Work-Related Injuries in Athens County 1982 to 1986

A Comparison of Emergency Department and Workers' Compensation Data

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In 1987, the Panel on Occupational Safety and Health Statistics issued a report concluding that the existing national surveillance system for occupation injuries might result in substantial underreporting of occupational injuries. In this study, we examined two sources of data on occupational injuries, the National Electronic Injury Surveillance System (NEISS) and lost-work time claims to the Bureau of Workers' Compensation (BWC), available in one community, Athens County, Ohio. Based on comparison of the NEISS and BWC data sets, we conclude that neither data set alone gives a complete nor an accurate picture of occupational injuries in Athens County. The two may provide a more complete representation of occupational injuries when examined together. Using the NEISS and BWC data sets in combination results in a total number of injuries higher than that predicted by national norms.

In 1987, the Panel on Occupational Safety and Health Statistics, organized by the National Research Council, issued a report, *Counting Injuries and Illnesses in the Workplace: Proposals for a Better System.*[1] The existing national surveillance system for injuries, under the jurisdiction of the Occupational Safety and Health Administration (OSHA) of the Department of Labor, depends on annual reporting by employers of significant on-the-job injuries on the OSHA Form 200, which is examined by OSHA on a sampling basis. The Panel concluded that this system might result in substantial underreporting of occupational injuries but that few data were available to confirm or refute this view.

The project reported here was designed to address this question with data from one community. The community studied (Athens County, Ohio) has information available about on-the-job injuries from two independent sources. Data from the State of Ohio's Workers' Compensation Bureau are available for Athens as for most communities. In addition, data on emergency department visits for occupational injuries were collected for the 5-year period 1982 through 1986 at the principal local hospital as part of the Consumer Product Safety Commission's National Electronic Injury Surveillance System (NEISS).

The project's first goal was to compare the sensitivity of these two distinct approaches to surveillance for injury in the workplace in one community. This was carried out by merging the two data sets and calculating

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the number of injuries detected by one system or the other, and by the two systems together.

The second goal was to estimate the total incidence of significant work-related injury in this community. A significant work-related injury was defined as an injury occurring on the job and resulting in either a visit to an emergency department or a lost-work-time claim to the Ohio Bureau of Workers' Compensation, or both. This definition excluded persons who were treated elsewhere than an emergency department and did not miss work or missed work but did not file a lost-time claim.

Our definition was thus less inclusive than that intended in the OSHA-200-based surveillance system, where all injuries resulting in medical treatment beyond first aid or in any time lost from work are to be included. However, it has been suggested that the OSHA-200 system undercounts injuries that are eligible for inclusion in that system.[1] Therefore, we predicted that the number of significant injuries observed would be higher than the expected value based on published statistics from the Bureau of Labor Statistics (based on the OSHA-200 system), and although our definition was narrower, we thought this was a conservative bias.

Athens County, Ohio, is a relatively self-contained community of about 58,000 inhabitants located in the Appalachian region of southeastern Ohio about 70 miles from Columbus and 35 miles from Parkersburg, West Virginia. The county has two principal population centers. Athens, population 27,428 (1980 census), is centrally located in the county. Its hospital, O'Bleness Memorial Hospital (OMH), has 75 beds, provides general services, and has participated in the NEISS system since the late 1970s.

Nelsonville, population 4563 (1980 census), is located in the northwest corner of the county. Its hospital, Doctor's Hospital (DH), has 32 beds and also provides general services, although fewer than does OMH. The county's economy is based on a mixture of industries and services. The principal employers in the county include Ohio University (Athens), Hocking Technical College (Nelsonville), the Athens Mental Health Center (Athens), a shoe factory (Nelsonville), several surface and underground coal mines, retail trade establishments, wholesale food and beverage distributors, a state correctional facility, utility companies, restaurants, local government, and several small high-tech firms spun off from the University.

During the study period only one employer in the study area retained a private physician's services for the care of workers with work-related injuries, and one other employer used its on-site student health service to provide initial care to employees. In most of the other companies, employees had the choice of seeking care at an emergency department or at the physician's office of their choice.

