsuperscript{1}
• Management
  – High index of suspicion
  – Increased case detection with monitoring\textsuperscript{2}
  – No agreed-upon monitoring scheme
    • Consider adding inflammatory markers for 4 weeks
  – Consultation with cardiology
• Rechallenge discouraged in clear cases\textsuperscript{3}
  – Slow titration may be protective

\textsuperscript{2}Neufeld NH and Remington G. Schizophr Res. 2019;206:462-3.
Clozapine-associated myocarditis

• Prospective monitoring study
  – Setting: state hospital with limited resources
  – N=100

• Findings
  – Presumptive myocarditis 5.3%
  – Weekly troponin levels sensitive
  – Other markers of inflammation insensitive and non-specific

• Unresolved:
  – Optimal monitoring (frequency, role of echocardiogram)
  – Better biomarkers (NTproBNP)
  – Smoldering myocarditis (?)

Clozapine and COVID-19
Clozapine use during COVID-19

- Consensus statement on the use of clozapine during the COVID-19 pandemic\(^1\)
  - REC #1: Criteria for up to 90-day clozapine supply
  - REC #2: Evaluate for any new infection
  - REC #3: Consider reducing clozapine dose during infection
- Consistent with FDA guidance\(^2\)
- Endorsed by many states including MA and countries

\(^2\)https://www.fda.gov/media/136317/download
ROUTINE SIDE EFFECT MANAGEMENT
“However beautiful the strategy*, you should occasionally look at the results.**”

-Sir Winston Churchill

* = what your clinic does
** = how your patient is doing

The need to focus on mortality

The day the music died
ELMHC clozapine cohort


Greatly decreased life expectancy

Natural causes: 85%
Unnatural causes: 15%

Two main medical causes:
#1 Cardiovascular disease
#2 Cancer

# CATIE – baseline cardiovascular risk factors

<table>
<thead>
<tr>
<th></th>
<th>CATIE</th>
<th>NHANES</th>
<th>( P )</th>
<th>CATIE</th>
<th>NHANES</th>
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<td><strong>Metabolic Syndrome Prevalence</strong>*</td>
<td>36.0%</td>
<td>19.7%</td>
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<td>51.6%</td>
<td>25.1%</td>
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<td><strong>Waist Circumference Criterion</strong></td>
<td>35.5%</td>
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<td>76.3%</td>
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<td><strong>Triglyceride Criterion</strong></td>
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<td><strong>HDL Criterion</strong></td>
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<td>21.7%</td>
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*National Cholesterol Education Program (NCEP) criteria

NHANES = National Health and Nutrition Examination Survey III

Proactive medical management

• Iatrogenic complications
• But: worst outcomes in untreated patients with schizophrenia\(^1,2\)
• Iatrogenic complications
• Proactive (preventive) treatment
  – Metformin\(^3\)
  – Behavioral interventions\(^4\)

\(^4\)Ward MC and Druss BG. JAMA Psychiatry. 2019;76(7):759-60. [JAMA Network Insights]
Antipsychotic-induced weight gain

- Most robust predictor: H1 receptor affinity; 5HT2C polymorphisms
- Almost all antipsychotics show weight gain after extended use
  - Weight gain more pronounced in antipsychotic naïve patients\(^1\)
  - Not clearly dose-dependent
- Meta-analysis in first-episode patient\(^2\)
  - Short-term (3 months or less) weight gain: 3.22 kg
  - Long-term (over 3 months) weight gain: 5.3 kg
  - More weight gain in Western samples
  - Only antipsychotic that did not cause weight gain: ziprasidone
- Decreased insulin sensitivity develops rapidly in 12 weeks
  - More pronounced in olanzapine vs. risperidone or aripiprazole\(^3\)

\(^3\)Nicole GE et al. *JAMA Psychiatry.* 2018;75(8):788-796.
Metabolic prevention

A. Choose wisely, if you can - prevent

B. Screen and monitor – detect
   • Very frequent monitoring early\(^1\)

C. Prevent/blunt weight gain - mitigate
   • Add behavioral management
   • Switch antipsychotics
   • Add prophylactic metformin
   • Add weight loss medications

