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List of Terms and Abbreviations

ABLES	Adult Blood Lead Epidemiology and Surveillance
ACBS	Asthma Call-Back Survey
ATV	all-terrain vehicle
BLS	Bureau of Labor and Statistics
BRFSS	Behavioral Risk Factor Surveillance System
CFOI	Census of Fatal Occupational Injuries
CSTE	Council of State and Territorial Epidemiologists
CTR	Central Tumor Registry
DEQ	Department of Environmental Quality
DLI	Department of Labor & Industry
DPHHS	Department of Public Health and Human Services
I/O	industry and occupation
MDT	Montana Department of Transportation
MHDDS	Montana Hospital Discharge Data System
MIDIS	Montana Infectious Disease Information System
MOHSS	Montana Occupational Health and Safety Surveillance Program
MT	Montana
NAICS	North American Industry Classification System
NIOSH	National Institute for Occupational Safety and Health
OHI	Occupational Health Indicators
OSHS	Montana Occupational Safety and Health Statistics Program
SHB	Safety and Health Bureau
SOII	Survey of Occupational Injuries and Illnesses
UTV	utility terrain vehicle
VR	Vital Records
WC	workers' compensation

Abstract

Correspondence can be addressed to the PI, Emily Healy, at 406-444-1722 or emily.healy@mt.gov. The Montana Occupational Health and Safety Surveillance (MOHSS) Program accomplished three main goals in order bridge the gap between occupational health surveillance and prevention and safety activities and provide valuable information to lead to occupational health improvement across the state. MOHSS collected, reported, and analyzed the NIOSH Occupational Health Indicators as a baseline for occupational health surveillance. Collection of the indicators allowed for analysis of state trends in occupational health, monitoring of Montana's occupational safety and health landscape, revealed areas in need of more in-depth surveillance, and guided prevention efforts. MOHSS also used interagency collaborations to improve the quantity and quality of occupational health data collected and used for occupational health surveillance. MOHSS worked to improve access to and quality of existing systems as well as explored new data sources. In order to accomplish this, MOHSS collaborated with other agencies and bureaus within Montana to take advantage of the large variety of surveillance systems already in place. These included the Montana Department of Public Health and Human Services (DPHHS), Montana Department of Transportation (MDT), and the Montana Occupational Safety and Health Statistics (OSHS) Program. Finally, MOHSS created and maintained active communication with stakeholders in occupational safety and health to provide avenues through which information from MOHSS can reach agencies able to act on the findings. Findings from MOHSS guided interventions and preventive policy targeting occupational health and safety hazards. These relationships also provided external guidance to MOHSS and provided council on aspects of occupational health of particular importance or concern.

Section 1

Significant or Key Findings

The key findings of the MOHSS program include the following:

A translational key finding of the MOHSS program was the development of an occupational safety and health program within the state. The MOHSS program was established in 2015 and in addition a program steering committee and a program website were created as well. In the following years, MOHSS developed relationships with other state departments, educational institutions, and private organizations. Program staff frequently attended and participated in state and national meetings to build knowledge of occupational health surveillance, share experience with other researchers, and spread research, results, and findings with other agencies outside of Montana.

The second key applied finding of the program was the collection of the occupational health indicators. The indicators were collected annually and analyzed to identify trends in Montana. Findings showed that while some indicators were not relevant to the working population of Montana, others, such as blood lead surveillance and fatalities, were significant. Reports on the indicators were shared with stakeholders and published online in an interactive dashboard.

Finally, the MOHSS program completed translational research by collecting and assessing the quality of data sets for occupational safety and health research. To augment for gaps in data, additional data sources were created. Collection of the data allowed for occupational safety and health research, the results of which were disseminated throughout the state in reports, presentations, and publications.

