Paediatric Office Emergencies: Preparedness and pre-hospital care

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Objectives

At the conclusion of this activity, participants will be able to:

• Perform a self-assessment of office readiness to respond to pediatric emergencies in the outpatient setting.

• Identify the components of a pediatric emergency response plan and the resources required.

• Name the most common pediatric emergencies presenting in primary care offices and review the initial management of these presentations.
95% saw at least one patient in need of resuscitation within the last year.

Median of 8 emergencies per year.

Johnston, Coulthard and Dick (2001)
“life threatening emergency calls”

264

paediatric calls

Liddy, Dreise and Gaboury (2009)
Survey of family physicians and paediatricians in an urban setting

62% Reported seeing more than one child per week who required hospitalization or urgent stabilization

80% Reported seeing at least one severely ill child in the office setting within a 3 month period

Fuchs, Jaffe and Christoffel (1989)
PREPAREDNESS

Less than 20% had completed PALS training
6% of offices had conducted a mock emergency
30% did not have child sized masks for oxygen administration

Mansfield, Price, Frush and Dallara (2001)
Asthma flares (93%)
Serious febrile illness (65%)
Allergic reactions (64%)
Dehydration (64%)
Severe croup (48%)
Foreign body (11%)

Mansfield, Price, Frush and Dallara (2001)
UK Study of 27 primary healthcare centres in the Nottingham City region showed lack of availability and accessibility of basic paediatric resuscitation equipment and algorithms.

Gnanalingham, Harris and Didcock (2006)
Barriers

• Perception that emergencies are rare
• Time constraints
• Financial constraints - prohibitive cost
• Proximity of hospitals and emergency departments

Sempowski and Brison (2002)
Patient Safety

• **Canadian Medical Association's Code of Ethics:** physicians should “provide whatever appropriate assistance you can to any person with an urgent need for medical care."

• **Canadian Medical Protection Association:** Physicians owe a duty of care to be prepared for complications that may arise from the medical interventions they are providing
Policy Statements

• American Academy of Pediatrics (AAP) Committee on Pediatric Emergency Medicine
  • Preparation for Emergencies in the Offices of Pediatricians and Pediatric Primary Care Providers Policy Statement

• Canadian Paediatric Society (CPS)
  • No official policy statement
  • Expired: Guidelines for paediatric emergency equipment and supplies for a physician’s office (2009)
  • Heterogeneity of care settings across Canada
  • Resource and geography challenges
Office Readiness and Emergency Response Planning
Risk Profile

- **Low risk offices:**
  - Urban location
  - Close to emergency departments
  - Low patient volumes
  - No parental medications given
  - Limited scope of practice

- **Moderate-high risk offices:**
  - Rural or remote locations
  - No local hospital
  - High-volume, large-group practice
  - Parental medications frequently given
  - No access to EMS
  - Delay in EMS response
  - Walk-in clinic

Sempowski and Brison (2002)
Office Self Assessment

**EMERGENCY CHARACTERISTICS**
- Frequency
- Type
- Office setting

**EXTERNAL ENVIRONMENT**
- External resources
- Accessing EMS
- EMS response time
- Distance to nearest ED/pediatric centre

**STAFF CHARACTERISTICS**
- Staffing schedule
- Staff emergency preparedness
- Non-clinical staff knowledge
- Skill maintenance

**EMERGENCY EQUIPMENT AND SUPPLIES**
- Availability
- Accessibility
- Emergency dosage
- Documentation strategy
Office Emergency Response Plan

RECOGNIZE

STABILIZE

TRANSFER
Office Emergency Response Plan

Maintain Preparedness

Recognize Emergency

EMS Activation

Roles + Responsibilities During Response
Office Emergency Response Plan

Maintain Preparedness
Maintaining Preparedness

• Basic life support
• Paediatric advanced life support (resource, location dependent)
• Emergency kit
• Written emergency protocol
• Identification of emergency routes
• Mock emergencies
Recommended Equipment: Airway Management

**Essential**
- Oxygen-delivery system
- Bag-valve mask
- Oxygen masks, breather and non-rebreather with reservoirs
- Suction device, tonsil tip, bulb syringe
- Nebulizer
- Oropharyngeal airway
- Pulse oximeter

