



Hydroxychloroquine

Indications/Dosage

[expand all](#) | [collapse all](#)

Labeled

- discoid lupus erythematosus
- malaria
- malaria prophylaxis
- rheumatoid arthritis
- systemic lupus erythematosus (SLE)

Off-Label

- coronavirus disease 2019 (COVID-19) †
- lupus nephritis †
- polymorphous light eruption †
- severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection †

† Off-label indication

Per the manufacturer, this drug has been shown to be active against most strains of the following microorganisms either in vitro and/or in clinical infections:

Plasmodium falciparum, Plasmodium malariae, Plasmodium ovale, Plasmodium vivax.

NOTE: The safety and effectiveness in treating clinical infections due to organisms with in vitro data only have not been established in adequate and well-controlled clinical trials.

This drug may also have activity against the following microorganisms:

severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

NOTE: Some organisms may not have been adequately studied during clinical trials; therefore, exclusion from this list does not necessarily negate the drug's activity against the organism.

INVESTIGATIONAL USE: For the treatment of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection†, the virus that causes coronavirus disease 2019 (COVID-19)†

Oral dosage

- **Adults weighing 50 kg or more**

Available data are limited and inconclusive. Due to a lack of clinical data, the National Institutes of Health (NIH) COVID-19 treatment guidelines do not give recommendations for or against the use of hydroxychloroquine; however, if used, guidelines advise monitoring for adverse events, including QT interval prolongation. Additionally, due to the potential for toxicities, they recommend against the use of azithromycin in combination with hydroxychloroquine outside of clinical trials.[\[65314\]](#) 800 mg (620 mg base) PO on day 1 then 400 mg (310 mg base) PO daily for 4 to 7 days in patients in which enrollment in clinical trials is not feasible is suggested by the FDA in the Emergency Use Authorization (EUA) statement.[\[65171\]](#) [\[65173\]](#) Other dosing regimens, alone and in combination, are being evaluated, including 400 mg PO (310 mg base) twice daily on day 1 then 200 mg (155 mg base) PO twice daily for 4 days; 200 mg (155 mg base) PO twice daily for 5 to 20 days; 200 mg (155 mg base) PO 3 times daily for 10 days; 1,200 mg (930 mg base) PO daily for 3 days followed by 800 mg (620 mg base) PO daily for 2 to 3 weeks; and 600 mg (465 mg base) PO twice daily on day 1 then 400 mg (310 mg base) PO daily for 4 days.[\[65119\]](#) [\[65121\]](#) [\[65123\]](#) [\[65124\]](#) [\[65125\]](#) [\[65147\]](#) [\[65148\]](#) [\[65186\]](#) [\[65198\]](#) [\[65277\]](#) [\[65321\]](#) [\[65386\]](#)

- **Adults weighing less than 50 kg**

Available data are limited and inconclusive. Due to a lack of clinical data, the National Institutes of Health (NIH) COVID-19 treatment guidelines do not give recommendations for or against the use of hydroxychloroquine; however, if used, guidelines advise monitoring for adverse events, including QT interval prolongation. Additionally, due to the potential for toxicities, they recommend against the use of azithromycin in combination with hydroxychloroquine outside of clinical trials.[\[65314\]](#) Dosing regimens, alone and in combination, are being evaluated, including 400 mg (310 mg base) PO twice daily on day 1 then 200 mg (155 mg base) PO twice daily for 4 days; 200 mg (155 mg base) PO twice daily for 5 to 20 days; 200 mg (155 mg base) PO 3 times daily for 10 days; 1,200 mg (930 mg base) PO daily for 3 days followed by 800 mg (620 mg base) PO daily for 2 to 3 weeks; and 600 mg (465 mg base) PO twice daily on day 1 then 400 mg (310 mg base) PO daily for 4 days.[\[65119\]](#) [\[65121\]](#) [\[65123\]](#) [\[65124\]](#) [\[65125\]](#) [\[65147\]](#) [\[65148\]](#) [\[65186\]](#) [\[65198\]](#) [\[65277\]](#) [\[65321\]](#) [\[65386\]](#)

- **Adolescents weighing 50 kg or more**

Available data are limited and inconclusive. Due to a lack of clinical data, the National Institutes of Health (NIH) COVID-19 treatment guidelines do not give recommendations for or against the use of hydroxychloroquine; however, if used, guidelines advise monitoring for adverse events, including QT interval prolongation.[\[65314\]](#) 800 mg (620 mg base) PO on day 1 then 400 mg (310 mg base) PO daily for 4 to 7 days in patients in which enrollment in clinical trials is not feasible is suggested by the FDA in the Emergency Use Authorization (EUA) statement.[\[65171\]](#) [\[65173\]](#) Based on extrapolation from pediatric dosing for other indications and comparative doses to adult dosing regimens suggested for COVID-19, doses of 6.5 mg (5 mg base)/kg/dose PO every 12 hours [Max: 400 mg/dose (310 mg base/dose)] for 2 doses, then 3.25 mg (2.5 mg base)/kg/dose every 12 hours [Max: 200 mg/dose (155 mg base/dose)] are being used in limited pediatric dosing protocols.[\[41806\]](#) [\[63245\]](#) [\[65159\]](#) A 5- to 20-day course is being used in adult patients.[\[65121\]](#) [\[65123\]](#) [\[65148\]](#)

- **Adolescents weighing less than 50 kg**

Efficacy and optimal dosing in pediatric patients are not established. Due to a lack of clinical data, the National Institutes of Health (NIH) COVID-19 treatment guidelines do not give recommendations for or against the use of hydroxychloroquine; however, if used, guidelines advise monitoring for adverse events, including QT interval prolongation.[\[65314\]](#) Based on extrapolation from pediatric dosing for other indications and comparative doses to adult dosing regimens suggested for COVID-19, doses of 6.5 mg (5 mg base)/kg/dose PO every 12 hours [Max: 400 mg/dose (310 mg base/dose)] for 2 doses, then 3.25 mg (2.5 mg base)/kg/dose every 12 hours [Max: 200 mg/dose (155 mg base/dose)] are being used in

limited pediatric dosing protocols.[\[41806\]](#) [\[63245\]](#) [\[65159\]](#) A 5- to 20-day course is being used in adult patients.[\[65121\]](#) [\[65123\]](#) [\[65148\]](#)

- **Infants and Children**

Efficacy and optimal dosing in pediatric patients are not established. Due to a lack of clinical data, the National Institutes of Health (NIH) COVID-19 treatment guidelines do not give recommendations for or against the use of hydroxychloroquine; however, if used, guidelines advise monitoring for adverse events, including QT interval prolongation.[\[65314\]](#) Based on extrapolation from pediatric dosing for other indications and comparative doses to adult dosing regimens suggested for COVID-19, doses of 6.5 mg (5 mg base)/kg/dose PO every 12 hours [Max: 400 mg/dose (310 mg base/dose)] for 2 doses, then 3.25 mg (2.5 mg base)/kg/dose every 12 hours [Max: 200 mg/dose (155 mg base/dose)] are being used in limited pediatric dosing protocols.[\[41806\]](#) [\[63245\]](#) [\[65159\]](#) A 5- to 20-day course is being used in adult patients.[\[65121\]](#) [\[65123\]](#) [\[65148\]](#)

For the treatment of malaria due to susceptible strains of *P. falciparum*, *P. knowlesi*†, *P. malariae*, *P. ovale*, and *P. vivax*

Oral dosage

- **Adults**

13 mg (10 mg base)/kg/dose [Max: 800 mg (620 mg base)/dose] PO, then 6.5 mg (5 mg base)/kg/dose [Max: 400 mg (310 mg base)/dose] PO at 6, 24, and 48 hours after the initial dose.[\[41806\]](#) [\[64059\]](#) For *P. vivax* or *P. ovale*, give in combination with primaquine phosphate or tafenoquine. Guidelines recommend hydroxychloroquine for uncomplicated malaria in patients with chloroquine-sensitive *P. falciparum* or *P. vivax* or in all patients with *P. malariae*, *P. knowlesi*, or *P. ovale*.[\[64059\]](#)

- **Infants, Children, and Adolescents**

13 mg (10 mg base)/kg/dose [Max: 800 mg (620 mg base)/dose] PO, then 6.5 mg (5 mg base)/kg/dose [Max: 400 mg (310 mg base)/dose] PO at 6, 24, and 48 hours after the initial dose.[\[41806\]](#) [\[63245\]](#) [\[64059\]](#) For *P. vivax* or *P. ovale*, give in combination with primaquine phosphate or tafenoquine (16 years and older). Guidelines recommend hydroxychloroquine for uncomplicated malaria in patients with chloroquine-sensitive *P. falciparum* or *P. vivax* or in all patients with *P. malariae*, *P. knowlesi*, or *P. ovale*.[\[64059\]](#)

For malaria prophylaxis in areas where chloroquine-resistance has not been reported

Oral dosage

- **Adults**

6.5 mg (5 mg base)/kg/dose [Max: 400 mg (310 mg base)/dose] PO weekly on the same day of each week, starting 1 to 2 weeks before entering the endemic area and continuing for 4 weeks after leaving the area.[\[41806\]](#) [\[63990\]](#) Guidelines suggest hydroxychloroquine as an alternative to chloroquine.[\[63990\]](#)

- **Infants, Children, and Adolescents**

6.5 mg (5 mg base)/kg/dose [Max: 400 mg (310 mg base)/dose] PO weekly on the same day of each week, starting 1 to 2 weeks before entering the endemic area and continuing for 4 weeks after leaving the area.[\[41806\]](#) [\[63245\]](#) [\[63990\]](#) Guidelines suggest hydroxychloroquine as an alternative to chloroquine.[\[63990\]](#)

For the treatment of rheumatoid arthritis

Oral dosage

- **Adults**

400 to 600 mg (310 to 465 mg base) PO once daily or in 2 divided doses as monotherapy or part of combination therapy. Side effects may require a temporary initial dose reduction. After a clinical response is obtained, reduce the dose by 50% and continue 200 to 400 mg (155 to 310 mg base) PO once daily or in 2 divided doses. Do not exceed 600 mg/day (465 mg base/day) or 6.5 mg/kg/day (5 mg base/kg/day), whichever is lower.[\[41806\]](#) [\[65215\]](#)

For the treatment of systemic lupus erythematosus (SLE)

Oral dosage

- **Adults**

200 to 400 mg (155 to 310 mg base) PO once daily or in 2 divided doses. Do not exceed 400 mg/day.[\[41806\]](#)

- **Children[†] and Adolescents[†]**

4 to 6 mg (3.1 to 4.6 mg base)/kg/day PO.[\[64633\]](#) [\[65218\]](#) [\[65219\]](#) [\[65220\]](#)

For the treatment of discoid lupus erythematosus

Oral dosage

- **Adults**

200 to 400 mg (155 to 310 mg base) PO once daily or in 2 divided doses. Do not exceed 400 mg/day.
[41806] May add quinacrine if a patient fails monotherapy.[62154] [65216]

For the treatment of lupus nephritis†

Oral dosage

- **Adults**

200 to 400 mg/day (155 to 310 mg/day base) PO. Max: 5 mg/kg/day.[52522] [65217]

For the suppression of polymorphous light eruption†

Oral dosage

- **Adults**

200 to 400 mg (155 to 310 mg base) PO once daily or in 2 divided doses.[61732]

Therapeutic Drug Monitoring

The following recommendations are for baseline and continuous monitoring when using hydroxychloroquine with azithromycin:

- Obtain a pre-treatment QTc using a standard 12-lead ECG, telemetry, or mobile ECG device.

- Obtain baseline electrolytes, including calcium, magnesium, and potassium; correct abnormalities.
- Determine if the patient is currently on any QT-prolonging medications that can be discontinued. [65170]
- Document high-risk cardiovascular and comorbid conditions.[65170] Assess and adjust for hepatic and renal dysfunction.[65242]

Inpatient Use

- Place telemetry prior to initiation, if possible.
- Monitor and optimize serum electrolytes daily.[65242]
- If the baseline QTc is 500 msec or more and/or the patient has an inherent tendency to develop an exaggerated QTc response (i.e., change of 60 msec or more), correct contributing electrolyte abnormalities, review and discontinue other unnecessary QTc prolonging medications, and proceed with close QTc surveillance.[65170] Some experts recommend withholding treatment for patients with a baseline QTc of 500 msec or more (or more than 530 to 550 msec in patients with a QRS interval more than 120 msec) or in those with congenital long QT syndrome.[65242]
- If the baseline QTc is 460 to 499 msec (prepubertal), 470 to 499 msec (postpubertal males), or 480 to 499 msec (postpubertal females), correct contributing electrolyte abnormalities, review and discontinue other unnecessary QTc prolonging medications, and obtain an initial on-therapy QTc daily (or 48 and 96 hours after treatment initiation).[65170] [65242]
- If the baseline QTc is less than 460 msec (prepubertal), less than 470 msec (postpubertal males), or less than 480 msec (postpubertal females), correct electrolyte abnormalities and obtain an initial on-therapy QTc daily (or 48 and 96 hours after treatment initiation).[65170] [65242]
- Obtain an initial on-therapy QTc approximately 2 to 4 hours after the first dose and then daily (some recommend 48 and 96 hours after treatment initiation).[65170] [65242]
- Discontinue azithromycin and/or reduce the antimalarial dose if the subsequent QTc is prolonged or significantly increased above the specified parameters. If the QTc remains prolonged or significantly increased, reevaluate the risk/benefit of therapy, consider consultation with an electrophysiologist, and consider hydroxychloroquine/chloroquine discontinuation.[65242]

Outpatient Use

- Do not initiate outpatient therapy in the setting of acute renal or hepatic failure.[65242]
- If the baseline QTc is 500 msec or more and/or the patient has an inherent tendency to develop an exaggerated QTc response (i.e., change of 60 msec or more), correct contributing electrolyte abnormalities, review and discontinue other unnecessary QTc prolonging medications, and proceed with close QTc surveillance.[65170] Some experts recommend withholding treatment in patients with a baseline QTc of 480 msec or more (or more than 510 to 530 msec in patients with a QRS interval more than 120 msec), congenital long QT syndrome, or a Tisdale risk score of 11 or more.[65242]
- Consider no further ECG/telemetry assessment for patients with a Tisdale risk score of 6 or less, if resource or quarantine constraints are prohibitive of monitoring. Otherwise, repeat the ECT 2 to 3 hours after dosing on day 3 of therapy. If the QTc exceeds 500 msec (or 530 to 550 msec if QRS is more than 120 msec) or increases by more than 30 to 60 msec, consider discontinuing therapy.[65242]

Maximum Dosage Limits

- Adults

800 mg/dose (620 mg base/dose) PO for malaria up to a total of 2 g (1.55 g base) PO in 48 hours; 400 mg/week (310 mg base/week) PO for malaria prophylaxis; 600 mg/day (465 mg base/day) PO for other indications.

- Geriatric

800 mg/dose (620 mg base/dose) PO for malaria up to a total of 2 g (1.55 g base) PO in 48 hours; 400 mg/week (310 mg base/week) PO for malaria prophylaxis; 600 mg/day (465 mg base/day) PO for other indications.

- Adolescents

13 mg/kg/dose (10 mg base/kg/dose) [Max: 800 mg (620 mg base)] PO for malaria up to a total of 32.5 mg/kg (25 mg base/kg) [Max: 2 g (1.55 g base)] PO in 48 hours; 6.5 mg/kg/week (5 mg base/kg/week) [Max: 400 mg/week (310 mg base/week)] PO for malaria prophylaxis.

- Children

13 mg/kg/dose (10 mg base/kg/dose) [Max: 800 mg (620 mg base)] PO for malaria up to a total of 32.5 mg/kg (25 mg base/kg) [Max: 2 g (1.55 g base)] PO in 48 hours; 6.5 mg/kg/week (5 mg base/kg/week) [Max: 400 mg/week (310 mg base/week)] PO for malaria prophylaxis.

- Infants

13 mg/kg/dose (10 mg base/kg/dose) PO for malaria up to a total of 32.5 mg/kg (25 mg base/kg) PO in 48 hours; 6.5 mg/kg/week (5 mg base/kg/week) PO for malaria prophylaxis.

- Neonates

Safety and efficacy have not been established.

Patients with Hepatic Impairment Dosing

A dosage reduction may be necessary in patients with hepatic disease or those taking concomitant medications known to affect the liver. However, no specific dosage adjustment guidelines are available for patients with hepatic impairment.[\[41806\]](#)

Patients with Renal Impairment Dosing

A dosage adjustment is not required in patients with renal impairment. However, a dosage reduction may be necessary in patients with renal disease or those taking concomitant medications known to affect the kidney. No specific dosage adjustment guidelines are available for patients with renal impairment.[\[41806\]](#)

† Off-label indication

References

- 41806** – Plaquenil (hydroxychloroquine) package insert. St. Michael, Barbados: Concordia Pharmaceuticals, Inc.; 2017 Jan.
- 52522** – Hahn BH, McMahon MA, Wilkinson A, et al. American College of Rheumatology guidelines for screening, treatment, and management of lupus nephritis. *Arthritis Care and Research* 2012;64(6):797-808.
- 61732** – Ben-Zvi H, Kivity S, Langevitz P, et al. Hydroxychloroquine: from malaria to autoimmunity. *Clin Rev Allergy Immunol* 2012;42:145-53.
- 62154** – Okon LG, Werth VP. Cutaneous lupus erythematosus: diagnosis and treatment. *Best Pract Res Clin Rheumatol* 2013;27:391-404.
- 63245** – American Academy of Pediatrics. Red Book: 2018-2021 Report of the Committee on Infectious Diseases. 31st ed. Elk Grove Village, IL: American Academy of Pediatrics; 2018.
- 63990** – Arguin PM, Tan KR. Chapter 3. Infectious diseases related to travel. Malaria. In: Centers for Disease Control and Prevention. 2018 Yellow Book - Traveler's Health. Atlanta: U.S. Department of Health and Human Services, Public Health Service. <https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/malaria>
- 64059** – Centers for Disease Control and Prevention. Treatment of malaria (guidelines for clinicians). Atlanta, GA: US Department of Health and Human Services; 2019. https://www.cdc.gov/malaria/diagnosis_treatment/treatment.html.
- 64633** – Fanouriakis A, Kostopoulou M, Alunno A et al. 2019 update of the EULAR recommendations for the management of systemic lupus erythematosus. *Ann Rheum Dis* 2019;78:736-745.
- 65119** – Gao J, Tian Z, Yang X. Breakthrough: Chloroquine Phosphate Has Shown Apparent Efficacy in Treatment of COVID-19 Associated Pneumonia in Clinical Studies. *Biosci Trends* 2020 Feb 19. [Epub ahead of print]
- 65121** – Yao X, Fei Y, Zhang M, et al. In Vitro Antiviral Activity and Projection of Optimized Dosing Design of Hydroxychloroquine for the Treatment of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). *Clin Infect Dis* 2020 Mar 9. [Epub ahead of print]
- 65123** – World Health Organization (WHO). Coronavirus: landscape analysis of therapeutics as of 17 February 2020. Retrieved March 16, 2020. Available on the World Wide Web at https://www.who.int/blueprint/priority-diseases/key-action/Table_of_therapeutics_Appendix_17022020.pdf?ua=1.
- 65124** – Colson P, Rolain J, Lagier J, et al. Chloroquine and hydroxychloroquine as available weapons to fight COVID-19. *Int J Antimicrob Agents*. 2020 (Epub ahead of print)
- 65125** – Dong L, Hu S, Gao J. Discovering drugs to treat coronavirus disease 2019 (COVID-19). *Drug Discov Ther* 2020;14:58-60.
- 65147** – Gautret P, Lagier J, Parola P, et al. Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial. *Int J Antimicrob Agents* 2020. [Epub ahead of print]
- 65148** – Italian Society of Infectious and Tropical Diseases. Handbook for the care of people with disease-COVI 19. Edition 2.0, March 13, 2020.
- 65159** – American Society of Transplantation and Cellular Therapy Infectious Diseases Special Interest Group. Interim Guidelines for COVID-19: Management in Hematopoietic Cell Transplant and Cellular Therapy

Patients. March 18, 2020. Available on the world wide web at:
https://higherlogicdownload.s3.amazonaws.com/ASBMT/a1e2ac9a-36d2-4e23-945c-45118b667268/UploadedImages/COVID-19_Interim_Patient_Guidelines_3_18_20.pdf

65170 – Giudicessi JR, Noseworthy PA, Friedman PA, Ackerman MJ. Urgent guidance for navigating and circumventing the QTc prolonging and torsadogenic potential of possible pharmacotherapies for COVID-19 [published online ahead of print, March 25, 2020]. Mayo Clin Proc 2020;95.

65171 – Food and Drug Administration (FDA). Chloroquine phosphate or hydroxychloroquine sulfate supplied from the strategic national stockpile for treatment of 2019 coronavirus disease: emergency use authorization letter. Retrieved March 30, 2020. Available on the World Wide Web at <https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization#2019-ncov>.

65173 – Food and Drug Administration (FDA). Fact sheet for health care providers: emergency use authorization (EUA) of hydroxychloroquine sulfate supplied from the strategic national stockpile for treatment of COVID-19 in certain hospitalized patients. Retrieved March 30, 2020. Available on the World Wide Web at <https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization#2019-ncov>.

65186 – Chen Z, Hu J, Zhang Z, et al. Efficacy of hydroxychloroquine in patients with COVID-19: results of a randomized clinical trial. 2020 DOI: <https://doi.org/10.1101/2020.03.22.20040758>

65198 – Molina JM, Delaugerre C, Goff JL, et al. No evidence of rapid antiviral clearance or clinical benefit with the combination of hydroxychloroquine and azithromycin in patients with severe COVID-19 infection. Med Mal Infect 2020 Mar. [Epub ahead of print]

65215 – Singh JA, Saag KG, Bridges SL Jr, et al. 2015 American College of Rheumatology guideline for the treatment of rheumatoid arthritis. Arthritis Rheumatol 2016;68:1-26.

65216 – Garza-Mayers AC, McClurkin M, Smith GP. Review of treatment for discoid lupus erythematosus. Dermatologic Therapy 2016;29:274-83.

65217 – Fanouriakis An, Kostopoulou M, Cheema K, et al. 2019 Update of the Joint European League Against Rheumatism and European Renal Association–European Dialysis and Transplant Association (EULAR/ERA–EDTA) recommendations for the management of lupus nephritis. Ann Rheum Dis 2020.

65218 – Thakral A, Klein-Gitelman MS. An update on the treatment and management of pediatric systemic lupus erythematosus. Rheumatol Ther 2016;3:209-19.

65219 – Groot N, de Graeff N, Avcin T, et al. European evidence-based recommendations for diagnosis and treatment of childhood-onset systemic lupus erythematosus: the SHARE initiative. Ann Rheum Dis 2017;76:1788-96.

65220 – Smith EMD, Lythgoe H, Midgley A, et al. Juvenile-onset systemic lupus erythematosus: update on clinical presentation, pathophysiology, and treatment options. Clin Immunol 2019;209:108274.

