TITLE PAGE

Agency:
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Project title: Outcomes of Agricultural Injury to Children in Missouri

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ABSTRACT

This project was initiated to examine the outcomes of childhood agricultural injuries and the impact of those injuries on the agricultural activities of their families. The outcomes to be studied were physical disabilities, both long- and short-term; educational challenges, medical costs; and financial and work-related impact on the families of injured children. Two methods would examine injury outcomes: Missouri state population-based comparison of injury frequency, severity, and cost for children living in agricultural and metropolitan settings; and surveys of at least 100 families of injured children regarding financial difficulties and changes in agricultural activity as a consequence of an agriculture-related injury to a child. The Missouri Trauma Registry and information obtained with assistance of agriculture teachers in schools would be used to identify families for the survey. The Missouri Patient Abstract System and the Head and Spinal Cord Injury registry would be used for rural/metropolitan comparisons. This project would build upon work carried out by Osberg *et al.* in Massachusetts. This research would expand the information regarding the full impact of childhood agricultural injury and help inform policy commitments to prevention efforts. Information about agricultural injuries to Missouri children would be used to develop and implement prevention strategies to address such injuries. The main finding was how difficult it is to develop a sampling frame of children who have incurred agriculture-related injuries.

The project has been discontinued with termination of funding after the first year. The parts of the project which were completed or underway before the project was discontinued include:

- Definition of the purpose and objectives of the project.
- Approval of the project by the Missouri Department of Health Institutional Review Board.
- Partial identification of subjects for the survey. Subjects were parents of Missouri children injured in agricultural or farm-related incidents.
- Analyses of the Missouri Head and Spinal Cord Injury Registry regarding the incidence of trauma due to agriculture-related injuries to children.
- Analyses of the PAS hospital data for injury records likely due to agriculture-related injuries.
- Consultation with: Richard M. Hessler, Professor of Sociology
  University of Missouri-Columbia
  David Baker, Professor of Agricultural Engineering
  University of Missouri-Columbia
  Terry Heiman, Director of Agricultural Education
  Missouri Dept of elementary and Secondary Education
- Development of a data collection instrument and cover letter.

LIST OF FIGURES

None

LIST OF ABBREVIATIONS

- CHIME: Center for Health Information Management and Epidemiology
- CODES: Crash Outcome Data Evaluation Systems
- HSCI: Head and Spinal Cord Injury Registry
- ICD-9-CM: International Classification of Diseases, 9th Revision, Clinical Modification
- IRB: Institutional Review Board (of Missouri Department of Health)
- MODOH: Missouri Department of Health
- PAS: Patient Abstract Data
- RSMo: Revised Statutes of Missouri
- STAT: State Technical Assistance Team

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SIGNIFICANT FINDINGS

Given the brief tenure of this project, the most significant finding is that it is very difficult to identify on a retrospective basis a large, representative sample of children with severe injuries directly related to agriculture work. Too few existing databases contain information allowing the identification of agriculture as the source of the injury (hospital discharge records). Other databases are not representative or contain too few cases (Head and Spinal Cord Injury Registry), or are not directly relevant (mortality records) despite indicating agriculture as the injury source.

USEFULNESS OF FINDINGS

Because this project was terminated after the first year and was never completed, there is nothing to report in this section.

BODY OF REPORT

The national action plan, *Children in Agriculture: Opportunities for Safety and Health,* (National Committee for Childhood Agricultural Injury Prevention, 1996) gives strong support to the need for research into the consequences associated with children and adolescents who participate in agricultural work. The Missouri research initiated with this project would address the recommended action of estimating the societal and economic costs and consequences associated with childhood agricultural injury.

Purpose and Objectives.
The purpose of the project was to examine the outcomes of childhood agricultural injuries and the impact of those injuries on the persons injured and their families. The outcomes to be studied were: physical disabilities, both long- and short-term; educational challenges; medical costs; and financial and work-related impact on the families of the injured persons. The information gathered by this project would assist in clarifying the specific causes, injuries, inpatient costs, continuing medical problems, impact on education, and ability of families to continue farming.

The hypotheses to be tested were:
- -For a selected pediatric population, the physical, educational, and financial outcomes of agricultural/rural childhood injuries can be identified and studied.
- -In Missouri, rural and agriculture-related injuries to children are more frequent, severe and/or expensive than injuries to children living in metropolitan areas.
- -The outcomes of severe injuries to children affect the agricultural activity and productivity of their farming families.
- -For a state population, there are statistically significant differences in injury causes for rural children compared with metropolitan children.