**Strongly Suggested (essential if EMS time is > 10 minutes)**
- Nasopharyngeal airways
- Magill forceps
- Suction catheters and Yankauer suction tip
- Nasogastric tubes
- Laryngoscope
- Endotracheal tubes
- Stylets
- Esophageal intubation detector or end-tidal carbon dioxide

AAP Policy Statement (reaffirmed 2019)
Recommended Equipment: Vascular access and fluid management

**Essential**

**Strongly Suggested (essential if EMS time is > 10 minutes)**

- Butterfly needles
- Catheter-over-needle device
- Arm boards, tape, tourniquet
- Intraosseous needles
- Intravenous tubing, microdrip

AAP Policy Statement (reaffirmed 2019)
Recommended Equipment: Miscellaneous

**Essential**
- Colour coded tape or preprinted drug doses/Broselow tape
- Cardiac arrest board/backboard
- Blood pressure monitor (infant, child, adult, thigh cuffs)
- Splints, sterile dressings

**Strongly Suggested (essential if EMS time is > 10 minutes)**
- Automated external defibrillator with pediatric capabilities
- Spot glucose test
- Stiff neck collars (small/large)
- Heating source (overhead warmer/infrared lamp)

AAP Policy Statement (reaffirmed 2019)
Recommended Drugs

**Essential**
- Oxygen
- Salbutamol
- Epinephrine (1:1000)

**Strongly Suggested (essential if EMS time is > 10 minutes)**
- Activated charcoal
- Antibiotics
- Anticonvulsant agents
- Corticosteroids
- Dextrose
- Diphenhydramine
- Atropine sulfate
- Naloxone
- Sodium bicarbonate
- Normal Saline or lactated Ringers
- 5% Dextrose, 0.45 normal saline

AAP Policy Statement (reaffirmed 2019)
Mock Office Emergencies

Office Preparedness for Pediatric Emergencies (OPPE)

1. Increase the number of primary care physicians with up to date pediatric resuscitation knowledge and skills
2. Train office staff in the identification of acutely ill and injured children
3. Provide practices with emergency treatment protocols
4. Educate practices about the role and level of training of local EMS providers

Bordley et al. (2003)
INTERVENTION

20 practices
60%
118

CONTROL

19 practices
21%
54

Bordley et al. (2003)
20 pediatric primary care practices underwent simulation training

Pre-simulation

- Preparedness: 2.95
- Management: 3.22

Post-simulation

- Preparedness: 4.02
- Management: 4.53

Kalidindi and Lacy (2018)
**Office Mock Emergency Examples**

**Anaphylaxis**

4 year old girl was stung by a bee playing outside, mom noticed his eyes and lips swelled within minutes, she presented to your walk-in clinic when she developed wheezing.

**Asthma**

7 year old boy has been wheezing for 2 days with an upper respiratory tract infection but worsened this morning, mom brought him to your office in the afternoon. He has been giving himself puffs of his inhaler every half hour.

AAP Policy Statement (reaffirmed 2019)
Office Mock Emergency Evaluation Form

<table>
<thead>
<tr>
<th>Clinical primary survey</th>
<th>Yes</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airway assessed initially</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breathing then assessed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxygen started for respiratory distress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circulation assessed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial interventions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protocol or treatment guideline followed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient reassessed frequently</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary survey (head-to-toe examination)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All supplies requested were available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplies were found quickly when requested</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Code form” available and/or used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personnel knew how to use equipment properly (O₂ tanks, etc)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protocols available and/or used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Office Mock Emergency Observations

Clinical
- Were the ABCs assessed rapidly at the onset of the emergency then reassessed at frequent intervals during the resuscitation?
- If intravenous access was not established within 90 seconds, did the team move rapidly to intraosseous access?
- Once the ABCs were assessed, did the examiner complete a systematic evaluation of the patient?
- When interventions were unsuccessful, did the team move rapidly to another intervention?
- Was the patient stabilized before the transfer, or was the “scoop-and-run” principle utilized?
- Did office practitioners use services that EMS can provide, including equipment and skills?

Organizational
- Was the EMS system activated promptly?
- Was communication directed and clear between all members of the emergency team?
- Were roles clearly assigned by the team leader?
- Were all members of the emergency team free to make suggestions on the patient’s behalf?
- Did anyone speak to the family during the emergency stabilization?
- Did someone record the events during the emergency stabilization?