Translation of Findings

The findings of the MOHSS program can be used to prevent workplace diseases and injuries by increasing the knowledge of the occupational safety and health community and increasing the capacity for research. While the program does not currently have the capacity to generate interventions to reduce the risk for injury and illness, the data and research from the program can be used for such purposes. The value of the MOHSS program was its ability to collaborate with many agencies to increase the data available for use. MOHSS has successfully proven the benefits of using a variety of data sets to identify priority areas and highlight industries and occupations with specific needs. These findings were shared throughout the greater community by publishing papers, attending meetings with other agencies, presenting at conferences, and leveraging members of the MOHSS steering committee.

Research Outcomes/Impact

Potential Outcome: The identification of new data sources for occupational safety and health research has the potential to influence worker health and safety. Initial findings show that other researchers are also interested in the value of the additional data. The full potential of using these data sets is not yet known, but the MOHSS program plans to further study the impact of using new data sources for research.

Intermediate Outcome: Collection and dissemination of the data increased the awareness and knowledge of occupational safety and health. The identification of issues and trends highlighted possible issues for further research and analysis, which may lead to strategies for improving worker health. Data was shared on the MOHSS website, during meetings, through presentations, and in peer-reviewed journals.

Intermediate Outcome: Research from the MOHSS program was used to help inform decisions statewide. The MOHSS program provided informational testimony on legislative bills including firefighter safety and health and assaults on healthcare workers. While not all the bills passed, they did create media coverage that increased awareness of worker health concerns. Support was also provided to update administrative rules mandating heavy metal reporting. Other state and federal agencies used MOHSS findings state health improvement plans and priority areas.

Section 2

Scientific Report

Background

Montana has a poor history of workplace safety and health. Not only has Montana experienced occupational health disasters, such as those resulting in the superfund sites of Libby and the Silver Bow Creek/Butte Area, but Montana has consistently had one of the highest rates of fatal and non-fatal injuries and illnesses in the United States for many years. In the ten year period between 2003 and 2012, Montana had the highest incidence rate for non-fatal injuries five times. The most recent data from the Bureau of Labor Statistics (BLS) shows Montana has the third highest rate of injuries and illnesses, at 3.7 per 100 full-time workers. One may attribute this to Montana's relatively large mining and agricultural industries, but this is not necessarily the case. Montana's incidence rates are above the national average for nearly all major North American Industry Classification System (NAICS) industry sectors.

Montana's above average rates of injury and illness are a subject of concern and their improvement can lead to a multitude of benefits. In addition to the avoidance of injury to workers, there are also very large economic impacts beyond the costs associated with medical care. The index premium rate for workers' compensation insurance in Montana is the 12th highest in the nation as of 2020 (Dotter and Manley, 2021). This is in part due to the observed high rates of injury and illness. Reductions in incidence rates can reduce the premiums paid by Montana businesses, saving additional money that can be used to pay higher wages or hire more employees both of which further improve worker wellbeing. Montana now has a labor force of over 500,000 (BLS, 2021) workers and it continues to grow. With more workers entering the workplace, the potential for gains using a thorough occupational health surveillance program with connections to parties in public health, policymaking, and employer-employee relations continues to grow.

To address the occupational health issue in Montana, and the problem of these high incidence rates, public health professionals, policymakers, and employers must have better knowledge of the injuries and illnesses that occur in Montana. Previously, statistics, reporting, and data did little to illuminate the causes and reasons for Montana's poor performance and the most effective means to effect positive change. Improved occupational health surveillance in the form of enhanced datasets and more active monitoring, coupled with in-depth analyses, provides a greater understanding of the underlying sources. Sharing this information with stakeholders in employment, public health, and occupational safety and health allows these professionals to make more informed decisions.

Specific Aims

The aims of MOHSS were as follows:

Aim 1: Report at least 20 of the 21 occupational health indicators to NIOSH annually, one of the 20 indicators being indicator 13, elevated blood lead levels among adults. Use the collected indicators to perform in-depth analyses on occupational injury and disease trends in Montana.

Aim 2: Assess the quality of data available for occupational health surveillance, with priority on data sources used in calculating the indicators, through meaningful discussions of reporting standards with agencies in charge of these systems and comparative analyses between sources. Use these assessments to formulate data improvement goals that will guide program activities.

