

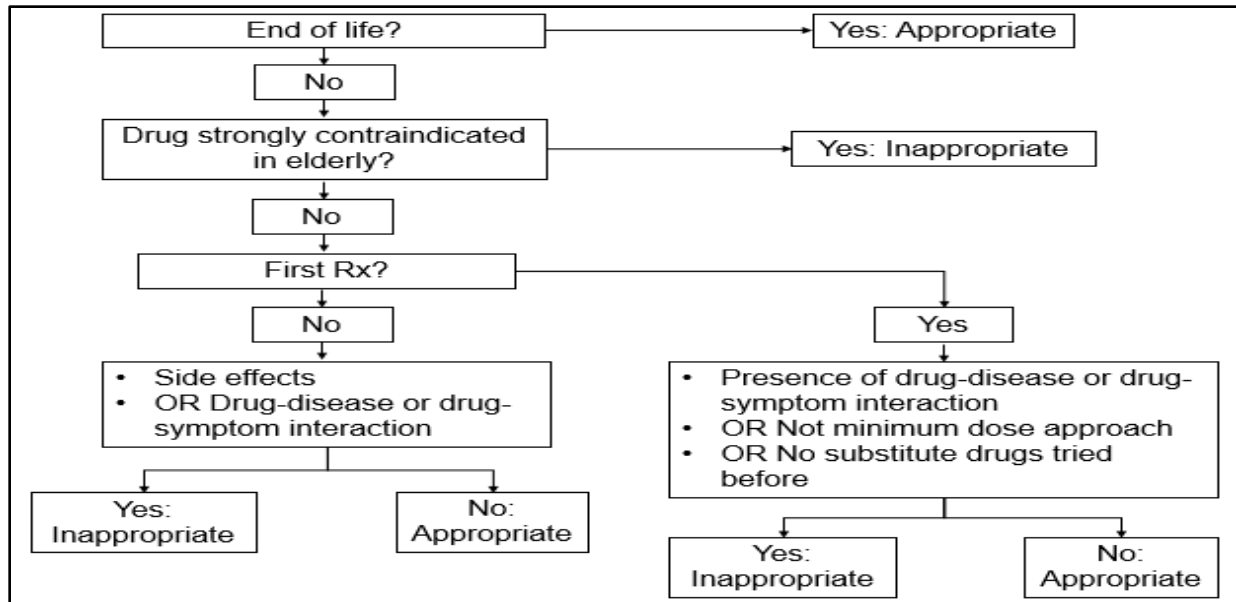
## SUPPLEMENTARY FILE

### Appendix A. Clinical decision support alerts evaluated

- Dose (overdose)
  - Medications that are uncommonly ordered as standing (scheduled frequency and not pro re nata)
    - Metoprolol (intravenous)
    - Benzodiazepines
      - Lorazepam
      - Midazolam
    - Insulin (subcutaneous)
    - Opioids
      - Fentanyl
      - Morphine
      - Oxycodone
- Drug-allergy
  - Alerts identified as ‘Very High’ importance
  - Definite (match of ordered medication and documented allergen)
  - Potentially life-threatening reactions
    - Anaphylaxis
    - Angioedema
    - Bronchospasm
    - Hepatotoxicity
    - Renal toxicity
    - Shortness of breath
    - Swelling
    - Other (see comments)
      - Evaluated free-text manually to match one of the above life-threatening reactions
- Drug-drug interaction
  - Amiodarone/dronedarone and digoxin
  - Anticoagulants
  - ‘Contraindicated’ combinations per databank
  - Level 1 combinations from proprietary databank used in legacy electronic health record at our institution (i.e., combinations that were not allowed to be ordered together and required removal of one part of combination to progress with order)
  - QTc-prolonging agents
    - Amiodarone
    - Ciprofloxacin
    - Fluconazole