The local emergency medical service covers all of Athens County and parts of adjacent counties. Injured persons are taken to the nearest emergency department; for all Athens County except a sparsely populated area in the extreme eastern end, either OMH or DH is the nearest emergency department. In this rural area of Ohio, three adjacent counties have no hospital at all, and the hospitals in the other three adjacent counties have no advantage over OMH and DH in terms of facilities or services offered. Thus we assumed that all persons employed in Athens County who were injured on the job and who went to an emergency department would be seen at one of our study hospitals. There is a small number of workers employed in Athens County who are injured on the job while in another county; similarly, work-related injuries occurring in Athens to persons employed in other counties are occasionally treated at one of the two study hospitals.

Methods

Two data sources were used for this project: (1) Emergency Department (ED) records from the two hospitals located in Athens County, and (2) lost-time claims made to the Ohio Bureau of Workers' Compensation for injuries on the job during 1982 through 1986, occurring in Athens County.

Emergency Department Records

ED Visits to OMH in Athens 1982 through 1986. Each patient visit meeting the criteria of the NEISS surveillance system had been coded and keypunched by a clerk in the billing office at the ED and was available on tape from the Consumer Product Safety Commission. Occupational injuries were specifically included in NEISS beginning in 1982 under a cooperative agreement with NIOSH.

Data items available for each record included: age and sex of the injured person; date of the ED visit; part of the body injured; date and type of injury; codes for up to two consumer products involved; disposition (admitted, discharged, died); type of industrial equipment involved (if any); and circumstances of the injury. No address or occupation/industry data were available. Social security numbers were not recorded in the NEISS data but were available for 82% of the patients from ED billing records.

A validation study also was performed to ascertain if a random sample of O'Bleness Hospital ED visits for on-the-job injuries had been entered appropriately in NEISS. Files of emergency department charts were reviewed systematically to obtain a sample of 361 charts for treatment of on-the-job injuries. The NEISS data set was then searched to locate a record for each of these injuries.

Systematic One-Sixth Sample of ED Records from DH in Nelsonville, 1982 through 1986. Work-related injuries were identified from the ED chart, and information was abstracted and coded in the NEISS format, noting also the social security number when available. From this sample the total number of work-related injuries presenting to the Doctor's Hospital ED during the study period was estimated.

Lost-Time Claims to the Ohio Bureau of Worker's Compensation for On-the-Job Injuries Occurring in Athens County, 1982 through 1986

In general, these claims are assigned to the county in which the injury occurred. In some cases, however, where the corporate offices and actual work site are near one another in adjacent counties, the claim may be assigned to the county that is the site of the corporate office.

By law, state-insured employers must file lost-time claims if at least 1 day of work is missed, although in practice this is not always done. Self-insured employers must file on workers who lose 7 days or more of work but are encouraged to file claims whenever at least 1 day is missed.

Data items available in the Workers' Compensation data set are similar to those in the NEISS data set, plus the social security number, industry code, and occupation code of the injured worker. The two coding systems for nature of injury and part of the body injured are similar but not identical.

Records from the above sources were compared to detect records that represented the same injury event. When available, the social security number was used for preliminary matching. The match was then confirmed by date, age, sex, nature of injury (diagnosis), body part, and/or accident type. When the social security number was not available, records were matched via an algorithm that first considered date of injury (±7 days), then age (±3 years), sex, body part, and nature of injury. Initial matching by social security number and date were done on a Macintosh SE using Panorama data base software. Subsequent matching by additional parameters was done by hand.

The total number of occupational injuries was estimated by combining information from these and other sources. The number of emergency department visits at OMH was adjusted for underreporting using the results of the NEISS validation study. The number of emergency department visits at DH was estimated by multiplying the observed number of matched and unmatched visits by six. The number of injuries detected by emergency department visits alone, by workers' compensation alone, and by both combined were then compared by age, sex, diagnosis, body part, and accident type to detect whether there were differences in the injuries reported by each source.

