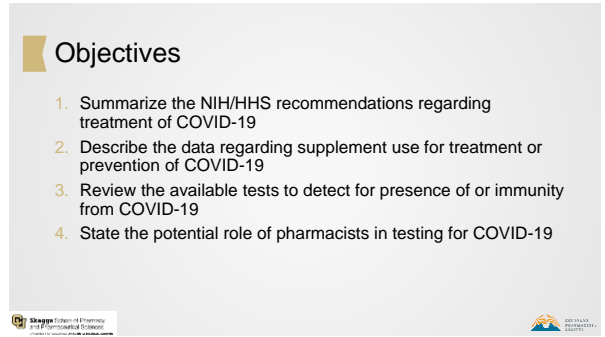
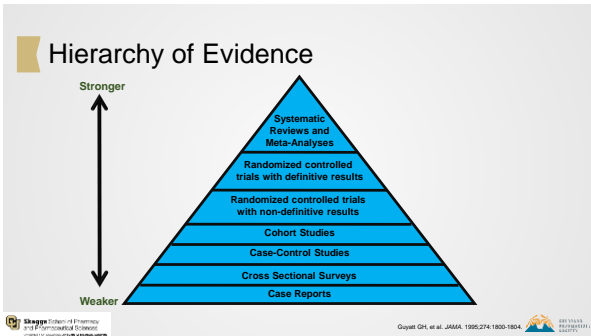




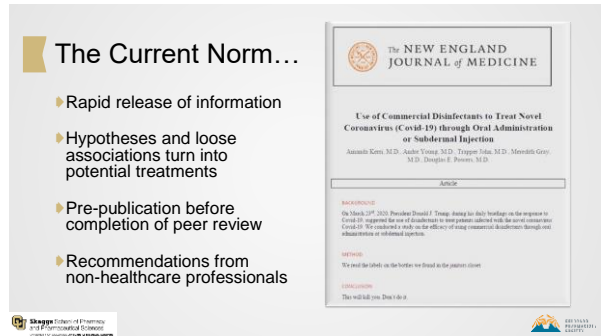
1



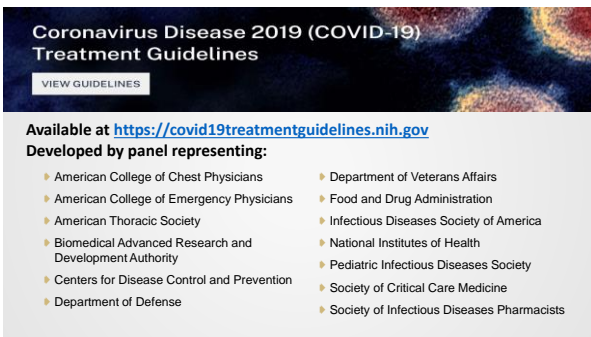
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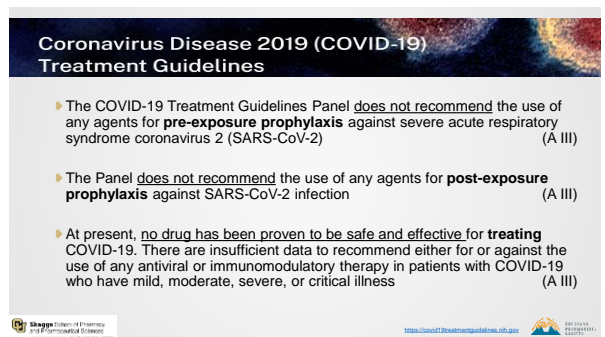
3



4



5



6

Purported Pharmacotherapy for COVID-19

Sardesai, JM, et al. JAMA. doi:10.1001/jama.2020.6019 Published online April 13, 2020.

