

# USE OF TREAT-AND-RELEASE MEDICAL DIRECTIVES FOR PARAMEDICS AT A MASS GATHERING

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## ABSTRACT

**Introduction.** Paramedics provide a substantial proportion of care at mass gatherings but do not typically release patients without physician assessment. **Objective.** To evaluate treat-and-release medical directives implemented at a large single-day summer rock concert. **Methods.** Medical directives allowed paramedics to administer acetaminophen, dimenhydrinate, diphenhydramine, or polymyxin B ointment for common complaints without evidence of serious illness on history or examination. After treatment, patients were released or transferred to a medical facility according to predefined criteria. Patient demographics, chief complaint, treatment, and disposition were obtained from paramedic records. To determine whether any patients released by paramedic subsequently required ambulance transport, all ambulance records were searched for a period of eight hours before to 24 hours after the event. **Results.** More than 450,000 people attended the concert, with 1,870 presenting for medical attention. Four hundred seven patients received medications under the directives. No disposition was recorded in 13 cases. Two hundred ninety-nine patients were treated with acetaminophen, of whom 269 (90.0%) were released and 23 (7.7%) required additional care. Sixty-two patients received dimenhydrinate, 44 (71%) were released, and 14 (23%) required transport. Thirty-six patients received diphenhydramine, and 34 (94%) were released. Ten patients received polymyxin B and were released. No patient released by paramedics was found to have later required ambulance transport. **Conclusions.** Treat-and-release medical directives for paramedics at mass gatherings may help divert patients from requiring care at a medical facility. Future research is needed to determine the safety (morbidity and mortality) of these directives. **Key words:** emergency medical services; paramedic; treat and release; mass gathering; medical directives.

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Providing medical care at mass gatherings presents unique challenges. Many patients do not require transport to community hospitals if appropriate management and disposition are available at the event.<sup>1</sup> A variety of strategies are used to limit the number of transports off site and reduce the impact on hospitals in the community. These usually include the implementation of field hospitals staffed by physicians and nurses, first-aid units staffed by a variety of personnel, and mobile paramedic teams.<sup>2,3</sup>

Although paramedics provide a substantial proportion of care at many mass gatherings,<sup>3,4</sup> they do not typically possess the authority to release patients after treatment. Given this limitation, one rationale for having on-site physicians at mass gatherings is to reduce the need for off-site ambulance transports.<sup>1</sup> Treat-and-release medical directives may be another means of limiting the need for physician assessment or off-site transport, but the use of such directives at mass gatherings has not been previously described. Limited experience with such protocols had been accumulated at smaller mass gatherings in Toronto, but no systematic review with respect to their role or effectiveness had been carried out.

During the "Toronto Rocks!" Rolling Stones 12-hour outdoor concert held on July 30, 2003, with an expected attendance of 500,000 spectators, several measures were taken to provide as much on-site medical care as possible. These included implementation of a 76-bed field hospital, a 48-bed medical rehydration unit, and five freestanding first-aid tents. The field hospital and rehydration unit were staffed with physicians who were responsible for patient discharge and disposition, while the first-aid tents were intended to be staffed by paramedics who could discharge selected patients using treat-and-release medical directives.

We describe and evaluate medical directives designed to allow paramedics to treat and release patients with minor illnesses and injuries at a mass gathering.

## METHODS

Toronto Emergency Medical Services (EMS) is the sole EMS provider for the city of Toronto. Medical oversight is provided by EMS physicians working with the Base Hospital Program of the Sunnybrook and Women's College Health Sciences Center. Current

paramedic protocols in Toronto do not typically permit a paramedic to treat and release patients, although patients requesting not to be transported can sign a release form if they have the capacity to consent to or refuse treatment.<sup>5</sup>

In order to limit the need for physician assessments at the concert, a series of special-events medical directives were designed to allow paramedics to administer four medications that were not within their usual scope of practice. These included acetaminophen 650 mg po for headache or mild musculoskeletal pain, dimenhydrinate 25 to 50 mg po for nausea and/or vomiting, diphenhydramine 50 mg po for allergic rhinitis or isolated urticaria, and polymyxin B ointment for small wounds not requiring sutures or débridement. The medical directives are shown in the Appendix.