The combined total also was compared to the expected annual number of on-the-job injuries as calculated by applying published industry-specific Bureau of Labor Statistics rates[2] to the number of persons employed in Athens County. The latter number, ie, the denominator, was determined by analyzing several sources, including County Business Patterns 1982–1986,[3] statistics from the Ohio Bureau of Employment Services,[4] and personal contact with industries within and straddling county lines but expected to be within the ED service area.

Results

Records Examined, Total Work-Related Injury ED Visits, Matches Between Two Data Sources

Table 1 shows the number of records examined from each source with the resulting number of matches. A total of 1571 lost-work time claims for Athens County were filed with the Bureau of Workers' Compensation. At O'Bleness Hospital 2967 NEISS records were coded as occupationally related. The remaining 8494 NEISS records at O'Bleness Hospital were coded "nonoccupational," however, they were also examined to seek matches that might have been miscoded. Among all these records, 387 matches were found where the same injury event appears in both O'Bleness Hospital records and Workers' Compensation records. Of these, 35 matches were among the NEISS records not marked as occupational in NEISS.

The validation study done at O'Bleness Hospital revealed that only 71.2% of the eligible work-related injuries at that hospital were recorded in the NEISS file (Table 2). This percentage was quite consistent from year to year over the study period.

In the one-sixth sample at Doctor's Hospital, 135 work-related injuries were identified and reviewed, and 23 matches to Workers' Compensation claims were detected. By extrapolation there would be 810 NEISS-equivalent records in the 5-year period, with 138 matched records and 672 unmatched records.

For the study years, therefore, it can be estimated that the total number of work-related injuries seen in Athens County Emergency Departments was 4977 (2967 [OMH NEISS data] plus 1200 [28.8% not captured in OMH NEISS] plus 810 [Nelsonville estimate]). Of those 4977 injuries, 620 (12.4%) were matches between NEISS

TABLE 1
Number and Type of Records Examined by Year

Year	All Records			Matched Records			Unmatched Records		
	BWC*	Occup NEISS†	Nonoccup NEISS‡	BWC	Occup NEISS	Nonoccup NEISS	BWC	Occup NEISS	Nonoccup NEISS
1982	357	537	2076	83	65	18	274	472	2058
1983	276	531	1714	76	71	5	200	460	1709
1984	314	661	1456	78	73	5	236	588	1451
1985	339	636	1647	80	76	4	259	560	1643
1986	285	602	1601	70	67	3	215	535	1598
Total	1571	2967	8494	387	352	35	1184	2615	8459

* BWC = Bureau of Workers' Compensation.

† Occupational NEISS = National Electronic Injury Surveillance System records from O'Bleness Memorial Hospital (OMH) coded "occupational."

‡ Nonoccupational NEISS = NEISS records from OMH not coded "occupational."

TABLE 2
O'Bleness Memorial Hospital (OMH) Validation Study*

Year	In NEISS†	Not in NEISS	Total
1982	65	35	100
1983	69	28	97
1984	60	24	84
1985	63	17	80
Total‡	257	104	361

* Emergency room records were examined to identify records that involved occupationally related injuries according to predetermined criteria, including text of the patient history and indication of Workers' Compensation as type of insurance. Each of 20 to 25 rolls per year of microfilmed records in alphabetical order were examined until four records meeting the criteria were identified. These were then compared with a printout of NEISS information for the same period.

† NEISS = National Electronic Injury Surveillance System.

‡ 257/361 × 100 = 71.2% of the work-related injuries treated at OMH were accurately reported as such in the NEISS data base.

and BWC (387 [OMH/NEISS matches] plus 95 [predicted OMH matches in the other 28.8%] plus 138 [predicted matches at Nelsonville]). The overall match rate at OMH was 9.2% and at DH was 17%.

The total number of work-related injuries in Athens County, 6173 over the study period, can also be estimated from these numbers (Table 3). Of the injuries occurring in Workers' Compensation data and/or emergency department data, the Workers' Compensation system detects an estimated 25.5%, while the emergency department data detects an estimated 81.2%.

