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WHITE PAPER

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#2021-06-04-04	Acetaminophen		June 4, 2021
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Appropriate management of acute pain is an integral part of patient management in the prehospital setting. Adequate pain relief is known to minimize anxiety, decrease intracranial pressure and decrease cardiac complications associated with acute pain, and, of course, decrease human suffering. For prehospital patients experiencing moderate to severe pain due to traumatic injury, current guidelines strongly recommend initial pain management be initiated in the prehospital setting. Previously, options focused on weight-based opioids, either intravenous (IV/IO) morphine or IV/IO/intranasal (IN) fentanyl. However, these medications are not without risk including respiratory depression, hypotension, sedation and vomiting. Further complicating the appropriate use of prehospital opioids is the risk of abuse and the resulting epidemic in the United States. These are not uncommon adverse events and have led to alternative analgesic options. Nonopioid analgesics, including ketamine, acetaminophen (APAP), nitrous oxide/oxygen and nonsteroidal anti-inflammatory drugs (NSAIDs), have been used to provide analgesia. With this in mind, the Maine EMS Medical Direction and Practices Board (MDPB) has added intravenous acetaminophen to the Maine EMS formulary at the AEMT and Paramedic scope of practice and has made oral acetaminophen available to providers from the EMT through Paramedic level.

Maine EMS 2021 Protocol Acetaminophen Dose Chart

Weight lbs/kgs	Acetaminophen Dose	Number of 80 mg Chew tabs
NOTE: Oral Acetaminophen is for children 5 years and older AND 20 lbs. and over		
20 – 26 lbs/9.4 – 12 kgs	160mg	2 tab
27 – 32 lbs/12.1 - 14.7 kgs	200mg	2.5 tab
32 – 38 lbs/14.8 - 17.3 kgs	240mg	3 tab
44 – 50 lbs/17.4 – 20 kgs	280mg	3.5 tab
44 – 50 lbs/20.1 - 22.7 kgs	320mg	4 tab
50 – 56 lbs/22.8 - 25.3 kgs	360mg	4.5 tab
56 – 65 lbs/25.4 - 29.3 kgs	400mg	5 tab
65 – 76 lbs/29.4 - 34.7 kgs	480mg	6 tab
76 – 89 lbs/34.8 - 40.3 kgs	560mg	7 tab
89 – 120 lbs/40.4 – 55 kgs	640mg	8 tab
121 lbs and up/ 55.1 kgs and up	960mg	12 tab

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The MDPB considered many alternatives, including releasing nitrous oxide, ketamine or fentanyl to levels outside of the Paramedic licensure and adding IV NSAIDS (i.e., ketorolac) or oral NSAIDs (i.e., ibuprofen). Ultimately, the risk-benefit ratios favored expanded use of acetaminophen due to its efficacy and safety profile. Opioids, as mentioned, carry risks of sedation, respiratory depression, hypotension, vomiting and addiction; ketamine has its own inherent risks including hallucinations, hypersalivation and laryngospasm; nitrous oxide has been documented to cause worsening of pneumothoraces, hypotension, apnea and vomiting; ketorolac is associated with increased bleeding, thrombosis and kidney injury; acetaminophen can lead to hepatotoxicity. All interventions, including medications, come with inherent risk, which is why it is essential to understand the indication of each medication and the potential side effects of that treatment. Though no medication is 100% safe (even oxygen, glucose and normal saline can be detrimental if not administered appropriately), of the analgesic options available, acetaminophen is one of the safest. It is this fact that led to the decision to liberalize the use of oral acetaminophen in the field and add an intravenous product to the formulary. The intravenous formulation is available for those patients who are unable to take oral medications (whether for risk of aspiration, mental status changes, vomiting, presence of head injury or to very young patients).

Accompanying the protocol are dose charts based on weight to assist with appropriate use. Please note, in pediatric patients, the protocol requires the child to be 5 years old and 20 lbs. (9.1 kg) or larger to receive the oral form of acetaminophen. At the AEMT scope of practice, intravenous acetaminophen is available for patients weighing 70 kg (154 lbs.) or more. At this weight, the weight-based and maximum dose is 1000mg.

Formulation and administration specific notes:
The oral form of acetaminophen available for use in the prehospital setting is the chewable tablet. If your patient is unable to safely swallow or chew the tablets, this form should be avoided. It is this fact that has led to a lower-end age- and weight-based cutoff for use of oral acetaminophen.

Intravenous acetaminophen is packaged in glass bottles. Storage should account for the fragile nature of this container. Attach an administration set in accordance with the manufacturer's recommendations which may vary by product. The administration set should include *vented* tubing. Glass (and some plastic) containers are rigid and cannot collapse as a drug is infused. The vent allows for air to replace the volume infused and allow flow to continue. Please be sure to carry appropriate tubing or be prepared to transfer the dose into an empty bag for administration.

Weight (kg)	Acetaminophen Dose – Intravenous 12.5 mg/kg IV
8 - 11	100mg
12 - 15	150mg
16 - 19	200mg
20 - 23	250mg
24 - 27	300mg
28 - 31	350mg
32 - 35	400mg
36 - 39	450mg
40 - 43	500mg
44 - 47	550mg
48 - 51	600mg
52 - 55	650mg
56 - 59	700mg
60 - 63	750mg
64 - 67	800mg
68 - 71	850mg
72 - 75	900mg
76 - 79	950mg
>/= 80	1000mg

A pump will not be required for doses of 1,000mg (the standard dose for adults 70 kg and larger). Intravenous acetaminophen will require administration via a pump for doses less than 1,000mg. Please note, the 2021 Maine EMS Protocols only allow Paramedics to provide intravenous acetaminophen to patients less than 70 kg.

Administer appropriate dose of undiluted acetaminophen over 15 minutes.