On the day of the concert, paramedics attended a one-hour briefing in a nearby staging area. The briefing consisted of an overview of the site, access routes, site communications, and instruction in the use of the special-events medical directives. Paramedics were instructed to assess vital signs, allergies, contraindications to treatment, and signs or symptoms of serious underlying illness. All directives included predefined criteria for transfer to a site medical facility. Patients who were candidates for release were advised of the availability of medical facilities at the concert and that they should seek additional care at their own discretion if their symptoms persisted or worsened.

After treatment, a paramedic could release the patient or transfer him or her for physician assessment. Those deemed suitable for release could be released by paramedics without direct physician-patient contact and without contacting online medical control. Lack of a satisfactory response to treatment usually indicated the need for transfer to the on-site medical facility or to hospitals in the community. Online medical control physicians were consulted to determine disposition only for those patients identified by paramedics as requiring physician assessment.

All off-site ambulance transports to a community hospital required use of the standard ambulance call report (ACR) used in the Province of Ontario. For all other patient encounters requiring treatment, a pocket-sized notebook filled with patient contact reports (PCRs) was issued to each paramedic. The PCRs were an abridged version of the ACR developed to facilitate record keeping for brief patient encounters during the concert. All ACRs and PCRs were collected immediately after the concert. Data abstracted included patient demographics, chief complaint, time of incident, initial vital signs, treatment, and disposition.

Although there was no formal follow-up conducted to determine whether patients released by paramedics subsequently presented to their physicians or to hospital emergency departments on their own, all ACRs for Toronto EMS were collected for a 48-hour period

starting eight hours before the concert and ending 24 hours after the concert. A hand search of these records was conducted to determine whether there were any instances in which patients required transport after release by paramedics within 24 hours.

The study was approved by the Sunnybrook and Women's College Health Sciences Center Research Ethics Board.

## RESULTS

More than 450,000 people attended the concert, with 1,870 (42 per 10,000 attendees) presenting for medical attention. A substantial proportion of patients were simply requesting water, sunscreen, or bandages. Records were not taken of these encounters. Records were obtained for 1,205 patients, of whom 703 were treated at the first-aid tents. Of these 703 patients, 407 (58%) received medications under the treat-and-release directives.

Table 1 summarizes the number and disposition of patients treated under the special-events medical directives. The average patient age for those who were treated with medications under the special-events medical directives was 28 years (range 12 to 61), and 66% were female. Overall, 357 (88%) patients out of 407 treated under these directives were released.

Disposition was not recorded in 13 (3%) cases, but the search of all 758 ACRs in the city of Toronto from eight hours before the concert until 24 hours after the concert showed that none of the patients treated under these protocols required subsequent ambulance transfer from the concert to community hospitals. In addition, no patient who was treated under the special-events medical directives and subsequently released by paramedics later required Toronto EMS transport within 24 hours after the end of the concert.

## DISCUSSION

Mass gatherings represent a significant medical and logistic undertaking for a community. Various strategies are employed to mitigate the effect of the event on EMS resources and community hospitals. Although

TABLE 1. Number and Disposition of Patients Treated under the Special-Events Medical Directives at the Concert\*

Special-Events Medical Directive	Patient Released	Patient Transferred for Further Care On Site	Patient Transferred to Community Hospital
Acetaminophen ( <i>n</i> = 299)	269 (90%)	23 (7.7%)	0
Dimenhydrinate ( <i>n</i> = 62)	44 (71%)	14 (23%)	0
Diphenhydramine ( <i>n</i> = 36)	34 (94%)	2 (6%)	0
Polymyxin B ( <i>n</i> = 10)	10 (100%)	0	0

\*Totals may not add up to 100% due to incomplete recording of patient disposition.

the composition of site medical teams usually includes volunteer first aiders, paramedics, registered nurses, and physicians, a substantial proportion of prehospital care in these settings is rendered by paramedics. One prospective study of patients presenting at motorized vehicle races showed that direct physician care or physician oversight was needed to provide care to nearly half of the patients.<sup>1</sup> The authors speculated that protocols could have been implemented at the mass gathering that would allow paramedics to treat and release patients who met predefined criteria.

