

Pharmacist Communication – QT Prolongation Scoring System & BPA

Beginning 3/20/2024 a BPA will fire when providers are signing orders for adult inpatients who are at high risk of QT prolongation and an increased risk of torsades de pointes. The BPA is powered by a scoring system that considers the patient’s risk factors. A score of 11 or higher will trigger the BPA. This alert will replace the medication warnings. Additionally, the “QT Prolongation Risk” Report displays the patient’s risk score, risk factors, signed and active QTc Prolonging Medications, and EKG Orders and Results. It is available from Snapshot or Summary tabs.

QT Prolongation Scoring System	
Points	Risk Factor
1	Age >= 68 years
1	Female sex
1	Active order for a Loop Diuretic administered within 48 hours
2	Serum Potassium <= 3.5 mEq/L within 24 hours
2	Admission or most recent QTc >= 450 ms
2	Recent history of acute MI (within last 30 days of encounter)
3	1 active order for a QTc prolonging medication administered within 48 hours
3	2 or more active orders for QTc prolonging medications administered within 48 hours
3	History of sepsis within 90 days
3	CHF within 90 days

BestPractice Advisory - Mvhdecisionsupport, Lynn

Important (1)

ⓘ These orders could place your patient at a **HIGH** risk of **QT prolongation** and an increased risk of **torsades de pointes**.

<p>Patient's risk factors for QT prolongation:</p> <ul style="list-style-type: none"> - Female - Serum K is 3.5 mEq /L or less - Recent QTc 450 ms or greater - Recent history of Acute MI - Congestive Heart Failure - Recent Sepsis 	<p>Most Recent QTc interval:</p> <p>QTc Interval: 550 (2/27/2024 11:00 AM)</p> <p>QT Interval: 500 (2/27/2024 11:00 AM)</p>
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Signed and Active QTc Prolonging Medications

	Dose/Rate	Route	Frequenc y	Ordered	Stop
ondansetron (ZOFTRAN ODT) RAPID DISSOLVING tablet 8 mg	8 mg	Oral	EVERY 6 HOURS PRN	03/14/24 0949	

Last POTASSIUM, Collected: 3/14/2024 9:48 AM = 3.2 mEq/L
Prev POTASSIUM, Collected: 2/27/2024 11:42 AM = 3.5 mEq/L

Remove the following orders? _____

dronedaron (MULTAQ) tablet 400 mg
400 mg, Oral, WITH AM & PM MEALS, First dose today at 1055, Until Discontinued

Acknowledge Reason _____

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The screenshot displays the 'Summary' tab in an Epic EMR interface, specifically the 'QT Prolongation Risk' section. At the top, a red banner indicates 'QT Prolongation Risk Factors --- HIGH Risk'. Below this, a table lists 13 total score items:

13	Total Score
1	Patient's sex is female
2	K less than or equal to 3.5 mEq/L in last 24 hours
2	- History of Acute MI within 30 days
2	- History of Sepsis in last 90 days
3	QTc interval 450 ms or greater
3	- Congestive Heart Failure

Below the risk factors, a section titled 'Signed and Active QTc Prolonging Medications' shows a table with the following data:

Medication	Dose/Rate	Route	Frequency	Ordered	Stop
ondansetron (ZOFRAN ODT) RAPID DISSOLVING tablet 8 mg	8 mg	Oral	EVERY 6 HOURS PRN	03/14/24 0949	

Further down, there are sections for 'EKG Orders and Results' and 'EKG Standard'. The 'EKG Standard' section shows an order for an EKG that has been cancelled. It includes fields for 'Electronically signed by', 'Ordering user', 'Frequency: Now 02/12/24 1115 - 1 occurrence', 'Cancelled by', and 'Pended by'. A 'Questionnaire' section is also visible with 'Question' and 'Answer' columns, and a 'Reason for exam' field containing 'Post-Op Mitraclip'. The status is 'Cancel Pend'.

The goal of this BPA is to notify providers when a patient is at high risk of developing torsades due to patient specific characteristics plus other medications that are active when a new QTc prolonging medication order or orders are placed. The Epic FS QT prolongation scoring system is modeled after the workflow created by Froedtert Health, Inc and Loma Linda University Medical Center which is published in Circulation: Cardiovascular Quality and Outcomes¹.

An electronic targeted smart alert system designed at University of Colorado looking at similar QT prolonging patient factors as the EPIC turbocharger package and 12 frequently prescribed high-risk medications over nine months had a total of 6453 alerts fire resulting in 3020 (46.8%) of orders being cancelled by the ordering provider. This focused electronic alert decreased prescribing of QT prolonging medications in high- risk patients which is the goal for QTc prolonging turbocharger package for Premier Health.²

The American Heart Association has developed a scientific statement on drug-induced arrhythmias related to medications that can cause numerous types of arrhythmias with one section focusing on medications and patient factors that may cause QT prolongation leading to increased risk of torsades de pointes (TdP).³ More than 190 drugs are known to prolong QT interval while 57 of those are known to cause TdP at normally prescribed doses. QT prolonging medications listed in the scientific statement along with patient risk factors both modifiable and non are built into the BPA alert and QT prolongation scoring system.

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Testing of this BPA has been live behind the scenes in EPIC here at Premier since November of 2023 to see frequency of firing with adjustments over time to bring meaningful alerts to providers while hopefully preventing alert fatigue.

If any questions arise, please contact Nathan Stockman or Theresa Braun

References

1. Tisdale JE, Jaynes HA, et al. Development and validation of a risk score to predict QT interval prolongation in hospitalized patients. *Circulation: Cardiovascular Quality and Outcomes*. <https://www.ahajournals.org/doi/full/10.1161/CIRCOUTCOMES.113.000152>. Published May 28, 2013.
2. Cheung D, Cumbler E, Hale G, Pell J. Reining in the QTc: reducing the risk of Torsades de Pointes across a major health system. *Journal of the American Medical Informatics Association* 25(9) 2018:1202-1205
3. Tisdale JE, Chung MK, Campbell KB et al. Drug-Induced Arrhythmias: A Scientific Statement From the American Heart Association. *Circulation* 2020;142(15):e214-233.