65242 – Simpson TF, Kovacs RJ, Stecker EC. Ventricular arrhythmia risk due to hydroxychloroquine-azithromycin treatment for COVID-19. Accessed April 10, 2020. Available at: <https://www.acc.org/latest-in-cardiology/articles/2020/03/27/14/00/ventricular-arrhythmia-risk-due-to-hydroxychloroquine-azithromycin-treatment-for-covid-19>

65277 – Tang W, Cao Z, Han M, et al. Hydroxychloroquine in patients with mainly mild to moderate coronavirus disease 2019: open label, randomised controlled trial. BMJ 2020;369:m1849.

65314 – COVID-19 Treatment Guidelines Panel. Coronavirus Diseases 2019 (COVID-19) Treatment Guidelines. National Institutes of Health. Accessed May 12, 2020. Available at on the World Wide Web at: <https://covid19treatmentguidelines.nih.gov/>.

65321 – Magagnoli J, Narendran S, Pereira F, et al. Outcomes of hydroxychloroquine usage in United States veterans hospitalized with Covid-19. Pre-print. Retrieved April 22, 2020. Available on the World Wide Web at: <https://www.medrxiv.org/content/10.1101/2020.04.16.20065920v1>.

65386 – Geleris J, Sun Y, Platt J, et al. Observational study of hydroxychloroquine in hospitalized patients with COVID-19. N Engl J Med 2020 May 7. [Epub ahead of print]

How Supplied

Hydroxychloroquine Sulfate Oral tablet Hydroxychloroquine Sulfate 200mg Tablet (16729-0485) (Accord Healthcare, Inc.) Hydroxychloroquine Sulfate 200mg Tablet (65162-0610) (Akyma Pharmaceuticals, a subsidiary of Amneal Pharmaceuticals) (off market)	
Hydroxychloroquine Sulfate 200mg Tablet (68084-0269) (American Health Packaging)	
Hydroxychloroquine Sulfate 200mg Tablet (42291-0320) (AvKARE, Inc.) (off market)	
Hydroxychloroquine Sulfate 200mg Tablet (42291-0318) (AvKARE, Inc.) (off market)	
Hydroxychloroquine Sulfate 200mg Tablet (50268-0412) (AvPAK; a Division of AvKARE Inc)	

Hydroxychloroquine Sulfate Oral tablet

Hydroxychloroquine Sulfate 200mg Tablet (10544-0578) (Blenheim Pharmacal, Inc.) (off market)	
Hydroxychloroquine Sulfate 200mg Tablet (43598-0721) (Dr. Reddy's Laboratories, Inc.)	
Hydroxychloroquine Sulfate 200mg Tablet (00143-2128) (Hikma Pharmaceuticals USA Inc.) (off market)	
Hydroxychloroquine Sulfate 200mg Tablet (00904-5107) (Major Pharmaceuticals Inc, a Harvard Drug Group Company) (off market)	
Hydroxychloroquine Sulfate 200mg Tablet (00904-6508) (Major Pharmaceuticals Inc, a Harvard Drug Group Company)	
Hydroxychloroquine Sulfate 200mg Tablet (00904-6884) (Major Pharmaceuticals Inc, a Harvard Drug Group Company) (off market)	
Hydroxychloroquine Sulfate 200mg Tablet (52555-0642) (Martec Pharmaceuticals Inc) (off market)	
Hydroxychloroquine Sulfate 200mg Tablet (63739-0777) (McKesson Packaging)	
Hydroxychloroquine Sulfate 200mg Tablet (42292-0011) (Mylan Institutional LLC)	
Hydroxychloroquine Sulfate 200mg Tablet (00378-0373) (Mylan Pharmaceuticals Inc.)	
Hydroxychloroquine Sulfate 200mg Tablet (16714-0474) (Northstar Rx LLC)	
Hydroxychloroquine Sulfate 200mg Tablet (16714-0753) (Northstar Rx LLC)	

Hydroxychloroquine Sulfate Oral tablet

[Hydroxychloroquine Sulfate 200mg Tablet](#) (16714-0110) (Northstar Rx LLC)



[Hydroxychloroquine Sulfate 200mg Tablet](#) (72789-0026) (PD-Rx Pharmaceuticals, Inc.)

[Hydroxychloroquine Sulfate 200mg Tablet](#) (66993-0057) (Prasco Laboratories)



[Hydroxychloroquine Sulfate 200mg Tablet](#) (17236-0610) (R&S Northeast, LLC, formerly Dixon-Shane Drug Company) (off market)

[Hydroxychloroquine Sulfate 200mg Tablet](#) (42385-0927) (Rising Pharmaceuticals Inc)

[Hydroxychloroquine Sulfate 200mg Tablet](#) (00781-1407) (Sandoz Inc. a Novartis Company) (off market)



[Hydroxychloroquine Sulfate 200mg Tablet](#) (00781-5994) (Sandoz Inc. a Novartis Company)



[Hydroxychloroquine Sulfate 200mg Tablet](#) (62269-0250) (Sandoz, Inc. a Novartis Company) (off market)

[Hydroxychloroquine Sulfate 200mg Tablet](#) (00955-0790) (Sanofi U.S. LLC) (off market)

[Hydroxychloroquine Sulfate 200mg Tablet](#) (00677-1590) (Sun Pharmaceutical Industries, Inc.) (off market)

[Hydroxychloroquine Sulfate 200mg Tablet](#) (63304-0296) (Sun Pharmaceutical Industries, Inc.)



[Hydroxychloroquine Sulfate 200mg Tablet](#) (57664-0761) (Sun Pharmaceutical Industries, Inc.)

[Hydroxychloroquine Sulfate 200mg Tablet](#) (00093-9774) (Teva Pharmaceuticals USA) (off market)



[Hydroxychloroquine Sulfate 200mg Tablet](#) (52544-0698) (Teva/Actavis US) (off market)



Hydroxychloroquine Sulfate Oral tablet

[Hydroxychloroquine Sulfate 200mg Tablet](#) (00591-0698) (Teva/Actavis US) (off market)



[Hydroxychloroquine Sulfate 200mg Tablet](#) (00591-3041) (Teva/Actavis US)



[Hydroxychloroquine Sulfate 200mg Tablet](#) (00955-0790) (Winthrop U.S., a business of Sanofi-Aventis) (off market)

[Hydroxychloroquine Sulfate 200mg Tablet](#) (68382-0096) (Zydus Pharmaceuticals (USA) Inc.)



[Hydroxychloroquine Sulfate 200mg Tablet \(Almus\)](#) (00378-0373) (Mylan Pharmaceuticals Inc.) (off market)



[Plaquenil 200mg Tablet](#) (42291-0335) (AvKARE, Inc.) (off market)



[Plaquenil 200mg Tablet](#) (24987-0562) (Concordia Pharmaceuticals Inc.) (off market)



[Plaquenil 200mg Tablet](#) (59212-0562) (Concordia Pharmaceuticals Inc.)



[Plaquenil 200mg Tablet](#) (00024-1562) (COVIS Pharmaceuticals Inc) (off market)



Hydroxychloroquine Sulfate Oral tablet

[Plaquinil 200mg Tablet](#) (24987-0562) (COVIS Pharmaceuticals Inc) (off market)



[Plaquinil 200mg Tablet](#) (00024-1562) (Sanofi U.S. LLC) (off market)



[Quineprox 200mg Tablet](#) (52761-0377) (Genderm Corp) (off market)

Description/Classification

Description

Hydroxychloroquine is an oral disease-modifying antirheumatic drug (DMARD) used to treat rheumatoid arthritis and systemic lupus erythematosus. It also is used to prevent and treat malaria. Irreversible retinal damage has been observed with use, and postmarketing cases of life-threatening and fatal cardiomyopathy, including ventricular arrhythmias and torsade de pointes, have been reported.[\[41806\]](#) Hydroxychloroquine was FDA-approved in 1955.

Updates for coronavirus disease 2019 (COVID-19):

Available data are limited and inconclusive. Due to a lack of clinical data, the National Institutes of Health (NIH) COVID-19 treatment guidelines do not give recommendations for or against the use of hydroxychloroquine; however, if used, guidelines advise monitoring for adverse events including QT interval prolongation. Additionally, due to the potential for toxicities, they recommend against the use of azithromycin in combination with hydroxychloroquine outside of clinical trials.[\[65314\]](#) The FDA has issued an Emergency Use Authorization (EUA) for the use of hydroxychloroquine to treat hospitalized COVID-19 patients for whom clinical trial participation is not feasible.[\[65171\]](#) [\[65173\]](#) Use in COVID-19 patients outside of clinical trials or in a nonhospital setting is not recommended due to the potential for serious adverse events and drug interactions.[\[65332\]](#) In an open-label, non-randomized clinical trial ($n = 26$), the proportion of patients that had negative PCR results significantly differed between treated patients and controls. On day 6, 70% of hydroxychloroquine-treated patients were virologically cured compared to 12.5% in the control group.[\[65147\]](#) A parallel-group, randomized trial ($n = 62$) of hospitalized patients with non-severe COVID-19 compared 5 days of hydroxychloroquine to standard treatment. Cough and fever recovery times were shortened in the hydroxychloroquine group compared to standard therapy.[\[65186\]](#) Another small study ($n = 11$) reviewed hydroxychloroquine plus azithromycin and found nasopharyngeal swabs were still positive for SARS-CoV-2 in 8 of 10 patients 5 to 6 days after treatment initiation.[\[65198\]](#) In a multicenter, parallel, open-label, randomized trial in 150 adult hospitalized patients, hydroxychloroquine ($n = 75$) was added to standard therapy. The majority of patients ($n = 148$) had mild to moderate disease. The overall 28-day negative viral conversion rate was not different between the two groups (85.4% hydroxychloroquine vs. 81.3% control). The median time to negative conversion was also similar between groups (8 days hydroxychloroquine vs. 7 days control; HR 0.85; 95% CI,

0.58 to 1.23; $p = 0.34$). Negative conversion rates on days 4, 7, 10, 14, and 21 were similar between the groups. There was no difference in the 28-day symptom alleviation rate and the median time to alleviation of clinical symptoms was similar between the groups (19 days hydroxychloroquine vs. 21 days control; HR 1.10; 95% CI 0.59 to 1.74; $p = 0.97$). Adverse events were reported in 9% of the control group and 30% of the hydroxychloroquine group.[\[65277\]](#) Preliminary data from a retrospective analysis ($n = 368$) assessed the use of either hydroxychloroquine ($n = 97$) or hydroxychloroquine plus azithromycin ($n = 133$) in addition to standard of care compared to standard of care alone ($n = 158$). The cohort consisted of only men in the Veterans Health Administration medical centers with a median age greater than 65 years, the majority of whom were black. The primary outcomes were death and the need for mechanical ventilation. Rates of death in the hydroxychloroquine group, the hydroxychloroquine plus azithromycin group, and the standard treatment group were 27.8%, 22.1%, and 11.4%, respectively. Compared to standard therapy, the risk of death from any cause was higher in the hydroxychloroquine group (adjusted HR 2.61; 95% CI, 1.10 to 6.17; $p = 0.03$), but not in the hydroxychloroquine plus azithromycin group (adjusted HR 1.14; 95% CI, 0.56 to 2.32; $p = 0.72$). Rates of ventilation in the hydroxychloroquine group, the hydroxychloroquine plus azithromycin group, and the standard treatment group were 13.3%, 6.9%, and 14.1%, respectively. Compared to standard therapy, the risk of ventilation was similar in both the hydroxychloroquine group (adjusted HR 1.43; 95% CI, 0.53 to 3.79; $p = 0.48$) and the hydroxychloroquine plus azithromycin group (adjusted HR 0.43; 95% CI, 0.16 to 1.12; $p = 0.09$).[\[65321\]](#) Preliminary observational data ($n = 1,376$) examined the association between hydroxychloroquine use and intubation or death at a large medical center. Hydroxychloroquine was not associated with a significantly higher or lower risk of intubation or death (HR 1.04; 95% CI, 0.82 to 1.32); similar results were noted when adjusted for propensity score. Hydroxychloroquine-treated patients were more severely ill at baseline. Due to wide confidence intervals and the observational nature of the trial, the authors stated that the results should not be utilized to rule out either benefit or harm of hydroxychloroquine and suggested further randomized clinical trials to test efficacy.[\[65386\]](#) Preliminary data from an observational study of 1438 hospitalized patients, there was no difference in mortality in patients treated with hydroxychloroquine (HR 1.08; 95% CI, 0.63 to 1.85), azithromycin (HR 0.56; 95% CI, 0.26 to 1.21), or both (HR 1.35; 95% CI, 0.76 to 2.4) compared with no use of these agents. In logistic models, cardiac arrest was significantly more likely in patients receiving hydroxychloroquine plus azithromycin (AOR 2.13; 95% CI, 1.12 to 4.05) compared to patients receiving neither drug; however, this was not the case in patients receiving either drug alone. In adjusted logistic regression models, there were no significant differences in the relative likelihood of abnormal EKG findings.[\[65415\]](#) Additional data regarding clinical efficacy for COVID-19 are being evaluated.[\[65123\]](#) [\[65148\]](#)

Classifications

- [General Anti-infectives Systemic](#)
 - [Antiparasitic Agents, Insecticides, and Repellants](#)
 - [Antiprotozoals](#)
 - [Antimalarials](#)
 - [Musculo-Skeletal System](#)
 - [Antiinflammatory Agents and Antirheumatic Agents](#)
 - [Antiinflammatory and Antirheumatic Agents](#)
 - [Other Antiinflammatory and Antirheumatic Agents](#)

41806 – Plaquenil (hydroxychloroquine) package insert. St. Michael, Barbados: Concordia Pharmaceuticals, Inc.; 2017 Jan.

65123 – World Health Organization (WHO). Coronavirus: landscape analysis of therapeutics as of 17 February 2020. Retrieved March 16, 2020. Available on the World Wide Web at https://www.who.int/blueprint/priority-diseases/key-action/Table_of_therapeutics_Appendix_17022020.pdf?ua=1.

65147 – Gautret P, Lagier J, Parola P, et al. Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial. *Int J Antimicrob Agents* 2020. [Epub ahead of print]

65148 – Italian Society of Infectious and Tropical Diseases. Handbook for the care of people with disease-COVI 19. Edition 2.0, March 13, 2020.

65171 – Food and Drug Administration (FDA). Chloroquine phosphate or hydroxychloroquine sulfate supplied from the strategic national stockpile for treatment of 2019 coronavirus disease: emergency use authorization letter. Retrieved March 30, 2020. Available on the World Wide Web at <https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization#2019-ncov>.

65173 – Food and Drug Administration (FDA). Fact sheet for health care providers: emergency use authorization (EUA) of hydroxychloroquine sulfate supplied from the strategic national stockpile for treatment of COVID-19 in certain hospitalized patients. Retrieved March 30, 2020. Available on the World Wide Web at <https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization#2019-ncov>.

65186 – Chen Z, Hu J, Zhang Z, et al. Efficacy of hydroxychloroquine in patients with COVID-19: results of a randomized clinical trial. 2020 DOI: <https://doi.org/10.1101/2020.03.22.20040758>

65198 – Molina JM, Delaugerre C, Goff JL, et al. No evidence of rapid antiviral clearance or clinical benefit with the combination of hydroxychloroquine and azithromycin in patients with severe COVID-19 infection. *Med Mal Infect* 2020 Mar. [Epub ahead of print]

65277 – Tang W, Cao Z, Han M, et al. Hydroxychloroquine in patients with mainly mild to moderate coronavirus disease 2019: open label, randomised controlled trial. *BMJ* 2020;369:m1849.

65314 – COVID-19 Treatment Guidelines Panel. Coronavirus Diseases 2019 (COVID-19) Treatment Guidelines. National Institutes of Health. Accessed May 12, 2020. Available at on the World Wide Web at: <https://covid19treatmentguidelines.nih.gov/>.

65321 – Magagnoli J, Narendran S, Pereira F, et al. Outcomes of hydroxychloroquine usage in United States veterans hospitalized with Covid-19. Pre-print. Retrieved April 22, 2020. Available on the World Wide Web at: <https://www.medrxiv.org/content/10.1101/2020.04.16.20065920v1>.

65332 – Food and Drug Administration. FDA Drug Safety Communication: Hydroxychloroquine or chloroquine for COVID-19: FDA cautions against use outside of the hospital setting or a clinical trial due to risk of heart rhythm problems. Retrieved April 23, 2020. Available on the World Wide Web at: https://www.fda.gov/safety/medical-product-safety-information/hydroxychloroquine-or-chloroquine-covid-19-drug-safety-communication-fda-cautions-against-use?utm_campaign=FDA%20MedWatch%20

65386 – Geleris J, Sun Y, Platt J, et al. Observational study of hydroxychloroquine in hospitalized patients with COVID-19. *N Engl J Med* 2020 May 7. [Epub ahead of print]

65415 – Rosenberg ES, Dufort EM, Udo T, et al. Association of treatment with hydroxychloroquine or azithromycin with in-hospital mortality in patients with COVID-19 in New York state. *JAMA* 2020. [Epub ahead of print]

Administration Information

General Administration Information

For storage information, see the specific product information within the How Supplied section.

Route-Specific Administration

Oral Administration

- Administer with meals or a glass of milk to minimize gastric indigestion or irritation.[\[41806\]](#)

Oral Solid Formulations

- Crushing or dividing hydroxychloroquine tablets is not recommended per the FDA-approved product labeling.[\[41806\]](#)

Extemporaneous Compounding-Oral

Extemporaneous 25 mg/mL oral suspension (using tablets)

- Remove the coating of hydroxychloroquine tablets, if necessary, with a towel moistened with alcohol.
- Crush fifteen 200 mg hydroxychloroquine tablets into a fine powder in a mortar.
- Add approximately 15 mL of the vehicle (e.g., Oral Mix or Oral Mix SF) to the mortar and levigate to form a fine paste.
- Add the vehicle in geometric portions almost to volume and mix thoroughly after each addition.
- Transfer the contents of the mortar to a graduated cylinder.
- Rinse the mortar and pestle using a small amount of vehicle and transfer to the graduated cylinder.
- Add enough vehicle to bring the final volume to 120 mL and transfer to an amber bottle.
- *Storage:* The suspension is stable for 112 days under refrigeration (4 degrees C) or at room temperature (25 degrees C).[\[65138\]](#) [\[65145\]](#)

Compounding Drug Information

From Trissel's 2™ Clinical Pharmaceutics Database

Hydroxychloroquine sulfate

1. Identity/Properties

Hydroxychloroquine sulfate is a white to almost white, odorless crystalline powder having a bitter taste. Hydroxychloroquine sulfate 100 mg is approximately equivalent to 77 mg of the base. Solubility: Hydroxychloroquine sulfate has a solubility of about 200 mg/mL in water but is

practically insoluble in ethanol. pH: A 1% hydroxychloroquine sulfate solution in water has a pH between 3.5 and 5.5. Tablet Dispersion: Martin et al. reported that commercial oral 200-mg tablets of hydroxychloroquine sulfate (Plaquenil) did not completely disperse in five minutes in 20 mL of water at 20 degree C with swirling, even when halved.

References

- Anon. Manufacturer's information and labeling. (Package insert and bulk material data sheet).
- Anon. The Merck Index, Whitehouse Station, New Jersey: Merck & Co., Inc. Current edition.
- Anon. Martindale The Complete Drug Reference. London: The Pharmaceutical Press. Current edition and selected information from prior editions.
- Martin TP, Hayes P, Collins DM. Tablet dispersion as an alternative to formulation of oral liquid dosage forms. *Austral J Hosp Pharm.* 1993; 23:378-86
- McEvoy GK (ed). AHFS Drug Information (current edition). Bethesda, MD: American Society of Health-System Pharmacists.

2. General Stability Info

Hydroxychloroquine sulfate tablets should be packaged in tight, light-resistant containers and stored at controlled room temperature.

References

- Anon. The United States Pharmacopeia. Rockville, Maryland: The United States Pharmacopeial Convention. Current edition.
- McEvoy GK (ed). AHFS Drug Information (current edition). Bethesda, MD: American Society of Health-System Pharmacists.

3. Oral Liquid

Pesko reported on an extemporaneous suspension of hydroxychloroquine. Fifteen hydroxychloroquine sulfate 200-mg tablets were rubbed with a towel moistened with alcohol to remove the coating. The tablets were ground to a fine powder and levigated to a paste with 15 mL of Ora-Plus suspending agent. An additional 45 mL of the suspending agent was added and the mixture was brought to 120 mL with water for irrigation, yielding a suspension containing hydroxychloroquine sulfate 25 mg/mL. The author noted that sugar and artificial flavorings should not be added to the product. A 30-day expiration period was recommended, although stability testing was not performed.

References

- Pesko LJ. Compounding: hydroxychloroquine. *Am Druggist.* 1993; 207:57

References

- 41806** – Plaquenil (hydroxychloroquine) package insert. St. Michael, Barbados: Concordia Pharmaceuticals, Inc.; 2017 Jan.
- 65138** – McHenry AR, Wempe WF, Rice PJ. Stability of extemporaneously prepared hydroxychloroquine sulfate 25-mg/mL suspensions in plastic bottles and syringes. Int J Pharm Compd 2017;21:251-254.
- 65145** – Michigan Collaborative Standardization of Compounded Oral Liquids. Hydroxychloroquine Oral Suspension. Available on the world wide web at: <https://www.mipedscompounds.org/sites/default/files/standard-formulations/Hydroxychloroquine.pdf>. Accessed March 20, 2020.