Release of patients by paramedics without physician assessment is an area of controversy in prehospital care. One report found that 2% of patients who initially refused transport called 9-1-1 again within 48 hours with a chief complaint related to their original problem. These patients tended to be older (over 65 years) and all were transported on the second call. More than half required hospital admission and one died en route to the hospital.<sup>6</sup> Another study in rural New York State showed that 48% of patients who initially refused transport later sought medical care, with one-fourth requiring admission, and with one death in hospital.<sup>7</sup> Paramedic-initiated refusals are also problematic, with 18% reporting dissatisfaction with the paramedics' assessment and care and 22% later requiring hospital admission.<sup>8</sup> A more recent attempt to use a formal protocol to have paramedics identify patients who may not require ambulance transport did not achieve satisfactory results. Among 47 patients for whom hospital follow-up was available, eight were admitted to hospital, with three requiring monitored beds.<sup>9</sup> Finally, patient refusals pose significant medicolegal concerns, with nontransport occasionally resulting in litigation.<sup>10</sup>

There are few published studies on paramedic treat-and-release medical directives, with the majority evaluating protocols for diabetic patients with hypoglycemia. In one small series, patients could be released if their blood sugar, mental status, and vital signs had normalized, if they were not vomiting, and if they were not taking oral hypoglycemic agents. One patient out of the 38 enrolled developed hypoglycemic encephalopathy after release and required admission to a long-term care facility.<sup>11</sup> A study in Helsinki showed that 32.5% of hypoglycemic patients released after administration of intravenous or oral glucose required an ambulance and 95% sought care from their physician during a three-month follow-up period.<sup>12</sup> No data on adverse outcomes were reported. Other studies showing rates of recurrent hypoglycemia of between 2% and 9% and hospital admission rates of between 2% and 3% point to the relative safety of not transporting these patients.<sup>13,14</sup> However, both of these studies were limited by small sample sizes.

In our current system, we do not normally use treat-and-release medical directives for 9-1-1 callers. Patients

who wish to refuse treatment and transport must be assessed for mental capacity to determine their ability to make an informed decision and they must be advised of the risks of refusing treatment and transport. The treat-and-release directives used at the concert were implemented for a single, daylong event and were limited to patients with apparent mild complaints and no evidence on history or physical examination of serious underlying disease. Our target population included a large proportion of younger and presumably healthy adults attending a large rock concert. More than one-third of patients presenting for medical aid at the concert were treated using these directives, and 88% were released without physician assessment. The patients treated in first-aid tents under the treat-and-release medical directives were nearly as numerous as the 465 patients treated in the field hospital and would likely have represented a substantial challenge to the field hospital had all been transferred there for physician assessment. Of the 39 patients treated under the directives but subsequently transferred to the rehydration unit or field hospital, all were eventually discharged home or back to the concert, suggesting that paramedics were capable of safely selecting patients with mild, uncomplicated illnesses.

## LIMITATIONS AND FUTURE STUDY

This prospective observational study had inherent design limitations. There was no comparison group to determine whether released patients fared differently from those receiving traditional physician evaluation. No follow-up was arranged, nor was there any measure of patient outcomes, response to treatment, or relapse requiring additional medical care. Although the review of all ambulance transports and cancelled calls for the 24 hours after the concert found no instance of a patient released under our protocols who required another ambulance, patients presenting on their own to physicians or hospitals, or deaths to which there was no ambulance response would have been missed. Future implementation of these directives for mass gatherings should have formal follow-up arranged, as a large data set that can support or refute the safety of treat-and-release directives would be an important contribution to the prehospital literature.

The treat-and-release directives described herein were not developed for the general population of patients who call 9-1-1, nor would they necessarily be applicable to different demographic groups, weather conditions, or other types of mass gatherings. Patients attending the concert tended to be relatively young, and many of the patient presentations were due to heat and environmental exposure rather than underlying medical conditions. During the concert, crowd conditions at times severely restricted the movement of ambulances between the first-aid tents and the rehydration unit or

field hospital. This problem was addressed by sending physicians to the first-aid tents to help with patient management and disposition for those not meeting the directives. It is possible that there were instances of undocumented physician input to paramedics using the treat-and-release directives to manage patients in first-aid tents.

## CONCLUSIONS

Treat-and-release medical directives for paramedics providing care at mass gatherings allows the release of selected patients and may divert patients from requiring care at an on-site medical facility, or from being transported off site for care at a community hospital. We describe the use of a set of treat-and-release directives for mild, uncomplicated illnesses or injuries at a single-day mass gathering. Further study is needed to evaluate the safety and efficacy of such protocols.