AAP Policy Statement (reaffirmed 2019)
Office Emergency Response Plan

Maintain Preparedness

Recognize Emergency
Paediatric Assessment Triangle

Appearance (mental status, muscle tone):
- Tone
- Irritability
- Consolability
- Look (gaze)
- Speech

Work of breathing (respiratory effort, respiratory rate):
- Laboured or fatigued
- Retractions
- Nasal flaring
- Accessory muscle use

Circulation (skin, mucous membranes):
- Pallor
- Mottling
- Cyanosis
- Bleeding
Paediatric Assessment Triangle

- Appearance
- Circulation to skin
- Work of Breathing

= STABLE

= RESPIRATORY DISTRESS

= RESPIRATORY FAILURE

= SHOCK

= CNS / METABOLIC

= CARDIO-PULMONARY FAILURE
Office Emergency Response Plan

Maintain Preparedness

Recognize Emergency

EMS Activation
EMS Activation

- Office address and location
- Patient information
- Clinical staff present
- Level of response (BLS vs. ALS)
- Desired transport destination
- Meeting spot
Office Emergency Response Plan

Maintain Preparedness

Recognize Emergency

EMS Activation

Roles + Responsibilities During Response
Roles and Responsibilities: Communication

- Activate office emergency response system
- Contact emergency medical services
- Bring patient to appropriate location
- Inform other patients of delays
- Evacuate patients if required
- Clear pathway for EMS
- Get or print patient profile
- Get emergency equipment
- Participate in team debrief
Roles and Responsibilities: Medical

• Primary survey (ABCDE)
• Secondary survey
• Ongoing assessment
• If > one clinician can assign roles:
  • Team lead
  • Airway
  • Assist with resuscitation
  • Administering medications
  • Documentation
  • Help where needed
Prevention and Education

• Anticipatory guidance for families
• Advocating for first aid and CPR training for caregivers
• Guidance about what services can be provided in the office
• Where to go when the office is not open
• Telephone triage

Klig and O’Malley (2007)
Approach to the Unwell Child
Primary Survey

- Airway
- Breathing
- Exposure
- Disability
- Circulation
Airway

- Determine patency
- Check for breath sounds
- Positioning
  - Head tilt, chin lift
  - Avoid overextension head/neck in infants
- Suction
- Foreign body aspiration
  - < One year = 5 back slaps + 5 chest thrust
  - > One year = abdominal thrusts
- Adjuncts

Breathing

• Respiratory rate
  • < 10 or > 60 abnormal
  • Irregular vs. tachypnea vs. bradypnea

• Respiratory effort
  • Nasal flaring, retractions, head bobbing, seesaw respirations

• Chest wall expansion

• Airway sounds
  • Stridor, gurgling, snoring, wheezing, crackles, cough, grunting (late)

• Auscultation

• Pulse oximetry
  • <94% RA = hypoxemia
Circulation

- Skin appearance
- Heart rate and rhythm
  - Tachy
    - > 180/min in infant or toddler
    - > 160/min in child >2 years
  - Bradycardia
    - <100/min infant
    - < 60/min in child
- Pulses
  - Central and peripheral

- Capillary refill
  - 2 seconds or less
- Blood pressure

<table>
<thead>
<tr>
<th>Age</th>
<th>Minimum SBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonate (0-28 days)</td>
<td>&gt;60</td>
</tr>
<tr>
<td>Infant (1-12 months)</td>
<td>&gt;70</td>
</tr>
<tr>
<td>Children 1-10 years</td>
<td>&gt;70 + (age in years x 2)</td>
</tr>
<tr>
<td>Children &gt; 10 years</td>
<td>&gt;90</td>
</tr>
</tbody>
</table>
Disability

• AVPU Paediatric Response Scale
• Modified Glasgow Coma Scale
• Pupillary response
• Blood glucose
Disability

- AVPU Paediatric Response Scale
  - Cerebral cortex function
  - Prehospital setting

<table>
<thead>
<tr>
<th>AVPU Response</th>
<th>GCS Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alert</td>
<td>15</td>
</tr>
<tr>
<td>awake, active, appropriately responsive</td>
<td></td>
</tr>
<tr>
<td>Verbal</td>
<td>13</td>
</tr>
<tr>
<td>responds only to voice</td>
<td></td>
</tr>
<tr>
<td>Painful</td>
<td>8</td>
</tr>
<tr>
<td>responds only to painful stimulus</td>
<td></td>
</tr>
<tr>
<td>Unresponsive</td>
<td>6</td>
</tr>
<tr>
<td>does not respond to any stimulus</td>
<td></td>
</tr>
</tbody>
</table>
## Disability