Adverse Reactions

- abdominal pain
- acute generalized exanthematous pustulosis (AGEP)
- agranulocytosis
- alopecia
- anemia
- angioedema
- anorexia
- aplastic anemia
- ataxia
- AV block
- blurred vision
- bronchospasm
- bullous rash
- bundle-branch block
- cardiomyopathy
- corneal deposits
- corneal edema
- corneal opacification
- diarrhea
- dizziness
- Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS)
- dyskinesia
- dystonic reaction
- emotional lability
- erythema multiforme
- exfoliative dermatitis
- fatigue
- hair discoloration
- headache
- hearing loss
- heart failure
- hemolysis
- hepatic failure
- hypoglycemia
- irritability
- leukopenia
- macular degeneration
- myopathy
- nausea
- nightmares
- nystagmus
- photophobia
- photosensitivity
- porphyria
- pruritus
- psoriasis
- psychosis
- pulmonary hypertension
- QT prolongation
- rash
- retinal pigment changes
- retinopathy
- scotomata
- seizures
- skin discoloration
- Stevens-Johnson syndrome
- suicidal ideation
- thrombocytopenia
- tinnitus
- torsade de pointes
- toxic epidermal necrolysis
- tremor
- urticaria
- ventricular fibrillation
- ventricular tachycardia
- vertigo
- visual impairment
- vomiting
- weakness
- weight loss

Hydroxychloroquine can cause ocular toxicity including irreversible retinopathy with retinal pigment changes (bull's eye appearance), visual field defects (paracentral scotomata) and visual impairment (visual acuity), maculopathies (macular degeneration), decreased dark adaptation, color vision abnormalities, and corneal changes (corneal edema and corneal opacification) including corneal deposits of the drug with or without accompanying symptoms (halo around lights, photophobia, blurred vision). A baseline ocular exam should be performed within the first year of hydroxychloroquine treatment. This baseline exam should include best corrected distance visual acuity (BCVA), an automated threshold visual field (VF) of the central 10 degrees (with retesting if an abnormality is noted), and spectral domain ocular coherence tomography (SD-OCT). Annual exams are recommended for patients with significant risk factors for retinal damage. For patients without significant risk factors, annual exams may be deferred until 5 years of treatment. In Asian patients, retinal toxicity may first be noticed outside the macula; therefore, visual field testing should be performed in the central 24 degrees instead of the central 10 degrees. Discontinue hydroxychloroquine if ocular toxicity is suspected and monitor the patient closely for ocular disease (i.e., retinal changes) and visual disturbance which may progress even after discontinuation of therapy.[\[41806\]](#)

Allergic and dermatologic reactions have been reported with the use of hydroxychloroquine. These include urticaria, angioedema, bronchospasm, rash (unspecified), pruritus, pigmentations disorders in the skin (skin discoloration) and mucous membranes, hair color changes (hair discoloration), alopecia, drug reaction with eosinophilia and systemic symptoms (DRESS), photosensitivity, and exfoliative dermatitis. Dermatitis bullous eruptions (bullos rash), including erythema multiforme, Stevens-Johnson syndrome, and toxic epidermal necrolysis (TEN) have also been reported.[\[41806\]](#)

Hydroxychloroquine may precipitate a severe attack of psoriasis that may be associated with pyrexia and hyperleukocytosis. Hydroxychloroquine may also exacerbate or precipitate porphyria, which has been reported with hydroxychloroquine or other 4-aminoquinoline use.[\[41806\]](#)

Hydroxychloroquine has been associated with acute generalized exanthematous pustulosis (AGEP).[\[41806\]](#) The nonfollicular, pustular, erythematous rash starts suddenly and is associated with fever above 38 degrees C. Drugs are the main cause of AGEP. A period of 2 to 3 weeks after an inciting drug exposure appears necessary for a first episode of AGEP. Unintentional reexposure may cause a second episode within 2 days.[\[27736\]](#)

Sensorimotor disorder or skeletal muscle myopathy or neuromyopathy (neuropathy) leading to progressive weakness and atrophy of proximal muscle groups, depression of tendon reflexes, and abnormal nerve conduction has been reported. Muscle and nerve biopsies have been associated with curvilinear bodies and muscle fiber atrophy with vacuolar changes. Assess muscle strength and deep tendon reflexes periodically in patients on long-term therapy.[\[41806\]](#)

Hematological adverse reactions of hydroxychloroquine or other 4-aminoquinolines include bone marrow failure, anemia, aplastic anemia, agranulocytosis, leukopenia, and thrombocytopenia. Hemolysis was reported in individuals with glucose-6-phosphate dehydrogenase (G-6-PD) deficiency. Monitor blood cell counts periodically if patients are given prolonged hydroxychloroquine therapy. If any severe blood disorder, such as aplastic anemia, agranulocytosis, leukopenia, or thrombocytopenia which is not attributable to the disease under treatment occurs, consider discontinuing hydroxychloroquine.[\[41806\]](#)

Deafness (hearing loss), nerve deafness, and tinnitus have been reported with hydroxychloroquine or other 4-aminoquinolines.[\[41806\]](#)

Cardiomyopathy, which may result in heart failure and in some cases a fatal outcome, has been noted in postmarketing reports of hydroxychloroquine or other 4-aminoquinolines. Patients may present with AV block, pulmonary hypertension, sick sinus syndrome, or with cardiac complications. ECG finding may include AV, right, or left bundle-branch block. Additionally, hydroxychloroquine causes QT prolongation. Ventricular arrhythmias (i.e., ventricular fibrillation and ventricular tachycardia) and torsade de pointes have been reported in patients taking hydroxychloroquine. Monitor ECG during hydroxychloroquine therapy. Chronic toxicity should be considered when conduction disorders (bundle-branch block, AV block) or biventricular hypertrophy

are diagnosed. If cardiotoxicity is suspected, prompt discontinuation of hydroxychloroquine may prevent life-threatening cardiac complications.[\[41806\]](#)

Adverse gastrointestinal (GI) effects reported with hydroxychloroquine or other 4-aminoquinolines include nausea, vomiting, abdominal pain, diarrhea, and decreased appetite (anorexia). These effects are associated with oral administration and can be minimized by taking hydroxychloroquine with food. Abnormal liver function tests and acute hepatic failure have also been reported.[\[41806\]](#)

Suicidal ideation/behavior has been rarely reported in patients treated with hydroxychloroquine. Other CNS or psychiatric adverse reactions reported with hydroxychloroquine or other 4-aminoquinolines include headache, dizziness, affect/emotional lability, irritability, psychosis, nervousness, nightmares, vertigo, nystagmus, ataxia, seizures, and extrapyramidal disorders such as dystonic reaction, dyskinesia, and tremor.[\[41806\]](#)

Weight loss and fatigue have been reported with the use of hydroxychloroquine or other 4-aminoquinolines.[\[41806\]](#)

Hydroxychloroquine has been shown to cause severe hypoglycemia including loss of consciousness that could be life threatening in patients treated with or without antidiabetic medications. Monitor blood glucose and adjust treatment as necessary in patients presenting with clinical symptoms of hypoglycemia during hydroxychloroquine treatment.[\[41806\]](#)

Revision Date: 03/12/2020 08:42:39 AM

References

27736 – Beylot C, Doutre M, Beylot-Barry M. Acute generalized exanthematous pustulosis. Semin Cutan Med Surg 1996;15(4):244-249.

41806 – Plaquenil (hydroxychloroquine) package insert. St. Michael, Barbados: Concordia Pharmaceuticals, Inc.; 2017 Jan.

Contraindications/Precautions

Absolute contraindications are italicized.

- accidental exposure
- alcoholism
- apheresis
- Asian patients
- AV block
- bradycardia
- breast-feeding
- cardiomyopathy
- celiac disease
- children
- diabetes mellitus
- females
- fever
- G6PD deficiency
- geriatric
- GI disease
- heart failure
- hepatic disease
- human immunodeficiency virus (HIV) infection
- hyperparathyroidism
- hypocalcemia
- hypoglycemia
- hypokalemia
- hypomagnesemia
- hypothermia
- hypothyroidism
- infants
- long QT syndrome
- myocardial infarction
- myopathy
- neonates

- neurological disease
 - ocular disease
 - pheochromocytoma
 - porphyria
 - pregnancy
 - psoriasis
 - QT prolongation
- renal disease
 - rheumatoid arthritis
 - sickle cell disease
 - sleep deprivation
 - stroke
 - systemic lupus erythematosus (SLE)
 - visual disturbance
-

Hydroxychloroquine is contraindicated in patients with known *hypersensitivity to 4-aminoquinoline compounds.* [41806]

Severe and irreversible retinal damage has been reported with the use of hydroxychloroquine. Risk factors for retinal damage include daily doses more than 6.5 mg/kg (5 mg/kg base) of actual body weight, durations of use greater than 5 years, subnormal glomerular filtration, use of concomitant drugs such as tamoxifen, and concurrent macular disease. A baseline ocular exam should be performed within the first year of hydroxychloroquine treatment. This baseline exam should include best corrected distance visual acuity (BCVA), an automated threshold visual field (VF) of the central 10 degrees (with retesting if an abnormality is noted), and spectral domain ocular coherence tomography (SD-OCT). Annual exams are recommended for patients with significant risk factors for retinal damage. For patients without significant risk factors, annual exams may be deferred until 5 years of treatment. In Asian patients, retinal toxicity may first be noticed outside the macula; therefore, visual field testing should be performed in the central 24 degrees instead of the central 10 degrees. Discontinue hydroxychloroquine if ocular toxicity is suspected and monitor the patient closely for ocular disease (i.e., retinal changes) and visual disturbance which may progress even after discontinuation of therapy.[41806]

Hydroxychloroquine should be used with extreme caution in patients with psoriasis or porphyria because it has been shown to precipitate severe attacks. Use hydroxychloroquine in patients with these conditions only if the potential benefit to the patient outweighs the possible risk.[41806]

Hydroxychloroquine should be used with caution in patients with hepatic disease, a history of alcoholism, or in conjunction with known hepatotoxic drugs. A dosage reduction may be necessary in patients with hepatic disease and in those taking medicines known to affect the liver.[41806]

Hydroxychloroquine can cause gastric irritation and should be used with caution in patients with GI disease. It can be taken with meals or milk to minimize gastric irritation.[41806]

Administer hydroxychloroquine with caution in patients with glucose-6-phosphate dehydrogenase deficiency (G6PD deficiency) due to the risk of hemolysis.[41806]

Hydroxychloroquine should be used with caution in patients with neurological disease and myopathy. Skeletal muscle myopathy or neuropathy leading to progressive weakness and atrophy of proximal muscle groups, depressed tendon reflexes, and abnormal nerve conduction have been reported. Assess muscle strength and deep tendon reflexes periodically in patients on long-term therapy with hydroxychloroquine.[41806]

The safety and efficacy of the chronic use of hydroxychloroquine for systemic lupus erythematosus and juvenile idiopathic arthritis in children and infants have not been established. Children are especially sensitive to the 4-aminoquinoline compounds. Fatalities have been reported after accidental exposure of chloroquine; some cases involved relatively small doses (e.g., 0.75 g or 1 g in a 3-year-old child). Strongly warn patients to keep hydroxychloroquine out of the reach of pediatric patients, including neonates, infants, children, and adolescents. [41806]

Cases of human pregnancy resulting in live birth to women exposed to hydroxychloroquine have been reported in the literature; no increase in the rate of birth defects has been demonstrated. Embryonic deaths and malformations of anophthalmia and microphthalmia in the offspring have been reported when pregnant rats

received large doses of chloroquine.[\[41806\]](#) Guidelines recommend hydroxychloroquine as an alternative to chloroquine as a treatment option for acute malaria and for prophylaxis in pregnant women during all trimesters.[\[63990\]](#) [\[64059\]](#) Hydroxychloroquine may also be appropriate for pregnancies complicated by lupus.[\[34349\]](#) [\[34358\]](#)

Use caution when administering hydroxychloroquine to breast-feeding women. Hydroxychloroquine is excreted in the breast milk, and it is known that infants are extremely sensitive to the toxic effects of 4-aminoquinolines.[\[41806\]](#) Breast milk concentrations ranged from 10.6 to 1392 mcg/L in small studies of women; breast-fed infants would likely receive 0.2 mg/kg or less of hydroxychloroquine.[\[48476\]](#) [\[48477\]](#) [\[48478\]](#) [\[48479\]](#) In infants monitored for up to at least 1 year of age, careful follow-up found no adverse effects on growth, vision, or hearing.[\[48474\]](#) [\[48475\]](#) Previous American Academy of Pediatrics (AAP) recommendations considered hydroxychloroquine as usually compatible with breast-feeding.[\[27500\]](#)

Use hydroxychloroquine with caution in patients with hypoglycemia or diabetes mellitus. Hydroxychloroquine can cause severe, life-threatening hypoglycemia in patients treated with or without antidiabetic medications. Warn patients about the risk of hypoglycemia and the associated clinical signs and symptoms. Monitor blood glucose and adjust treatment as necessary in patients presenting with clinical symptoms of hypoglycemia during hydroxychloroquine treatment.[\[41806\]](#)

Hydroxychloroquine prolongs the QT interval. Use hydroxychloroquine with caution in patients with conditions that may increase the risk of QT prolongation including congenital long QT syndrome, bradycardia, AV block, heart failure, stress-related cardiomyopathy, myocardial infarction, stroke, hypomagnesemia, hypokalemia, hypocalcemia, or in patients receiving medications known to prolong the QT interval or cause electrolyte imbalances. Females, geriatric patients, patients with sleep deprivation, pheochromocytoma, sickle cell disease, hypothyroidism, hyperparathyroidism, hypothermia, systemic inflammation (e.g., human immunodeficiency virus (HIV) infection, fever, and some autoimmune diseases including rheumatoid arthritis, systemic lupus erythematosus (SLE), and celiac disease) and patients undergoing apheresis procedures (e.g., plasmapheresis [plasma exchange], cytapheresis) may also be at increased risk for QT prolongation.[\[28432\]](#) [\[28457\]](#) [\[41806\]](#) [\[56592\]](#) [\[65180\]](#) In patients taking hydroxychloroquine with another drug that also prolongs the QT interval (see Therapeutic Drug Monitoring for recommendations specific to azithromycin with hydroxychloroquine used together for COVID-19), obtain a pre-treatment QTc using a standard 12-lead ECG, telemetry, or mobile ECG device. Obtain baseline electrolytes, including calcium, magnesium, and potassium. Determine if the patient is currently on any QT-prolonging medications that can be discontinued. Document high-risk cardiovascular and comorbid conditions. If the baseline QTc is 500 msec or more and/or the patient has an inherent tendency to develop an exaggerated QTc response (i.e., change of 60 msec or more), correct contributing electrolyte abnormalities, review and discontinue other unnecessary QTc prolonging medications, and proceed with close QTc surveillance. Obtain an initial on-therapy QTc approximately 2 to 4 hours after the first dose and then again at 48 and 96 hours after treatment initiation. If the baseline QTc is 460 to 499 msec (prepubertal), 470 to 499 msec (postpubertal males), or 480 to 499 msec (postpubertal females), correct contributing electrolyte abnormalities, review and discontinue other unnecessary QTc prolonging medications, and obtain an initial on-therapy QTc 48 and 96 hours after treatment initiation. If the baseline QTc is less than 460 msec (prepubertal), less than 470 msec (postpubertal males), or less than 480 msec (postpubertal females), correct electrolyte abnormalities and obtain an initial on-therapy QTc 48 and 96 hours after treatment initiation.[\[65170\]](#) Consider chronic toxicity when conduction disorders (bundle-branch block, AV block) or biventricular hypertrophy are diagnosed. If cardiotoxicity is suspected, prompt discontinuation of hydroxychloroquine may prevent life-threatening cardiac complications.[\[41806\]](#)

Because renal clearance of hydroxychloroquine does not correlate with creatinine clearance, dosage adjustments are not required in patients with renal impairment. However, a dosage reduction may be necessary in patients with renal disease or in patients with concomitant medications known to affect the kidney. No specific dosage adjustment guidelines are available for patients with renal impairment.[\[41806\]](#)

References

- 27500** – American Academy of Pediatrics (AAP) Committee on Drugs. Transfer of drugs and other chemicals into human milk. *Pediatrics* 2001;108(3):776-789.
- 28432** – Roden, DM. Drug-induced prolongation of the QT interval. *New Engl J Med* 2004;350:1013-22.
- 28457** – Crouch MA, Limon L, Cassano AT. Clinical relevance and management of drug-related QT interval prolongation. *Pharmacotherapy* 2003;23:881-908.
- 34349** – Bertsias G, Ioannidis JPA, Boletis J, et al. EULAR recommendations for the management of systemic lupus erythematosus. Report of a task force of the EULAR standing committee for international clinical studies including therapeutics. *Ann Rheum Dis* 2008;67:195-205.
- 34358** – Levy RA, Vilela VS, Cataldo MJ, et al. Hydroxychloroquine (HCQ) in lupus pregnancy: double-blind and placebo-controlled study. *Lupus* 2001;10:401-4.
- 41806** – Plaquenil (hydroxychloroquine) package insert. St. Michael, Barbados: Concordia Pharmaceuticals, Inc.; 2017 Jan.
- 48474** – Cimaz R, Brucato A, Meregalli E et al. Electroretinograms of children born to mothers treated with hydroxychloroquine during pregnancy and breast-feeding: comment on the article by Costedoat-Chalumeau et al. *Arthritis Rheum*. 2004;50:3056-7. PMID
- 48475** – Motta M, Tincani A, Faden D et al. Follow-up of infants exposed to hydroxychloroquine given to mothers during pregnancy and lactation. *J Perinatol*. 2005;25:86-9.
- 48476** – Ostensen M, Brown ND, Chiang PK et al. Hydroxychloroquine in human breast milk. *Eur J Clin Pharmacol*. 1985; 28:357.
- 48477** – Nation RL, Hackett LP, Dusci LJ et al. Excretion of hydroxychloroquine in human milk. *Br J Clin Pharmacol*. 1984;17:368-9.
- 48478** – Costedoat-Chalumeau N, Amoura Z, Aymard G et al. Evidence of transplacental passage of hydroxychloroquine in humans. *Arthritis Rheum*. 2002;46:1123-4.
- 48479** – Costedoat-Chalumeau N, Amoura Z, Sebbough D et al. Electroretinograms of children born to mothers treated with hydroxychloroquine during pregnancy and breast-feeding: comment on the article by Costedoat-Chalumeau et al. Author reply. *Arthritis Rheum*. 2004;50:3057-8.
- 56592** – van Noord C, Eijgelsheim M, Stricker BH. Drug- and non-drug-associated QT interval prolongation. *Br J Clin Pharmacol* 2010;70(1):16-23.
- 63990** – Arguin PM, Tan KR. Chapter 3. Infectious diseases related to travel. Malaria. In. Centers for Disease Control and Prevention. 2018 Yellow Book - Traveler's Health. Atlanta: U.S. Department of Health and Human Services, Public Health Service. <https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/malaria>
- 64059** – Centers for Disease Control and Prevention. Treatment of malaria (guidelines for clinicians). Atlanta, GA: US Department of Health and Human Services; 2019. https://www.cdc.gov/malaria/diagnosis_treatment/treatment.html.
- 65170** – Giudicessi JR, Noseworthy PA, Friedman PA, Ackerman MJ. Urgent guidance for navigating and circumventing the QTc prolonging and torsadogenic potential of possible pharmacotherapies for COVID-19 [published online ahead of print, March 25, 2020]. *Mayo Clin Proc* 2020;95.

Mechanism of Action

Hydroxychloroquine is a weak base and may exert its antimalarial effect by concentrating in the acid vesicles of the plasmodia and by inhibiting the polymerization of heme. It can also inhibit certain enzymes by its interaction with DNA. Organisms with reduced susceptibilities to chloroquine also show reduced susceptibilities to hydroxychloroquine.[\[41806\]](#)

Although the mechanisms underlying the antiinflammatory and immunomodulatory effects of hydroxychloroquine are unknown, several possible mechanisms of action have been proposed. It is unclear if these mechanisms work similarly for rheumatic and autoimmune diseases. Potential mechanisms include reduced cytokine production, inhibition of immune effector cells, inhibition of platelet function, protection of the cell surface from external disturbances, competitive binding to nucleic acid ligands or toll-like receptors (TLRs), interference with lysosomal function, reduction of leakage of lysosomal enzymes, and interference with endosomal NADPH oxidase (NOX).[\[41806\]](#) [\[61727\]](#) [\[61728\]](#) [\[61729\]](#)

There are several potential mechanisms by which hydroxychloroquine may be active against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). These include inhibition of viral enzymes or processes such as viral DNA and RNA polymerase, viral protein glycosylation, virus assembly, new virus particle transport, and virus release. Other mechanisms may also involve ACE2 cellular receptor inhibition, acidification at the surface of the cell membrane inhibiting fusion of the virus, and immunomodulation of cytokine release.[\[61729\]](#) [\[61732\]](#) [\[65120\]](#) [\[65121\]](#) [\[65139\]](#) [\[65140\]](#) [\[65141\]](#) [\[65142\]](#) [\[65143\]](#)

Revision Date: 03/20/2020 07:18:47 PM

References

41806 – Plaquenil (hydroxychloroquine) package insert. St. Michael, Barbados: Concordia Pharmaceuticals, Inc.; 2017 Jan.

61727 – Muller-Calleja N, Manukyan D, Canisius A, et al. Hydroxychloroquine inhibits proinflammatory signalling pathways by targeting endosomal NADPH oxidase. Ann Rheum Dis 2016. Epub ahead of print, doi: 10.1136/annrheumdis-2016-210012.

61728 – Kuznik A, Bencina M, Svajger U, et al. Mechanism of endosomal TLR inhibition by antimalarial drugs and imidazoquinolines. J Immunol 2011;186:4794-804.

61729 – Fox R. Anti-malarial drugs: possible mechanisms of action in autoimmune disease and prospects for drug development. Lupus 1996;S1:S4-10.

61732 – Ben-Zvi H, Kivity S, Langevitz P, et al. Hydroxychloroquine: from malaria to autoimmunity. Clin Rev Allergy Immunol 2012;42:145-53.

65120 – Wang M, Cao R, Zhang L, et al. Remdesivir and Chloroquine Effectively Inhibit the Recently Emerged Novel Coronavirus (2019-nCoV) in Vitro. Cell Res 2020;30(3):269-271.

65121 – Yao X, Fei Y, Zhang M, et al. In Vitro Antiviral Activity and Projection of Optimized Dosing Design of Hydroxychloroquine for the Treatment of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Clin Infect Dis 2020 Mar 9. [Epub ahead of print]

65139 – Fox RI. Mechanism of action of hydroxychloroquine as an antirheumatic drug. Semin Arthritis Rheum 1993;23(2 S1):82-91.

65140 – Savarino A, Trani LD, Donatelli I, et al. New insights into the antiviral effects of chloroquine. The Lancet 2006;6:67-9.

65141 – Vincent MJ, Bergeron E, Benjannet S, et al. Chloroquine is a potent inhibitor of SARS coronavirus infection and spread. Virol J 2005;2:69.

65142 – Cortegiani A, Ingoglia G, Ippolito M, et al. A systematic review on the efficacy and safety of chloroquine for the treatment of COVID-19. J Crit Care 2020. [In press]

65143 – Cohen SN, Yielding KL. Inhibition of DNA and RNA polymerase reactions by chloroquine. Proc Natl Acad Sci U S A 1965; 54: 521-7.

Pharmacokinetics

Hydroxychloroquine is administered orally. It is widely distributed into body tissues, with high concentrations in the bone marrow, liver, kidneys, lungs, adrenal gland, and pituitary gland. Hydroxychloroquine has a high affinity for melanin and thus is concentrated in the choroid and ciliary body of the eye, which may account for the retinal toxicity. Cellular concentrations have been shown to be higher in mononuclear cells than in polymorphonuclear leukocytes.[\[41806\]](#) [\[61731\]](#) [\[61732\]](#)

Hydroxychloroquine is partially metabolized in the liver to 3 metabolites. These include the major metabolite, desethylhydroxychloroquine (DHCQ), as well as desethylchloroquine (DCQ) and bidesethylhydroxychloroquine (BDCQ). Elimination appears to take place in a biphasic manner. Renal clearance of unchanged drug ranges from 16% to 30% and does not correlate with creatinine clearance. The absorption half-life is approximately 3 to 4 hours and the terminal half-life is about 40 to 50 days. Urine concentrations are still detectable several months after single doses. The long-half life is attributed to extensive tissue uptake rather than decreased excretion.
[\[41806\]](#) [\[61731\]](#)

Affected cytochrome P450 isoenzymes and drug transporters: CYP2C8, CYP2D6, CYP3A4, P-gp

In vitro data suggest that hydroxychloroquine is metabolized primarily by CYP2C8 and CYP3A4, and to a much lesser extent, by CYP2D6.[\[65236\]](#) [\[65239\]](#) It has also been shown to be an inhibitor of the drug transporter P-glycoprotein (P-gp).[\[65237\]](#)

Route-Specific Pharmacokinetics

- Oral Route

Bioavailability is approximately 74%. Hydroxychloroquine displays linear kinetics. Peak plasma concentrations are achieved in 3 to 4 hours. In rheumatoid arthritis patients, there is a large variability in absorption (30% to 100%) with mean concentrations significantly higher in patients with less disease activity.[\[41806\]](#)

Special Populations

- **Renal Impairment**

Renal clearance does not correlate with creatinine clearance.[\[41806\]](#)

Revision Date: 04/13/2020 02:18:19 PM

References

41806 – Plaquenil (hydroxychloroquine) package insert. St. Michael, Barbados: Concordia Pharmaceuticals, Inc.; 2017 Jan.