Aim 3: Augment occupational surveillance by creating new data sources either by adding occupation data collection to other surveillance systems, linking existing sources, or by creating new data through surveys or special projects.

Aim 4: Create a specific program steering committee to review and discuss issues arising from various advisory groups in order to determine the focus and priority of program activities. Members of this committee will meet with advisory groups to gather information from stakeholders and update advisory groups on program activities.

Aim 5: Identify needs for intervention and participate in prevention and intervention activities by providing information and support. Follow up on results in order to report impacts of interventions.

Aim 6: Establish MOHSS website in order to make program activities public and post publications from the program and other applicable sources. Increase visibility by providing information to other health programs' websites.

Aim 7: Use surveillance data to perform occupational health research. Publish findings and reports to website, NIOSH clearinghouse, or peer-reviewed journals when applicable. Disseminate research to stakeholders through advisory groups and other regular meetings.

Aim 8: Attend and participate in local, regional, and national meetings in order to build knowledge of occupational health surveillance, share experience with other researchers, and spread research, results, and findings with other agencies outside of Montana.

Methodology

A successful occupational health surveillance program must do more than simply collect occupational health data. Successful programs must gather data from a variety of sources, analyze and interpret the data, and disseminate findings to parties capable of utilizing the information for improved processes. To best achieve these goals, and to maximize coverage, insight, and results, a program must have a wide range of sources, perspectives, and audiences. The MOHSS program approached this issue through close collaborations with groups and agencies across the entire range of occupational health and safety agencies, organizations, and professionals. A unique setting for the program, within the Montana Department of Labor & Industry (DLI), with strong collaborative ties with the Montana Department of Public Health and Human Services (DPHHS), MOHSS had the ability to accomplish the interdisciplinary and interagency goals of the surveillance program.

The MOHSS program was developed within Montana DLI where staff had direct access to occupational health data from the workers' compensation industry. Often, workers' compensation data can be

difficult to use, either due to the regulatory boards and agencies not collecting data in a manner conducive to research or being separate from other health surveillance systems. MOHSS on the other hand, was not only able to utilize the data, but had access to staff with experience accessing the database, knowledge of its contents, and the ability to easily recommend improvements to the data. Access to workers' compensation data provided significant, otherwise unobservable, knowledge to MOHSS. For example, Montana's workers' compensation law covers small agricultural operations and many small businesses not included by the Bureau of Labor Statistics (BLS) in the Survey of Occupational Injuries and Illnesses (SOII) because of their size. This data therefore provides a valuable supplement to other data sources to allow for more complete surveillance coverage.

Another sector of workers that is mostly unobserved in occupational health surveillance is independent contractors. In Montana, independent contractors may apply with DLI in order to obtain approval and a certificate to be exempt from workers' compensation law. Because these independent contractors are not subject to workers' compensation law, it is unclear what regular safety practices are used by these workers and the rates of injury and illness that they experience. The independent contractor database of exempt workers provided valuable information which was useful for determining the number of workers operating outside of the sphere of surveillance by MOHSS. It also provided the opportunity to conduct a survey on independent contractors in order to learn more about occupational health in this sector.

Not only does being located in DLI provide advantages to data availability, but there was also a unique ability to make use of findings from surveillance. One objective of the Safety and Health Bureau (SHB) of DLI is to raise awareness of workplace safety and health in Montana. These goals are achieved by conducting inspections, offering consultations, and providing technical assistance and trainings. SHB has the authority to inspect public sector organizations, provide voluntary assistance to private businesses, and manage compliance and safety in coal mines and sand and gravel operations. Additionally, SHB hosts SafetyFest events across Montana in which free safety trainings, led by certified safety professionals and industrial hygienists, are provided to people and businesses who attend. The relationship that MOHSS has with SHB allows information discovered in the process of surveillance to be immediately used to influence the trainings, enforcement activities, and consultations performed by the SHB. This allows SHB to use its resources more effectively and allows MOHSS have a direct avenue through which to improve occupational health.