Missouri's geography has resulted in distinct patterns of agricultural activity in several areas of the state. This project would study injuries related to varying agricultural production: grains, dairy farming, and cotton and rice. The presence of two major metropolitan areas in the state provides a basis for comparison of rural and urban injury patterns in children.

The information gathered by this project would assist in clarifying the specific injury risk factors for rural children. Awareness of the impact of childhood injury on farming families would increase the commitment to prevention. Major challenges in preventing agricultural injuries are correct identification of risk factors and consensus about appropriate prevention mechanisms. A clearer definition of outcomes related to specific causes of agricultural injuries to children would help meet these challenges.

Child Agricultural Injury in the Literature.
Survey of literature of the field confirms that little is known about the outcomes of agricultural injuries in children. While fatality data provide information on the most severe injuries from all causes, the losses, whether human, societal, or fiscal, resulting from non-fatal injuries have been very difficult to quantify. However it is estimated that "persons 19 years of age or younger are involved in 25,000 nonfatal traumatic events and 300 injury deaths on farms annually in the United States" (Heyer, *et al.*, 1992).

Most farms in the United States are not covered by the Occupational Safety and Health Act because they are managed by the family, with no one outside of the family

employed on the farm. Because there are no existing restrictions of age or hazards for children working on their parents' farms, farm operators are left to determine what activities are safe. In addition, children are dependent upon their adult care givers for the first several years of life. *"Parents bring their children to the fields because there is little accessible, affordable day care in rural areas. Thus, infants, toddlers, and young children are exposed to the same workplace hazards as their parents"* (Wilk, 1993). With injury being the leading cause of death and disability in young people, much more needs to be known about causation and outcomes of childhood injury, and those injury outcomes need to be compared with other types of injuries to so that effective prevention efforts can be identified and implemented (National Committee for Childhood Agricultural Injury Prevention).

A major challenge for the field of injury control is to move to comprehensive information regarding non-fatal injuries. Motor vehicle injuries are the most completely documented type of injury, as current Crash Outcome Data Evaluation Systems (CODES) work demonstrated. Morbidity represents the area of greatest direct fiscal cost. Occupational injuries to adults have been extensively researched because information is available, either due to government regulations or because companies themselves have pursued reduction in on-the-job injuries from both the humanitarian and fiscal interests. Also, behaviors to prevent work-related injuries can be required by an employer in a setting where employees work in company facilities or company vehicles. Injuries which occur at home and at recreation are more difficult to assess and to prevent. A study by Kidd, Scharf, and Veazie (1996) showed that *"farmers believed they had expert knowledge of most injury prevention strategies, and that lack of knowledge was not a key risk factor for injury."* Therefore, progressive prevention and behavior change are the only tools available for efforts in these areas of life. *"The result of effective planning should be a reduction in the work demands on the principal farm operators, reduced fatigue, and a more controlled and stable level of risks for injury"* (Kidd, Scharf, and Veazie, 1996).

Agricultural injures, and injuries to children in general pose additional challenges in the areas of surveillance and prevention. Other than for fatal injuries (and there are major challenges remaining in child death review efforts), little information is available about the outcomes of injuries to children. Even in the mature data systems related to motor vehicles, some critical information about children is missing. Motor vehicle-related injuries are a leading cause of childhood death in Missouri and across the country (Baker, *et al.*, 1996), but surveillance systems are unable to produce much information about nonfatal motor vehicle crash injuries to children, unless the child was driving a vehicle. In Missouri, information is available through the CODES project about child occupants injured in crashes (Van Tuinen, 1997), but we have no way of determining the number of child occupants or the number of children surviving crashes uninjured. Dambrosia and Ellenberg (1980) would agree: another obvious limitation of trauma-center based surveillance, as compared with population-based surveillance, is that it does not permit calculation of incidence rates of injury because the population at risk is unknown. In other less documented types of injury incident, the information available is even more scarce. Injuries at home, whether in an urban or rural setting, pose the greatest challenge for documentation and study. Most childhood agricultural injuries fall into this category.

Identifying Agricultural Injuries.