Choose wisely, if you can

Relative risk (Schizophrenia PORT 2009)¹

Clozapine=olanzapine
low-potency FGAs
risperidone=paliperidone=quetiapine
medium-potency FGAs
high-potency antipsychotics=molindone*=aripiprazole=ziprasidone

Newer antipsychotics

– Lurasidone²,³
  • Pooled analysis from 6 clinical trials, mean change at month 12³
    – -0.4 kg with lurasidone; +2.6 kg with risperidone; +1.2 kg with quetiapine XR.

– Cariprazine⁴
  • 1.9 kg weight gain from lead-in to end of 48-week open-extension

– Brexpiprazole⁵
  • 1.1 kg weight gain in short- and long-term studies

²de Hert et al. *CNS Drugs.* 2012 Sep;1;26(9):733-59

*discontinued*
Samidorphan/olanzapine (ALKS 3831)

Phase II (PoC); NCT01903837

NOTE
Does not prevent weight gain
Blunts weight gain

Significant difference

Perfect is the enemy of good.

- Population-based management
- Keep it simple
- Do it regularly (enough)
- Get non-fasting results


50% metabolic monitoring is achievable with QI initiative.*
Behavioral interventions for SMI

• Evidence-based practice
  – ACHIEVE\(^1\)
  – STRIDE\(^2\)
  – In SHAPE\(^3\)

• STRIDE core interventions
  – Increasing awareness through monitoring
  – Creating personalized diet and exercise
  – Reducing calories
  – Improving diet
  – Increasing physical activity
  – Graphing progress

Weight loss is possible for patients with SMI\(^4\)

Long-term support might be needed

Consider behavioral-educational groups*

Use multifaceted interventions**

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**Daumit GL et al. JAMA Network Open. 2020;3(6):e207247
Switching to aripiprazole (CAMP)

CAMP study = comparison of antipsychotics for metabolic problems
Switching antipsychotics

- Meta-analysis (59 studies)
- Best benefit
  - Aripiprazole
  - Ziprasidone
- Any switch risks psychiatric destabilization

Switching antipsychotics, if possible is the most potent intervention.

Prophylactic metformin to prevent antipsychotic-associated glucose intolerance

- Shown in first-episode and chronic patients on antipsychotic to re-sensitive insulin receptors
  
- MOA: does not cause hypoglycemia
  
- Meta-analysis: total cholesterol, TGs, weight, HbA1c; not WC, LDL
  
- Safety
  - Rare lactic acidosis: more likely with excessive alcohol use
  - May be associated with vitamin B12 deficiency
  - Safe for cognition
  - Most common side effects: GI (N/V 14%, diarrhea 7%)

- Dosing
  - Target total daily dose 2,000 mg (with food)

FDA-approved weight loss medications

- Withdrawn 1997: fen-phen
- Withdrawn 2010: sibutramine (Meridia)
- Orlistat (Xenical, OTC Alli)
- **WITHDRAWN 02/13/20** lorcaserin (Belviq) – CIV
- *Phentermine plus topiramate* (Qsymia) – CIV
- Bupropion plus naltrexone (Contrave)
- *Liraglutide* (Saxenda; lower-dose: Victoza)
- **NEW**: Superabsorbent hydrogel (Gelesis100)\(^a\)

Topiramate and weight loss

- Topiramate (23/46/69/92 mg) + phentermine
  - FDA-approved for weight loss in obesity [brand name QSYMIA]
  - Most effective medication in a meta-analysis\(^1\)
    - 75% achieved at least 5% weight loss
    - 8.8 kg (95% CI, -10.20 to -7.42 kg) weight loss over one year

- Topiramate in schizophrenia\(^2\)
  - Meta-analysis of 8 add-on trials (N=439)
  - Results
    - Dose range 100 to 400 mg/d
    - Improved psychopathology
    - Reduced weight
  - “Larger studies are needed”