DLI also employs the Medical Director for Workers' Compensation, who is a valuable resource to the MOHSS program. The medical director is charged with researching and reviewing the emerging medical treatments that address the many conditions resulting from occupational injuries and illnesses. MOHSS relied on the medical director's professional perspective on occupational health and vast knowledge of emerging trends in health conditions.

A significant amount of knowledge on occupational health issues also exists in other agencies within Montana. Epidemiologists and health educators in the Montana Department of Public Health and Human Services (DPHHS) actively monitor and address health conditions such as asthma, hospitalizations, cancer, and lead poisonings. While the focus of many of these activities are not directly occupational health related, there exists a wealth of knowledge and resources on how to monitor many

conditions and program for prevention. MOHSS worked with DPHHS to obtain hospital discharge, cancer, lead and other heavy metals, Behavioral Risk Factor Surveillance System (BRFSS), syndromic surveillance, and vital records data. MOHSS worked closely with epidemiologists and medical professionals within DPHHS to evaluate datasets and improve data collection. MOHSS staff attended DPHHS surveillance meetings, as well as met individually with epidemiologists and other staff within DPHHS staff in order to take advantage of their knowledge and resources.

Utilizing the knowledge already accrued within DPHHS helped MOHSS accelerate its activities and use time and resources more effectively. Not only did epidemiologists from DPHHS help MOHSS researchers identify evaluations to perform on datasets being used, but MOHSS had the support of the senior public health epidemiologist and the state medical officer. These two personnel provided significant knowledge on occupational concerns, data available within DPHHS, and experience in research techniques and practices.

Public health employees within DPHHS also have significant experience creating campaigns and programs that address health concerns within Montana. When MOHSS identified occupational health concerns, MOHSS passed this information along to DPHHS so that the information could be incorporated into preexisting programs and to request aid in creating fact sheets and other materials for public consumption. Collaboration with DPHHS not only improved the surveillance capabilities of MOHSS, but provided another sector for dissemination of information.

Guidance of the MOHSS program relied on a steering committee, consisting of members from different agencies and bureaus that MOHSS collaborates with. The steering committee organized program activities and goals into a work-plan that prioritized program activities based on necessity and impact. The steering committee consisted of the MOHSS PI, medical officer and research analyst from DLI, senior personnel from SHB, the state public health epidemiologist, state toxicologist, and hospital data discharge epidemiologist from DPHHS, a representative from the Department of Environmental Quality, and the director of the School of Public and Community Health Sciences at the University of Montana. Members of the committee represented MOHSS in other meetings and work groups in order to report MOHSS activities and findings across a variety of areas. This process assisted in dissemination of MOHSS surveillance across many other agencies and stakeholders. It also provided an avenue through which steering committee members could observe trends and activities that may influence MOHSS decision making.

MOHSS also worked extensively on building relationships with the academic community throughout Montana. Staff worked with both faculty and students at Montana State University, University of Montana, and Montana Technological University. Collaborative work resulted in numerous published papers, presentations, and posters. The combined efforts furthered the aims of the MOHSS program by performing new research and disseminating the results to a wider group.

Three main facets of the MOHSS program worked together to result in improvements in occupational safety and health in Montana. The program relied on thorough data collection, analyses of the datasets, and communication of the findings to entities that make use of them. Using the innovative environment

outlined earlier, these three goals were accomplished using the collaboration between several parties and comprehensive planning incorporating interdisciplinary knowledge to organize and prioritize program activities. Analyses performed in the first year provided a baseline assessment on the state of occupational health in Montana and the quality of the datasets being used. These findings helped the steering committee determine program activities and the progression that would follow.