The challenges offered by agricultural injuries to children include deficiencies in the ICD-9-CM E-codes used to report injury causation, the broad range of injury causes involved

in agricultural injuries, and the informal participation by children in family agricultural production which is exempt from child labor regulations. However, without adequate information about the incidence and outcomes of child agricultural injury, children will continue unprotected from a significant cause of injury and disability.

A preliminary review of 1995 and 1996 Missouri Patient Abstract System (PAS) data for Ecodes specific to agricultural injury demonstrated both the benefit of a statewide surveillance system and some of the deficits which will need to be addressed. Using the ICD-9-CM E-codes listed below, the frequencies shown in Table 1 were found in the Missouri Patient Abstract System.

-Place of occurrence codes (E-849) for use with categories E-850-E-869 and E-880-E-928, to denote the place where the injury or poisoning occurred.:
  E-849.1 Farm
-Unintentional poisoning by agricultural and horticultural chemical and pharmaceutical preparations other than plant foods and fertilizers. (Excludes plant foods and fertilizers, E-866.5):
  E-863.0 Insecticides of organochlorine compounds
  E-863.1 Insecticides of organophosphorus compounds
  E-863.2 Carbamates
  E-863.3 Mixtures of insecticides
  E-863.4 Other and unspecified insecticides
  E-863.5 Herbicides
  E-863.6 Fungicides
  E-863.7 Rodenticides
  E-863.8 Fumigants
  E-863.9 Other and unspecified
-Other injuries caused by animals:
  E-906.8 Other specified injury caused by animal
-Unintentional injuries caused by machinery:
  E-919.0 Agricultural machines

Identifying children treated for injuries associated with these codes in the patient abstract system data resulted in the incidence shown in Table 1:

TABLE 1

Hospital Visits for Agriculture-Related Injury and Poisoning
Identified by E-code in 1995 and 1996 PAS Datasets.
Missouri Residents, Age 0-17 Years.

	INPATIENTS		OUTPATIENTS	
E-code	1995	1996	1995	1996
E-849.1	0	0	0	1
E-863.0 -863.9	6	11	231	198
E-906.8	20	23	546	583
E-919.0	15	12	73	71
Totals:	41	46	850	853

The information resulting from this review of 1995 and 1996 Missouri data demonstrates several salient points. The place-of-occurrence E-codes are infrequently used as an additional code on the record and the valuable information they might provide is being

lost. With the exception of E-906.8, the information produced represents useful information about agricultural injuries, and the data for E-919.0 demonstrate the frequent severity of injuries from agricultural machines. The current coding system does not, however, allow differentiation among those machines. For animal injuries, analysis is needed to identify at least the agricultural nature of these injuries. The place-of-occurrence code used with these injuries would be very helpful, and E-906.8 falls within the range of codes for which use of E-849 as a secondary code is intended. While the information presented here is useful, it does not begin to capture all of the agricultural injuries that could appropriately be coded throughout the E-code system.

Gunderson *et al.* (1990) spelled out the surveillance challenges related to agricultural injuries and did not pose a single comprehensive solution. They reviewed studies by type of agricultural worker and by a variety of data collection modalities. It is clear that effective prevention activities will not be put into place until more is known about the etiology and outcomes of agricultural injury. Cummings (1991), however, had this recommendation:

> *Farm families seem to have their own set of rules and beliefs - their own reality that fosters their actions. A qualitative study of farmers as a sub-cultural group seems to be the logical approach to better defining and understanding the experience of farm accidents and injuries among farm families and their workers.*

This project was to address the need for information regarding the outcomes of childhood agricultural injuries. The Osberg *et al.* study noted a surprising amount of work-related and financial stress in the families of injured children at one and six months post injury. This same study noted that families of severely injured children were at greater risk for family stress (Osberg *et al.*, 1996). This project intended to gain a better understanding of the causes of injuries to children in agricultural settings.

The Missouri Department of Health has in the Patient Abstract System a unique data system, invaluable for injury research. The extensive E-code data in the PAS is one of the key elements in making possible the fulfilling the objective of this project. Missouri is one of only a few states where E-coding is mandated for both inpatient and outpatient hospital records.

The data systems of the Missouri Department of Health are managed in the Center for Health Information Management and Epidemiology (CHIME) which contains, among other programs, the three units responsible for health data: The Bureau of Health Resources Statistics, the Bureau of Health Data Analysis, and the Bureau of Health Services Statistics.