61731 – Mackenzie AH. Pharmacologic actions of 4-aminoquinoline compounds. Am J Med 1983;75:5-10.

61732 – Ben-Zvi H, Kivity S, Langevitz P, et al. Hydroxychloroquine: from malaria to autoimmunity. Clin Rev Allergy Immunol 2012;42:145-53.

65236 – Schrezenmeier E, Dorner T. Mechanisms of action of hydroxychloroquine and chloroquine: implications for rheumatology. Rheumatology 2020;16:155-166.

65237 – Tiberghien F, Loor F. Ranking of P-glycoprotein substrates and inhibitors by a calcein-AM fluorometry screening assay. Anti-Cancer Drugs 1996;7:568-578.

65239 – Projean D, Baune B, Farinotti R, et al. In vitro metabolism of chloroquine: Identification of CYP2C8, CYP3A4, and CYP2D6 as the main isoforms catalyzing N-desethylchloroquine formation. Drug Metab Dispos 2003;31:748-754.

Pregnancy/Breast-feeding

Pregnancy

Cases of human pregnancy resulting in live birth to women exposed to hydroxychloroquine have been reported in the literature; no increase in the rate of birth defects has been demonstrated. Embryonic deaths and malformations of anophthalmia and microphthalmia in the offspring have been reported when pregnant rats received large doses of chloroquine.[\[41806\]](#) Guidelines recommend hydroxychloroquine as an alternative to chloroquine as a treatment option for acute malaria and for prophylaxis in pregnant women during all trimesters. [\[63990\]](#) [\[64059\]](#) Hydroxychloroquine may also be appropriate for pregnancies complicated by lupus.[\[34349\]](#) [\[34358\]](#)

Breast-Feeding

Use caution when administering hydroxychloroquine to breast-feeding women. Hydroxychloroquine is excreted in the breast milk, and it is known that infants are extremely sensitive to the toxic effects of 4-aminoquinolines. [41806] Breast milk concentrations ranged from 10.6 to 1392 mcg/L in small studies of women; breast-fed infants would likely receive 0.2 mg/kg or less of hydroxychloroquine.[48476] [48477] [48478] [48479] In infants monitored for up to at least 1 year of age, careful follow-up found no adverse effects on growth, vision, or hearing.[48474] [48475] Previous American Academy of Pediatrics (AAP) recommendations considered hydroxychloroquine as usually compatible with breast-feeding.[27500]

Revision Date: 03/20/2020 09:06:13 PM

References

- 27500** – American Academy of Pediatrics (AAP) Committee on Drugs. Transfer of drugs and other chemicals into human milk. Pediatrics 2001;108(3):776-789.
- 34349** – Bertsias G, Ioannidis JPA, Boletis J, et al. EULAR recommendations for the management of systemic lupus erythematosus. Report of a task force of the EULAR standing committee for international clinical studies including therapeutics. Ann Rheum Dis 2008;67:195-205.
- 34358** – Levy RA, Vilela VS, Cataldo MJ, et al. Hydroxychloroquine (HCQ) in lupus pregnancy: double-blind and placebo-controlled study. Lupus 2001;10:401-4.
- 41806** – Plaquenil (hydroxychloroquine) package insert. St. Michael, Barbados: Concordia Pharmaceuticals, Inc.; 2017 Jan.
- 48474** – Cimaz R, Brucato A, Meregalli E et al. Electroretinograms of children born to mothers treated with hydroxychloroquine during pregnancy and breast-feeding: comment on the article by Costedoat-Chalumeau et al. Arthritis Rheum. 2004;50:3056-7. PMID
- 48475** – Motta M, Tincani A, Faden D et al. Follow-up of infants exposed to hydroxychloroquine given to mothers during pregnancy and lactation. J Perinatol. 2005;25:86-9.
- 48476** – Ostensen M, Brown ND, Chiang PK et al. Hydroxychloroquine in human breast milk. Eur J Clin Pharmacol. 1985; 28:357.
- 48477** – Nation RL, Hackett LP, Dusci LJ et al. Excretion of hydroxychloroquine in human milk. Br J Clin Pharmacol. 1984;17:368-9.
- 48478** – Costedoat-Chalumeau N, Amoura Z, Aymard G et al. Evidence of transplacental passage of hydroxychloroquine in humans. Arthritis Rheum. 2002;46:1123-4.
- 48479** – Costedoat-Chalumeau N, Amoura Z, Sebbough D et al. Electroretinograms of children born to mothers treated with hydroxychloroquine during pregnancy and breast-feeding: comment on the article by Costedoat-Chalumeau et al. Author reply. Arthritis Rheum. 2004;50:3057-8.
- 63990** – Arguin PM, Tan KR. Chapter 3. Infectious diseases related to travel. Malaria. In. Centers for Disease Control and Prevention. 2018 Yellow Book - Traveler's Health. Atlanta: U.S. Department of Health and Human Services, Public Health Service. <https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/malaria>
- 64059** – Centers for Disease Control and Prevention. Treatment of malaria (guidelines for clinicians). Atlanta, GA: US Department of Health and Human Services; 2019. https://www.cdc.gov/malaria/diagnosis_treatment/treatment.html.

Interactions

Level 1 (Severe)

- Cisapride
- Dronedarone
- Pimozide
- Thioridazine

Level 2 (Major)

- Aclidinium; Formoterol
- Albuterol
- Albuterol; Ipratropium
- Alfuzosin
- Amiodarone
- Amitriptyline
- Amitriptyline; Chlordiazepoxide
- Amoxicillin; Clarithromycin; Lansoprazole
- Amoxicillin; Clarithromycin; Omeprazole
- Anagrelide
- Antacids
- Apomorphine
- Arformoterol
- Aripiprazole
- Arsenic Trioxide
- Artemether; Lumefantrine
- Asenapine
- Aspirin, ASA; Citric Acid; Sodium Bicarbonate
- Atomoxetine
- Azithromycin
- Bedaquiline
- Bismuth Subcitrate Potassium; Metronidazole; Tetracycline
- Bismuth Subsalicylate; Metronidazole; Tetracycline
- Budesonide; Formoterol
- Buprenorphine
- Buprenorphine; Naloxone
- Calcium Carbonate
- Calcium Carbonate; Magnesium Hydroxide
- Calcium Carbonate; Risedronate
- Calcium Carbonate; Simethicone
- Ceritinib
- Chlorpromazine
- Ciprofloxacin
- Citalopram
- Clarithromycin
- Clofazimine
- Clomipramine
- Clozapine
- Codeine; Phenylephrine; Promethazine
- Codeine; Promethazine
- Crizotinib
- Dasatinib
- Degarelix
- Desflurane
- Desipramine
- Deutetetabenazine
- Dextromethorphan; Promethazine
- Dextromethorphan; Quinidine
- Disopyramide
- Dofetilide
- Dolasetron
- Dolutegravir; Rilpivirine
- Donepezil
- Donepezil; Memantine
- Doxepin
- Droperidol
- Efavirenz
- Efavirenz; Emtricitabine; Tenofovir
- Efavirenz; Lamivudine; Tenofovir Disoproxil Fumarate
- Eliglustat
- Emtricitabine; Rilpivirine; Tenofovir alafenamide
- Emtricitabine; Rilpivirine; Tenofovir disoproxil fumarate
- Encorafenib
- Enflurane
- Entrectinib
- Eribulin
- Erythromycin
- Erythromycin; Sulfisoxazole
- Escitalopram
- Ezogabine
- Fingolimod
- Flecainide
- Fluconazole
- Fluoxetine
- Fluoxetine; Olanzapine
- Fluphenazine
- Fluticasone; Salmeterol
- Fluticasone; Umeclidinium; Vilanterol

- Fluticasone; Vilanterol
- Fluvoxamine
- Formoterol
- Formoterol; Mometasone
- Foscarnet
- Gemifloxacin
- Gemtuzumab Ozogamicin
- Gilteritinib
- Glasdegib
- Glycopyrrolate; Formoterol
- Goserelin
- Granisetron
- Halogenated Anesthetics
- Haloperidol
- Halothane
- Histrelin
- Hydroxyzine
- Ibutilide
- Iloperidone
- Imipramine
- Indacaterol
- Indacaterol; Glycopyrrolate
- Inotuzumab Ozogamicin
- Isoflurane
- Itraconazole
- Ivosidenib
- Ketoconazole
- Lanthanum Carbonate
- Lapatinib
- Lefamulin
- Lenvatinib
- Leuprolide
- Leuprolide; Norethindrone
- Levalbuterol
- Levofloxacin
- Lithium
- Lofexidine
- Long-acting beta-agonists
- Loperamide
- Loperamide; Simethicone
- Lopinavir; Ritonavir
- Macimorelin
- Maprotiline
- Mefloquine
- Meperidine; Promethazine
- Metaproterenol
- Methadone
- Metronidazole
- Midostaurin
- Mifepristone
- Mirtazapine
- Moxifloxacin
- Nilotinib
- Norfloxacin
- Nortriptyline
- Octreotide
- Ofloxacin
- Olanzapine
- Olodaterol
- Omeprazole; Sodium Bicarbonate
- Ondansetron
- Osilodrostat
- Osimertinib
- Oxaliplatin
- Paliperidone
- Panobinostat
- Pasireotide
- Pazopanib
- Penicillamine
- Pentamidine
- Perphenazine
- Perphenazine; Amitriptyline
- Phenylephrine; Promethazine
- Pimavanserin
- Pirbuterol
- Pitolisant
- Posaconazole
- Primaquine
- Procainamide
- Prochlorperazine
- Promethazine
- Propafenone
- Protriptyline
- Quetiapine
- Quinidine
- Quinine
- Rabies Vaccine
- Ranolazine
- Ribociclib
- Ribociclib; Letrozole
- Rilpivirine
- Risperidone
- Romidepsin
- Salmeterol
- Saquinavir
- Selpercatinib
- Sertraline
- Sevoflurane
- Short-acting beta-agonists
- Siponimod
- Sodium Bicarbonate
- Solifenacin
- Sorafenib
- Sotalol
- Sunitinib
- Tacrolimus
- Tamoxifen
- Telavancin

- Telithromycin
- Terbutaline
- Tetrabenazine
- Tiotropium; Olodaterol
- Tolterodine
- Toremifene
- Trazodone
- Tricyclic antidepressants
- Trifluoperazine
- Trimipramine
- Triptorelin
- Umeclidinium; Vilanterol
- Vandetanib
- Vardenafil
- Vemurafenib
- Venlafaxine
- Vigabatrin
- Voriconazole
- Vorinostat
- Ziprasidone

Level 3 (Moderate)

- Acarbose
- Acetazolamide
- Acetohexamide
- Albiglutide
- Alogliptin
- Alogliptin; Metformin
- Alogliptin; Pioglitazone
- Alpha-glucosidase Inhibitors
- Amobarbital
- Ampicillin
- Atropine; Hyoscyamine; Phenobarbital; Scopolamine
- Belladonna Alkaloids; Ergotamine; Phenobarbital
- Betrixaban
- Brivaracetam
- Canagliflozin
- Canagliflozin; Metformin
- Carbamazepine
- Chlorpropamide
- Cimetidine
- Clobazam
- Clonazepam
- Clorazepate
- Cyclosporine
- Dabigatran
- Dapagliflozin
- Dapagliflozin; Metformin
- Dapagliflozin; Saxagliptin
- Diazepam
- Digoxin
- Dipeptidyl Peptidase-4 Inhibitors
- Dulaglutide
- Edoxaban
- Empagliflozin
- Empagliflozin; Linagliptin
- Empagliflozin; Linagliptin; Metformin
- Empagliflozin; Metformin
- Ertugliflozin
- Ertugliflozin; Metformin
- Ertugliflozin; Sitagliptin
- Eslicarbazepine
- Ethosuximide
- Ethotoxin
- Exenatide
- Felbamate
- Fosphenytoin
- Gabapentin
- Glimepiride
- Glimepiride; Pioglitazone
- Glimepiride; Rosiglitazone
- Glipizide
- Glipizide; Metformin
- Glyburide
- Glyburide; Metformin
- Incretin Mimetics
- Insulin Aspart
- Insulin Aspart; Insulin Aspart Protamine
- Insulin Degludec
- Insulin Degludec; Liraglutide
- Insulin Detemir
- Insulin Glargine
- Insulin Glargin; Lixisenatide
- Insulin Glulisine
- Insulin Lispro
- Insulin Lispro; Insulin Lispro Protamine
- Insulin, Inhaled
- Insulins
- Isophane Insulin (NPH)
- Lacosamide
- Lamotrigine
- Lente Insulin
- Levetiracetam
- Linagliptin
- Linagliptin; Metformin
- Liraglutide
- Lixisenatide
- Lorazepam
- Meglitinides
- Mephobarbital

- Metformin
- Metformin; Pioglitazone
- Metformin; Repaglinide
- Metformin; Rosiglitazone
- Metformin; Saxagliptin
- Metformin; Sitagliptin
- Methotrexate
- Methylsuximide
- Miglitol
- Nateglinide
- Pentobarbital
- Perampanel
- Phenobarbital
- Phentermine; Topiramate
- Phenytoin
- Pioglitazone
- Pramlintide
- Pregabalin
- Primidone
- Regular Insulin
- Regular Insulin; Isophane Insulin (NPH)
- Repaglinide
- Rituximab
- Rituximab; Hyaluronidase
- Rosiglitazone
- Rufinamide
- Saxagliptin
- Semaglutide
- SGLT2 Inhibitors
- Simvastatin; Sitagliptin
- Sitagliptin
- Sulfonylureas
- Thiazolidinediones
- Tiagabine
- Tolazamide
- Tolbutamide
- Topiramate
- Ultralente Insulin
- Valproic Acid, Divalproex Sodium
- Zonisamide

Level 4 (Minor)

- Praziquantel
 - Telbivudine
-

Acarbose: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the alpha-glucosidase inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Acetazolamide: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as acetazolamide. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Acetohexamide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including sulfonylureas, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Aclidinium; Formoterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Albiglutide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the incretin mimetics, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

[Albuterol](#): (Major) Avoid coadministration of short-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [33925] [41806] [49951] [51793] [59321] [65157] [65170]

[Albuterol; Ipratropium](#): (Major) Avoid coadministration of short-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [33925] [41806] [49951] [51793] [59321] [65157] [65170]

[Alfuzosin](#): (Major) Avoid coadministration of alfuzosin and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Alfuzosin may prolong the QT interval in a dose-dependent manner. [28261] [41806] [65157] [65170]

[Alogliptin](#): (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

[Alogliptin; Metformin](#): (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

[Alogliptin; Pioglitazone](#): (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the thiazolidinediones, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

[Alpha-glucosidase Inhibitors](#): (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the alpha-glucosidase inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

[Amiodarone](#): (Major) Avoid coadministration of amiodarone and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, perform a baseline ECG to assess initial QT interval and determine frequency of subsequent ECG monitoring; also, evaluate baseline electrolytes and correct any abnormalities. Hydroxychloroquine prolongs the QT interval. Amiodarone, a class III antiarrhythmic agent, is

associated with a well-established risk of QT prolongation and torsade de pointes (TdP). Although the frequency of TdP is less with amiodarone than with other Class III agents, amiodarone is still associated with a risk of TdP. Due to the extremely long half-life of amiodarone, a drug interaction is possible for days to weeks after discontinuation of amiodarone. [28224] [28432] [28457] [41806] [65157] [65170]

Amitriptyline: (Major) Avoid coadministration of tricyclic antidepressants and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tricyclic antidepressants (TCAs) share pharmacologic properties similar to the Class IA antiarrhythmic agents and may prolong the QT interval, particularly in overdose or with higher-dose prescription therapy (elevated serum concentrations). [28225] [28415] [28416] [41806] [65157] [65170]

Amitriptyline; Chlordiazepoxide: (Major) Avoid coadministration of tricyclic antidepressants and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tricyclic antidepressants (TCAs) share pharmacologic properties similar to the Class IA antiarrhythmic agents and may prolong the QT interval, particularly in overdose or with higher-dose prescription therapy (elevated serum concentrations). [28225] [28415] [28416] [41806] [65157] [65170]

Amobarbital: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as amobarbital. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Amoxicillin; Clarithromycin; Lansoprazole: (Major) Avoid coadministration of clarithromycin and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Clarithromycin is associated with an established risk for QT prolongation and torsade de pointes (TdP). [28225] [28238] [41806] [65157] [65170]

Amoxicillin; Clarithromycin; Omeprazole: (Major) Avoid coadministration of clarithromycin and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Clarithromycin is associated with an established risk for QT prolongation and torsade de pointes (TdP). [28225] [28238] [41806] [65157] [65170]

Ampicillin: (Moderate) Administer oral ampicillin 2 hours before or 2 hours after hydroxychloroquine. Ampicillin bioavailability may be decreased with coadministration of hydroxychloroquine as a significant reduction in ampicillin bioavailability was observed with the structurally similar chloroquine in a study of healthy volunteers. The reduction of ampicillin bioavailability could be attributed to slower gastric emptying and enhancement of gut motility produced by chloroquine. [29758] [41806] [61761]

Anagrelide: (Major) Avoid coadministration of anagrelide and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Torsade de pointes (TdP) and ventricular tachycardia have been reported with anagrelide. In addition, dose-related increases in mean QTc and heart rate were observed in healthy subjects. [30163] [41806] [65157] [65170]

Antacids: (Major) Hydroxychloroquine absorption may be reduced by antacids as has been observed with the structurally similar chloroquine. Administer hydroxychloroquine and antacids at least 4 hours apart. Of note, a

study demonstrated no significant difference in hydroxychloroquine serum concentration in patients taking concomitant antacids (n = 14) compared to those not taking antacids (n = 495). [30284] [30285] [41806] [61758]

Apomorphine: (Major) Avoid coadministration of apomorphine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Dose-related QTc prolongation is associated with therapeutic apomorphine exposure. [28661] [41806] [59321] [65157] [65170]

Arformoterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Aripiprazole: (Major) Avoid coadministration of aripiprazole and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. QT prolongation has occurred during therapeutic use of aripiprazole and following overdose. [41806] [42845] [53394] [60196] [63328] [65157] [65170]

Arsenic Trioxide: (Major) Avoid coadministration of arsenic trioxide and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Torsade de pointes (TdP), QT interval prolongation, and complete atrioventricular block have been reported with arsenic trioxide use. [41806] [59438] [65157] [65170]

Artemether; Lumefantrine: (Major) Avoid coadministration of artemether; lumefantrine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval.

Artemether; lumefantrine is associated with prolongation of the QT interval. [34501] [41806] [65157] [65170]
(Major) Avoid coadministration of artemether; lumefantrine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Artemether; lumefantrine is associated with prolongation of the QT interval. [34501] [41806] [65157] [65170]

Asenapine: (Major) Avoid coadministration of asenapine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Asenapine has also been associated with QT prolongation. [36343] [41806] [65157] [65170]

Aspirin, ASA; Citric Acid; Sodium Bicarbonate: (Major) Hydroxychloroquine absorption may be reduced by antacids as has been observed with the structurally similar chloroquine. Administer hydroxychloroquine and antacids at least 4 hours apart. Of note, a study demonstrated no significant difference in hydroxychloroquine serum concentration in patients taking concomitant antacids (n = 14) compared to those not taking antacids (n = 495). [30284] [30285] [41806] [61758]

Atomoxetine: (Major) Avoid coadministration of atomoxetine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. QT prolongation has occurred during therapeutic use of atomoxetine and following overdose. [28405] [41806] [65157] [65170]

Atropine; Hyoscyamine; Phenobarbital; Scopolamine: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as phenobarbital. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. Additionally, coadministration of phenobarbital may decrease exposure of hydroxychloroquine resulting in decreased efficacy. [41806] [65210]

Azithromycin: (Major) Avoid coadministration of hydroxychloroquine and azithromycin due the risk of additive QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances (See Therapeutic Drug Monitoring for recommendations specific to COVID-19). Hydroxychloroquine prolongs the QT interval. QT prolongation and torsade de pointe (TdP) have been spontaneously reported during azithromycin postmarketing surveillance. [28855] [41806] [43974] [65157] [65170]

Bedaquiline: (Major) Avoid coadministration of bedaquiline and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine and bedaquiline prolong the QT interval. Discontinue bedaquiline if evidence of serious ventricular arrhythmia or QTcF interval greater than 500 msec. [41806] [52746] [65157] [65170]

Belladonna Alkaloids; Ergotamine; Phenobarbital: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as phenobarbital. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. Additionally, coadministration of phenobarbital may decrease exposure of hydroxychloroquine resulting in decreased efficacy. [41806] [65210]

Betrixaban: (Moderate) Use caution if hydroxychloroquine is coadministered with bextrixaban due to the potential for increased bextrixaban exposure which may increase the risk of bleeding. Bextrixaban is a P-gp substrate; limited data suggests that hydroxychloroquine is a P-gp inhibitor. [62037] [65210]

Bismuth Subcitrate Potassium; Metronidazole; Tetracycline: (Major) Avoid coadministration of metronidazole and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Potential QT prolongation has been reported in limited case reports with metronidazole. [41806] [57377] [57378] [65157] [65170]

Bismuth Subsalicylate; Metronidazole; Tetracycline: (Major) Avoid coadministration of metronidazole and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Potential QT prolongation has been reported in limited case reports with metronidazole. [41806] [57377] [57378] [65157] [65170]

Brivaracetam: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as brivaracetam. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Budesonide; Formoterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Buprenorphine: (Major) Avoid coadministration of buprenorphine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Buprenorphine has been associated with QT prolongation and has a possible risk of TdP. [41235] [41806] [59321] [60270] [65157] [65170]

Buprenorphine; Naloxone: (Major) Avoid coadministration of buprenorphine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Buprenorphine has been associated with QT prolongation and has a possible risk of TdP. [41235] [41806] [59321] [60270] [65157] [65170]

Calcium Carbonate: (Major) Hydroxychloroquine absorption may be reduced by antacids as has been observed with the structurally similar chloroquine. Administer hydroxychloroquine and antacids at least 4 hours apart. Of note, a study demonstrated no significant difference in hydroxychloroquine serum concentration in patients taking concomitant antacids (n = 14) compared to those not taking antacids (n = 495). [30284] [30285] [41806] [61758]

Calcium Carbonate; Magnesium Hydroxide: (Major) Hydroxychloroquine absorption may be reduced by antacids as has been observed with the structurally similar chloroquine. Administer hydroxychloroquine and antacids at least 4 hours apart. Of note, a study demonstrated no significant difference in hydroxychloroquine serum concentration in patients taking concomitant antacids (n = 14) compared to those not taking antacids (n = 495). [30284] [30285] [41806] [61758]

Calcium Carbonate; Risedronate: (Major) Hydroxychloroquine absorption may be reduced by antacids as has been observed with the structurally similar chloroquine. Administer hydroxychloroquine and antacids at least 4 hours apart. Of note, a study demonstrated no significant difference in hydroxychloroquine serum concentration in patients taking concomitant antacids (n = 14) compared to those not taking antacids (n = 495). [30284] [30285] [41806] [61758]