DLI has regularly compiled all of the OHIs identified by NIOSH since 2009 and sent them to CSTE and NIOSH to be included in the national dataset. Additionally, DLI completed and published an online interactive dashboard for stakeholders to view the indicators. This was possible in major part due to the relationships DLI has established with DPHHS and other groups in order to obtain the necessary data. In the process of compiling the OHIs, DLI makes use of the workers' compensation database and is provided with data from the Montana Hospital Discharge Data System (MHDDS), Vital Records (VR), Central Tumor Registry (CTR), Asthma Call-Back Survey (ACBS), Survey of Occupational Injuries and Illnesses (SOII), and the Census of Fatal Occupation Injuries (CFOI), among other data sources. The use of this wide variety of data sources allows DLI to provide information on indicators across a wide range of occupational health and safety areas. In order to continue reporting the OHIs, MOHSS continues to utilize the relationships previously formed that allows access to this wide range of information.

While DLI has been able to report all of the OHIs, there are many ways that the data and its delivery, were improved in order to benefit MOHSS activities. This was a major component of the program. While DLI has collected and compiled the OHIs and has the capability of examining their trends, improvements in the data collection allowed for more in-depth analysis of specific health trends and concerns observed in the analysis of the OHIs. MOHSS funded the addition of the industry and occupation (I/O) module to the Behavioral Risk Factor Surveillance System (BRFSS), providing additional information on contrasts between general health and health behaviors for Montanans in different industries, occupations, and employment status. MOHSS funded two additional questions to BRFSS asking whether or not workers have been injured at work in the past year and who paid for the treatment of that injury.

The hope was to use the additional BRFSS questions on work-related injuries to identify industries and occupations in which workers were not utilizing workers' compensation, industries where worker and employer awareness and/or compliance needs to be improved, and shortcomings that existed in the workers' compensation database. Unfortunately the sample size of the survey provided a limited number of responses and the sample was not large enough to perform analyses by industry and occupation. However, MOHSS did use the opportunity to join a national workgroup of other states who added similar questions to perform a group analysis. The proceedings of the group have been put on hold while members are responding to the COVID-19 pandemic. The group hopes to continue its work and publish the results in the future.

Other work by MOHSS focused on improving the data already being delivered to DLI. Improved data allowed for further understanding of the indicators and the information they contain. MOHSS entered into a data sharing agreement with DPHHS so that MOHSS could have direct access to the MHDDS data. Previously MOHSS would request that the OHIs using hospital discharge data be performed by DPHHS,

but the data sharing agreement has allowed MOHSS to have more active surveillance of particular conditions that arise from workplace injuries.

Lead surveillance required improvements in the data. Montana DPHHS received Adult Blood Lead Epidemiology and Surveillance (ABLES) funding from 2008 until funding was lost in 2013. Fortunately, reporting of blood lead level testing was required by the administrative rules of the state of Montana, but the data were not being analyzed and reported to NIOSH. With the establishment of MOHSS, program staff were able to analyze the collected lead data and report the results to NIOSH once again. Funding was used to support the surveillance efforts by providing funds to county health departments to pay for the blood lead testing of residents.

With the beginning of COVID-19 and the fast spread of the pandemic, MOHSS staff had to quickly adapt to meet the needs of the safety of workers. Staff participated in weekly and monthly meetings with DPHHS, CSTE, and the NIOSH Center for Workers' Compensation Studies. MOHSS identified data sources for research, including workers' compensation and communicable disease data. Staff discussed adding questions to the BRFSS survey but it was determined the sample size was not large enough to yield enough data for analysis. Whenever possible, MOHSS assisted with implementing best practices to keep workers safe, from both mental stress and COVID-19 itself, throughout the pandemic.