- Haloperidol
  - Levofloxacin
  - Methadone
  - Risperidone
- Other
  - Randomized selection of ‘High’ severity alerts, based on frequency from pilot
    - Top 50% most frequent (n=3)
      - Angiotensin converting enzyme inhibitors – Angiotensin II receptor blockers/Trimethoprim
      - Propofol – QT-prolonging medications
      - Trazodone – Selected CYP3A4 inhibitors
    - Bottom 50% most frequent (n=5)
      - Ethacrynic acid – Furosemide
      - Haloperidol – Lithium
      - Itraconazole/Ketoconazole – Medications affecting gastric pH
      - Linezolid – Monoamine oxidase inhibitors
      - Posaconazole – QT-prolonging medications
- Geriatric
  - All alerts
- Renal
  - Medications with recommendation to not use in patient with renal impairment
  - Medications from proprietary databank used in legacy electronic health record at our institution
    - Aspirin
    - Glyburide
    - Hydrochlorothiazide
    - Ibuprofen
    - Metformin
    - Naproxen

## Appendix B. Geriatric alert appropriateness evaluation



### Appendix C. Adverse drug events by alert type

Type of Alert	Alert Details	Classification
Allergy - Definite	Medication: Vancomycin Documented reaction: Red man syndrome Override reason: Does not apply to patient ADE: Small papule itchy skin rash	Inappropriate override Definite ADE Severity: Serious
Allergy - Definite	Medication: Vancomycin Documented reaction: Blisters, sloughing rash Override reason: Benefit outweighs risks ADE: Superficial sloughing and de-roofed blisters to left upper back	Inappropriate override Definite ADE Severity: Serious
Allergy - Definite	Medication: Oxycodone/acetaminophen Documented reaction: Hallucinations Override reason: Will monitor ADE: Hallucinations (e.g., rats crawling on ceiling)	Inappropriate override Possible ADE Severity: Serious
Allergy - Definite	Medication: Oxycodone/acetaminophen Documented reaction: Vomiting Override reason: Will monitor ADE: Vomiting	Appropriate override Possible ADE Severity: Significant
DDI	Medications: Amiodarone, digoxin Override reason: Will monitor ADE: Wide-complex tachycardia	Appropriate override Possible ADE Severity: Serious
DDI	Medications: Amiodarone, digoxin Override reason: Patient tolerated before ADE: Bradycardia	Appropriate override Possible ADE Severity: Serious

DDI - QTc	Medications: Amiodarone, azithromycin Override reason: N/A ADE: QTc to 513	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Amiodarone, fluconazole Override reason: Will monitor ADE: QTc to 505	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Amiodarone, haloperidol Override reason: N/A ADE: QTc to 546	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Fluconazole, ciprofloxacin Override reason: Will monitor ADE: QTc to 546	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Haloperidol, quetiapine Override reason: N/A ADE: QTc to 530	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Haloperidol, quetiapine Override reason: N/A ADE: QTc to 501	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Haloperidol, quetiapine Override reason: Will monitor ADE: QTc to 525	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Haloperidol, quetiapine Override reason: N/A ADE: QTc to 525	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Haloperidol, quetiapine Override reason: N/A	Appropriate override Possible ADE

	ADE: QTc to 508	Severity: Serious
DDI - QTc	Medications: Levofloxacin, tacrolimus Override reason: N/A ADE: QTc to 517	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Propofol, amiodarone Override reason: N/A ADE: QTc to 507	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Propofol, ciprofloxacin Override reason: N/A ADE: QTc to 621	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Propofol, escitalopram Override reason: N/A ADE: QTc to 527	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Propofol, levofloxacin Override reason: N/A ADE: QTc to 612	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Propofol, levofloxacin Override reason: Benefit outweighs risk ADE: QTc to 528	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Propofol, levofloxacin Override reason: N/A ADE: QTc to 518	Appropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Amiodarone, azithromycin Override reason: Will monitor ADE: Wide-complex tachycardia	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Amiodarone, haloperidol	Inappropriate override