7

Hydroxychloroquine (HCQ) in COVID-19

- Retrospective analysis; 368 hospitalized US Veterans
 - Death: 27.8% with HCQ; 22.1% with HCQ/AZ; 11.4%, neither
 - Ventilation: 13.3% with HCQ; 6.9% with HCQ/AZ; 14.1%, neither
- Open-label, randomized controlled trial; 150 patients from China
 - 28-day negative seroconversion:
 - 85.4% with HCQ vs 81.3% without (P=0.34)
 - Symptoms resolved quicker with HCQ

Majumdar, A, et al. <https://doi.org/10.1101/2020.04.18.20095807>
Tang W, et al. doi: <https://doi.org/10.1101/2020.04.19.20095807>

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HCQ with Azithromycin

| Drugs: | Severity: | Documentation: | Summary: |
|---|-----------|----------------|---|
| AZITHROMYCIN – HYDROXYCHLOROQUINE SULFATE | Major | Good | Concurrent use of HYDROXYCHLOROQUINE and QT PROLONGING AGENTS may result in increased risk of QT-interval prolongation. |

Coadministration is not recommended (Prod Info PLAQUENIL® oral tablets, 2017) as life-threatening additive effects on the QT interval, including torsades de pointes, may occur

University of Liverpool COVID-19 drug-interactions (<http://www.covid19-druginteractions.org/>)

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Drug Interactions on QTc in Exploratory COVID-19 Treatment

Recommendations to minimize arrhythmia risk:

- ECG/QT interval monitoring
 - Withhold medications if baseline QT \geq 500 msec, or known congenital long QT
 - Stop medications if QT becomes \geq 500 msec
- Correct electrolyte abnormalities
 - Hypokalemia to $>$ 4 mEq/L
 - Hypomagnesemia to $>$ 2 mg/dL
- Avoid other QTc prolonging medications whenever feasible

Roden et al. 10.1161/CIRCULATIONAHA.120.047521

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Chloroquine (CQ)

- Double-blind trial in hospitalized with severe COVID-19 randomized to
 - High-dose CQ: 600 mg twice daily x 10 days
 - Low-dose CQ: 450 mg twice daily day 1 then once daily x 4 days
- Results:
 - Death at day 13: 39.0%, high-dose vs 15.0%, low-dose
 - QTc prolongation: 18.9%, high-dose vs. 11.1%, low-dose

Borke MGS, et al. JAMA. *Neuro Open*. 2020; 3(4):e208857. doi:10.1001/jamanetworkopen.2020.8857

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FDA Drug Safety Communication

FDA cautions against use of hydroxychloroquine or chloroquine for COVID-19 outside of the hospital setting or a clinical trial due to risk of heart rhythm problems

Close supervision is strongly recommended

Safety Announcement [04-24-2020]

<https://www.fda.gov/medwatch/2020/sa512020-01>

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Coronavirus Disease 2019 (COVID-19) Treatment Guidelines

- Persons with COVID-19 who are prescribed an **ACEi or ARB** for cardiovascular disease (or other indications) should continue these medications (A III)

Shaggs College of Pharmacy
University of North Carolina at Chapel Hill

<https://www.covid19treatmentguidelines.nih.gov>

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SARS-CoV-2 and the RAAS are Related

- ACEi or ARB therapy can upregulate ACE2 expression in animal models
- ACEi or ARB therapy might increase SARS-CoV-2 attachment and COVID-19
- Observational data suggest COVID-19 patients with CVD/risk factors have worse outcomes

Shaggs College of Pharmacy
University of North Carolina at Chapel Hill

M. Velazquez et al. *N Engl J Med* 2020; DOI: 10.1056/NEJMc2002765
Parodi CM, et al. *Circulation* 2020; 11(20):2005-2010
Gao T, et al. *JAMA Cardiol* March 27, 2020 [pub ahead of print] doi:10.1001/jamacardio.2020.1017

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ACEi/ARB use in COVID-19 from China

- Retrospective case series; 1178 hospitalized patients
 - 32.9% ACEi/ARB users had severe disease, 30.7% in non-users (P=.65)
 - 27.3% non-survivors used ACEi/ARB vs 33.0% in survivors (P=.34)
- Retrospective study; 1128 hospitalized patients with hypertension
 - ACEi/ARB users (n=188) compared to non-users (n=940)
 - Mortality rate lower in the ACEi/ARB group (3.7% vs. 9.8%; P = 0.01)
 - Adjusted for variables HR, 0.37 (95% CI, 0.15-0.89; p=0.03)
 - Compared to other antihypertensives HR, 0.30 (95% CI, 0.12-0.70; p=0.01)