The final process in the program was to disseminate the information gathered from surveillance and analysis to parties who could make use of the information. The multiple collaborations established in the process of creating a steering committee and collecting the indicators, participation in regional and national meetings and conferences, and publication of reports and research allowed for the major findings from MOHSS to be distributed across a wide range of audiences. Some of the meetings attended by MOHSS staff include:

- DPHHS/DEQ Quarterly Surveillance meetings
- BRFSS planning and I/O workgroup meetings
- DPHHS monthly epidemiologist meetings
- Montana State Health Improvement Plan meetings
- MDT Unrestrained Vehicle Occupant Emphasis Area meetings
- MDT Emergency Response After-Crash Care Emphasis Area meetings
- DLI Labor-Management Advisory Council meetings
- DLI Governor's Conference on Workers' Compensation
- Workers' Compensation Research Institute conferences

MOHSS not only benefited from sharing information within Montana, but also across states. Sharing the experiences and successes between state fundamental, fundamental plus, and expanded programs was valuable for developing the best possible surveillance program. These experiences have not only allowed the PI to gain experience in surveillance activities, but share Montana's experience with occupational health and surveillance. Meetings and conferences attended by the PI included:

- NIOSH WestON National meetings

- NIOSH Consortium of Occupational State-Based Surveillance and CSTE Occupational Health Subcommittee meetings
- CSTE Annual Conference

On top of disseminating information through the connections established by the steering committee, MOHSS also conducted research and created reports that were distributed to stakeholders and made available to the public. An in depth report on the condition of occupational health trends in Montana was written and distributed as well as creation of an online dashboard of the indicators. MOHSS also produced reports on:

- Firefighters in Montana: Health & Safety Issues
- Work-Related Fatalities in Montana
- Assaults on Healthcare Workers in Montana
- Opioids in the Workplace

MOHSS created website devoted to occupational health surveillance reports and research written by the program as well as links to other state agencies and programs that have information on occupational health. The MOHSS website is easy to access and has copies of all work made available. In addition to publishing reports, the MOHSS website also hosts data dashboards, an interactive tool for users to explore MOHSS data. Currently the site hosts dashboards on the occupational health indicators and BRFSS data showing the relationship between mental health, behavioral health, and chronic and communicable diseases and employment and the different industries and occupations.

Results and Discussion

Aim 1: MOHSS collected all of the OHIs each year and reported them to NIOSH and CSTE. A detailed OHI trend report was published and an interactive dashboard was published online. Unfortunately, due to the small population size of Montana, many of the indicators have small numbers and rates that cannot be calculated. It is difficult to view trends over time when the overall numbers are so small. The indicators did provide valuable information in that they required collaboration across agencies and helped create a dialogue about occupational safety and health.

Aim 2: As discussed under Aim 1, it was determined that many of the occupational health indicators did not provide valuable data for Montana because of the state's small population size and therefore small number of injuries and illnesses for specific indicators. Fortunately this is a good problem to have because it means less workers are being injured and does not require any improvements to our data collection or data systems. However, this did lead to discussions with other data specialists about improvement of the MOHSS surveillance system overall. For example, the PI was able to build a relationship with the hospital data discharge epidemiologist, which helped in the process of acquiring a data agreement for the hospital discharge data. In addition, when DPHHS established an Environmental Health Education and Assessment Program, the MOHSS program was able to use the lead indicator as evidence as to why it was important to continue collecting data for ABLES and why quality improvement measures should be put into place to provide better data.

Aim 3: New data was created through the formation of the independent contractor survey, adding valuable information about an otherwise unknown population. MOHSS intended to link workers' compensation data to unemployment data to calculate rates of injury and illness, but unfortunately a data use agreement was not able to be met between divisions of DLI. This project is still valuable to the work of the program and staff plan to continue to pursue linking the data sets. Employment and industry and occupation questions were added to valuable data sets, including the BRFSS. Work is still in progress to add these variables to the Montana Infectious Disease Information System to collect occupational health data for COVID-19.

Aim 4: A steering committee was formed during the first year and membership grew to include a diverse group of individuals. The committee was instrumental to guiding the program during its inception. Members advised on research topics and methodology and communicated research findings back to their respective areas of expertise. In addition, the committee assisted with future planning of the MOHSS program and its activities.

Aim 5: Information and support was provided for research projects throughout the course of the grant. Most notably, MOHSS provided data and assistance for reports on ATV and UTV injuries among workers, heat-related illnesses, arthritis among agricultural workers, agricultural injuries overall, after-crash injuries of first responders, and oil and gas industry injuries. The provided data led to numerous publications, poster, presentations, and an awarded grant. Many of the projects are ongoing and will require continued support of the program.