Characterizing and Comparing Injury Data From the Two Sources

Tables 4 through 8 compare the distribution of records by sex, age, accident type, body part, and diagnosis among the entire BWC data set, the entire NEISS data set, the data set of matches between NEISS and BWC, records in BWC that did not match NEISS records, and records in NEISS that did not match BWC records. For these comparisons, only data from O'Bleness Hospital were used because of their completeness, and no adjustment was made for underreporting of occupational injuries to NEISS. Considering that all the OMH NEISS records and all the Athens County BWC records during the study years were coded as data for this study, the proportions shown in Tables 4–8 should be considered population values for Athens County.

There are no major differences between the data sets when sex is examined (Table 4). In both data sets, about 80% of injured workers are men, although NEISS-only injured workers are more likely to be men than are BWC-only injured workers.

Table 5 presents the distribution of injuries for age categories broken into 10-year ranges. It can be seen that younger workers are more likely to seek emergency medical assistance than are older workers although less likely to file for workers' compensation benefits. Mean age for all workers in the BWC data set was 36.03 years, compared with 32.05 years for all workers in the NEISS data set.

Differences are noted among the data sets when accident type is examined (Table 6). This parameter was compared only for years 1983 through 1986; NEISS data were incomplete for accident type during 1982. There is a greater representation of the "struck against" and "struck by" types in the NEISS records and of the "fall on same level" and "bodily reaction" types in the BWC records. "Overexertion" accounts for 31.3% of BWC-

TABLE 3
Estimated Number of Work-Related Injuries in Athens County, 1982 through 1982

	Matched	Bureau of Workers' Compensation (BWC) Only	National Electronic Injury Survey System (NEISS) Only	Total
OMH*	387		2615	3002
Adjustment			1200	1200
Doctor's Hospital	23		787	810
Athens County		1161		1161
Total	410	1161	4602	6173†

Estimated injuries detected by BWC = (410 + 1161)/6173 = 25.5%.
Estimated injuries detected by NEISS = (410 + 4602)/6173 = 81.2%.
Estimated average number of injuries in Athens County each year = 6173/5 = 1235.

* OMH = O'Bleness Memorial Hospital.

† This differs from the 4977 total number of work-related injuries in Athens County in the text because (1) it includes the 35 matches found in improperly coded NEISS records, and (2) it includes the BWC only category (text is only of Emergency Department injuries, and need to add in the BWC here for the complete picture).

TABLE 4
Distribution of Records by Sex

Sex	Matched N = 387		Unmatched BWC* Only N = 1184		Unmatched NEISS† Only N = 2615		All BWC N = 1571		All NEISS N = 3002‡	
	n	%	n	%	n	%	n	%	n	%
Male	298	23.0	937	20.9	2120	18.9	1235	78.6	2418	80.6
Female	89	77.0	247	79.1	495	81.1	336	21.4	584	19.4
Total	387	100	1184	100	2615	100	1571	100	3002	100

* BWC = Bureau of Workers' Compensation.

† NEISS = National Electronic Injury Surveillance System.

‡ 3002 = 2967 (Occupational NEISS total) + 35 records from Nonoccupational NEISS.

only records and only 10.3% of NEISS-only records.

Table 7 reports distribution by body part. Differences are again noted among the data sets. NEISS reports a greater percentage of injuries to the hands, fingers, face and mouth, and eyes. BWC reports a greater percentage of injuries to the lower trunk, unspecified back or vertebrae, and involvement of more than 25% of the body, other systems, or unclassifiable part(s).

Differences in distribution by diagnosis are shown in Table 8. NEISS reports a greater percentage of the diagnoses contusion/crushing/bruise/abrasion, foreign substance, and laceration/avulsion/puncture. BWC reports a greater percentage of the diagnoses dislocation, fracture, strain/sprain, and the miscellaneous diagnoses of joint inflammation, multiple injuries, other, and nonclassifiable.