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## APPENDIX

### *The Special-events Medical Directives*

### Prehospital Administration of Dimenhydrinate (Gravol)

When the following conditions exist, a paramedic may administer dimenhydrinate (Gravol) for nausea and/or vomiting.

#### Conditions

- Systolic blood pressure >100 and <180 mm Hg
- Glasgow Coma Score = 15
- Normal mental status

#### Contraindications

- Allergy or sensitivity to dimenhydrinate
- Continued or repeated vomiting (more than two episodes)
- Patient has previously received or taken dimenhydrinate within the previous four hours prior to paramedic contact
- Head injury
- Signs suggestive of a heat-related illness

#### Precautions

- Concomitant use of tranquilizers or sedatives, including ethanol

#### Procedure

1. Administer **dimenhydrinate** according to the following:
  - 6–12 years → 25 mg per os
  - >12 years → 50 mg per os
2. Advise the patient not to drive or operate heavy machinery.
3. Advise the patient to seek medical care if repeated vomiting occurs or the patient becomes thirsty or feels faint.
4. The patients may be released from care after treatment if he or she continues to have normal mental status and vital signs.

## Prehospital use of Polymyxin B (Polysporin)

When the following conditions exist, an emergency medical technician or paramedic may use polymyxin B (Polysporin) for minor wounds and abrasions.

### Conditions

- Uncomplicated cuts or abrasions.

### Contraindications

- Allergy or sensitivity to polymyxin B

### Procedure

1. Clean the cut or abrasion.
2. Place a small quantity of polymyxin B (Polysporin) onto an appropriate dressing and apply it to the affected area.
  - Instruct the patient to seek medical care if the affected area shows signs of infection, requires sutures, or requires débridement beyond simple irrigation.
  - Advise the patient to follow up with his or her primary health care provider to ensure that his or her tetanus status is up to date.

## Prehospital Administration of Acetaminophen (Tylenol)

When the following conditions exist, a paramedic may administer acetaminophen (Tylenol) for uncomplicated headaches and minor musculoskeletal pain.

### Conditions

- Headache *must* conform to the patient's usual pattern. Note: If there is any deviation from a patient's normal headache pattern (e.g., sudden onset, change in mental status, transient neurologic deficits), acetaminophen *must be withheld* and transport offered.
- The patient must be >12 years of age
- No neurologic deficits
- Glasgow Coma Score = 15

### Contraindications

- Allergy or sensitivity to acetaminophen
- Vomiting

### Procedure

1. Administer **acetaminophen (Tylenol) 650 mg per os**
2. All attempts must be made to ensure that the patient is transported to hospital if headache persists or does not conform to the patient's usual pattern, or if serious musculoskeletal injury is suspected (e.g., fracture). If the patient ultimately refuses transport, appropriate procedures must be followed.
3. The patient may be released from care after treatment if he or she continues to have normal mental status and vital signs.

## Prehospital Administration of Diphenhydramine (Benadryl®)

When the following conditions exist, a paramedic may administer diphenhydramine (Benadryl®) for allergic rhinitis ("hay fever"-type) symptoms or isolated hives (urticaria).

### Conditions

- Age  $\geq$  12 years
- Symptoms consistent with allergic rhinitis; e.g.: sneezing, runny nose, watery eyes
- Isolated hives without other signs of anaphylaxis
- Systolic blood pressure >100 AND <180 mmHg
- Glasgow coma score = 15

### Contraindications

- Allergy or sensitivity to diphenhydramine.
- Evidence of wheezing, or other signs of anaphylaxis
- Patient has previously received or taken antihistamines within the previous 4 hours prior to contact.
- Concomitant use of tranquilizers or sedatives, including ethanol.

### Precautions

- If the patient presents with signs and symptoms consistent with anaphylaxis, they should be treated according to the appropriate medical directive and transported to hospital.

### Procedure

1. Administer **diphenhydramine 50 mg per os**
2. Advise patient not to drive or operate heavy machinery.
3. Advise patient to seek medical care if short of breath, wheezy, unable to swallow, feels faint or experiences hives or facial or tongue swelling.
4. Patients may be released from care after treatment if they continue to have normal mental status, vital signs, and show no signs and symptoms of anaphylaxis.