Aim 6: A MOHSS specific website was created during the first year of the program and has been expanded ever since. Reports, resources, and links to other sites are added as they are published and when necessary. For example, with the COVID-19 pandemic, a section with resources for employers and employees was added. The biggest addition to the website was the creation of interactive dashboards. These dashboards provide an opportunity for data users to have direct access to the most up-to-date data available.

Aim 7: The use of numerous surveillance data systems led to significant occupational health research. Research projects included work-related fatalities, firefighter health and safety, assaults on healthcare workers, opioid use and overdose deaths, chronic disease and behavioral health, and industry specific profiles. These reports were published on the MOHSS website, presented at conferences, and published in journals. All research was guided by the MOHSS steering committee and members reported the results back to their respective organizations.

Aim 8: MOHSS staff participated in numerous meetings and conferences both locally, regionally, and nationally. Attendance was integral to the success of the MOHSS program as it allowed for education of current and emerging areas of research, sharing of areas of importance for Montana's working population, and development of a greater community for collaboration. Outreach builds appreciation for the work of the MOHSS program, including sharing practical information for policymaking and prevention activities. Collaboration and communication are key to making the most of our resources in

Montana. The increased outreach over the course of the grants helped build the program's capacity to continue to collaborate with old and new groups of stakeholders to address health and safety issues across the state

Conclusion

Having a dedicated occupational safety and health program is necessary to improve the health and wellbeing of workers. While many data sets collected employment data prior to the existence of the program, no one used the data in a meaningful way. Since the inception of the MOHSS program in 2015, a dedicated website was created, a steering committee was formed, numerous legislative bills have been passed, and there have been countless reports written, presentations given, and meetings attended to promote worker health and safety.

There is still more work to be done to improve worker health in Montana. The COVID-19 pandemic has highlighted the importance of including employment variables in all data sets. Prior to the onset of COVID-19, the only employment questions asked in terms of communicable diseases was relative to food-borne outbreaks. We now know how quickly a communicable disease can wipe out an industry and how the affects quickly spread forward. In addition, we have seen how the pandemic has impacted workers' mental health and the affects that has on their work. While there is still not a clear picture of the overall impact of COVID-19 in Montana, MOHSS plans to continue to research both the short-term and long-term outcomes.

MOHSS has worked with various other state and national agencies to increase the data available for researching occupational safety and health. Numerous professors and students in the academic community worked with MOHSS to access data for occupational safety and health research. By working with a broader community, it increases the capacity of the program without needing to increase the number of staff. In a state with a small population and limited resources, our best line of defense is to work together to increase the overall safety and health of our working population.

Publications

Marinovich A, Healy E, Birkenbuel L, Autenrieth D, Gilkey DP: [2021] ATV and UTV Injuries in Montana: Worker's Compensation Claims Analysis. *Acta Scientific Orthopaedics*, in press.

Webber EJ, Tran T, June R, Healy E, Andrews TM, Younkin R, MacDonald J, Adams ES: [2021] WOMAC Score and Arthritis Diagnosis Predict Decreased Agricultural Productivity. *BMC Musculoskeletal Disorders* 22:181-192.

Mutzenberger R, Brennan J, Healy E, Stack T, Kuenzi A, Autenrieth D, Gilkey DP: [2019] Firefighter's Workers' Compensation Claims in Montana, 2007-2017: A Cost Analysis. *Acta Scientific Medical Sciences* 3:159-165.

Cumulative Inclusion Enrollment Table

Not applicable as no human subject data were collected in this study. All data used in this study were collected from public health surveillance data systems.

Inclusion of Gender and Minority Study Subjects

Not applicable as no human subject data were collected in this study. All data used in this study were collected from public health surveillance data systems.

Inclusion of Children

Not applicable as no human subject data were collected in this study. All data used in this study were collected from public health surveillance data systems.

Materials Available for Other Investigators