A working relationship exists with the Missouri Child Fatality Review Project, housed in the Missouri Department of Social Services. Each of the 114 Missouri counties and the city of St. Louis have established Child Fatality Review panels which investigate all unexplained death of children in Missouri up to the age of 18 years. The long-term purpose of the child fatality review process is the prevention of childhood injury and death. Section 210.192 RSMo, passed by the Missouri General Assembly in 1991 as House Bill 185, mandates each county review panel to include: the prosecuting or circuit attorney, the coroner or medical examiner, law enforcement personnel, division of family services representative, public health representative, and a juvenile court representative. Others may also be included as needed. With the exception of the metropolitan teams, which meet on an established schedule, county panels meet

within 24 hours of the incident to begin their review. This process leads naturally to prevention activities.

The State Technical Assistance Team (STAT), Department of Social Services, provides training and assistance to the county review panels. In addition, the staff of STAT periodically provide prevention information to the county panels. Each panel has a designated prevention coordinator, in most cases the public health representative.

Selection of Subjects.
Because of the topographic diversity in Missouri, which results in defined regions of agricultural activity, we had expected to use the geographic regions, the urban/rural diversity, and the presence of an established head and spinal cord and trauma registry with common elements to identify subjects for our study of childhood agricultural injury outcomes. The trauma registry identifies approximately 40 Missouri children per year who suffer an agriculture-related injury (Table 2).

The Patient Abstract System (PAS) contains basic demographic data of interest relative to potential subjects of this study. It has very little information, however, to allow determination of those particular children whose injuries were related to farming or agriculture. As shown above, use of specific E-codes suggesting the possibility of a farm-related injury produced forty-one injuries in 1995 and 46 injuries in 1996. About one-half of those injured were coded as injuries caused by animals, and the proportion of those animal injuries which are agriculture-related is not available from the PAS data. Another source of potential subjects is needed.

Another resource available for identifying possible subjects for this study was through use of agriculture education in the schools. The following possibilities were being explored:

-There are approximately 270 high school agriculture teachers in the public schools of Missouri. Through a newsletter distributed quarterly to each of those teachers, they were informed of this research project, and teachers were requested to inform their students. Students who made themselves known who had suffered serious farm-related injuries during the years 1996 or 1997 would be asked to volunteer themselves as subjects for this study. They also would be asked to inform us if they knew of someone else - a friend, etc. - who may have suffered such an injury. Through this procedure we expected to be able to identify some injuries which then could be matched to our PAS records.

- Ninety-five percent of the agriculture students in the state participate in the FFA organization. That organization held its annual state convention in April of 1998. In cooperation with the state-level planners of that convention, we attempted to contact students at that convention who themselves, or who know of others who had suffered an injury consistent with parameters of this study. We expected that through this procedure, too, we would be able to identify still other injuries which we could then match to our PAS records.

-Terry Heiman, who directs the bureau of the Missouri state education agency which administers agriculture education in the public schools, has available in his office a full listing of agriculture students in the secondary schools of the state. We considered this a possible source of potential subjects for this study, as the names

of agriculture students would be matched with PAS records of injuries. Individuals on this matched list would likely have incurred agriculture-related injuries and could be potential subjects of this study, subject to further procedures for identification.

TABLE 2

HSCI and Trauma Registries, 1990-1995: Injuries on Farms to Children Under 18

External Cause of Injury	Frequency	Percent
Motor vehicles	48	20.3
Riding Animals	38	16.1
Falls	33	14.0
Animals	31	13.1
Agricultural machines	23	9.7
Other machines	14	5.9
Firearms-unintentional	13	5.5
Burns, Explosions	8	3.4
Falling objects	7	3.0
Struck by object	7	3.0
Other vehicles	4	1.7
PedalCycles	4	1.7
Missing	2	0.8
Electric current	1	0.4
Object in eye	1	0.4
Pest	1	0.4
Train/Railway	1	0.4

The potential subjects for this study were Missouri children, age 0-17, who have been seriously injured in agricultural activity or in an agricultural setting. Both genders and all minority children would be included if present in the subject population. Missouri has little racial diversity outside the two urban areas in the state, Kansas City and St. Louis. In the counties of southeastern Missouri, African Americans make up 3% to 5% of the county populations. In these counties we would anticipate some African American children in the pool of potential subjects. Also, while female children would have been included in this study, we anticipated that among injured children, there would be a predominance of males if agricultural injuries revealed the same gender patterns as other injuries. In our data analysis we would develop the incidence numbers and rates for each gender.