Comparison of Injury Rates with Published Data

Table 9 shows calculations comparing the actual number of injuries in Athens County for 1986 with the predicted number of injuries based on injury incidence rates published by the Bureau of Labor Statistics. The number of employees by industry in the county is shown from two sources: County Business Patterns (CBP)[3] (16,170) and the Ohio Bureau of Employment Services (BES)[4] (16,689). These numbers were adjusted to account for employees who may be working outside the county but still fall within the service area of county hospitals. This was especially important in the Mining classification, where it is estimated that approximately 600 workers, in both Athens and adjacent counties, were within the O'Bleness Hospital and Doctor's Hos-

TABLE 5
Distribution by Age

Age	Matched N = 387		Unmatched BWC* Only N = 1184		Unmatched NEISS† Only N = 2615		All BWC N = 1571		All NEISS N = 3002	
	n	%	n	%	n	%	n	%	n	%
0–15	3	0.8	8	0.7	10	0.4	11	0.7	13	0.4
16–24	87	22.5	154	12.0	748	28.6	241	15.3	835	27.8
25–34	127	32.8	440	37.2	1026	39.2	567	36.1	1153	38.4
35–44	78	20.2	285	24.1	507	19.4	363	23.1	585	19.5
45–54	61	15.8	190	16.1	220	8.4	251	16.0	281	9.4
55–64	29	7.5	103	8.7	95	3.7	132	8.4	124	4.1
65+	2	0.5	4	0.3	9	0.4	6	0.4	11	0.4
Total	387	100	1184	100	2615	100	1571	100	3002	100

* BWC = Bureau of Workers' Compensation.
† NEISS = National Electronic Injury Surveillance System.

TABLE 6
Distribution by Accident Type*

Accident Type	Matched N = 304		Unmatched BWC† Only N = 910		Unmatched NEISS‡ Only N = 2143		All BWC N = 1214		All NEISS N = 2449	
	n	%	n	%	n	%	n	%	n	%
Not given	0	0	0	0	3	0.1	0	0.0	3	0.1
Struck against	30	9.9	50	5.5	470	21.9	80	6.6	500	20.4
Struck by	67	22.0	116	12.7	644	30.1	183	15.1	711	29.1
Fall from elevation	26	8.6	64	7.0	89	4.2	90	7.4	115	4.7
Jump from elevation	1	0.3	2	0.2	0	0	3	0.3	1	§
Fall on same level	39	12.8	110	12.1	136	6.4	149	12.3	175	7.2
Caught in, under, between	41	13.5	68	7.5	200	9.3	109	9.0	241	9.9
Rubbed or abraded	2	0.7	26	2.9	64	3.0	28	2.3	66	2.7
Stress	0	0	4	0.4	0	0	4	0.3	0	0.0
Bodily reaction	17	5.6	70	7.7	89	4.2	87	7.2	106	4.3
Overexertion	49	16.1	285	31.3	1221	10.3	334	27.5	270	11.0
Electric contact	3	1.0	0	0	4	0.2	3	0.3	7	0.3
Temperature extremes	12	4.0	12	1.3	74	3.5	24	2.0	86	3.5
Radiation, toxic substances, caustics	4	1.3	34	3.7	59	2.8	38	3.1	63	2.6
Other	13	4.3	69	7.6	90	4.2	82	6.8	103	4.2
Total	304	100	910	100	2143	100	1214	100	2449	100

* Note that 1982 is not included in analysis of this parameter because NEISS data for that year were incomplete.
† BWC = Bureau of Workers' Compensation.
‡ NEISS = National Electronic Injury Surveillance System.
§ Less than 0.1%.