Calcium Carbonate; Simethicone: (Major) Hydroxychloroquine absorption may be reduced by antacids as has been observed with the structurally similar chloroquine. Administer hydroxychloroquine and antacids at least 4 hours apart. Of note, a study demonstrated no significant difference in hydroxychloroquine serum concentration in patients taking concomitant antacids (n = 14) compared to those not taking antacids (n = 495). [30284] [30285] [41806] [61758]

Canagliflozin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Canagliflozin; Metformin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are

coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Carbamazepine: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as carbamazepine. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. Additionally, coadministration of carbamazepine may decrease exposure of hydroxychloroquine resulting in decreased efficacy. [41806] [65210]

Ceritinib: (Major) Avoid coadministration of ceritinib and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. An interruption of ceritinib therapy, dose reduction, or discontinuation of therapy may be necessary if QT prolongation occurs. Ceritinib causes concentration-dependent QT prolongation. Hydroxychloroquine also prolongs the QT interval. [41806] [57094] [65157] [65170]

Chlorpromazine: (Major) Avoid coadministration of chlorpromazine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Chlorpromazine is associated with an established risk of QT prolongation and torsade de pointes (TdP). [28415] [41806] [43065] [65157] [65170]

Chlorpropamide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including sulfonylureas, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Cimetidine: (Moderate) Avoid concomitant use of hydroxychloroquine and cimetidine as cimetidine may inhibit the metabolism of hydroxychloroquine, increasing its plasma concentration. This interaction has been observed on treatment with the structurally similar chloroquine and cannot be ruled out for hydroxychloroquine. [29396] [41806] [61759] [61760]

Ciprofloxacin: (Major) Avoid coadministration of ciprofloxacin and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Rare cases of QT prolongation and torsade de pointes (TdP) have been reported with ciprofloxacin during postmarketing surveillance. [28432] [28457] [29833] [33144] [33145] [33146] [41806] [43411] [48869] [48871] [65157] [65170]

Cisapride: (Severe) Coadministration of cisapride and hydroxychloroquine is contraindicated due to the risk of increased QT prolongation. Hydroxychloroquine prolongs the QT interval. QT prolongation and ventricular arrhythmias, including torsade de pointes (TdP) and death, have been reported with cisapride. [28978] [41806] [47221]

Citalopram: (Major) Avoid coadministration of citalopram and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Citalopram causes dose-dependent QT interval prolongation. [28269] [41806] [65157] [65170]

Clarithromycin: (Major) Avoid coadministration of clarithromycin and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Clarithromycin is associated with an established risk for QT prolongation and torsade de pointes (TdP). [28225] [28238] [41806] [65157] [65170]

Clobazam: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as clobazam. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Clofazimine: (Major) Avoid coadministration of clofazimine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. QT prolongation and torsade de pointes (TdP) have been reported in patients receiving clofazimine in combination with QT prolonging medications. [41806] [63936] [65157] [65170]

Clomipramine: (Major) Avoid coadministration of tricyclic antidepressants and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tricyclic antidepressants (TCAs) share pharmacologic properties similar to the Class IA antiarrhythmic agents and may prolong the QT interval, particularly in overdose or with higher-dose prescription therapy (elevated serum concentrations). [28225] [28415] [28416] [41806] [65157] [65170]

Clonazepam: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as clonazepam. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Clorazepate: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as clorazepate. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Clozapine: (Major) Avoid coadministration of clozapine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Treatment with clozapine has been associated with QT prolongation, torsade de pointes (TdP), cardiac arrest, and sudden death. [28262] [41806] [65157] [65170]

Codeine; Phenylephrine; Promethazine: (Major) Avoid coadministration of promethazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Promethazine, a phenothiazine, is associated with a possible risk for QT prolongation. [28225] [41806] [55578] [65157] [65170]

Codeine; Promethazine: (Major) Avoid coadministration of promethazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Promethazine, a phenothiazine, is associated with a possible risk for QT prolongation. [28225] [41806] [55578] [65157] [65170]

Crizotinib: (Major) Avoid coadministration of crizotinib and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. An interruption of therapy, dose reduction, or discontinuation of therapy may be necessary for crizotinib if QT prolongation occurs. Crizotinib can cause concentration-dependent QT prolongation. Hydroxychloroquine also prolongs the QT interval. [41806] [45458] [65157] [65170]

Cyclosporine: (Moderate) Use caution with the coadministration of hydroxychloroquine and cyclosporine as increased serum concentrations of cyclosporine have been noted. Monitoring cyclosporine concentrations after

starting or stopping hydroxychloroquine therapy may be necessary. Monitor patients for cyclosporine-related adverse events such as nephrotoxicity or hepatic toxicity. [41806]

Dabigatran: (Moderate) Use caution if hydroxychloroquine is coadministered with dabigatran due to the potential for increased dabigatran exposure which may increase the risk of bleeding. Dabigatran is a P-gp substrate; limited data suggests that hydroxychloroquine is a P-gp inhibitor. [42121] [65210]

Dapagliflozin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Dapagliflozin; Metformin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Dapagliflozin; Saxagliptin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Dasatinib: (Major) Avoid coadministration of dasatinib and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. In vitro studies have shown that dasatinib has the potential to prolong the QT interval. [32387] [41806] [65157] [65170]

Degarelix: (Major) Avoid coadministration of degarelix and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Androgen deprivation therapy (i.e., degarelix) may prolong the QT/QTC interval. [41806] [46869] [65157] [65170]

Desflurane: (Major) Avoid coadministration of halogenated anesthetics and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Both hydroxychloroquine and halogenated anesthetics can prolong the QT interval. [28457] [28458] [28754] [28755] [28756] [41806] [65157] [65170]

Desipramine: (Major) Avoid coadministration of tricyclic antidepressants and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tricyclic antidepressants (TCAs) share pharmacologic properties similar to the Class IA antiarrhythmic agents and may prolong the QT interval, particularly in overdose or with higher-dose prescription therapy (elevated serum concentrations). [28225] [28415] [28416] [41806] [65157] [65170]

[Deutetrabenazine](#): (Major) Avoid coadministration of deutetrabenazine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. For patients taking a deutetrabenazine dosage more than 24 mg/day, assess the QTc interval before and after increasing the deutetrabenazine dosage or other medications that prolong the QTc interval. Hydroxychloroquine prolongs the QT interval. Clinically relevant QTc prolongation may occur with deutetrabenazine. [41806] [61845] [65157] [65170]

[Dextromethorphan](#); [Promethazine](#): (Major) Avoid coadministration of promethazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Promethazine, a phenothiazine, is associated with a possible risk for QT prolongation. [28225] [41806] [55578] [65157] [65170]

[Dextromethorphan](#); [Quinidine](#): (Major) Avoid coadministration of quinidine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Quinidine administration is associated with QT prolongation and torsade de pointes (TdP). [41806] [42280] [47357] [65157] [65170]

[Diazepam](#): (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as diazepam. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

[Digoxin](#): (Moderate) Monitor serum digoxin concentrations in patients receiving digoxin and hydroxychloroquine as coadministration may result in increased serum digoxin concentrations. [41806]

[Dipeptidyl Peptidase-4 Inhibitors](#): (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

[Disopyramide](#): (Major) Avoid coadministration of disopyramide and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Disopyramide administration is also associated with QT prolongation and torsade de pointes (TdP). [28228] [41806] [65157] [65170]

[Dofetilide](#): (Major) Avoid coadministration of dofetilide and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Dofetilide, a Class III antiarrhythmic agent, is associated with a well-established risk of QT prolongation and torsade de pointes (TdP). Hydroxychloroquine also prolongs the QT interval. [28221] [28432] [28457] [41806] [65157] [65170]

[Dolasetron](#): (Major) Avoid coadministration of dolasetron and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Dolasetron has been associated with a dose-dependent prolongation in the QT, PR, and QRS intervals on an electrocardiogram. [41806] [42844] [65157] [65170]

[Dolutegravir](#); [Rilpivirine](#): (Major) Avoid coadministration of rilpivirine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT

interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Supratherapeutic doses of rilpivirine (75 to 300 mg/day) have caused QT prolongation. [41806] [44376] [65157] [65170]

Donepezil: (Major) Avoid coadministration of donepezil and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Case reports indicate that QT prolongation and torsade de pointes (TdP) can occur during donepezil therapy. [41806] [59321] [59322] [65157] [65170]

Donepezil; Memantine: (Major) Avoid coadministration of donepezil and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Case reports indicate that QT prolongation and torsade de pointes (TdP) can occur during donepezil therapy. [41806] [59321] [59322] [65157] [65170]

Doxepin: (Major) Avoid coadministration of tricyclic antidepressants and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tricyclic antidepressants (TCAs) share pharmacologic properties similar to the Class IA antiarrhythmic agents and may prolong the QT interval, particularly in overdose or with higher-dose prescription therapy (elevated serum concentrations). [28225] [28415] [28416] [41806] [65157] [65170]

Dronedarone: (Severe) Coadministration of dronedarone and hydroxychloroquine is contraindicated due to the risk of increased QT prolongation. Hydroxychloroquine prolongs the QT interval. Dronedarone administration is associated with a dose-related increase in the QTc interval. The increase in QTc is approximately 10 milliseconds at doses of 400 mg twice daily (the FDA-approved dose) and up to 25 milliseconds at doses of 1600 mg twice daily. Although there are no studies examining the effects of dronedarone in patients receiving other QT prolonging drugs, coadministration of such drugs may result in additive QT prolongation. [36101] [41806]

Droperidol: (Major) Avoid coadministration of droperidol and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Initiate droperidol at a low dose and increase the dose as needed to achieve the desired effect. Hydroxychloroquine prolongs the QT interval. Droperidol administration is associated with an established risk for QT prolongation and torsade de pointes (TdP). [28235] [28236] [28737] [41806] [51289] [65157] [65170]

Dulaglutide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the incretin mimetics, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Edoxaban: (Moderate) Use caution if hydroxychloroquine is coadministered with edoxaban due to the potential for increased edoxaban exposure which may increase the risk of bleeding. Edoxaban is a P-gp substrate; limited data suggests that hydroxychloroquine is a P-gp inhibitor. [58685] [65210]

Efavirenz: (Major) Avoid coadministration of efavirenz and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte

imbalances. Hydroxychloroquine prolongs the QT interval. QTc prolongation has been observed with the use of efavirenz. [28442] [41806] [65157] [65170]

Efavirenz; Emtricitabine; Tenofovir: (Major) Avoid coadministration of efavirenz and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. QTc prolongation has been observed with the use of efavirenz. [28442] [41806] [65157] [65170]

Efavirenz; Lamivudine; Tenofovir Disoproxil Fumarate: (Major) Avoid coadministration of efavirenz and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. QTc prolongation has been observed with the use of efavirenz. [28442] [41806] [65157] [65170]

Eliglustat: (Major) Avoid coadministration of eliglustat and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Eliglustat is predicted to cause PR, QRS, and/or QT prolongation at significantly elevated plasma concentrations. [41806] [57803] [65157] [65170]

Empagliflozin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Empagliflozin; Linagliptin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Empagliflozin; Linagliptin; Metformin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Empagliflozin; Metformin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Emtricitabine; Rilpivirine; Tenofovir alafenamide: (Major) Avoid coadministration of rilpivirine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Supratherapeutic doses of rilpivirine (75 to 300 mg/day) have caused QT prolongation. [41806] [44376] [65157] [65170]

Emtricitabine; Rilpivirine; Tenofovir disoproxil fumarate: (Major) Avoid coadministration of rilpivirine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Supratherapeutic doses of rilpivirine (75 to 300 mg/day) have caused QT prolongation. [41806] [44376] [65157] [65170]

Encorafenib: (Major) Avoid coadministration of encorafenib and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Encorafenib is associated with dose-dependent prolongation of the QT interval. [41806] [63317] [65157] [65170]

Enflurane: (Major) Avoid coadministration of halogenated anesthetics and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Both hydroxychloroquine and halogenated anesthetics can prolong the QT interval. [28457] [28458] [28754] [28755] [28756] [41806] [65157] [65170]

Entrectinib: (Major) Avoid coadministration of entrectinib and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Entrectinib has also been associated with QT prolongation. [41806] [64567] [65157] [65170]

Eribulin: (Major) Avoid coadministration of eribulin and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Both hydroxychloroquine and eribulin have been associated with QT prolongation. [41806] [42449] [65157] [65170]

Ertugliflozin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Ertugliflozin; Metformin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Ertugliflozin; Sitagliptin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful

monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Erythromycin: (Major) Avoid coadministration of erythromycin and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Erythromycin is associated with QT prolongation and torsade de pointes (TdP). [41806] [43258] [65157] [65170]

Erythromycin; Sulfoxazole: (Major) Avoid coadministration of erythromycin and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Erythromycin is associated with QT prolongation and torsade de pointes (TdP). [41806] [43258] [65157] [65170]

Escitalopram: (Major) Avoid coadministration of escitalopram and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Escitalopram has been associated with a risk of QT prolongation and torsade de pointes (TdP). [28270] [41806] [65157] [65170]

Eslicarbazepine: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as eslicarbazepine. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Ethosuximide: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as ethosuximide. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Ethotoin: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as ethotoin. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Exenatide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the incretin mimetics, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Ezogabine: (Major) Avoid coadministration of ezogabine and hydroxychloroquine due to the risk of increased QT prolongation and seizures. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine and ezogabine have both been associated with QT prolongation. Additionally, hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806] [44800] [65157] [65170]

Felbamate: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as felbamate. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Fingolimod: (Major) Avoid coadministration of fingolimod and hydroxychloroquine due to the risk of increased QT prolongation. If coadministration cannot be avoided, overnight monitoring with continuous ECG in a medical facility is advised after the first fingolimod dose for patients taking QT prolonging drugs with a known risk of torsade de pointes (TdP). Also, avoid any non-essential QT prolonging drugs and correct electrolyte

imbalances. Monitor ECG throughout therapy. Hydroxychloroquine prolongs the QT interval. Fingolimod initiation results in decreased heart rate and may prolong the QT interval. Fingolimod has not been studied in patients treated with drugs that prolong the QT interval, but drugs that prolong the QT interval have been associated with cases of TdP in patients with bradycardia. [41806] [41823] [65157] [65170]

Flecainide: (Major) Avoid coadministration of flecainide and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Flecainide is a Class IC antiarrhythmic associated with a possible risk for QT prolongation and/or TdP; flecainide increases the QT interval, but largely due to prolongation of the QRS interval. Although causality for TdP has not been established for flecainide, patients receiving concurrent drugs which have the potential for QT prolongation may have an increased risk of developing proarrhythmias. Hydroxychloroquine also prolongs the QT interval. [23774] [28752] [41806] [65157] [65170]

Fluconazole: (Major) Avoid coadministration of fluconazole and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Fluconazole has been associated with QT prolongation and rare cases of torsade de pointes (TdP). [28674] [41806] [65157] [65170]

Fluoxetine: (Major) Avoid coadministration of fluoxetine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. QT prolongation and torsade de pointes (TdP) have been reported in patients treated with fluoxetine. [32127] [41806] [65157] [65170]

Fluoxetine; Olanzapine: (Major) Avoid coadministration of fluoxetine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. QT prolongation and torsade de pointes (TdP) have been reported in patients treated with fluoxetine. [32127] [41806] [65157] [65170] (Major) Avoid coadministration of olanzapine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Limited data, including some case reports, suggest that olanzapine may be associated with a significant prolongation of the QTc interval. [28785] [32732] [32734] [32745] [32746] [41806] [65157] [65170]

Fluphenazine: (Major) Avoid coadministration of fluphenazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Fluphenazine is associated with a possible risk for QT prolongation. [28514] [41806] [65157] [65170]

Fluticasone; Salmeterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Fluticasone; Umeclidinium; Vilanterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at

baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Fluticasone; Vilanterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Fluvoxamine: (Major) Avoid coadministration of fluvoxamine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Cases of QT prolongation and torsade de pointes (TdP) have been reported during postmarketing use of fluvoxamine. [41806] [50507] [65157] [65170]

Formoterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Formoterol; Mometasone: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Foscarnet: (Major) Avoid coadministration of foscarnet and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Foscarnet has been associated with postmarketing reports of both QT prolongation and torsade de pointes (TdP). [28377] [41806] [65157] [65170]

Fosphenytoin: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as fosphenytoin. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Gabapentin: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as gabapentin. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Gemifloxacin: (Major) Avoid coadministration of gemifloxacin and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Gemifloxacin may prolong the QT interval in some patients. The maximal change in the QTc interval occurs approximately 5 to 10 hours following oral administration of gemifloxacin. The likelihood of QTc prolongation may increase with increasing dose of the drug; therefore, the recommended dose should not be exceeded especially in patients with renal or hepatic impairment where the Cmax and AUC are slightly higher. [28424] [28432] [28457] [29833] [33144] [33145] [33146] [41806] [48869] [49971] [65157] [65170]

Gemptuzumab Ozogamicin: (Major) Avoid coadministration of gemptuzumab and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Although QT interval prolongation has not been reported with gemptuzumab ozogamicin, it has been reported with other drugs that contain calicheamicin. [41806] [62292] [65157] [65170]

Gilteritinib: (Major) Avoid coadministration of gilteritinib and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Both drugs have been associated with QT prolongation. [41806] [63787] [65157] [65170]

Glasdegib: (Major) Avoid coadministration of glasdegib and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Glasdegib therapy may result in QT prolongation and ventricular arrhythmias including ventricular fibrillation and ventricular tachycardia. [41806] [63777] [65157] [65170]

Glimepiride: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including sulfonylureas, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Glimepiride; Pioglitazone: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including sulfonylureas, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the thiazolidinediones, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Glimepiride; Rosiglitazone: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including sulfonylureas, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the thiazolidinediones, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Glipizide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including sulfonylureas, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Glipizide; Metformin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including sulfonylureas, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Glyburide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including sulfonylureas, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Glyburide; Metformin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including sulfonylureas, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Glycopyrrolate; Formoterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Goserelin: (Major) Avoid coadministration of goserelin and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Androgen deprivation therapy (e.g., goserelin) also may prolong the QT/QTc interval. [28592] [41806] [65157] [65170]

Gransetron: (Major) Avoid coadministration of granisetron and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Both drugs have been associated with QT prolongation. [31723] [41806] [65157] [65170]

Halogenated Anesthetics: (Major) Avoid coadministration of halogenated anesthetics and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Both hydroxychloroquine and halogenated anesthetics can prolong the QT interval. [28457] [28458] [28754] [28755] [28756] [41806] [65157] [65170]

Haloperidol: (Major) Avoid coadministration of haloperidol and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. QT prolongation and torsade de pointes (TdP) have been observed during haloperidol treatment. Excessive doses (particularly in the overdose setting) or IV administration of haloperidol may be associated with a higher risk of QT prolongation. [23500] [23779] [28225] [28307] [28415] [28416] [41806] [65157] [65170]

Halothane: (Major) Avoid coadministration of halogenated anesthetics and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Both hydroxychloroquine and halogenated anesthetics can prolong the QT interval. [28457] [28458] [28754] [28755] [28756] [41806] [65157] [65170]

Histrelin: (Major) Avoid coadministration of histrelin and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Androgen deprivation therapy (e.g., histrelin) also may prolong the QT/QTC interval. [30369] [41806] [65157] [65170]

Hydroxyzine: (Major) Avoid coadministration of hydroxyzine and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Postmarketing data indicate that hydroxyzine causes QT prolongation and torsade de pointes (TdP). [41806] [47129] [65157] [65170]

Ibutilide: (Major) Avoid coadministration of ibutilide and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Ibutilide administration can cause QT prolongation and torsade de pointes (TdP). [41806] [41830] [65157] [65170]

Iloperidone: (Major) Avoid coadministration of iloperidone and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine and iloperidone have been associated with QT prolongation. [36146] [41806] [65157] [65170]

Imipramine: (Major) Avoid coadministration of tricyclic antidepressants and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tricyclic antidepressants (TCAs) share pharmacologic properties similar to the Class IA antiarrhythmic agents and may prolong the QT interval, particularly in overdose or with higher-dose prescription therapy (elevated serum concentrations). [28225] [28415] [28416] [41806] [65157] [65170]

Incretin Mimetics: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the incretin mimetics, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Indacaterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Indacaterol; Glycopyrrolate: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-

essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Inotuzumab Ozogamicin: (Major) Avoid coadministration of inotuzumab and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Both inotuzumab and hydroxychloroquine have been associated with QT prolongation. [41806] [62245] [65157] [65170]

Insulin Aspart: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Insulin Aspart; Insulin Aspart Protamine: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Insulin Degludec: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Insulin Degludec; Liraglutide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the incretin mimetics, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Insulin Detemir: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Insulin Glargine: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Insulin Glargine; Lixisenatide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the incretin mimetics, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Insulin Glulisine: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Insulin Lispro: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Insulin Lispro; Insulin Lispro Protamine: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Insulin, Inhaled: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Insulins: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Isoflurane: (Major) Avoid coadministration of halogenated anesthetics and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Both hydroxychloroquine and halogenated anesthetics can prolong the QT interval. [28457] [28458] [28754] [28755] [28756] [41806] [65157] [65170]

Isophane Insulin (NPH): (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Itraconazole: (Major) Avoid coadministration of itraconazole and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine and itraconazole have been associated with prolongation of the QT interval. [40233] [41806] [57441] [65157] [65170]

Ivosidenib: (Major) Avoid coadministration of ivosidenib and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Dose reduce or interrupt ivosidenib therapy if QT prolongation occurs. Prolongation of the QTc interval and ventricular arrhythmias have been reported in patients treated with ivosidenib. Hydroxychloroquine also prolongs the QT interval. [41806] [63368] [65157] [65170]

Ketoconazole: (Major) Avoid coadministration of ketoconazole and hydroxychloroquine due to the increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Ketoconazole and hydroxychloroquine have been associated with prolongation of the QT interval. [27982] [41806] [65157] [65170]

Lacosamide: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as lacosamide. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Lamotrigine: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as lamotrigine. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Lanthanum Carbonate: (Major) Oral compounds known to interact with antacids, like hydroxychloroquine, may interact with lanthanum carbonate. Hydroxychloroquine absorption may be reduced by antacids as has been observed with the structurally similar chloroquine. Administer hydroxychloroquine and lanthanum carbonate at least 4 hours apart. Of note, a study demonstrated no significant difference in hydroxychloroquine serum concentration in patients taking concomitant antacids (n = 14) compared to those not taking antacids (n = 495). [30284] [30285] [41806] [44406] [61758]

Lapatinib: (Major) Avoid coadministration of lapatinib and hydroxychloroquine due to the increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Lapatinib has also been associated with concentration-dependent QT prolongation; ventricular arrhythmias and torsade de pointes (TdP) have been reported in postmarketing experience with lapatinib. [33192] [41806] [65157] [65170]

Lefamulin: (Major) Avoid coadministration of lefamulin and hydroxychloroquine due to the increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Lefamulin has a concentration dependent QTc prolongation effect. The pharmacodynamic interaction potential to prolong the QT interval of the electrocardiogram between lefamulin and other drugs that effect cardiac conduction is unknown. [41806] [64576] [65157] [65170]