- Modified Glasgow Coma Scale

<table>
<thead>
<tr>
<th>SCORE</th>
<th>EYE RESPONSE</th>
<th>BEST VERBAL RESPONSE</th>
<th>BEST MOTOR RESPONSE</th>
<th>PEDIATRIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No response</td>
<td>Grunts, agitated, restless</td>
<td>Abnormal extension (Decerebrate)</td>
<td>&lt;2 years</td>
</tr>
<tr>
<td>2</td>
<td>Eyes open to painful stimuli</td>
<td>Inconsistently inconsolable</td>
<td>Abnormal flexion (Decorticate)</td>
<td>2-5 years</td>
</tr>
<tr>
<td>3</td>
<td>Eyes open to verbal stimuli</td>
<td>Cries but consolable</td>
<td>Flexion withdrawal from pain</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Spontaneous</td>
<td>Smiles, follows objects, interacts</td>
<td>Withdraws from being touched</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

https://www.eventmedicinegroup.org
Exposure

• Keep child warm
• Focused physical exam
• Evidence of nonaccidental trauma
  • Injuries not correlating with history
  • Delay in presentation
• Dermatologic findings
• Extremity injuries
Secondary Survey

- Focused history
  - AMPLE history
- Detailed physical exam
- Ongoing reassessment
  - Paediatric Assessment Triangle
  - ABCDE
  - Effectiveness of interventions
Common Paediatric Office Emergencies
Paediatric Office Emergencies

- Asthma exacerbations and other respiratory emergencies
- Seizures
- Sepsis or severe infection
- Dehydration
- Anaphylaxis
- Choking
- Poisoning
- Head injury
- Cardiac arrest (rare)
Asthma

• Measure vitals and SpO2
• Physical exam
• Salbutamol
  • 4-8 puffs MDI q20-30min x 3 doses
  • 2.5-5mg nebulizer q20-30min x 3 doses
• Ipratropium
  • 4-8 puffs q20min PRN for up to 3h
  • 250mcg/dose (<20kg) q20min x 3 doses
  • 500mcg/dose (>20kg) q20min x 3 doses
• Supplemental oxygen to maintain SpO2 > 92%
• Oral glucocorticoids
  • Dexamethasone 0.6 mg/kg/dose (max 16mg)
  • Prednisone 1-2mg/kg po (max 60mg)
• Epinephrine 1mg/mL (1:1000)
  • 0.01mg/kg IM or SC (maximum 0.5mg/dose) q10-20min x 3 doses

*If severe exacerbation initiate treatment while arranging transfer
# Asthma

### Assessment: Use PRAM Scoring Tool

<table>
<thead>
<tr>
<th>SIGNS</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suprasternal indrawing</td>
<td>Absent</td>
<td>Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scalene retractions</td>
<td>Absent</td>
<td>Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheezing</td>
<td>Absent</td>
<td>Expiratory only</td>
<td>Inspiratory +/− expiratory</td>
<td>Audible wheeze/ silent chest/ minimal air entry</td>
</tr>
<tr>
<td>Air entry</td>
<td>Normal</td>
<td>Decreased at bases</td>
<td>Widespread decrease</td>
<td>Absent/minimal</td>
</tr>
<tr>
<td>$O_2$ Saturation (Room Air)</td>
<td>&gt;94%</td>
<td>92–94%</td>
<td>&lt;92%</td>
<td></td>
</tr>
</tbody>
</table>

### Mild Asthma (PRAM 1–3)
- Salbutamol MDI x 1 treatment, reassess in 60 min

### Moderate Asthma (PRAM 4–7)
- Salbutamol MDI q 20 minutes x 3 treatments
- Dexamethasone 0.6 mg/kg/dose (MAX 12 mg) within 60 minutes

### Severe Asthma (PRAM 8–12)
- 3 consecutive treatments of:
  - Salbutamol (MDI or neb) + Ipratropium (MDI or neb)
  - Dexamethasone 0.6 mg/kg/dose (MAX 12 mg) within 60 minutes

