

Screening for Carbon Monoxide (CO) Poisoning & Related Disorders (page 1 of 2)

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Patient Name: _____ Age: _____

Date: ___/___/___ Screened by: _____, MD or _____

1) Suspected CO Exposure: No Yes, from ___/___/___ to ___/___/___ Specify CO Source:

Vehicle Boat Fire Dichloromethane Appliance/Other, Specify: _____

If CO Found & Tested: Max CO exposure: ___ ppm Breath CO: ___ ppm COHb: ___%

Date(s) of Each Test: ___/___/___ ___/___/___ ___/___/___

2) Current CO Symptoms: Have you had any of the following symptoms every day (or almost every day) for at least the last month? Check only those symptoms that are NOT substantially relieved by either rest or medication and NOT due to any other illness, including:

headache or migraine physical fatigue mental fatigue muscle pain = ___ of 4

→ Suspect CO poisoning if 3 or 4 of 4, possible if 2 of 4, but unlikely if only 1 of 4

3) Current Multi-Sensory Sensitivity (aka MUSES Syndrome). Do you have reduced tolerance to any of:

Odors Lights Sounds Tastes Touch Heat or Cold Drugs or Alcohol = ___ of 7

→ Suspect CO poisoning if 5, 6 or 7 of 7, possible if 4 of 7, but unlikely if only 1, 2 or 3 of 7

4) Current Facial Asymmetry. Look in a mirror with your face relaxed, Do you see any drooping or lower:

a. Right Pupil & Left Mouth c. Right Pupil Only e. Right Pupil & Right Mouth

b. Left Pupil & Right Mouth d. Left Pupil Only f. Left Pupil & Left Mouth

→ Suspect chronic CO poisoning if 4a or 4b, milder/briefer CO if 4c or 4d, and Bell's Palsy if 4e or 4f

5) Current CO-Related Diagnoses (given by physician or other health care professional) = ___ of 21

→ Suspect CO poisoning if 7 or more, possible if 4 to 6, but unlikely if only 1, 2 or 3

Check Current Diagnoses below but only if Symptoms (Sx) have been experienced in the last week	Year or Age Sx Began	Year or Age Sx Stopped	# Days treated w/oxygen	List All Current Prescription Medications and Supplements below, but Check only those that are taken at least <u>once every day</u> .
<input type="checkbox"/> Attention Deficit Disorder or ADHD				<i>If oxygen therapy is prescribed, list should be reviewed by physician with patient to identify non-essentials that may be weaned.</i>
<input type="checkbox"/> Anemia or Hemochromatosis				
<input type="checkbox"/> Asthma of any kind				
<input type="checkbox"/> Autism or Autism Spectrum Dis.				<input type="checkbox"/>
<input type="checkbox"/> Blurred or Painful Vision				<input type="checkbox"/>
<input type="checkbox"/> Chronic Fatigue Syndrome/ME				<input type="checkbox"/>
<input type="checkbox"/> Depression of any kind				<input type="checkbox"/>
<input type="checkbox"/> Dermatitis, especially red rash				<input type="checkbox"/>
<input type="checkbox"/> Diabetes				<input type="checkbox"/>
<input type="checkbox"/> Epilepsy of any kind				<input type="checkbox"/>
<input type="checkbox"/> Fibromyalgia				<input type="checkbox"/>
<input type="checkbox"/> Heart Disease of any kind				<input type="checkbox"/>
<input type="checkbox"/> Irritable Bowel Syndrome				<input type="checkbox"/>
<input type="checkbox"/> Memory Loss or Alzheimer's				<input type="checkbox"/>
<input type="checkbox"/> Mitral Valve Prolapse				<input type="checkbox"/>
<input type="checkbox"/> Multiple Chemical Sensitivity				<input type="checkbox"/>
<input type="checkbox"/> Neurasthenia or Nervousness				<input type="checkbox"/>
<input type="checkbox"/> Panic, Paranoia or Fears				<input type="checkbox"/>
<input type="checkbox"/> Parkinson's or Parkinsonism				<input type="checkbox"/>
<input type="checkbox"/> Recurring Headache / Migraines				<input type="checkbox"/>
<input type="checkbox"/> Tinnitus or Painful Hearing				<input type="checkbox"/>

C. LABORATORY TESTING of

Date Ordered: / /

1) **Arterial & Venous Blood Gas Testing** (should be repeated at least monthly during and after any oxygen treatment): If history includes CO poisoning OR If screening is positive for current CO symptoms (2+), sensitivities (4+) AND diagnoses (4+), then recommend testing for the arterial and venous blood gas values listed below. Specify in writing that samples should be taken from the same elbow, without a tourniquet, while the patient is seated and only after being at rest for at least 5 minutes. If O2 gaps are low, consider daily O2 for 1 to 4 months until symptoms resolve and O2 gaps normalize
Track Results: Pre-Treatment During Tx (circle month: 1 2 3 4) After Tx (month: 1 2 3 4)