Lente Insulin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Lenvatinib: (Major) Avoid coadministration of lenvatinib and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine and lenvatinib are both associated with QT prolongation. [41806] [58782] [65157] [65170]

Leuprolide: (Major) Avoid coadministration of leuprolide and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Androgen deprivation therapy (e.g., leuprolide) also may prolong the QT/QTc interval. [41806] [43800] [65157] [65170]

Leuprolide; Norethindrone: (Major) Avoid coadministration of leuprolide and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Androgen deprivation therapy (e.g., leuprolide) also may prolong the QT/QTc interval. [41806] [43800] [65157] [65170]

Levalbuterol: (Major) Avoid coadministration of short-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT

interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [33925] [41806] [49951] [51793] [59321] [65157] [65170]

Levetiracetam: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as levetiracetam. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Levofloxacin: (Major) Avoid coadministration of levofloxacin and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Levofloxacin has been associated with a risk of QT prolongation and torsade de pointes (TdP). Although extremely rare, TdP has been reported during postmarketing surveillance of levofloxacin. [28421] [28432] [28457] [29758] [29833] [33144] [33145] [33146] [41806] [48869] [48871] [61195] [63729] [65157] [65170]

Linagliptin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Linagliptin; Metformin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Liraglutide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the incretin mimetics, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Lithium: (Major) Avoid coadministration of lithium and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine and lithium have both been associated with QT prolongation. [41806] [59809] [59810] [59811] [65157] [65170]

Lixisenatide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the incretin mimetics, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Lofexidine: (Major) Avoid coadministration of lofexidine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Lofexidine may prolong the QT interval, and torsade de pointes (TdP) has been reported during postmarketing use. [41806] [63161] [65157] [65170]

[Long-acting beta-agonists](#): (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

[Loperamide](#): (Major) Avoid coadministration of loperamide and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. At high doses, loperamide has been associated with serious cardiac toxicities, including syncope, ventricular tachycardia, QT prolongation, torsade de pointes (TdP), and cardiac arrest. [29396] [30106] [41806] [60864] [65157] [65170]

[Loperamide; Simethicone](#): (Major) Avoid coadministration of loperamide and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. At high doses, loperamide has been associated with serious cardiac toxicities, including syncope, ventricular tachycardia, QT prolongation, torsade de pointes (TdP), and cardiac arrest. [29396] [30106] [41806] [60864] [65157] [65170]

[Lopinavir; Ritonavir](#): (Major) Avoid coadministration of hydroxychloroquine and lopinavir due the risk of additive QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Lopinavir is also associated with QT prolongation. [28341] [41806] [65157] [65170]

[Lorazepam](#): (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as lorazepam. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

[Macimorelin](#): (Major) Avoid coadministration of macimorelin and hydroxychloroquine due to an increased risk of QT prolongation and torsade de pointes-type ventricular tachycardia. Sufficient washout time of drugs that are known to prolong the QT interval prior to administration of macimorelin is recommended. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Treatment with macimorelin has been associated with an increase in the corrected QT (QTc) interval. Hydroxychloroquine prolongs the QT interval. [41806] [62723] [65157] [65170]

[Maprotiline](#): (Major) Avoid coadministration of maprotiline and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Maprotiline has been reported to prolong the QT interval, particularly in overdose or with higher-dose prescription therapy (elevated serum concentrations). Cases of long QT syndrome and torsade de pointes (TdP) tachycardia have been described with maprotiline use, but rarely occur when the drug is used alone in normal prescribed doses and in the absence of other known risk factors for QT prolongation. Limited data are available regarding the safety of maprotiline in combination with other QT-prolonging drugs. [28225] [28759] [41806] [65157] [65170]

[Mefloquine](#): (Major) Avoid coadministration of hydroxychloroquine with mefloquine due to an increased risk of QT prolongation and seizures. These drugs are both analogs of quinine. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT

interval. There is evidence that the use of halofantrine after mefloquine causes a significant lengthening of the QTc interval. Mefloquine alone has not been reported to cause QT prolongation. Also, both drugs may lower the seizure threshold. [28301] [41806] [65157] [65170]

Meglitinides: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the meglitinides, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Meperidine; Promethazine: (Major) Avoid coadministration of promethazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Promethazine, a phenothiazine, is associated with a possible risk for QT prolongation. [28225] [41806] [55578] [65157] [65170]

Mephobarbital: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as mephobarbital. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Metaproterenol: (Major) Avoid coadministration of short-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [33925] [41806] [49951] [51793] [59321] [65157] [65170]

Metformin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Metformin; Pioglitazone: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the thiazolidinediones, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Metformin; Repaglinide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the meglitinides, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Metformin; Rosiglitazone: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the thiazolidinediones, are

coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Metformin; Saxagliptin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Metformin; Sitagliptin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including metformin, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806] (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Methadone: (Major) Avoid coadministration of methadone and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Methadone is considered to be associated with an increased risk for QT prolongation and TdP, especially at higher doses (more than 200 mg/day but averaging approximately 400 mg/day in adult patients). Most cases involve patients being treated for pain with large, multiple daily doses of methadone, although cases have been reported in patients receiving doses commonly used for maintenance treatment of opioid addiction. [28319] [28320] [28321] [28322] [33136] [41806] [65157] [65170]

Methotrexate: (Moderate) Concomitant use of hydroxychloroquine may increase the risk of adverse effects with methotrexate. In a small study, the methotrexate AUC was increased when administered with hydroxychloroquine. [31335] [56263]

Methsuximide: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as methsuximide. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Metronidazole: (Major) Avoid coadministration of metronidazole and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Potential QT prolongation has been reported in limited case reports with metronidazole. [41806] [57377] [57378] [65157] [65170]

Midostaurin: (Major) Avoid coadministration of midostaurin and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. In clinical trials, QT prolongation has been reported in patients who received midostaurin. [41806] [61906] [65157] [65170]

Mifepristone: (Major) Avoid coadministration of mifepristone and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Mifepristone has been associated with dose-dependent prolongation of the QT interval. [41806] [48697] [65157] [65170]

Miglitol: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the alpha-glucosidase inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Mirtazapine: (Major) Avoid coadministration of mirtazapine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Cases of QT prolongation, torsade de pointes (TdP), ventricular tachycardia, and sudden death have been reported during postmarketing use of mirtazapine, primarily following overdose or in patients with other risk factors for QT prolongation. [40942] [41806] [65157] [65170]

Moxifloxacin: (Major) Avoid coadministration of moxifloxacin and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Quinolones have been associated with a risk of QT prolongation and torsade de pointes (TdP). Although extremely rare, TdP has been reported during postmarketing surveillance of moxifloxacin. These reports generally involved patients with concurrent medical conditions or concomitant medications that may have been contributory. [28423] [28432] [28457] [29833] [33144] [33145] [33146] [41806] [48869] [48871] [65157] [65170]

Nateglinide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the meglitinides, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Nilotinib: (Major) Avoid coadministration of nilotinib and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Sudden death and QT prolongation have been reported in patients who received nilotinib therapy. [41806] [58766] [65157] [65170]

Norfloxacin: (Major) Avoid coadministration of norfloxacin and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, perform an ECG at baseline and monitor closely throughout therapy. Hydroxychloroquine prolongs the QT interval. Quinolones have been associated with a risk of QT prolongation and torsade de pointes (TdP). Although extremely rare, torsade de pointes has been reported during postmarketing surveillance of norfloxacin. These reports generally involved patients with concurrent medical conditions or concomitant medications that may have been contributory. Norfloxacin should be used cautiously with other agents that may prolong the QT interval or increase the risk of TdP. [29818] [41806] [65157] [65170]

Nortriptyline: (Major) Avoid coadministration of tricyclic antidepressants and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tricyclic antidepressants (TCAs) share pharmacologic properties similar to the Class IA antiarrhythmic agents and may prolong the QT interval, particularly in overdose or with higher-dose prescription therapy (elevated serum concentrations). [28225] [28415] [28416] [41806] [65157] [65170]

Octreotide: (Major) Avoid coadministration of octreotide and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Arrhythmias, sinus bradycardia, and conduction disturbances have occurred during octreotide therapy. Since bradycardia is a risk factor for development of torsade de pointes (TdP), the potential occurrence of bradycardia during octreotide administration could

theoretically increase the risk of TdP in patients receiving drugs that prolong the QT interval. [28432] [29113] [30624] [41806] [65157] [65170]

Ofloxacin: (Major) Avoid coadministration of ofloxacin and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Quinolones have been associated with a risk of QT prolongation and torsade de pointes (TdP). Although extremely rare, torsade de pointes has been reported during postmarketing surveillance of ofloxacin. These reports generally involved patients with concurrent medical conditions or concomitant medications that may have been contributory. [28432] [28457] [29833] [30738] [33144] [33145] [33146] [41806] [48869] [48871] [65157] [65170]

Olanzapine: (Major) Avoid coadministration of olanzapine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Limited data, including some case reports, suggest that olanzapine may be associated with a significant prolongation of the QTc interval. [28785] [32732] [32734] [32745] [32746] [41806] [65157] [65170]

Oladaterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Omeprazole; Sodium Bicarbonate: (Major) Hydroxychloroquine absorption may be reduced by antacids as has been observed with the structurally similar chloroquine. Administer hydroxychloroquine and antacids at least 4 hours apart. Of note, a study demonstrated no significant difference in hydroxychloroquine serum concentration in patients taking concomitant antacids (n = 14) compared to those not taking antacids (n = 495). [30284] [30285] [41806] [61758]

Ondansetron: (Major) Avoid coadministration of ondansetron and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Ondansetron has been associated with a dose-related increase in the QT interval and postmarketing reports of torsade de pointes (TdP). [31266] [41806] [65157] [65170]

Osilodrostat: (Major) Avoid coadministration of osilodrostat and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Osilodrostat is associated with dose-dependent QT prolongation. [41806] [65098] [65157] [65170]

Osimertinib: (Major) Avoid coadministration of osimertinib and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. An interruption of osimertinib therapy with dose reduction or discontinuation may be necessary if QT prolongation occurs. Concentration-dependent QTc prolongation occurred during clinical trials of osimertinib. Hydroxychloroquine prolongs the QT interval. [41806] [60297] [65157] [65170]

Oxaliplatin: (Major) Avoid coadministration of oxaliplatin and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. QT prolongation and ventricular arrhythmias including fatal torsade de pointes (TdP) have been reported with oxaliplatin use in postmarketing experience. Hydroxychloroquine prolongs the QT interval. [41806] [41958] [65157] [65170]

Paliperidone: (Major) Avoid coadministration of paliperidone and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Paliperidone has been associated with QT prolongation; Torsade de pointes (TdP) and ventricular fibrillation have been reported in the setting of overdose. [40936] [41806] [65157] [65170]

Panobinostat: (Major) Avoid coadministration of panobinostat and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. QT prolongation has also been reported with panobinostat. [41806] [58821] [65157] [65170]

Pasireotide: (Major) Avoid coadministration of pasireotide and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. QT prolongation has occurred with pasireotide at therapeutic and supra-therapeutic doses. [41806] [52611] [65157] [65170]

Pazopanib: (Major) Avoid coadministration of pazopanib and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine and pazopanib both prolong the QT interval. [37098] [41806] [65157] [65170]

Penicillamine: (Major) Do not use penicillamine concurrently with antimalarials due to an increased risk of severe hematologic and renal adverse reactions. [28834]

Pentamidine: (Major) Avoid coadministration of pentamidine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Systemic pentamidine has been associated with QT prolongation. [23620] [23778] [28419] [28879] [41806] [65157] [65170]

Pentobarbital: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as pentobarbital. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Perampanel: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as perampanel. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Perphenazine: (Major) Avoid coadministration of perphenazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Perphenazine is associated with a possible risk for QT prolongation. [28514] [41806] [65157] [65170]

Perphenazine; Amitriptyline: (Major) Avoid coadministration of perphenazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Perphenazine is associated with a possible risk for QT prolongation. [28514] [41806] [65157] [65170] (Major) Avoid coadministration of tricyclic antidepressants and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances.

Hydroxychloroquine prolongs the QT interval. Tricyclic antidepressants (TCAs) share pharmacologic properties similar to the Class IA antiarrhythmic agents and may prolong the QT interval, particularly in overdose or with higher-dose prescription therapy (elevated serum concentrations). [28225] [28415] [28416] [41806] [65157] [65170]

Phenobarbital: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as phenobarbital. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. Additionally, coadministration of phenobarbital may decrease exposure of hydroxychloroquine resulting in decreased efficacy. [41806] [65210]

Phentermine; Topiramate: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as topiramate. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Phenylephrine; Promethazine: (Major) Avoid coadministration of promethazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Promethazine, a phenothiazine, is associated with a possible risk for QT prolongation. [28225] [41806] [55578] [65157] [65170]

Phenytoin: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as phenytoin. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. Additionally, coadministration of phenytoin may decrease exposure of hydroxychloroquine resulting in decreased efficacy. [41806] [65210]

Pimavanserin: (Major) Avoid coadministration of pimavanserin and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine and pimavanserin both prolong the QT interval. [41806] [60748] [65157] [65170]

Pimozide: (Severe) Coadministration of pimozide and hydroxychloroquine is contraindicated due to an increased risk of QT prolongation. Hydroxychloroquine prolongs the QT interval. Pimozide is associated with a well-established risk of QT prolongation and torsade de pointes (TdP). [28225] [41806] [43463]

Pioglitazone: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the thiazolidinediones, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Pirbuterol: (Major) Avoid coadministration of short-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [33925] [41806] [49951] [51793] [59321] [65157] [65170]

Pitolisant: (Major) Avoid coadministration of pitolisant and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Both pitolisant and hydroxychloroquine prolong the QT interval. [41806] [64562] [65157] [65170]

Posaconazole: (Major) Avoid coadministration of posaconazole and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Posaconazole has been associated with prolongation of the QT interval as well as rare cases of torsade de pointes. [32723] [41806] [65157] [65170]

Pramlintide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including pramlintide, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Praziquantel: (Minor) Hydroxychloroquine may reduce praziquantel bioavailability and maximum serum concentrations as was observed with the structurally similar chloroquine. The mechanism of the interaction is not certain. Clinicians should be alert to the possibility of praziquantel failure if hydroxychloroquine is used. [27846] [41806]

Pregabalin: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as pregabalin. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Primaquine: (Major) Avoid coadministration of primaquine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Primaquine is associated with the potential for QT prolongation. [41806] [41984] [65157] [65170]

Primidone: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as primidone. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Procainamide: (Major) Avoid coadministration of procainamide and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Procainamide is associated with a well-established risk of QT prolongation and torsade de pointes (TdP). [28250] [41806] [65157] [65170]

Prochlorperazine: (Major) Avoid coadministration of prochlorperazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Prochlorperazine is associated with a possible risk for QT prolongation. Theoretically, prochlorperazine may increase the risk of QT prolongation if coadministered with other drugs that have a risk of QT prolongation. [28514] [41806] [65157] [65170]

Promethazine: (Major) Avoid coadministration of promethazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Promethazine, a phenothiazine, is associated with a possible risk for QT prolongation. [28225] [41806] [55578] [65157] [65170]

Propafenone: (Major) Avoid coadministration of propafenone and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Propafenone is a Class IC antiarrhythmic which increases the QT interval, but largely due to prolongation of the QRS interval. [28287] [41806] [65157] [65170]

Protriptyline: (Major) Avoid coadministration of tricyclic antidepressants and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tricyclic antidepressants (TCAs) share pharmacologic properties similar to the Class IA antiarrhythmic agents and may prolong the QT interval, particularly in overdose or with higher-dose prescription therapy (elevated serum concentrations). [28225] [28415] [28416] [41806] [65157] [65170]

Quetiapine: (Major) Avoid coadministration of quetiapine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Limited data, including some case reports, suggest that quetiapine may be associated with a significant prolongation of the QTc interval in rare instances. [29118] [33068] [33072] [33074] [41806] [65157] [65170]

Quinidine: (Major) Avoid coadministration of quinidine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Quinidine administration is associated with QT prolongation and torsade de pointes (TdP). [41806] [42280] [47357] [65157] [65170]

Quinine: (Major) Avoid coadministration of quinine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Quinine has been associated with QT prolongation and rare cases of torsade de pointes (TdP). [31403] [41806] [65157] [65170]

Rabies Vaccine: (Major) If administered concurrently, antimalarials can impair the immunologic response to the rabies vaccine, thereby, decreasing its protective effect. If possible, administration of antimalarials should be avoided during use of the rabies vaccine for postexposure prophylaxis. When antimalarials must be administered to persons also receiving the rabies vaccine for postexposure prophylaxis, a serum rabies antibody titer should be obtained on day 14 (day of the 4th vaccination) to ensure an acceptable antibody response has been induced. [40848] [40849]

Ranolazine: (Major) Avoid coadministration of ranolazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Ranolazine is associated with dose- and plasma concentration-related increases in the QTc interval. [31938] [41806] [65157] [65170]

Regular Insulin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Regular Insulin; Isophane Insulin (NPH): (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of

the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Repaglinide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the meglitinides, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Ribociclib: (Major) Avoid coadministration of ribociclib and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Ribociclib has been shown to prolong the QT interval in a concentration-dependent manner. [41806] [61816] [65157] [65170]

Ribociclib; Letrozole: (Major) Avoid coadministration of ribociclib and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Ribociclib has been shown to prolong the QT interval in a concentration-dependent manner. [41806] [61816] [65157] [65170]

Rilpivirine: (Major) Avoid coadministration of rilpivirine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Supratherapeutic doses of rilpivirine (75 to 300 mg/day) have caused QT prolongation. [41806] [44376] [65157] [65170]

Risperidone: (Major) Avoid coadministration of risperidone and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Risperidone has been associated with a possible risk for QT prolongation and/or torsade de points (TdP), primarily in the overdose setting. [22256] [28225] [28414] [28416] [41806] [65157] [65170]

Rituximab: (Moderate) The concomitant use of rituximab with other disease modifying anti-rheumatic drugs (DMARDs), such as hydroxychloroquine, may result in an increased risk of infection. Hydroxychloroquine itself does not increase immunosuppression or infection risk, but, is often used in DMARD regimens where infection risk is increased. Monitor patients closely for signs or symptoms of infection. [41806] [49773] [56233]

Rituximab; Hyaluronidase: (Moderate) The concomitant use of rituximab with other disease modifying anti-rheumatic drugs (DMARDs), such as hydroxychloroquine, may result in an increased risk of infection. Hydroxychloroquine itself does not increase immunosuppression or infection risk, but, is often used in DMARD regimens where infection risk is increased. Monitor patients closely for signs or symptoms of infection. [41806] [49773] [56233]

Romidepsin: (Major) Avoid coadministration of romidepsin and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Romidepsin has been reported to prolong the QT interval. [37292] [41806] [65157] [65170]

Rosiglitazone: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the thiazolidinediones, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Rufinamide: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as rufinamide. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Salmeterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Saquinavir: (Major) Avoid coadministration of saquinavir and hydroxychloroquine due to an increased risk of QT prolongation. If no acceptable alternative therapy is available, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Saquinavir boosted with ritonavir increases the QT interval in a dose-dependent fashion, which may increase the risk for serious arrhythmias such as torsade de pointes (TdP). Hydroxychloroquine prolongs the QT interval. [28995] [41806] [65157] [65170]

Saxagliptin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Selercatinib: (Major) Avoid coadministration of hydroxychloroquine and selercatinib due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Concentration-dependent QT prolongation has been observed with selercatinib therapy. [41806] [65157] [65170] [65387]

Semaglutide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the incretin mimetics, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Sertraline: (Major) Avoid coadministration of sertraline and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Sertraline's FDA-approved labeling recommends avoiding concomitant use with drugs known to prolong the QTc interval; however, the risk of sertraline-induced QT prolongation is generally considered to be low in clinical practice. Its effect on QTc interval is minimal (typically less than 5 msec), and the drug has been used safely in patients with cardiac disease (e.g., recent myocardial infarction, unstable angina, chronic heart failure). [28343] [41806] [64391] [64392] [64394] [64395] [64396] [65157] [65170]

Sevoflurane: (Major) Avoid coadministration of halogenated anesthetics and hydroxychloroquine due to the risk of increased QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Both hydroxychloroquine and halogenated anesthetics can prolong the QT interval. [28457] [28458] [28754] [28755] [28756] [41806] [65157] [65170]

SGLT2 Inhibitors: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the SGLT2 inhibitors, are coadministered. A decreased dose of the antidiabetic

agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Short-acting beta-agonists: (Major) Avoid coadministration of short-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [33925] [41806] [49951] [51793] [59321] [65157] [65170]

Simvastatin; Sitagliptin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Siponimod: (Major) Avoid coadministration of siponimod and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Siponimod therapy prolonged the QT interval at recommended doses in a clinical study. Hydroxychloroquine prolongs the QT interval. [41806] [64031] [65157] [65170]

Sitagliptin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the dipeptidyl peptidase-4 inhibitors, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Sodium Bicarbonate: (Major) Hydroxychloroquine absorption may be reduced by antacids as has been observed with the structurally similar chloroquine. Administer hydroxychloroquine and antacids at least 4 hours apart. Of note, a study demonstrated no significant difference in hydroxychloroquine serum concentration in patients taking concomitant antacids (n = 14) compared to those not taking antacids (n = 495). [30284] [30285] [41806] [61758]

Solifenacin: (Major) Avoid coadministration of solifenacin and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Solifenacin has been associated with dose-dependent prolongation of the QT interval. Torsade de pointes (TdP) has been reported with postmarketing use, although causality was not determined. [30515] [41806] [65157] [65170]

Sorafenib: (Major) Avoid coadministration of sorafenib and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Interrupt or discontinue sorafenib if QT prolongation occurs. Hydroxychloroquine and sorafenib both prolong the QT interval. [31832] [41806] [65157] [65170]

Sotalol: (Major) Avoid coadministration of sotalol and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Sotalol administration is associated with QT prolongation and torsade de pointes (TdP). Proarrhythmic events should be anticipated after initiation of therapy and after each upward dosage adjustment. [28234] [41806] [65157] [65170]

Sulfonylureas: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including sulfonylureas, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Sunitinib: (Major) Avoid coadministration of sunitinib and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine and sunitinib can prolong the QT interval. [31970] [41806] [65157] [65170]

Tacrolimus: (Major) Avoid coadministration of tacrolimus and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tacrolimus may prolong the QT interval and cause torsade de pointes (TdP). [27954] [28611] [41806] [65157] [65170]

Tamoxifen: (Major) Avoid coadministration of tamoxifen and hydroxychloroquine due to an increased risk of QT prolongation and retinal toxicity. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tamoxifen has been reported to prolong the QT interval, usually in overdose or when used in high doses. Rare case reports of QT prolongation have also been described when tamoxifen is used at lower doses. [41806] [61870] [61871] [61872] [63589] [65157] [65170]

Telavancin: (Major) Avoid coadministration of hydroxychloroquine and telavancin. Hydroxychloroquine increases the QT interval and should not be administered with other drugs known to prolong the QT interval. Ventricular arrhythmias and torsade de pointes have been reported with the use of hydroxychloroquine. Telavancin has been associated with QT prolongation. [36615] [41806]