	Override reason: N/A ADE: QTc to 523	Possible ADE Severity: Serious
DDI - QTc	Medications: Amiodarone, levofloxacin Override reason: N/A ADE: QTc to 600	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Amiodarone, propofol Override reason: Will monitor ADE: QTc to 584	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Amiodarone, tacrolimus Override reason: N/A ADE: QTc to 590	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Ciprofloxacin, tacrolimus Override reason: N/A ADE: QTc to 590	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Fluconazole, propofol Override reason: N/A ADE: QTc to 616	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Fluconazole, propofol Override reason: benefit outweighs risk ADE: QTc to 502	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Haloperidol, amiodarone Override reason: N/A ADE: QTc to 523	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Haloperidol, levofloxacin Override reason: N/A ADE: QTc to 512	Inappropriate override Possible ADE Severity: Serious

DDI - QTc	Medications: Haloperidol, levofloxacin Override reason: N/A ADE: QTc to 510	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Haloperidol, quetiapine Override reason: Will monitor ADE: QTc to 524	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Haloperidol, quetiapine Override reason: Will monitor ADE: QTc to 506	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Haloperidol, quetiapine Override reason: N/A ADE: QTc to 500	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Levofloxacin, propofol Override reason: N/A ADE: QTc to 618	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Propofol, amiodarone Override reason: N/A ADE: QTc to 584	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Propofol, ciprofloxacin Override reason: Will monitor ADE: QTc to 696	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Propofol, escitalopram Override reason: Will monitor ADE: QTc to 506	Inappropriate override Possible ADE Severity: Serious
DDI - QTc	Medications: Propofol, levofloxacin Override reason: N/A	Inappropriate override Possible ADE



	ADE: QTc to 557	Severity: Serious
DDI - QTc	Medications: Trazodone, ritonavir Override reason: N/A ADE: Ventricular tachycardia	Inappropriate override Possible ADE Severity: Life-threatening
DDI - Contraindicated	Medications: Tamsulosin, voriconazole Override reason: N/A ADE: Hypotension	Inappropriate override Possible ADE Severity: Serious
DDI - Contraindicated	Medications: Dofetilide, prochlorperazine Override reason: Will monitor ADE: QTc to 526	Inappropriate override Possible ADE Severity: Serious
DDI - Contraindicated	Medications: Dofetilide, haloperidol Override reason: N/A ADE: QTc to 544	Inappropriate override Possible ADE Severity: Serious
DDI - Contraindicated	Medications: Fluvoxamine, ramelteon Override reason: N/A ADE: Hallucination	Inappropriate override Possible ADE Severity: Significant
DDI - QTc	Medications: Trazodone, voriconazole Override reason: N/A ADE: QTc to 517	Appropriate override Possible ADE Severity: Serious
Dose	Medication: Lorazepam Override reason: N/A ADE: Confusion, delirium	Inappropriate override Possible ADE Severity: Serious
Dose	Medication: Lorazepam Override reason: N/A ADE: Lethargy	Inappropriate override Possible ADE Severity: Serious
Dose	Medication: Lorazepam	Appropriate override

	Override reason: N/A ADE: Altered mental status	Possible ADE Severity: Serious
Dose	Medication: Lorazepam Override reason: N/A ADE: Somnolence	Inappropriate override Possible ADE Severity: Serious
Geriatric	Medication: Amitriptyline Override reason: N/A ADE: Confusion	Inappropriate override Definite ADE Severity: Serious
Renal	Medication: Chlorothiazide Override reason: N/A ADE: Acute kidney injury	Inappropriate override Possible ADE Severity: Serious
Renal	Medication: Chlorothiazide Override reason: N/A ADE: Acute kidney injury	Inappropriate override Possible ADE Severity: Serious
Renal	Medication: Chlorothiazide Override reason: N/A ADE: Acute kidney injury	Inappropriate override Possible ADE Severity: Serious
Renal	Medication: Mannitol Override reason: N/A ADE: Acute kidney injury, Osm >320	Inappropriate override Definite ADE Severity: Serious

ADE = adverse drug event; DDI = drug-drug interaction