In addition to the proposed work on nonfatal agricultural injuries, we would have annually reviewed the Child Fatality System records for the circumstances surrounding fatal agricultural injuries to children in Missouri. As explained in the preliminary studies section, the Missouri Child Fatality Review process reports a mandatory and comprehensive investigation into each injury death of a Missouri child under the age of 18 years. The combination of this fatality information with the knowledge gained from this study would result in prevention information to be distributed in all Missouri counties.

For the family survey as described below, Richard Hessler, sociology professor at the University of Missouri - Columbia, would have worked under contract to advise the

project and assist with development of the survey instrument. Dr. Hessler brings extensive experience in such research and has worked effectively with the Department of Health in the past. Dr. Hessler is at the campus of the University of Missouri - Columbia, which is located 35 miles north of the Dept. of Health office in Jefferson City. In addition, all personnel at the Missouri Department of Health and the University of Missouri have Internet access and can easily communicate with one another.

Family Survey

The purpose of the family survey was to ascertain the impact of a child's injury on his or her family's work activity, productivity, and fiscal stress. A survey questionnaire (Appendix 2, 3) was developed to obtain this information from the perspective of farm families whose children have survived serious agricultural injuries. This work would build upon the research of Osberg, *et al.* One conclusion reached during their study on the impact of childhood injury on family finances and work was that the families of severely injured children are most at risk for negative impacts. The Osberg study included batteries of tests to determine injury severity. The authors of the study concluded that the battery of tests may have skewed their study toward families with more resources, flexible schedules and access to transportation (Osberg, *et al.*, 1996). Because Missouri collects E-coded records of both emergency department visits and inpatient records, we would have been able to select more severely injured children by analyzing the patient records, including disposition at discharge. We had limited our study to families of children requiring inpatient care. Also, for children whose records are in the Trauma Registry, we would have some or all of the following as indicators of injury severity and disability: Revised Trauma Score, Glasgow Coma Score or Pediatric Trauma Score, Injury Severity Score, and the disposition and disability at discharge.

For the survey we intended to identify approximately 180-200 children as potential subjects, with the goal of having 100 or more actual respondents to the survey. For minor children, the HSCI registry data systems have identifiers for parents or care givers. For patients identified from the Patient Abstract System, it would have been more challenging to locate families. The PAS records have unique identifiers with which we would try to identify potential subjects, but do not include addresses or phone numbers.

Geographic Data Analysis

The purpose of the data analysis based on an urban/rural comparison and by agricultural region was to determine if there are differing patterns of injuries to children and if agricultural injury outcomes can be determined from this population-based, mandatory surveillance system. The Patient Abstract System, which contains E-coded records for all hospitalizations and emergency department visits, was described more fully in the preliminary studies section. For the proposed geographic analysis, we would identify regions of Missouri along county lines using agricultural production as the defining factor. We would begin the geographic analysis with two regions of our state clearly defined: the rice and cotton producing counties in the southeast corner of the state and a group of southwest counties heavily involved in dairy farming. Because of the topographical variation in Missouri, those regions are quite discrete. Identifying a specific grain-producing region poses more difficulty, but with assistance from David Baker, School of Agriculture, University of Missouri, we would have identified a region of the state which could have been be used to study injuries related to crop cultivation.

Two counties containing Kansas City, St. Louis County, and the city of St. Louis, offered the potential to compare childhood injuries in metropolitan areas with rural segments of the state. Neither of these geographic areas contains significant agricultural production. Some counties would have been deliberately left out of the geographic analysis because there is a significant mix of urban and rural populations in the counties. Boone, Greene, and St. Charles are examples of such mixed-population counties. The map in Appendix 4 depicts the geographic regions as we have identified them.

In addition to studying the physical outcomes of serious injury to children in agricultural regions of the state, we would have used the Missouri Patient Abstract System and the Head and Spinal Cord Injury (HSCI) Registry to obtain initial cost outcomes for these injuries. The Patient Abstract System contains unique patient identifiers, including county of residence as well as initial cost reporting from the health care provider (hospital). The county of residence information allows us to use medical care data in conjunction with agricultural production data. A weakness is the difficulty of identifying injuries as agricultural in origin, except on the HSCI.