Telbivudine: (Minor) Monitor patients for signs or symptoms of unexplained muscle pain, tenderness, or weakness during concomitant treatment with hydroxychloroquine and telbivudine. Interrupt telbivudine therapy if myopathy is suspected and discontinue telbivudine if myopathy is confirmed. It is unknown if the risk of myopathy during treatment with telbivudine is increased with coadministration of other drugs associated with myopathy, like hydroxychloroquine. [32827]

Telithromycin: (Major) Avoid coadministration of telithromycin and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Telithromycin is associated with QT prolongation and torsade de pointes (TdP). [28156] [41806] [65157] [65170]

Terbutaline: (Major) Avoid coadministration of short-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [33925] [41806] [49951] [51793] [59321] [65157] [65170]

Tetrabenazine: (Major) Avoid coadministration of tetrabenazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tetrabenazine causes a small increase in the corrected QT interval (QTc). [34389] [41806] [65157] [65170]

Thiazolidinediones: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including the thiazolidinediones, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Thioridazine: (Severe) Coadministration of thioridazine and hydroxychloroquine is contraindicated due to an increased risk of QT prolongation. Hydroxychloroquine prolongs the QT interval. Thioridazine is associated with a well-established risk of QT prolongation and torsade de pointes (TdP). [28225] [28293] [41806]

Tiagabine: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as tiagabine. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Tiotropium; Olodaterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Tolazamide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including sulfonylureas, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Tolbutamide: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including sulfonylureas, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Tolterodine: (Major) Avoid coadministration of tolterodine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tolterodine has been associated with dose-dependent prolongation of the QT interval, especially in poor CYP2D6 metabolizers. [31112] [41806] [65157] [65170]

Topiramate: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as topiramate. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Toremifene: (Major) Avoid coadministration of toremifene and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Toremifene has been shown to prolong the QTc interval in a dose- and concentration-related manner. Hydroxychloroquine prolongs the QT interval. [28822] [41806] [65157] [65170]

Trazodone: (Major) Avoid coadministration of trazodone and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Trazodone can prolong the QT/QTc interval at therapeutic doses. In addition, there are postmarketing reports of torsade de pointes (TdP). [38831] [41806] [65157] [65170]

Tricyclic antidepressants: (Major) Avoid coadministration of tricyclic antidepressants and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tricyclic antidepressants (TCAs) share pharmacologic properties similar to the Class IA antiarrhythmic agents and may prolong the QT interval, particularly in overdose or with higher-dose prescription therapy (elevated serum concentrations). [28225] [28415] [28416] [41806] [65157] [65170]

Trifluoperazine: (Major) Avoid coadministration of trifluoperazine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Trifluoperazine is associated with a possible risk for QT prolongation. [28514] [41806] [65157] [65170]

Trimipramine: (Major) Avoid coadministration of tricyclic antidepressants and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Tricyclic antidepressants (TCAs) share pharmacologic properties similar to the Class IA antiarrhythmic agents and may prolong the QT interval, particularly in overdose or with higher-dose prescription therapy (elevated serum concentrations). [28225] [28415] [28416] [41806] [65157] [65170]

Triptorelin: (Major) Avoid coadministration of triptorelin and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Androgen deprivation therapy (e.g., triptorelin) also may prolong the QT/QTc interval. [41806] [45411] [65157] [65170]

Ultralente Insulin: (Moderate) Careful monitoring of blood glucose is recommended when hydroxychloroquine and antidiabetic agents, including insulins, are coadministered. A decreased dose of the antidiabetic agent may be necessary as severe hypoglycemia has been reported in patients treated concomitantly with hydroxychloroquine and an antidiabetic agent. [41806]

Umeclidinium; Vilanterol: (Major) Avoid coadministration of long-acting beta-agonists and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Beta-agonists may be associated with adverse cardiovascular effects including QT interval prolongation, usually at higher doses, when associated with hypokalemia, or when used with other drugs known to prolong the QT interval. This risk may be more clinically significant with long-acting beta-agonists as compared to short-acting beta-agonists. [28229] [32901] [41231] [41806] [44026] [44063] [44979] [59321] [65157] [65170]

Valproic Acid, Divalproex Sodium: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as valproic acid. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Vandetanib: (Major) Avoid coadministration of vandetanib and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Interrupt or dose reduce vandetanib for QT prolongation. Vandetanib can prolong the QT interval in a concentration-dependent manner; torsade de pointes (TdP) and sudden death have been reported in patients receiving vandetanib. Hydroxychloroquine also prolongs the QT interval. [41806] [43901] [65157] [65170]

Vardenafil: (Major) Avoid coadministration of vardenafil and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine

frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Both therapeutic and supratherapeutic doses of vardenafil produce an increase in QTc interval. [28216] [41806] [65157] [65170]

Vemurafenib: (Major) Avoid coadministration of vemurafenib and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Vemurafenib and hydroxychloroquine have both been associated with QT prolongation. [41806] [45335] [65157] [65170]

Venlafaxine: (Major) Avoid coadministration of venlafaxine and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Venlafaxine administration is associated with a possible risk of QT prolongation; torsade de pointes (TdP) has been reported with postmarketing use. [33715] [41806] [65157] [65170]

Vigabatrin: (Major) Vigabatrin should not be used with hydroxychloroquine, which is associated with serious ophthalmic effects (e.g., retinopathy or glaucoma) unless the benefit of treatment clearly outweighs the risks. Additionally, hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [36250] [41806]

Voriconazole: (Major) Avoid coadministration of voriconazole and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Voriconazole has been associated with QT prolongation and rare cases of torsade de pointes (TdP). [28158] [41806] [65157] [65170]

Vorinostat: (Major) Avoid coadministration of vorinostat and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Vorinostat therapy is also associated with a risk of QT prolongation. [32789] [41806] [65157] [65170]

Ziprasidone: (Major) Avoid coadministration of ziprasidone and hydroxychloroquine due to an increased risk of QT prolongation. If use together is necessary, obtain an ECG at baseline to assess initial QT interval and determine frequency of subsequent ECG monitoring, avoid any non-essential QT prolonging drugs, and correct electrolyte imbalances. Hydroxychloroquine prolongs the QT interval. Clinical trial data indicate that ziprasidone causes QT prolongation; there are postmarketing reports of torsade de pointes (TdP) in patients with multiple confounding factors. [28233] [41806] [65157] [65170]

Zonisamide: (Moderate) Caution is warranted with the coadministration of hydroxychloroquine and antiepileptic drugs, such as zonisamide. Hydroxychloroquine can lower the seizure threshold; therefore, the activity of antiepileptic drugs may be impaired with concomitant use. [41806]

Revision Date: 05/20/2020 02:25:00 AM

References

22256 – Risperdal Consta (risperidone long-acting injection) package insert. Titusville, NJ: Janssen Pharmaceuticals, Inc.; 2020 Jan.

23500 – Wilt JL, Minnema AM, Johnson RF, et al. Torsade de pointes associated with the use of intravenous haloperidol. Ann Intern Med 1993;119:391-4.

23620 – Green PT, Reents S, Harman E, et al. Pentamidine-induced torsades de pointes in a renal transplant recipient with *Pneumocystis carinii* pneumonia. S Med J 1990;83:481-4.

23774 – Lui HK, Lee G, Dietrich P, et al. Flecainide-induced QT prolongation and ventricular tachycardia. Am Heart J 1982;103:567-9.

23778 – Wharton JM, Demopoulos PA, Goldschlager N. Torsade de pointes during administration of pentamidine isethionate. Am J Med 1987;83:571-6.

23779 – Kriwisky M, Perry GY, Tarchitsky D, et al. Haloperidol-induced torsades de pointes. Chest 1990;98:482-3.

27846 – Masimirembwa CM, Naik YS, Hasler JA. The effect of chloroquine on the pharmacokinetics and metabolism of praziquantel in rats and humans. Biopharm Drug Dispos 1994;15:33-43.

27954 – Neupogen (filgrastim, G-CSF) package insert. Thousand Oaks, CA: Amgen Inc.; 2013 Sep.

27982 – Ketoconazole tablets package insert. Morgantown, WV: Mylan Pharmaceuticals, Inc.; 2017 Sept.

28156 – Ketek (telithromycin) package insert. Bridgewater, NJ: Sanofi-Aventis Pharmaceuticals; 2015 Oct.

28158 – VFEND (voriconazole) tablets, suspension, and injection package insert. New York, NY: Pfizer Inc; 2019 Jan.

28216 – Levitra (vardenafil) package insert. Kenilworth, NJ: Schering-Plough; 2017 Aug.

28221 – Tikosyn (dofetilide) package insert. New York, NY: Pfizer Labs; 2019 Aug.

28224 – Cordarone (amiodarone) tablets package insert. Philadelphia, PA: Wyeth Pharmaceuticals Inc.; 2018 Oct.

28225 – CredibleMeds. Drugs to avoid in congenital long QT. Available on the World Wide Web at <http://www.crediblemeds.org>.

28228 – Norpace and Norpace CR (disopyramide) package insert. Chicago, IL: G.D. Searle LLC division of Pfizer Inc; 2016 Aug.

28229 – Demaziere J, Fourcade JM, Busseuil CT, et al. The hazards of chloroquine self prescription in west Africa. J Toxicol Clin Toxicol 1995;33:369-70.

28233 – Geodon (ziprasidone) package insert. New York, NY: Pfizer; 2020 Jan.

28234 – Betapace (sotalol) package insert. Wayne, NJ: Berlex Laboratories; 2011 Aug.

28235 – Richards JR, Schneir AB. Droperidol in the emergency department: is it safe? J Emerg Med 2003;24:441-7.

28236 – Kao LW, Kirk MA, Evers SJ, et al. Droperidol, QT prolongation, and sudden death: what is the evidence? Ann Emerg Med 2003;41:546-58.

28238 – Baxin (clarithromycin) package insert. North Chicago, IL: AbbVie, Inc.; 2019 Sep.

28250 – Procanbid (procainamide) package insert. Bristol, TN: Monarch Pharmaceuticals; 2002 Jan.

28261 – Uroxatral (alfuzosin) package insert. Cary, NC: Covis Pharmaceuticals, Inc.; 2013 Sep.

28262 – Clozaril (clozapine) tablets package insert. Rosemont, PA: HLS Therapeutics (USA), Inc. (Clozaril is a registered trademark of Novartis AG); 2017 Feb.

28269 – Celexa (citalopram) package insert. Irvine, CA: Allergan USA, Inc.; 2019 Jan.

28270 – Lexapro (escitalopram) package insert. Irvine, CA: Allergan USA, Inc.; 2019 Jan.

28287 – Rythmol SR (propafenone hydrochloride) capsule extended release package insert. Research Triangle Park, NC: GlaxoSmithKline; 2018 Nov.

28293 – Thioridazine package insert. Morgantown, WV: Mylan Pharmaceuticals Inc.; 2016 Nov.

28301 – Mefloquine package insert. Princeton, NJ: Sandoz Inc.; 2013 Jul.

28307 – Haldol injection for immediate release (haloperidol) package insert. Titusville, NJ: Janssen Pharmaceuticals, Inc.; 2020 Feb.

28319 – Krantz MJ, Kutinsky IB, Robertson AD, et al. Dose-related effects of methadone on QT prolongation in a series of patients with torsade de pointes. *Pharmacotherapy* 2003;23:802-5.

28320 – Walker PW, Klein D, Kasza L. High dose methadone and ventricular arrhythmias: a report of three cases. *Pain* 2003;103:321-4.

28321 – Kornick CA, Kilborn MJ, Santiago-Palma J, et al. QTc interval prolongation associated with intravenous methadone. *Pain* 2003;105:499-506.

28322 – Gil M, Sala M, Anguera I, et al. QT prolongation and Torsades de Pointes in patients infected with human immunodeficiency virus and treated with methadone. *Am J Cardiol* 2003;92:995-7.

28341 – Kaletra (lopinavir; ritonavir) tablet and solution package insert. North Chicago, IL: AbbVie Inc; 2020 Mar.

28343 – Zoloft (sertraline) package insert. New York, NY: Pfizer; 2019 Apr.

28377 – Foscavir (foscarnet) package insert. Lake Forest, IL: Clinigen Healthcare, Ltd.; 2017 Feb.

28405 – Strattera (atomoxetine) package insert. Indianapolis, IN: Eli Lilly and Company; 2020 Feb.

28414 – Risperdal (risperidone tablets, oral solution, and orally disintegrating tablets) package insert. Titusville, NJ: Janssen Pharmaceuticals, Inc.; 2020 Jan.

28415 – Nora Goldschlager, Andrew E Epstein, Blair P Grubb, et al. Etiologic considerations in the patient with syncope and an apparently normal heart. *Arch Intern Med* 2003;163:151-62.

28416 – Hansten PD, Horn JR. Drug Interactions with Drugs that Increase QTc Intervals. In: The Top 100 Drug Interactions - A Guide to Patient Management. 2007 Edition. Freeland, WA: H&H Publications; 2007:144-8.

28419 – Owens RC Jr. Risk assessment for antimicrobial agent-induced QTc interval prolongation and torsades de pointes. *Pharmacotherapy* 2001;21:301-19.

28421 – Levaquin (levofloxacin) tablet package insert. Titusville, NJ: Janssen Pharmaceutical, Inc.; 2019 Jul.

28423 – Avelox (moxifloxacin) package insert. Whippany, NJ: Bayer HealthCare Pharmaceuticals Inc.; 2020 May.

28424 – Factive (gemifloxacin mesylate) package insert. Toronto, ON: Merus Labs International, Inc.; 2019 May.

28432 – Roden, DM. Drug-induced prolongation of the QT interval. *New Engl J Med* 2004;350:1013-22.

28442 – Sustiva (efavirenz) package insert. Princeton, NJ: Bristol-Myers Squibb Company; 2019 Oct.

28457 – Crouch MA, Limon L, Cassano AT. Clinical relevance and management of drug-related QT interval prolongation. *Pharmacotherapy* 2003;23:881-908.

28458 – Schmeling WT, Warltier DC, McDonald DJ, et al. Prolongation of the QT interval by enflurane, isoflurane, and halothane in humans. *Anesth Analg* 1991;72:137-44.

28514 – Prince LA, Stork CM. Prolonged cardiotoxicity from poison lilly (*Veratrum viride*). *Vet Hum Toxicol* 2000;42:282-5.

28592 – Zoladex (goserelin acetate 3.6 mg implant) package insert. Lake Forest, IL: TerSera Therapeutics LLC; 2019 Feb.

28611 – Prograf (tacrolimus) capsules, injection, and granules for oral suspension package insert. Astellas Pharma US, Inc.: Northbrook, IL; 2019 Jun.

28661 – Apokyn and Apokyn Pen (apomorphine) injection package insert. Louisville, KY: US WorldMeds LLC; 2020 Apr.

28674 – Diflucan oral tablet and suspension (fluconazole) package insert. New York, NY: Pfizer; 2019 Feb.

28737 – Inapsine (Droperidol) Injection package insert. Lake Forest, IL: Akorn, Inc.; 2011 Oct.

28752 – Thevenin J, Da Costa A, Roche F, et al. Flecainide induced ventricular tachycardia (torsades de pointes). *Pacing Clin Electrophysiol* 2003;26:1907-8.

28754 – Loeckinger A, Kleinsasser A, Maier S, et al. Sustained prolongation of the QTc interval after anesthesia with sevoflurane in infants during the first 6 months of life. *Anesthesiology* 2003;98:639-42.

28755 – Kleinsasser A, Loeckinger A, Lindner KH, et al. Reversing sevoflurane-associated Q-Tc prolongation by changing to propofol. *Anesthesia* 2001;56:248-50.

28756 – Kuenszberg E, Loeckinger A, Kleinsasser A, et al. Sevoflurane progressively prolongs the QT interval in unpremedicated female adults. *Eur J Anaesthesiol* 2000;17:662-4.

28759 – Maprotiline HCl tablet package insert. Morgantown WV: Mylan Pharmaceuticals Inc; 2014 Dec.

28785 – Zyprexa (olanzapine, all formulations) package insert. Indianapolis, IN: Eli Lilly and Company; 2020 Apr.

28822 – Fareston (toremifene citrate) tablets package insert. Bedminster, NJ: Kyowa Kirin Inc.; 2017 May.

28834 – Cuprimine (penicillamine) package insert. Lawrenceville, NJ: Atom Pharma; 2010 Mar.

28855 – Zithromax (azithromycin 250 mg and 500 mg tablets and azithromycin oral suspension) package insert. New York, NY: Pfizer Inc.; 2019 Apr.

28879 – Pentamidine isethionate injection package insert. Manasquan, NJ: Seton Pharma, LLC; 2014 Jan.

28978 – Michalets EL, Williams CR. Drug interactions with cisapride: clinical implications. *Clin Pharmacokinet* 2000;39:49-75.

28995 – Invirase (saquinavir) package insert. South San Francisco, CA: Genentech Inc.; 2019 Dec.

29113 – Sandostatin (octreotide) package insert. Stein, Switzerland: Novartis Pharma Stein AG Corporation; 2019 April.

29118 – Seroquel (quetiapine fumarate) package insert. Wilmington, DE: AstraZeneca Pharmaceuticals LP; 2020 Jan.

29396 – Somer M, Kallio J, Pesonen U, et al. Influence of hydroxychloroquine on the bioavailability of oral metoprolol. *Br J Clin Pharmacol* 2000;49:549-54.

29758 – Aralen (chloroquine) package insert. Bridgewater, NJ: Sanofi-aventis U.S. LLC.; 2018 Oct.

29818 – Noroxin (norfloxacin) tablets package insert. Whitehouse Station, NJ: Merck and C., Inc.; 2016 Jul.

29833 – Frothingham R. Rates of torsades de pointes associated with ciprofloxacin, ofloxacin, levofloxacin, gatifloxacin, and moxifloxacin. *Pharmacotherapy* 2001;21:1468-72.

30106 – Imodium A-D Liquid and Caplets (loperamide HCL) consumer product labels. Fort Washington, PA: Johnson and Johnson Consumer Inc., McNeil Consumer Healthcare Division; 2019.

30163 – Agrylin (anagrelide) capsules package insert. Lexington, MA: Shire US Inc.; 2020 Feb.

30284 – McElnay JC, Mukhtar HA, D' Arcy PF, Temple DJ. In vitro experiments on chloroquine and pyrimethamine absorption in the presence of antacid constituents or kaolin. *J Trop Med Hyg* 1982;85:153-8.

30285 – McElnay JC, Mukhtar HA, D' Arcy PF, et al. The effect of magnesium trisilicate and kaolin on the in vivo absorption of chloroquine. *J Trop Med Hyg* 1982;85:159-63.

30369 – Vantas (histrelin implant) package insert. Chadds Ford, PA: Endo Pharmaceuticals Solutions Inc.; 2019 Feb.

30515 – Vesicare (solifenacin) package insert. Research Triangle Park, NC: GlaxoSmithKline; 2012 Jul.

30624 – Herrington AM, George KW, Moulds CC. Octreotide-induced bradycardia. *Pharmacotherapy* 1998;18:413-6.

30738 – Ofloxacin tablets package insert. Sacramento, CA: Nivagen Pharmaceuticals, Inc.; 2019 Feb.

31112 – Detrol (tolterodine tartrate) package insert. New York, NY: Pharmacia and Upjohn Co., division of Pfizer; 2016 Nov.

31266 – Zofran (ondansetron) injection package insert. Research Triangle Park, NC: GlaxoSmithKline; 2017 Mar.

31335 – Carmichael SJ, Beal J, Day RO, et al. Combination therapy with methotrexate and hydroxychloroquine for rheumatoid arthritis increases exposure to methotrexate. *J Rheumatol* 2002;29:2077-83.

31403 – Qualaquin (quinine sulfate) capsules package insert. Cranbury, NJ: Sun Pharmaceutical Industries, Inc.; 2019 Jun.

31723 – Kytril injection (gransetron) package insert. Nutley, NJ: Roche Pharmaceuticals; 2011 Nov.

31832 – Nexavar (sorafenib) package insert. Wayne, NJ; Bayer HealthCare Pharmaceuticals Inc.; 2020 March.

31938 – Ranexa (ranolazine extended-release tablets) package insert. Foster City, CA: Gilead Sciences, Inc. 2019 Oct.

31970 – Sunitinib (Sutent) package insert. New York, NY: Pfizer Labs; 2019 May.

32127 – Prozac (fluoxetine hydrochloride) package insert. Indianapolis, IN: Eli Lilly and Company; 2020 Apr.

32387 – Sprycel (dasatinib) package insert. Princeton, NJ: Bristol-Myers Squibb Company; 2014 April.

32723 – Noxafil (posaconazole) package insert. Whitehouse Station, NJ: Merck & Co. Inc.: 2019 Mar.

32732 – Stollberger C, Huber JO, Finsterer J. Antipsychotic drugs and QT prolongation. *Int Clin Psychopharmacol* 2005;20:243-51.

32734 – Su KP, Lane HY, Chuang CL, et al. Olanzapine-induced QTc prolongation in a patient with wolff-parkinson-white syndrome. *Schizophrenia Research* 2004;66:191-2.

32745 – Dineen S, Withrow K, Voronovitch L, et al. QTc prolongation and high-dose olanzapine. *Psychosomatics* 2003;44:174-5.

32746 – Gurovich, I. QTc prolongation: chlorpromazine and high-dosage olanzapine. *Can J Psychiatry* 2003;48:348.

32789 – Zolinza (vorinostat) capsules package insert. Whitehouse Station, NJ: Merck & Co., Inc.; 2018 Dec.

32827 – Tyzeka (telbivudine) package insert. East Hanover, NJ: Novartis Pharmaceuticals, Corp.; 2018 Dec.

32901 – Brovana (arformoterol tartrate) inhalation solution package insert. Marlborough, MA: Sunovion Pharmaceuticals, Inc.; 2019 May.

33068 – Gajwani P, Pozuelo L, Tesar G, et al. QT interval prolongation associated with quetiapine (seroquel) overdose. *Psychosomatics* 2000;41:63-5.

33072 – Beelen AP, Yeo KTJ, Lewis LD. Asymptomatic QTc prolongation associated with quetiapine fumarate overdose in a patient being treated with risperidone. *Hum Exp Toxicol* 2001;20:215-9.

33074 – Furst BA, Champion KM, Pierre JM, et al. Possible association of QTc interval prolongation with co-administration of quetiapine and lovastatin. *Biol Psychiatry* 2002;51:264-5.

33136 – Dolophine (methadone) package insert. Eatontown, NJ: West-Ward Pharmaceuticals Corp.; 2019 Oct.

33144 – Owens RC Jr, Ambrose PG. Antimicrobial Safety: Focus on fluoroquinolones. *Clin Infect Dis* 2005;41 (Suppl 2):S144-S157.

33145 – Falagas ME, Rafailidis PI, Rosmarakis ES. Arrhythmias associated with fluoroquinolone therapy. *Int J Antimicrob Agents* 2007;doi:10.1016/j.ijantimicag.2006.11.011

33146 – Bischoff U, Schmidt C, Netzer R, et al. Effects of fluoroquinolones on HERG currents. *Eur J Pharmacol* 2000;406:341-3.

33192 – Tykerb (lapatinib) tablet package insert. Research Triangle Park, NC: GlaxoSmithKline; 2018 Dec.