TABLE 7
Distribution by Body Type

Body Part	Matched N = 387		Unmatched BWC* Only N = 1184		Unmatched NEISS† Only N = 2615		All BWC N = 1571		All NEISS N = 3002	
	n	%	n	%	n	%	n	%	n	%
Not available	7	1.8	23	1.9	0	0	30	1.9	7	0.2
Brain, head, skull, scalp	8	2.1	17	1.4	93	3.6	25	1.6	101	3.4
Ear	3	0.8	15	1.3	14	0.5	18	1.2	17	0.6
Shoulder(s)	9	2.3	32	2.7	49	1.9	41	2.6	58	1.9
Elbow(s)	11	2.9	16	1.4	46	1.9	27	1.7	57	1.9
Wrist(s)	9	2.3	26	2.2	82	3.1	35	2.2	91	3.0
Hand(s)	15	3.9	26	2.2	247	9.5	41	2.6	262	8.7
Arm(s), lower, upper, unspecified, mult	19	4.9	33	2.8	136	5.2	52	3.3	155	5.2
Finger(s)	61	15.8	96	8.1	608	23.3	157	10.0	669	22.3
Knee(s)	27	7.0	82	6.9	115	4.4	109	6.9	142	4.7
Ankles	29	7.5	40	3.4	74	2.8	69	4.4	103	3.4
Foot (feet)	22	5.7	36	3.0	122	4.7	58	3.7	144	4.8
Leg(s), lower, upper, unspecified, mult	24	6.2	40	3.4	108	4.1	64	4.1	132	4.4
Toe(s)	9	2.3	9	0.8	50	1.9	18	1.2	59	2.0
Face and mouth	4	1.0	10	0.8	123	4.7	14	0.9	127	4.2
Neck	3	0.8	24	2.0	42	1.6	27	1.7	45	1.5
Eye(s)	6	1.6	26	2.2	280	10.7	32	2.0	286	9.5
Upper trunk	8	2.1	28	2.3	152	5.8	36	2.3	160	5.3
Lower trunk	45	11.6	287	24.2	1231	8.8	332	21.1	276	9.2
Trunk not otherwise specified	5	1.3	21	1.8	0	0	26	1.7	5	0.2
Pubic region	0	0	5	0.4	12	0.5	5	0.3	12	0.4
Unspecified back or vertebrae	16	3.4	127	10.7	10	4.1	143	9.1	16	0.5
25–100% of body involved	44	11.4	122	10.3	31	1.2	166	10.6	75	2.5
Other systems	3	0.8	29	2.5	0	0	32	2.0	3	0.1
Unclassifiable	0	0	14	1.2	0	0	14	0.9	0	0.0
Total	387	100	1184	100	2615	100	1571	100	3002	100

* BWC = Bureau of Workers' Compensation.
† NEISS = National Electronic Injury Surveillance System.

pital service areas, although only 242 and 42 were reported by CBP and BES, respectively.

The other adjustment to this table is the estimation of the number of full-time equivalents for part-time student workers at the major employer in the area, Ohio University (1800). These workers are not represented in either the CBP or BES systems, but would be represented in the population susceptible to work-related injuries in the county. Information for estimating this number is currently available only for 1985 and 1986.

If BLS incidence rates are applied to the published number of employees in the county, the predicted number of work-related injuries in Athens County (582 with CBP figures, 868 with BES figures) substantially underestimates the actual number. If the rates are applied to the number of employees calculated using the above assumptions, the number of work-related injuries (972 and 994 with CBP and BES figures respectively) is somewhat closer to the actual number (1235), although it is still an underestimate.

Discussion

It is apparent from Tables 4 through 8 that neither the NEISS nor the BWC data sets completely represent the number and types of injuries occurring in Athens County. There are several potential reasons for this.

The NEISS data set is limited in that (a) not all work-related injuries are properly coded as such, although some injuries that may not be work-related are coded as occupational; and (b) only ED visits are recorded, ie, visits to private physicians and company physicians are not included. The validation study at O'Bleness Hospital indicates that up to 29% of work-related injuries seen there are missed by NEISS, probably due to coding errors. The actual number of work-related visits to private physicians could not be estimated in this study. The number of visits to company physicians is estimated to be at least 45/year during the study years. Only one small distribution firm employing 25

