

APPENDIX E

**SEVERITY INDEX FOR USE IN STATE-BASED
SURVEILLANCE OF ACUTE PESTICIDE-RELATED
ILLNESS AND INJURY**



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PURPOSE

The purpose of the severity index is to provide simple, standardized criteria for assigning severity to cases of acute pesticide-related illness and injury.

RATIONALE

It is important to assign a severity category to each case of acute pesticide-related illness and injury. An understanding of illness severity will be useful to evaluate the morbidity of acute pesticide-related illness and injury, to assess its impact on society, and to assist the targeting of limited intervention/prevention resources toward the most pressing pesticide problems.

DESCRIPTION

This severity index is based upon existing systems for ranking severity of poisonings, including pesticide illness [AAPCC 1992; Washington Department of Health 1999; EPA 1998; Persson et al. 1998]. It takes into account the following: signs and symptoms, whether medical care was sought, whether the individual was hospitalized, and whether lost time from work or usual activities occurred. Severity should be assigned only to acute pesticide-related illnesses or injuries classified as definite, probable, possible, or suspicious. As such, this severity index should be used in conjunction with the *Case Definition for Acute Pesticide-Related Illness and Injury Cases Reportable to the National Public Health Surveillance System* [NIOSH 2004].

Figure 1 is the flow diagram that should be used as a guide for assigning severity. The figure often refers to “the Table.” This is Table 1, a listing of signs and symptoms that correspond to the different severity categories. Many of the signs and symptoms in the table are included in *Standardized Variables for Pesticide Poisoning Surveillance* [NIOSH 2000]. When using the table, only signs and symptoms related to the pertinent acute pesticide-related illness or injury should be considered (that is, only consider those signs and symptoms used to classify the acute pesticide-related illness and injury as definite, probable, possible, or suspicious).

The list of signs and symptoms provided in the table is not comprehensive, but instead provides examples to assist in assessing severity. In addition, a given health effect may appear in more than one of the table’s severity columns. In such instances, the health effect observed as a sign (that is, a health

effect observed and described by a licensed HCP) will be considered as having greater severity compared to the health effect reported as a symptom (that is, a health effect perceived and reported by the patient but not observed by a licensed HCP).

This severity index provides standardized criteria to ensure inter-rater uniformity in assigning severity. However, we recognize that this severity index cannot address all conceivable clinical situations. Therefore, it is not realistic to insist on strict adherence to these criteria. The user must be flexible when using this severity index, given that the user will not infrequently need to employ judgment and experience when assigning severity.

A brief description of each of the four severity categories follows.

S-1 DEATH

This category describes a human fatality resulting from exposure to one or more pesticides.

S-2 HIGH SEVERITY ILLNESS OR INJURY

The illness or injury is severe enough to be considered life threatening and typically requires treatment. This level of effect commonly involves hospitalization to prevent death. Signs and symptoms include, but are not limited to, coma, cardiac arrest, renal failure, and/or respiratory depression. The individual sustains substantial loss of time (> 5 days) from regular work (this can include assignment to limited/light work duties) or normal activities (if not employed). This level of severity might include the need for continued health care following the exposure event, prolonged time off work, and limitations or modification of work or normal activities. The individual may sustain permanent functional impairment.

S-3 MODERATE SEVERITY ILLNESS OR INJURY

This category includes cases of less severe illness or injury often involving systemic manifestations. Generally, treatment was provided. The individual is able to return to normal functioning without any residual disability. Usually, less time is lost from work or normal activities (3 to 5 days), compared with those with severe illness or injury. No residual impairment is present (although effects may be persistent).

S-4 LOW SEVERITY ILLNESS OR INJURY

This is the category of lowest severity. It is often manifested by skin, eye, or upper respiratory irritation and may also include fever, headache, fatigue, or dizziness. Typically the illness or injury resolves without treatment. There is minimal lost time (< 3 days) from work or normal activities.

REFERENCES

- AAPCC [1992]. Toxic Exposure Surveillance System (TESS) Manual. Washington, DC: American Association of Poison Control Centers.
- EPA [1998]. Expanded explanation for the new FIFRA 6(a)(2)159.814 (5)(i)(A-E) and (5)(ii)(A E) exposure severity categories. Washington, DC: U.S. Environmental Protection Agency.
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- WSDOH [1999]. 1998 Annual Report, Pesticide Incident Reporting and Tracking Review Panel. Olympia, WA: Washington State Department of Health (WSDOH), Office of Environmental Health and Safety.

Table 1. Signs and symptoms by severity category. (Modeled after Persson et al. 1998 and includes SPIDER database elements.)