33715 – Effexor XR (venlafaxine extended-release capsules) package insert. Philadelphia, PA: Wyeth Pharmaceuticals, Inc; 2017 Dec.

33925 – Ventolin HFA (albuterol sulfate) Inhalation Aerosol package insert. Research Triangle Park, NC: GlaxoSmithKline; 2008 Mar.

34389 – Xenazine (tetrabenazine) package insert. Deerfield, IL: Lundbeck, Inc.; 2017 Sep.

34501 – Perini JA, Vianna-Jorge R, Brogliato AR, et al. Influence of CYP2C9 genotypes on the pharmacokinetics and pharmacodynamics of piroxicam. Clin Pharmacol Ther 2005;78:362-9.

35401 – Coartem (artemether; lumefantrine) package insert. East Hanover, NJ: Novartis Pharmaceuticals Corporation; 2019 Aug.

36101 – Multaq (dronedarone) package insert. Bridgewater, NJ: Sanofi-aventis; 2014 Mar.

36146 – Fanapt (iloperidone) package insert. Rockville, MD: Vanda Pharmaceuticals, Inc.; 2017 Mar.

36250 – Sabril (vigabatrin) tablet/powder for oral solution package insert. Deerfield, IL: Lundbeck Inc.; 2020 Jan.

36343 – Saphris (asenapine) package insert. St. Louis, MO: Forest Pharmaceuticals, Inc.; 2017 Mar.

36615 – Vibativ (telavancin) package insert. Nashville, TN: Cumberland Pharmaceuticals Inc.; 2020 Feb.

37098 – Votrient (pazopanib) package insert. Research Triangle Park, NC: GlaxoSmithKline; 2011 Oct.

37292 – Istdox (romidepsin) package insert. Bedford, OH: Ben Venue Laboratories, Inc.; 2018 Nov.

38831 – Oleptro (trazodone hydrochloride) extended-release tablets package insert. Dublin, Ireland: Labopharm Europe Limited; 2014 Jul.

40233 – Sporanox (itraconazole) oral solution package insert. Titusville, NJ: Janssen Pharmaceuticals, Inc.; 2019 Mar.

40848 – Imovax Rabies (rabies vaccine) package insert. Swiftwater, PA: Sanofi-Pasteur Inc.; 2019 Oct.

40849 – RabAvert (rabies vaccine) package insert. Emeryville, CA: Novartis Vaccines and Diagnostics, Inc.; 2018 August.

40936 – Invega Sustenna (paliperidone palmitate injectable suspension) package insert. Titusville, NJ: Janssen Pharmaceuticals, Inc.; 2019 Jan.

40942 – Remeron and RemeronSolTabs (mirtazapine tablets and ODT tablets) package insert. Roseland, NJ: Organon USA, Inc.; 2020 Apr.

41231 – Foradil inhalation powder (formoterol fumarate) package insert. Kenilworth, NJ: Schering Corporation; 2012 Nov.

41235 – Butrans (buprenorphine transdermal system) package insert. Stamford, CT: Purdue Pharma L.P.; 2019 Oct.

41806 – Plaquenil (hydroxychloroquine) package insert. St. Michael, Barbados: Concordia Pharmaceuticals, Inc.; 2017 Jan.

41823 – Gilenya (fingolimod) package insert. East Hanover, New Jersey: Novartis Pharmaceuticals Corporation; 2019 Dec.

41830 – Convert (ibutilide) package insert. New York, NY: Pharmacia and Upjohn Company; 2016 Aug.

41958 – Eloxatin (oxaliplatin) package insert. Bridgewater, NJ: Sanofi-aventis U.S. LLC; 2020 April.

41984 – Primaquine phosphate package insert. Bridgewater, NJ: Sanofi-aventis; 2017 Jun.

42121 – Pradaxa (dabigatran) package insert. Ridgefield, CT: Boehringer Ingelheim Pharmaceuticals, Inc.; 2019 Nov.

42280 – Nuedexta (dextromethorphan hydrobromide; quinidine sulfate capsule) package insert. Aliso Viejo, CA: Avanir Pharmaceuticals, Inc.; 2019 Jun.

42449 – Halaven (eribulin mesylate) injection package insert. Woodcliff Lake, NJ: Eisai Inc.; 2016 Oct.

42844 – FDA Drug Safety Communication: Abnormal heart rhythms associated with use of Anzemet (dolasetron mesylate). Retrieved December 17, 2010. Available on the World Wide Web at: <http://www.fda.gov/Drugs/DrugSafety/ucm237081.htm>.

42845 – Abilify (aripiprazole) tablets, discmelt orally-disintegrating tablets, oral solution, and intramuscular injection package insert. Tokyo, Japan: Otsuka America Pharmaceutical, Inc.; 2020 Feb.

43065 – Chlorpromazine package insert. Princeton, NJ: Sandoz Inc; 2019 Dec.

43258 – Eryped (erythromycin ethylsuccinate) package insert. Atlanta, GA: Arbor Pharmaceuticals, INC.; 2018 Apr.

43411 – Cipro (ciprofloxacin tablet; suspension) package insert. Wayne, NJ: Bayer HealthCare Pharmaceuticals Inc.; 2020 May.

43463 – Orap (pimozide) package insert. Sellersville, PA: Teva Pharmaceuticals USA; 2014 Mar.

43800 – Lupron Depot (leuprolide acetate for depot suspension) package insert. North Chicago, IL: AbbVie Inc; 2017 July.

43901 – Caprelsa (vandetanib) package insert. Wilmington, DE: AstraZeneca Pharmaceuticals LP; 2018 Oct.

43974 – Zithromax (azithromycin injection) package insert. New York, NY: Pfizer Inc.; 2019 Apr.

44026 – Advair HFA (fluticasone propionate; salmeterol inhalation aerosol) package insert. Research Triangle Park, NC: GlaxoSmithKline; 2019 Jan.

44063 – Advair Diskus (fluticasone propionate; salmeterol inhalation powder) package insert. Research Triangle Park, NC: GlaxoSmithKline; 2019 Jan.

44376 – Edurant (rilpivirine) package insert. Titusville, NJ: Janssen Therapeutics; 2019 May.

44406 – Fosrenol (lanthanum carbonate chewable tablets and oral powder) package insert. Lexington, MA: Shire US Inc.; 2020 May.

44800 – Potiga (ezogabine) package insert. Research Triangle Park, NC: GlaxoSmithKline; 2016 May.

44979 – Arcapta Neohaler (indacaterol inhalation powder) package insert. East Hanover, NJ: Novartis Pharmaceuticals Corporation; 2019 May.

45335 – Zelboraf (vemurafenib) tablet package insert. South San Francisco, CA: Genentech USA, Inc.; 2017 Nov.

45411 – Trelstar (triptorelin pamoate for injectable suspension) package insert. Parsippany, NJ: Watson Pharma, Inc; 2018 Dec.

45458 – Xalkori (crizotinib) package insert. New York, NY: Pfizer Labs; 2019 June.

46869 – Firmagon (degarelix) package insert. Parsippany, NJ: Ferring Pharmaceuticals Inc.; 2020 Dec.

47129 – Hydroxyzine hydrochloride injection package insert. Shirley, NY: American Regent, Inc.; 2016 Oct.

47221 – Propulsid (cisapride) package insert. Titusville, NJ; Janssen Pharmaceutica; 2006 Oct. NOTE: As of May 2000; Propulsid has only been available in the United States via an investigational limited access program to ensure proper patient screening and prescribing.

47357 – Quinidine gluconate extended release tablet package insert. Richmond, VA: Richmond Pharmaceuticals, Inc.; 2011 Jan.

48697 – Korlym (mifepristone) tablet package insert. Menlo Park, CA: Corcept Therapeutics Incorporated; 2017 May.

48869 – Briassoulis A, Agarwal V, Pierce WJ. QT prolongation and tosade de pointes induced by fluoroquinolones: infrequent side effects from commonly used medications. Cardiology 2011;120:103-10.

48871 – Bril Fernando, Gonzalez CD, Di Girolamo G. Antimicrobial agents-associated with QT interval prolongation. Curr Drug Saf 2010;5:85-92.

49773 – Rituxan (rituximab) injection package insert. South San Francisco, CA: Genentech, Inc.; 2018 Apr.

49951 – Ventolin HFA (albuterol sulfate) Inhalation Aerosol package insert. Research Triangle Park, NC: GlaxoSmithKline; 2014 Dec.

49971 – Papathanasopoulos A, Kouroupis D, Henshaw K, et al. Effects of antithrombotic drugs fondaparinux and tinzaparin on in vitro proliferation and osteogenic and chondrogenic differentiation of bone-derived mesenchymal stem cells. J Orthop Res 2011;1327-1335.

50507 – Luvox CR (fluvoxamine maleate extended-release capsules) package insert. Palo Alto, CA: Jazz Pharmaceuticals, Inc.; 2017 Jan.

51289 – Inapsine (droperidol) package insert. Lake Forest, IL: Akorn, Inc.; 2011 Nov.

51793 – Xopenex (levalbuterol) inhalation solution package insert. Lake Forest, IL: Akorn, Inc.; 2019 Jan.

52611 – Signifor (pasireotide diaspartate) package insert. Stein, Switzerland: Novartis Pharma Stein AG; 2020 Jan.

52746 – Sirturo (bedaquiline) tablet package insert. Titusville, NJ: Janssen Therapeutics; 2020 Jan.

53394 – Abilify Maintena (aripiprazole) extended-release intramuscular injection package insert. Rockville, MD: Otsuka America Pharmaceutical, Inc.; 2020 Feb.

55578 – Owczuk R, Twardowski P, Dylczyk-Sommer A, et al. Influence of promethazine on cardiac repolarization: a double-blind, midazolam-controlled study. Anaesthesia 2009;64:609-614.

56233 – Singh JA, Furst DE, Bharat A, et al. 2012 Update of the 2008 American College of Rheumatology Recommendations for the Use of Disease-Modifying Antirheumatic Drugs and Biologic Agents in the Treatment of Rheumatoid Arthritis. Arthritis Care & Research 2012;64(5):625-639.

56263 – Otrexup (methotrexate) injection package insert. Ewing, NJ: Antares Pharma, Inc.;2019 Dec.

57094 – Zykadia (ceritinib) package insert. Indianapolis, IN: Novartis; 2019 March.

57377 – Altin C, Kanyilmaz S, Baysal S, et al. QT interval prolongation due to metronidazole administration. Anadolu Kardiyol Derg 2011;11:46-9.

57378 – Cohen O, Saar N, Swartzon M, et al. First report of metronidazole-induced QT interval prolongation. Int J Antimicrob Agents 2008;31:180-81.

57441 – Iribarren C, Round AD, Peng JA, et al. Validation of a population-based method to assess drug-induced alterations in QT interval: a self-controlled crossover study. Pharmacoepidemiol Drug Saf 2013;22:1222-32.

57803 – Cerdelga (eliglustat) capsules. Waterford, Ireland: Genzyme Ireland, Ltd.;2018 Sept.

58685 – Savaysa (edoxaban) package insert. Basking Ridge, NJ: Daiichi Sankyo, Inc.; 2020 Apr.

58766 – Tasigna (nilotinib) capsules package insert. East Hanover, NJ: Novartis Pharmaceuticals Corporation; 2019 Sept.

58782 – Lenvima (lenvatinib) package insert. Woodcliff Lake, NJ:Eisai Inc; 2020 Feb.

58821 – Farydak (panobinostat) capsules package insert. East Hanover, NJ: Novartis Pharmaceuticals Corporation; 2016 June.

59321 – CredibleMeds. QT drug lists. Available on the World Wide Web at <http://www.crediblemeds.org>.

59322 – Howes LG. Cardiovascular effects of drugs used to treat alzheimer's disease. Drug Saf. 2014;37:391–395.

59438 – Trisenox (arsenic trioxide) injection package insert. North Wales, PA: Teva Pharmaceuticals USA, Inc.; 2019 June.

59809 – Mamiya K, Sadanaga T, Sekita A, et al. Lithium concentration correlates with QTc in patients with psychosis. J Electrocardiol 2005;38:148-51.

59810 – van Noord C, Straus SM, Sturkenboom MC, et al. Psychotropic drugs associated with corrected QT interval prolongation. J Clin Psychopharmacol 2009;29:9-15.

59811 – Altinbas K, Guloksuz S, Caglar IM, et al. Electrocardiography changes in bipolar patients during long-term lithium monotherapy. Gen Hosp Psychiatry 2014;36:694-7.

60196 – Aristada (aripiprazole lauroxil) extended-release intramuscular suspension package insert. Waltham, MA: Alkermes, Inc.; 2017 Jun.

60270 – Belbuca (buprenorphine) buccal film package insert. BioDelivery Sciences International, Inc.: Raleigh, NC; 2019 Oct.

60297 – Tagrisso (osimertinib) tablet package insert. Wilmington, DE: AstraZeneca Pharmaceuticals LP; 2018 Aug.

60748 – Nuplazid (pimavanserin) package insert. San Diego, CA: Acadia; 2019 Sep.

60864 – US Food and Drug Administration (FDA). FDA Drug Safety Communication: FDA warns about serious heart problems with high doses of the antidiarrheal medicine loperamide (Imodium), including from abuse and misuse. Retrieved June 7, 2016. Available on the World Wide Web at:

[http://www.fda.gov/Drugs/DrugSafety/ucm504617.htm?
source=govdelivery&utm_medium=email&utm_source=govdelivery](http://www.fda.gov/Drugs/DrugSafety/ucm504617.htm?source=govdelivery&utm_medium=email&utm_source=govdelivery)

61195 – Levofloxacin injection package insert. North Brunswick, NJ: Claris Injectables Ltd.; 2018 Jun.

61758 – Jallouli M, Galicier L, Zahr N, et al. Determinants of hydroxychloroquine blood concentration variations in systemic lupus erythematosus. *Arthritis Rheumatol* 2015;67:2176-84.

61759 – Ette EI, Brown-Awala EA, Essien EE. Chloroquine elimination in humans: effect of low-dose cimetidine. *J Clin Pharmacol* 1987;27:813-16.

61760 – Furst DE. Pharmacokinetics of hydroxychloroquine and chloroquine during treatment of rheumatic diseases. *Lupus* 1996;5(S1):S11-15.

61761 – Ali HM. Reduced ampicillin bioavailability following oral coadministration with chloroquine. *J Antimicrob Chemother* 1985;15:781-4.

61816 – Kisqali (ribociclib) tablets package insert. East Hanover, NJ: Novartis Pharmaceuticals Corporation; 2020 Jan.

61845 – Austedo (deutetrabenazine) tablets package insert. North Wales, PA: Teva Pharmaceuticals USA, Inc.; 2019 Jul.

61870 – Chiu MH, Al-Majed NS, Stubbins R, et al. A case report of QT prolongation with glycopyrronium bromide in a patient with chronic tamoxifen use. *BMC Res Notes*. 2016;9:310.

61871 – Slovacek L, Priester P, Petera J, et al. Tamoxifen/norfloxacin interaction leading to QT interval prolongation in a female patient with extracranial meningioma. *Bratisl Lek Listy*. 2011;112(6):353-4.

61872 – Slovacek L, Ansorgova V, Macingova Z, et al. Tamoxifen-induced QT interval prolongation. *J Clin Pharm Ther*. 2008;33(4):453-5.

61906 – Rydapt (midostaurin) capsule package insert. East Hanover, NJ: Novartis Pharmaceuticals Corporation; 2020 Mar.

62037 – Bevyxxa (betrixaban) capsules package insert. South San Francisco, Ca: Portola Pharmaceuticals, Inc.; 2019 Jul.

62245 – Besponsa (inotuzumab ozogamicin) injection package insert. Philadelphia, PA: Wyeth Pharmaceuticals Inc; 2017 Aug.

62292 – Mylotarg (gemtuzumab ozogamicin) injection package insert. Philadelphia, PA: Pfizer Inc.; 2020 Feb.

62723 – Macrilen (macimorelin) package insert. Frankfurt am Main, Germany: Aeterna Zentaris GmbH; 2018 Jan.

63161 – Lucemyra (lofexidine) tablets package insert. Louisville, KY: US WorldMeds, LLC; 2018 May.

63317 – Braftovi (encorafenib) capsules package insert. Boulder, CO: Array BioPharma Inc.; 2020 April.

63328 – Aristada Initio (aripiprazole lauroxil extended-release injectable suspension) package insert. Altham, MA:Alkermes, Inc.; 2018 Jun.

63368 – Tibsovo (ivosidenib) tablet package insert. Cambridge, MA: Agios Pharmaceuticals; 2019 May.

63589 – Soltamox (tamoxifen) oral solution package insert. Raleigh, NC: Midatech Pharma US Inc.; 2019 April.

63729 – Levofloxacin premix injection package insert. Lake Forest, IL: Hospira; 2019 Jan.

63777 – Daurismo (glasdegib) tablets package insert. New York, NY: Pfizer Labs; 2020 Mar.

63787 – Xospata (gilteritinib) tablets package insert. Northbrook, IL: Astellas Pharma US, Inc.; 2019 May.

63936 – Lamprene (clofazimine) package insert. East Hanover, NJ: Novartis Pharmaceuticals Corporation; 2019 Jan.

64031 – Mayzent (siponimod) tablets package insert. East Hanover, NJ: Novartis Pharmaceutical Corporation; 2019 Mar.

64391 – Beach SR, Kostis WJ, Celano CM, et al. Meta-analysis of selective serotonin reuptake inhibitor-associated QTc prolongation. *J Clin Psychiatry* 2014;75:e441-e449.

64392 – Glassman AH, O'Connor CM, Califf RM, et al. Sertraline treatment of major depression in patients with acute MI or unstable angina. *JAMA* 2002;288:701-709.

64394 – O'Connor CM, Jiang W, Kuchibhatla M, et al. Safety and efficacy of sertraline for depression in patients with heart failure: results of the SADHART-CHF (Sertraline Against Depression and Heart Disease in Chronic Heart Failure) trial. *J Am Coll Cardiol* 2010;56:692-699.

64395 – Brouillette J, Nattel S. A practical approach to avoiding cardiovascular adverse effects of psychoactive medications. *Can J Cardiol* 2017;33:1577-1586.

64396 – Beach SR, Celano CM, Sugrue AM, et al. QT prolongation, torsades de pointes, and psychotropic medications: a 5-year update. *Psychosomatics* 2018;59:105-122.

64562 – Wakix (pitolisant) tablets package insert. Plymouth Meeting, PA: Harmony Biosciences, LLC; 2019 Aug.

64567 – Rozlytrek (entrectinib) package insert. South San Francisco, CA: Genentech Inc.; 2019 Aug.

64576 – Xenleta (lefamulin) package insert. Dublin, Ireland: Nabriva Therapeutics US, Inc.; 2019 Aug.

65098 – Isturisa (osilodrostat) tablet package insert. Lebanon, NJ: Recordati Rare Disease, Inc.; 2020 Mar.

65157 – CredibleMeds. COVID-19 experimental therapies and TdP risk. Available on the World Wide Web at [http://https://crediblemeds.org/blog/covid-19-experimental-therapies-and-tdp-risk](https://crediblemeds.org/blog/covid-19-experimental-therapies-and-tdp-risk). Accessed March 23, 2020.

65170 – Giudicessi JR, Noseworthy PA, Friedman PA, Ackerman MJ. Urgent guidance for navigating and circumventing the QTc prolonging and torsadogenic potential of possible pharmacotherapies for COVID-19 [published online ahead of print, March 25, 2020]. *Mayo Clin Proc* 2020;95.

65210 – University of Liverpool. COVID-19 Drug Interactions. Retrieved April 6, 2020. Available on the World Wide Web at <https://www.covid19-druginteractions.org/>.

65387 – Retevmo (selpercatinib) capsules package insert. Indianapolis, IN: Eli Lilly and Company; 2020 May.

Monitoring Parameters

- blood glucose
- CBC
- ECG

- glucose-6-phosphate dehydrogenase (G6PD) activity
- ophthalmologic exam

US Drug Names

- Plaquenil
- Quineprox

Global Drug names

Argentina

- Axokine - (Rontag)
- Evoquin - (Ivax)
- Metirel - (Rontag)
- Narbon - (Buxton)
- Plaquenil - (Sanofi-Aventis)
- Polirreumin - (TRB)

Australia

- Hequinol - (Aspen)
- Plaquenil - (Sanofi-Aventis)
- Rusquen - (Ipca)

Austria

- Plaquenil - (Sanofi Synthelabo)

Belgium

- Plaquenil - (Sanofi-Aventis)

Brazil

- Plaquinol - (Sanofi-Aventis)
- Requinol - (Apsen)

Canada

- Apo-Hydroxyquine - (Apotex)
- Plaquenil - (Sanofi-Aventis)
- Pro-Hydroxyquine - (Pro Doc)

Chile

- Ilinol - (Pharma Investi)
- Parenquil - (Recalcine)
- Plaquinol - (Sanofi-Aventis)
- Quinilen - (Royal)
- Reumazine - (Sanitas)

China

- Fen Le - (ZhongXi)
- Plaquenil - (Abbott)

Czech Republic

- Plaquenil - (Sanofi-Aventis)

Denmark

- Ercquin - (Medic)
- Plaquenil - (Sanofi-Aventis)

Finland

- Oxiklorin - (Orion)
- Plaquenil - (Sanofi Synthelabo)

France

- Plaquenil - (Sanofi-Aventis)

Germany

- Quensyl - (Sanofi-Aventis)

Greece

- Plaquenil - (IFET (ΙΦΕΤ))

Hong Kong

- Plaquenil - (Sanofi-Aventis)

India

- HCQS - (Ipca)
- HQTor - (Torrent)
- Hydrocad - (Cadila)
- Hydroquin - (Sun)
- Oxcq - (Wallace)
- Oxy-Q - (Daffohils)

Ireland

- Plaquenil - (Sanofi-Aventis)

Israel

- Plaquenil - (Sanofi-Aventis)

Italy

- Plaquenil - (Sanofi-Aventis)

Japan

- Plaquenil - (Sanofi)

Malaysia

- Plaquinil - (Sanofi-Aventis)

Mexico

- Plaquinil - (Sanofi-Aventis)

Netherlands

- Plaquinil - (Sanofi-Aventis)

New Zealand

- Plaquinil - (Sanofi-Aventis)

Norway

- Ercoquin - (Nycomed)
- Plaquinil - (Sanofi-Aventis)

Philippines

- Plaquinil - (Sanofi-Aventis)

Portugal

- Plaquinol - (Alfa Wassermann)

Russian Federation

- Immard - (Ipca)
- Plaquinil - (Sanofi-Aventis)

Singapore

- Haloxin - (Hanlim)
- Plaquinil - (Sanofi-Aventis)

Spain

- Dolquine - (Products & Technology)

Sweden

- Plaquinil - (Sanofi-Aventis)

Switzerland

- Plaquinil - (Sanofi-Aventis)

Thailand

- HCQS - (Ipca)
- Hydroquin - (Sun)
- Plaquinil - (Sanofi-Aventis)

Turkey

- Plaquenil - (Sanofi-Aventis)

Ukraine

- Immard - (Ipca)
- Plaquenil - (Sanofi-Aventis)

United Kingdom

- Plaquenil - (Zentiva)
- Quimoric - (Bristol)

Venezuela

- Plaquinol - (Sanofi-Aventis)

Copyright © 2020 Elsevier Inc. All rights reserved.