\(^1\)Khera R et al. JAMA. 2016;315(22):2424-34.
Drug-induced extrapyramidal symptoms (EPS)

• By time course
  – Peracute   Acute dystonic reaction (ADR)
  – Acute      Akathisia, NMS
  – Subacute   Parkinsonism
  – Chronic    Tardive dyskinesia (TD)

• Other syndromes
  – Pisa syndrome
  – Rabbit syndrome
  – See also: supersensitivity psychosis*

Clinical scheme of movement disorders

- **HYPERKINETIC**
  - rhythmic
  - too much
    - Medication tremor
    - Tremor
    - Tics
    - Myoclonus
    - Speed

- **HYPOKINETIC**
  - too little
    - Tardive dyskinesia
    - ADR
    - Parkinsonism
    - Catatonia
    - bradykinetic
    - akinetic

Antipsychotic-induced motor side effects

Akathisia - treatment

• Recognize
  – Differential diagnosis: psychotic agitation

• Change antipsychotic drug regimen
  – Reduce dose
  – Switch to low-risk antipsychotic
    • Iloperidone¹, quetiapine, clozapine

• If not possible add anti-akathisia medication
  – Benzodiazepines
  – Propranolol 40 to 80 mg per day
  – Serotonin 2A receptor antagonists²
    • Mirtazapine 15 mg per day
  – Anticholinergics ineffective (add only if Parkinsonism)

Poyurovski M. Br J Psychiatry. 2010;196(2):89-91. [REVIEW]
Parkinsonism - treatment

- Anticholinergics
  - Avoid because of cognitive side effects
  - If used prophylactically, stop after one month
- Amantadine
  - Good alternative to anticholinergics
  - Dose: 100 mg twice daily
  - Possible benefit: weight loss

Tardive dyskinesia (TD) - Numbers

• **Incidence**\(^1\)
  – FGA 6.5% per year
  – SGA 2.6% per year

• **Prevalence**\(^2\)
  – Global: 25%
  – Current SGA: 20%; never FGA: 7%
  – Current FGA: 30%

• **Reversibility**\(^3\)
  – Remission rate: 2% (!)

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TD – risk factors

• Risk factors¹
  – FGA>SGA>clozapine
  – Age (over age 45)
    • 26% year 1; 52% year 2; 60% year 3²
  – Dose and duration of treatment (cumulative dose)
  – Sensitivity to EPS (acute EPS)
  – Other:
    • Non-modifiable: female, African decent, brain damage, mood disorders, gene polymorphisms (Perlecan gene HSPG2)
    • Modifiable: alcohol/drugs, diabetes, smoking, anticholinergics

Management of TD

**PREVENT**
- Clear indication for antipsychotic
- Short term treatment, if possible
- Lowest-risk choice and lowest dose
- Stop anticholinergics***

**MONITOR**
- Baseline motor exam
- Longitudinal follow-up
- At least annual AIMS*

**TREAT**
- Slowly taper antipsychotic, if possible
- Switch to quetiapine or clozapine**, if possible
- Treat TD symptomatically
- TOC VMAT-2 inhibitors

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*In low-risk patients; more frequent monitoring in higher risk patients
TD – best practices expert consensus

• Outdated practice guidelines
• Method
  – 29 TD experts
  – Modified Delphi procedure
  – Content area: screening, diagnosing, treating TD
• Consensus in 4 areas
  1) Brief, clinical assessment at every visit
  2) Even mild movements in one body area could be TD
  3) Management requires reassessment of antipsychotics and anticholinergics; VMAT-2
  4) Informed discussions with patient/caregiver essential

Tips on using the AIMS

• A score on a the AIMS is not a diagnosis
  – There is no mention of TD in the AIMS
• Assessment
  – Look at 7 body areas
  – Severity for each
  – Functional relevance and insight
  – There is no single best interpretation of AIMS scores*
    • Not a linear scale
• Score what you see
  – Do not count tremor
  – Do not count gum chewing (!)
• Repeat every 6 months or more frequently if high risk

Severity scores
Total score (sum of 1 to 7)
Global severity score
Incapacitation
Insight into movements