ORGAN SYSTEM	SEVERITY CATEGORY AND CODE			
	DEATH 1	HIGH 2	MODERATE 3	LOW 4
Gastrointestinal system	<p>Fatal</p> <ul style="list-style-type: none"> Severe or life-threatening signs Massive hemorrhage/perforation of gut 	<ul style="list-style-type: none"> Diarrhea (GI4, sign only) Melena (GI7) Vomiting (GI6, sign only) 	<ul style="list-style-type: none"> Abdominal pain, cramping (GI1) Anorexia (GI2) Constipation (GI3) Diarrhea (GI4, symptom) Nausea (GI5) Vomiting (GI6, symptom) 	<p>Mild, transient, and spontaneously resolving symptoms</p>
Respiratory system	<ul style="list-style-type: none"> Cyanosis (RESP 2) + Respiratory depression (RESP 7) Pulmonary edema (RESP6) Respiratory arrest 	<ul style="list-style-type: none"> Abnormal pulmonary x-ray Pleuritic chest pain/pain on deep breathing (RESP8) Respiratory depression (RESP7) Wheezing (RESP9) Dyspnea, shortness of breath (RESP4, sign only) 	<ul style="list-style-type: none"> Cough (RESP1) Upper respiratory pain, irritation (RESP3) Dyspnea, shortness of breath (RESP4, symptom) 	
Nervous system	<ul style="list-style-type: none"> Coma (NS3) Paralysis, generalized (NS10) Seizure (NS5, sign only) 	<ul style="list-style-type: none"> Confusion (NS4) Hallucinations (NS99 Other) Miosis with blurred vision (NS14) Seizure (NS5, symptom) Ataxia (NS1, sign only) Slurred speech (NS12) Syncope (fainting) (NS17) Peripheral neuropathy (NS11, sign only) 	<ul style="list-style-type: none"> Hyperactivity (NS2) Headache (NS7) Profuse sweating (NS13) Dizziness (NS15) Ataxia (NS1, symptom) Peripheral neuropathy (NS11, symptom) 	
Cardiovascular system	<ul style="list-style-type: none"> Bradycardia/ heart rate <40 for adults, < 60 infants and children, <80 neonates (CV1) Tachycardia/ heart rate >180 for adults, >190 infants/children, >200 in neonates (CV4) Cardiac arrest (CV2) 	<ul style="list-style-type: none"> Bradycardia / heart rate 40-50 in adults, 60-80 in infants/children, 80-90 in neonates (CV1) Tachycardia / heart rate=140-180 in adults, 160-190 infants/children, 160-200 in neonates (CV4) Chest Pain (CV7) + Hyperventilation, Tachypnea (RESP5) Conduction disturbance (CV3) Hypertension (CV6) Hypotension (CV5) 		

Table 1 (Continued). Signs and symptoms by severity category. (Modeled after Persson et al. 1998 and includes SPIDER database elements.)

ORGAN SYSTEM	SEVERITY CATEGORY AND CODE			
	DEATH 1	HIGH 2	MODERATE 3	LOW 4
	Fatal	Severe or life-threatening signs	Pronounced or prolonged signs or symptoms	Mild, transient, and spontaneously resolving symptoms
Metabolism		<ul style="list-style-type: none"> Acid Base disturbance (pH < 7.15 or > 7.7) 	<ul style="list-style-type: none"> Acid Base disturbance (pH = 7.15-7.24 or 7.60-7.69) Elevated anion gap (MISC4) 	<ul style="list-style-type: none"> Fever (MISC1)
Renal system		<ul style="list-style-type: none"> Anuria (GU2) Renal failure 	<ul style="list-style-type: none"> Hematuria (GU3) Oliguria (GU2) Proteinuria (GU4) 	<ul style="list-style-type: none"> Polyuria (GU1)
Muscular system		<ul style="list-style-type: none"> Muscle rigidity (NS9) + elevated urinary myoglobin + elevated creatinine 	<ul style="list-style-type: none"> Fasciculations (NS6) Muscle rigidity (NS9) Muscle weakness (NS8, sign only) 	<ul style="list-style-type: none"> Muscle weakness (NS8, symptom) Muscle pain (NS16)
Local effects on skin		<ul style="list-style-type: none"> Burns, second degree (involving >50% of body surface area) Burns, third degree (involving >2% of body surface area) 	<ul style="list-style-type: none"> Bullae (DERM1) Burns, second degree (involving <50% of body surface area) Burns, third degree (involving <2% of body surface area) 	<ul style="list-style-type: none"> Skin Edema/Swelling, Erythema, Rash, Irritation/Pain, Pruritis (DERM3 - 7) Hives/Urticaria
Local effects on eye		<ul style="list-style-type: none"> Corneal ulcer/perforation 	<ul style="list-style-type: none"> Corneal abrasion (EYE3) Ocular burn (EYE2) 	<ul style="list-style-type: none"> Lacrimation (EYE4) Mydriasis (EYE6) Miosis (EYE1) Ocular pain/irritation/inflammation (diagnosis of conjunctivitis) (EYE5)
Other effects				<ul style="list-style-type: none"> Fatigue (MISC5) Malaise (MISC6)