Shaggs College of Pharmacy
University of North Carolina at Chapel Hill

Liu J, et al. *JAMA Cardiol*. doi:10.1001/jamacardio.2020.1624
Zhang P, et al. *Coronavirus*. DOI: 10.1101/2020.03.24.20037154

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Coronavirus Disease 2019 (COVID-19) Treatment Guidelines

- Persons with COVID-19 who are prescribed **statin** therapy for the treatment or prevention of cardiovascular disease should continue these medications (A III)

Shaggs College of Pharmacy
University of North Carolina at Chapel Hill

<https://www.covid19treatmentguidelines.nih.gov>

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Coronavirus Disease 2019 (COVID-19) Treatment Guidelines

- Oral corticosteroid therapy** used prior to COVID-19 diagnosis for another underlying condition (e.g., primary or secondary adrenal insufficiency, rheumatological diseases) should not be discontinued (A III)
- Inhaled corticosteroids** used daily for patients with asthma and chronic obstructive pulmonary disease for control of airway inflammation should not be discontinued (A III)
- Persons with COVID-19 who are taking **NSAIDs** for a co-morbid condition should continue therapy as previously directed by their physician (A III)
- The Panel recommends that there be no difference in the use of **antipyretic strategies** (e.g., with acetaminophen or NSAIDs) between patients with or without COVID-19 (A III)

Shaggs College of Pharmacy
University of North Carolina at Chapel Hill

<https://www.covid19treatmentguidelines.nih.gov>

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Purported Pharmacotherapy for COVID-19

Shaggs College of Pharmacy
University of North Carolina at Chapel Hill

Sanders, AJ, et al. *JAMA*. doi:10.1001/jama.2020.6019 Published online April 13, 2020.

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Emerging Treatments: Possibly Effective

- ▶ **Remdesivir**
 - 61 hospitalized patients requiring oxygen support
 - Compassionate use provided for 10 days
 - 36 of 53 (68%) had clinical improvement in oxygen support
 - 25 of 53 (47%) were discharged
 - 7 of 53 (13%) died
 - No placebo group
- ▶ **Convalescent Plasma**
 - Case series of five critically ill patients with COVID-19 and ARDS
 - Treatment provided between days 10 and 22
 - All five patients clinically improved
 - 3 were discharged
 - 2 in stable condition 37 days post treatment

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Want Ongoing COVID Updates?



- ▶ Ongoing ECHO sessions held virtually Mon/Wed/Fri 7:00 - 8:00 AM MST
 - Featured topic by local experts,
 - CO epidemiology updates
 - Medication updates
- ▶ Sign up:
 - <https://projectcore.echocolorado.org/Series/Registration/258>

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Supplements: Should we recommend them?

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Vitamin C: Does it help?

- ▶ Observational data suggests high-dose Vitamin C may benefit patients with sepsis and ARDS
- ▶ Upregulates protein channels regulating alveolar clearance
- ▶ RCT in China evaluating IV Vitamin C in patients with SARS CoV-2: 12g every 12 hours for 7 days
 - Primary outcome measure: # of ventilator free days
 - Expected completion date: September 2020

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Vitamin C: Does it help?

BOTTOM LINE:

- ▶ There is only observational data with high-dose IV vitamin C in ARDS
- ▶ No evidence to support oral vitamin C can prevent or treat COVID-19

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What about Vitamin D?

- ▶ Metanalysis of 25 trials of patients with acute respiratory tract infections
 - ▶ NOT COVID-19 patients
 - ▶ Daily or weekly dosing of vitamin D decreased the risk of respiratory track infection
 - ▶ Most benefit seen in patients that had significant vitamin D deficiencies
 - ▶ The pandemic started during the winter when vitamin D levels are low

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Surely, elderberry can help, can't it?

- One relatively small (n=312) study claimed elderberry extract decreased the incidence and duration of cold symptoms
- Another small study (n=60) claimed elderberry syrup, started within 48 hours of flu symptoms, decreased symptoms four days earlier than those patient who received placebo

BOTTOM LINE:

- NO evidence that elderberry can prevent or treat COVID-19

25

Emerging Treatments: Hope and Hype

- Bacille Calmette-Guérin (BCG) vaccine:
 - Ongoing trials
 - Unpublished study shows COVID-19 mortality lower among BCG-using countries
- Zinc lozenges
 - May shorten duration of the common cold.
 - Speculation that hydroxychloroquine helps the zinc enter SARS-CoV-2 infected cells and might then exert antiviral effects

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And more hype....