Tardive dyskinesia - treatment

**First-line**
- Dopamine-depleting agents
  - Reserpine
  - Tetrabenazine
  - Deutetrabenazine*
  - Valbenazine*

**Second-line**
- Amantadine
- Benzodiazepines
- Beta-blockers
- Branched-chain amino acids
- Clozapine – switch**
- Ginkgo biloba
- Vitamin B6 – but toxicity?
- Vitamin E – perhaps as prophylaxis
- Botox injections – for focal TD; orofacial TD
- Deep brain stimulation – for tardive dystonia

Waln O and Jankovic J. Tremor Other Hyperkin Mov 2013;3.
Vesicular monoamine transporter (VMAT)

- Transport protein of synaptic vesicles
- Presynaptic neuron
- 2 types
  - VMAT2 for monoamine neurons
- Inhibition increases cytosolic neurotransmitter → vulnerable to MAO degradation → depletion
- 2 binding sites
  - Reserpine*
  - Tetrabenazine

*Also used in veterinary medicine as long-acting horse tranquilizer

Tetrabenazine and valbenazine metabolism

**Tetrabenazine (TBZ) racemic mixture**

- **(-)-TBZ enantiomer**
  - carbonyl reductase
  - (-)-β-HTBZ
  - (-)-α-HTBZ

- **(+) TBZ enantiomer**
  - carbonyl reductase
  - (+)-β-HTBZ
  - (+)-α-HTBZ

**Valbenazine**

- Non-P450 hydrolysis
- Mono-Oxidation
- Metabolite
- TBZ = Tetrabenazine
- HTBZ = Dihydrotetrabenazine

**Freudenreich O and Remington G. Clin Schizophr Rel Psychoses. 2017;11(2):113-9.**

**VMAT-2**
- Low affinity
- Off-target effects
  - Dopamine receptors
  - Serotonin Receptors
  - Adrenergic receptors

**VMAT-2**
- Potent inhibition
- Off-target effects
  - None or minimal
Valbenazine

• VMAT-2 inhibitor
• FDA-approved 2017 for adults with tardive dyskinesia
  – Clear efficacy
  – Longer half-life (20 hours): QD dosing
• Dosing
  – Start 40 mg/d x 7 days, then 80 mg/d
  – Dose strengths: 40 mg, 60 mg, 80 mg
• Minimal effect on QTc (but consider if risk factors)
• Lower dose for poor metabolizers 2D6 or 3A4

ES 0.90 for 80 mg dose
Deutetrabenazine

• Deuterated tetrabenazine
• FDA-approval 2017 for Huntington’s disease (brand name Austedo) and for TD
  – Start 6 mg twice daily, increase by 6 mg weekly
  – Twice daily dosing
  – Up to 24 mg twice daily (48 mg TDD)
  – Adjust dose for 2D6 status
  – Monitor QTc for doses above 24 mg per day
• Clinical trials
  – AIM-TD*
  – RIM-TD (open-label, one-year extension study); NCT02198794

APA Schizophrenia Guideline, 3rd ed

- Acute dystonia
  - APA recommends anticholinergic
- Parkinsonism
  - APA suggests lowering dose, switching, treating with anticholinergic
- Akathisia
  - APA suggests lowering dose, switching, treating with benzodiazepine or beta-blocker
- Tardive dyskinesia
  - APA recommends treatment with reversible VMAT-2 inhibitor for moderate or severe/disabling TD

Hyperprolactinemia

• Tubero-infundibular pathway
  – Dopamine is PIF (prolactin-inhibiting factor)
• Gender-specific problems¹
  – Females have higher prolactin elevations
  – Female side effects
    • (Secondary) amenorrhoea and infertility
    • Gynecomastia and galactorrhea
    • Loss of libido
  – Male side effects
    • Loss of libido, erectile dysfunction
    • Gynecomastia and galactorrhea
• Long-term effects
  – (Secondary) hyopogonadism → osteoporosis → fracture risk²
  – Increased breast cancer risk?³
  – No increased endometrial cancer risk⁴

Montejo AL et al. World Psychiatry. 2018;17(1):3-11. [Sexual dysfunction due to psychotropics]
Management of elevated prolactin

• Shared-decision making
  – Gender-specific side effects
  – Long-term risk (osteoporosis, breast cancer?)