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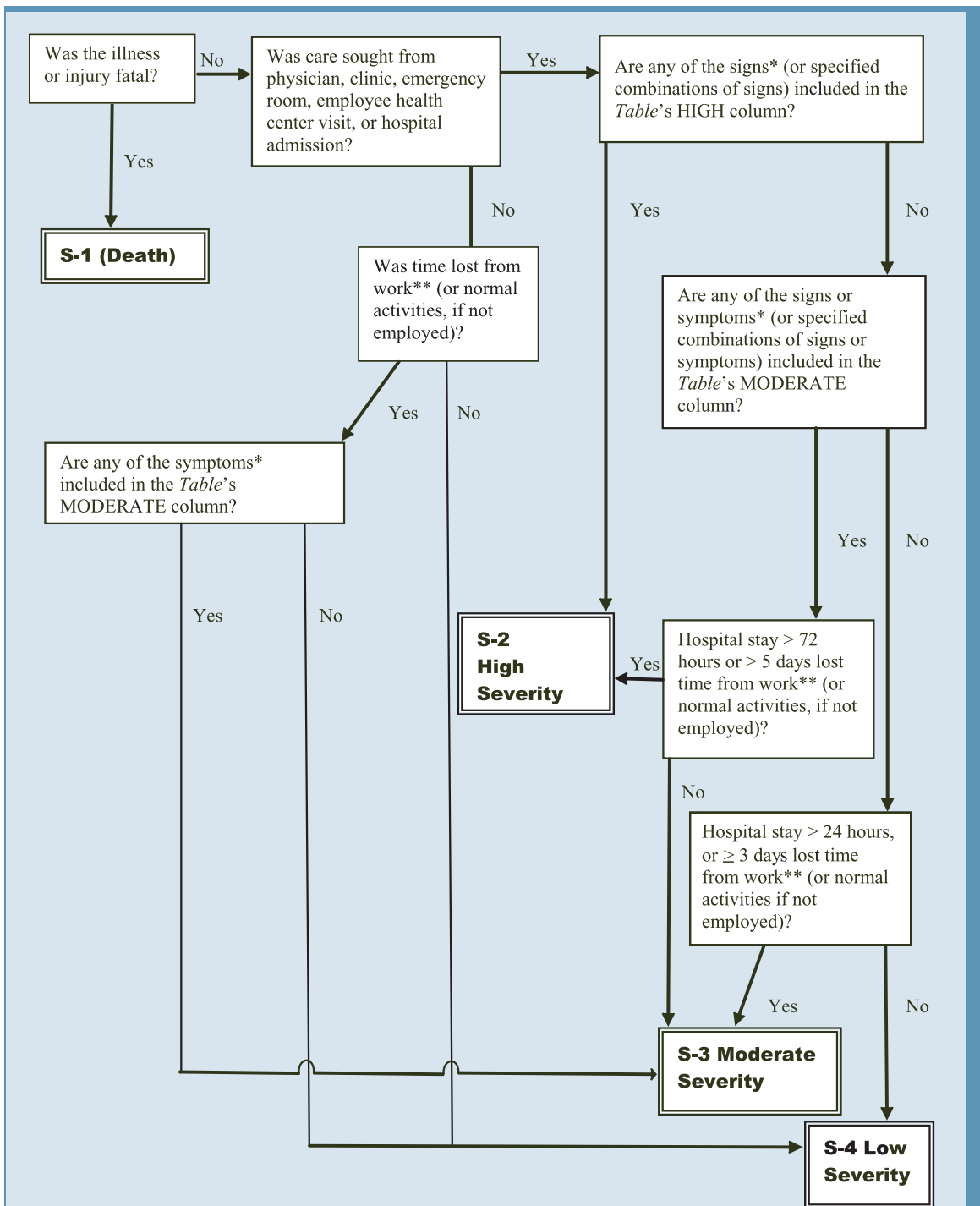


Figure 1. Flow diagram for assigning severity to cases of acute pesticide-related illness and injury.

* Consider only signs or symptoms related to pesticide exposure when assigning severity.

** This can include assignment to light/limited work duties resulting from prolonged illness or injury related to pesticide exposure.