Arterial Results of Interest : Check if <input type="checkbox"/> High or <input type="checkbox"/> Low	Venous Results of Interest : Check if <input type="checkbox"/> High or <input type="checkbox"/> Low	Art.-Ven. Gaps* of Interest : Check if <input type="checkbox"/> High or <input type="checkbox"/> Low
Date Drawn:	Date Drawn:	Date Reviewed:
COHb = <input type="checkbox"/> H Normal non-smoker <2 % Normal smoker <10 %	COHb = <input type="checkbox"/> H Normal non-smoker <2 % Normal smoker <10 %	COHb Gap = <input type="checkbox"/> H Normal V-A Gap < 0.2 NOT normal if A >> V
O2 Sat = <input type="checkbox"/> L Normal > 94% (O2 urgent if <90%)	O2 Sat = <input type="checkbox"/> H Normal < 65 %	O2 Sat Gap = <input type="checkbox"/> L Normal A-V Gap > 30
PO2 = <input type="checkbox"/> L Normal > 90 mmHg	PO2 = <input type="checkbox"/> H Normal < 35 mmHg	PO2 Gap = <input type="checkbox"/> L Normal A-V Gap > 55
PCO2 = <input type="checkbox"/> L <input type="checkbox"/> H Normal = 35-45mmHg	PCO2 = <input type="checkbox"/> L <input type="checkbox"/> H Normal = 41-51mmHg	PCO2 Gap= <input type="checkbox"/> L <input type="checkbox"/> H Normal V-A Gap > 6
pH = <input type="checkbox"/> L <input type="checkbox"/> H Normal = 7.35-7.45	pH = <input type="checkbox"/> L <input type="checkbox"/> H Normal = 7.32-7.42	PH Gap = <input type="checkbox"/> L <input type="checkbox"/> H Normal pH Gap < 0.1
HCO3 = <input type="checkbox"/> L <input type="checkbox"/> H Normal = 22-26meq/L	HCO3 = <input type="checkbox"/> L <input type="checkbox"/> H Normal = 24-28meq/L	HCO3 Gap = <input type="checkbox"/> L <input type="checkbox"/> H Normal V-A Gap = 2

* Normal adult (healthy) ranges shown above are from Good Samaritan Hospitals in Puyallup WA and Downers Grove IL

2) **Other Testing** that should be done when blood samples are drawn and considered in interpretation:

Heart Rate = ___ Respiration Rate = _____ Blood Pressure = _____ Weight = _____

NOTE: Insurance usually pays for this blood testing and O2 if prescribed for CO poisoning or migraines.

D. OXYGEN TREATMENT For detailed protocol & references, see www.mcsrr.org/resources/articles/P11.html
 If COHb is high or if O2 gaps are low (see normal ranges above), and if there is no history of COPD or adverse reactions to oxygen, consider prescribing normobaric humidified "medical" oxygen for 2 hours/day until CO-related symptoms resolve (usually 1 to 2 months) and blood gases normalize (usually a month or two longer). Prescription should specify nasal cannula or partial non-rebreather mask with bag (if tolerated); oxygen concentration, either 99% USP (available via rental of either O2 tanks or liquid O2 systems) or clinically equivalent 93% USP (available via rental or purchase of O2 concentrators); and oxygen flow rate (recommend 5 or 6 liters/minute, which is the max that most concentrators can do). Also consider weaning patient from all non-essential drugs and supplements while on daily oxygen (see list over), except keep daily anti-oxidant. Teach patient to breathe only via nose while on O2; 4 seconds in and 6 seconds out maximizes O2 uptake.

E. FOLLOW-UP

If untreated, no follow-up needed but recommend patient return for re-testing if symptoms worsen.
 If treated with O2, recommend monthly follow-up to retest blood gases. Daily treatment should continue until chronic symptoms resolve (usually within 2-4 weeks) and blood gases normalize (usually within 2-4 months).
 If chronic symptoms return within one week of stopping daily O2, resume O2 and retest after 4 more weeks.
 If symptoms still recur during stress or toxic exposures, consider prescribing portable oxygen (USP 99 or USP 93) for up to 2 hours per day as needed during such emergencies. Note that small canisters of USP 99 oxygen containing a 10-15 minute supply are available without a prescription from www.rei.com. The canister is attached to a small nasal mask and small enough to fit in a purse or pocket. It can be taken anywhere for emergency use except on commercial aircraft.