• Decision points
  – Monitor prolactin
    • Baseline
    • Serial prolactin levels
  – Endocrinology referral
  – Take action
    • Stay the course
    • Switch to prolactin-sparing antipsychotic
    • Add aripiprazole

"Prolactin-sparing" antipsychotics

Hyperprolactenemia

Paliperidone
- Risperidone, first-generation AP

Olanzapine*
- Lurasidone, asenapine
- Ziprasidone

Iloperidone, quetiapine, clozapine
- Aripiprazole** and partial agonists

*Usually transient
**Can lower prolactin levels

Citizenship in a republic

It is not the critic who counts; not the man who points out how the strong man stumbles, or where the doer of deeds could have done them better. **The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood;** who strives valiantly; who errs, who comes short again and again, because there is no effort without error and shortcoming; but who does actually strive to do the deeds; who knows great enthusiasms, the great devotions; who spends himself in a worthy cause; who at the best knows in the end the triumph of high achievement, and who at the worst, if he fails, at least fails while daring greatly, so that his place shall never be with those cold and timid souls who neither know victory nor defeat.
Sequential antipsychotic trials

• **Select**
  • Lowest-risk choice
  • Patient preference
    • LAI acceptable?
  • Early ancillary medical prevention
    • Behavioral interventions
    • Adjunctive metformin*

• **Monitor**
  • Clinical response
  • Follow antipsychotic monitoring guidelines**

• **Step-up**
  • Switch antipsychotics
    • Psychiatric: early use of clozapine for refractory patients
    • Medical: metabolically lower risk antipsychotic
  • Add psychological treatments
  • Treat medical morbidities

Premature mortality in schizophrenia

- Causes of premature death\(^1\)
  - Nontrivial amount due to suicide and accidents
  - Majority due to 5 “natural causes”
    - Medication side effects
    - Suboptimal lifestyle
    - Somatic comorbidity
    - Suboptimal treatment
    - Accelerated aging/genetic explanations
- Denmark (1995-2015)\(^2\)
  - Overall improvements in life-years lost
  - Gap of 11 – 13 years in life-expectancy remains
  - General population gained three years due to natural causes
- Benefit for schizophrenia in unnatural causes offset by increased mortality from natural causes
- Inadequate detection throughout life-span\(^3\)
- BUT: cardiovascular risk is lower in patients taking antipsychotics\(^4\)

\(^1\)Laursen TM. Curr Opin Psychiatry. 2019; 32(5):388-393. [Meta-analysis]
\(^3\)Brink M et al. Schizophr Res. 2019;206:347-354.  

There is no medical health without psychiatric health.\(^4\)
Need for med-psych integration ("reverse integration")

“All organizations are perfectly designed to get the results they get!”

- Don Berwick, MD (and others)
Beyond monitoring: need for action

• Physical health monitoring (screening) *alone* does not improve mortality

• Improving physical health through intervention¹
  – Psychiatric stability
  – Dietary and exercise interventions
  – Choice and duration of antipsychotic prescribing
  – Pharmacological support for smoking cessation
  – Screening for health conditions

• Correct (*standard*) medical treatment saves lives²

Ward MC and Druss BG. JAMA Psychiatry. 2019;76(7):759-60. [JAMA Network Insights]
Coordinated Health And Medical Prevention Service and Clozapine Clinic

Erich Lindemann Mental Health Center

New patient

FTC FEPP
MDs LICSWs

Psychiatrist
Care coordinator
Medical secretary
Consultant Internist

Smoking Cessation
Illness Management And Recovery
Supported exercise (gym)
Phlebotomist Pharmacist

Outside Community And Peer Services

Outside PCPs
THANK YOU!

John Umstead Hospital, Butner, NC, ca. 1995