The geographic data analysis would have been ongoing throughout the project. Analysis of the survey results would have taken place in the final year of activity after the data had been collected and survey results tabulated. Dr. Hessler would have been consulted in an ongoing way to ensure the most effective use of the information gathered and the most comprehensive analysis possible.

Human Subject Protection.
Elements of this proposal required full Institutional Review Board (IRB) review and approval. The Missouri Department of Health has an Institutional Review Board which reviews approximately six to eight proposals each year. The department does not hold any multiple project assurances. Using the following information, the IRB protocol and application was approved.

(1) The subject population would have been children in the age range 0 through 12 years and adolescents in the age range 13 through 17 years, using the definitions in the national action plan of the National Committee for Childhood Agricultural Injury Prevention (1996). Subjects would have been residents of Missouri who have been seriously injured in agricultural activities or locations. For minor children, their parents or other caregivers would have been treated as subjects and would have served as proxies for their children in the informed consent process. No subpopulation would have been excluded. For family surveys, we planned to identify 180 to 200 children and adolescents as potential subjects, with the goal of having at least 100 actual respondents to the survey.

(2) Sources of research data and records to be obtained from living human subjects would have been information recalled by children and their families. All other health data from human subjects are held by the Missouri Department of Health by statute (RSMo192.665 and 192.667, Cum. Supp. 1992).

(3) Subjects for the family survey would have been recruited by letter and telephone contact from a list of potential subjects developed as described above in the Selection of Subjects section. Informed consent would have been explained and obtained in writing with a document to be included with the survey instrument. Subjects and their families would have been given an explanation of the

confidentiality protections which would have been built into the research design, and the policies regulating the work of Missouri Department of Health employees.

(4) Potential risks to subjects would have been social, legal, and fiscal. There would have been no potential direct physical risks to the subject since the focus of this study was gathering information regarding injuries which the subjects have sustained in the past. Due to confidentiality constraints on Department of Health personnel carrying out the work, and the use of identifiers other than unique personal identifiers, risk to subjects would have been minimal.

(5) For all research material, unique personal identifiers would have been removed from documents before they were used in analysis or detailed study. Survey forms would have been designed so that unique personal identifiers would have been separated from the forms which would have been used in the study. There would have been no medical risks to subjects in this study.

(6) Because so little information is available to guide effective interventions for childhood agricultural injuries, the minimal risks to subjects was reasonable in relation to the knowledge to be gained. We anticipated that there would have been community knowledge about children recovering from agricultural injury. Educational and fiscal information would have been held confidential.

The element in this proposal that required IRB approval was the family survey. The request to the IRB was for full review and informed consent. Protocols and survey instruments were developed during the first year of the grant.

The data analysis proposed here involves data systems to which the Department of Health has statutory and proprietary possession. The confidentiality of patient records is defined by Missouri law cited above. All Department of Health employees having access to these data for this project would have been bound by the confidentiality policy of the department under the rule contained in 19CSR30-33.010.

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APPENDICES

Appendix 1. Letter Requesting Participation.

Missouri Department of Health
Bureau of Health Services Statistics

OUTCOMES OF AGRICULTURAL INJURY TO CHILDREN

Dear :

As you probably know, farming is one of the most dangerous of all occupations, and many people are interested in finding ways to make farming safer. To do this, more and better information is needed. The Missouri Department of Health is planning to do a study to try to obtain some of that needed information.

The study is entitled "Outcomes of Agricultural Injury to Children in Missouri." We expect to examine the impact of serious farm-related injuries on the physical, educational, and financial outcomes of the injured children and their families. To do this study we are interested in obtaining information from families which include a child who was injured in Missouri during the period 1994-1997, who were within the age range 5-17 years at the time of the injury, whose injuries were related to farming or production agriculture, and whose injuries were severe enough to require a stay of at least one overnight in a hospital.

On the basis of information that we have, either from hospital records or from other sources, we understand that there may be a child in your household who did sustain such an injury, who meets this description. This letter is to ask for your help with this study by providing information about that injury and its outcomes. If you do agree to assist, we will ask you to complete and return a brief survey which asks some questions about your family; about the nature and causes of the injury which your child sustained; about the disability or residual effect, if any, of the injury; about the effect of the injury on your household; and a little bit about your farm. Completing the survey will require about 30 to 45 minutes of your time. In return for the completion and return of the questionnaire, we will send you $30.00 in appreciation for your time and your help.