TABLE 8
Distribution by Diagnosis

Diagnosis	Matched N = 387		Unmatched BWC* Only N = 1184		Unmatched NEISS† Only N = 2615		All BWC N = 1571		All NEISS N = 3002	
	n	%	n	%	n	%	n	%	n	%
Not indicated	0	0	0	0	1	‡	0	0	1	‡
Thermal burn or scald	15	3.9	15	1.3	84	3.2	30	1.9	99	3.3
Burn, electrical, chemical, radiation	3	0.8	6	0.5	46	1.8	9	0.6	49	1.6
Amputation	7	1.8	8	0.7	7	0.3	15	1.0	14	0.5
Concussion, closed head injury	3	0.8	9	0.8	10	0.4	12	0.8	13	0.4
Contusion/crush/bruise/abrasion	62	16.0	109	9.2	701	26.8	171	10.9	763	25.4
Dislocation	4	1.0	34	2.9	7	0.3	38	2.4	11	0.4
Foreign substance	0	0	0	0	184	7.0	0	0	184	6.1
Fracture	75	19.4	134	11.3	171	6.5	209	13.3	246	8.2
Laceration, avulsion, puncture	63	16.3	87	7.3	819	31.3	150	9.6	882	29.4
Nerve damage	0	0	0	0	2	0.1	0	0	2	0.1
Strain, sprain	116	30.0	516	43.6	502	19.2	632	40.2	618	20.6
Anoxia, asphyxia	0	0	1	0.1	8	0.3	1	0.1	8	0.3
Electric shock	3	0.8	1	0.1	6	0.2	4	0.3	9	0.3
Poisoning	2	0.5	13	1.1	7	0.3	15	1.0	9	0.3
Dermatitis, conjunctivitis	1	0.3	15	1.2	47	1.8	16	1.0	48	1.6
Joint inflammation	1	0.3	26	2.2	0	0	27	1.7	1	‡
Multiple injuries	13	3.4	42	3.6	0	0	55	3.5	13	0.4
Other	2	0.5	67	5.6	13	0.5	69	4.4	15	0.5
No injury or illness	0	0	1	0.1	0	0	1	0.1	0	0
Nonclassifiable	17	4.4	100	8.5	1	‡	117	7.5	17	0.6
Total	387	100	1184	100	2615	100	1571	100	3002	100

* BWC = Bureau of Workers' Compensation.
† NEISS = National Electronic Injury Surveillance System.
‡ Less than 0.1%.

people retained a company physician during 1982 through 1986. At the local university, employees injured during daytime working hours (8 AM to 4:30 PM) were first seen at the student health service, then treated or referred for treatment. During 1982 through 1986, 226 employees were seen for whom BWC claims were filed; the number not filing BWC claims is uncertain.

The BWC data set is limited in that (a) not all work-related injuries result in lost-work time; and (2) not all work-related injuries resulting in lost-work time are actually reported to BWC. Lost-work time injuries are reported to BWC by the employer. State-insured companies report more than 1 day lost-work time; self-insured companies report 7 or more days lost-work time; federal employees are not reported to the state system at all. A survey of 52 major employers in Athens County revealed that 43 of them (83%) are state insured. The remainder, representing almost 1000 employees, are self-insured or insured by the federal government. Among the self-insured firms are a coal-mining company, a shoe-manufacturing factory, and various services and utilities firms. According to representatives of these companies, work-related injuries resulting in less than 7 days lost-work time are not reported to BWC.

The percentage of matches between the two data sets was lower than expected. This can be explained at least partially by the same factors discussed above: (1) use of private or company physicians, (2) incomplete coding at ED, (3) incomplete reporting to BWC, or (4) minor injuries not resulting in lost-work time claims. Specifically, injured workers with strains and sprains may seek medical care from private physicians, lose time from work, file a lost-time claim, and never visit an emergency department. Conversely, injured workers with lacerations or minor fractures may seek emergency department care but never miss enough time from work for a lost-time claim to be filed.

The differences in diagnosis, accident type, and body part involved between the two data sets appear reasonable. Diagnoses such as contusion, foreign substance, and laceration indicate injuries that are more likely to be seen in an ED and treated without loss of work-time. Diagnoses such as strain/sprain and miscellaneous likely would be seen in a private physician's office but result in greater morbidity and lost-work time. Diagnoses such as dislocation and fracture would be seen in an ED and result in lost-work time.