Missouri Sues Televangelist Jim Bakker For Selling Fake Coronavirus Cure

March 11, 2020 - 4:35 PM ET

Silver Solution "has been proven by the government that it has the ability to kill every pathogen it has ever been tested on, including SARS and HIV," Sellman continued.

Four 4-ounce bottles could be yours, a message on the screen said, for just \$60.

Date: April 27, 2020

RE: Unapproved and Misbranded Products Related to Coronavirus Disease 2019 (COVID-19)

This is to advise you that the United States Food and Drug Administration (FDA) and the Federal Trade Commission (FTC) received your notice of the Silver Solution "Silver Solution" on April 13, 2020, and that the FDA has observed that your Silver Solution is not a legal drug and that these products are intended to mislead, deceive, cheat, and defraud consumers.

Date: April 27, 2020

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Testing

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Emergency Use Authorization (EUA)

- Allows unapproved products or unapproved uses of an approved product
- Public health emergency
- No adequate, approved or available alternatives
- Includes labs, PPE, ventilators



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Testing: What we know




- Pharmacists may administer CLIA-waived tests, provided they have a CLIA waiver
- All current CLIA-waived tests (as of 4/29/20 at noon) are for detecting the presence of virus
 - AKA, "molecular" or "PCR"
 - Variable approaches
 - Collection only (in partnership with a lab)
 - Collection and testing
 - Home testing
 - CLIA waiver only needed if the pharmacy runs the test

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Testing: What we know

- ▶ Antibody testing
 - AKA, serology tests
- ▶ There are no CLIA-waived tests for antibodies
 - Questionable sensitivity and specificity
 - Important from a public health perspective to detect viral prevalence in a community
 - Does NOT indicate an individual is immune

CLIA-waived tests

| Company | Test Name | Collection method | Timing of results | Product image |
|--------------------|------------------------------|--------------------------------------|-------------------|---|
| Abbott Diagnostics | ID Now COVID-19 | Nasal, nasopharyngeal, or throat | 5-13 mins |  |
| Mesa Biotech Inc | Accula SARS-CoV-2 Test | Nasal or throat | 30 mins |  |
| Cepheid | Xpert Xpress SARS-CoV-2 Test | Nasal, mid-turbinate, nasopharyngeal | 45 mins |  |

Other considerations

- ▶ DORA/Governor's Communication (4/28/20)
 - Make sure to include appropriate patient identifiers on all specimens
 - State contacts:
 - Ben Henderson, Director of Operations (Benjamin.s.henderson@state.co.us)
 - Alicia Cronquist, Chief of the Public Health Informatics, Reporting, and Refugee Branch (Alicia.cronquist@state.co.us)
- ▶ Reimbursement

Resources

- ▶ HHS Pharmacist Guidance
 - <https://www.hhs.gov/sites/default/files/authorizing-licensed-pharmacists-to-order-and-administer-covid-19-tests.pdf>
- ▶ COVID-19 Tests
 - <https://www.360dx.com/coronavirus-test-tracker-launched-covid-19-tests>
- ▶ Antibody Tests
 - <https://www.centerforhealthsecurity.org/resources/COVID-19/serology/Serology-based-tests-for-COVID-19.html#sec2>
- ▶ FDA
 - <https://www.fda.gov/medical-devices/emergency-situations-medical-devices/emergency-use-authorizations#ivdnote1>

Continuing Education

How to claim credit (pharmacists & pharmacy technicians)

1. Navigate to UCDenver.edu/pharmacy/continuingeducation
2. Select **Online CE**
3. Select Today's Webinar

Questions: sop.continuingeducation@cuanschutz.edu

The University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education (CPE). This activity has been accredited for 1.0 contact hours of knowledge-based CPE for pharmacists and pharmacy technicians. To receive CPE, participants must create a profile on pharmCE.UCDenver.edu with their NABP eProfile ID number and birthdate, and complete the activity evaluation. CPE credit will be uploaded to CPE Monitor upon completion of the activity evaluation.

UAN # 0008-9999-20-044-LH01-P, Release: 04/29/2020, Expiry: 04/29/2023