Enclosed with this letter is a "Written Consent Form," which will inform you more of the requirements of the study and list any risks and benefits which you might have as a participant. Any risk you may have would be very small, since the information you provide will be handled in confidence, and no report of this study will contain anything which could identify you as a person or as a family. Please read the Written Consent Form carefully, and when you understand it please mark the appropriate space indicating whether you will participate in the study, and sign and return the form. You may call the Department of Health number given for more information, if you wish.

We do request your participation in this important effort.

Sincerely,

Appendix 2. Letter Conveying Questionnaire.

Missouri Department of Health
Bureau of Health Services Statistics

OUTCOMES OF AGRICULTURAL INJURY TO CHILDREN

Dear :

We previously sent you a some information about the study "Outcomes of Agricultural Injury to Children in Missouri," which is underway by the Missouri Department of Health. As you may remember, the study is to examine the impact of serious farm injuries to children on the physical, educational, and financial outcomes of the injured children and their families. We need to obtain information about persons, and their families, who were injured in Missouri during the period 1994-1997, who were within the age range 5-17 years at the time of the injury, and whose injuries were related to farming or production agriculture.

You have returned the Consent Form, which tells us that you accepted our request to help with this study by completing a survey form. The consent form also assures that your participation is voluntary, that the information you provide will be handled confidentially, and that you will be paid $30.00 after you complete your part of the study. We thank you for your willingness to help in this way.

Enclosed is the questionnaire which we ask that you complete and return within 15 days. It asks some questions about your family; about the nature and causes of the injury which your child sustained; about the disability or residual effect of the injury, if any; about the effect of the injury on your household; and a little bit about your farm. Completing the questionnaire will probably require 30 to 45 minutes of your time.

Again, we thank you for your help with this study. Please answer the questions as best you can and return the form as indicated. If you have questions, please write or call me at this number: 573-751-6274.

Sincerely,

Appendix 3. Questionnaire Form

OUTCOMES OF AGRICULTURAL INJURY SURVEY

Directions: Please complete this form, answering the questions as accurately as you can. Do not write your name or other identifying information on the form. Please send the completed form to the address shown on the last page.

FAMILY DEMOGRAPHICS

1. In what month and year was the child injured? (If injured more than once, please answer this Survey for the most recent injury.)
   a. Month: _____ b. Year: _____

2. How old was the child at the time of the injury? _____ years.

3. The injured child is... a. ___ Male b. ___ Female.

4. Who was living in the household with the child at the time of his/her injury? (Please mark all that apply.)
   a. ___ Mother (biological or adoptive)
   b. ___ Stepmother
   c. ___ Father (biological or adoptive)
   d. ___ Stepfather
   e. ___ Brother(s) (_____ number of brothers)
   f. ___ Sister(s) (_____ number of sisters)
   g. ___ Other (specify) _____

CAUSES AND NATURE OF THE INJURY

5. What part(s) of the child's body sustained the major part of the injury? (Mark more than one response if appropriate)
   a. ___ Head/neck c. ___ Eye e. ___ Chest/trunk g. ___ Back
   b. ___ Arm/shoulder d. ___ Finger/hand/wrist f. ___ Leg/knee/hip h. ___ Toe/foot/ankle
   i. ___ Other (specify) _____

6. What was the nature of the injury sustained by the child? (Mark more than one if appropriate)
   a. ___ Amputation d. ___ Smothered g. ___ Bruise j. ___ Near drowning
   b. ___ Cut e. ___ Crush h. ___ Fracture k. ___ Poisoning
   c. ___ Puncture f. ___ Sprain/strain i. ___ Burn l. ___ Electric shock
   m. ___ Other (specify) _____

7. How did the injury occur? (Mark the one response which best describes how it occurred)
   a. ___ Body caught in/between object/equipment
   b. ___ Body caught under object/equipment
   c. ___ Struck by/against object/equipment
   d. ___ Struck by falling or flying object
   e. ___ Fall (on same level; slipping, tripping)
   f. ___ Fall (from a higher elevation)
   g. ___ Overexertion
   h. ___ Contact with poison/toxic substance
   i. ___ Contact with hot object/substance
   j. ___ Contact with sharp object
   k. ___ Contact with electric charge
   l. ___ Other (specify) _____

8. What type of activity was being performed when the injury occurred? (Mark the one response which best describes the work)
   a. ___ Farmstead maintenance or construction
   b. ___ Field work (tillage, planting, harvesting)
   c. ___ Handling livestock
   d. ___ Riding pony or horse
   e. ___ Servicing or repairing machinery
   f. ___ Handling or storing harvested crops
   g. ___ Other (specify) _____