The estimated number of work-related injuries in Athens County resulting in either an emergency depart-

TABLE 9
Injuries in Athens County, Calculated by Bureau of Labor Statistics (BLS) Published Rates and Actual Count from Bureau of Workers' Compensation, 1986

Industry (SIC codes)	BLS Injury Rate*	Number Employed CBP†	Predicted Injuries BLS × CBP	Number Employed BES‡	Predicted Injuries BLS × BES
Agriculture, forestry, fishing	10.7	20	2.1	34	3.6
Mining (10–14)	7.2	600§	43.2	600§	43.2
Construction (15–17)	15.1	193	29.1	218	32.9
Manufacturing-all	10.1	1041	105.1		0.0
Manufacturing-durable (24–25, 32–39)	10.6			256	27.1
Manufacturing-nondurable (20–23, 26–31)	9.5			881	83.7
Transportation, public utilities (40–49)	8.1	684	55.4	944	76.5
Wholesale trade	7.6	414	31.5	402	30.6
Retail trade (52–59)	7.8	3114	242.9	2936	229.0
Finance/insurance/real estate (60–67)	2.0	498	10.0	661	13.2
Services (70–89)	5.2	2222	115.5	2373	123.4
State government	3.8‖	3220¶	122.4	3220	122.4
Local government	3.8‖	2364¶	89.8	2364	89.8
Part-time state government (FTEs**)	3.8‖	1800#	68.4	1800#	68.4
Total		16170	915.4	16689	943.8
Average/y (1985–1986)††		17457	972	17877	994
Average/y (1982–1986) based on examination of National Electronic Injury Surveillance System and Bureau of Workers' Compensation data in current study					1235
Number of injuries predicted/y without adjustments to work force described in text			582		868

* US Department of Labor, Bureau of Labor Statistics (BLS).[2]
† US Department of Commerce, Bureau of the Census, County Business Patterns (CBP).[3]
‡ Labor Market Information Division, Ohio Bureau of Employment Services (BES).[4]
§ Estimated based on discussions with local mine operators and the United Mine Workers of America (UMWA).
‖ Rate used here is that for persons employed in educational services, colleges, and universities.
¶ The same values used in source† were used here.
# Estimated from university personnel reports to the Bureau of the Census, available for 1985 and 1986.
** FTE = full time equivalents.
‡‡ 1985 and 1986 are averaged here as the 2 y with presumably most complete data.

ment visit, a lost-work-time claim, or both is about 25% more than the number expected based on applying BLS injury rates (for medically treated injuries) to the work force of Athens County. This difference could result from (1) less safe working conditions in Athens County workplaces than in the US workplaces in the industries or (2) underreporting of injuries in the BLS system. Because industry and occupation coding are not available in the NEISS data set, these variables could not be examined in this study.

Based on the examination of the NEISS and BWC data sets, we conclude that neither data set alone gives a complete or accurate picture of occupational injuries in Athens County. The two may provide a more complete representation of occupational injuries when examined together. Using the NEISS and BWC data sets in combination results in a total number

of injuries higher than that predicted by national norms.

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Several Freedoms

There are three types of freedom: sovereignal, civic, and personal. Throughout the Middle Ages, the notion of sovereignal freedom was dominant, which meant that the powerful—both in the church and in secular life—were free to act as they pleased, regardless of the wishes of the less powerful. In America, the Founding Fathers outwardly celebrated the civic form of freedom, which was democracy, but they were really very suspicious of it. They felt that it was potentially dangerous. During the Jacksonian era, there was concern on the part of the emerging capitalist elites that the mob would use civic freedom to take over. So they emphasized sovereignal freedom, using power to create a harmonious society that kept in check the potential restiveness of the masses. Over time, sovereignal freedom has become bound up with the notion of property rights, which is simply another form of the idea of freedom as power over others.

Throughout American history, the notion of personal freedom—the freedom not to be controlled by anyone, including the state—has been highly developed. In its extreme, that concept can mean that the community in which you live has no sense of compassion for the individual, who is free to be left alone to starve.

When the New Deal came along, it tempered the extremes of both personal and sovereignal freedom and put more emphasis on a caring democracy. Today, different sections of the population emphasize one or another of the concepts. In the struggle over affirmative action, for example, blacks are committed to civic freedom, while opponents emphasize personal freedom, arguing that the less the state has to do, the better for everyone. The three concepts are intimately linked. They complement even as they oppose one another.—Orlando Patterson

—From "Varieties of Human Freedom" by A. P. Sanoff in *U.S. News and World Report,* December 16, 1991