### Impending Respiratory Failure (PRAM 12 + lethargy, cyanosis, decreasing respiratory effort, and/or rising $pCO_2$)
- Add Magnesium sulfate 50 mg/kg IV over 20 - 30 min (MAX 2000 mg /dose)
- Hydrocortisone 8 mg/kg IV if po steroid not tolerated (MAX 400 mg/dose)
Anaphylaxis

• Recognition
  • Skin/mucosal changes PLUS Resp +/- Cardio +/- GI symptoms OR
  • Hypotension, bronchospasm or upper airway obstruction with exposure to known allergen

• Initial management
  • Remove offending trigger if possible
  • Put patient supine unless resp destress or vomiting
  • Assess ABCD, vitals
  • Call EMS
Anaphylaxis

• IM epinephrine 0.01mg/kg (1:1000 = 1mg/mL), MAX 0.5mg
• Epinephrine autoinjectors
  • <7.5kg = 0.15mg dose not ideal but appropriate
  • 7.5kg to 25kg = 0.15mg dose
  • > 25kg = 0.3mg dose
• **Route:** Intramuscular into anterolateral thigh
• Repeat IM epinephrine q5-10 minutes as needed
• **There is no absolute contraindication to epinephrine in anaphylaxis**
Anaphylaxis

• **Pruritis:** Non-sedating antihistamines for (cetirizine or rupatadine)
  • Avoid diphenhydramine due to sedating effects
  • Ranitidine unlikely to improve symptoms

• **Respiratory symptoms**
  • Sitting position
  • High flow oxygen, consider need for advanced airway
  • Inhaled salbutamol

• **Hypotension or poor perfusion/decreased LOC**
  • Supine position (do not sit up)
  • High flow oxygen
  • IV or IO access
  • Fluid bolus 20mL/kg IV/IO rapid push
Take Home Messages

• Paediatric office emergencies are uncommon, but do present to the family physician office

• Given the variability of practice environments in Canada, important to conduct a self-assessment of office readiness to determine what is feasible in your practice setting taking into account risk profile

• Depending on geography and resources, paediatric emergency response plans will require different levels of preparedness
Resources

• AAP Policy Statement: Preparation for emergencies in the offices of pediatricians and pediatric primary care providers.
• PBSG Pre-Hospital Care of Emergencies. Vol. 26 (4), February 2018
• [http://www.officeemergencies.ca/](http://www.officeemergencies.ca/)
• Translating Emergency Knowledge for Kids: [https://trekk.ca/](https://trekk.ca/)
Member Interest Groups Section

• Introducing the Member Interest Groups Section (MIGS) formerly Communities of Family Practice in Family Medicine

• The Member Interest Groups Section links CFPC members across Canada with similar practice interests. It fosters professional peer connections to explore and address issues impacting family medicine.

• The Member Interest Groups Section is designed to support the College of Family Physicians of Canada’s (CFPC’s) dedication to providing a professional home for family physicians across a diversity of clinical and non-clinical interests and practice types. Currently the Section is comprised of 19 different member interest groups.

• To join, simply indicate your interest(s) in your CFPC member profile or see the MIGS team at the Mainpro+ and Practice Support booth and they will make sure you’re kept up to date on any future developments!
MiGroups

*Powered by Members, Connected by TimedRight*

- MIGS members are invited to join **MiGroups**, a private, secure online community for family physicians.

- MiGroups is used by members to share their experiences with peers, ask clinical questions, promote new practice tools, learn about upcoming events, and more!

- To join, visit [http://cfpc.timedright.com](http://cfpc.timedright.com) or scan the QR code. Then, sign up with the email you use to receive CFPC emails.

Questions? Contact us at [migs@cfpc.ca](mailto:migs@cfpc.ca)
Please fill out your session evaluation now!

Complete a session evaluation one of two ways:

- FMF app
- Fmf.cfpc.ca

Session #: 269
Session Name: Paediatric Office Emergencies: Preparedness and pre-hospital care

YOUR FEEDBACK IS IMPORTANT TO US!
References


• CMPA. Preparing for a medical emergency — Anticipating the unexpected in an office or clinic, *CMPA Safety of Care*, January 2013


References


References

• PBSG Pre-Hospital Care of Emergencies. Vol. 26 (4), February 2018
• Translating Emergency Knowledge for Kids: https://trekk.ca/