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All feedback and suggestions are welcome. Please forward to: Clinical.Guidelines@ambulance.qld.gov.au

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Organophosphates are pesticides that inhibit acetylcholinesterase enzymes, increasing the action of the neurotransmitter acetylcholine. Acetylcholine excess leads to a cholinergic syndrome that may be fatal.[1] Carbamates are similar to organophosphates in toxicity, but the clinical features are typically less severe.[1]

<table>
<thead>
<tr>
<th>Organophosphates:</th>
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<tbody>
<tr>
<td>Chlorpyrifos</td>
</tr>
<tr>
<td>Coumaphos</td>
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<td>Diazinon</td>
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<tr>
<td>Dichlorvos</td>
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<tr>
<td>Dimethoate</td>
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<tr>
<td>Fenthion</td>
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<tr>
<td>Malathion</td>
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<td>Trichlorfon</td>
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<table>
<thead>
<tr>
<th>Carbamates:</th>
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</thead>
<tbody>
<tr>
<td>Carbendazim</td>
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<tr>
<td>Oxamyl</td>
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<tr>
<td>Carbofuran</td>
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<tr>
<td>Methomyl</td>
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<td>Methiocarb</td>
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<tr>
<th>Nerve agents:</th>
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<tbody>
<tr>
<td>Sarin</td>
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<td>Tabun</td>
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<td>Soman</td>
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<td>VX</td>
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<th>Pharmaceuticals:</th>
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<tbody>
<tr>
<td>Rivastigmine</td>
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<td>Pyridostigmine</td>
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<tr>
<td>Pilocarpine</td>
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<tr>
<td>Bethanechol</td>
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</tbody>
</table>

### Clinical features

Clinical features are of cholinergic excess. The onset can be delayed up to 12 hours with some agents. All patients with suspected exposures should be transported to hospital for assessment.

**Clinical features of Muscarinic excess ‘DUMBBELS’[2]**

- Diarrhoea
- Urination
- Miosis (constricted pupils)
- Bronchorrhoea/bronchospasm
- Bradycardia
- Emesis
- Lacrimation
- Salivation
- Hypotension (a late sign and suggests severe toxicity)

**Clinical features of Nicotinic excess**

- Fasciculations
- Tremor
- Muscle weakness
- Respiratory muscle paralysis

**Central effects**

- Agitation
- Seizures
- Coma
Risk Assessment

- Deliberate self poisoning can be life-threatening.[3]

Additional information

- Universal precautions are sufficient to prevent contamination of others.[5]
- Atropine is used to block the muscarinic effects of acetylcholine.[4]
- In life-threatening toxicity, large cumulative doses of atropine may be required.
- A chemical pneumonitis can develop if the hydrocarbon solvent is aspirated.[1]
- Cholinergic syndrome may also result from nicotinic agents (nicotine patches, tobacco products and plants) and muscarinic agents (mushrooms).
- Inhalational or dermal exposure is rarely life-threatening. The smell of an agent does not indicate exposure as it is usually the solvent and poses no toxicity risk to paramedics or bystanders.[6]

Consider:
- Verbal de-escalation
- QPS assistance
- Physical restraint
- EEA

Manage as per:
CPG: Sedation – Acute behavioural disturbance

Ongoing imminent risk of harm?

Y

EVIDENCE OF SERIOUS TOXICITY?
- Hypotension
- Bradycardia
- Bronchospasm
- Paralysis
- Seizures
- Coma

Y

Consider:
- Atropine
- Oxygen
- IPPV
- IV access
- IV fluid

N

Consider:
- Oxygen
- IV access
- Antiemetic

Transport to hospital
Pre-notify as appropriate

Note: Clinicians are only to perform procedures for which they have received specific training and authorisation by the QAS.