9. What was the object or substance which directly caused the injury?
   a. ___ Tractor
   b. ___ Hand tool (not powered)
   c. ___ Power tool
   d. ___ Pesticide/other chemical
   e. ___ Other liquid
   f. ___ Plant or tree
   g. ___ Working surface
   h. ___ Truck or automobile
   i. ___ Other vehicle (specify) _____
   j. ___ Animal (specify) _____
   k. ___ Machinery (specify) _____
   l. ___ Other (specify) _____

10. What type of health care was required for treating the injury? (Please mark all that apply)
    a. ___ Physical therapy/rehabilitation
    b. ___ Admittance to trauma center hospital
    c. ___ Admittance to other acute care hospital
    d. ___ Surgery
    e. ___ Emergency room care
    f. ___ Visit to physician

RESIDUAL EFFECT OF THE INJURY ON THE CHILD

11. Is the child still affected by the injury in any of the following areas?
    A. Physical problems (difficulties with vision, hearing, walking, self-care, etc.)
        a. ___ No
        b. ___ Yes If yes, please describe. _____
        _____

    B. School problems (difficulty learning, speaking or thinking; difficulty with certain subjects, etc.)
        a. ___ No
        b. ___ Yes If yes, please describe. _____
        _____

    C. Social or emotional (difficulty making or keeping friends, depression, tantrums, etc.)
        a. ___ No
        b. ___ Yes If yes, please describe. _____
        _____

12. Has the injury affected the child's ability to help with farm work?
    a. ___ Not applicable - never helped with farm work.
    b. ___ No
    c. ___ Yes If Yes, please describe. _____
    _____

13. Does the child have any special health care needs resulting from the injury (needs attendant, special health care devices, etc)?
    a. ___ No
    b. ___ Yes If Yes, please describe. _____
    _____

14. Has the injury prevented the child from living at home with his/her family, either part of the time or all of the time?
    a. ___ No
    b. ___ Yes If Yes, please describe. _____
    _____

EFFECT OF THE INJURY ON THE HOUSEHOLD

15. What type of farming did the family engage in at the time of the injury? (types of crops or livestock raised) _____
    _____

16. Has the child's injury resulted in a change in the type of farming which the family has done?
    a. ___ No
    b. ___ Yes If Yes, please explain briefly. What was the nature of the change, and why was the change necessary? _____
    _____

17. Has the child's injury resulted in a change in the level of farming, or amount of farm land, which the family has farmed?
    a. ___ No
    b. ___ Yes If Yes, please explain briefly. What was the nature of the change, and why was the change necessary? _____
    _____

18. At the time of the injury, were other persons besides family members employed to work on the farm?
    a. ___ No
    b. ___ Yes If yes, how many persons were employed full-time: ____ Part-time: _____

19. Has the injury resulted in any change in the farm's need for paid employees?
    a. ___ No
    b. ___ Yes If yes, please explain. _____

20. At the time the child was injured, was he/she assisting with farming activities around the farm?
    a. ___ No
    b. ___ Yes If yes, please describe. _____
    _____

21. Has the child's injury resulted in a change in the relationship between his/her parents, or among brothers, sisters, or other family members?
    a. ___ No
    b. ___ Yes If Yes, please explain briefly what was the nature of the change, and why did the change occur? _____
    _____

FARM ECONOMICS

22. At the time of the injury, did the family derive significant income from any source other than farming?
    a. ___ No
    b. ___ Yes 1) If yes, what was that source other than farming? _____
    2) If yes, approximately what percent of total family income was derived from sources other than farming? _____(%)
    3) If yes, has this percent changed since the injury?
    a. ___ No
    b. ___ Yes If yes, what is the percent now, approximately? _____(%)

23. In the last year before the child's injury, approximately what was the total annual gross income of the farm? _____
    A. In what year was this? _____
    B. For comparison purposes, what was the approximate total annual gross income of the farm in 1997? _____

Thank you for your assistance. Please send the completed form to:

Missouri Department of Health
Bureau of Health Services Statistics
P. O. Box 570
Jefferson City, MO 65102

Appendix 4
MISSOURI PLANNING COMMISSION AREAS AND AGRICULTURAL PRODUCTION REGIONS